BLM

United States Department of the Interior
Bureau of Land Management

SODA MOUNTAIN SOLAR PROJECT

PROPOSED PLAN AMENDMENT/ FINAL ENVIRONMENTAL IMPACT STATEMENT/ ENVIRONMENTAL IMPACT REPORT

Volume 2 of 2

June 2015

CACA #049584

Publication Index #: *BLM/CA/PL-2015/010+1793*

TABLE OF CONTENTS
Soda Mountain Solar Project
Proposed PA/FEIS/EIR

Volume 2 – Appendices

Page

Volume 2 – Appendices (continued)

Page

Volume 2 – Appendices (continued)

Page

Volume 2 – Appendices (continued)

J. Comment Letters Received (continued)

Page

Volume 2 – Appendices (continued)

Page

Volume 2 – Appendices (continued)

K. Individual Responses to Comments (continued)

Page

Volume 2 – Appendices (continued)

APPENDIX A
Figures

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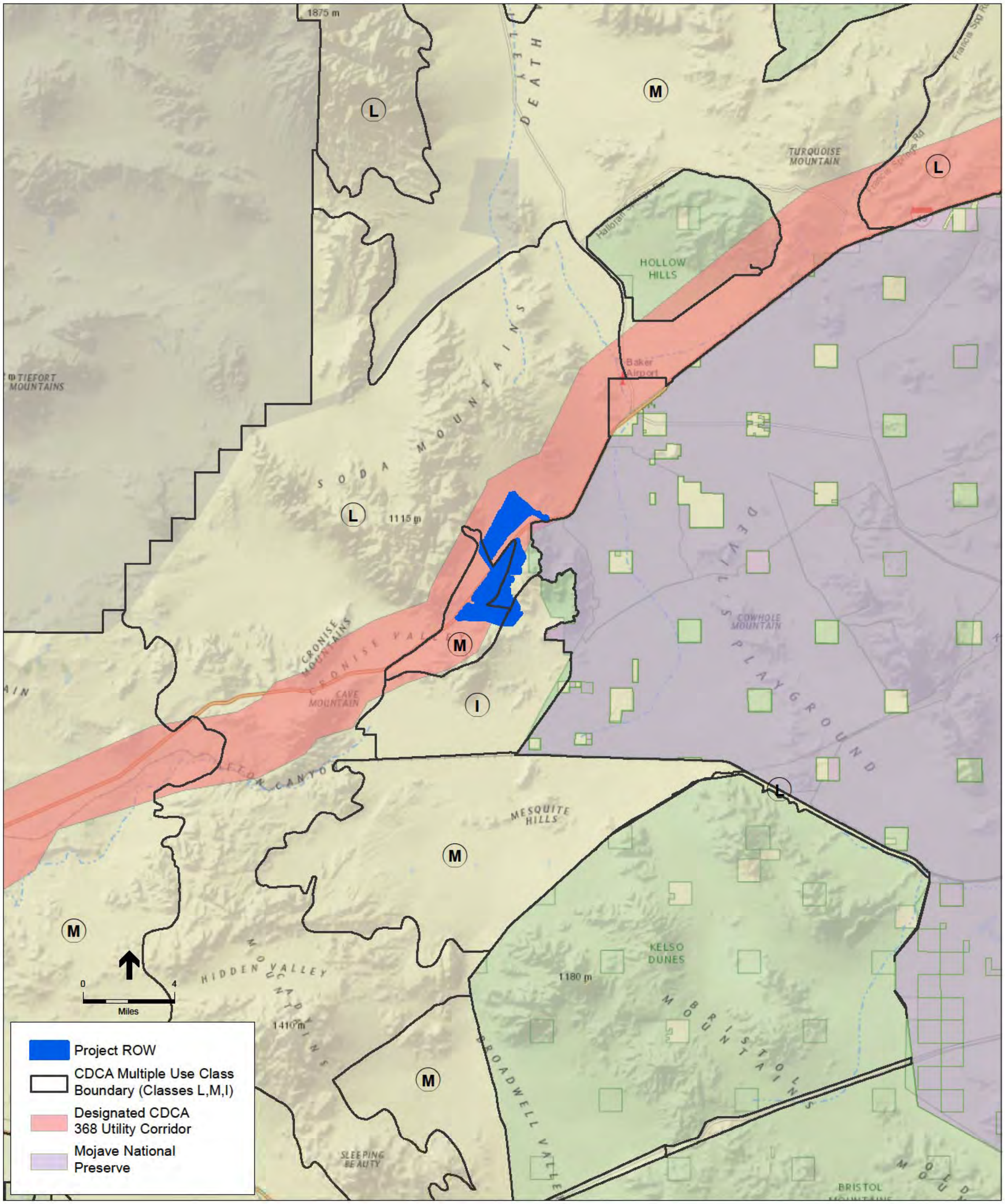
SOURCE: BLM, 2013

Soda Mountain Solar Project . 120592

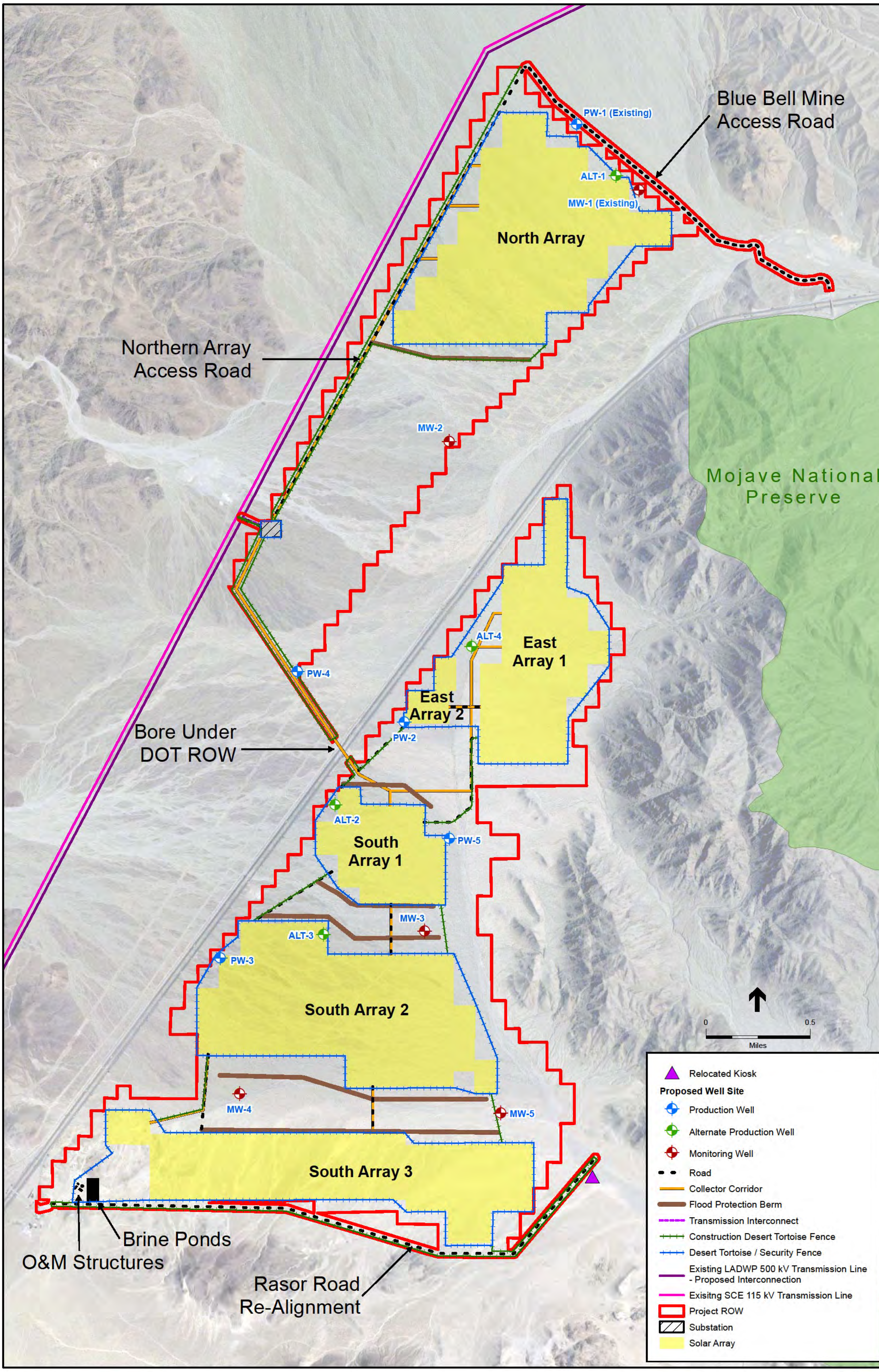
Figure 1-1
Regional Context



SOURCE: BLM, 2012; Panorama Environmental Inc., 2013

Soda Mountain Solar Project . 120592

Figure 1-2
Project Location



SOURCE: Panorama Environmental Inc., 2013

Soda Mountain Solar Project . 120592

Figure 2-1
Proposed Project

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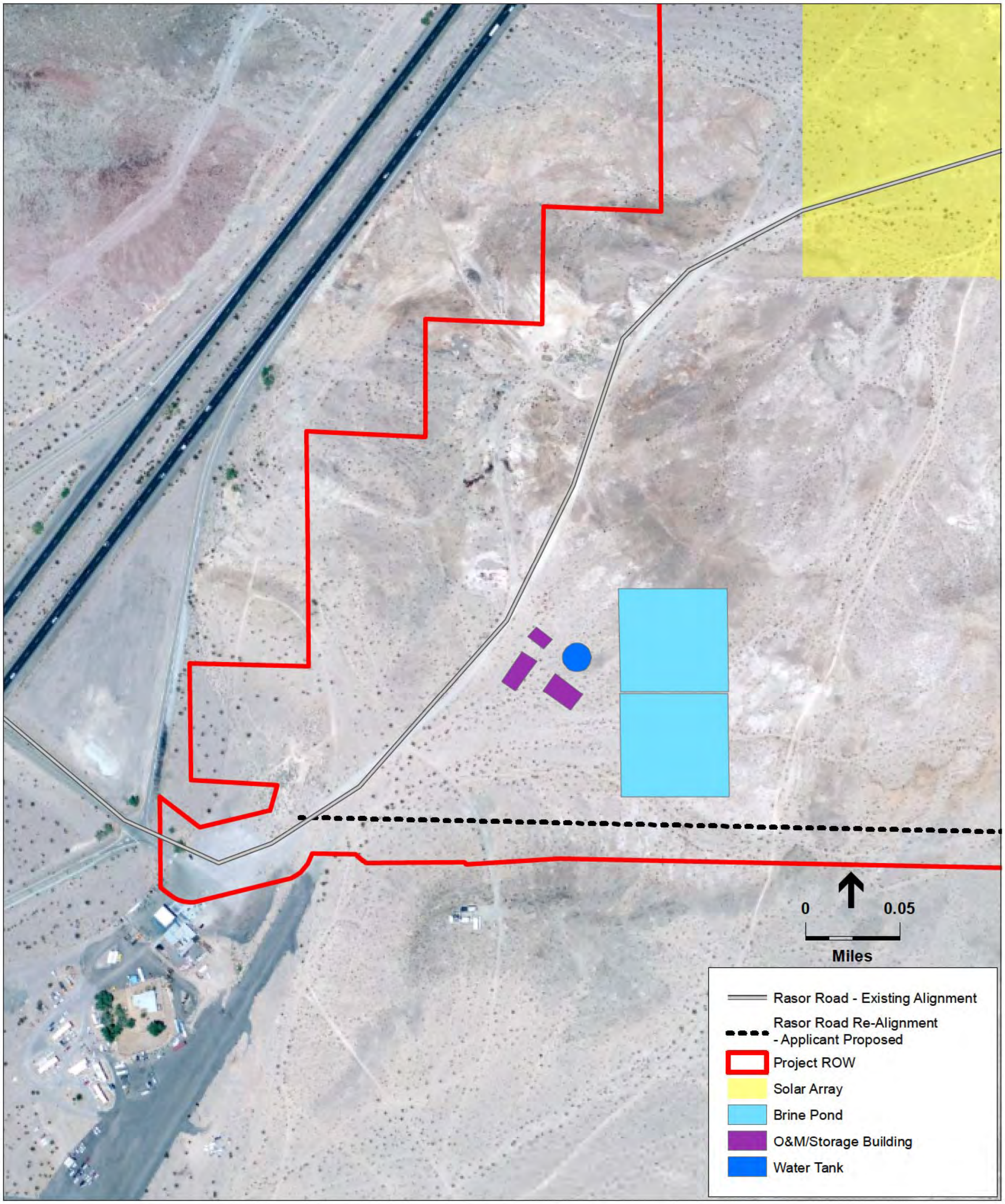
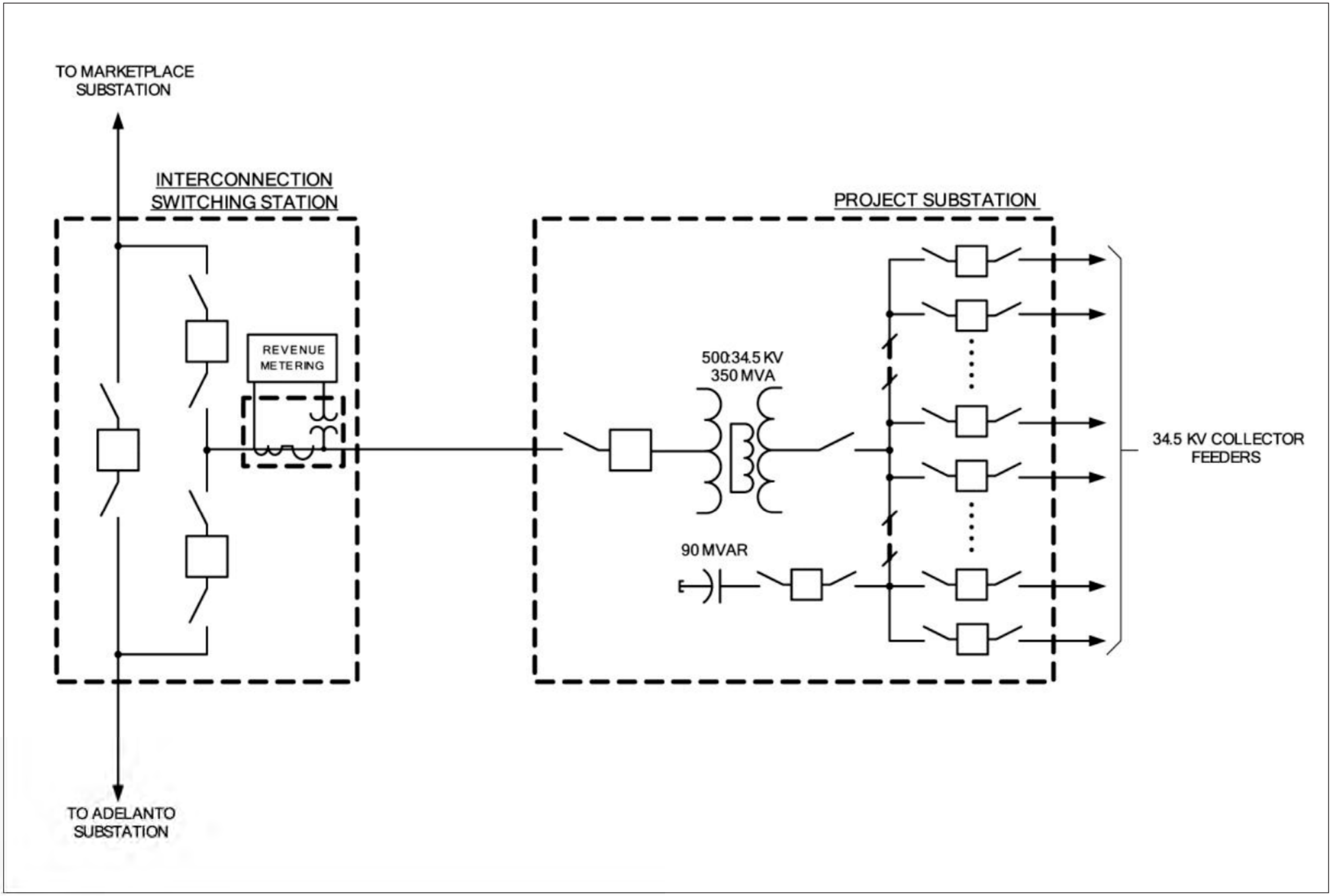


SOURCE: Panorama Environmental Inc., 2013

Soda Mountain Solar Project . 120592

Figure 2-2
Project Buildings

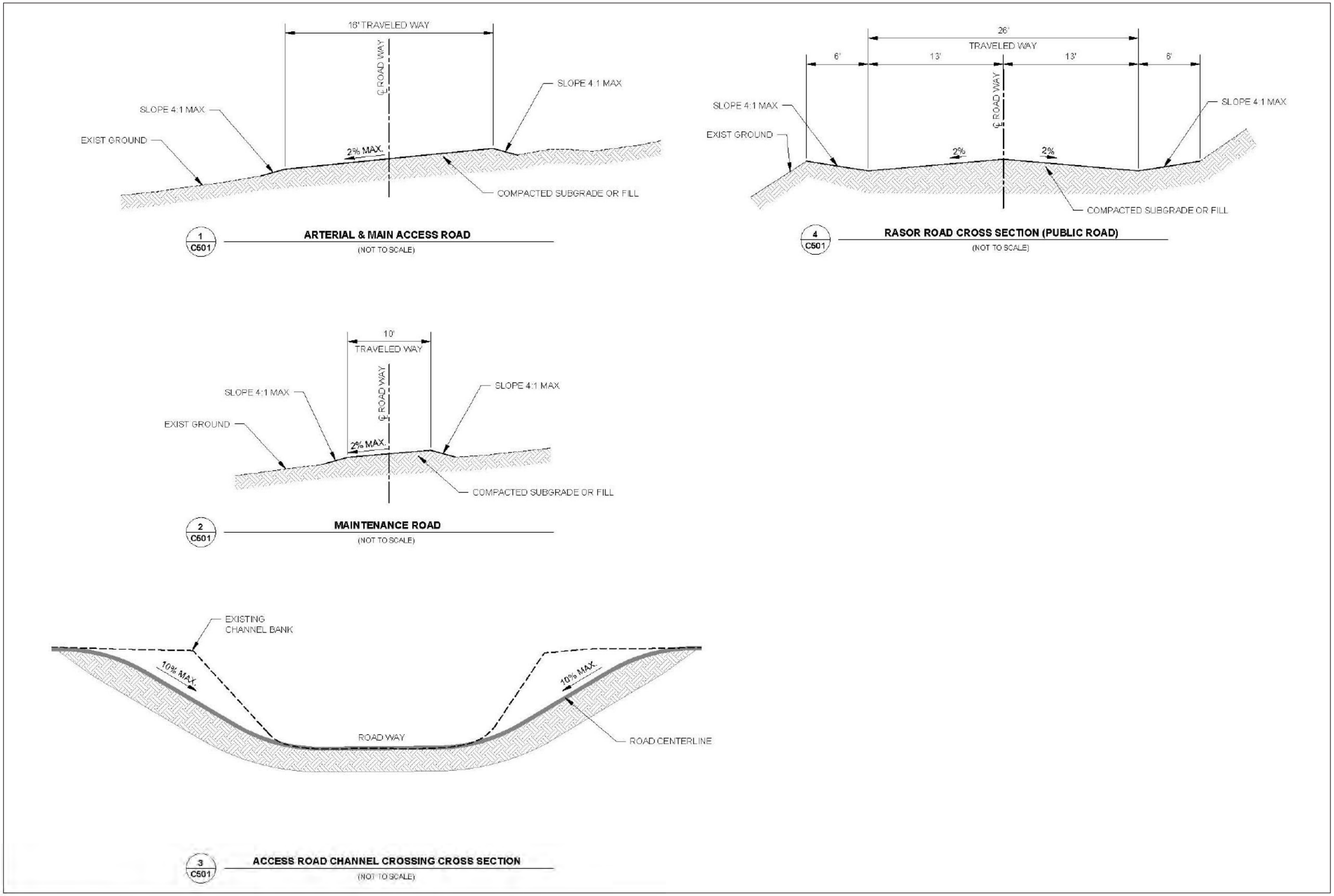


SOURCE: Caithness, 2009

Soda Mountain Solar Project . 120592

Figure 2-3

Substation Components



SOURCE: RMT

Soda Mountain Solar Project . 120592

Figure 2-4

Access Road Typical Details

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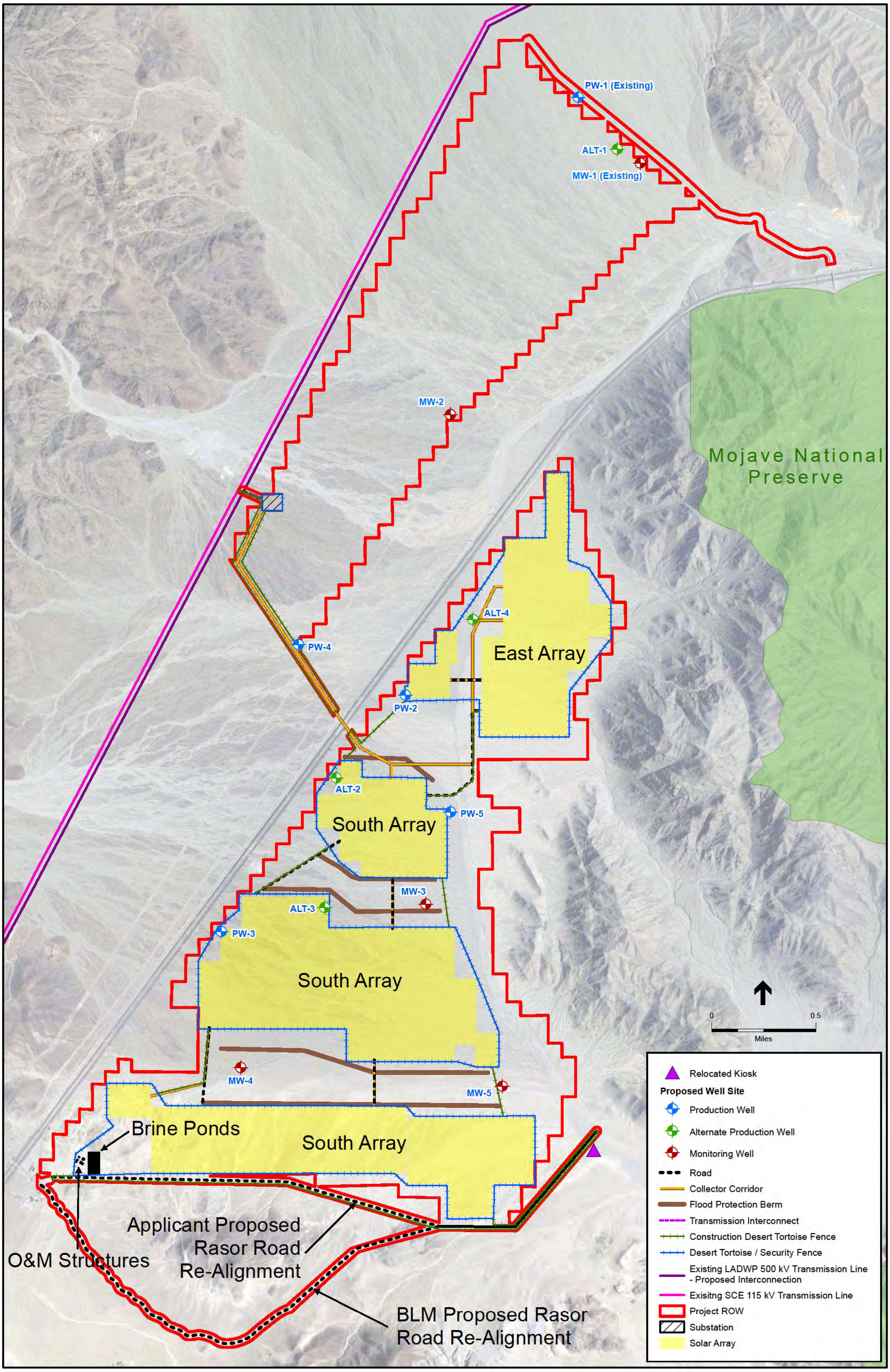
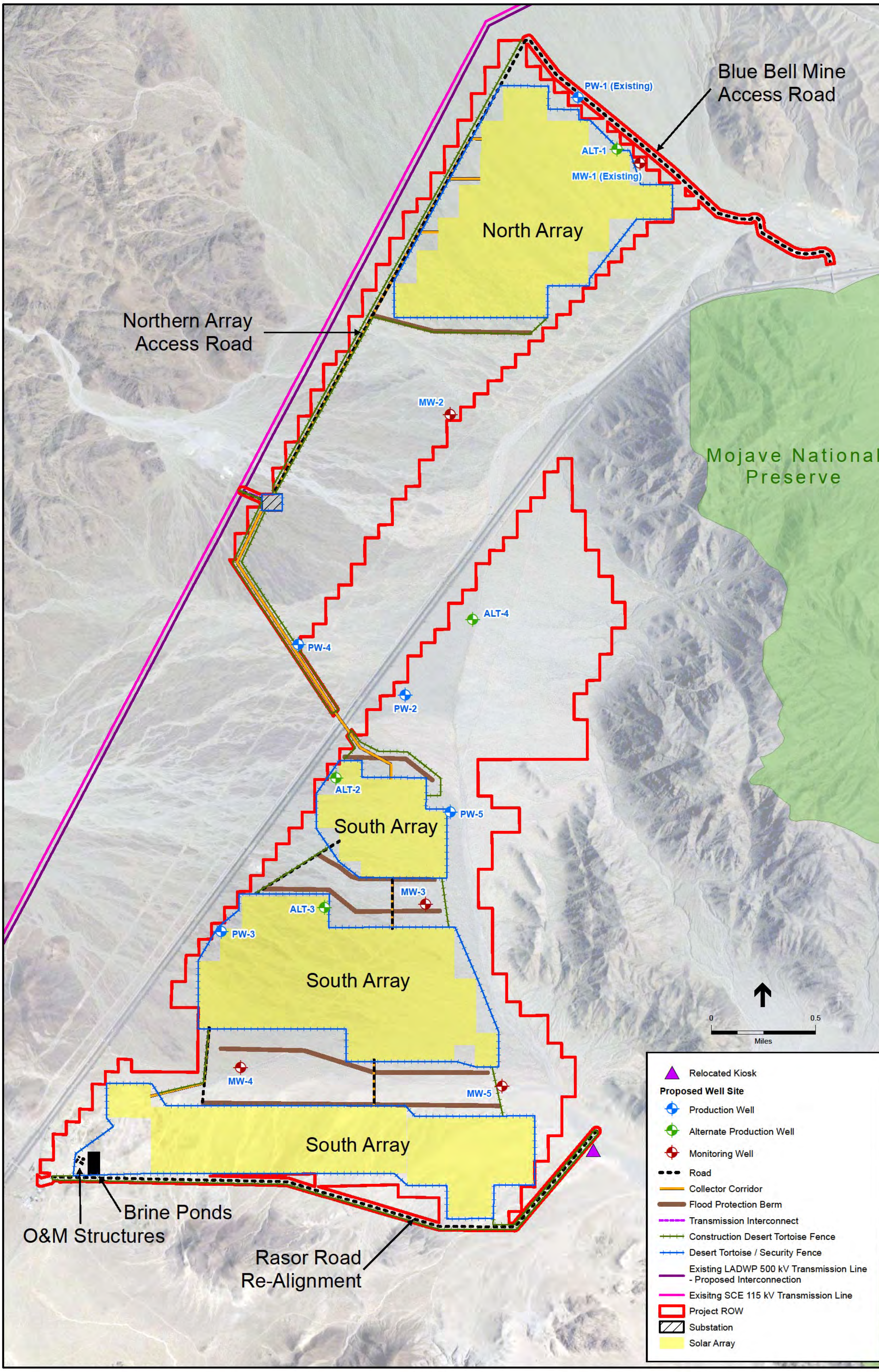


SOURCE: Panorama Environmental Inc., 2013

Soda Mountain Solar Project . 120592

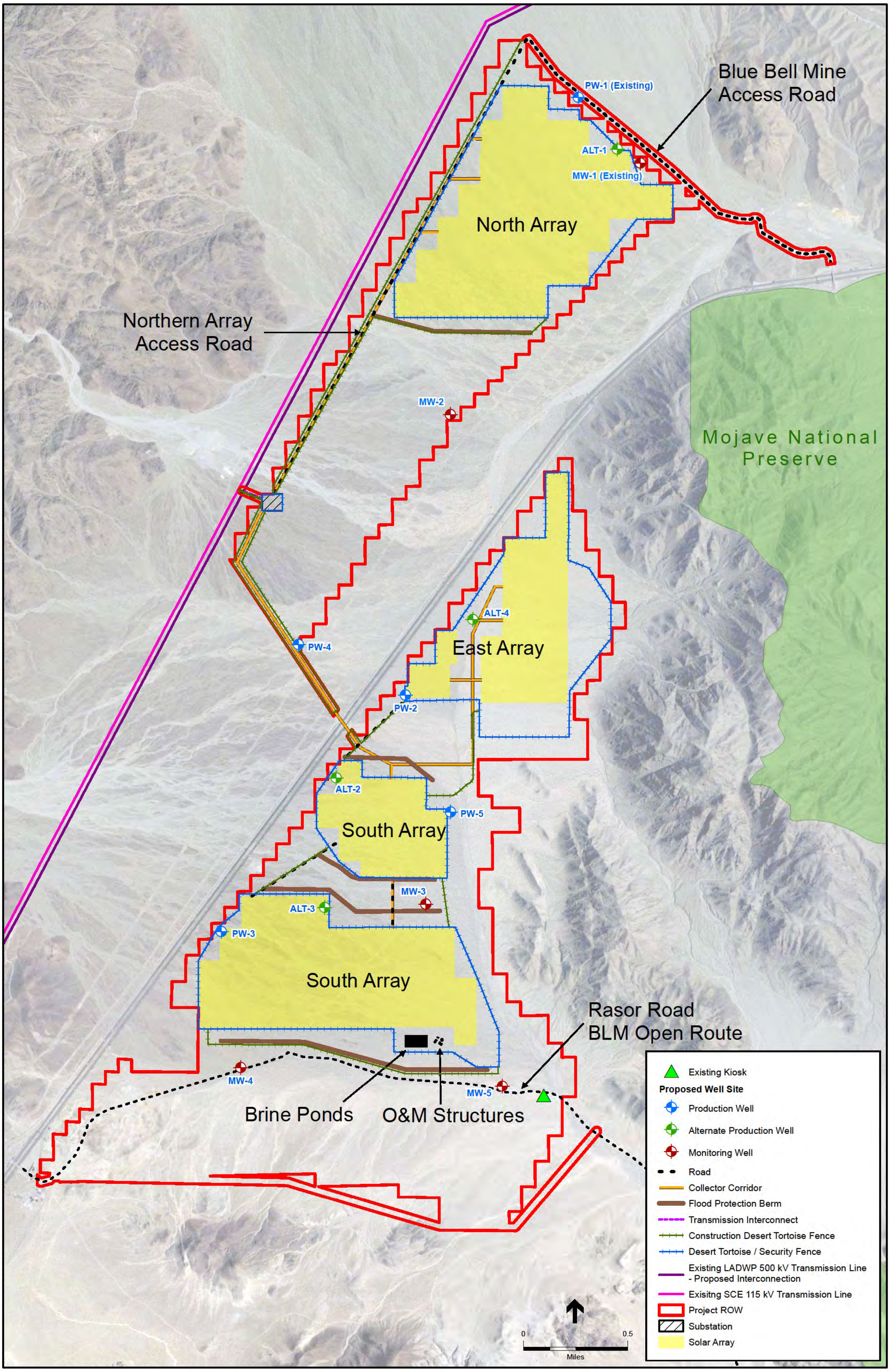
Figure 2-5
Alternative B



SOURCE: Panorama Environmental Inc., 2013

Soda Mountain Solar Project . 120592

Figure 2-6
Alternative C



SOURCE: Panorama Environmental Inc., 2013

Soda Mountain Solar Project . 120592

Figure 2-7
Alternative D

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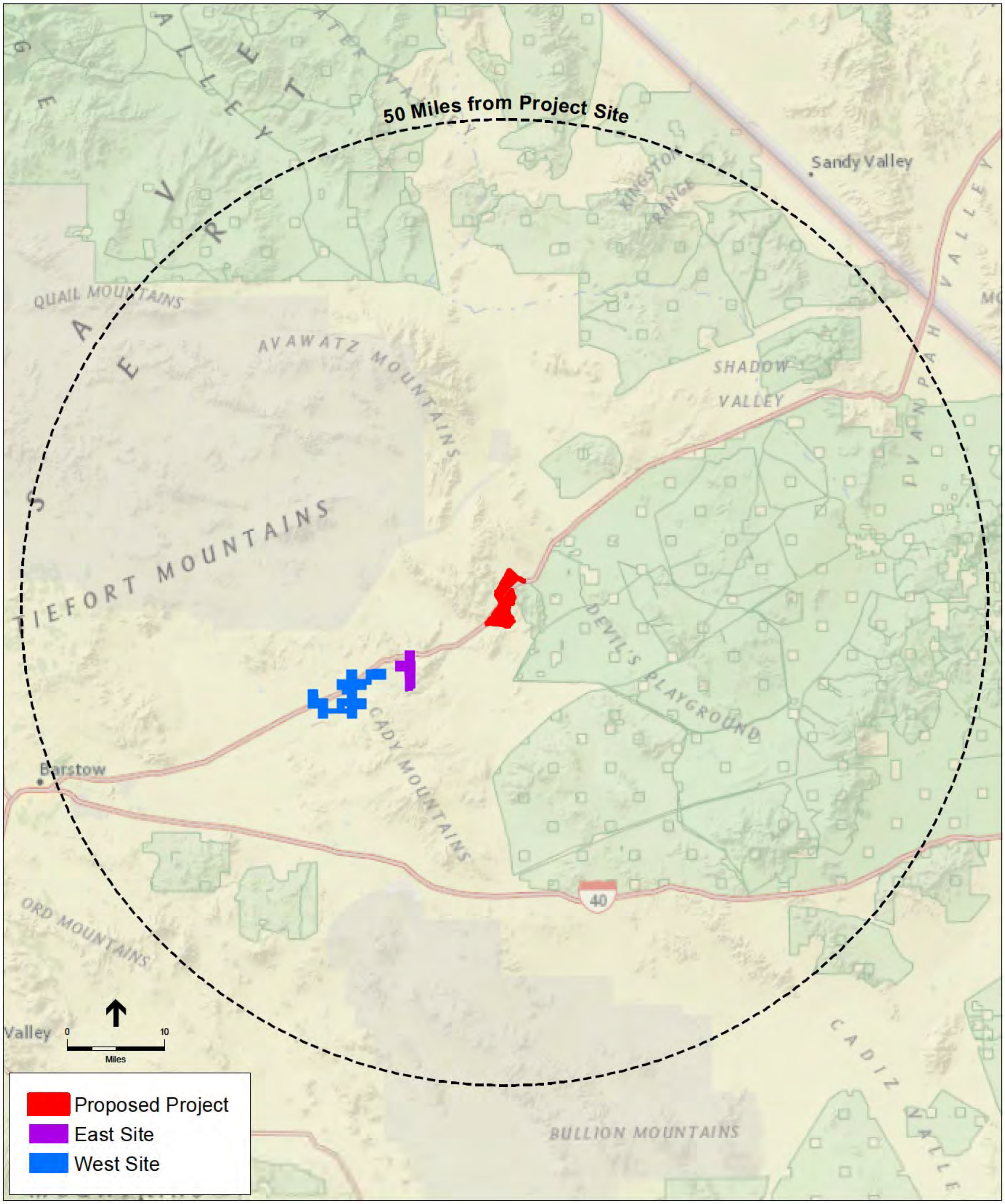
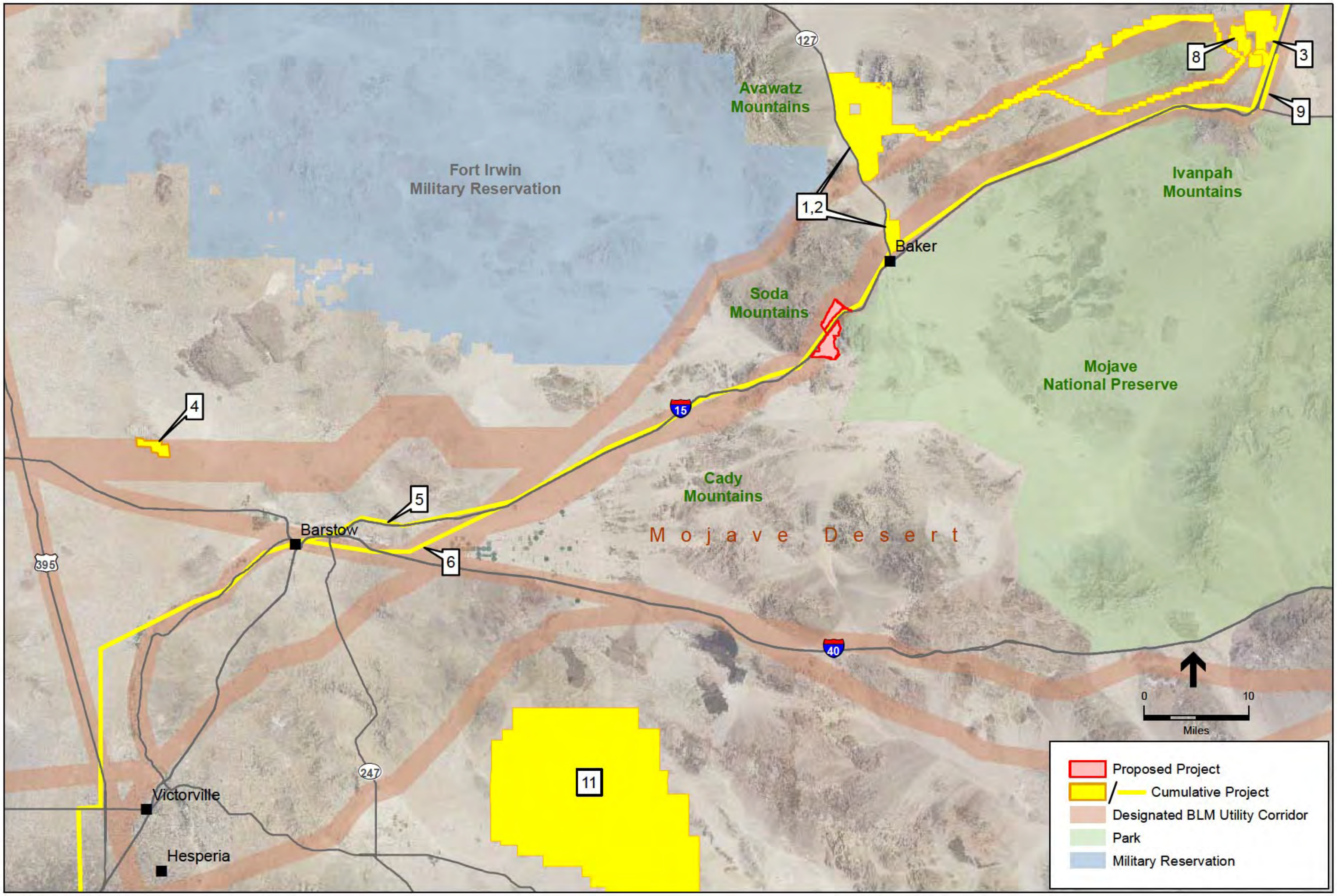


SOURCE: Panorama Environmental Inc., 2013; BLM, 2012

Soda Mountain Solar Project . 120592

Figure 2-8
Potential Private Land Alternative



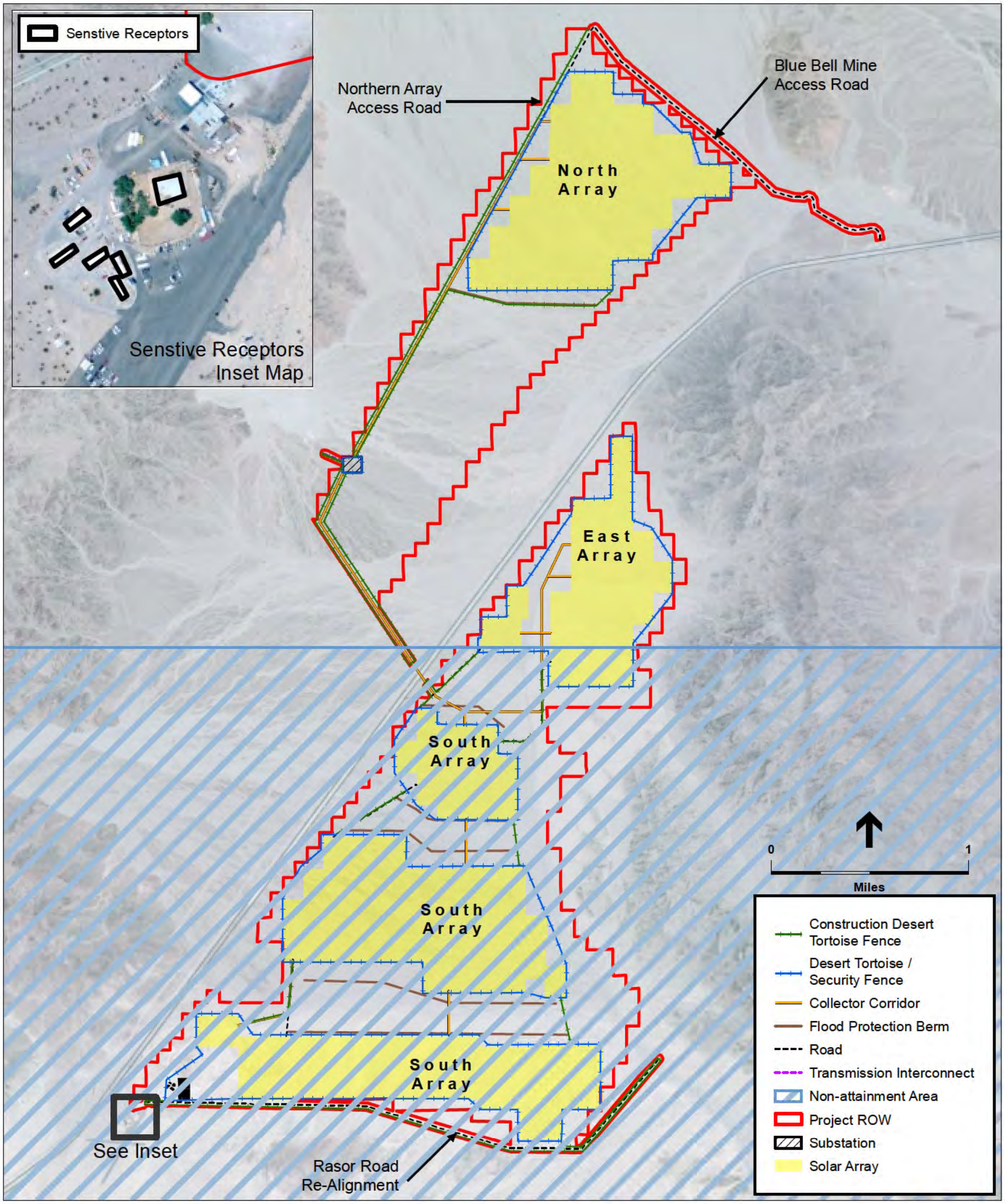
SOURCE: BLM, 2013

Note: Refer to Table 3.1-3 for the lists of projects in the cumulative scenario

Soda Mountain Solar Project . 120592

Figure 3.1-1

Cumulative Projects



SOURCE: Panorama Environmental Inc., 2013

Soda Mountain Solar Project . 120592

Figure 3.2-1
Federal Ozone Non-attainment Area

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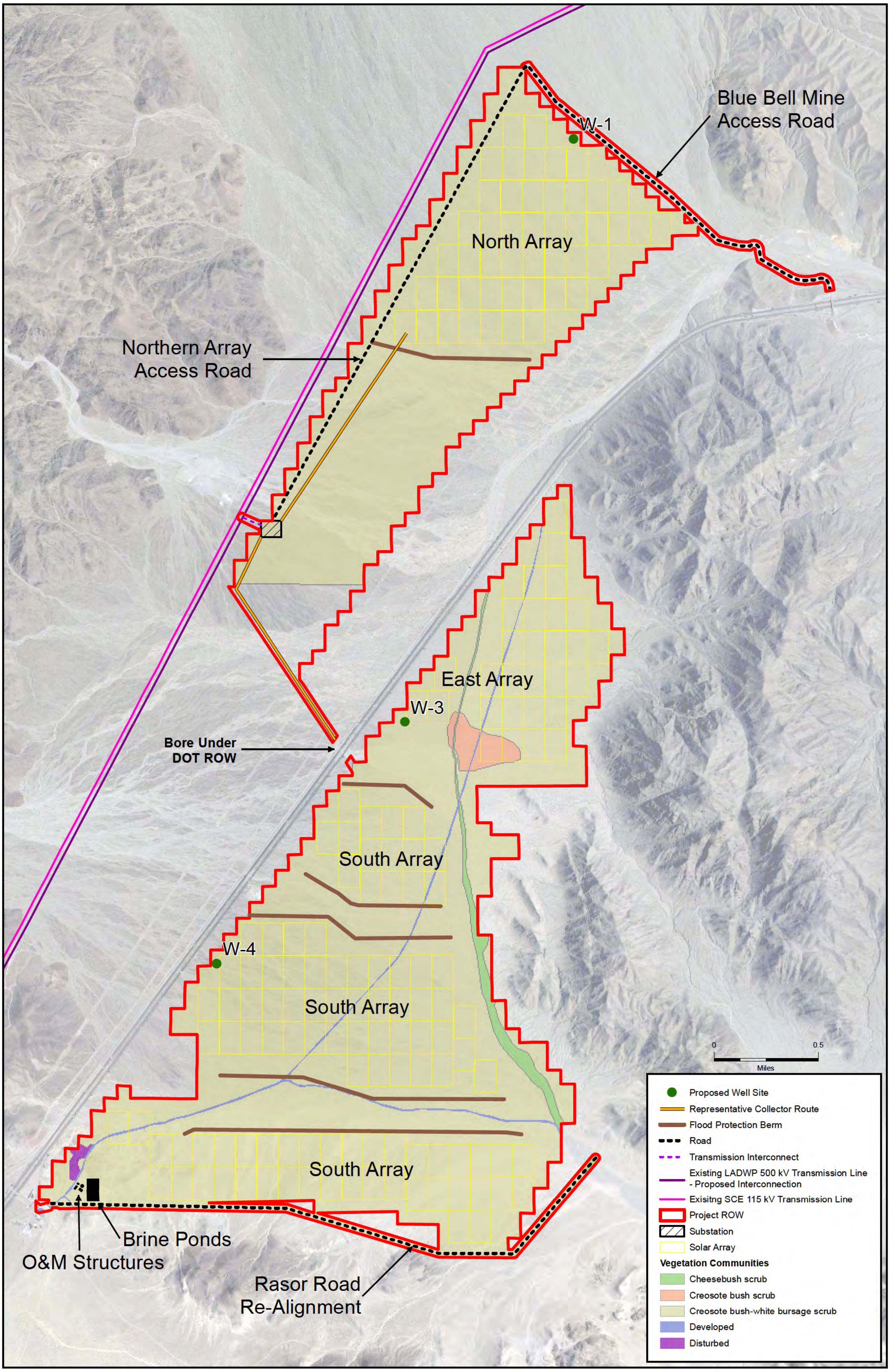
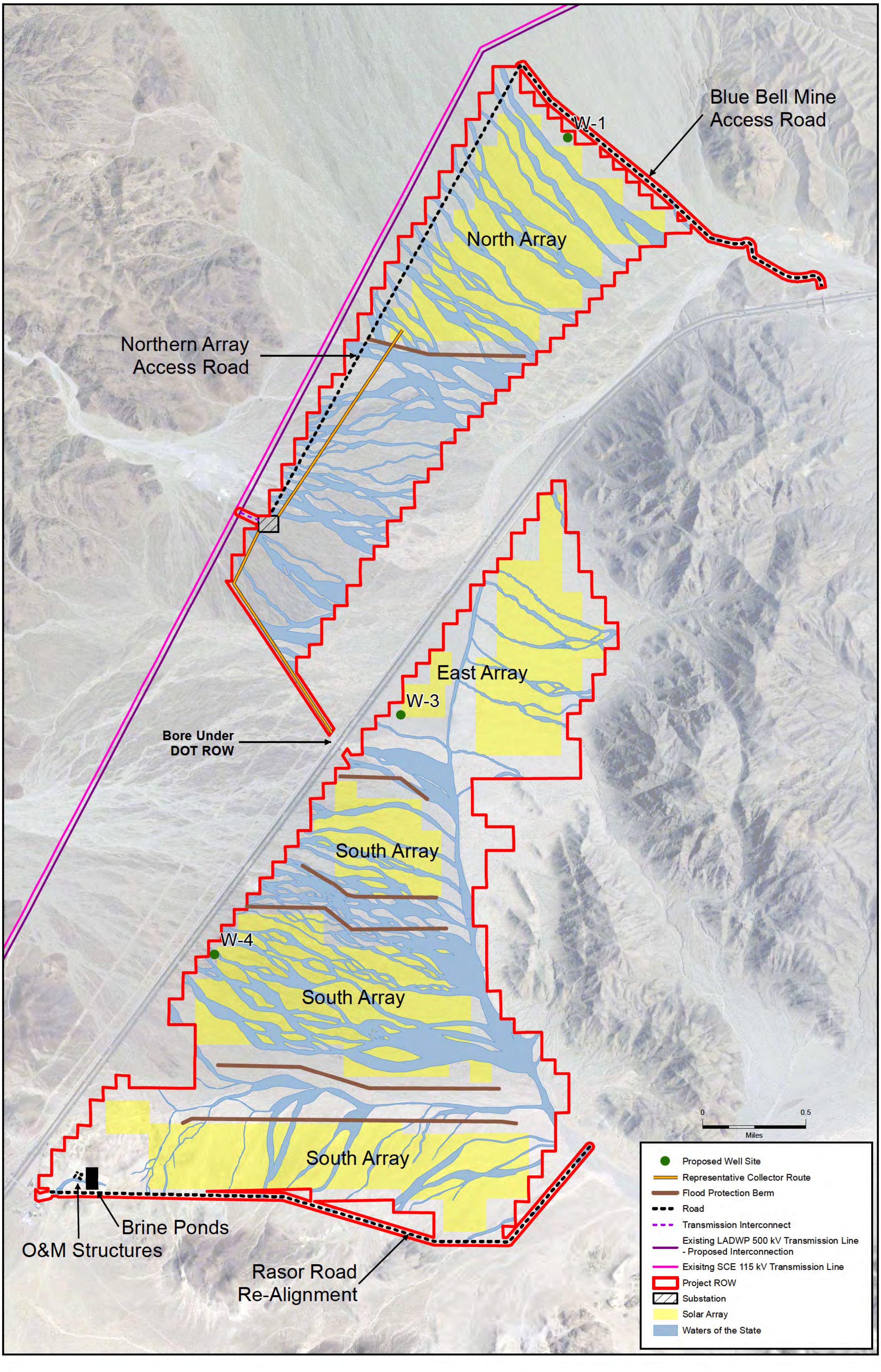


SOURCE: Panorama Environmental, 2012

Soda Mountain Solar Project . 120592

Figure 3.3-1
Vegetation Communities within the Proposed Project ROW

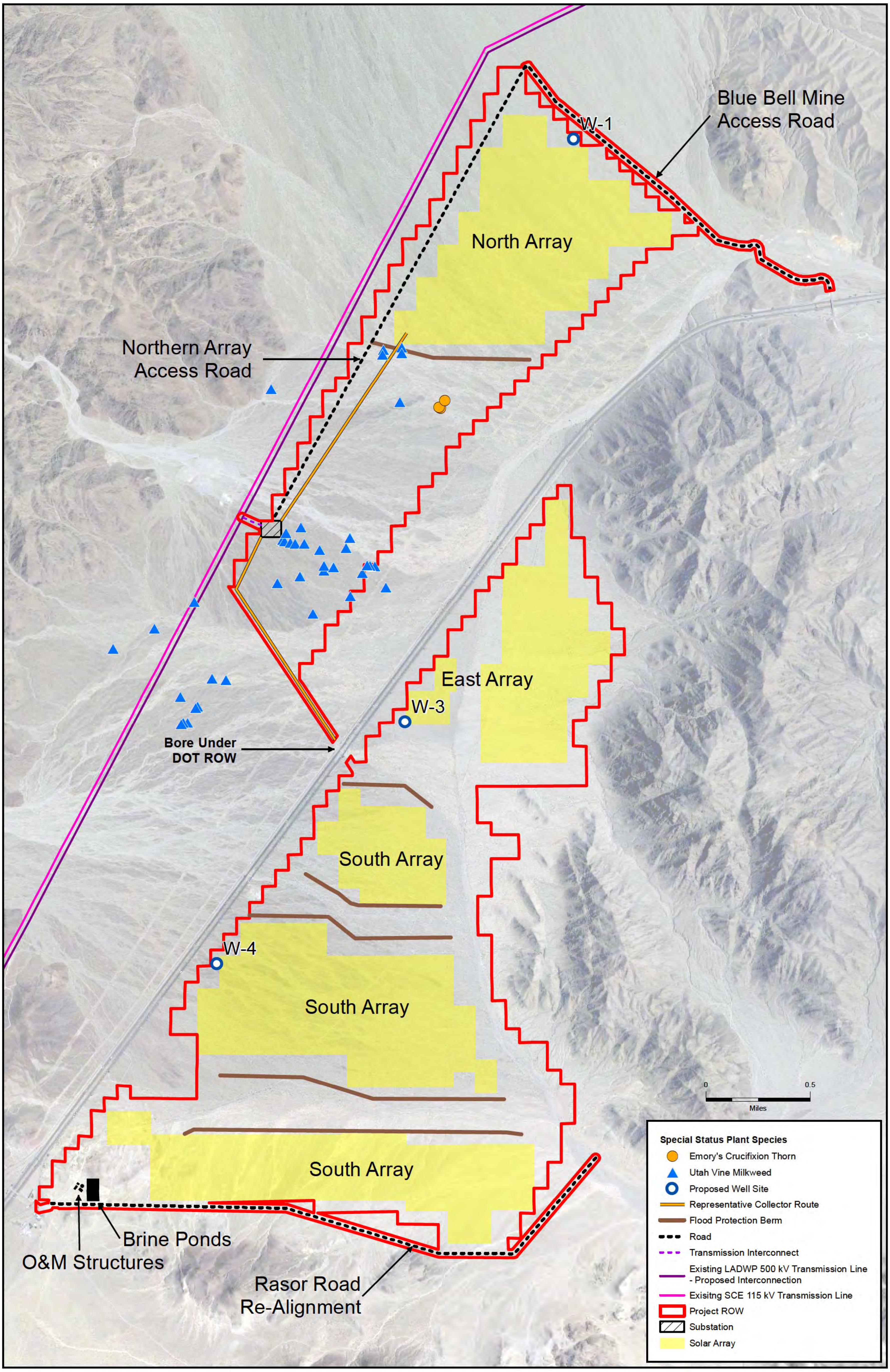


SOURCE: Panorama Environmental, 2013

Soda Mountain Solar Project . 120592

Figure 3.3-2

Waters of the State within the Proposed Project ROW



SOURCE: Panorama Environmental, 2012

Soda Mountain Solar Project . 120592

Figure 3.3-3

Special Status Plants

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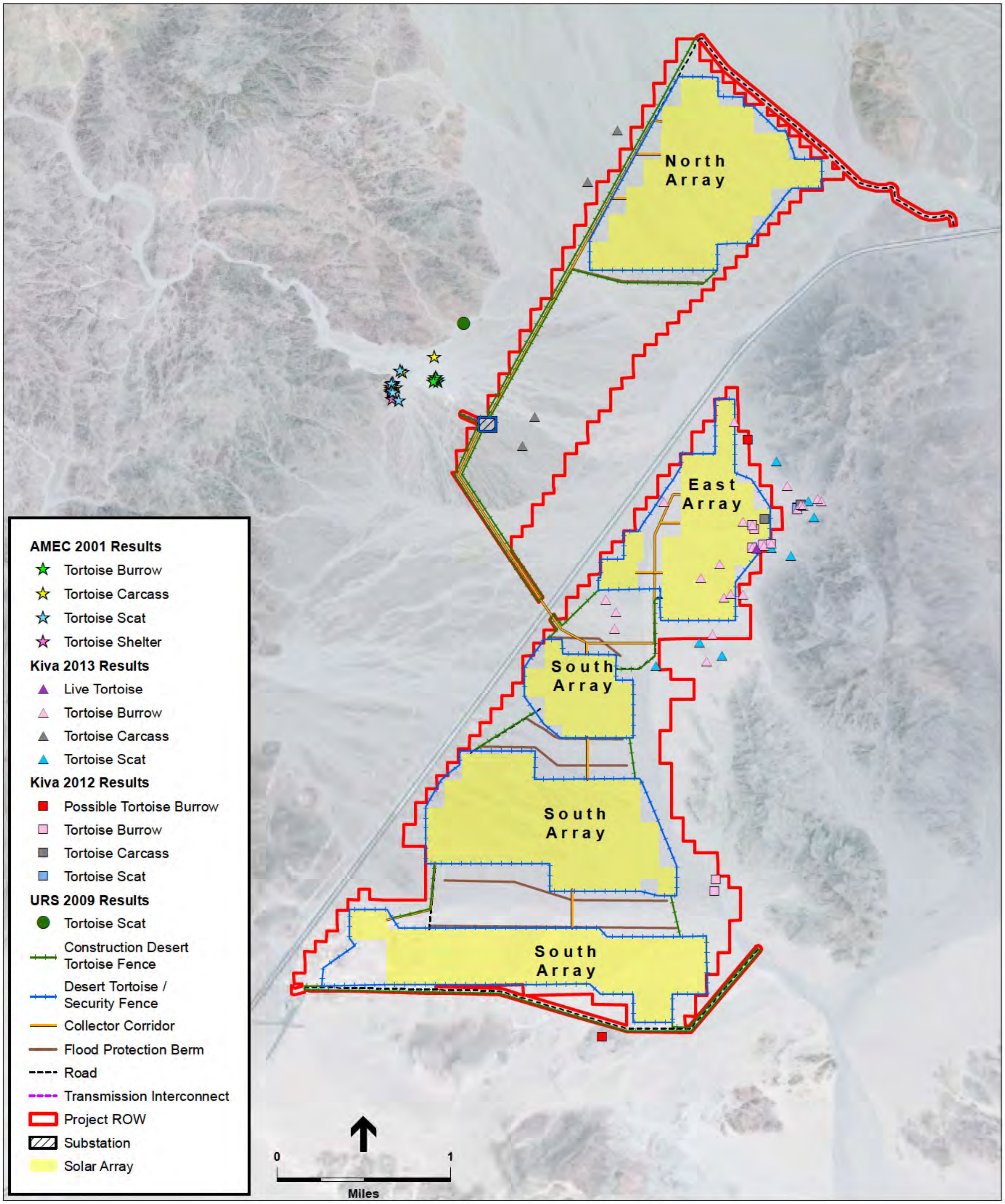
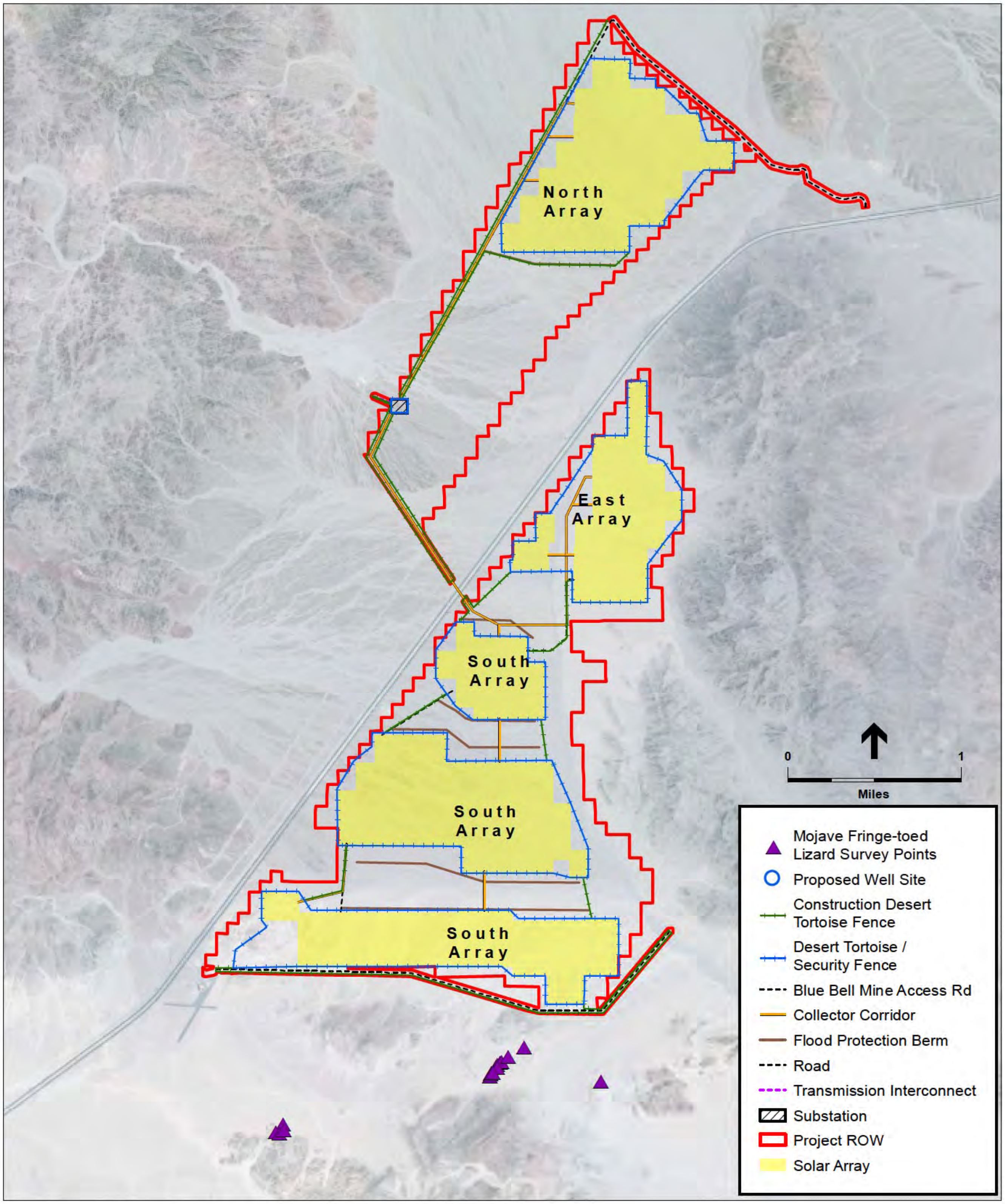


SOURCE: AMEC, 2001; Kiva, 2012/2013; URS, 2009

Soda Mountain Solar Project . 120592

Figure 3.4-1
Desert Tortoise Survey Findings

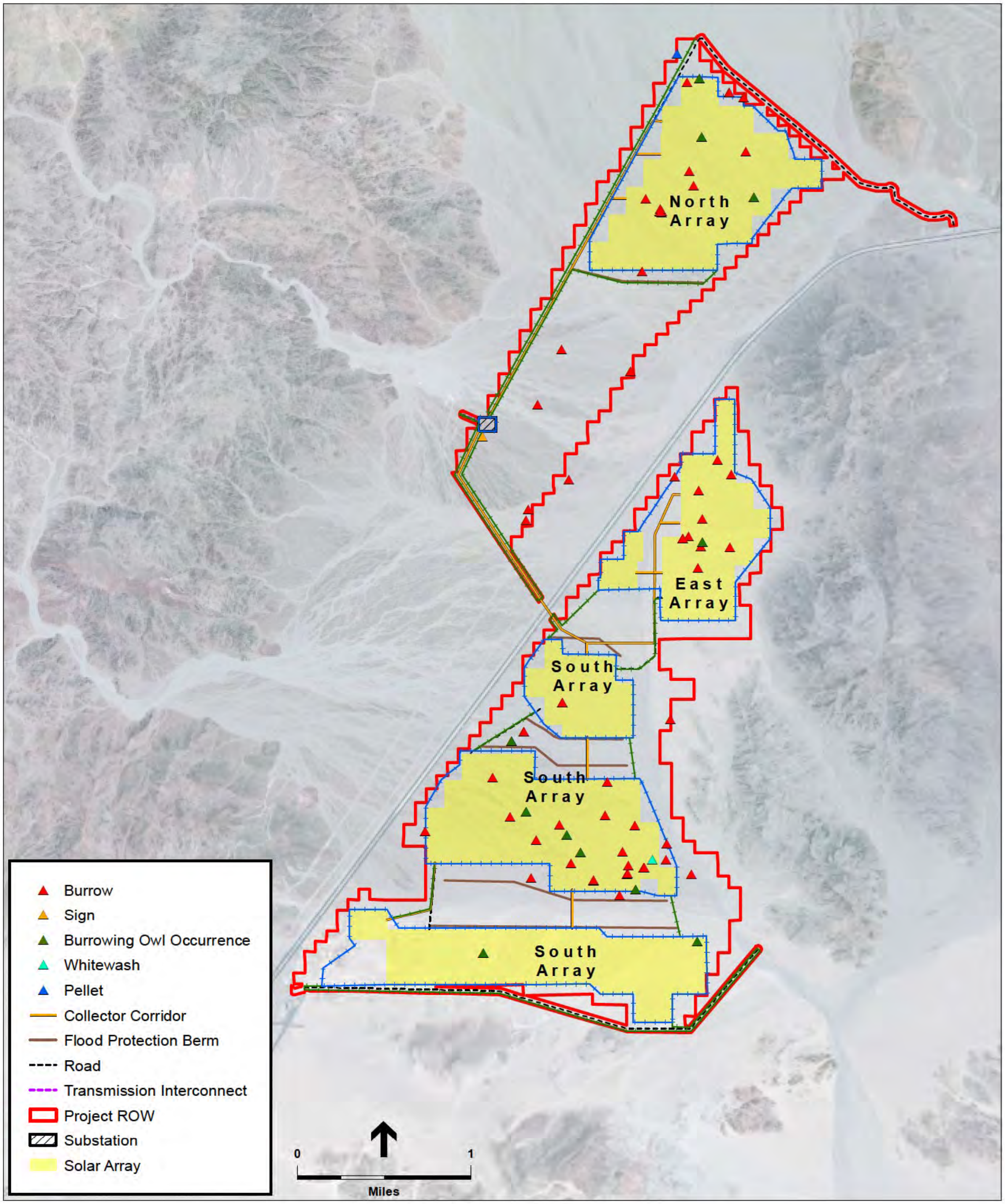


SOURCE: Kiva, 2012; URS, 2009

Soda Mountain Solar Project . 120592

Figure 3.4-2

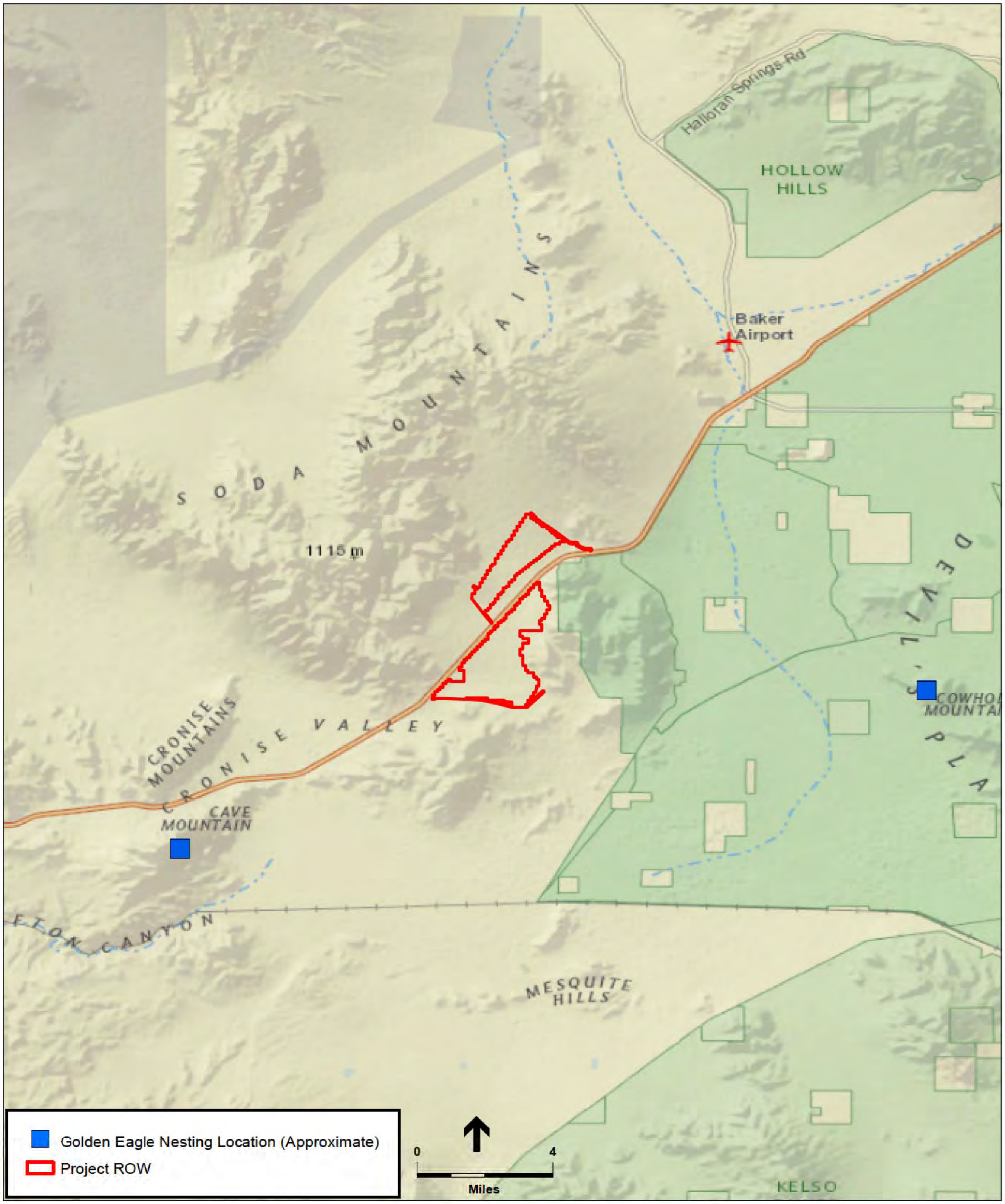
Mojave Fringe-toed Lizard Survey Findings



SOURCE: CS Ecological Surveys and Assesments, 2012; Kiva, 2013

Soda Mountain Solar Project . 120592

Figure 3.4-3
Burrowing Owl Survey Findings

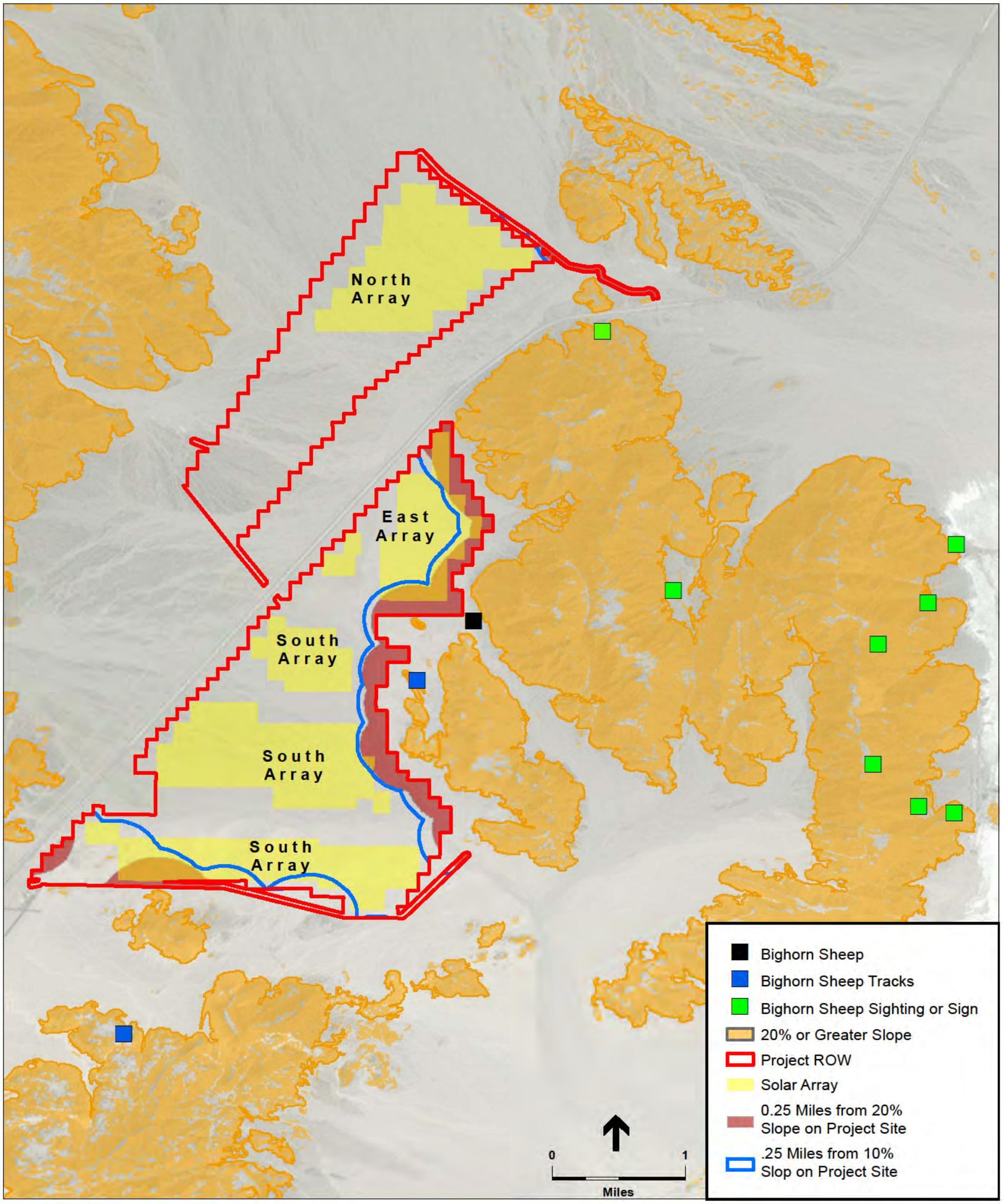


SOURCE: CNDDB, 2013

Soda Mountain Solar Project . 120592

Figure 3.4-4

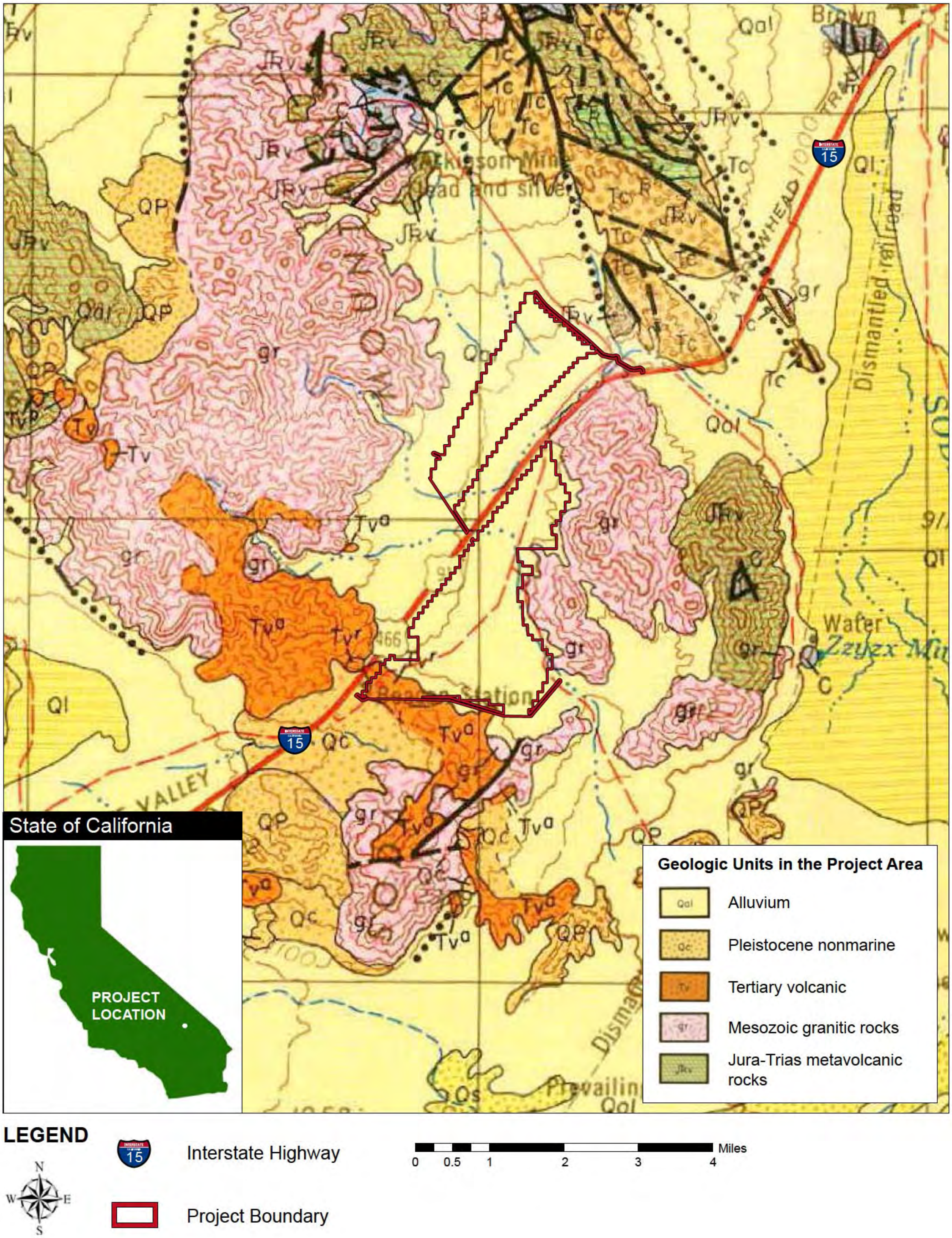
Golden Eagle nesting within 10 miles of project



SOURCE: Kiva, 2012; BRC, 2011; CDFG, 2012

Soda Mountain Solar Project . 120592

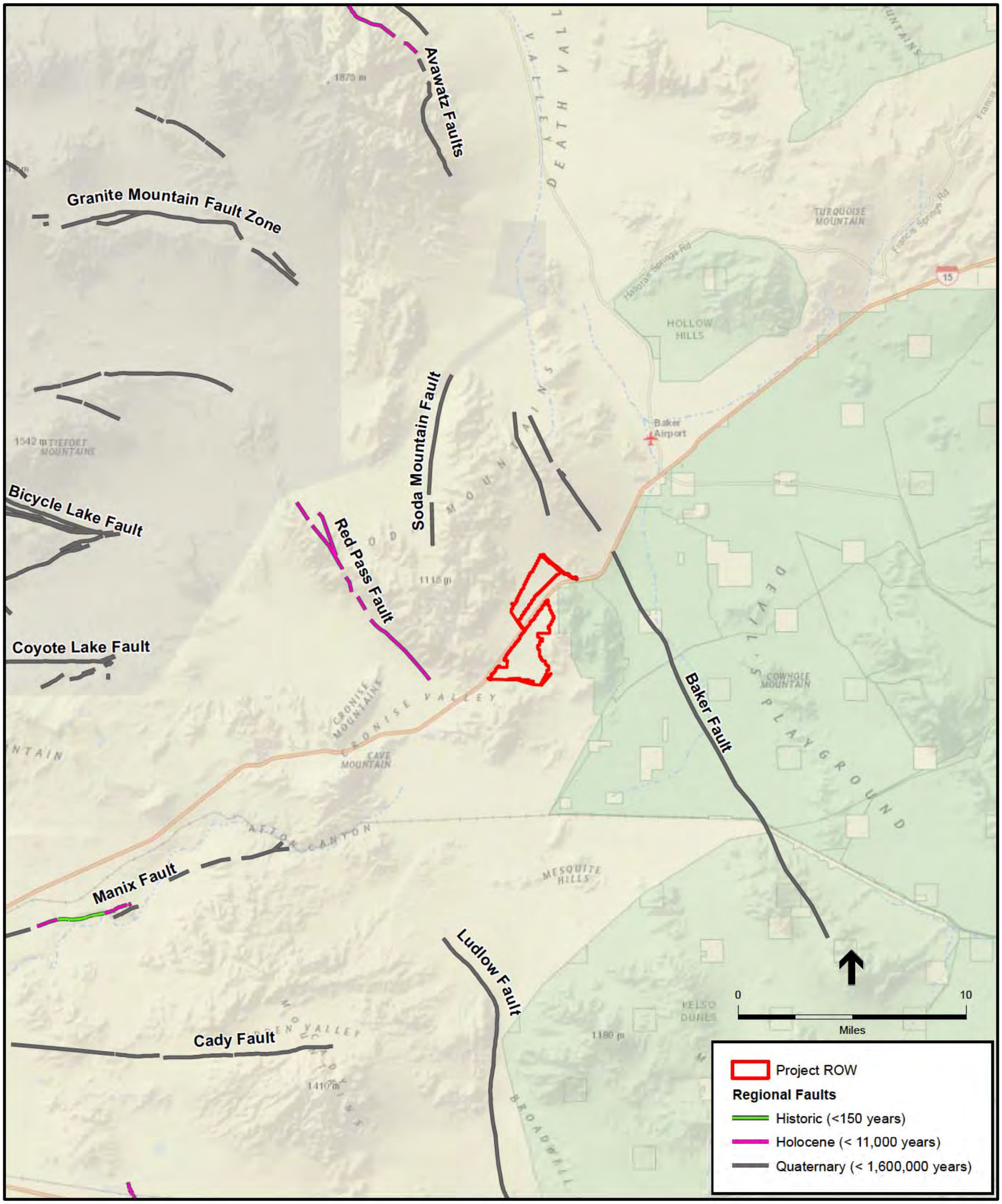
Figure 3.4-5
Bighorn Sheep



SOURCE: Wilson Geosciences 2010, Jenkins, O. P., 1962, and RMT Inc. 2010

Soda Mountain Solar Project . 120592

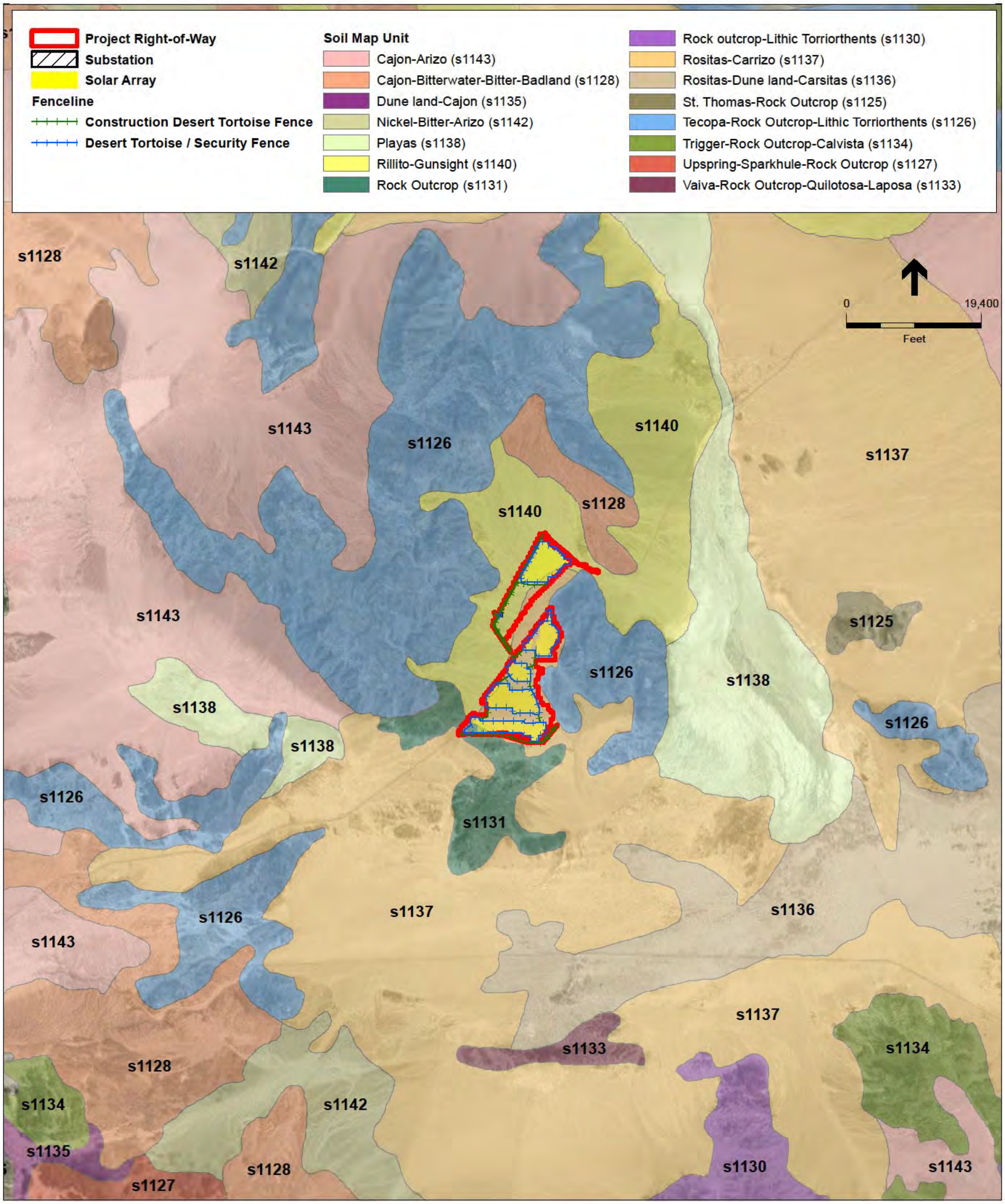
Figure 3.7-1
Regional Geology



SOURCE: USGS/CGS, 2010

Soda Mountain Solar Project . 120592

Figure 3.7-2
Regional Faults

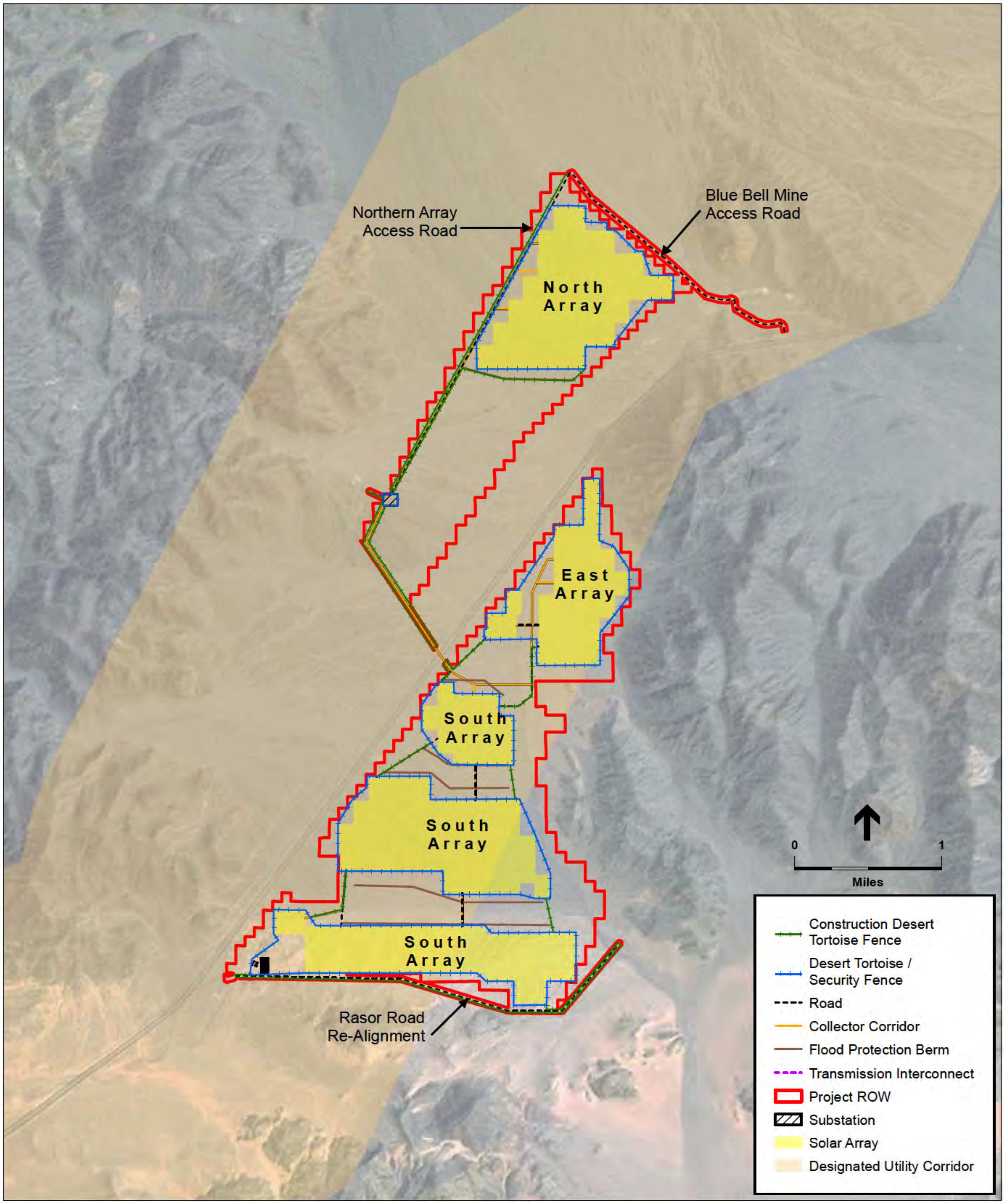


SOURCE: NRCS, 2006

Note: The Digital General Soil Map of the United States is a broad based inventory of soils and non-soil areas that occur in a repeatable pattern on the landscape and were designed to be cartographically shown at the map scale of 1:250,000, as shown in the map above. The level of mapping is designed for broad planning and management uses covering state, regional, and multi-state areas.

Soda Mountain Solar Project . 120592

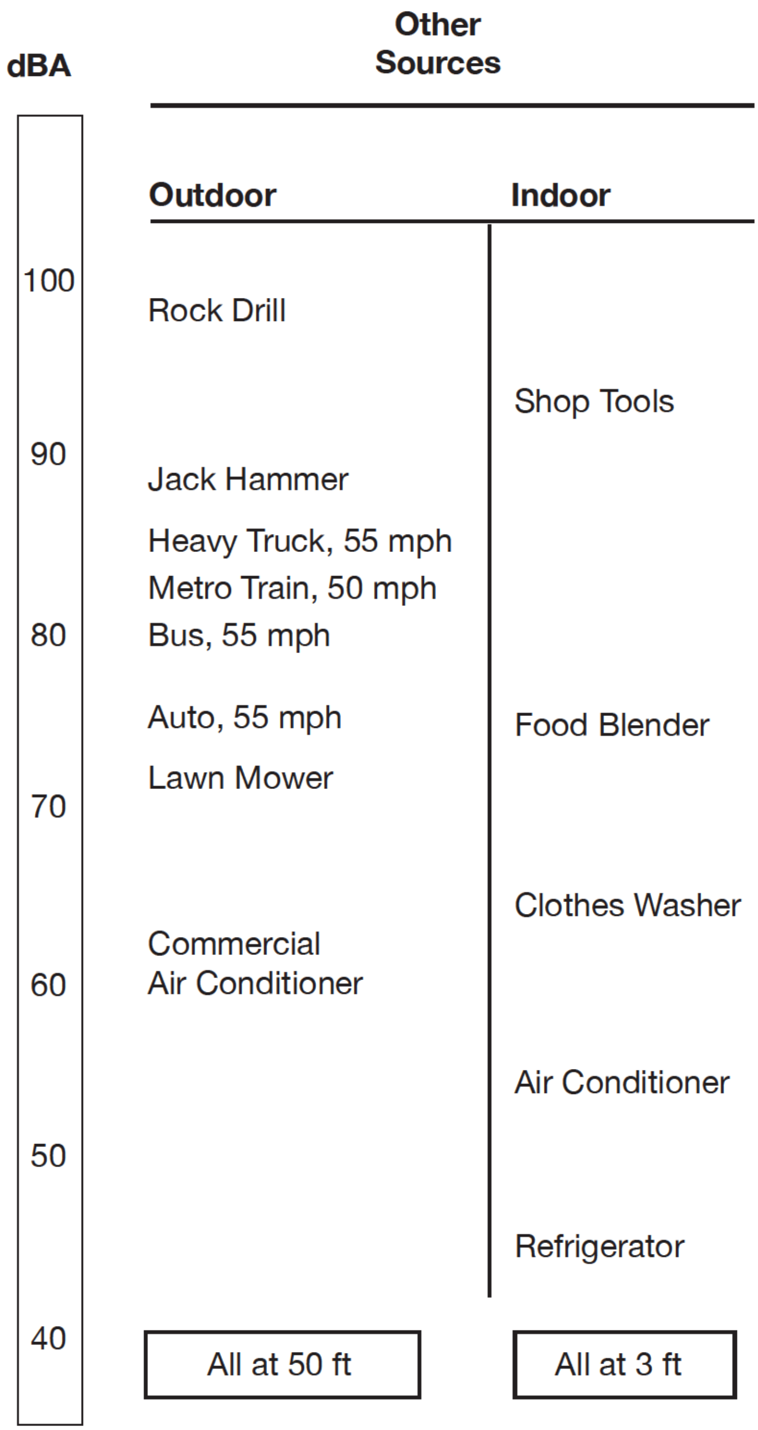
Figure 3.7-3
STATSGO2 Soils Data



SOURCE: Panorama Environmental Inc., 2013; BLM, 2010

Soda Mountain Solar Project . 120592

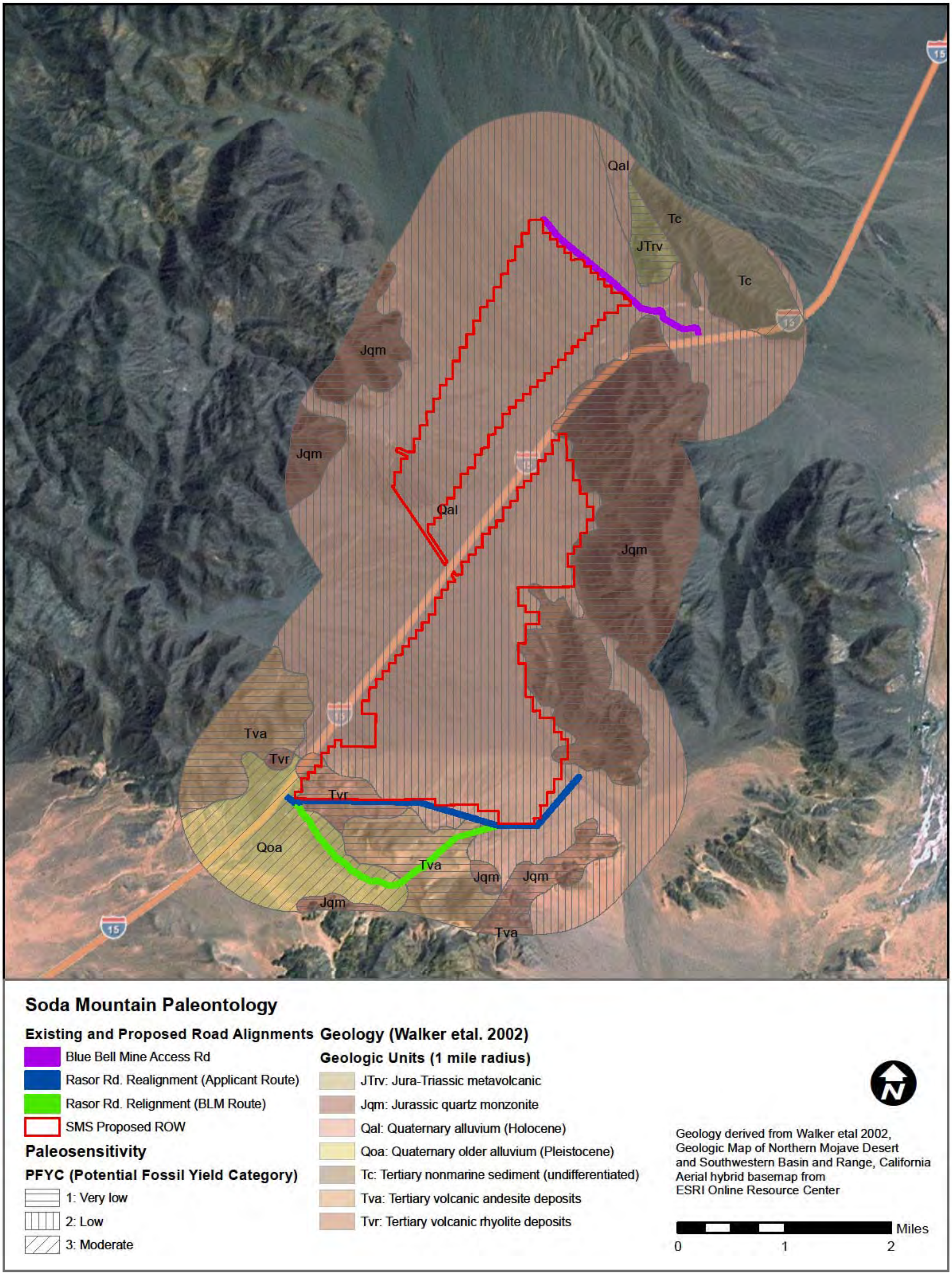
Figure 3.9-1
Designated Utility Corridor Location



SOURCE: Federal Transit Administration, 2006

Soda Mountain Solar Project . 120592

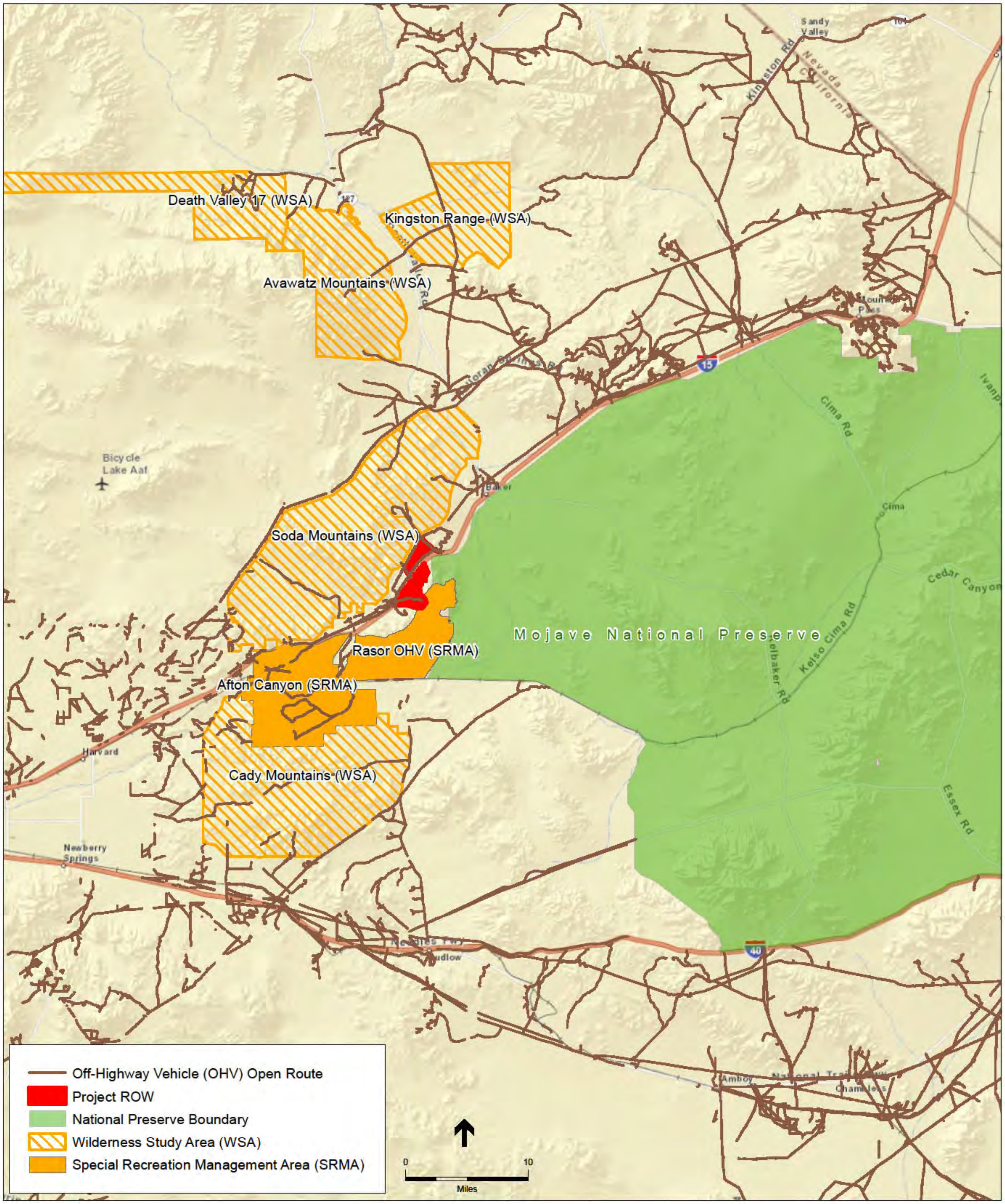
Figure 3.11-1
Typical A - Weighted Sound Levels



SOURCE: Paleo Solutions

Soda Mountain Solar Project . 120592

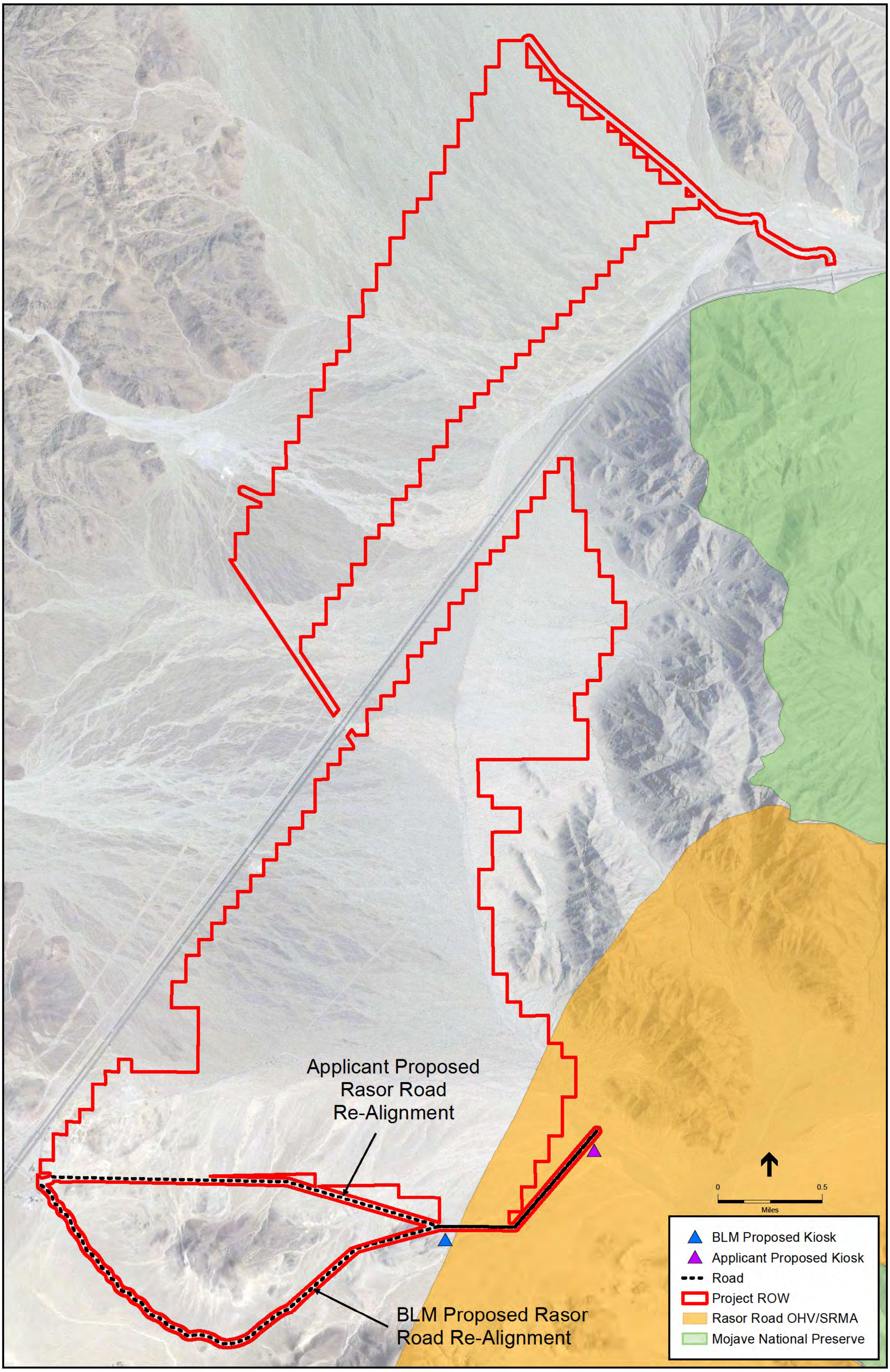
Figure 3.12-1
Geology and Paleosensitivity



SOURCE: BLM, 2012

Soda Mountain Solar Project . 120592

Figure 3.13-1
Recreational Resources in the Project Vicinity



SOURCE: Panorama Environmental Inc., 2013

Soda Mountain Solar Project . 120592

Figure 3.13-2
Recomended Kiosk Location

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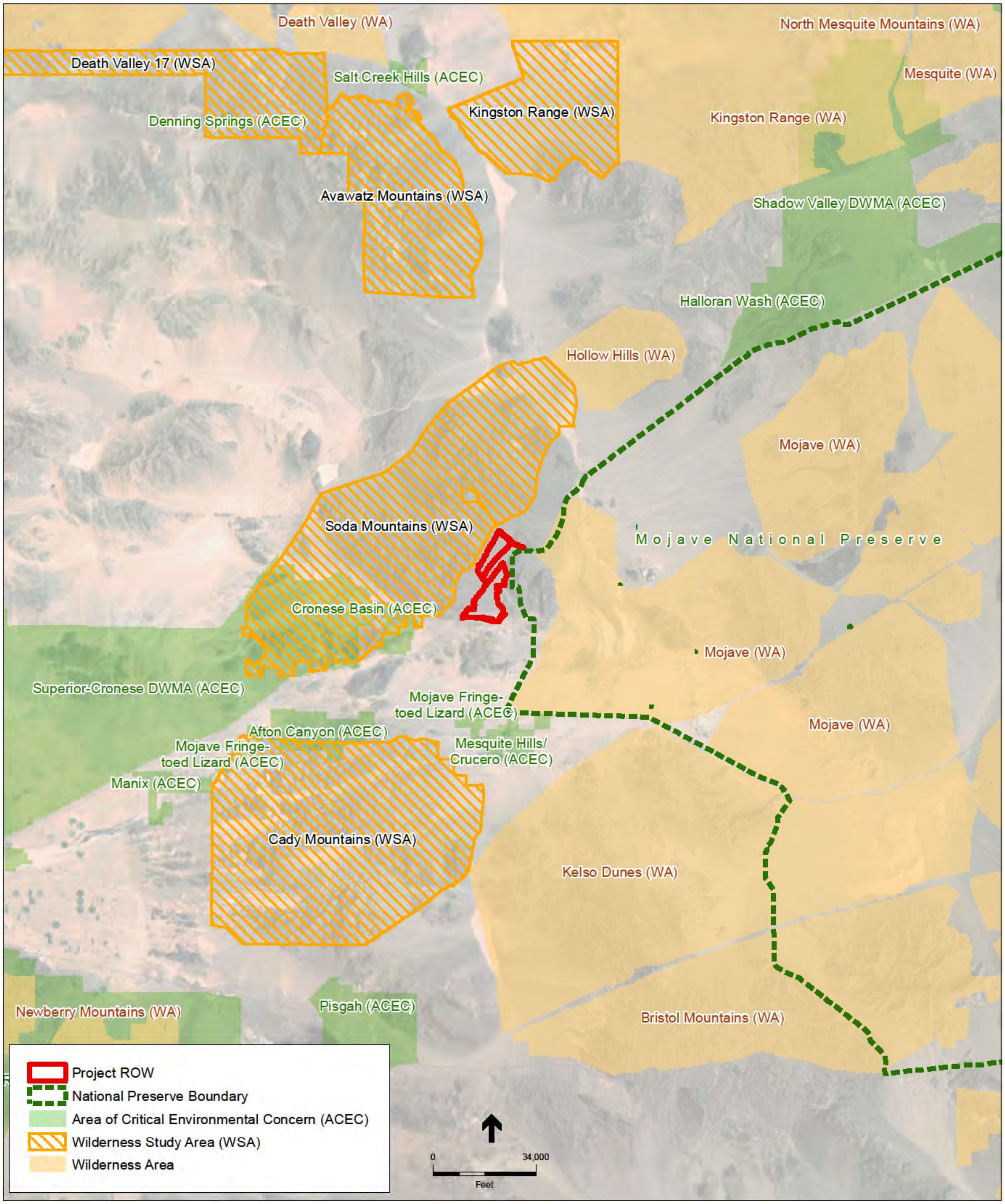


SOURCE: Panorama Environmental Inc., 2013; BLM, 2013

Soda Mountain Solar Project . 120592

Figure 3.15-1
Special Designations

SOURCE: ESA, 2012

Soda Mountain Solar Project . 120592

Figure 3.18-1

Characteristic Landscape of the Project Site

Cholla Cactus, North of I-15 (credit: ESA)

Creosote Scrub, Rasor Road, looking West (credit: 2M Associates)

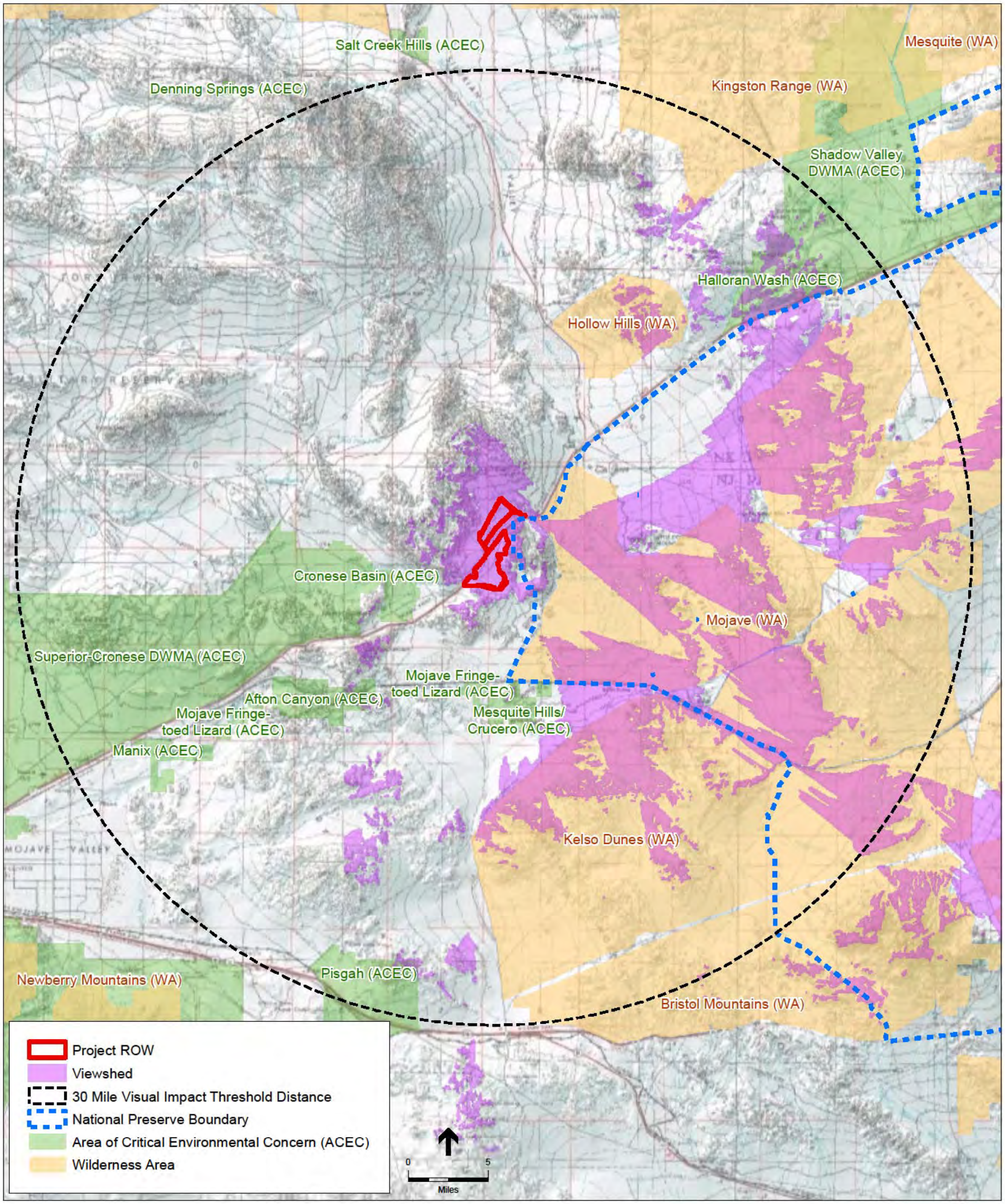
Rasor OHV Area, Looking toward South Array Area (credit: 2M Associates)

Blue Bell Mine Road, Looking South (credit: 2M Associates)

SOURCE: ESA

Soda Mountain Solar Project . 120592

Figure 3.18-2
Landscape Context Photos

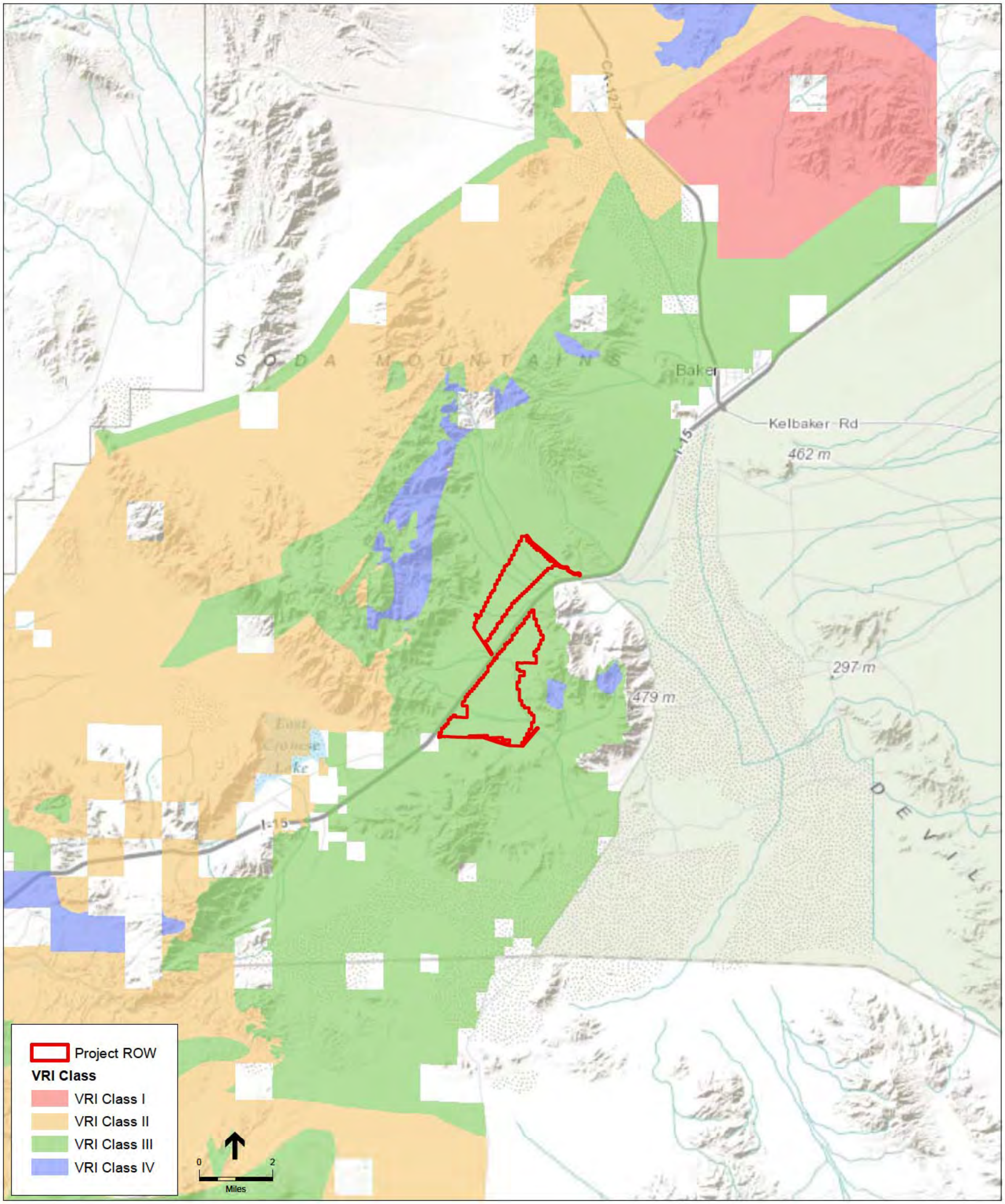


SOURCE: Panorama Environmental Inc., 2013; USGS, 2013; RMT, 2012

Soda Mountain Solar Project . 120592

Figure 3.18-3

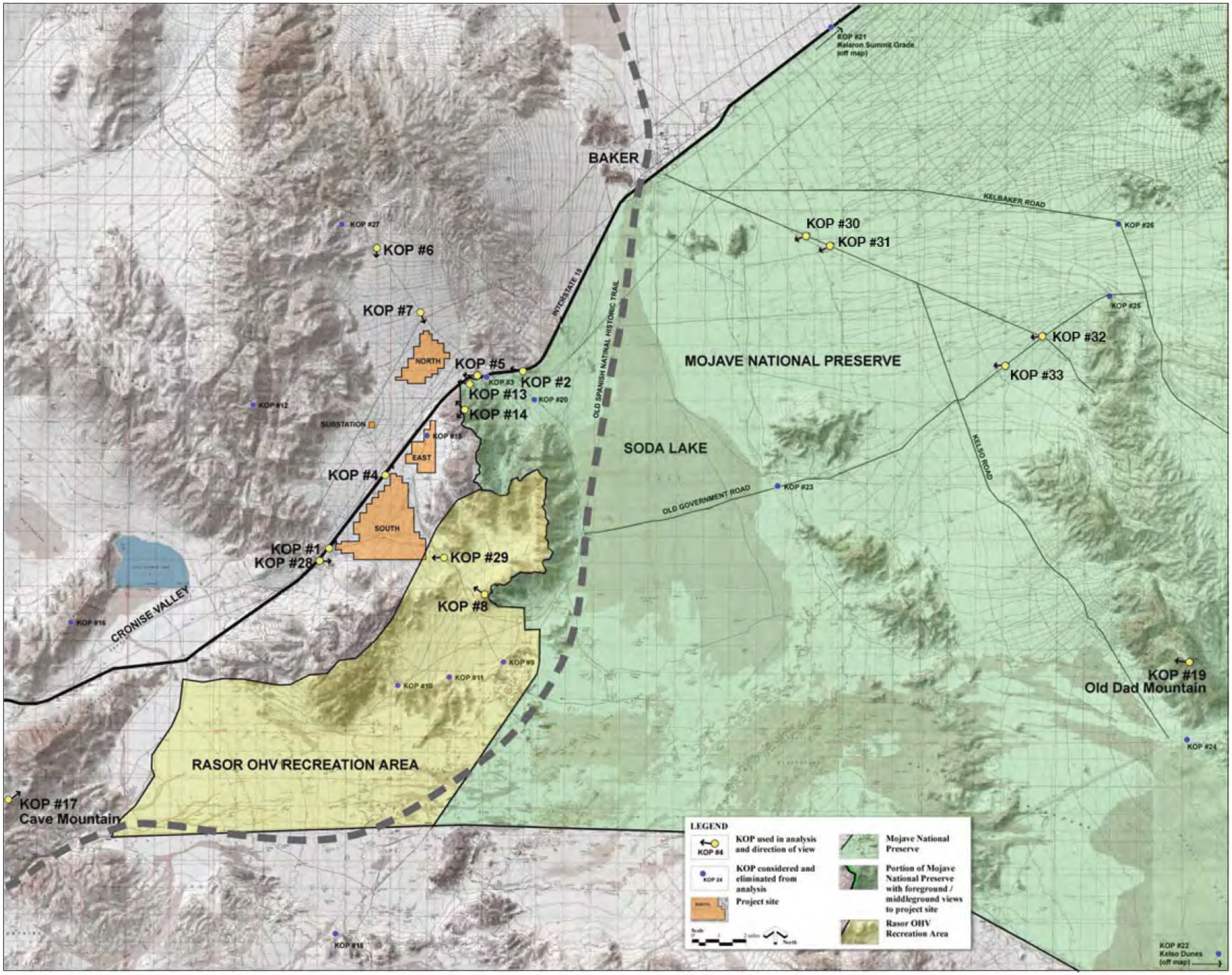
Project Area and Viewshed



SOURCE: Panorama Environmental Inc., 2013; BLM, 2013

Soda Mountain Solar Project . 120592

Figure 3.18-4
Visual Resource Inventory (VRI) Classifications



SOURCE: 2M Associates

Soda Mountain Solar Project . 120592

Figure 3.18-5
Key Observation Points

SOURCE: Robert Sullivan, Argonne National Laboratory

Soda Mountain Solar Project . 120592

Figure 3.18-6

Photovoltaic Array Examples
Silver State North Solar

SOURCE: Robert Sullivan, Argonne National Laboratory

Soda Mountain Solar Project . 120592

Figure 3.18-7

Photovoltaic Panels During Various Times of Day

Copper Mountain Solar Facility, Boulder City, NV

Inverters Painted White

Inverters Treated to Blend with Backdrop

SOURCE: Robert Sullivan, Argonne National Laboratory

Soda Mountain Solar Project . 120592

Figure 3.18-8

Inverter Treatment

SOURCE: Marc Sanchez, BLM

Soda Mountain Solar Project . 120592

Figure 3.18-9

Nighttime Lighting at PV Solar Facility Buildings

Existing Condition

Simulated Condition

SOURCE: 2M Associates, May 2013

Soda Mountain Solar Project . 120592

Figure 3.18-10

View from KOP 1, I-15 near Rasor Road Interchange
Looking North


Existing Condition


Simulated Condition

SOURCE: 2M Associates, May 2013

Soda Mountain Solar Project . 120592

Figure 3.18-11
View from KOP 4, I-15
Looking North

Existing Condition

Simulated Condition

SOURCE: 2M Associates, May 2013

Soda Mountain Solar Project . 120592

Figure 3.18-12
View from KOP 5, I-15
Looking Southwest


Existing Condition


Simulated Condition

SOURCE: 2M Associates, May 2013

Figure 3.18-13
View from KOP 28, I-15 and Rasor Road Overpass Looking East


Existing Condition


Simulated Condition

SOURCE: 2M Associates, May 2013

Soda Mountain Solar Project . 120592

Figure 3.18-14
View from KOP 29, Rasor Road
Looking East


Existing Condition


Simulated Condition

SOURCE: 2M Associates, August 2014

Soda Mountain Solar Project . 120592

Figure 3.18-15

View from KOP 30, Brannigan Mine Road (Project not visible)
Looking West


Existing Condition


Simulated Condition

SOURCE: 2M Associates, August 2014

Soda Mountain Solar Project . 120592

Figure 3.18-16
View from KOP 31, Brannigan Mine Road
Looking West

Existing Condition

Simulated Condition

SOURCE: 2M Associates, August 2014

Soda Mountain Solar Project . 120592

Figure 3.18-17
View from KOP 32, Mojave (Old Government) Road
Looking West

Existing Condition

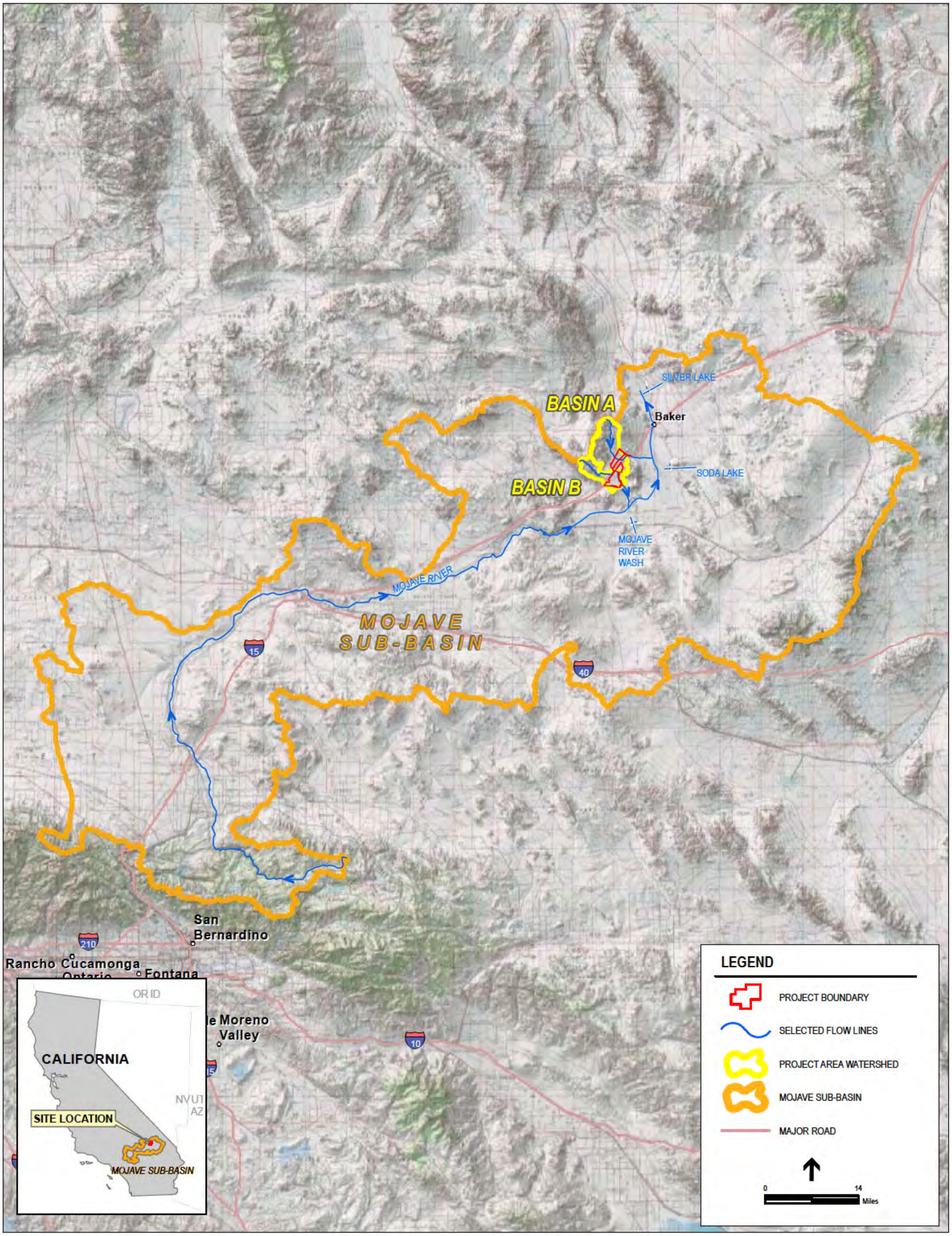
Simulated Condition

SOURCE: 2M Associates, August 2014

Soda Mountain Solar Project . 120592

Figure 3.18-18

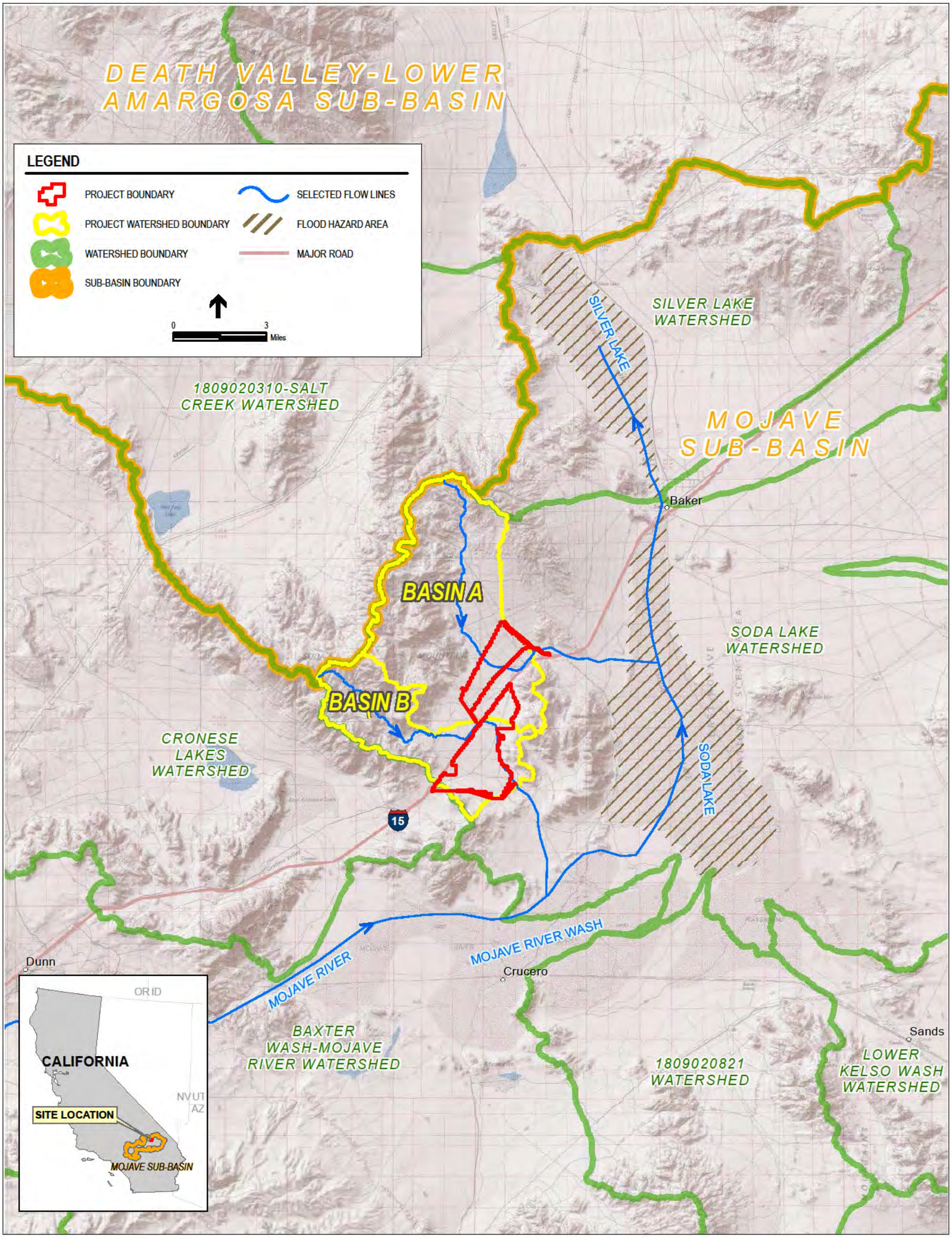
View from KOP 33, Mojave (Old Government) Road
Looking West



SOURCE: RMT

Soda Mountain Solar Project . 120592

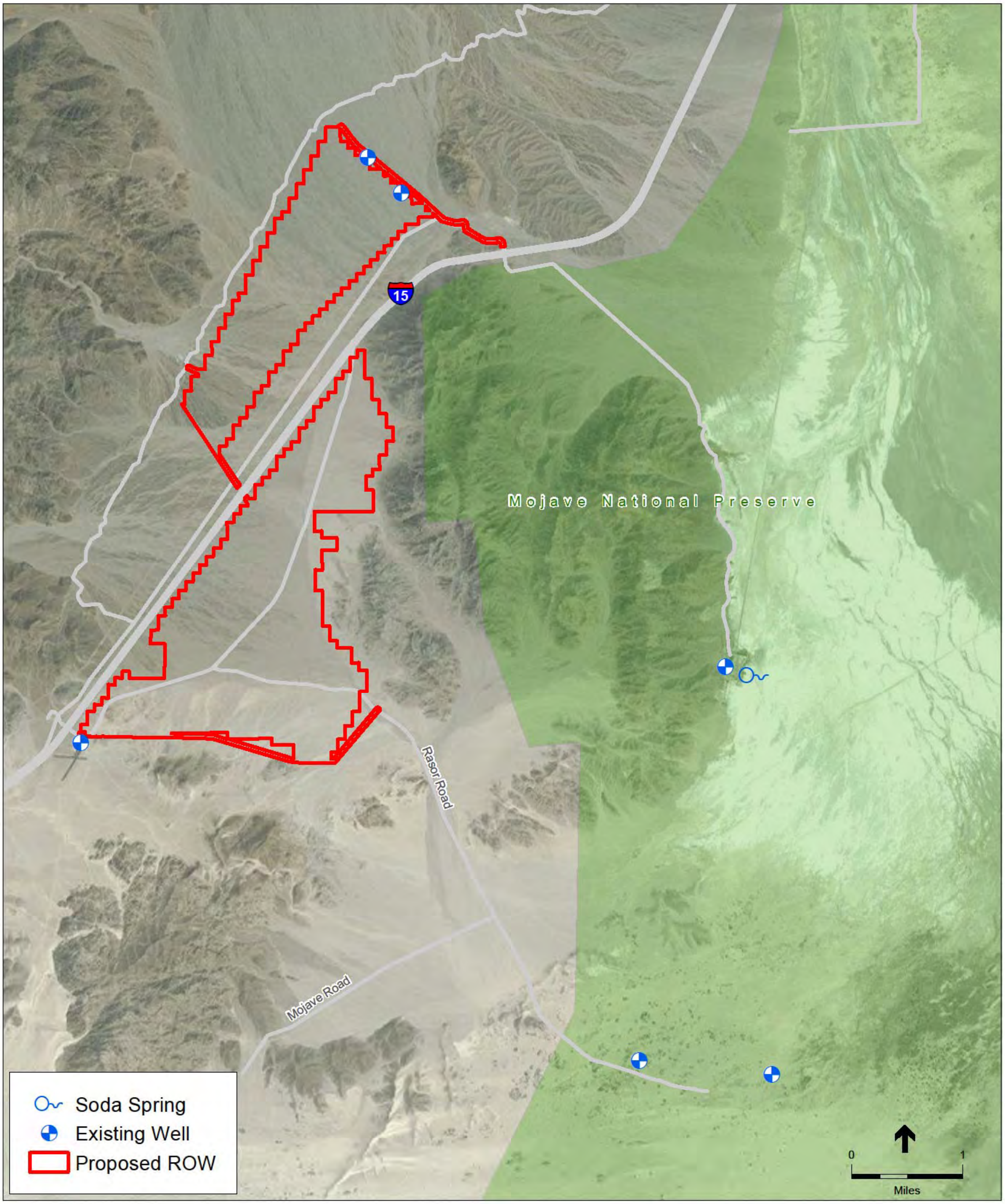
Figure 3.19-1
Mojave River Watershed



SOURCE: RMT

Soda Mountain Solar Project . 120592

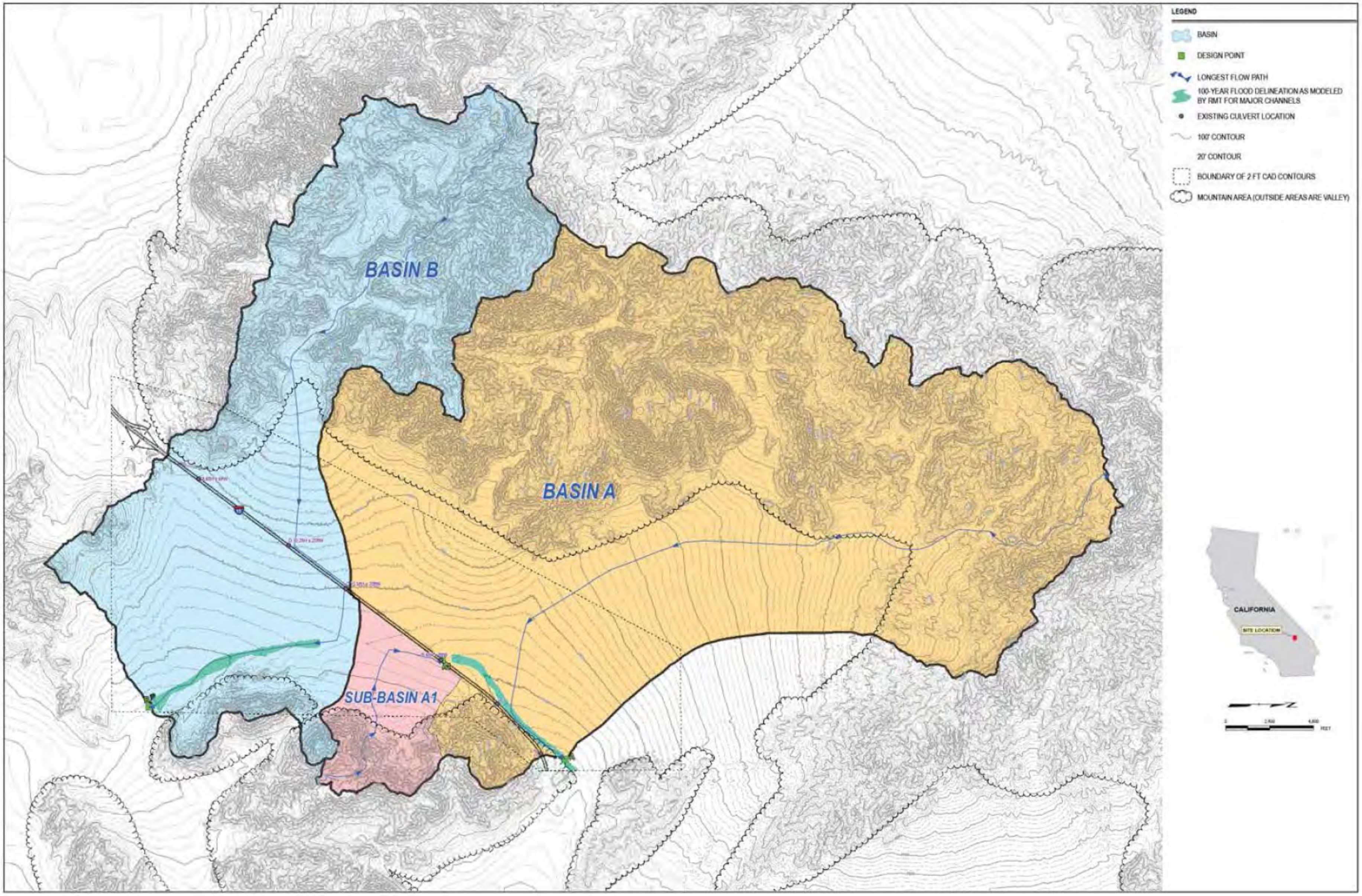
Figure 3.19-2
Project Sub-Basins



SOURCE: USGS, 2012

Soda Mountain Solar Project . 120592

Figure 3.19-3
Well and Spring Locations



SOURCE: RMT

Soda Mountain Solar Project . 120592

Figure 3.19-4
Site Drainage

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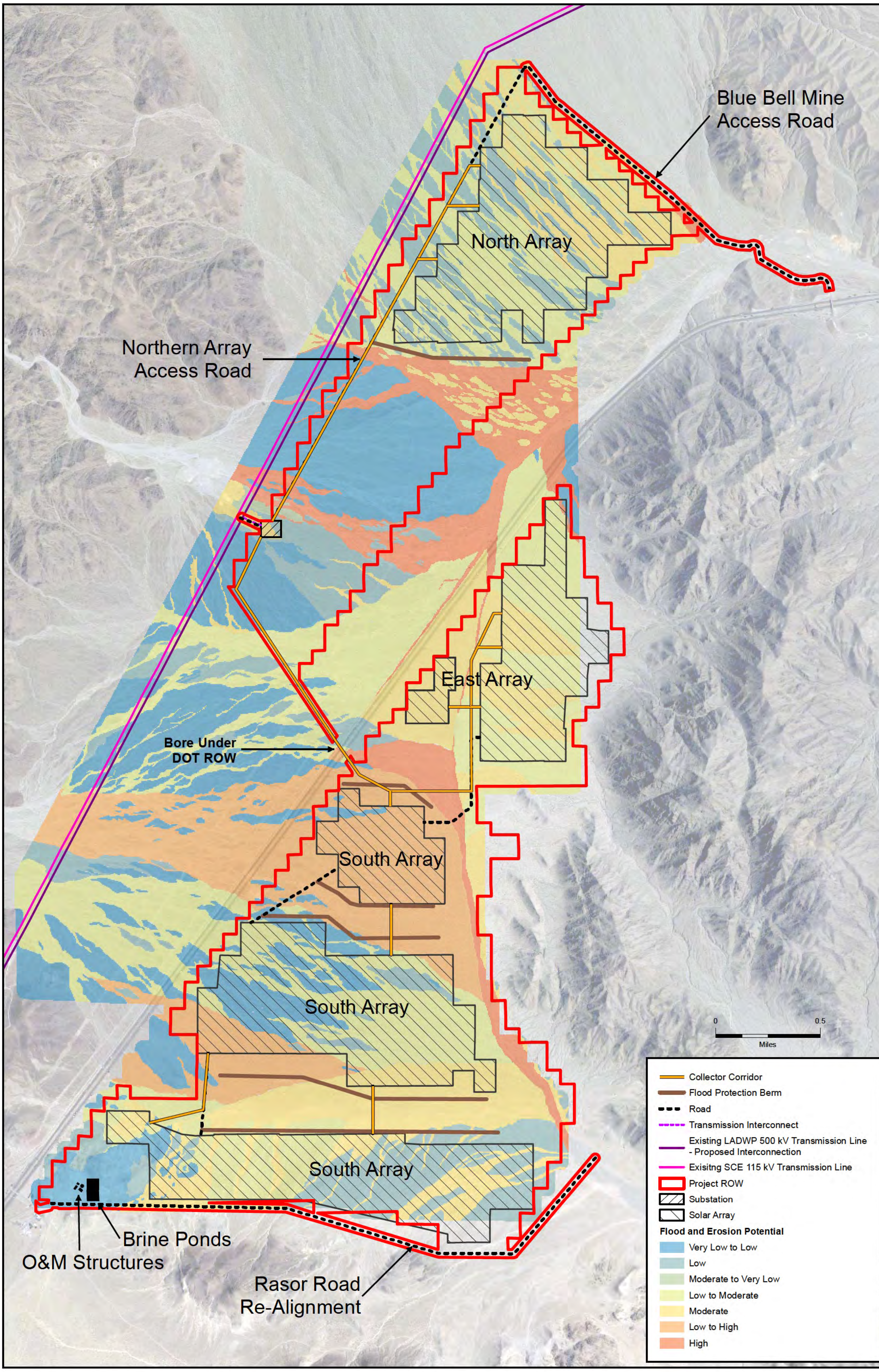

SOURCE: Wilson Geosciences, 2011; RMT, 2011

Soda Mountain Solar Project . 120592

Figure 3.19-5

Flood and Erosion Potential

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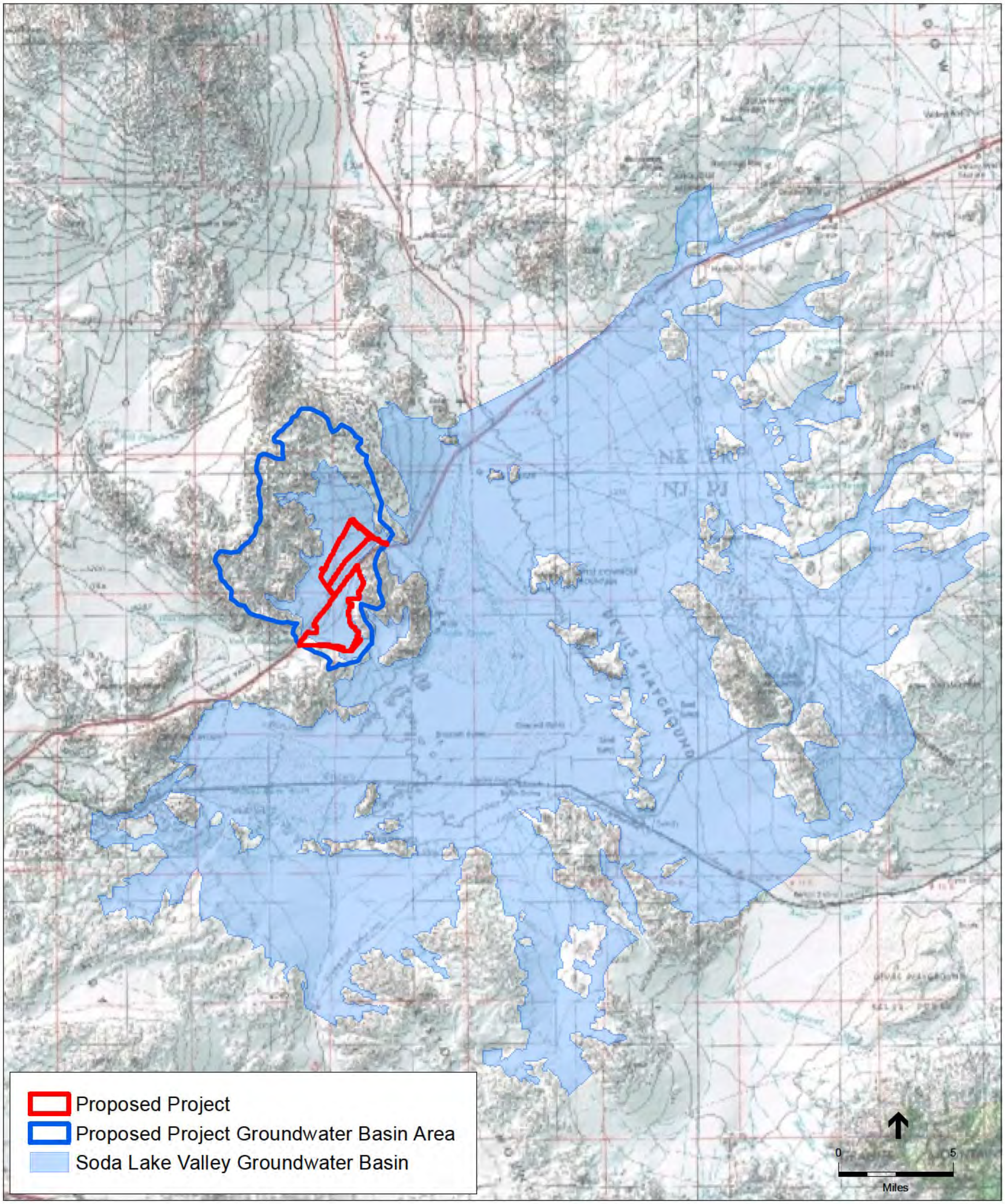
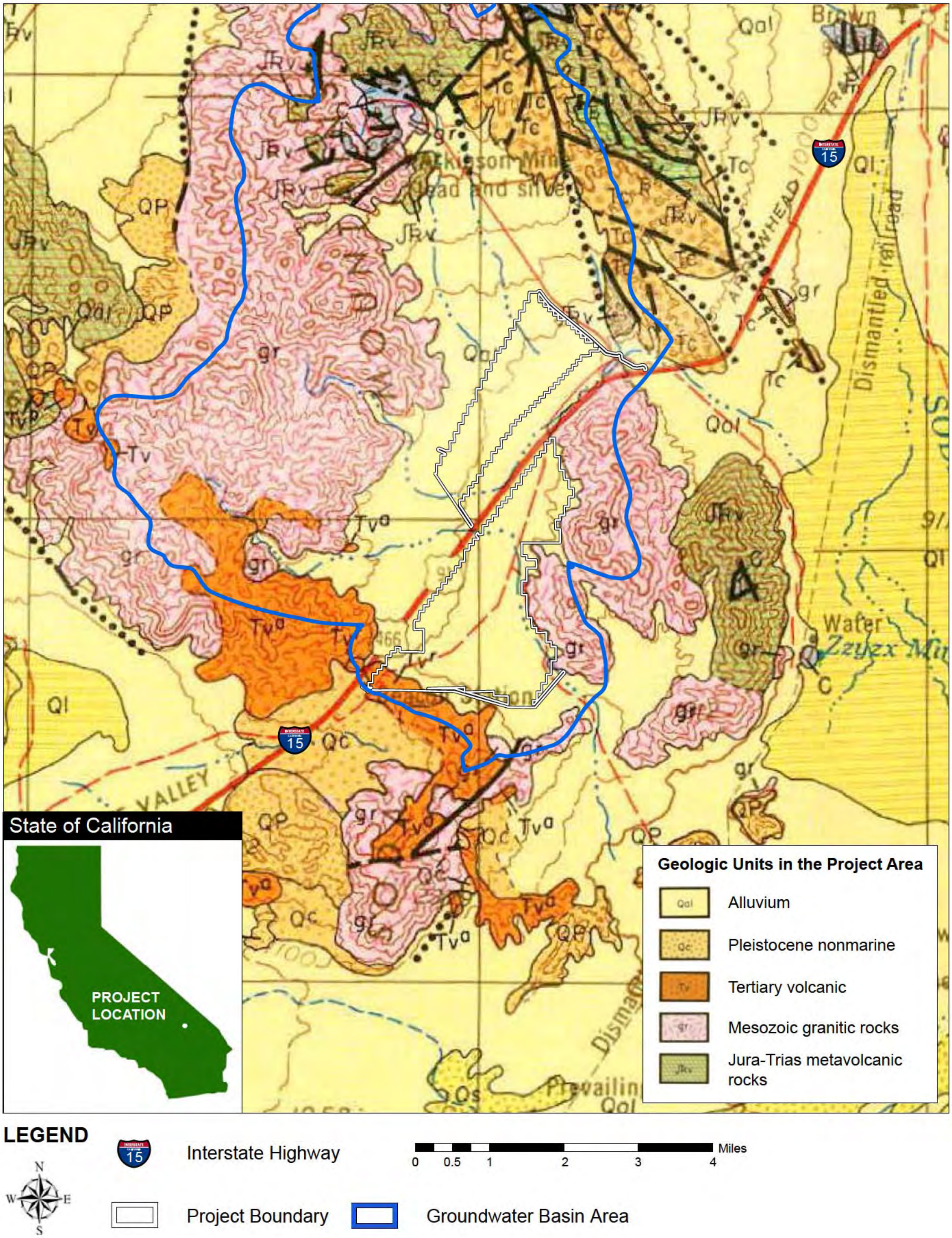


SOURCE: DWR, 2003; Panorama Environmental, 2012

Soda Mountain Solar Project . 120592

Figure 3.19-6
Groundwater Basins

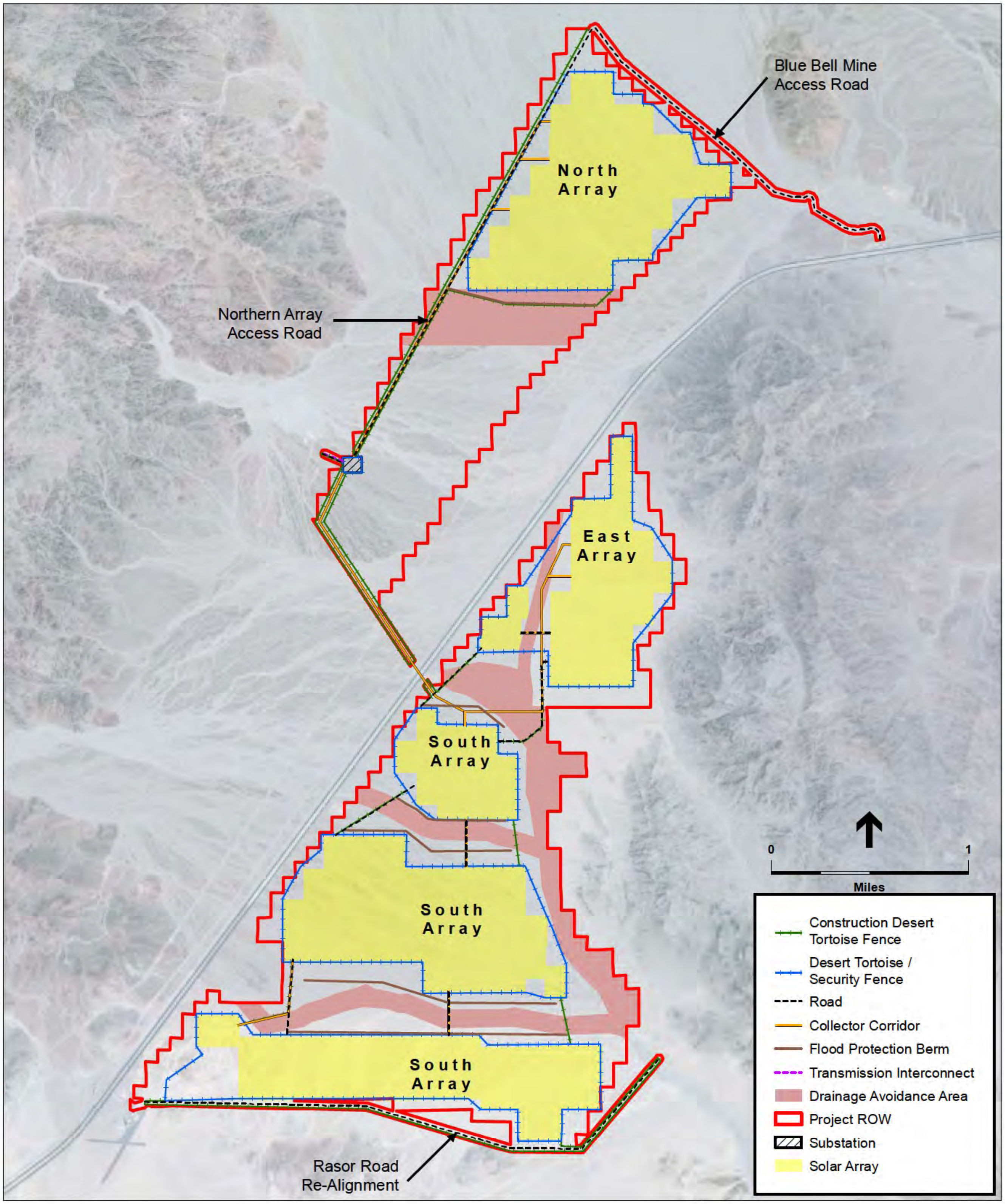


SOURCE: Wilson Geosciences 2010, Jenkins, O. P., 1962, and RMT Inc. 2010

Soda Mountain Solar Project . 120592

Figure 3.19-7

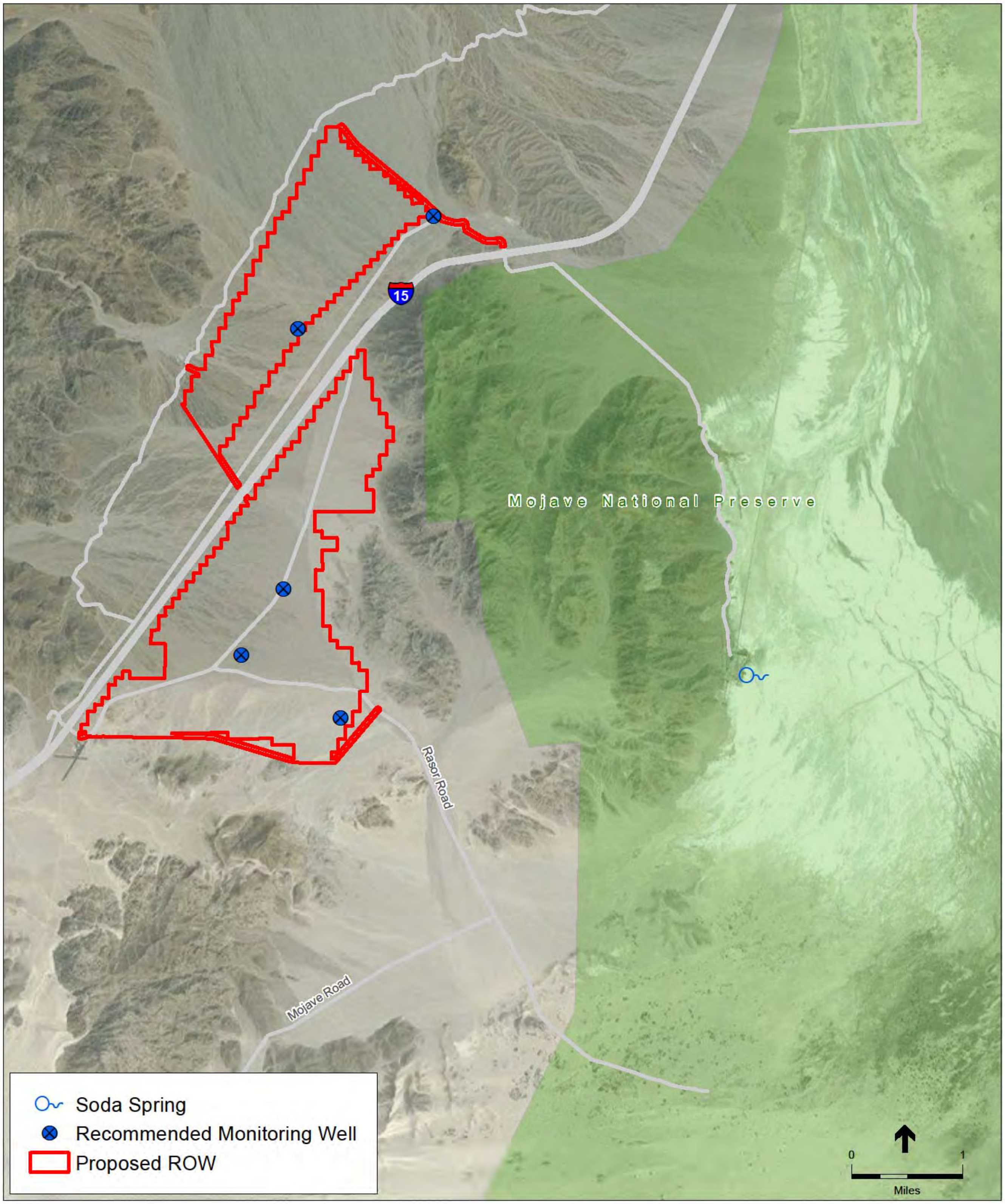
Sub-basin Geology



SOURCE: Panorama Environmental Inc., 2013

Soda Mountain Solar Project . 120592

Figure 3.19-8
Drainage Avoidance Areas



SOURCE: BLM, 2013

Soda Mountain Solar Project . 120592

Figure 3.19-9

Recommended Monitoring Well Locations

APPENDIX B

Scoping Report

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PUBLIC SCOPING REPORT

Environmental Impact Statement /
Environmental Impact Report
Soda Mountain Solar Project

Lead Agencies:

Bureau of Land Management
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22835 Calle San Juan De Los Lagos
Moreno Valley, California 92553-9046

San Bernardino County
Contact: Nelson Miller, (760) 995-8153
15900 Smoke Tree Street
Hesperia, CA 92345

JANUARY 2013

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TABLE OF CONTENTS

Soda Mountain Solar Project
Public Scoping Report EIS/EIR

Appendices

Acronyms Used in this Report

ACM	asbestos containing material
BLM	Bureau of Land Management
CCR	California Code of Regulations
CDFW	California Department of Fish and Wildlife
CEQ	Council on Environmental Quality
CEQA	California Environmental Quality Act
CESA	California Endangered Species Act
CFR	Code of Federal Regulations
CNDDB	California Natural Diversity Data Base
CORVA	California Off-Highway Vehicle Association
CWA	Clean Water Act
EIR	Environmental Impact Report
EIS	Environmental Impact Statement
EPA	Environmental Protection Agency
FESA	Federal Endangered Species Act
LADWP	Los Angeles Department of Water and Power
LST	Localized Significant Thresholds
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act
NOI	Notice of Intent
NOP	Notice of Preparation
NPS	National Park Service
OHV	Off-Highway Vehicle
kV	kilovolt
MW	megawatt
PV	photovoltaic
ROW	Right-of-Way
RTP	Regional Transportation Plan
SCAG	Southern California Association of Governments
SCAQMD	South Coast Air Quality Management District
SCS	Sustainable Communities Strategies
SSC	Species of Special Concern
USFWS	U.S. Fish and Wildlife Service

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SECTION 1.0
Overview of NEPA/CEQA Scoping Process

1.1 Introduction

Soda Mountain, LLC has applied to the Bureau of Land Management (BLM) for a right-of-way (ROW) grant on public lands to construct, operate, maintain, and decommission a 350 megawatt (MW) photovoltaic (PV) solar energy generating facility and related infrastructure approximately 6 miles southwest of the town of Baker, California, in unincorporated San Bernardino County, to be known as the Soda Mountain Solar Project (Project). The Project would be constructed on approximately 4,397 acres of BLM administered public lands. If the ROW grant application is approved, an amendment of the California Desert Conservation Area Plan of 1980, as amended (CDCA Plan) would be required to identify the site as appropriate for the proposed use. The ROW grant application and CDCA Plan amendment are subject to review under the National Environmental Policy Act (NEPA). The applicant also has submitted a groundwater well construction permit application to San Bernardino County. The County's decision regarding the issuance of a well permit is a discretionary action subject to review under the California Environmental Quality Act (CEQA).

This scoping report documents the joint NEPA/CEQA scoping process and summarizes the scoping comments received for the Project. Specifically, this report describes the scoping events and activities conducted for the Project. It also summarizes the written and verbal comments received on the BLM's Notice of Intent (NOI) and County's Notice of Preparation (NOP). The BLM is the NEPA Lead Agency for the Project; San Bernardino County is the CEQA Lead Agency. This report serves as an information source to the Lead Agencies in their determination of the range of issues and alternatives to be addressed in the joint Environmental Impact Statement (EIS)/Environmental Impact Report (EIR). The Lead Agencies will use the comments received during the scoping period to:

1) Identify key issues to focus the analysis
2) Identify reasonable alternatives to the Project
3) Analyze environmental impacts of the Project and alternatives
4) Identify ways to avoid or reduce environmental impacts
5) Inform the Lead Agencies' decision-making processes.

1.2 Summary of NEPA/CEQA Scoping Process

The NEPA/CEQA scoping process provides government agencies, organizations, and members of the general public the opportunity to identify environmental issues and alternatives for consideration in the EIS/EIR. The scoping process and results are an initial step in the NEPA/CEQA process.

To comply with NEPA (40 CFR 1501.7), the U.S. Environmental Protection Agency (EPA) published a NOI in the Federal Register on October 23, 2012, that provided notice of the BLM's intent to prepare an EIS for the Project (77 FR 64824). The NOI serves as the official legal notice that a federal agency is commencing preparation of an EIS. The Federal Register serves as the U.S. Government's official noticing and reporting publication. The NOI initiates the public scoping period for the EIS, provides information about the Project, and serves as an invitation for other federal agencies to provide comments on the scope and content of the EIS. The NOI for the Project is included as Appendix A-1.

The BLM issued a press release regarding the NOI on October 24, 2012. The NOI and press release, included as Appendix B-1, were made available to agencies and the public on BLM's website for the Project:

http://www.blm.gov/ca/st/en/fo/barstow/renewableenergy/soda_mountain.html

As required by Section 15082 of the CEQA Guidelines (14 CCR 15000 et seq.), San Bernardino County issued an NOP on October 26, 2012, that summarized the Project, stated the County's intention to prepare a joint EIS/EIR, and requested comments from interested parties. The NOP is included as Appendix A-2. Three public notices sent to property owners; 15 copies of the NOP were sent to the California State Clearinghouse; 79 public notices were sent to federal, state, and local agencies and organizations; and 6 public notices were sent to local libraries. Public notices also were sent to Native American groups.

During the NOI comment period, the BLM and San Bernardino County held two joint public scoping meetings on November 14, 2012, one from 2-5 PM and the other from 6-9 PM, at the Hampton Inn & Suites in Barstow, California (2710 Lenwood Road, Barstow, CA 92311). Comment cards and speaker cards were available to participants. The BLM and the County put on a PowerPoint presentation explaining the EIS/EIR processes, the BLM's and the County's roles throughout these processes, and public participation opportunities (the PowerPoint presentation is provided in Appendix C).

The scoping meetings provided the public and government agencies opportunities to receive information on the NEPA/CEQA process and about the Project, as well as to provide oral and written comments. The scoping meetings from 2-5 PM and 6-9 PM were attended by four and 26 persons, respectively, including representatives from local and state agencies, organizations, and private citizens.

All materials provided to the public at the scoping meetings are contained within Appendix C and include the following:

1) Comment Cards
2) Speaker Registration Cards
3) Scoping Meeting Presentations

Appendix D includes the sign-in sheets from both scoping meetings. Appendix E includes the completed speaker registration cards and a summary of the verbal comments from both of the meetings. Speaker comments made during the BLM scoping meeting were recorded by-hand and summarized.

The comment period ended on December 14, 2012 for the BLM's NOI and November 26, 2012 for the County's NOP. In total, 22 letters were received: 11 from federal, state, and local agencies; and 11 from individuals and organizations (see Table 1). These comments have been included in the administrative record for the Project, are documented and summarized in this scoping report, and will be considered in the drafting of the EIS/EIR.

1.3 Agencies, Organizations, and Persons Providing Scoping Comments

Federal, state, and local agencies; private and public organizations; and members of the general public provided written comments during the scoping period. Written comments received during the scoping meetings and in response to the NOI/NOP are included in Appendix F. Table 1 presents the agencies, organizations, and private citizens that provided comments during the scoping process in chronological order.

1.4 Scoping Report Organization

This scoping report summarizes the comments and issues identified during the scoping period, including the public scoping meetings. The Lead Agencies will review and consider all of the scoping comments received in preparing the EIS/EIR for the Project.

Section 2 provides summary information on the Applicant's stated Project objectives and a description of the Project.

Section 3 provides a summary of the comments received and issues raised during the Project's scoping periods, including comments received during the public scoping meetings.

Section 4 provides a summary of future steps in the planning process and indicates opportunities for public participation in the environmental review process.

The Appendices that follow Section 4 include notices, scoping meeting notices, scoping comments received, and other information.

TABLE 1
COMMENTS RECEIVED DURING PUBLIC SCOPING PERIOD

Commenter	Date
Governmental Agencies	
Mojave Desert Air Quality Management District (Alan J. Salvio, Supervising Air Quality Engineer)	November 1, 2012
Bureau of Land Management (Mark Chandler, BLM Realty Specialist-Renewable Energy Coordination Office, Las Vegas, Nevada)	November 6, 2012
Native American Heritage Commission (Dave Singleton, Program Analyst)	November 6, 2012
California Department of Fish and Game (Rebecca Jones, Sr. Environmental Scientist)	November 9, 2012
South Coast Air Quality Management District (Ian McMillan, Program Supervisor, CEQA Inter-governmental; Review, Planning, Rule Development & Area Sources)	November 9, 2012
City of Fontana (Stephanie Hall, Sr. Planner)	November 13, 2012
Department of Toxic Substances Control (Rafiq Ahmed, Project Manager, Brownfields and Environmental Restoration Program)	November 19, 2012
U.S. Environmental Protection Agency, Region IX (Tom Plenys, Environmental Review Office (CED-2), Communities and Ecosystems Division)	November 21, 2012
U.S. Department of the Interior, National Park Service, Mojave National Preserve (Stephanie R. Dubois, Superintendent)	November 21, 2012
California Water Boards, Lahontan Regional Water Quality Control Board (Alan Miller, Chief, North Basin Regulatory Unit)	November 26, 2012
Southern California Association of Governments (Jonathan Nadler, Manager, Compliance and Performance Assessment)	November 26, 2012
Organizations and Individuals	
Laborers International Union of North America, Local Union 1184 (Tony Stearns, Lozeau Drury)	November 2, 2012
Library of Sands (N. Shineywater)	November 10, 2012
Thomas Petroleum (Merritt (Mick) Mead)	November 16, 2012
Basin and Range Watch (Kevin Emmerich, Laura Cunningham)	November 22, 2012
Society for the Conservation of Bighorn Sheep (Bob Burke, Vice President)	November 26, 2012
Brendan Hughes	December 2, 2012
Desert Tortoise Council (Edward L. LaRue, Jr., Ecosystems Advisory Committee)	December 13, 2012
Amargosa Conservancy (Kathleen Boden, Executive Director)	December 14, 2012
Randy Banis	December 14, 2012
National Parks Conservation Association (Seth Shteir, California Desert Field Representative)	December 14, 2012
California Off-Road Vehicle Association (Amy Granat, Managing Director)	December 17, 2012

SECTION 2.0
Summary of the Proposed Project

This section provides an overview of the Project.

2.1 The BLM's Purpose and Need

The BLM's purpose and need for action will dictate the range of alternatives under NEPA and provide a basis for the rationale for eventual selection of an alternative in a decision. The BLM's purpose and need for the Project is to respond to the Applicant's application under Title V of the Federal Land Policy and Management Act of 1976 (FLPMA) (43 USC §1761(a)(4)) for a ROW grant to construct, operate, maintain, and decommission a solar PV facility on public lands in compliance with FLPMA, BLM ROW regulations, and other applicable federal laws. In accordance with §103(c) of FLPMA, public lands are to be managed for multiple uses that take into account the long-term needs of future generations for renewable and non-renewable resources. The Secretary of the Interior is authorized to grant ROWs on public lands for systems of generation, transmission, and distribution of electric energy (43 USC §1761(a)(4)). Taking into account BLM's multiple use mandate, the BLM will decide whether to approve, approve with modification(s), or deny issuance of a ROW grant to the Applicant for the Project.

The BLM's action also will include consideration of a concurrent amendment of the CDCA Plan. The CDCA Plan, while recognizing the potential compatibility of solar generation facilities on public lands, requires that all sites associated with power generation or transmission that are not identified in the CDCA Plan be added to it through the land use plan amendment process.

2.2 Applicant's Project Objectives

The County will consider the applicant's Project objectives in developing a reasonable range of alternatives to the Project under CEQA. The applicant has six primary objectives for the Project:

1) Create an economically viable source of clean renewable electricity generation
2) Provide power to help California's utilities meet the growing demand for electrical power
3) Locate the Project near existing transmission lines to facilitate interconnection
4) Meet Project need while minimizing environmental impacts
5) Provide renewable energy that assists California utilities meet RPS targets
6) Provide a source of renewable energy that fulfills many federal energy policies

2.3 Project Description

Major components of the Project would include:

1) PV panel arrays, inverters, medium-voltage collector transformers, and ancillary equipment.

2) Unpaved access roads between the arrays

3) 34.5-kilovolt (kV) collector lines to connect the panel arrays to the substation

4) A substation and switchyard for interconnection to the transmission system

5) Wells, water storage tanks, and possibly water treatment equipment

6) Buildings: control room/office building, maintenance facility, storage warehouse, and other ancillary structures

7) Relocation of approximately 3.3 miles of Rasor Road

The 350 MW Project would use PV panels attached to single-axis linear trackers with a minimum height of approximately 20 feet. The panels would be oriented north-south so that the panels would follow the sun across the sky east to west over the course of the day. Approximately 1,440 tracker assemblies, each consisting of 22 individual trackers driven by a single motor, would be grouped into 1 MW blocks of four tracker assemblies each.

The Project would interconnect to a 500-kV transmission line owned by a consortium of municipal electric utilities and managed by the Los Angeles Department of Water and Power (LADWP) that runs parallel to I-15 on the west side of the highway. The Project substation would be located northwest of I-15, adjacent to the LADWP transmission line ROW. Within the Project site, 34.5-kV power collection lines would transfer electricity from the solar panel arrays to the substation. Power collection lines from the east side of the site would be routed to the substation under I-15 using a jack-and-bore or directional drilling system that would avoid effects on freeway operations. Power would be stepped up to 500 kV at the substation and fed to the switchyard located adjacent to the LADWP transmission line.

SECTION 3.0
Summary of Scoping Comments

This section of the report summarizes the comments raised by agencies, organizations, and members of the public during the scoping process. This summary is based upon both written and oral comments that were received during the scoping period. Table 1 provides a list of commenters including federal, state, and local agencies as well as organizations and individuals who provided comments. A number of environmental concerns were raised during the scoping process that focused on the Project's potential effects to several environmental resources and issue areas. This scoping report summarizes the comments received according to the following major themes:

1) Project description
2) Human environment issues
3) Natural environment issues
4) Indirect and cumulative impacts
5) Project alternatives
6) EIS/EIR administrative and permitting issues.

3.1 Project Description

Several commenters expressed concerns regarding the proposed location of the Project, particularly that it is located on relatively undisturbed land within close proximity to the Mojave National Preserve. Many of these commenters noted that the Project could have significant impacts on biological, visual, and water resources due to the location of the site. One commenter requested that the Project analysis thoroughly describe the proposed activities with regard to BLM's Solar Programmatic EIS and the DRECP.

Statement of Purpose and Need

Both the USEPA and Basin and Range Watch submitted comments regarding the Statement of Purpose and Need of the Project. Basin and Range Watch stated that the Statement of Purpose and Need should reflect the need to preserve (1) wildlife linkage, (2) connectivity corridors, (3) the visual integrity of the adjacent Mojave National Preserve, (4) the air quality of the Project site, (5) the adjacent Mojave National Preserve, (6) water resources that are important to maintain the wetlands at Soda Springs and habitat for the federally endangered Mojave Tui Chub, (7) rare plants, (8) cultural resources, and (9) recreational access to public lands.

The USEPA submitted comments stating the following with regard to the Statement of Purpose and Need:

1) The purpose and need should be a clear, objective statement of the rational for the proposed Project;

2) The EIS/EIR should discuss the Project in the context of the larger energy market that the Project would serve;

3) The EIS/EIR should identify potential purchasers of the power produced; and

4) The EIS/EIR should discuss how the Project will assist the State in meeting its renewable energy portfolio standards and goals.

3.2 Human Environment Issues

Aesthetics/Visual Resources

Several commenters expressed concern about the visual impact that will occur as a result of the Project and called for visual resource studies to identify the Project's impact to surrounding landscapes and scenic vistas.

The National Park Service (NPS) expressed concern about the effect that lighting would have on the visual landscape surrounding the Project area and recommended the use of shielded lights to prevent light spillage across the landscape. They also called for detailed evaluation and analysis of the Project's impact on scenic vistas, recommending that the visual simulations be created from scenic vistas depicting views towards and away from the Project site.

Basin and Range Watch stated that the Project would be adjacent to conservation areas and the impact to visual resources would degrade the visitor experience. They suggested that the BLM should require more key observation point simulations that depict the worst case scenario. Basin and Range Watch recommends that the following key observation point simulations be included in the visual analysis:

1) Simulations from Razor Road.
2) Simulations from the adjacent Mojave National Preserve.
3) Simulations of dust plumes and potential dust blackout events from construction activity.
4) Two simulations from the Soda Mountain Wilderness Study Area.
5) Two dark sky simulations of construction lighting and security lighting.

The EPA submitted a comment recommending that the EIS/EIR include a glint and glare study and analysis to evaluate the potential hazards of glint and glare to motorists driving on I-15, people working on the site, and pilots flying overhead.

Another commenter requested a complete daytime and nighttime visual analysis of the visual impacts from Mesquite Hills and the south rim of Afton Canyon to determine the visual impact to visitors of the surrounding recreation areas.

Cultural Resources

Numerous comments regarding the Project's potential effect on existing cultural and historic resources in the area were submitted. Many of the cultural resource comments expressed concern about the handling of Native American artifacts during the Project's development and requested that the BLM conduct Native American tribal consultation throughout the permitting process.

One commenter, Seth Shteir from the National Parks Conservation Association, submitted the three documents listed below and requested that they be used as a research guide for the cultural resources section in the EIS/EIR.

1) "A Constraints Study of Cultural Resource Sensitivity within the California Desert" prepared for the Mojave Desert Land Trust by Russell L. Kaldenberg of ASM Planning and Research in July 2008.

2) A Map of "Archaeological and Historical Places that Matter in the California Desert Conservation Area".

3) Sensitive site roster.

The EPA and Native American Heritage Commission submitted comments recommending early consultation and coordination with tribal governments to determine the location of cultural artifacts and minimize the potential damage to these resources.

The Native American Heritage Commission also stated that Lead Agencies should consider the historic context of proposed projects and research the cultural landscape of the Project site. Additionally, historic properties of religious and cultural significance are to be kept confidential, and if Native American cultural sites and/or Native American burial sites are prevalent at the Project site they should be avoided.

The EPA stated that the EIS/EIR should describe the process and outcome of government-to-government consultation between the BLM and each of the tribal governments within the Project area, issues that were raised (if any), and how those issues were addressed in the selection of the proposed alternative.

The EPA also suggested that the EIS/EIR discuss the existence of Indian sacred sites in the Project. The EIS/EIR should also address Executive Order 13007, distinguish it from Section 106 of the National Historic Preservation Act, and discuss how the BLM will avoid adversely affecting the physical integrity, accessibility, or use of sacred sites, if they exist. The EIS/EIR should provide a summary of all coordination with Tribes and with the State Historic Preservation Officer and Tribal Historic Preservation Officer, including identification of National Register of Historic Places eligible sites, and development of a Cultural Resource Management Plan.

Noise

The NPS recommended that the EIS/EIR include a noise analysis that evaluates the noises created during the construction and operation phases of the Project, including timing, intensity, duration, frequency spectrum, and impacts to both people and wildlife.

Public Health and Safety

The Department of Toxic Substances control submitted the following comments:

1. The EIR should evaluate whether conditions within the Project area may pose a threat to human health or the environment.

2. The EIR should identify the mechanism to initiate any required investigation and/or remediation for any site within the proposed Project area that may be contaminated, and the government agency to provide appropriate regulatory oversight. If necessary, DTSC would require an oversight agreement in order to review such documents.

3. Any environmental investigations, sampling and/or remediation for a site should be conducted under a workplan approved and overseen by a regulatory agency that has jurisdiction to oversee hazardous substance cleanup. The findings of any investigations, including any Phase I or II Environmental Site Assessment investigations, should be summarized. All sampling results in which hazardous substances were found above regulatory standards should be summarized clearly in a table. All closure, certification or remediation approval reports by regulatory agencies should be included in the EIS/EIR.

4. If buildings, other structures, asphalt or concrete-paved surface areas are being planned to be demolished, an investigation should be conducted for the presence of other hazardous chemicals, mercury, and asbestos containing materials (ACMs). If other hazardous chemicals, lead-based paints or products, mercury or ACMs are identified, proper precautions should be taken during demolition activities. Additionally, the contaminants should be remediated in compliance with California environmental regulations.

5. Future project construction may require soil excavation or filling in certain areas. Sampling may be required. If soil is contaminated, it must be properly disposed and not simply placed in another location onsite. Land Disposal Restrictions may be applicable to such soils. Also, if the Project proposes to import soil to backfill the areas excavated, sampling should be conducted to ensure that the imported soil is free of contamination.

6. Human health and the environment of sensitive receptors should be protected during any construction or demolition activities. If necessary, a health risk assessment overseen and approved by the appropriate government agency should be conducted by a qualified health risk assessor to determine if there are, have been, or will be, any releases of hazardous materials that may pose a risk to human health or the environment.

7. If the site was used for agricultural, livestock or related activities, onsite soils and groundwater might contain pesticides, agricultural chemical, organic waste or other related residue. Proper investigation, and remedial actions, if necessary, should be conducted under the oversight of and approved by a government agency at the site prior to construction of the Project.

8. If it is determined that hazardous wastes are, or will be, generated by the proposed operations, the wastes must be managed in accordance with the California Hazardous Waste Control Law (California Health and Safety Code, Division 20, Chapter 6.5) and the Hazardous Waste Control Regulations (California Code of Regulations, Title 22, Division 4.5). If it is determined that hazardous wastes will be generated, the facility also should obtain an EPA Identification Number. Certain hazardous waste treatment processes or hazardous materials, handling, storage or uses may require authorization from the local Certified Unified Program Agency.

The EPA submitted comments stating that the EIS/EIR should address potential direct, indirect, and cumulative impacts of hazardous waste from construction and operation. The document should identify projected hazardous waste types and volumes, and expected storage, disposal and management plans. It should address the applicability of state and federal hazardous waste requirements and include measures to mitigate hazardous waste. The EPA also stated that appropriate mitigation should be evaluated in the EIS/EIR, including measures to minimize the generation of hazardous waste. The EPA suggests that alternate industrial processes using less toxic materials should be evaluated as mitigation.

The EPA also recommended that the EIS/EIR address the full product life cycle by sourcing PV components from a company that: 1) minimizes environmental impacts during raw material extraction; 2) manufactures PV panels in a zero waste facility; 3) provides future disassembly for material recovery for reuse and recycling; and 4) minimizes the carbon footprint associated with the manufacture and transport of PV panels.

Because children are more susceptible and vulnerable than adults to environmental health and safety risks, the EPA recommends that the EIS/EIR assess children's potential exposure to Project-related pollutants, including the following:

1) Identification of the pollutants and sources of concern: Consider whether the pollutants and sources of concern pose a particular hazard to children's health (for example, PM_{10}, dust, heavy metals, or air pollution from near construction or roadway exposure).

2) Exposure Assessment: Describe the relevant demographics of affected neighborhoods, populations, and/or communities and focus exposure assessments on children who are likely to be present at schools, recreation areas, childcare centers, parks, and residential areas in close proximity to the Project, and other areas of apparent frequent and/or prolonged exposure.

3) Baseline health conditions: consider obtaining and discussing relevant, publicly available health data/records for the populations, neighborhoods, and/or communities of concern.

4) Impacts from Mobile Source Air Pollutant Emissions: Consider exposure and impacts to children from mobile source air pollutants from Project construction and operations, including significant increases in traffic predicted as a result of the Project. Children are believed to be especially vulnerable due to higher relative doses of air pollution, smaller diameter airways, and more active time spent outdoors and closer to ground-level sources of vehicle exhaust. Identify children's proximity to Project emissions sources, including transportation corridors and construction sites.

5) Respiratory Impacts/Asthma: Within the discussion on air pollution impacts, consider community living, working, playing, and attending school and daycare near the Project site. To the extent feasible, identify potential for increased health risks of the Project with respect to asthma rates and severity in children near the Project site and discuss associates potential costs.

6) Noise Impacts: Consider impacts from noise on health and learning, especially near homes, schools, and daycare centers.

7) Impacts from Other Chemical or Physical Exposures: Consider potential impacts to children from other site activities, such as pesticide application, demolition, etc.

Project Decommissioning, Site Restoration and Financial Assurance

The California Department of Fish and Game, now the California Department of Fish and Wildlife (CDFW) submitted a comment letter recommending that the EIS/EIR include a decommissioning plan.

Environmental Justice

Comments submitted by the EPA state that the EIS/EIR should include an evaluation of environmental justice populations within the geographic scope of the Project. If such populations exist, the EIS/EIR should address the potential for disproportionate adverse impacts to minority and low-income populations, and the approaches used to foster public participation by these populations. Assessment of the Project's impact on minority and low-income populations should reflect coordination with those affected populations. The EPA also recommends that the EIS/EIR should describe outreach conducted to all other communities that could be affected by the Project, since rural communities may be among the most vulnerable to health risks associated with the Project.

Land Use

The EPA stated that the EIS/EIR should discuss how the Project would support or conflict with the objectives of federal, state, tribal or local land use plans, policies and controls in the Project area. The term "land use plans" includes all types of formally adopted documents for land use planning, conservation, zoning and related regulatory requirements. Proposed plans not yet developed should also be addressed if they have been formally proposed by the appropriate government body in a written form (CEQ's Forty Questions, #23b).

Recreation

The Project is proposed to be built adjacent to the Razor Off-Highway Vehicle (OHV) Open Area. The California Off-Road Vehicle Association (CORVA) submitted a letter expressing the organization’s concern about the Project’s impact on the scenery and the enjoyment of the recreation area. CORVA requested that the EIS/EIR include a thorough analysis of the Project’s potential impact to the Razor OHV Open Area.

Another commenter requested that the EIS/EIR include conditions to protect the Razor OHV area from future unforeseen conflict that may arise as a result of the adjacent Project development. The commenter also requested that access to the OHV area and views of the surrounding recreation areas not be blocked or impeded by the Project development.

Transportation and Traffic

The NPS submitted a comment stating that the Project's construction and operation traffic could affect wildlife, soundscapes, and air quality and recommends the preparation of a traffic study to address the Project's traffic-related impacts on the surrounding roads and environment.

The Southern California Association of Governments (SCAG) recommends that the Project's traffic study includes a side-by-side comparison of their eight 2012-2015 Regional Transportation Plan/Sustainable Communities Strategies (RTP/SCS) Goals with discussions of the consistency, non-consistency, or non-applicability of the policy and supportive analysis in a table format. Suggested format is as follows:

SCAG 2012-2015 RTP/SCS GOALS

Goal	Analysis
RTP/SCS G1: Align the plan investments and policies with improving regional economic development and competitiveness.	Consistent: Statement as to why Not-Consistent: Statement as to why or Not Applicable: Statement as to why DEIR page number reference
RTP/SCS G2: Maximize mobility and accessibility for all people and goods in the region.	Consistent: Statement as to why Not-Consistent: Statement as to why or Not Applicable: Statement as to why DEIR page number reference
RTP/SCS G3: Ensure travel safety and reliability for all people and goods in the region.	Consistent: Statement as to why Not-Consistent: Statement as to why or Not Applicable: Statement as to why DEIR page number reference
Etc.	Etc.

Additionally, SCAG recommended that the EIS/EIR reflect the most recently adopted SCAG forecasts (2012-2035 RTP/SCS population, household and employment forecasts) and review the SCAG 2012-2035 RTP/SCS Final Program EIR list of Mitigation Measures Appendix for additional traffic impact mitigation guidance.

3.3 Natural Environment Issues

Biological Resources

Biological issues raised by the public and responsible agencies included potential direct, indirect, and cumulative impacts on the overall health of the ecosystem and special-status species known to occur in the region. Specific comments addressed potential impacts to species including: desert tortoise, bighorn sheep, and burrowing owl. Commenters requested that the Project site be surveyed for these species, as well as any other special status species that may exist in the area. Several commenters also expressed concern about the Project's impact on species' connectivity, which may cause irreversible harm to the viability of species populations and diversity in the area.

The NPS and Basin and Range Watch both identified the Project site as high quality desert tortoise and bighorn sheep habitat and stated that even in the absence of these species the land is important to maintaining the viability and connectivity of these species. Furthermore, the extent of land used by the bighorn sheep on the west side of Soda Mountain is not well known, according to the California Desert Studies Consortium, who requested this land to be further surveyed and addressed in the EIS/EIR.

The NPS believes that the Project could potentially impact other wildlife including raptors, song birds, and bats, and consistent with other comments submitted, the NPS called for extensive biological surveys that are conducted over a period of two years, identifies direct and indirect loss of wildlife habitat, identifies impacts during each season, includes a distribution map with potential migratory and dispersal routes, and addresses loss of wildlife connectivity. The NPS also requested the completion of a salvage plan for any special-status plants of species associated with habitat loss in the Project area.

Comments submitted by Basin and Range Watch included a list of 23 plant species that the organization believes would be affected by the Project and request surveys throughout different times of the year that also would identify wildlife species that may be negatively affected by the Project, including kit fox, burrowing owl, and fringe-toed lizard. Basin and Range Watch recommends the implementation of a kit fox monitoring plan to detect and prevent the spread of distemper among the species. They also recommend that the location of the off-site burrowing owl habitat conservation land is determined prior to Project approval and that impacts to the fringe-toed lizard are mitigated. Basin and Range Watch is also concerned that the solar panel glare will create a "lake effect" that attracts avian species and recommends that the EIS/EIR include a list of the bird species that could be threatened by collision with the panels.

A comment letter from the Desert Tortoise Council addressed several concerns about the Project's impact on biological resources and the lack of available information about the biological resources that currently exist on site. The Council disputed that the Project site had been previously disturbed by OHVs and called for an updated site disturbance survey. They also called for updated biological resource surveys that extend beyond the Project site to evaluate indirect impacts on species that inhabit the areas around the site and requested that the desert tortoise surveys are conducted at a 5-meter interval.

One commenter, Seth Shteir from the National Parks Conservation Association, submitted the four documents listed below and requested that they be used as a research guide for the biological resources section in the EIS/EIR.

1) "Development of Science Priorities for the Desert Landscape Conservation Cooperative: A Comprehensive Assessment of Science Needs" published by Desert LCC Science Working Group in August 2012.

2) "Wildlife Conservation and Solar Energy Development in the Desert Southwest, United States" published in Bioscience Magazine (Vol. 61 No. 12) by Jeffrey E. Lovich and Joshua R. Ennen in December 2011.

3) "Solar Power in the Desert: Are the current large-scale solar development really improving California's environment?" published by Michael F. Allen and Alan McHughen of UC Riverside.

4) Materials from the stakeholder meeting on December 12, 2012 including a letter expressing concern about the Project's impact on the bighorn sheep population that exists in the vicinity of the proposed Project site.

CDFW submitted a comment letter requesting that the EIS/EIR include the following information to enable its staff to adequately review and comment on the Project:

1) A complete assessment of the flora and fauna within and adjacent to the Project area should be conducted, with particular emphasis upon identifying special status species including rare, threatened, and endangered species. This assessment should also address locally unique species, rare natural communities, and wetlands. The assessment area should be large enough to encompass areas potentially subject to both direct and indirect Project affects.

    a) The EIS/EIR should include survey methods, dates, and results; and should list all plant and animal species detected within the Project study area. Special emphasis should be directed toward describing the status of rare, threatened, and endangered species in all areas potentially affected by the Project. All necessary biological surveys should be conducted in advance of EIS/EIR circulation, and should not be deferred until after Project approval.

    b) Rare, threatened, and endangered species to be addressed should include all those which meet the definition in CEQA Guidelines Section 15380.

    c) Species of Special Concern (SSC) status applies to animals generally not listed under the federal Endangered Species Act or the California Endangered Species Act, but which nonetheless are declining at a rate that could result in listing, or historically occurred in low numbers and known threats to their persistence currently exist. SSCs should be considered during the environmental review process.

    d) A thorough assessment of rare plants and rare natural communities following CDFW's November 2009 Protocols for Surveying and Evaluating Impacts to Special Status Native Plan Populations and Natural Communities (Attachment 1).

    e) A detailed vegetation map should be prepared, preferably overlaid on an aerial photograph. The map should be of sufficient resolution to depict the locations of the Project site's major vegetation communities, and view Project impacts relative to each community type. The vegetation classification system used to name the polygons should be described.

f) A complete assessment of rare, threatened, and endangered invertebrate, fish, wildlife, reptile, and amphibian species should be presented in the EIR/EIS. Seasonal variations in use of the Project area also should be addressed. Focused species-specific surveys, conducted at the appropriate time of year and time of day when the species are active or otherwise identifiable, are required. Acceptable species-specific survey procedures should be developed in consultation with CDFW and the U.S. Fish and Wildlife Service (USFWS).

g) CDFW's California Natural Diversity Data Base (CNDDB) should be searched to obtain current information on previously reported sensitive species and habitat, including Significant Natural Areas identified under Chapter 12 of the California Fish and Game code. In order to provide an adequate assessment of special-status species potentially occurring within the Project vicinity, the search area for CNDDB occurrences should include all U.S. Geological Survey 7.5-minute topographic quadrangles with Project activities, and all adjoining 7.5-minute topographic quadrangles. The EIS/EIR should discuss how and when the CNDDB search was conducted, including the names of each quadrangle queried.

2) A thorough discussion of direct, indirect, and cumulative impacts expected to adversely affect biological resources, with specific measures to offset such impacts, should be included.

a) The EIS/EIR should present clear thresholds of significance to be used by the Lead Agencies in their determination of the significance of environmental effects. A threshold of significance is an identifiable quantitative, qualitative or performance level of a particular environmental effect.

b) CEQA Guidelines Section 15125(a) directs that knowledge of the regional setting is critical to an assessment of environmental impacts and that special emphasis should be placed on resources that are rare or unique to the region.

c) Impacts associated with initial Project implementation as well as its long-term operation and maintenance should be addressed in the EIS/EIR.

d) In evaluating the significance of the environmental effect of a Project, the Lead Agencies should consider direct physical changes in the environment and reasonably foreseeable indirect physical changes in the environment, both of which may be caused by the Project. Expected impacts should be quantified (e.g., acres, linear feet, number of individuals taken, volume or rate of water extracted, etc.) to the extent feasible.

e) Project impacts should be analyzed relative to their effects of off-site habitats. Specifically, this may include public lands, open space, downstream aquatic habitats, areas of groundwater depletion, or any other natural habitat that could be affected by the Project.

f) Impacts to and maintenance of wildlife corridor/movement areas and other key seasonal use areas should be fully evaluated and provided.

g) A discussion of impacts associated with increased lighting, noise, human activity, changes in drainage patterns, changes in water volume, velocity, quantity, and quality, soil erosion, and/or sedimentation in streams and water courses on or near the Project site, with mitigation measures proposed to alleviate such impacts should be included. Special considerations applicable to linear projects include ground disturbance that may facilitate infestations by exotic and invasive species over a great distance.

h) A cumulative effects analysis should be developed as described under CEQA Guidelines, Section 15130. General and specific plans, as well as past, present, and anticipated future projects, should be analyzed relative to their impacts to similar plant communities and wildlife habitats.

3) Mitigation measures for adverse Project-related impact on sensitive plants, animals, and habitats should be thoroughly discussed. Mitigation measures should first emphasize avoidance and reduction of Project impacts. For unavoidable impacts, the feasibility of on-site habitat restoration or enhancement should be discussed. If on-site mitigation is not feasible, off-site mitigation through habitat creation, enhancement, acquisition, and preservation in perpetuity should be addressed.

a) CDFW generally does not support the use of relocation, salvage, and/or transplantation as mitigation for impacts to rare, threatened, or endangered species. Studies have shown that these efforts are experimental in nature and largely unsuccessful.

b) Areas reserved as mitigation for Project impacts should be legally protected from future direct and indirect impacts. Potential issues to be considered include limitation of access, conservation, easements, monitoring and management programs, water pollution, and fire.

c) Plans for restoration and revegetation should be prepared by persons with expertise in southern California ecosystems and native plant revegetation techniques. Each plan should include, at a minimum: (a) the location of the mitigation site; (b) the plant species to be used, container sizes, and/or seeding rates; (c) a schematic depicting the mitigation area; (d) planting schedule; (e) a description of the irrigation methodology; (f) measures to control exotic vegetation on site; (g) specific success criteria; (h) a detailed monitoring program ; (i) contingency measures should the success criteria not met; and (j) identification of the party responsible for meeting the success criteria and providing for long-term conservation of the mitigation site.

4) Take of species or animals listed as endangered or threatened under the California Endangered Species Act (CESA) is unlawful unless authorized by CDFW. However, a CESA Section 2081(b) Incidental Take Permit may authorize incidental take during Project construction or over the life of the Project. The EIS/EIR must state whether the Project would result in any amount of incidental take of any CESA-listed species. CESA permits are issued to conserve, protect, enhance, and restore State-listed threatened or endangered species and their habitats. Early consultation is encouraged, as significant modification to a Project and mitigation measures may be required in order to obtain a CESA Permit.

CDFW's issuance of a CESA permit for a project that is subject to CEQA will require CEQA compliance actions by CDFW as a Responsible Agency. CDFW may require additional mitigation measures for the issuance of a CESA permit unless the Project's CEQA document addresses all Project impacts to listed species and specifies a mitigation monitoring and reporting program that will meet the requirements of a CESA permit.

To expedite the CESA permitting process, CDFW recommends that the DEIR addresses the following CESA permit requirements:

a) The impacts of the authorized take are minimized and fully mitigated;

b) The measures required to minimize and fully mitigate the impacts of the authorized take and: (1) are roughly proportional in extent to the impact of the taking on the species; (2) maintain the applicant's objectives to the greatest extent possible, and (3) are capable of successful implementation;

c) Adequate funding is provided to implement the required minimization and mitigation measures and to monitor compliance with and the effectiveness of the measures; and

d) Issuance of the permit will not jeopardize the continued existence of a State-listed species.

5) CDFW has responsibility for wetland and riparian habitats. It is the policy of the agency to strongly discourage development in wetlands or conversion of wetlands to uplands. It opposes any development or conversion which would result in a reduction of wetland acreage or wetland habitat values, unless, at a minimum, mitigation measures assure there will be "no net loss" of either wetland habitat values or acreage. The EIS/EIR should demonstrate that the Project will not result in a net loss of wetland habitat values or acreage.

a) If the Project site has the potential to support aquatic, riparian, or wetland habitat, a jurisdictional delineation of lakes, streams, and associated riparian habitats potentially affected by the Project should be provided for agency and public review. This report should include a jurisdictional delineation that includes wetlands identification pursuant to the USFWS wetland definition as adopted by CDFW. Some of the wetland and riparian habitats subject to CDFW's authority may extend beyond the jurisdictional limits of the U.S. Army Corps of Engineers. The jurisdictional delineation should also include mapping of ephemeral, intermittent, and perennial stream courses potentially impacted by the Project. In addition to federally protected wetlands, CDFW considers impacts to wetlands (as defined by CDFW) potentially significant.

b) The Project may require a Lake or Streambed Alteration Agreement pursuant to Section 1600 at seq. of the California Fish and Game Code, with the applicant prior to the applicant's commencement of any activity that will substantially divert or obstruct the natural flow or substantially change the bed, channel, or bank (which may include associated riparian resources) of a river, stream or lake, or use material from a streambed. CDFW's issuance of a lake or Streambed Alteration Agreement for a project that is subject to CEQA will require CEQA compliance actions by CDFW as a responsible agency. To minimize additional requirements by CDFW pursuant to Section 1600 et seq. and/or under CEQA, the EIS/EIR should fully identify the potential impacts to the lake, stream, or riparian resources and provide adequate avoidance, mitigation, monitoring and reporting commitments for issuance of the agreement.

CDFW also recommended that the EIS/EIR address the following site-specific environmental issues:

1) The Project is within the range of the desert tortoise (*Gopherus aggassizzi*), which is listed as threatened under CESA and FESA. CDFW recommends surveys for desert tortoise be conducted using the most recent USFWS protocol. CDFW also recommends the survey

datasheets be submitted with the EIS/EIR. The EIS/EIR should include mitigation measures to fully mitigate potential impacts to desert tortoise.

2) The Project is within the range of the burrowing owl (*Athene cunicularia*), which is a Species of Special Concern and protected under Fish and Game Code Section 3503.5. CDFW recommends surveys for burrowing owl to be conducted using the most recent established survey protocol. CDFW also recommends the survey datasheets be submitted with the EIS/EIR and the EIS/EIR include mitigation measures to offset potential impacts to burrowing owl.

3) The desert bighorn sheep (*Ovis Canadensis nelsoni*) is a Fully Protected Species under the Fish and Game Code Section 4700 and the golden eagle (*Aquila chrysaetos*) is Fully Protected under Fish and Game Code Section 3511. Fully protected species may not be taken or possessed at any time and no licenses or permits may be issued for their take except for collecting these species for necessary scientific research and relocation of the bird species for the protection of livestock. CDFW recommends the EIS/EIR include mitigation measures that will offset potential impacts to these species.

To guide the Project's plant and natural community surveys, CDFW recommended a paper titled "Protocols for Surveying and Evaluating Impacts to Special Status Native Plant Populations and Natural Communities," published by the California Natural Resource Agency on November 24, 2009.

Comments submitted by the EPA state that the EIS/EIR should identify and quantify the species and the critical habitat areas that might be directly, indirectly, or cumulatively affected by each alternative and mitigate impact to these species, with emphasis placed on protecting species based on their status or potential status under the Endangered Species Act. The EPA recommends that the BLM work closely with the USFWS and CDFW to determine potential impacts of the Project on plant and wildlife species, especially species classified rare, threatened, endangered, or special status on federal state or agency lists.

Analysis of impacts and mitigation on covered species should:

1) Identify all petitioned and listed threatened and endangered species and critical habitat, as well as sensitive species, which may occur within the Project area;

2) Discuss how surveys were conducted for each species, the findings of each survey, and all follow-up surveys and monitoring that would be conducted before, during, and/or after site construction begins;

3) A clear description of how avoidance, mitigation, and conservation measures will protect and encourage the recovery of the covered species and their habitats in the Project area;

4) Monitoring, reporting, and adaptive management efforts to ensure species and habitat conservation effectiveness;

5) Discuss how and when the BLM intends to meet its obligations under Section 7 of the Endangered Species Act, if applicable;

6) Include the biological assessment by reference or as an appendix, if one is prepared;

7) If a biological opinion is prepared by the USFWS, it should be summarized or included as an appendix in the DEIS to demonstrate that the preferred alternative is consistent with the biological opinion.

The EPA states that the EIS/EIR should describe the extent of the construction, installation, and maintenance activities proposed onsite and the associated impacts on habitat and threatened and endangered species. The EPA encourages habitat conservation alternatives that avoid and protect high value habitat and create or preserve linkages between habitat areas to better conserve the covered species.

1) The EIS/EIR should indicate what measures will be taken to protect important wildlife habitat areas from potential adverse effects of proposed covered activities. The EPA encourages the BLM to maximize options to protect habitat and minimize habitat loss and habitat fragmentation.

2) The EIS/EIR should discuss the impacts associated with an increase of shade and alteration of rainfall deposition patterns on vegetation and/or species.

3) The EIS/EIR should evaluate mounting PV arrays at sufficient height above ground to maintain natural vegetation and minimize drainage disturbance. The EIS/EIR should also quantify acreage that would not require clearing and grading as a result, and compare results to existing alternatives and incorporate into site design and conditions of use.

4) The EIS/EIR should provide detailed information on any proposed fencing design and placement, and its potential effects on drainage systems on the Project site. Fencing for the Project should meet appropriate hydrologic, wildlife protection and movement, and security performance standards. Those standards should be described in the EIS/EIR.

If the applicant has or is to acquire compensation lands, the location(s) and management plan for these lands should be discussed in the EIS/EIR. The EPA made the following recommendations regarding mitigation of impacts created by the Project:

1) Incorporate into the EIS/EIR information on the compensatory mitigation proposals (including quantification of acreages, estimates of species protected, costs to acquire compensatory lands, etc.) for unavoidable impacts to Waters of the U.S., state waters, and biological resources.

2) Identify compensatory mitigation lands or quantify, in the EIS/EIR, available lands for compensatory habitat mitigation for this Project, as well as reasonably foreseeable projects in the area. Specify, in the EIS/EIR, provisions that will ensure habitat selected for compensatory mitigation will be protected in perpetuity.

3) Incorporate into the EIS/EIR mitigation, monitoring, and reporting measures that result from consultation with the USFWS and CDFW, and that incorporate lessons learned from other solar projects and recently released guidance to avoid and minimize adverse effects to sensitive biological resources.

4) The EIS/EIR should describe the potential for habitat fragmentation and obstructions for wildlife movement from the construction of this Project and other projects in the area.

5) Discuss the need for monitoring, mitigation, and if applicable, translocation management plans for the sensitive biological resources, approved by the BLM and the biological resource management agencies. This would include, but not be limited to, a Bird and Bat Conservation Strategy; a Raven Monitoring, Management, and Control Plan; and a Special Status Plant Impact Avoidance and Mitigation Plan.

6) The EIS/EIR should include assurances that the design of the transmission line would be in compliance with current standards and practices that reduce the potential for raptor fatalities and injuries. The commonly referenced source of such design practices is found within the avian Power Line Interaction Committee documents: *Suggested Practices for Avian Protection on Power Lines: State of the Art in 2006* manual and *Mitigation Bird Collisions with Power Lines: The State of the Art in 1994.* In consultation with the USFWS, determine the need for a Bird and Bat Conservation Strategy to be developed using the 2005 Avian Power Line Interaction Committee and USFWS Avian Protection Plan Guidelines or the need for an Eagle Conservation Plan following the USFWS 2011 Draft Eagle Conservation Plan Guidance.

The EPA encourages alternative management practices to limit the use of herbicides, focusing instead on other methods to limit invasive species vegetation and decrease fire risk.

1) The EIS/EIR should describe the invasive management plan used to monitor and control noxious weeds. If herbicides or pesticides will be used to manage vegetation, the EIS/EIR should disclose the projected quantities and types of chemicals. The invasive plant management plan should identify methods that can be used to limit the introduction and spread of invasive species during the post-construction. These measures can include marketing and avoidance of invasives, timing construction activities during periods that would minimize their spread, proper cleaning of equipment and proper disposal of woody material removed from the site.

2) Because construction measures may not be completely effective in controlling the introduction and spread of invasives, EIS/EIR should describe post-construction activities that will be required such as surveying for invasive species following restoration of the construction site and measures that will be taken if infestations are found.

Water Resources

Comments regarding the Project's impact on water resources were received from Basin and Range Watch, the EPA, NPS, as well as individual citizens.

Comments from the NPS and Basin and Range Watch expressed concern about the assumptions made in the Hydrogeologic Conditions and Groundwater Modeling Report; specifically they believe that the assumptions did not include enough hard data to substantiate the report's groundwater recharge rate data. The NPS also stated that the report does not accurately describe the surface water flow and actual field observations should be used to report the surface water flows and subsurface data.

The NPS and the California Desert Studies Consortium expressed concern that the Project's groundwater withdrawal will affect Soda Springs which is habitat for the source population of the endangered Mohave Tui Chub (*Siphateles mohavensis bicolor*), as well as other species that are dependent on the limited water resources in the desert. To alleviate impacts to the groundwater resources, the California Desert Studies Consortium recommends that the EIS/EIR include a full investigation of the aquifer that is proposed to be used by the Project and the impacts that will occur as a result of groundwater withdrawal from the aquifer.

The NPS and Lahontan Regional Water Quality Control Board (Board) believe that storm water management must be considered as a significant component in the Project design and implementation. The Board commented that hydrologic changes tend to exacerbate flooding, erosion, scouring, sedimentation and may ultimately lead to near-total loss of natural functions and values and the EIS/EIR should address these potential impacts, which are considered significant. Additionally, the Board requested that the EIS/EIR evaluate all potential storm water impacts, describe controls needed during construction, and needed to mitigate potential post-construction hydrologic impacts, and describe specific best management practices that, when implemented, will reduce those potential impacts to a less than significant level. To avoid groundwater impacts altogether, the Board also requests that the EIS/EIR describe design alternatives that maintain the existing hydrology of the site. The NPS submitted a comment regarding alternatives, stating that alternatives to the use of groundwater, including the use of dust palliatives and panel cleaning by air blowing, dust clothes, or other means, should be considered in the EIS/EIR. In the absence of feasible alternatives, mitigation measures shall be included in the EIS/EIR and implemented to alleviate significant storm water flow impacts.

Both the NPS and the Board requested that maps be created to provide more information about the water resources in the vicinity of the Project site and the potential water resource impacts created by the Project. Specifically, the NPS requested a map that evaluates all potential storm water impacts and a description of post-construction hydrologic impacts and specific best-management practices that, when implemented, would reduce those potential impacts to insignificant levels. The Board requested that the EIS/EIR include a map identifying all surface water resources within the vicinity of the Project area and include a narrative discussion of the delineation methods used to discern those surface water features in the field.

The Board recommends that the EIS/EIR analyze compliance with policies in the Basin Plan and requires the applicant to comply with all applicable water quality standards and prohibitions, including provisions of the Basin Plan concerning industrial wastes, wetlands, floodplains, construction activities, and land development. The board also requests that the applicant consult with the U.S. Army Corps of Engineers and the CDFW and perform the necessary jurisdictional determinations for surface waters within the Project area. Additionally, the Board requests that the EIS/EIR list the permits that may be required and identify the specific operations, maintenance, and/or minor construction activities and their impact mitigation measures that will be employed under these permitting actions.

The Board requested that the EIS/EIR identify surface waters and the prescribed beneficial uses of these waters within the Project area, and evaluate the Project’s potential impacts to water quality with respect to those beneficial uses (examples of beneficial uses include: wildlife habitat, groundwater recharge, water quality enhancement, etc.). For each water resource impact, the

Board requested that the EIS/EIR include alternative and mitigation measures to minimize impacts to the greatest extent possible.

Basin and Range Watch expressed their belief that that the amount of water required to maintain the Project has been underestimated and cannot be estimated accurately without knowing the Project's photovoltaic technology selection. Their other concerns include the Project's impact on the smoke tree (*Psorothamnus spinosus*) as a result of groundwater draw down, the effect stormwater diversion will have on groundwater levels downstream, and the potential for flash flood damage due to the presence of alluvial drainages throughout the Project site.

Similar to the requests from several other commenters, CDFW submitted a comment recommending that the applicant conduct a complete impact analysis to evaluate whether groundwater withdrawal could cause drying or reduction of water to springs adjacent to the Project area. The agency also requested that the impact analysis be included in the EIS/EIR.

The EPA submitted comments concerning the Project's impact on water resources and stated that the EIS/EIR should estimate the quantity of water that Project will require (including during construction and operation) 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 EIS/EIR should clearly depict reasonably foreseeable direct, indirect, and cumulative impacts to water resources. If groundwater is to be used, the potentially-affected groundwater basin should be identified and any potential for subsidence and impacts to springs or other open water bodies and biologic resources should be analyzed. The EPA recommends that the EIS/EIR address the following points to identify the Project's water needs and the resulting impacts on water resources:

1. A discussion of the amount of water needed for the proposed PV electrical generation facility and where this water will be obtained.

2. A discussion of availability of groundwater within the basin and annual recharge rates.

3. A description of the water right permitting process and the status of water rights within that basin, including an analysis of whether water rights have been over-allocated, and a discuss groundwater adjunction in the Project vicinity.

4. A discussion of cumulative impacts to groundwater supply within the hydrographic basin, including impacts from other proposed large-scale developments.

5. An analysis of different types of technology that can be used to minimize or recycle water, including minimizing or eliminating water use for washing PV panels.

6. A discussion of whether it would be feasible to use other sources of water, including potable water or wastewater.

7. An analysis of the potential for the Project and alternatives to cause adverse aquatic impacts such as impacts to water quality and aquatic habitats, directly, indirectly, and cumulatively.

The EPA also recommended that the EIS/EIR address the potential effects of Project discharges, if any, on surface water quality. Specific discharges should be identified and potential effects of discharges on designated beneficial uses of affected waters should be analyzed. If the facility is a zero discharge facility, the EIS/EIR should disclose the amount of processed water that would be disposed of onsite and explain methods of onsite containment.

The EPA strongly encourages the BLM to include in the EIS/EIR a description of all water conservation measures that will be implemented to reduce the water demands. Project designs should maximize conservation measures such as appropriate use or recycled water for landscaping and industry, xeric landscaping, a water pricing structure that accurately reflects the economic and environmental costs of water use, and water conservation education.

The EIS/EIR should describe the water reliability for the Project and clarify how existing and/or proposed sources may be affected by climate change. At a minimum, the EPA expects a qualitative discussion of impacts to water supply and the adaptability of the Project to these changes.

Additionally, the EPA recommends coordination with the U.S. Army Corps of Engineers to obtain a jurisdictional delineation and confirm the presence of Waters of the U.S. in the Project area, in order to determine whether or not a Clean Water Act (CWA) Section 404 permit is needed. If a permit is needed, the EIS/EIR should demonstrate the Project's compliance with the CWA Section 404(b)(1) Guidelines. The EIS/EIR should describe all Waters of the U.S. that could be affected by the Project alternatives, and include maps that clearly identify all Waters of the U.S. within the Project area. The discussion should include acreages and channel lengths, habitat types, values, and functions of the Waters of the U.S.

If an aquatic feature does not constitute a Water of the U.S. but could be affected by the Project, the EPA recommends that the EIS/EIR characterize the functions of the aquatic feature and discuss potential mitigation measures. To avoid and minimize direct and indirect impacts to desert washes (such as erosion, migration of channels, and local scour), as applicable:

1. Avoid placement of support structures in washes;
2. Utilize existing natural drainage channels on site and more natural features, such as earthen berms or channels, rather than concrete-line channels;
3. Discuss the feasibility of higher profile panel installation (e.g. greater ground clearance) to allow for less disturbance of natural contours, drainage channels, and vegetation on site.
4. Commit to the use of natural washes, in their present location and natural form and including adequate natural buffers, for flood control to the maximum extent practicable;
5. Minimize the number of road crossings over washes and designing necessary crossings to provide adequate flow-through during storm events; and

6. Avoid complete clearing and grading of the site by evaluating the mounting of PV panels at sufficient height above ground to minimize natural vegetation and reduce impacts to drainages.

The EPA also recommended that the EIS/EIR discuss the availability of sufficient compensation lands within the Project's watershed to replace desert wash functions lost on the Project site.

The EPA stated that the Project may be subject to a California State Water Resources Control Board General Permit associated with construction activity Construction General Permit Order 2009-0009-DWQ. If such a permit is required, the agency requests that the EIS/EIR include a description of the proposed stormwater pollution control and mitigation measures.

Air Resources

The EPA, Basin and Range Watch, Mojave Desert Air Quality Management District, South Coast Air Quality Management District (SCAQMD), and the NPS submitted comments regarding air resource impacts. Many of the comments recommended that the EIS/EIR include studies that explain and quantify the potential air quality impacts throughout each phase of the Project.

The SCAQMD recommends that the Lead Agencies use the CEQA Air Quality Handbook as guidance when preparing the air quality analysis and identifies any potential adverse air quality impacts that could occur during each phase of the Project. Additionally, the SCAQMD requests that the Lead Agencies quantify PM2.5 emissions and compare the results to the recommended PM2.5 significance threshold. The Lead Agencies also should calculate the localized air quality impacts and compare the results to localized significant thresholds (LSTs). Since the Project will utilize vehicles, the SCAQMD recommends that the Lead Agencies perform a mobile source health risk assessment. In the event that Project generates adverse air quality impacts, the SCAQMD recommends mitigations measures that go beyond what is required by law are implemented to reduce all significant impacts.

The Mojave Desert Air Quality Management District and the NPS both submitted comment letters recommending that the County require the Project applicant to prepare and submit a dust control plan pursuant to requirements of District Rule 403.2 prior to commencing earth-moving activity that describes all applicable dust control measures that will be implemented in the Project.

Basin and Range Watch expressed concern about the increase in airborne particles with each additional solar project development. They are concerned that the removal of stabilized soil will create additional air quality impacts and recommends that construction not be permitted on days of high winds or during the hottest months of the year. Basin and Range Watch also is concerned that the use of soil stabilizers will cause the top layer of soil to unnaturally hard, making it difficult to rework the top layer into the existing soil during the site decommissioning and restoration. Another concern is that these soil stabilizers will erode the drainage onsite and end up in the Soda Springs system.

The EPA stated that the EIS/EIR should provide a detailed discussion of ambient air conditions (baseline or existing conditions), National Ambient Air Quality Standards (NAAQS), criteria pollutant nonattainment areas, and potential air quality impacts of the Project (including cumulative and indirect impacts). The EPA believes such an evaluation is necessary to assure compliance with State and Federal air quality regulations, and to disclose the potential impacts from temporary or cumulative degradation of air quality.

The EPA also recommended that the EIS/EIR describe and estimate air emissions from potential construction and maintenance activities, as well as, proposed mitigation measures to minimize those emissions. In addition, the EPA recommends an evaluation of the following measures to reduce emission of criteria air pollutants and hazardous air toxics.

1) ***Existing Conditions*** – The EIS/EIR should provide a detailed discussion of ambient air conditions, NAAQS, and criteria pollutant nonattainment areas in all areas considered for solar development. The EIS/EIR should identify all Class I Prevention of Significant Deterioration areas located within 100 km of the proposed Project site. Class I areas even further away could potentially be affected. Potential impacts to Class I Prevention of Significant Deterioration areas, including visibility impacts, should be discussed.

2) ***Quantify Emissions*** – The EIS/EIR should estimate emissions of criteria pollutants from the Project and discuss the timeframe for release of these emissions over the lifespan of the Project. The EIS/EIR should describe and estimate emissions from potential construction activities, as well as proposed mitigation measures to minimize these emissions.

3) ***Specify Emission Sources*** – The EIS/EIR should specify the emission sources by pollutant from mobile sources, stationary sources, and ground disturbance. This source specific information should be used to identify appropriate mitigation measures and areas in need of the greatest attention.

4) ***Construction Emissions Mitigation Plan*** – The EIS/EIR should include a Construction Emissions Mitigation Plan and ultimately adopt this plan in the Record of Decision. In addition to all applicable local, state, or federal, requirements, the EPA recommends that the following mitigation measures be included in the Construction Emission Mitigation Plan in order to reduce impacts associated with emission of particulate matter and other toxics from construction-related activities:

    a) *Fugitive Dust Control Plan* – The EIS/EIR should identify the need for a Fugitive Dust Control Plan to reduce Particulate Matter 10 and Fine Particulate Matter 2.5 emissions during construction and operations. The EPA recommends that the plan include the following general commitments: stabilize heavily used unpaved roads; use water during grading to control visible plumes; limit vehicle speeds; inspect and wash construction equipment vehicle tires before entering paved roadways; ensure construction vehicles exit construction sites through treated entrance roadways by providing gravel ramps at tire washing/cleaning stations; take measures to prevent run-off in roadways; keep paved roadways free of dirt; stabilize disturbed soils; cover or treat soil storage piles; and utilize wind erosion control techniques.

    b) *Mobile and Stationary Source Controls* – commit to the best available emission control technology; use most fuel-efficient vehicles possible; minimize vehicle trips and idling; and maintain engines to perform at California Air Resources Board and/or EPA certification levels.

c) *Administrative Controls* – Develop a construction traffic and parking management plan; identify sensitive receptors in the Project area and minimize impacts to these populations; and include provision for monitoring fugitive dust in the fugitive dust control plan and initiate increased mitigation measures to abate any visible dust plumes.

Climate Change

The EPA and Basin and Range Watch submitted comments regarding climate change impacts. Basin and Range Watch requested that the EIS/EIR include a projection of the Project's carbon footprint and an estimate of much CO_2 sequestration material would be eliminated through removing close to 3,000 acres of topsoil.

The EPA stated that the EIS/EIR should consider how climate change could potentially influence the Project, specifically within sensitive areas, and assess how the projected impacts could be exacerbated by climate change. The EIS/EIR should also quantify and disclose the anticipated climate change benefits of solar energy. The EPA suggests quantifying greenhouse gas emissions from different types of generating facilities including solar, geothermal, natural gas, coal-burning, and nuclear and compiling and comparing these values.

3.4 Cumulative Impacts

Many of the comment letters received expressed concern about the cumulative impacts that would occur as a result of the Project being built in conjunction with several other large-scale energy projects in the desert. Commenters who expressed concern about this topic called for a thorough analysis of the cumulative impacts in the EIS/EIR.

The NPS submitted comments regarding cumulative impacts, stating that direct and indirect cumulative impacts need to be analyzed as they apply to the Project site and the greater vicinity. The NPS suggests that plans for past, present and anticipated future projects should be analyzed relative to their impacts to Mojave National Preserve.

Seth Shteir, from the National Parks Conservation Association, submitted the three documents listed below to express concern about the cumulative impact that solar development will have on tourism in the California desert, which is a source of income for residents in the area.

1) "Desert Renewable Energy Conservation Plan" memo from the Tourism Economic Commission to the California Energy Commission, sent on May 22, 2012.

2) "Desert Renewable Energy Conservation Plan Supplemental Map to Comments Filed November 14, 2012 by Morongo Basin Economic Development Consortium, Tourism Committee" memo from Joshua Tree Gateway Communities to the California Energy Commission, sent on December 5, 2012.

3) Map of "Tourism Economics Commission Important Tourism Areas" created by the Tourism Economics Commission in December 2012.

Mark Chandler, a BLM realty specialist, submitted a comment suggesting that the Las Vegas BLM renewable energy project site may be a useful resource when developing the cumulative impact analysis for the EIS/EIR.

The EPA stated that the cumulative impacts analysis should identify how resources, ecosystems, and communities in the vicinity of the Project have been, or will be, affected by past, present, or future activities in the Project area. The EPA also stated that the EIS/EIR should focus on resources of concern, which are those resources that are “at risk” and/or are significantly impacted by the Project before mitigation.

The EPA recommends that for each resource analyzed, the EIS/EIR should:

1) Identify the current condition of the resource as a measure of past impacts. For example, the percentage of species habitat lost to date.

2) Identify the trend in the condition of the resource as a measure of present impacts. For example, the health of the resource is improving, declining, or in stasis.

3) Identify all on-going, planned, and reasonably foreseeable projects in the study area that may contribute to cumulative impacts.

4) Identify the future condition of the resource based on an analysis of impacts from reasonably foreseeable projects or actions added to existing conditions and current trends.

5) Assess the cumulative impacts contribution of the proposed alternatives to the long-term health of the resource, and provide a specific measure for the projected impact from the proposed alternatives.

6) Disclose the parties that would be responsible for avoiding, minimizing, and mitigating those adverse impacts.

7) Identify opportunities to avoid and minimize impacts, including working with other entities.

The EIS/EIR should describe the reasonable foreseeable future land use and associated impacts that will result from the additional power supply. The document should provide an estimate of the amount of growth, its likely location, and the biological and environmental resources at risk.

The EPA recommends that the EIS/EIR should consider the direct and indirect effects of the inter-connecting transmission line for the Project, as well as the cumulative effects associated with the transmission needs of other reasonably foreseeable projects.

3.5 Project Alternatives

Basin and Range Watch, CDFW, the EPA, as well as several other individuals and organizations submitted comments regarding Project alternatives. The comments generally requested that the EIS/EIR include an analysis of a range of project alternatives to ensure that the full spectrum of alternatives to the proposed Project are fully considered and evaluated.

Several commenters expressed concern with the Project's impact to Razor Road and the Razor OHV Open Area. One commenter specifically requested that the EIS/EIR include an alternative to rerouting Razor Road and an alternative with a buffer zone around the OHV recreation area. Another commenter proposed a project location alternative that is wholly within the Interstate 15 corridor and does not extend south or east of Arrowhead Trail and the existing Razor Road, respectively.

A Bechtel representative indicated that the Project site was the preferred location out of a choice of the five sites considered, and the Desert Tortoise Council would like the EIS/EIR to include an analysis of the four other sites considered and explain why they were rejected.

Basin and Range Watch requested that the range of alternatives comply with NEPA guidelines and include (1) a No Action Alternative; (2) a Brownfields and Degraded Lands Alternative; (3) a Distributed Generation Alternative; and (4) a wildlife linkage conservation alternative considered under the DRECP.

The CDFW recommended that alternatives that avoid or otherwise minimize impacts to sensitive biological resources should be identified. They also stated that if the Project results in any impacts described under the Mandatory Findings of Significance (CEQA Guidelines §15065) the impacts must be analyzed in depth in the EIS/EIR, and the Lead Agencies are required to make detailed findings on the feasibility of alternatives or mitigation measures to substantially lessen or avoid the significant effects on the environment. When mitigation measures or Project changes are found to be feasible, the Project should be changed to substantially lessen or avoid the significant effects.

The EPA submitted comments regarding Project alternatives, stating that the EIS/EIR should describe how each alternative was developed, how it addresses each Project objective, and how it would be implemented. The alternatives analysis should include a discussion of a reduced acreage, reduced MW and modified footprint alternatives, as well as alternative sites and generating technologies, including different types of solar technologies, and describe the benefits associated with the proposed technology. The EIS/EIR should clearly describe the rational used to determine whether impacts of an alternative are significant or not. Thresholds of significance should be determined by considering the context and intensity of an action and its effects (40 CFR 1508.27).

The EPA strongly encouraged the Lead Agencies to pursue the siting of renewable energy projects on disturbed, degraded, and contaminated sites, including fallow or abandoned agricultural lands before considering large tracts of undisturbed public lands. The EIS/EIR should identify and analyze an environmentally preferable alternative. Options such as reducing the footprint of the Project within the Project area or relocating sections/components of the Project to other areas, including private land, to reduce environmental impacts should be examined. The EPA also recommended that the EIS/EIR describe the current condition of the land selected for the Project, discuss whether the land is classified as disturbed, and describe to what extent the land could be used for other purposes in the future.

3.6 EIS/EIR Administrative and Permitting Issues

Agency Permits/Consultation

Several comments were submitted by Basin and Range Watch, Lozeau Drury LLP, and the EPA regarding EIS/EIR administrative and permitting issues and needs.

Basin and Range Watch expressed concern that the Project will not meet the goals of Section 4 in Secretarial Order 3283, stating that it is not an "environmentally responsible" project. They also state that the Project would be inconsistent with the Best Management Practices concerning NEPA, the Endangered Species Act, and the FLPMA, due to its potential impacts on rare plants, endangered wildlife, cultural resources, air quality, and the adjacent Mojave National Preserve.

Lozeau Drury LLP submitted a comment on behalf of Laborers International Union of North America, Local Union 1184 and its members living in San Bernardino County requesting that the BLM include them on all recipient lists for all notices, public meetings, and the availability of environmental documents issued under NEPA, the California Planning and Zoning Law, and/or CEQA, referring or related to the Project.

The EPA submitted comments stating that the EIS/EIR should incorporate, as applicable, Best Management Practices or design features from the Best Management Practices and Guidance Manual: Desert Renewable Energy Projects, Dec. 2010, Publication #REAT-1000-2010-009-F and the BLM's Final Solar Energy Development Programmatic Environmental Impact Statement (Solar PEIS) and Record of Decision.

The EPA also recommends that the BLM consider adopting a formal adaptive management plan to evaluate and monitor resources and ensure the successful implementation of mitigation measures. The EPA recommends that BLM review specific discussion on Adaptive Management in the NEPA Task Force Report to the Council on Environmental Quality (CEQ) on Modernizing NEPA.

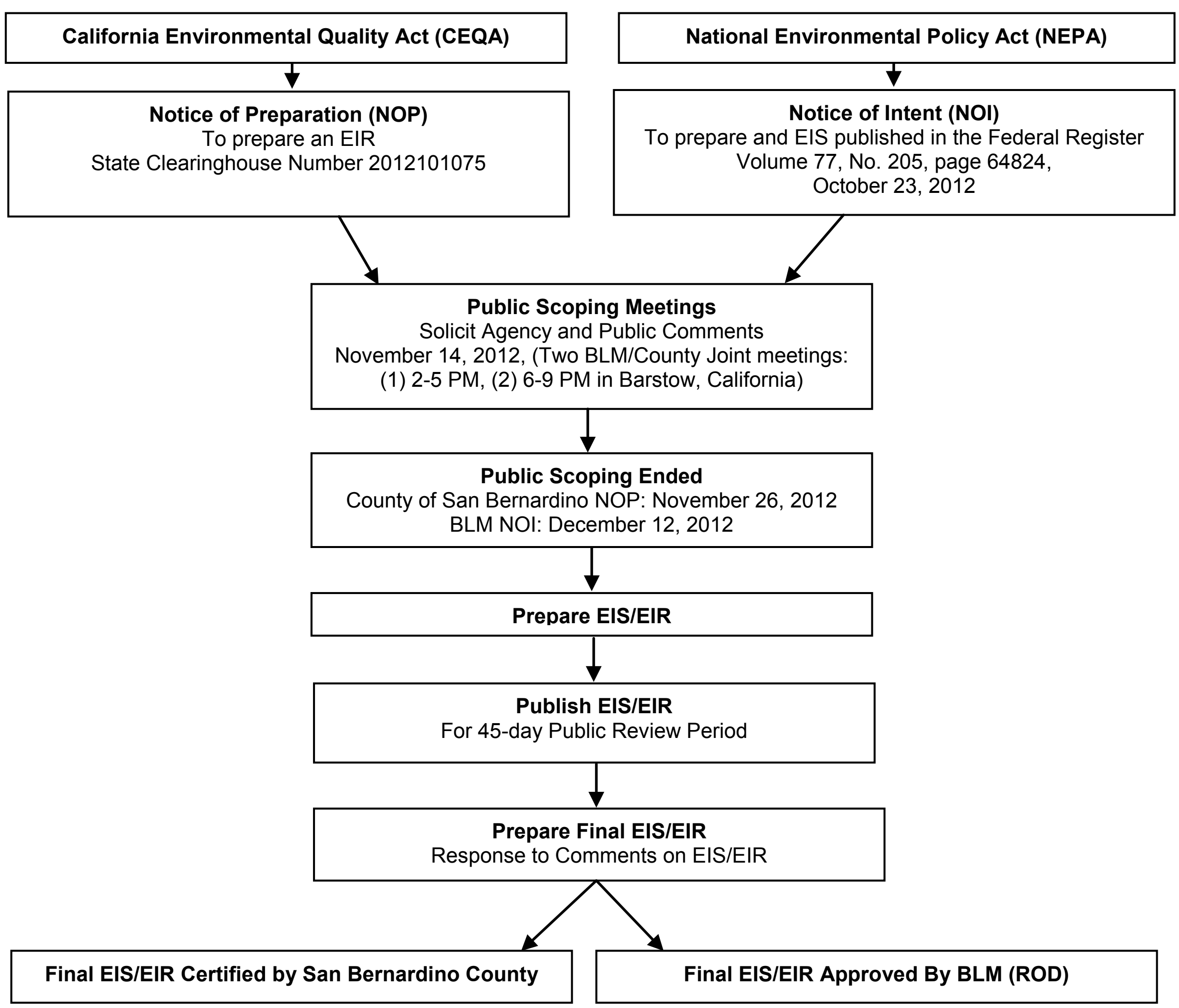
3.7 Issues Outside the Scope of the EIS/EIR

General comments were received that noted support and others that were against the development of the Project. One commenter noted that solar development should be concentrated in urban areas, on rooftops, and on wall panels, because development in the desert is a poor use of public lands. Basin and Range Watch expressed dissatisfaction with the end of the BLM comment period closing just after the Thanksgiving holiday and requested a two week extension of the comment period. Another commenter expressed interest in supplying fuel and lubricant to the contractor.

SECTION 4.0
Summary of Future Steps in the Planning Process

The EIS/EIR process requires a team of interdisciplinary resource specialists to complete each step. An important part of the environmental planning process is engaging the public and relevant agencies from the earliest stages of and throughout the planning process to address issues, comments, and concerns. The steps of the NEPA and CEQA planning processes and agency authority and decisions to be made are described as follows. Figure 1 provides a summary of the EIS (NEPA) and EIR (CEQA) processes.

Figure 1. NEPA/CEQA Process Flowchart



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APPENDIX A
Notices

A-1 Notice of Intent (published in the Federal Register on October 23, 2012)
A-2 Notice of Preparation (posted October 26, 2012)

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Appendix A-1
Notice of Intent (published in the Federal Register on October 23, 2012)

Dated: *October 17, 2012.*

Colette Pollard,

Department Reports Management Officer, Office of the Chief Information Officer.

[FR Doc. 2012–25987 Filed 10–22–12; 8:45 am]

BILLING CODE 4210–67–P

DEPARTMENT OF THE INTERIOR

Bureau of Land Management

[CACA 049584, L51010000.FX0000.LVRWB09B3130]

Notice of Intent To Prepare an Environmental Impact Statement, a Possible Land Use Plan Amendment, and a Public Lands Segregation for the Proposed Soda Mountain Solar Project, CA

AGENCY: Bureau of Land Management, Interior.

ACTION: Notice.

SUMMARY: In compliance with the National Environmental Policy Act of 1969, as amended (NEPA), and the Federal Land Policy and Management Act of 1976, as amended (FLPMA), the Bureau of Land Management (BLM), together with San Bernardino County, intend to prepare a joint Environmental Impact Statement (EIS)/Environmental Impact Report (EIR), which may include an amendment to the California Desert Conservation Area (CDCA) Plan, for the Soda Mountain Solar Project (Project). By this notice, the BLM is announcing the beginning of the scoping process to solicit public comments and identify issues related to the EIS/Plan Amendment (PA).

DATES: This notice initiates the public scoping process for the EIS/EIR/PA. Comments on issues may be submitted in writing until November 23, 2012. The date(s) and location(s) of any scoping meetings will be announced at least 15 days in advance through local media, newspapers, and the BLM Web site at: *http://www.blm.gov/ca/st/en/fo/cdd.html.* In order to be included in the analysis, all comments must be received prior to the close of the 30-day scoping period or 15 days after the last public meeting, whichever is later. We will provide additional opportunities for public participation as appropriate.

ADDRESSES: You may submit comments on issues and planning criteria related to the Soda Mountain Solar Project by any of the following methods:

- *Web site: http://www.blm.gov/ca/st/en/fo/cdd.html.*
- *Email: Sodamtnsolar@blm.gov.*
- *Fax:* 951–697–5299.
- *Mail:* ATTN: Jeffery Childers, Project Manager, BLM California Desert District Office, 22835 Calle San Juan de Los Lagos, Moreno Valley, CA 92553–9046.

Documents pertinent to this proposal may be examined at the BLM California Desert District Office at the above address.

FOR FURTHER INFORMATION CONTACT: For further information and/or to have your name added to our mailing list, contact Jeffery Childers; telephone 951–697–5308; address BLM California Desert District Office, 22835 Calle San Juan de Los Lagos, Moreno Valley, California 92553–9046; email *jchilders@blm.gov.* Persons who use a telecommunications device for the deaf (TDD) may call the Federal Information Relay Service (FIRS) at 1–800–877–8339 to contact the above individual during normal business hours. The FIRS is available 24 hours a day, 7 days a week, to leave a message or question with the above individual. You will receive a reply during normal business hours.

SUPPLEMENTARY INFORMATION: The applicant, Soda Mountain Solar, LLC, has requested a right-of-way (ROW) authorization to construct, operate, maintain and decommission a maximum 350 megawatt (MW) photovoltaic facility and necessary ancillary facilities, including a project substation, access road, realignment of an existing designated route (Rasor Road), operations and maintenance buildings, and lay down areas. The project is proposed on 4,397 acres with the solar field occupying approximately 2,691 acres. This Notice informs the public that the BLM intends to prepare a Draft CDCA Plan amendment and associated EIS/EIR with San Bernardino County for the Project and announces the beginning of the scoping process to seek public input on environmental issues and planning criteria.

The purpose of the public scoping process is to determine relevant issues that will influence the scope of the environmental analysis, including alternatives, and guide the process for developing the EIS/EIR. At present, the BLM has identified the following preliminary issues: Air quality and greenhouse gas emissions; biological resources, including special status species, cultural resources, geology and soils; hazards and hazardous materials; hydrology and water quality; land use; noise; recreation; traffic; visual resources; cumulative effects; and areas with high potential for renewable energy development.

You may submit comments on issues and planning criteria in writing to the BLM at any public scoping meeting, or you may submit them to the BLM using one of the methods listed in the **ADDRESSES** section above. Comments must be received by the close of the 30-day scoping period or within 15 days after the last public meeting, whichever is later.

Pursuant to the BLM's CDCA Plan, sites associated with power generation or transmission not identified in the Plan will be considered through the plan amendment process to determine the suitability of the site for renewable energy development. Since the proposed Project site was not previously identified as suitable, authorization of the Project would require amendment of the CDCA Plan. By this notice, the BLM is complying with requirements in 43 CFR 1610.2(c) to notify the public of potential amendments to the CDCA Plan predicated on the findings in the EIS/EIR. If a land use plan amendment is necessary, the BLM will integrate the land use planning process with the NEPA process for the Project. A preliminary list of the potential planning criteria that will be used to help guide and define the scope of the plan amendment includes:

1. The plan amendment will be completed in compliance with FLPMA, NEPA, and all other relevant Federal laws, executive orders, and BLM policies;
2. Existing valid plan decisions will not be changed and any new plan decisions will not conflict with existing plan decisions; and
3. The plan amendment(s) will recognize valid existing rights.

Pursuant to 43 CFR 2091.3–1(e) and 43 CFR 2804.25(e), the BLM is segregating the following described public lands, located in the State of California, subject to valid existing rights, from operation of the public land laws and mining laws, but not the mineral leasing or the material sale laws.

San Bernardino Meridian

T. 12 N., R. 7 E.,
Sec. 1, unsurveyed;
Sec. 2, unsurveyed;
Sec. 11, N½NE¼, SE¼;NE¼, NE¼NW¼, and SE¼;
Sec. 12, unsurveyed;
Sec. 13, unsurveyed;
Sec. 14, N½NE¼.
T.13 N., R. 7 E.,
Sec. 25, unsurveyed;
Sec. 36, NE¼, E½NW¼, and S½;.

T. 12 N., R. 8 E.,
Sec. 6, unsurveyed;
Sec. 7, unsurveyed;
Sec. 18, unsurveyed.
T. 13 N., R. 8 E.,
Sec. 17, unsurveyed;
Sec. 18, unsurveyed;
Sec. 19, unsurveyed;
Sec. 20, unsurveyed;
Sec. 30, unsurveyed;
Sec. 31, unsurveyed.
Containing 9,662 acres, more or less, in San Bernardino County, California.

In order to process the ROW application filed on the above described lands and continue to maintain the status quo, the BLM is segregating the above-described lands for a period of 2 years, subject to valid existing rights. The BLM has determined that this segregation is necessary for the orderly administration of the public lands.

The segregation period will terminate upon the date that is the earliest of the following: (1) The BLM issues a decision granting, granting with modifications, or denying the ROW application for the solar energy generation proposal; (2) Publication of a **Federal Register** notice of termination of the segregation; or (3) Automatically at the end of the segregation period provided for herein, without further administrative action by the BLM. The segregation made under this authority is effective only for a period of up to 2 years, without the possibility of extension.

The BLM will use the NEPA public participation requirements to assist the agency in satisfying the public involvement requirements under Section 106 of the National Historic Preservation Act (NHPA) (16 U.S.C. 470(f)) as provided for in 36 CFR 800.2(d)(3). The information about historic and cultural resources within the area potentially affected by the proposed Project and CDCA Plan amendment will assist the BLM in identifying and evaluating impacts to such resources in the context of both NEPA and Section 106 of the NHPA.

The BLM will consult with Indian tribes on a government-to-government basis in accordance with Executive Order 13175 and other policies. Tribal concerns, including impacts on Indian trust assets and potential impacts to cultural resources, will be given due consideration. Federal, State, and local agencies, along with tribes and other stakeholders that may be interested in or affected by the proposed action that the BLM is evaluating, are invited to participate in the scoping process and, if eligible, may request or be asked by the BLM to participate in the development of the environmental analysis as a cooperating agency.

Before including your address, phone number, email 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 do so.

The BLM will evaluate identified issues to be addressed in the plan amendment, and will place them into one of three categories:

1. Issues to be resolved in the plan amendment;
2. Issues to be resolved through policy or administrative action; or
3. Issues beyond the scope of this plan amendment.

The BLM will provide an explanation in the Scoping Report or the Draft EIS/EIR as to why an issue was placed in category two or three. The public is also encouraged to help identify any management questions and concerns that should be addressed in the plan. The BLM will work collaboratively with interested parties to identify the management decisions that are best suited to local, regional, and national needs and concerns.

Authority: 40 CFR 1501.7, 43 CFR 1610.2, 43 CFR 2091.3–1(e), and 43 CFR 2804.25(e).

Thomas Pogacnik,
Deputy State Director, California.
[FR Doc. 2012–26046 Filed 10–22–12; 8:45 am]
BILLING CODE 4310–40–P

DEPARTMENT OF THE INTERIOR

Bureau of Land Management

[LLUTG0200–L12200000–FH0000–24–1A]

Notice of Utah's Recreation Resource Advisory Council Conference Call Meeting

AGENCY: Bureau of Land Management, Interior.

ACTION: Notice of Conference Call Meeting.

SUMMARY: In accordance with the Federal Land Policy and Management Act, the Federal Advisory Committee Act, and the Federal Lands Recreation Enhancement Act, the Utah Recreation Resource Advisory Council (RecRAC) will host a conference call meeting regarding the Bureau of Land Management (BLM) Price Field Office's proposed changes to the recreational permitting system for Desolation and Gray Canyons of the Green River.

DATES: The Utah RecRAC will host a conference call meeting Monday, November 19, 2012, from 2:00 p.m. until 4:00 p.m., MST.

ADDRESSES: The public is invited to attend the meeting either via telephone or in person. Those participating via telephone must dial the toll-free number (800) 369–1890 and provide the passcode, ''BLM.'' Those attending in person must meet at the BLM Utah State Office, 440 West 200 South, Salt Lake City, Utah, in the Monument Conference Room on the fifth floor.

FOR FURTHER INFORMATION CONTACT: Sherry Foot, Special Programs Coordinator, Utah State Office, Bureau of Land Management, P.O. Box 45155, Salt Lake City, Utah 84145–0155; phone (801) 539–4195; *sfoot@blm.gov.*

SUPPLEMENTARY INFORMATION: In accordance with the Federal Lands Recreation Enhancement Act, the 15-member Utah Recreation Resource Advisory Council advises the Secretaries of the Interior and Agriculture, through the BLM and U.S. Forest Service, on the establishment and modification of recreational fees administered by these Federal agencies in Utah. The BLM Price Field Office is proposing to convert its recreational permitting system for Desolation and Gray Canyons of the Green River from a first-come, first-served call-in reservation process to an on-line lottery reservation process on the Recreation.gov Web site. Details of the proposal can be reviewed in the BLM Price Field Office's *Draft Business Plan for Desolation and Gray Canyons of the Green River (http://www.blm.gov/ut/st/en/info/newsroom/2012/october/blm_price_field_office.html).* A public comment period will take place immediately following the presentation outlining the proposal. Written comments may also be sent to the BLM at the address listed in the **FOR FURTHER INFORMATION CONTACT** section of this notice. The meeting is open to the public, however, transportation, lodging, and meals are the responsibility of the participating individuals.

Kent Hoffman,
Acting State Director.
[FR Doc. 2012–26063 Filed 10–22–12; 8:45 am]
BILLING CODE 4310–DQ–P

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Appendix A-2
Notice of Preparation
(posted October 26, 2012)

COUNTY OF SAN BERNARDINO

LAND USE SERVICES DEPARTMENT

NOTICE OF PREPARATION

FROM: San Bernardino County Land Use Services Department, Planning Division, 385 N. Arrowhead Avenue, First Floor, San Bernardino, CA 92415-0182

TO: **Interested Agencies, Organizations, and Individuals**

SUBJECT: Notice of Preparation of Draft Environmental Impact Statement/Environmental Impact Report

The County of San Bernardino will act as the Lead Agency for compliance with the California Environmental Quality Act (CEQA), in cooperation with the federal Bureau of Land Management (BLM), to prepare a joint Draft Environmental Impact Statement/Environmental Impact Report (EIS/EIR) for the project identified below. We are soliciting the views of agencies, organizations, and individuals on the scope and content of the EIS/EIR for the proposed project. Agencies will need to use the EIS/EIR prepared by the BLM and our agency when considering a permit or other approval for the project.

The project description, location, and potential environmental effects are described in the attached materials. An Initial Study has not been included because it is evident that a project of this scope and magnitude would require an EIS/EIR. The attached analysis is based on the numerous preliminary studies that have been prepared for the project.

Due to the time limits mandated by State law, your response must be sent at the earliest possible date but not later than November 26, 2012.

Please send your response to Matthew Slowik at the address shown above. Please include the name of a contact person in your response.

Project Title: Soda Mountain Solar Project

Project Applicant: Soda Mountain Solar, LLC

Project Description: The proposed Soda Mountain Solar Project (Project) would be located in an unincorporated area of northeast San Bernardino County approximately 6 miles southwest of the community of Baker. The Project would consist of a 350-megawatt solar photovoltaic energy generating facility that includes an on-site substation, operations and maintenance buildings, access roads, realignment of an existing road, and water wells. All Project structures and facilities would occupy approximately 2,700 acres of an approximately 4,400-acre right-of-way (ROW) on public lands managed by BLM.

County Contact Person: Matthew Slowik, Senior Planner, Planning Division, LUSD
Telephone: (909) 387-4372

Signature: Matthew Slowik Date: October 26, 2012

County of San Bernardino

NOTICE OF PREPARATION

Date:	October 26, 2012
To:	Interested Agencies, Organizations, and Individuals
From:	San Bernardino County Land Use Services Department, Planning Division, 385 N. Arrowhead Avenue, First Floor, San Bernardino, CA 92415-0182
Subject:	Notice of Preparation of Draft Environmental Impact Statement/Environmental Impact Report
Project Title:	**Soda Mountain Solar Project**

Implementation of the proposed Soda Mountain Solar Project (Project) would require discretionary approvals from federal, state, and local agencies; therefore, the Project is subject to the environmental review requirements of both the California Environmental Quality Act (CEQA) and the National Environmental Policy Act (NEPA). As Lead Agency under CEQA, the County of San Bernardino (County) has issued this Notice of Preparation (NOP) of an Environmental Impact Report (EIR) for the proposed Project. The U.S. Department of Interior, Bureau of Land Management (BLM), is the lead agency under NEPA and has published in the Federal Register a Notice of Intent to prepare an Environmental Impact Statement (EIS).

To ensure coordination between the CEQA and NEPA processes and avoid duplication of effort, the lead agencies will prepare a joint EIS/EIR as recommended by 40 CFR 1506.2 and CEQA Guidelines sections 15222 and 15226. . The County and BLM will evaluate whether potentially significant effects will result from the Project. The EIS/EIR will describe the proposed Project, assess the effects of the proposed Project on the environment, identify potentially significant impacts, identify feasible mitigation measures to reduce or eliminate potentially significant environmental impacts, and discuss alternatives to the proposed Project that may accomplish basic Project objectives while reducing or eliminating any potential significant Project impacts.

The NOP provides a description of the proposed Project and solicits comments on the scope and content of the EIS/EIR. Comments are solicited from responsible agencies; trustee agencies; federal, state, and local agencies; and the general public. Comments received in response to the NOP will be reviewed and considered by the lead agencies in determining the scope of the EIR/EIS. Due to time limits, as defined by CEQA, your response should be sent at the earliest possible date, but no later than 30 days after publication of this NOP. We need to know your agency, organization, or individual views on the scope and content of the environmental information for the proposed Project.

Please include the name, phone number, and address of the contact person in your comment letter. Comments and questions should be directed to:

Matthew Slowik, Senior Planner
County of San Bernardino Land Use Services Department
Planning Division
385 N. Arrowhead Avenue, First Floor
San Bernardino, CA 92415-0182
Telephone: (909) 387-4372
Email: mslowik@lusd.sbcounty.gov

Project Overview

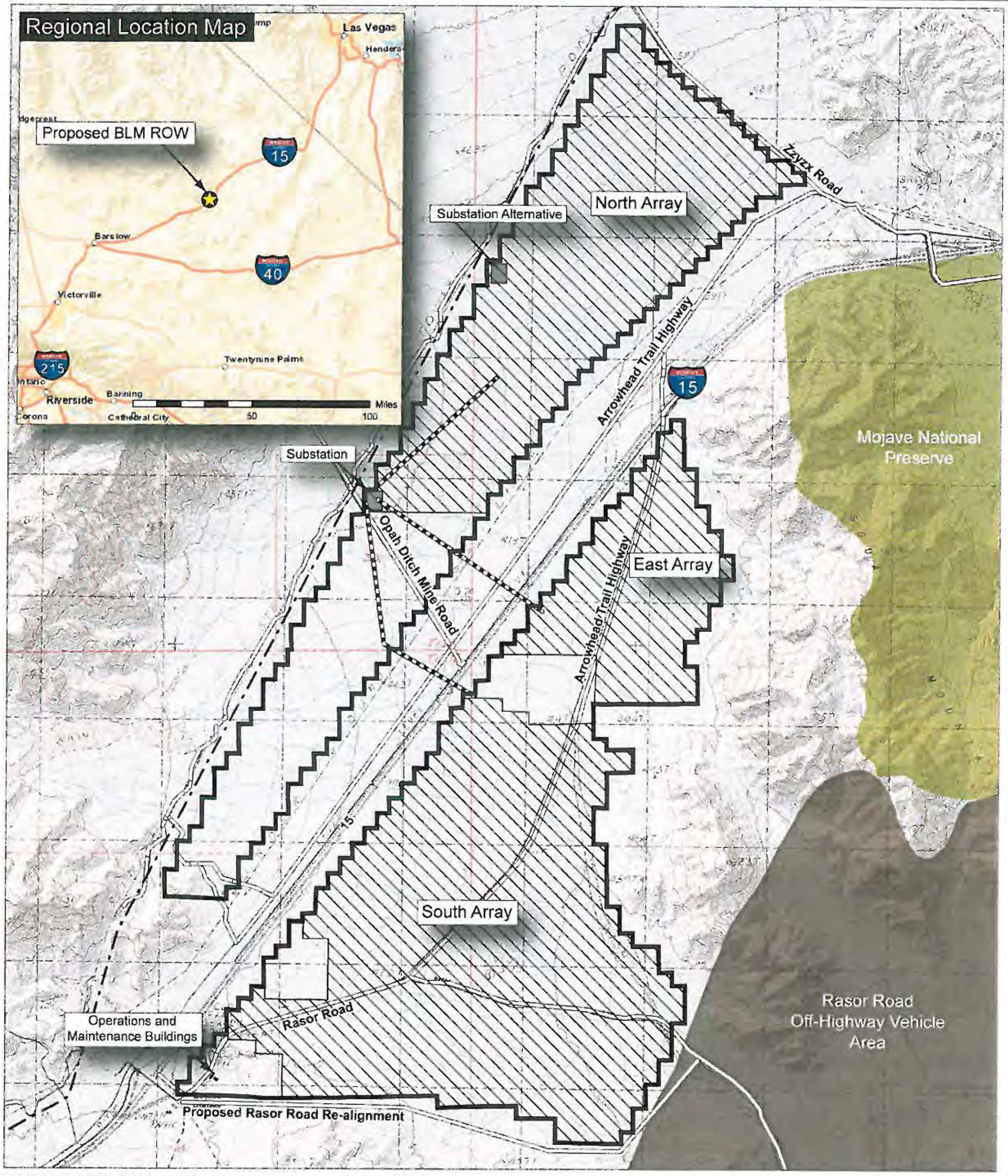
Soda Mountain Solar, LLC (Applicant), a wholly owned subsidiary of Bechtel Development Company, Inc., proposes to construct and operate a 350-megawatt (MW) solar photovoltaic (PV) energy generating project known as the Soda Mountain Solar Project (Project). All Project components would occupy approximately 2,700 acres of an approximately 4,400-acre right-of-way (ROW) on public lands administered by the BLM. Project components would include polycrystalline PV solar panel arrays, an on-site substation, operations and maintenance facilities, access roads, realignment of an existing road, and water wells. The Project would interconnect with the 500 kV Mead-Adelanto transmission line located adjacent to the proposed ROW. The Project would require approximately 275 acre-feet per year (AFY) of water for construction over a 3-year period. Approximately 7 AFY of water would be required to wash the PV panels during operation of the proposed Project.

Project Location

The Project would be located approximately 6 miles southwest of the community of Baker, California, along Interstate 15 (I-15) in northeast San Bernardino County (refer to Figure 1, Project Location Map).

The Project would be located within a desert valley composed of alluvial fan deposits surrounded by the Soda Mountains. Developed areas adjacent to the Project include I-15, two transmission lines (and associated access roads), a power distribution line, two petroleum product pipelines, a fiber optic line, a cellular tower, the Opah Ditch mine, Rasor Road Service Station, and the Rasor Road off-highway vehicle recreation area. There are no known residences within 0.5 mile of the proposed Project ROW. The Mojave National Preserve is located east of the Project area.

Figure 1: Project Location Map



SOURCE: ESRI 2012 and Panorama Environmental, Inc. 2012

Scale: 1:50,000

LEGEND

- Proposed BLM ROW
- Proposed Solar Array Area
- Proposed Building or Structure
- Proposed Collector Route
- Roadway
- Existing 500 kV Transmission Line

Miles 0 1 2

Print Date: 9/14/2012

PANORAMA ENVIRONMENTAL, INC.

Project Description

Major components of the Project would include:

- PV panel arrays, inverters, medium-voltage collector transformers, and ancillary equipment
- Unpaved access roads between the arrays
- 34.5-kilovolt (kV) collector lines to connect the panel arrays to the substation
- A substation and switchyard for interconnection to the transmission system
- Wells, water storage tanks, and possibly water treatment equipment
- Buildings: control room/office building, maintenance facility, storage warehouse, and other ancillary structures
- Relocation of approximately 3.3 miles of Rasor Road

The Project would use PV panels attached to single-axis linear trackers with a maximum height of approximately 20 feet. The panels would be oriented north-south so that the panels would follow the sun across the sky from east to west over the course of the day.

Approximately 1,440 tracker assemblies, each consisting of 22 individual trackers driven by a single motor, would be grouped into 1 MW blocks of four tracker assemblies each.

The Project would interconnect to a 500-kV transmission line owned by a consortium of municipal electric utilities and managed by the Los Angeles Department of Water and Power (LADWP) that runs parallel to I-15 on the west side of the highway. The Project substation would be located northwest of I-15, adjacent to the LADWP transmission line ROW. Two alternative locations are shown on Figure 1. Within the Project site, 34.5-kV power collection lines would transfer electricity from the solar panel arrays to the substation. Power collection lines from the east side of the site would be routed to the substation under the I-15 using a jack-and-bore or directional drilling system that would avoid effects on freeway operations. Power would be stepped up to 500 kV at the substation and fed to the switchyard located adjacent to the LADWP transmission line.

Site Access

Rasor Road would be used as the primary access route to the Project area on the southeast side of I-15. A 3.3-mile-long portion of Rasor Road located to the east of an existing service station would be relocated south of the ROW area. Long-term access to the Project operation and maintenance area would be provided by a gated entrance from Rasor Road. Internal access to the PV blocks would be provided for low-impact vehicles along the same routes used for construction access. Access to the portion of the Project site on the northwest side of I-15 would be provided via Zzyzx Road from the Zzyzx Road interchange with I-15.

Project Construction

Project construction would not begin until after all applicable approvals and permits have been obtained. The Applicant estimates that it would take approximately 3 years to construct the Project.

Construction would begin with clearing the staging areas and the substation location. Road corridors would then be surveyed, cleared, and graded as necessary to bring equipment, materials, and workers to the areas under construction. Construction of the PV arrays is expected to occur at a pace of approximately 3 MW per week. A separate crew would begin building the substation, switchyard, and collector line to the LADWP transmission line and interconnection when the solar arrays are being constructed. The initial solar arrays installed and interconnected to the grid would begin generating power while additional PV blocks are constructed.

Project Operation and Maintenance

The Project would have a minimum expected lifetime of 30 years, with an opportunity of 50 years or more with equipment replacement, repowering, and an extension of the applicable permits, approvals and authorizations. Operational activities at the site would include monitoring and optimizing the power generated by the solar arrays and interconnection with the transmission lines, operating the solar array tracking system, and performing panel washing activities once or twice each year.

Project maintenance activities would generally include road maintenance; vegetation restoration and management; scheduled maintenance of inverters, transformers, and other electrical equipment; and occasional replacement of faulty modules or other site electrical equipment. Access roads would be regularly inspected and any degradation due to weather or wear and tear would be repaired. Drainage maintenance would be conducted twice per year and following any extreme storm event. During operations, it is anticipated that the Project would require a workforce in the range of approximately 25 to 38 workers, which would include a mix of professional staff and maintenance and security personnel.

Government Agency Reviews and Permits

The Applicant has submitted a well construction permit application to the County. The County's decision regarding the issuance of a well permit is a discretionary action requiring CEQA review. The CEQA process will involve preparation of an EIR that will assess the environmental impacts of the Project and identify mitigation measures to avoid or minimize identified impacts. The County will coordinate with BLM in preparing a joint EIS/EIR to comply with CEQA.

BLM will be the federal Lead Agency for deciding whether to approve the Project and will determine whether to issue a ROW grant authorizing Project construction, operation, decommissioning, and use of federal lands. Such approval may also require a conforming amendment to the California Desert Conservation Area (CDCA) Plan (1980 as amended). The decision regarding the issuance of the ROW grant will be based on an evaluation of the potential environmental effects of the Project through the NEPA review process and the requirements of the Federal Land Policy and Management Act (FLPMA) and the CDCA Plan. The NEPA process will involve BLM's preparation of an EIS that will detail the expected environmental impacts of the Project and mitigation measures to avoid or minimize identified impacts. If a CDCA Plan amendment is required, the BLM will integrate the land-use planning process with the Project's NEPA process. If the Project is approved, BLM will issue the necessary ROW grant and any required CDCA Plan amendment through its Record of Decision following completion of the Final EIS.

The Applicant is currently in the process of working with other applicable federal, state, and local permitting agencies. These agencies include the National Park Service, the U.S. Fish and Wildlife Service (USFWS), the U.S. Army Corps of Engineers (ACOE), California State Water Resources Control Board (SWRCB), California Department of Transportation, Lahontan Regional Water Quality Control Board (RWQCB), Mojave Desert Air Quality Management District, California Department of Fish and Game (CDFG), and other agencies with jurisdiction over the Project.

Potential Environmental impacts

The Lead Agencies have determined that the Project could result in significant environmental impacts and/or have a significant impact on the quality of the human environment; therefore, preparation of a joint EIS/EIR is appropriate. The Lead Agencies did not prepare an Environmental Assessment or Initial Study for the Project. The following list identifies areas where the Project may have potential significant effects:

- Aesthetics/Visual (Adjacency to Mojave National Preserve)
- Air Quality (Construction emissions)
- Biological Resources (Desert tortoise; bighorn sheep)
- Cultural Resources (Neighboring cultural sites)
- Geology and Soils (Soil stability)
- Greenhouse Gas Emissions (Construction emissions; project offset)
- Hazards and Hazardous Materials (Construction materials)
- Hydrology and Water Resources (Ephemeral streambeds; groundwater use)
- Land Use and Planning/Lands and Realty (Adjacency to linear infrastructure)
- Noise/Vibration (Construction noise)
- Population and Housing (Construction worker influx)
- Public Health/Safety (Facility hazards to personnel and public)
- Public Services (Emergency response)
- Recreation (Adjacency to Mojave National Preserve, Rasor OHV Area)
- Socio -Economics/Environmental Justice (Labor force; local business)
- Special Designations (Adjacency to Wilderness, Rasor OHV Area)
- Transportation/Traffic (Adjacency to I-15)
- Mandatory Findings of Significance

Scoping Meeting

The County and BLM will host two scoping meetings to provide the opportunity for the public to learn about the Project and to share any concerns or comments they may have about the Project. The scoping meetings are scheduled for Wednesday, November 14, 2012. The first meeting will be from 2:00 P.M. to 5:00 P.M. and the second meeting will be from 6:00 P.M. to 9:00 P.M. Both meetings will provide the same information and opportunity to comment, and both will be held at the following location:

Hampton Inn
2710 Lenwood Road
Barstow, CA 92311
(760) 253-2600

The meeting is an open-house format to allow the public to visit with County and BLM representatives. Additional opportunities for public participation will be available upon publication of the Draft EIS/EIR.

Comments Due Date

Due to the time limit of 30 days mandated by state law, your comments must be sent at the earliest possible date but not later than **November 26, 2012.**

Should you have any questions or comments regarding this Notice of Preparation, please contact Matthew Slowik at (909) 387-4372.

Matthew Slowik, MURP, MPA
Senior Planner
County of San Bernardino

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APPENDIX B
Public Notices

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Appendix B-1
Scoping Meeting Announcement

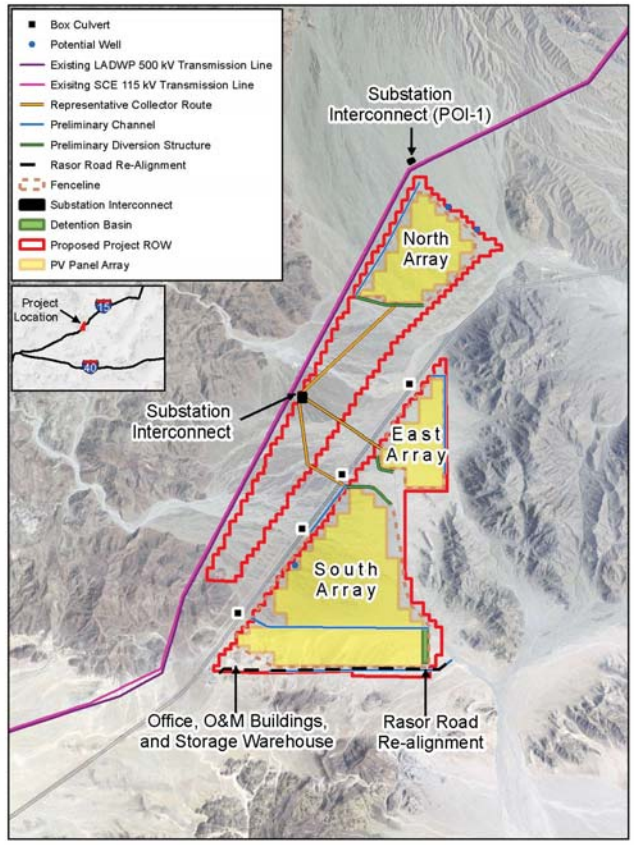
Public Scoping Meeting Announcement

For the Soda Mountain Solar Project
Draft Environmental Impact Statement/Environmental Impact Report

The Bureau of Land Management (BLM) and San Bernardino County intend to prepare a joint Environmental Impact Statement (EIS)/Environmental Impact Report (EIR) that may include an amendment to the California Desert Conservation Area Plan for the Soda Mountain Solar Project.

Soda Mountain Solar, LLC, has requested BLM right-of-way authorization to construct, operate, maintain, and decommission a 350 megawatt (MW) photovoltaic facility and necessary ancillary facilities, including a substation, access road, realignment of an existing designated route (Rasor Road), operation and maintenance buildings, and lay down areas and County approval for groundwater wells. The project is proposed on 4,397 acres of BLM-administered land, of which the solar field would occupy approximately 2,691 acres. The project is proposed in an unincorporated area of northeast San Bernardino County approximately 6 miles southwest of the community of Baker.

Community participation is a critical part of the environmental review process. Two public meetings will be held to aid the public's understanding of this project and to solicit written comments on planning issues and the potential impacts, alternatives, and mitigation measures that should be considered in the PA/EIS/EIR.



Soda Mountain Solar Project Site Layout

Public Meetings

Date	Times	Location
Wednesday, November 14, 2012	2:00 PM to 5:00 PM 6:00 PM to 9:00 PM	Hampton Inn & Suites Barstow, CA 2710 Lenwood Road, Room Jackrabbit 2 Barstow CA 92311

Written comments will be accepted at these meetings and also may be mailed, faxed or emailed to:

Jeffrey Childers, Project Manager
BLM California Desert District Office
22835 Calle San Juan de Los Lagos
Moreno Valley, CA 92553.
Fax: (951) 697-5299
Email: Sodamtnsolar@blm.gov

Matthew Slowik, Senior Planner
San Bernardino County
385 N. Arrowhead Avenue, 1st Floor
San Bernardino, CA 92415-0182

Further details about the proposed Soda Mountain Solar Project can be found at the following website:

http://www.blm.gov/ca/st/en/fo/barstow/renewableenergy/soda_mountain.html

APPENDIX C
Scoping Meeting Materials

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Appendix C-1
Written Comment Forms

Public Comment Card

Soda Mountain Solar Project

Commentor Name: ____________________ Date: ____________

Address: ____

Comment: ____

By submitting a scoping comment you will receive a copy of the EIS. Please indicate the format you would prefer:

☐ Compact Disk (CD) or ☐ Hardcopy

How to Comment:

Hardcopy: Use the form on the other side of this sheet. Please fold and staple this form and mail to the address below

Email: Sodamtnsolar@blm.gov Make sure subject line reads “Soda Mountain Solar Project”

☐ Public comments, including names and street addresses of respondents, will be available for public review at Bureau of Land Management, 22835 Calle San Juan de Los Lagos, Moreno Valley, CA 92553, during regular business hours (8:00 a.m. to 4:30 p.m.), Monday through Friday, except holidays. Individual respondents may request confidentiality. **If you wish to withhold your name or street address from public review or from disclosure under the Freedom of Information Act, you MUST check this box.** Such requests will be honored to the extent allowed by law. All submissions from organizations or businesses, and from individuals identifying themselves as representatives or officials of organizations or businesses, will be made available for public inspection in their entirety.

Place stamp here

Bureau of Land Management
c/o Jeffery Childers, Project Manager
22835 Calle San Juan de Los Lagos
Moreno Valley, CA 92553

Soda Mountain Solar Project

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Appendix C-2
Speaker Registration Cards

November 14, 2012

Soda Mountain Solar Project

Bureau of Land Management

Hampton Inn & Suites
2710 Lenwood Road
Barstow, CA 92311

Public Scoping Meeting

Speaker Registration Card

Please complete and return to staff

____

Name (Print)

____

Agency (if applicable)

____

Address **City** **Zip Code**

____________________ ____________________

Phone Number **Email**

November 14, 2012

Soda Mountain Solar Project

Bureau of Land Management

Hampton Inn & Suites
2710 Lenwood Road
Barstow, CA 92311

Public Scoping Meeting

Speaker Registration Card

Please complete and return to staff

____

Name (Print)

____

Agency (if applicable)

____

Address **City** **Zip Code**

____________________ ____________________

Phone Number **Email**

Appendix C-3
Scoping Meeting Presentations

Soda Mountain Solar Project

Draft EIS/EIR Public Meeting

November 2012

Meeting Format

- Opening and Introductions
- BLM Presentation – Jeff Childers
- San Bernardino County Presentation—Matt Slowick
- Soda Mountain Solar Presentation – Adriane Wodey
- Public Comments
- Instructions for the Open House – Jeff Childers
- Public Open House
- Meeting Closes at 9:00 p.m.

National Environmental Policy Act

NEPA

- Purpose of this meeting
- Establishes a public, interdisciplinary framework for federal decision-making
- Ensures that agencies take environmental factors into account when considering federal actions
- Required environmental analysis documents include environmental impact statements (EISs) and environmental assessments (EAs)

BLM's Role

- Administration of public lands under Federal Land Policy and Management Act of 1976 (FLPMA)
- Review of the Land Use Plan and processing of an EIS-level Land Use Plan Amendment (PA/EIS)
- California Desert Conservation Plan (1980, as amended)
- Issuance of right-of-way grants for use of federal land
- Lead agency for National Environmental Policy Act (NEPA), National Historic Preservation Act, etc.
- Lead agency for consultation with the U.S. Fish & Wildlife Service under Section 7 of the Endangered Species Act

Processing and Administration

- BLM:
  - Regulations: 43 CFR 2800
  - Right-of-Way Toolkit Information:
    - General ROW http://www.blm.gov/wo/st/en/prog/energy/cost_recovery_regulations.html
    - Solar ROW http://www.blm.gov/wo/st/en/prog/energy/solar_energy.html
    - NEPA http://www.blm.gov/ca/st/en/prog/planning/guidance.html

BLM LUP Amendment / NEPA Process (PA / EIS)

Notice of Intent

Public Scoping Period

Alternative Formulation

Notice of Availability (NOA) for Draft PA / Draft EIS

NOA Initiates a 90-day Public Review & Comment Period

NOA for Proposed PA / Final EIS

NOA Initiates a 30-day Protest Period on Proposed PA

Approved PA and Record of Decision

Notice to Proceed / Monitor Project

Environmental Issue Areas

- Air Resources
- Vegetation
- Wildlife
- Cultural Resources
- Environmental Justice
- Geology and Soils Resources
- Greenhouse Gas Emissions and Global Climate Change
- Hazards and Hazardous Materials
- Lands and Realty
- Mineral Resources
- Recreation and Public Access
- Social and Economic Effects
- Special Designations and Wilderness
- Transportation and Traffic
- Utilities and Service Systems
- Visual Resources
- Water Resources
- Wildland Fire Ecology

San Bernardino County's Role

- Discretionary approval of groundwater wells proposed to serve the project

- Lead agency for the California Environmental Quality Act (CEQA)

California Environmental Quality Act (CEQA)

- Requires environmental review of projects that need discretionary approval by local or state agencies
- Focused on analysis of "significant" impacts
- Preparation of an environmental impact report (EIR) is required for projects that could have a significant impact on the environment

U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

COUNTY OF SAN BERNARDINO

EIR Process

- Distribute Notice of Preparation (NOP)
- Prepare Draft EIR
  - Identify and analyze direct, indirect, and cumulative impacts
  - Recommend mitigation measures and alternatives to avoid or reduce potentially significant impacts
- Circulate the Draft EIR for agency and public review
- Respond to comments and prepare the Final EIR
- After completion of the EIR process, decision makers can render a decision on the project

Public Participation Opportunities

- Submit written comments during scoping
- Become a Formal Cooperating Agency with BLM
- Attend public meetings
- Participate in workshops
- Provide written comments on the Draft PA/EIS/EIR

Contact Information

- **Jeffery Childers, BLM NEPA Coordinator**
  - Phone: (951) 697-5308
  - e-mail: jchilders@blm.gov
- **Matt Slowick, San Bernardino County Senior Planner**
  - Phone: (909) 387-4372
  - E-mail: matt.slowik@lus.sbcounty.gov
- **Scoping comments to:**

  Soda Mountain Solar Project Scoping Comments
  c/o Jeffrey Childers, Project Manager
  BLM California Desert District Office
  22835 Calle San Juan de Los Lagos
  Moreno Valley, CA 9255

Or email comments to: sodamtnsolar@blm.gov

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APPENDIX D

Scoping Meeting Sign-in Sheets

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Appendix D-1
November 14, 2012 BLM Scoping Meeting Sign-in Sheets

Public Meeting Sign-in Sheet

Soda MountainSolar Project

November 14, 2012 2:00 pm to 5:00 pm
Hampton Inn & Suites, 2710 Lenwood Road, Barstow, CA 92311

Information Open to FOIA

Name	Organization (if applicable)	Address	Phone Number
1. Alexandra Kostalas	ESA	550 Kearny Street Suite 800, SF, CA 94108	415-896-5900
2. MATT SLOWIK	SB County	385 N. ARROWHEAD AVE SAN BERNARDINO CA 92415	909 387-4372
3. Mitch Ponce	433 Ironworkers	17495 Hurley St Industry CA 91717	323) 707-1102
4. Gabriel Villarreal	BTC	252 W. Hillcrest Ave San Bernardino CA 92408	909 884 5500
5. Lois Clark		Box 69 Baker, Calif	760 733 4485
6. ERIC NEGRETE	CALIBRE FT IRWIN	PO BOX 10209 FORT IRWIN CA 92310	760 380 3767
7. CHRIS OTAHAL	BLM		(760) 252-6033
8. Ronny Underwood	IUOE #12	1362 West Barbour Banning	951 663-5412
9. DAVE SHARP	LOCAL 12	LUGONIA AVE - REDLANDS	909 307-8700
10. Ted Weasma	NPS	2701 Barstow Rd	760 252 6106

Public Meeting Sign-in Sheet

Soda MountainSolar Project

November 14, 2012 2:00 pm to 5:00 pm
Hampton Inn & Suites, 2710 Lenwood Road, Barstow, CA 92311

Information Open to FOIA

Name	Organization (if applicable)	Address	Phone Number
11. Keith Harkey	I.W Local 433	17495 Hurley St. CA. 91744	626-964 2500
12. [illegible] Price		P.O. Box 69 Baker, CA. 92309	760 733 4541
13. David Osborne	I.W. Local 433	17495 Hurley St CA 91744	626-964 2500
14. Robert A Conway	IW# 433	3038 Woods Dr L.V. NV. 89108	702 498-3490
15. Tony Madrid	IUOE #12	1647 W. Lugonia Ave Redlands	909 307-8700
16. Andy Schwartz	IUOE L12	41865 Boardwalk Ste 114 Palm Desert CA.	760 779 0299
17. Todd Vauter	IUOE #12	1647 W Lugonia Ave Redlands Ca.	909 307-8700
18. Bob Rebalcava	Bechtel	San Francisco	(415) 205-3672
19. James Foster	UBC	3250 E Shelby Ontario, CA	323 724-0178
20. Louis A Cisneros	UBCarpenters	3250 E Shelby Ontario, CA	(909) 887-2524

Public Meeting Sign-in Sheet

Soda MountainSolar Project

November 14, 2012 2:00 pm to 5:00 pm
Hampton Inn & Suites, 2710 Lenwood Road, Barstow, CA 92311

Information Open to FOIA

Name	Organization (if applicable)	Address	Phone Number
21. ROB FULTON	CSU-DSC	POB 1 Baker, CA 92309	714-936-0461
22. Cal Mendenhall	IUOE 12		
23. KEVIN EMMERICH	BASIN + RANGE WATCH	BOX 70 BEATTY, NV	775-553-2806
24. LAURA CUNNINGHAM	BASIN + RANGE WATCH	PO BOX 70, BEATTY NV 89003	
25. Terry Brown	IBEW 477	1855 S. Business Center Dr San Bernardino, CA 92408	(909) 890-0607
26. Danette Woo	Mojave National Preserve	2701 Barstow Rd. Barstow, CA 92311	760 252 6107
27.			
28.			
29.			
30.			

Public Meeting Sign-in Sheet

Soda MountainSolar Project

November 14, 2012 6:00 pm to 9:00 pm
Hampton Inn & Suites, 2710 Lenwood Road, Barstow, CA 92311

Information Open to FOIA

Name	Organization (if applicable)	Address	Phone Number
1. Salvador Alvarez		720 W Buenavista St Barsto CA 92311	
2. Jose [illegible]		2950 SANDY HILL BARSTOW CA	
3. Robert Potter		1 Pointe Dr. Ste 320 Brea, CA 92821	
4. JEFF FELLOWS		2317 Laguna Blvd Redlands	
5.			
6.			
7.			
8.			
9.			
10.			

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APPENDIX E

Speaker Registration Cards and Summary of Verbal Public Comments from Scoping Meetings

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Appendix E-1
Speaker Registration Cards

November 14, 2012

Soda Mountain Solar Project

Bureau of Land Management

Hampton Inn & Suites
2710 Lenwood Road
Barstow, CA 92311

Public Scoping Meeting

Speaker Registration Card

Please complete and return to staff

KEVIN EMMERICH

Name (Print)

Agency (if applicable)

Box 70 BEATTY 89003

Address City Zip Code

Phone Number

Email

November 14, 2012

Soda Mountain Solar Project

Bureau of Land Management

Hampton Inn & Suites
2710 Lenwood Road
Barstow, CA 92311

Public Scoping Meeting

Speaker Registration Card

Please complete and return to staff

Perry Brown

Name (Print)

IBEW #477 Electricians

Agency (if applicable)

1855 S. Business Center Dr. San Bernardino 92408

Address City Zip Code

(909) 890-0607

Phone Number

perryb@ibew477.org

Email

November 14, 2012

Soda Mountain Solar Project

Bureau of Land Management

Hampton Inn & Suites
2710 Lenwood Road
Barstow, CA 92311

Public Scoping Meeting

Speaker Registration Card

Please complete and return to staff

Ted Weasma

Name (Print)

NPS - Mojave

Agency (if applicable)

Address City Zip Code

Phone Number

Email

November 14, 2012

Soda Mountain Solar Project

Bureau of Land Management

Hampton Inn & Suites
2710 Lenwood Road
Barstow, CA 92311

Public Scoping Meeting

Speaker Registration Card

Please complete and return to staff

JAMES PESTER

Name (Print)

UBC

Agency (if applicable)

3250 E SHELBY ST ONTARIO CA

Address City Zip Code

323-724-0178

Phone Number

JimPESTER@LOCAL-1607.ORG

Email

November 14, 2012

Hampton Inn & Suites
2710 Lenwood Road
Barstow, CA 92311

Soda Mountain Solar Project

Bureau of Land Management

Public Scoping Meeting

Speaker Registration Card

Please complete and return to staff

Danette Woo

Name (Print)

Mojave National Preserve

Agency (if applicable)

Address City Zip Code

Phone Number Email

November 14, 2012

Hampton Inn & Suites
2710 Lenwood Road
Barstow, CA 92311

Soda Mountain Solar Project

Bureau of Land Management

Hinkley

Public Scoping Meeting

Speaker Registration Card

Please complete and return to staff

Loreto orios

Name (Print)

Agency (if applicable)

Address City Zip Code

Phone Number Email

November 14, 2012

Hampton Inn & Suites
2710 Lenwood Road
Barstow, CA 92311

Soda Mountain Solar Project

Bureau of Land Management

Hinkley

Public Scoping Meeting

Speaker Registration Card

Please complete and return to staff

Salvador Alvarez

Name (Print)

Agency (if applicable)

Address City Zip Code

Phone Number Email

November 14, 2012

Hampton Inn & Suites
2710 Lenwood Road
Barstow, CA 92311

Soda Mountain Solar Project

Bureau of Land Management

Hinkley

Public Scoping Meeting

Speaker Registration Card

Please complete and return to staff

Jose Gomez

Name (Print)

Agency (if applicable)

Address City Zip Code

Phone Number Email

Appendix E-2
Summary of Verbal Comments

ESA Energy

550 Kearny Street
Suite 800
San Francisco, CA 94108
415.896.5900 phone
415.896.0332 fax

www.esassoc.com

meeting notes

project	Soda Mountain Solar Project	project no.	D120592.00
date	November 14, 2012	times	2:00 pm and 5:00 pm
present	See sign-in sheets	route to	Administrative Record
subject	Soda Mountain Scoping Meeting Notes		

action required: Consider Oral Comments in Preparation of Draft EIS/EIR

The Bureau of Land Management (BLM) and San Bernardino County held two public scoping meetings for the proposed Soda Mountain Solar Project on November 14, 2012, at the Hampton Inn & Suites Barstow, California. At each meeting, Jeff Childers described the BLM's process, including NEPA; Matt Slowik described the County's process, including CEQA; and Adriane Wodey (Soda Mountain Solar) presented a project overview. Meeting attendees were provided an opportunity to speak. Opportunities and methods to provide written input were emphasized.

Public Comments – Scoping Meeting 1 (2:00 pm)

<u>Commenter #1 -Kevin Emmerick from Basin and Range Watch</u> commented that he is concerned about large energy projects reducing access to public lands, and suggested that photovoltaics are designed for and work better on rooftops than open land. He requested that BLM analyze off-site alternatives, including options like distributed generation. He also noted that the EPA has identified brownfield sites on private lands for renewable and requests an alternative that includes development of brownfields. Mr. Emmerick questioned the Applicant's claim that during operation, it would only wash the panels two times per year and requested clarification of the type of photovoltaic panels to be used. He is concerned about how many acre-feet of water would be necessary for panel washing and construction and about how water use may affect springs at the Soda Springs aquifer/Mojave River. He also expressed concern about and requests analysis of impacts to bighorn sheep, burrowing owl, desert tortoise, and other species; impacts to access from Rasor Road; and visual impacts from Mojave National Preserve. He noted that a lot of projects have dust issues and that in areas around Desert Center, CA, disturbance is resulting in dust blackouts, and asked how much water would be needed to mitigate. He requested that BLM try to find an alternative location.

- Matt Slowick responded that the Applicant estimates 5.4 acre feet per year for panel washing.

<u>Commenter #2 - Jim Piester from the United Brotherhood of Carpenters Millwrights (union)</u> commented regarding dust issues on Genesis. He noted that at the Genesis project site they cleared the entire property, but Bechtel did not do that at its Ivanpah project, which mitigated a lot of the dust issues by leaving vegetation in place. Mr. Piester noted his support for the project, stating that we have energy needs, and that many people want power but not in their back yard, yet we can't get enough done with distributed generation.

Commenter #3 - Perry Brown from IBEW San Bernardino, Inyo, and Mono Counties commented that as the electrical workers union, they are concerned about the environment and want projects built in a sustainable manner. They strive for the ability to work out issues. The union trains workers in the San Bernardino area. These will be good jobs that will be provided by this project

Commenter #4 - Danette Woo with the Mohave Preserve questioned when the scoping comments are due.

- Jeff Childers responded that comments are due November 29th, although the BLM will try to consider comments received after that date.

Public Comments – Scoping Meeting 2 (5:00 pm)

Commenter #1 - Salvador Alvarez intended to make a comment but needed a translator.

Commenter #2 - Jose Gomez had a comment about water contamination from a PG&E project in Hinkley, but needed a translator.

- A Spanish-speaking member of the public volunteered to help translate, and explained that this project is not near Hinkley, not part of the same water basin, and that this project and project applicant are different than the subject of the speaker's concern.

Commenter #3 – Loreto Orios turned in a card but was not present. He was going to serve as translator for commenters #1 and #2.

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APPENDIX F

Comments Received During Scoping Period

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MOJAVE air quality management district DESERT

Mojave Desert Air Quality Management District
14306 Park Avenue, Victorville, CA 92392-2310
760.245.1661 • fax 760.245.2699
Visit our web site: http://www.mdaqmd.ca.gov
Eldon Heaston, Executive Director

2012 NOV -5 AM 11:12

November 1, 2012

Matt Slowik
San Bernardino County Land Use Services Department/Planning Division
385 North Arrowhead Avenue, First Floor
San Bernardino, CA 92415-0182

Project: Soda Mountain Solar Project

Dear Mr. Slowik:

The Mojave Desert Air Quality Management District (District) has received the Notice of Preparation of a Draft Environmental Impact Statement/Environmental Impact Report for the Soda Mountain Solar Project (Project). The proposed Project would be located in an unincorporated area of northeast San Bernardino County approximately 6 miles southwest of the community of Baker. The Project would consist of a 350-megawatt solar photovoltaic energy generating facility that includes an on-site substation, operations and maintenance buildings, access roads, realignment of an existing road, and water wells. All Project structures and facilities would occupy approximately 2,700 acres of an approximately 4,400-acre right-of-way on public lands managed by the Bureau of Land Management.

We have reviewed the Project and, based on the information available to us at this time, the District recommends the County require the Project to prepare and submit a dust control plan pursuant to requirements of District Rule 403.2 prior to commencing earth-moving activity that describes all applicable dust control measures that will be implemented at the Project.

The District supports the development of renewable energy sources; such development is expected to produce cumulative and regional environmental benefits.

Thank you for the opportunity to review this planning document. If you have any questions regarding this letter, please contact me at (760) 245-1661, extension 6726, or Tracy Walters at extension 6122.

Sincerely,

Alan J. De Salvio
Supervising Air Quality Engineer

AJD/tw

Soda Mtn Solar

12 NOV -6 AM 9:54

2012 NOV -8 PM 3:24

LOZEAU DRURY LLP

T 510.836.4200
F 510.836.4205

410 12th Street, Suite 250
Oakland, Ca 94607

www.lozeaudrury.com
richard@lozeaudrury.com

BY ELECTRONIC MAIL AND US MAIL

November 2, 2012

Mr. Jeff Childers
Project Manager
Bureau of Land Management
California Desert District
22835 Calle San Juan de Los Lagos
Moreno Valley, CA 92553
(951) 697-5308
Email: jchilders@blm.gov

Mr. Matt Slowik
Senior Land Use Planner
County of San Bernardino
Land Use Services / Planning Department
Barstow Building & Safety Office
301 East Mt. View Ave.
Barstow, CA 92311
(909) 387-4372
Email: mslowik@lusd.sbcounty.gov

Mr. Dennis Draeger
County Clerk
County of San Bernardino
San Bernardino County Hall of Records Building
First Floor
222 W. Hospitality Lane
San Bernardino, CA 92415-0022

Ms. Laura H. Welch
County of San Bernardino
Clerk of the Board of Supervisors
385 N. Arrowhead Ave., 2nd floor
San Bernardino, CA 92415-0130
Email: COB@sbcounty.gov

RE: NEPA, CEQA, and Land Use Notice Request for CACA - 49584, County Project No. AP20120014/ER, Soda Mountain Solar Project, 350-megawatt (MW) solar photovoltaic (PV) energy generating project to be located on 4,397 acres of land, approximately six miles southwest of Baker, CA in San Bernardino County (APN 0543231160000).

Dear Mr. Childers, Mr. Draeger, Ms. Welch and Mr. Slowik:

I am writing on behalf of Laborers International Union of North America, Local Union 1184, and its members living in San Bernardino County ("Commenters") to request that the United States Department of the Interior Bureau of Land Management ("BLM") put us on its notice lists for any and all notices, public meetings, and the availability of environmental documents issued under the National Environmental Policy Act, 42 U.S.C. §§ 4231 et seq. ("NEPA"), the California Planning and Zoning Law, and/or the California Environmental Quality Act ("CEQA"), referring or related to CACA - 49584, County Project No. AP20120014/ER, Soda Mountain Solar Project, 350-megawatt (MW) solar photovoltaic (PV) energy generating project to be located on 4,397 acres of land, approximately six miles southwest of Baker, CA in San Bernardino County (APN 0543231160000) ("**Soda Mountain Solar Project**").

In particular, we hereby request that the BLM and the County send by mail or electronic mail to our firm at the address below notice of any and all actions or hearings related to activities undertaken, authorized, approved, permitted, licensed, or certified by the County and any of its subdivisions, and/or supported, in whole or in part, through contracts, grants, subsidies, loans or other forms of assistance from the County, including, but not limited to the following:

- Any and all notices prepared pursuant to NEPA, including, but not limited to:
  - Notices of any public hearing in connection with the Project held pursuant to NEPA.
  - Notices of Intent that an Environmental Impact Statement ("EIS") or supplemental EIS is required for the Project, pursuant to NEPA, to 40 CFR § 1508.22, or any other title under the Code of Federal Regulations.
  - Notices of availability of an environmental assessment ("EA"), Draft EIS, or a finding of no significant impact ("FONSI") under NEPA for the Project.
  - Notices of any Record of Decision of any EIS, a FONSI, or other approval and/or determination to carry out the Project, prepared pursuant to NEPA or any other provision of law.
  - Notice of categorical exclusion from NEPA.
  - Notice of any Final EIS prepared pursuant to NEPA.

- Notice of any public hearing in connection with the Project as required by California Planning and Zoning Law pursuant to Government Code Section 65091.

- Any and all notices prepared pursuant to the California Environmental Quality Act ("CEQA"), including, but not limited to:
  - Notices of any public hearing held pursuant to CEQA.
  - Notices of determination that an Environmental Impact Report ("EIR") or supplemental EIR is required for a project, prepared pursuant to Public Resources Code Section 21080.4.
  - Notices of availability of an EIR or a negative declaration for the Project prepared pursuant to Public Resources Code Section 21152 and Section 15087 of Title 14 of the California Code of Regulations.
  - Notices of approval and/or determination to carry out the Project, prepared pursuant to Public Resources Code Section 21152 or any other provision of law.
  - Notice of approval or certification of any EIR or negative declaration prepared pursuant to Public Resources Code Section 21152 or any other provision of law.
  - Notice of exemption from CEQA prepared pursuant to Public Resources Code section 21152 or any other provision of law.
  - Notice of any Final EIR prepared pursuant to CEQA.

Please note that we are requesting notices of NEPA actions, CEQA actions, and notices of any public hearings to be held under any provision of Title 7 of the California Government Code governing California Planning and Zoning Law. This request is filed pursuant to 40 CFR § 1506.6(b)(1), which requires the lead NEPA agency to mail notice to those who have requested it on an individual action of all NEPA-related hearings, public meetings, and the availability of environmental documents, as well as under Public Resources Code Sections 21092.2, and 21167(f) and Government Code Section 65092, which require local agencies to mail such notices to any person who has filed a written request for them with the clerk of the agency's governing body.

Please send notice by electronic mail to:

Richard Drury
Tony Stearns
Lozeau Drury LLP
410 12th Street, Suite 250
Oakland, CA 94607
richard@lozeaudrury.com; tony@lozeaudrury.com

Please call should you have any questions. Thank you for your attention to this matter.

Sincerely,

Tony Stearns
Paralegal

12 NOV -6 AM 9:54
CALIFORNIA

Slowik, Matt - LUS

From:	Chandler, Mark A <mchandle@blm.gov>
Sent:	Tuesday, November 06, 2012 9:08 AM
To:	Slowik, Matt - LUS; Evans, John H
Cc:	Helseth, Gregory L; Christ, Nancy B; Ezell, Troy L; Wilhight, Brenda C
Subject:	DEIS/EIR Soda Mtn Solar Project
Attachments:	soda.pdf

Mr. Slowik,

Thank you for notifying the Bureau of Land Management of the Soda Mtn Solar Project. This project is about 6 miles west of the town of Baker, CA, on the west side of the Mojave Mountains. The project is a 350 MW photovoltaic site, on a 2700 ac foot print.

At this time we don't see a need to be involved in the project unless there is a change in proposed technology to say solar tower. For your cumulative impact analysis you may wish to visit the Las Vegas BLM renewable energy project web site http://www.blm.gov/nv/st/en/fo/lvfo/blm_programs/energy.html.

I will be out of the office for 90 days starting mid-November, so in the interim please contact Mr. John Evans, Planning and Environmental Coordinator for the Las Vegas Field Office at (702) 515-5097, or Ms. Nancy Christ, Planning and Environmental Coordinator for the Renewable Energy Coordination Office at (702) 515-5136 if you have any additional questions.

Mark Chandler, MPA
BLM Realty Specialist
Renewable Energy Coordination Office
4701N. Torrey Pines Drive
Las Vegas, Nevada 89130
Office (702) 515-5064
Mark_Chandler@blm.gov

NATIVE AMERICAN HERITAGE COMMISSION
915 CAPITOL MALL, ROOM 364
SACRAMENTO, CA 95814
(916) 653-6251
Fax (916) 657-5390
Web Site www.nahc.ca.gov
ds_nahc@pacbell.net

2012 NOV -8 PM 3: 22

November 6, 2012

Mr. Matthew Slowik, Senior Planner
County of San Bernardino Land Use Services Department
Planning Division
385 N. Arrowhead Avenue, First Floor
San Bernardino, CA 92415-0182

Re: SCH#2012101075 CEQA Notice of Preparation (NOP); draft Environmental Impact Report (DEIR) for the **"Soda Mountain Solar Project;"** located on approximately 2,700-acres six miles southwest of the Community of Baker; San Bernardino County California

Dear Mr. Slowik:

The NAHC is the State of California 'Trustee Agency' for the protection and preservation of Native American cultural resources pursuant to California Public Resources Code §21070 and affirmed by the Third Appellate Court in the case of EPIC v. Johnson (1985: 170 Cal App. 3rd 604).

This letter includes state and federal statutes relating to Native American historic properties or resources of religious and cultural significance to American Indian tribes and interested Native American individuals as 'consulting parties' under both state and federal law. State law also addresses the freedom of Native American Religious Expression in Public Resources Code §5097.9. This project is also subject to California Government Code Section 65352.3.

The California Environmental Quality Act (CEQA – CA Public Resources Code 21000-21177, amendment s effective 3/18/2010) requires that any project that causes a substantial adverse change in the significance of an historical resource, that includes archaeological resources, is a 'significant effect' requiring the preparation of an Environmental Impact Report (EIR) per the CEQA Guidelines defines a significant impact on the environment as 'a substantial, or potentially substantial, adverse change in any of physical conditions within an area affected by the proposed project, including ...objects of historic or aesthetic significance." In order to comply with this provision, the lead agency is required to assess whether the project will have an adverse impact on these resources within the 'area of potential effect (APE), and if so, to mitigate that effect. The NAHC advises the Lead Agency to request a Sacred Lands File search of the NAHC if one has not been done for the 'area of potential effect' or APE previously. .

The NAHC "Sacred Sites,' as defined by the Native American Heritage Commission and the California Legislature in California Public Resources Code §§5097.94(a) and 5097.96. Items in the NAHC Sacred Lands Inventory are confidential and exempt from the Public Records Act pursuant to California Government Code §6254 (r).

Early consultation with Native American tribes in your area is the best way to avoid unanticipated discoveries of cultural resources or burial sites once a project is underway. Culturally affiliated tribes and individuals may have knowledge of the religious and cultural significance of the historic properties in the project area (e.g. APE). We strongly urge that you make contact with the list of Native American Contacts on the attached list of Native American contacts, to see if your proposed project might impact Native American cultural resources and to obtain their recommendations concerning the proposed project. Pursuant to CA Public Resources Code § 5097.95, the NAHC requests cooperation from other public agencies in order that the Native American consulting parties be provided pertinent project information. Consultation with Native American communities is also a matter of environmental justice as defined by California Government Code §65040.12(e). Pursuant to CA Public Resources Code §5097.95, the NAHC requests that pertinent project information be provided consulting tribal parties, including archaeological studies. The NAHC recommends *avoidance* as defined by CEQA Guidelines §15370(a) to pursuing a project that would damage or destroy Native American cultural resources and California Public Resources Code Section 21083.2 (Archaeological Resources) that requires documentation, data recovery of cultural resources, construction to avoid sites and the possible use of covenant easements to protect sites.

Furthermore, the NAHC if the proposed project is under the jurisdiction of the statutes and regulations of the National Environmental Policy Act (e.g. NEPA; 42 U.S.C. 4321-43351). Consultation with tribes and interested Native American consulting parties, on the NAHC list, should be conducted in compliance with the requirements of federal NEPA and Section 106 and 4(f) of federal NHPA (16 U.S.C. 470 *et seq*), 36 CFR Part 800.3 (f) (2) & .5, the President's Council on Environmental Quality (CSQ, 42 U.S.C 4371 *et seq.* and NAGPRA (25 U.S.C. 3001-3013) as appropriate. The 1992 *Secretary of the Interiors Standards for the Treatment of Historic Properties* were revised so that they could be applied to all historic resource types included in the National Register of Historic Places and including cultural landscapes. Also, federal Executive Orders Nos. 11593 (preservation of cultural environment), 13175 (coordination & consultation) and 13007 (Sacred Sites) are helpful, supportive guides for Section 106 consultation. The aforementioned Secretary of the Interior's *Standards* include recommendations for all 'lead agencies' to consider the historic context of proposed projects and to "research" the cultural landscape that might include the 'area of potential effect.'

Confidentiality of "historic properties of religious and cultural significance" should also be considered as protected by California Government Code §6254(r) and may also be protected under Section 304 of he NHPA or at the Secretary of the Interior discretion if not eligible for listing on the National Register of Historic Places. The Secretary may also be advised by the federal Indian Religious Freedom Act (cf. 42 U.S.C., 1996) in issuing a decision on whether or not to disclose items of religious and/or cultural significance identified in or near the APEs and possibility threatened by proposed project activity.

Furthermore, Public Resources Code Section 5097.98, California Government Code §27491 and Health & Safety Code Section 7050.5 provide for provisions for inadvertent discovery of human remains mandate the processes to be followed in the event of a discovery of human remains in a project location other than a 'dedicated cemetery'.

To be effective, consultation on specific projects must be the result of an ongoing relationship between Native American tribes and lead agencies, project proponents and their contractors, in the opinion of the NAHC. Regarding tribal consultation, a relationship built around regular meetings and informal involvement with local tribes will lead to more qualitative consultation tribal input on specific projects.

Finally, when Native American cultural sites and/or Native American burial sites are prevalent within the project site, the NAHC recommends 'avoidance' of the site as referenced by CEQA Guidelines Section 15370(a).

If you have any questions about this response to your request, please do not hesitate to contact me at (916) 653-6251.

Sincerely,

Dave Singleton
Program Analyst

Cc: State Clearinghouse

Attachment: Native American Contact List

3

Native American Contacts
San Bernardino County
November 6, 2012

Ramona Band of Cahuilla Mission Indians
Joseph Hamilton, Chairman
P.O. Box 391670 — Cahuilla
Anza, CA 92539
admin@ramonatribe.com
(951) 763-4105
(951) 763-4325 Fax

Colorado River Indian Tribe
Eldred Enas ,Chairman; Ginger Scott, Museum
26600 Mojave Road — Mojave, Chemehuevi
Parker, AZ 85344
crit.museum@yahoo.com
(928) 669-9211-Tribal Office
(928) 669-8970 ext 21
(928) 669-1925 Fax

San Manuel Band of Mission Indians
Carla Rodriguez, Chairwoman
26569 Community Center Drive — Serrano
Highland, CA 92346
(909) 864-8933
(909) 864-3724 - FAX
(909) 864-3370 Fax

AhaMaKav Cultural Society, Fort Mojave Indian
Linda Otero, Director
P.O. Box 5990 — Mojave
Mohave Valley AZ 86440
(928) 768-4475
LindaOtero@fortmojave.com
(928) 768-7996 Fax

Chemehuevi Reservation
Edward Smith, Chairperson
P.O. Box 1976 — Chemehuevi
Chemehuevi Valley CA 92363
chair1cit@yahoo.com
(760) 858-4301
(760) 858-5400 Fax

Morongo Band of Mission Indians
Michael Contreras, Cultural Heritage Prog.
12700 Pumarra Road — Cahuilla, Serrano
Banning, CA 92220
(951) 201-1866 - cell
mcontreras@morongo-nsn.gov
(951) 922-0105 Fax

Fort Mojave Indian Tribe
Timothy Williams, Chairperson
500 Merriman Ave — Mojave
Needles, CA 92363
(760) 629-4591
(760) 629-5767 Fax

San Manuel Band of Mission Indians
Ann Brierty, Policy/Cultural Resources Departmen
26569 Community Center. Drive — Serrano
Highland, CA 92346
(909) 864-8933, Ext 3250
abrierty@sanmanuel-nsn.gov
(909) 862-5152 Fax

This list is current only as of the date of this document.

Distribution of this list does not relieve any person of the statutory responsibility as defined in Section 7050.5 of the Health and Safety Code, Section 5097.94 of the Public Resources Code and Section 5097.98 of the Public Resources Code.

This list is applicable for contacting local Native Americans with regard to cultural resources for the proposed SCH#2012101075; CEQA Notice of Preparation (NOP); draft Environmental Impact Report (DEIR) for the Soda Mountain Solar Project; located in the Mojave Desert, six miles southwest of BAker; San Bernardino County, California.

Serrano Nation of Mission Indians
Goldie Walker, Chairwoman
P.O. Box 343 Serrano
Patton , CA 92369

(909) 528-9027 or
(909) 528-9032

MOAPA Paiute Band of the Moapa Reservation
Attn: Cultural Resources Department
P.O. Box 56 Paiute
Moapa , NV 89025
lbradley@mvdsi.com
(702) 865-2787
(702) 865-2875 - FAX

Las Vegas Paiute Tribe
Attn: Cultural Resources Department
1 Paiute Drive Paiute
Las Vegas , NV 89106
contact@lvpaiute.com

(702) 386-3926
(702) 383-4019 - FAX

This list is current only as of the date of this document.

Distribution of this list does not relieve any person of the statutory responsibility as defined in Section 7050.5 of the Health and Safety Code, Section 5097.94 of the Public Resources Code and Section 5097.98 of the Public Resources Code.

This list is applicable for contacting local Native Americans with regard to cultural resources for the proposed SCH#2012101075; CEQA Notice of Preparation (NOP); draft Environmental Impact Report (DEIR) for the Soda Mountain Solar Project; located in the Mojave Desert, six miles southwest of BAker; San Bernardino County, California.

State of California -The Natural Resources Agency
DEPARTMENT OF FISH AND GAME
Inland Deserts Region (IDR)
407 West Line Street
Bishop, CA 93514
(760) 872-1171
(760) 872-1284 FAX

EDMUND G. BROWN JR, Governor
JOHN McCAMMAN, Director

November 9, 2012

San Bernardino County
Attn: Matthew Slowik
385 N. Arrowhead Avenue, 1st Floor
San Bernardino, CA 92415-0182

Soda Mountain Solar Project
(State Clearinghouse Number: 2012101075)

Dear Mr. Slowik:

The Department of Fish and Game, hereinafter referred to as Department has reviewed the Notice of Preparation (NOP) of the Draft Environmental Impact Report (DEIR) for Soda Mountain Solar Project (State Clearinghouse Number: 2012101075), hereinafter referred to as the "Project". The Department appreciates this opportunity to comment on the above-referenced project, relative to impacts to biological resources.

The Department is a Trustee Agency pursuant to the California Environmental Quality Act (CEQA). A Trustee Agency has jurisdiction over certain resources held in trust for the people of California. Trustee agencies are generally required to be notified of CEQA documents relevant to their jurisdiction, whether or not these agencies have actual permitting authority or approval power over aspects of the underlying project (CEQA Guidelines, Section 15386). As the trustee agency for fish and wildlife resources, the Department provides requisite biological expertise to review and comment upon CEQA documents, and makes recommendations regarding those resources held in trust for the people of California.

The Department may also assume the role of Responsible Agency. A Responsible Agency is an agency other than the lead agency that has a legal responsibility for carrying out or approving a project. A Responsible Agency actively participates in the Lead Agency's CEQA process, reviews the Lead Agency's CEQA document and uses that document when making a decision on the project. The Responsible Agency must rely on the Lead Agency's environmental document to prepare and issue its own findings regarding the project (CEQA Guidelines, Sections 15096 and 15381). The Department most often becomes a responsible agency when a 1600 Streambed Alteration Agreement or a 2081(b) California Endangered Species Act Incidental Take Permit is needed for a project. The Department relies on the environmental document prepared by the Lead Agency to make a finding and decide whether or not to issue the permit or agreement. It is important that the Lead Agency's EIR considers the Department's responsible agency requirements. For example, CEQA requires the Department to include additional feasible alternatives or feasible mitigation measures within its powers that would substantially lessen or avoid any significant effect the project would have on the environment (CEQA Guidelines, section 15096 (g) (2). In rare cases, the Department as Responsible Agency may be required to assume the role of the Lead Agency under certain conditions (CEQA Guidelines, section 15052).

Pursuant to California Fish and Game Code section 711.4, the Department collects a filing fee for all projects subject to CEQA. These filing fees are collected to defray the costs of managing and protecting fish and wildlife resources including, but not limited to, consulting with public agencies, reviewing environmental documents, recommending mitigation measures, and developing monitoring programs. Project applicants need not pay a filing fee in cases where a project will have no effect on fish and wildlife, as determined by the Department, or where their project is statutorily or categorically exempt from CEQA.

The proposed project is for construction and operating of a 350-megawatt (MW) solar photovoltaic (PV) energy generating project located on approximately 4,400 acres of BLM-administered public land. The Project will include polycrystalline PV solar panel arrays, an on-site substation, operations and maintenance buildings, access roads, realignment of an existing road, and water wells. The Project will connect directly to an existing transmission line.

To enable Department staff to adequately review and comment on the proposed project, we recommend the following information be included in the DEIR, as applicable:

1. A complete assessment of the flora and fauna within and adjacent to the project area should be conducted, with particular emphasis upon identifying special status species including rare, threatened, and endangered species. This assessment should also address locally unique species, rare natural communities, and wetlands. The assessment area should be large enough to encompass areas potentially subject to both direct and indirect project affects.

    a. The DEIR should include survey methods, dates, and results; and should list all plant and animal species detected within the project study area. Special emphasis should be directed toward describing the status of rare, threatened, and endangered species in all areas potentially affected by the project. All necessary biological surveys should be conducted in advance of DEIR circulation, and should not be deferred until after project approval.

    b. Rare, threatened, and endangered species to be addressed should include all those which meet the California Environmental Quality Act (CEQA) definition (see CEQA Guidelines, § 15380).

c. Species of Special Concern (SSC) status applies to animals generally not listed under the federal Endangered Species Act or the California Endangered Species Act, but which nonetheless are declining at a rate that could result in listing, or historically occurred in low numbers and known threats to their persistence currently exist. SSCs should be considered during the environmental review process.

d. A thorough assessment of rare plants and rare natural communities, following the Department's November 2009 *Protocols for Surveying and Evaluating Impacts to Special Status Native Plant Populations and Natural Communities* (Attachment 1).

e. A detailed vegetation map should be prepared, preferably overlaid on an aerial photograph. The map should be of sufficient resolution to depict the locations of the project site's major vegetation communities, and view project impacts relative to each community type. The vegetation classification system used to name the polygons should be described.

f. A complete assessment of rare, threatened, and endangered invertebrate, fish, wildlife, reptile, and amphibian species should be presented in the DEIR. Seasonal variations in use of the project area should also be addressed. Focused species-specific surveys, conducted at the appropriate time of year and time of day when the species are active or otherwise identifiable, are required. Acceptable species-specific survey procedures should be developed in consultation with the Department and the U.S. Fish and Wildlife Service.

g. The Department's California Natural Diversity Data Base (CNDDB) should be searched to obtain current information on previously reported sensitive species and habitat, including Significant Natural Areas identified under Chapter 12 of the Fish and Game Code. In order to provide an adequate assessment of special-status species potentially occurring within the project vicinity, the search area for CNDDB occurrences should include all U.S.G.S 7.5-minute topographic quadrangles with project activities, and all adjoining 7.5-minute topographic quadrangles. The EIR should discuss how and when the CNDDB search was conducted, including the names of each quadrangle queried.

2. A thorough discussion of direct, indirect, and cumulative impacts expected to adversely affect biological resources, with specific measures to offset such impacts, should be included.

    a. The EIR should present clear thresholds of significance to be used by the Lead Agency in its determination of the significance of environmental effects. A threshold of significance is an identifiable quantitative, qualitative or performance level of a particular environmental effect.

    b. CEQA Guidelines, § 15125(a), direct that knowledge of the regional setting is critical to an assessment of environmental impacts and that special emphasis should be placed on resources that are rare or unique to the region.

    c. Impacts associated with initial project implementation as well as long-term operation and maintenance of a project should be addressed in the EIR.

    d. In evaluating the significance of the environmental effect of a project, the Lead Agency should consider direct physical changes in the environment which may be caused by the project and reasonably foreseeable indirect physical changes in the environment which may be caused by the project. Expected impacts should be quantified (e.g., acres, linear feet, number of individuals taken, volume or rate of water extracted, etc. to the extent feasible).

    e. Project impacts should be analyzed relative to their effects on off-site habitats. Specifically, this may include public lands, open space, downstream aquatic habitats, areas of groundwater depletion, or any other natural habitat that could be affected by the project.

    f. Impacts to and maintenance of wildlife corridor/movement areas and other key seasonal use areas should be fully evaluated and provided.

    g. A discussion of impacts associated with increased lighting, noise, human activity, changes in drainage patterns, changes in water volume, velocity, quantity, and quality, soil erosion, and/or sedimentation in streams and water courses on or near the project site, with mitigation measures proposed to alleviate such impacts should be included. Special considerations applicable to linear projects include ground disturbance that may facilitate infestations by exotic and invasive species over a great distance.

h. A cumulative effects analysis should be developed as described under CEQA Guidelines, § 15130. General and specific plans, as well as past, present, and anticipated future projects, should be analyzed relative to their impacts to similar plant communities and wildlife habitats.

3. A range of project alternatives should be analyzed to ensure that the full spectrum of alternatives to the proposed project are fully considered and evaluated. Alternatives which avoid or otherwise minimize impacts to sensitive biological resources should be identified.

   a. If the project will result in any impacts described under the Mandatory Findings of Significance (CEQA Guidelines, § 15065) the impacts must be analyzed in depth in the EIR, and the Lead Agency is required to make detailed findings on the feasibility of alternatives or mitigation measures to substantially lessen or avoid the significant effects on the environment. When mitigation measures or project changes are found to be feasible, the project should be changed to substantially lessen or avoid the significant effects.

4. Mitigation measures for adverse project-related impacts to sensitive plants, animals, and habitats should be thoroughly discussed. Mitigation measures should first emphasize avoidance and reduction of project impacts. For unavoidable impacts, the feasibility of on-site habitat restoration or enhancement should be discussed. If on-site mitigation is not feasible, off-site mitigation through habitat creation, enhancement, acquisition and preservation in perpetuity should be addressed.

   a. The Department generally does not support the use of relocation, salvage, and/or transplantation as mitigation for impacts to rare, threatened, or endangered species. Studies have shown that these efforts are experimental in nature and largely unsuccessful.

   b. Areas reserved as mitigation for project impacts should be legally protected from future direct and indirect impacts. Potential issues to be considered include limitation of access, conservation easements, monitoring and management programs, water pollution, and fire.

   c. Plans for restoration and revegetation should be prepared by persons with expertise in southern California ecosystems and native plant revegetation techniques. Each plan should include, at a minimum: (a) the location of the mitigation site; (b) the plant species to be used, container sizes, and/or seeding rates; (c) a schematic depicting the mitigation area; (d) planting schedule; (e) a description of the irrigation methodology; (f) measures to control exotic vegetation on site; (g) specific success criteria; (h) a detailed monitoring program; (i) contingency measures should the success criteria not be met; and (j) identification of the party responsible for meeting the success criteria and providing for long-term conservation of the mitigation site.

5. Take of species of plants or animals listed as endangered or threatened under the California Endangered Species Act (CESA) is unlawful unless authorized by the Department. However, a CESA 2081(b) Incidental Take Permit may authorize incidental take during project construction or over the life of the project. The DEIR must state whether the project would result in any amount of incidental take[1] of any CESA-listed species. CESA Permits are issued to conserve, protect, enhance, and restore State-listed threatened or endangered species and their habitats. Early consultation is encouraged, as significant modification to a project and mitigation measures may be required in order to obtain a CESA Permit.

   The Department's issuance of a CESA Permit for a project that is subject to CEQA will require CEQA compliance actions by the Department as a Responsible Agency. The Department as a responsible agency under CEQA will consider the Lead Agency's Negative Declaration or Environmental Impact Report for the project. The Department may require additional mitigation measures for the issuance of a CESA Permit unless the project CEQA document addresses all project impacts to listed species and specifies a mitigation monitoring and reporting program that will meet the requirements of a CESA Permit.

   To expedite the CESA permitting process, the Department recommends that the DEIR addresses the following CESA Permit requirements:

   a. The impacts of the authorized take are minimized and fully mitigated;

   b. The measures required to minimize and fully mitigate the impacts of the authorized take and: (1) are roughly proportional in extent to the impact of the taking on the species; (2) maintain the applicant's objectives to the greatest extent possible, and (3) are capable of successful implementation;

[1] Even a single individual.

c. Adequate funding is provided to implement the required minimization and mitigation measures and to monitor compliance with and the effectiveness of the measures; and

d. Issuance of the permit will not jeopardize the continued existence of a State-listed species.

6. The Department has responsibility for wetland and riparian habitats. It is the policy of the Department to strongly discourage development in wetlands or conversion of wetlands to uplands. We oppose any development or conversion which would result in a reduction of wetland acreage or wetland habitat values, unless, at a minimum, project mitigation assures there will be "no net loss" of either wetland habitat values or acreage. The EIR should demonstrate that the project will not result in a net loss of wetland habitat values or acreage.

   a. If the project site has the potential to support aquatic, riparian, or wetland habitat, a jurisdictional delineation of lakes, streams, and associated riparian habitats potentially affected by the project should be provided for agency and public review. This report should include a jurisdictional delineation that includes wetlands identification pursuant to the U. S. Fish and Wildlife Service wetland definition[2] as adopted by the Department[3]. Please note that some wetland and riparian habitats subject to the Department's authority may extend beyond the jurisdictional limits of the U.S. Army Corps of Engineers. The jurisdictional delineation should also include mapping of ephemeral, intermittent, and perennial stream courses potentially impacted by the project. In addition to federally protected wetlands, the Department considers impacts to wetlands (as defined by the Department) potentially significant.

   b. The project may require a Lake or Streambed Alteration Agreement, pursuant to Section 1600 et seq. of the Fish and Game Code, with the applicant prior to the applicant's commencement of any activity that will substantially divert or obstruct the natural flow or substantially change the bed, channel, or bank (which may include associated riparian resources) of a river, stream or lake, or use material from a streambed.

[2] Cowardin, Lewis M., et al. 1979. Classification of Wetlands and Deepwater Habitats of the United States. U.S. Department of the Interior, Fish and Wildlife Service.

[3] California Fish and Game Commission Policies: Wetlands Resources Policy; Wetland Definition, Mitigation Strategies, and Habitat Value Assessment Strategy; Amended 1994

> The Department's issuance of a Lake or Streambed Alteration Agreement for a project that is subject to CEQA will require CEQA compliance actions by the Department as a responsible agency. The Department as a responsible agency under CEQA may consider the local jurisdiction's (lead agency) Negative Declaration or Environmental Impact Report for the project. To minimize additional requirements by the Department pursuant to Section 1600 et seq. and/or under CEQA, the document should fully identify the potential impacts to the lake, stream or riparian resources and provide adequate avoidance, mitigation, monitoring and reporting commitments for issuance of the agreement.

The Department has identified the following site-specific environmental issues that should be addressed in the EIR:

1. The EIR should conduct a complete impact analysis to evaluate whether groundwater withdrawal could potentially cause drying or reduction of water to springs adjacent to the project area.

2. The proposed project is within the range of the desert tortoise (*Gopherus aggassizzi*, DT), which is listed as threatened under the California Endangered Species Act (CESA) and the federal Endangered Species Act (FESA). The Department recommends surveys for DT be conducted using the most recent U.S. Fish and Wildlife Service protocol. The Department also recommends the survey datasheets be submitted with the EIR. The EIR should include mitigation measures to fully mitigate potential impacts to DT.

3. The proposed project is within the range of the burrowing owl (*Athene cunicularia*, BUOW), which is A Species of Special Concern and protected under Fish and Game Code Section 3503.5. The Department recommends surveys for BUOWDT be conducted using the most recent established survey protocol. The Department also recommends the survey datasheets be submitted with the EIR and the EIR include mitigation measures to offset potential impacts to BUOW.

4. The desert bighorn sheep (*Ovis canadensis nelsoni*) is a Fully Protected Species under Fish and Game Code Section 4700 and the golden eagle (*Aquila chrysaetos*) is a Fully Protected under Fish and Game Code Section 3511. Fully protected species may not be taken or possessed at any time and no licenses or permits may be issued for their take except for collecting these species for necessary scientific research and relocation of the bird species for the protection of livestock. The Department recommends the EIR include mitigation measures that will offset potential impacts to these species.

5. Include a decommissioning plan as part of the EIR.

Thank you for this opportunity to comment. Questions regarding this letter and further coordination on these issues should be directed to Ms. Wendy Campbell at 760-873-7355 or by email WCampbell@dfg.ca.gov.

Sincerely,

Rebecca Jones

Rebecca Jones
Senior Environmental Scientist

Attachment

cc: Wendy Campbell
CHRON

ATTACHMENT 1

Protocols for Surveying and Evaluating Impacts to Special Status Native Plant Populations and Natural Communities

State of California
CALIFORNIA NATURAL RESOURCES AGENCY
Department of Fish and Game
November 24, 2009[1]

INTRODUCTION AND PURPOSE

The conservation of special status native plants and their habitats, as well as natural communities, is integral to maintaining biological diversity. The purpose of these protocols is to facilitate a consistent and systematic approach to the survey and assessment of special status native plants and natural communities so that reliable information is produced and the potential of locating a special status plant species or natural community is maximized. They may also help those who prepare and review environmental documents determine when a botanical survey is needed, how field surveys may be conducted, what information to include in a survey report, and what qualifications to consider for surveyors. The protocols may help avoid delays caused when inadequate biological information is provided during the environmental review process; assist lead, trustee and responsible reviewing agencies to make an informed decision regarding the direct, indirect, and cumulative effects of a proposed development, activity, or action on special status native plants and natural communities; meet California Environmental Quality Act (CEQA)[2] requirements for adequate disclosure of potential impacts; and conserve public trust resources.

DEPARTMENT OF FISH AND GAME TRUSTEE AND RESPONSIBLE AGENCY MISSION

The mission of the Department of Fish and Game (DFG) is to manage California's diverse wildlife and native plant resources, and the habitats upon which they depend, for their ecological values and for their use and enjoyment by the public. DFG has jurisdiction over the conservation, protection, and management of wildlife, native plants, and habitat necessary to maintain biologically sustainable populations (Fish and Game Code §1802). DFG, as trustee agency under CEQA §15386, provides expertise in reviewing and commenting on environmental documents and makes protocols regarding potential negative impacts to those resources held in trust for the people of California.

Certain species are in danger of extinction because their habitats have been severely reduced in acreage, are threatened with destruction or adverse modification, or because of a combination of these and other factors. The California Endangered Species Act (CESA) provides additional protections for such species, including take prohibitions (Fish and Game Code §2050 *et seq.*). As a responsible agency, DFG has the authority to issue permits for the take of species listed under CESA if the take is incidental to an otherwise lawful activity; DFG has determined that the impacts of the take have been minimized and fully mitigated; and, the take would not jeopardize the continued existence of the species (Fish and Game Code §2081). Surveys are one of the preliminary steps to detect a listed or special status plant species or natural community that may be impacted significantly by a project.

DEFINITIONS

Botanical surveys provide information used to determine the potential environmental effects of proposed projects on all special status plants and natural communities as required by law (i.e., CEQA, CESA, and Federal Endangered Species Act (ESA)). Some key terms in this document appear in **bold font** for assistance in use of the document.

For the purposes of this document, **special status plants** include all plant species that meet one or more of the following criteria[3]:

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1 This document replaces the DFG document entitled "Guidelines for Assessing the Effects of Proposed Projects on Rare, Threatened and Endangered Plants and Natural Communities."

2 http://ceres.ca.gov/ceqa/

3 Adapted from the East Alameda County Conservation Strategy available at http://www.fws.gov/sacramento/EACCS/Documents/080228_Species_Evaluation_EACCS.pdf

- Listed or proposed for listing as threatened or endangered under ESA or candidates for possible future listing as threatened or endangered under the ESA (50 CFR §17.12).
- Listed[4] or candidates for listing by the State of California as threatened or endangered under CESA (Fish and Game Code §2050 *et seq.*). A species, subspecies, or variety of plant is **endangered** when the prospects of its survival and reproduction in the wild are in immediate jeopardy from one or more causes, including loss of habitat, change in habitat, over-exploitation, predation, competition, disease, or other factors (Fish and Game Code §2062). A plant is **threatened** when it is likely to become endangered in the foreseeable future in the absence of special protection and management measures (Fish and Game Code §2067).
- Listed as rare under the California Native Plant Protection Act (Fish and Game Code §1900 *et seq.*). A plant is rare when, although not presently threatened with extinction, the species, subspecies, or variety is found in such small numbers throughout its range that it may be endangered if its environment worsens (Fish and Game Code §1901).
- Meet the definition of rare or endangered under CEQA §15380(b) and (d). Species that may meet the definition of rare or endangered include the following:
  - Species considered by the California Native Plant Society (CNPS) to be "rare, threatened or endangered in California" (Lists 1A, 1B and 2);
  - Species that may warrant consideration on the basis of local significance or recent biological information[5];
  - Some species included on the California Natural Diversity Database's (CNDDB) *Special Plants, Bryophytes, and Lichens List* (California Department of Fish and Game 2008)[6].
- Considered a **locally significant species**, that is, a species that is not rare from a statewide perspective but is rare or uncommon in a local context such as within a county or region (CEQA §15125 (c)) or is so designated in local or regional plans, policies, or ordinances (CEQA Guidelines, Appendix G). Examples include a species at the outer limits of its known range or a species occurring on an uncommon soil type.

Special status natural communities are communities that are of limited distribution statewide or within a county or region and are often vulnerable to environmental effects of projects. These communities may or may not contain special status species or their habitat. The most current version of the Department's *List of California Terrestrial Natural Communities*[7] indicates which natural communities are of special status given the current state of the California classification.

Most types of wetlands and riparian communities are considered special status natural communities due to their limited distribution in California. These natural communities often contain special status plants such as those described above. These protocols may be used in conjunction with protocols formulated by other agencies, for example, those developed by the U.S. Army Corps of Engineers to delineate jurisdictional wetlands[8] or by the U.S. Fish and Wildlife Service to survey for the presence of special status plants[9].

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4 Refer to current online published lists available at: http://www.dfg.ca.gov/biogeodata.

5 In general, CNPS List 3 plants (plants about which more information is needed) and List 4 plants (plants of limited distribution) may not warrant consideration under CEQA §15380. These plants may be included on special status plant lists such as those developed by counties where they would be addressed under CEQA §15380. List 3 plants may be analyzed under CEQA §15380 if sufficient information is available to assess potential impacts to such plants. Factors such as regional rarity vs. statewide rarity should be considered in determining whether cumulative impacts to a List 4 plant are significant even if individual project impacts are not. List 3 and 4 plants are also included in the California Natural Diversity Database's (CNDDB) *Special Plants, Bryophytes, and Lichens List*. [Refer to the current online published list available at: http://www.dfg.ca.gov/biogeodata.] Data on Lists 3 and 4 plants should be submitted to CNDDB. Such data aids in determining or revising priority ranking.

6 Refer to current online published lists available at: http://www.dfg.ca.gov/biogeodata.

7 http://www.dfg.ca.gov/biogeodata/vegcamp/pdfs/natcomlist.pdf. The rare natural communities are asterisked on this list.

8 http://www.wetlands.com/regs/tlpge02e.htm

9 U.S. Fish and Wildlife Service Survey Guidelines available at http://www.fws.gov/sacramento/es/protocol.htm

BOTANICAL SURVEYS

Conduct botanical surveys prior to the commencement of any activities that may modify vegetation, such as clearing, mowing, or ground-breaking activities. It is appropriate to conduct a botanical field survey when:

- Natural (or naturalized) vegetation occurs on the site, and it is unknown if special status plant species or natural communities occur on the site, and the project has the potential for direct or indirect effects on vegetation; or
- Special status plants or natural communities have historically been identified on the project site; or
- Special status plants or natural communities occur on sites with similar physical and biological properties as the project site.

SURVEY OBJECTIVES

Conduct field surveys in a manner which maximizes the likelihood of locating special status plant species or special status natural communities that may be present. Surveys should be **floristic in nature**, meaning that every plant taxon that occurs on site is identified to the taxonomic level necessary to determine rarity and listing status. "Focused surveys" that are limited to habitats known to support special status species or are restricted to lists of likely potential species are not considered floristic in nature and are not adequate to identify all plant taxa on site to the level necessary to determine rarity and listing status. Include a list of plants and natural communities detected on the site for each botanical survey conducted. More than one field visit may be necessary to adequately capture the floristic diversity of a site. An indication of the prevalence (estimated total numbers, percent cover, density, etc.) of the species and communities on the site is also useful to assess the significance of a particular population.

SURVEY PREPARATION

Before field surveys are conducted, compile relevant botanical information in the general project area to provide a regional context for the investigators. Consult the CNDDB[10] and BIOS[11] for known occurrences of special status plants and natural communities in the project area prior to field surveys. Generally, identify vegetation and habitat types potentially occurring in the project area based on biological and physical properties of the site and surrounding ecoregion[12], unless a larger assessment area is appropriate. Then, develop a list of special status plants with the potential to occur within these vegetation types. This list can serve as a tool for the investigators and facilitate the use of reference sites; however, special status plants on site might not be limited to those on the list. Field surveys and subsequent reporting should be comprehensive and floristic in nature and not restricted to or focused only on this list. Include in the survey report the list of potential special status species and natural communities, and the list of references used to compile the background botanical information for the site.

SURVEY EXTENT

Surveys should be comprehensive over the entire site, including areas that will be directly or indirectly impacted by the project. Adjoining properties should also be surveyed where direct or indirect project effects, such as those from fuel modification or herbicide application, could potentially extend offsite. Pre-project surveys restricted to known CNDDB rare plant locations may not identify all special status plants and communities present and do not provide a sufficient level of information to determine potential impacts.

FIELD SURVEY METHOD

Conduct surveys using **systematic field techniques** in all habitats of the site to ensure thorough coverage of potential impact areas. The level of effort required per given area and habitat is dependent upon the vegetation and its overall diversity and structural complexity, which determines the distance at which plants can be identified. Conduct surveys by walking over the entire site to ensure thorough coverage, noting all plant taxa

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10 Available at http://www.dfg.ca.gov/biogeodata/cnddb

11 http://www.bios.dfg.ca.gov/

12 Ecological Subregions of California, available at http://www.fs.fed.us/r5/projects/ecoregions/toc.htm

observed. The level of effort should be sufficient to provide comprehensive reporting. For example, one person-hour per eight acres per survey date is needed for a comprehensive field survey in grassland with medium diversity and moderate terrain[13], with additional time allocated for species identification.

TIMING AND NUMBER OF VISITS

Conduct surveys in the field at the time of year when species are both evident and identifiable. Usually this is during flowering or fruiting. Space visits throughout the growing season to accurately determine what plants exist on site. Many times this may involve multiple visits to the same site (e.g. in early, mid, and late-season for flowering plants) to capture the floristic diversity at a level necessary to determine if special status plants are present[14]. The timing and number of visits are determined by geographic location, the natural communities present, and the weather patterns of the year(s) in which the surveys are conducted.

REFERENCE SITES

When special status plants are known to occur in the type(s) of habitat present in the project area, observe reference sites (nearby accessible occurrences of the plants) to determine whether those species are identifiable at the time of the survey and to obtain a visual image of the target species, associated habitat, and associated natural community.

USE OF EXISTING SURVEYS

For some sites, floristic inventories or special status plant surveys may already exist. Additional surveys may be necessary for the following reasons:

- Surveys are not current[15]; or
- Surveys were conducted in natural systems that commonly experience year to year fluctuations such as periods of drought or flooding (e.g. vernal pool habitats or riverine systems); or
- Surveys are not comprehensive in nature; or fire history, land use, physical conditions of the site, or climatic conditions have changed since the last survey was conducted[16]; or
- Surveys were conducted in natural systems where special status plants may not be observed if an annual above ground phase is not visible (e.g. flowers from a bulb); or
- Changes in vegetation or species distribution may have occurred since the last survey was conducted, due to habitat alteration, fluctuations in species abundance and/or seed bank dynamics.

NEGATIVE SURVEYS

Adverse conditions may prevent investigators from determining the presence of, or accurately identifying, some species in potential habitat of target species. Disease, drought, predation, or herbivory may preclude the presence or identification of target species in any given year. Discuss such conditions in the report.

The failure to locate a known special status plant occurrence during one field season does not constitute evidence that this plant occurrence no longer exists at this location, particularly if adverse conditions are present. For example, surveys over a number of years may be necessary if the species is an annual plant having a persistent, long-lived seed bank and is known not to germinate every year. Visits to the site in more

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13 Adapted from U.S. Fish and Wildlife Service kit fox survey guidelines available at www.fws.gov/sacramento/es/documents/kitfox_no_protocol.pdf

14 U.S. Fish and Wildlife Service Survey Guidelines available at http://www.fws.gov/sacramento/es/protocol.htm

15 Habitats, such as grasslands or desert plant communities that have annual and short-lived perennial plants as major floristic components may require yearly surveys to accurately document baseline conditions for purposes of impact assessment. In forested areas, however, surveys at intervals of five years may adequately represent current conditions. For forested areas, refer to 'Guidelines for Conservation of Sensitive Plant Resources Within the Timber Harvest Review Process and During Timber Harvesting Operations', available at https://r1.dfg.ca.gov/portal/Portals/12/THPBotanicalGuidelinesJuly2005.pdf

16 U.S. Fish and Wildlife Service Survey Guidelines available at http://www.fws.gov/ventura/speciesinfo/protocols_guidelines/docs/botanicalinventories.pdf

than one year increase the likelihood of detection of a special status plant especially if conditions change. To further substantiate negative findings for a known occurrence, a visit to a nearby reference site may ensure that the timing of the survey was appropriate.

REPORTING AND DATA COLLECTION

Adequate information about special status plants and natural communities present in a project area will enable reviewing agencies and the public to effectively assess potential impacts to special status plants or natural communities[17] and will guide the development of minimization and mitigation measures. The next section describes necessary information to assess impacts. For comprehensive, systematic surveys where no special status species or natural communities were found, reporting and data collection responsibilities for investigators remain as described below, excluding specific occurrence information.

SPECIAL STATUS PLANT OR NATURAL COMMUNITY OBSERVATIONS

Record the following information for locations of each special status plant or natural community detected during a field survey of a project site.

- A detailed map (1:24,000 or larger) showing locations and boundaries of each special status species occurrence or natural community found as related to the proposed project. Mark occurrences and boundaries as accurately as possible. Locations documented by use of global positioning system (GPS) coordinates must include the datum[18] in which they were collected;
- The site-specific characteristics of occurrences, such as associated species, habitat and microhabitat, structure of vegetation, topographic features, soil type, texture, and soil parent material. If the species is associated with a wetland, provide a description of the direction of flow and integrity of surface or subsurface hydrology and adjacent off-site hydrological influences as appropriate;
- The number of individuals in each special status plant population as counted (if population is small) or estimated (if population is large);
- If applicable, information about the percentage of individuals in each life stage such as seedlings vs. reproductive individuals;
- The number of individuals of the species per unit area, identifying areas of relatively high, medium and low density of the species over the project site; and
- Digital images of the target species and representative habitats to support information and descriptions.

FIELD SURVEY FORMS

When a special status plant or natural community is located, complete and submit to the CNDDB a California Native Species (or Community) Field Survey Form[19] or equivalent written report, accompanied by a copy of the relevant portion of a 7.5 minute topographic map with the occurrence mapped. Present locations documented by use of GPS coordinates in map and digital form. Data submitted in digital form must include the datum[20] in which it was collected. If a potentially undescribed special status natural community is found on the site, document it with a Rapid Assessment or Relevé form[21] and submit it with the CNDDB form.

VOUCHER COLLECTION

Voucher specimens provide verifiable documentation of species presence and identification as well as a public record of conditions. This information is vital to all conservation efforts. Collection of voucher specimens should

[17] Refer to current online published lists available at: http://www.dfg.ca.gov/biogeodata. For Timber Harvest Plans (THPs) please refer to the "Guidelines for Conservation of Sensitive Plant Resources Within the Timber Harvest Review Process and During Timber Harvesting Operations", available at https://r1.dfg.ca.gov/portal/Portals/12/THPBotanicalGuidelinesJuly2005.pdf

[18] NAD83, NAD27 or WGS84

[19] http://www.dfg.ca.gov/biogeodata

[20] NAD83, NAD27 or WGS84

[21] http://www.dfg.ca.gov/biogeodata/vegcamp/veg_publications_protocols.asp

be conducted in a manner that is consistent with conservation ethics, and is in accordance with applicable state and federal permit requirements (e.g. incidental take permit, scientific collection permit). Voucher collections of special status species (or suspected special status species) should be made only when such actions would not jeopardize the continued existence of the population or species.

Deposit voucher specimens with an indexed regional herbarium[22] no later than 60 days after the collections have been made. Digital imagery can be used to supplement plant identification and document habitat. Record all relevant permittee names and permit numbers on specimen labels. A collecting permit is required prior to the collection of State-listed plant species[23].

BOTANICAL SURVEY REPORTS

Include reports of botanical field surveys containing the following information with project environmental documents:

- **Project and site description**
  - A description of the proposed project;
  - A detailed map of the project location and study area that identifies topographic and landscape features and includes a north arrow and bar scale; and,
  - A written description of the biological setting, including vegetation[24] and structure of the vegetation; geological and hydrological characteristics; and land use or management history.
- **Detailed description of survey methodology and results**
  - Dates of field surveys (indicating which areas were surveyed on which dates), name of field investigator(s), and total person-hours spent on field surveys;
  - A discussion of how the timing of the surveys affects the comprehensiveness of the survey;
  - A list of potential special status species or natural communities;
  - A description of the area surveyed relative to the project area;
  - References cited, persons contacted, and herbaria visited;
  - Description of reference site(s), if visited, and phenological development of special status plant(s);
  - A list of all taxa occurring on the project site. Identify plants to the taxonomic level necessary to determine whether or not they are a special status species;
  - Any use of existing surveys and a discussion of applicability to this project;
  - A discussion of the potential for a false negative survey;
  - Provide detailed data and maps for all special plants detected. Information specified above under the headings "Special Status Plant or Natural Community Observations," and "Field Survey Forms," should be provided for locations of each special status plant detected;
  - Copies of all California Native Species Field Survey Forms or Natural Community Field Survey Forms should be sent to the CNDDB and included in the environmental document as an Appendix. It is not necessary to submit entire environmental documents to the CNDDB; and,
  - The location of voucher specimens, if collected.

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22 For a complete list of indexed herbaria, see: Holmgren, P., N. Holmgren and L. Barnett. 1990. Index Herbariorum, Part 1: Herbaria of the World. New York Botanic Garden, Bronx, New York. 693 pp Or: http://www.nybg.org/bsci/ih/ih.html

23 Refer to current online published lists available at: http://www.dfg.ca.gov/biogeodata.

24 A vegetation map that uses the National Vegetation Classification System (http://biology.usgs.gov/npsveg/nvcs.html), for example *A Manual of California Vegetation*, and highlights any special status natural communities. If another vegetation classification system is used, the report should reference the system, provide the reason for its use, and provide a crosswalk to the National Vegetation Classification System.

- **Assessment of potential impacts**
  - A discussion of the significance of special status plant populations in the project area considering nearby populations and total species distribution;
  - A discussion of the significance of special status natural communities in the project area considering nearby occurrences and natural community distribution;
  - A discussion of direct, indirect, and cumulative impacts to the plants and natural communities;
  - A discussion of threats, including those from invasive species, to the plants and natural communities;
  - A discussion of the degree of impact, if any, of the proposed project on unoccupied, potential habitat of the species;
  - A discussion of the immediacy of potential impacts; and,
  - Recommended measures to avoid, minimize, or mitigate impacts.

QUALIFICATIONS

Botanical consultants should possess the following qualifications:

- Knowledge of plant taxonomy and natural community ecology;
- Familiarity with the plants of the area, including special status species;
- Familiarity with natural communities of the area, including special status natural communities;
- Experience conducting floristic field surveys or experience with floristic surveys conducted under the direction of an experienced surveyor;
- Familiarity with the appropriate state and federal statutes related to plants and plant collecting; and,
- Experience with analyzing impacts of development on native plant species and natural communities.

SUGGESTED REFERENCES

Barbour, M., T. Keeler-Wolf, and A. A. Schoenherr (eds.). 2007. Terrestrial vegetation of California (3rd Edition). University of California Press.

Bonham, C.D. 1988. Measurements for terrestrial vegetation. John Wiley and Sons, Inc., New York, NY.

California Native Plant Society. Most recent version. Inventory of rare and endangered plants (online edition). California Native Plant Society, Sacramento, CA. Online URL http://www.cnps.org/inventory.

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Elzinga, C.L., D.W. Salzer, and J. Willoughby. 1998. Measuring and monitoring plant populations. BLM Technical Reference 1730-1. U.S. Dept. of the Interior, Bureau of Land Management, Denver, Colorado.

Leppig, G. and J.W. White. 2006. Conservation of peripheral plant populations in California. Madroño 53:264-274.

Mueller-Dombois, D. and H. Ellenberg. 1974. Aims and methods of vegetation ecology. John Wiley and Sons, Inc., New York, NY.

U.S. Fish and Wildlife Service. 1996. Guidelines for conducting and reporting botanical inventories for federally listed plants on the Santa Rosa Plain. Sacramento, CA.

U.S. Fish and Wildlife Service. 1996. Guidelines for conducting and reporting botanical inventories for federally listed, proposed and candidate plants. Sacramento, CA.

Van der Maarel, E. 2005. Vegetation Ecology. Blackwell Science Ltd., Malden, MA.

South Coast
Air Quality Management District
21865 Copley Drive, Diamond Bar, CA 91765-4182
(909) 396-2000 • www.aqmd.gov

FISCAL ADMIN
2012 NOV 16 PM 1:59

November 9, 2012

Matthew Slowik, Senior Planner
County of San Bernardino Land Use Services Department
Planning Division
385 N. Arrowhead Avenue, First Floor
San Bernardino, CA 92415

Notice of Preparation of a CEQA Document for the
Soda Mountain Solar Project

The South Coast Air Quality Management District (SCAQMD) appreciates the opportunity to comment on the above-mentioned document. The SCAQMD's comments are recommendations regarding the analysis of potential air quality impacts from the proposed project that should be included in the draft CEQA document. Please send the SCAQMD a copy of the Draft EIR upon its completion. Note that copies of the Draft EIR that are submitted to the State Clearinghouse are not forwarded to the SCAQMD. Please forward a copy of the Draft EIR directly to SCAQMD at the address in our letterhead. **In addition, please send with the draft EIR all appendices or technical documents related to the air quality and greenhouse gas analyses and electronic versions of all air quality modeling and health risk assessment files. These include original emission calculation spreadsheets and modeling files (not Adobe PDF files). Without all files and supporting air quality documentation, the SCAQMD will be unable to complete its review of the air quality analysis in a timely manner. Any delays in providing all supporting air quality documentation will require additional time for review beyond the end of the comment period.**

Air Quality Analysis

The SCAQMD adopted its California Environmental Quality Act (CEQA) Air Quality Handbook in 1993 to assist other public agencies with the preparation of air quality analyses. The SCAQMD recommends that the Lead Agency use this Handbook as guidance when preparing its air quality analysis. Copies of the Handbook are available from the SCAQMD's Subscription Services Department by calling (909) 396-3720. The lead agency may wish to consider using land use emissions estimating software such as the recently released CalEEMod. This model is available on the SCAQMD Website at: http://www.aqmd.gov/ceqa/models.html.

The Lead Agency should identify any potential adverse air quality impacts that could occur from all phases of the project and all air pollutant sources related to the project. Air quality impacts from both construction (including demolition, if any) and operations should be calculated. Construction-related air quality impacts typically include, but are not limited to, emissions from the use of heavy-duty equipment from grading, earth-loading/unloading, paving, (e.g., construction worker vehicle trips, material transport trips). Operation-related air quality impacts may include, but are not limited to, emissions from stationary sources (e.g., boilers), area sources (e.g., solvents and coatings), and vehicular trips (e.g., on- and off-road tailpipe emissions and entrained dust). Air quality impacts from indirect sources, that is, sources that generate or attract vehicular trips should be included in the analysis.

The SCAQMD has developed a methodology for calculating PM2.5 emissions from construction and operational activities and processes. In connection with developing PM2.5 calculation methodologies, the SCAQMD has also developed both regional and localized significance thresholds. The SCAQMD requests that the lead agency quantify PM2.5 emissions and compare the results to the recommended PM2.5 significance thresholds. Guidance for calculating PM2.5 emissions and PM2.5 significance thresholds can be found at the following internet address: http://www.aqmd.gov/ceqa/handbook/PM2_5/PM2_5.html.

In addition to analyzing regional air quality impacts the SCAQMD recommends calculating localized air quality impacts and comparing the results to localized significance thresholds (LSTs). LST's can be used in addition to the recommended regional significance thresholds as a second indication of air quality impacts when preparing a CEQA document. Therefore, when preparing the air quality analysis for the proposed project, it is recommended that the lead agency perform a localized significance analysis by either using the LSTs developed by the SCAQMD or performing dispersion modeling as necessary. Guidance for performing a localized air quality analysis can be found at http://www.aqmd.gov/ceqa/handbook/LST/LST.html.

In the event that the proposed project generates or attracts vehicular trips, especially heavy-duty diesel-fueled vehicles, it is recommended that the lead agency perform a mobile source health risk assessment. Guidance for performing a mobile source health risk assessment ("Health Risk Assessment Guidance for Analyzing Cancer Risk from Mobile Source Diesel Idling Emissions for CEQA Air Quality Analysis") can be found on the SCAQMD's CEQA web pages at the following internet address: http://www.aqmd.gov/ceqa/handbook/mobile_toxic/mobile_toxic.html. An analysis of all toxic air contaminant impacts due to the decommissioning or use of equipment potentially generating such air pollutants should also be included.

Mitigation Measures

In the event that the project generates significant adverse air quality impacts, CEQA requires that all feasible mitigation measures that go beyond what is required by law be utilized during project construction and operation to minimize or eliminate significant adverse air quality impacts. To assist the Lead Agency with identifying possible mitigation measures for the project, please refer to Chapter 11 of the SCAQMD CEQA Air Quality Handbook for sample air quality mitigation measures. Additional mitigation measures can be found on the SCAQMD's CEQA web pages at the following internet address: www.aqmd.gov/ceqa/handbook/mitigation/MM_intro.html Additionally, SCAQMD's Rule 403 – Fugitive Dust, and the Implementation Handbook contain numerous measures for controlling construction-related emissions that should be considered for use as CEQA mitigation if not otherwise required. Other measures to reduce air quality impacts from land use projects can be found in the SCAQMD's Guidance Document for Addressing Air Quality Issues in General Plans and Local Planning. This document can be found at the following internet address: http://www.aqmd.gov/prdas/aqguide/aqguide.html. In addition, guidance on siting incompatible land uses can be found in the California Air Resources Board's Air Quality and Land Use Handbook: A Community Perspective, which can be found at the following internet address: http://www.arb.ca.gov/ch/handbook.pdf. CARB's Land Use Handbook is a general reference guide for evaluating and reducing air pollution impacts associated with new projects that go through the land use decision-making process. Pursuant to state CEQA Guidelines §15126.4 (a)(1)(D), any impacts resulting from mitigation measures must also be discussed.

Data Sources

SCAQMD rules and relevant air quality reports and data are available by calling the SCAQMD's Public Information Center at (909) 396-2039. Much of the information available through the Public Information Center is also available via the SCAQMD's World Wide Web Homepage (http://www.aqmd.gov).

The SCAQMD staff is available to work with the Lead Agency to ensure that project-related emissions are accurately identified, categorized, and evaluated. If you have any questions regarding this letter, please call Ian MacMillan, Program Supervisor, CEQA Section, at (909) 396-3244.

Sincerely,

Ian V. MacMillan

Ian MacMillan
Program Supervisor, CEQA Inter-Governmental Review
Planning, Rule Development & Area Sources

IM
SBC121031-10
Control Number

From: LIBRARY OF SANDS [mailto:libraryofsands@gmail.com]
Sent: Saturday, November 10, 2012 12:37 PM
To: BLM_CA_Soda_Mtn_Solar
Subject: Fringe Toed Mohave Lizard

BLM,

I am opposed to the Soda Mountain Solar collection site.

Further I am opposed to the collection site on the geoglyphs in Blythe & near the Joshua Tree National Park.

I have written President Obama on this matter.

I have viewed video footage that proves the Mohave tribe weren't engaged in the BLM's EPS.

I have collected my own household energy from the sun for 4 years using only 4 solar panels.
I believe the destruction of the California desert for this project is poor management of Public lands.

Collection of solar energy should be done within City Limits using rooftops & wall panels.

I am opposed to big solar & the whole idea we need any international corporations from Germany or anywhere else.

It is un-american & shameful.

Americans invented all the useful technology & looking elsewhere on this matter only dis-empowers our own sciences & advancement.

The word on the street is the technology will be outdated in 25 years.

I feel like this is a real estate deal made with a lack of respect for wildlife, the desert & the people who love the desert.

In reality the Mohave tribe should be consulted because it is the place they are from.
The California Fringe Toed Mohave lizard needs a habitat & has one in the proposed area.

That is what BLM should be focused on... not real estate deals for fast-tracked money...

STOP BIG SOLAR ON CALIFORNIA PUBLIC LANDS!

PUT SOLAR PANELS IN THE CITY!

protect our desert & SHARED cultural heritage

USA DESERTS ARE #1

N. SHINEYWATER
PO BOX 1901
JOSHUA TREE, CA
92252


NOTICE
Cultural resources in the vicinity of this notice are fragile and irreplaceable. The Antiquities Act of 1906 protects them for the benefit of all Americans.
ENJOY BUT DO NOT DESTROY YOUR AMERICAN HERITAGE
Any person who, without official permission, injures, destroys, excavates or appropriates any historic or prehistoric ruin, artifact or object of antiquity on the public lands of the United States is subject to arrest and penalty of law.
Permits to excavate sites or remove artifacts can be issued only to recognized educational and scientific institutions.
UNITED STA PARTMENT OF THE INTERIOR
BU OF LAND MANAGEMENT

From: Mick Mead [mailto:MMead@CLTHOMAS.com]
Sent: Friday, November 16, 2012 11:52 AM
To: BLM_CA_Soda_Mtn_Solar
Subject: Soda Mtn Solar Project

Mr. Childers,

We were unable to attend the public meeting in Barstow on November 14th and are interested in helping out with this project by supplying fuel and lubricants for the contractor. I was wondering if you can tell me the name of the Contractor awarded this project and a possible contact??

Thanks

Merritt (Mick) Mead
Thomas Petroleum
mmead@clthomas.com
702-461-3790
Fax 702-920-8384

Department of Toxic Substances Control

Deborah O. Raphael, Director
5796 Corporate Avenue
Cypress, California 90630

Matthew Rodriquez
Secretary for
Environmental Protection

Edmund G. Brown Jr.
Governor

2012 NOV 26 AM 9:31

November 19, 2012

Mr. Matthew Slowik, Senior Planner
County of San Bernardino Land Use Services Department
Planning Division
385 N. Arrowhead Avenue, First Floor
San Bernardio, California 92415-0182

NOTICE OF PREPARATION (NOP) OF A DRAFT ENVIRONMENTAL STATEMENT / ENVIRONMENTAL IMPACT REPORT FOR THE SODA MOUNTAIN SOLAR PROJECT (SCH#), SAN BERNARDINO COUNTY

Dear Mr. Slowik:

The Department of Toxic Substances Control (DTSC) has received your submitted Notice of Preparation of a Draft Environmental Statement/Environmental Impact Report (EIR) for the above-mentioned project. The following project description is stated in your document:

"Soda Mountain Solar, LLC (Applicant), a wholly owned subsidiary of Bechtel Development Company, Inc., proposes to construct and operate a 350-megawatt (MW) solar photovoltaic (PV) energy generating project known as the Soda Mountain Solar Project (Project). All project components would occupy approximately 2,700 acres of approximately 4,400-acre right-of-way (ROW) on public land administrated by the Bureau of Land Management (BLM). The Project would interconnect with the 500 kV Mead-Adelanto transmission line located adjacent to the proposed ROW. The Project would be located approximately 6 miles southwest of the community of Baker, California, along Interstate 15 (I-15) in northeast San Bernardino County. The Project would be located within a desert valley composed of alluvial fan deposits surrounded by the Soda Mountains. The Mojave National Preserve is located east of the Project area. There are no known residences within 0.5 mile of the proposed Project ROW. BLM will be the federal Lead Agency for deciding whether to approve the Project and will determine whether to issue a ROW grant authorizing Project construction."

Based on the review of the submitted document DTSC has the following comments:

1) The EIR should evaluate whether conditions within the Project area may pose a threat to human health or the environment. Following are the databases of some of the regulatory agencies:

- National Priorities List (NPL): A list maintained by the United States Environmental Protection Agency (U.S.EPA).

- EnviroStor (formerly CalSites): A Database primarily used by the California Department of Toxic Substances Control, accessible through DTSC's website (see below).

- EnviroStor (formerly CalSites): A Database primarily used by the California Department of Toxic Substances Control, accessible through DTSC's website (see below).

- Resource Conservation and Recovery Information System (RCRIS): A database of RCRA facilities that is maintained by U.S. EPA.

- Comprehensive Environmental Response Compensation and Liability Information System (CERCLIS): A database of CERCLA sites that is maintained by U.S.EPA.

- Solid Waste Information System (SWIS): A database provided by the California Integrated Waste Management Board which consists of both open as well as closed and inactive solid waste disposal facilities and transfer stations.

- GeoTracker: A List that is maintained by Regional Water Quality Control Boards.

- Local Counties and Cities maintain lists for hazardous substances cleanup sites and leaking underground storage tanks.

- The United States Army Corps of Engineers, 911 Wilshire Boulevard, Los Angeles, California, 90017, (213) 452-3908, maintains a list of Formerly Used Defense Sites (FUDS).

2) The EIR should identify the mechanism to initiate any required investigation and/or remediation for any site within the proposed Project area that may be contaminated, and the government agency to provide appropriate regulatory oversight. If necessary, DTSC would require an oversight agreement in order to review such documents.

3) Any environmental investigations, sampling and/or remediation for a site should be conducted under a Workplan approved and overseen by a regulatory agency that has jurisdiction to oversee hazardous substance cleanup. The findings of any investigations, including any Phase I or II Environmental Site Assessment Investigations should be summarized in the document. All sampling results in which hazardous substances were found above regulatory standards should be clearly summarized in a table. All closure, certification or remediation approval reports by regulatory agencies should be included in the EIR.

4) If buildings, other structures, asphalt or concrete-paved surface areas are being planned to be demolished, an investigation should also be conducted for the presence of other hazardous chemicals, mercury, and asbestos containing materials (ACMs). If other hazardous chemicals, lead-based paints (LPB) or products, mercury or ACMs are identified, proper precautions should be taken during demolition activities. Additionally, the contaminants should be remediated in compliance with California environmental regulations and policies.

5) Future project construction may require soil excavation or filling in certain areas. Sampling may be required. If soil is contaminated, it must be properly disposed and not simply placed in another location onsite. Land Disposal Restrictions (LDRs) may be applicable to such soils. Also, if the project proposes to import soil to backfill the areas excavated, sampling should be conducted to ensure that the imported soil is free of contamination.

6) Human health and the environment of sensitive receptors should be protected during any construction or demolition activities. If necessary, a health risk assessment overseen and approved by the appropriate government agency should be conducted by a qualified health risk assessor to determine if there are, have been, or will be, any releases of hazardous materials that may pose a risk to human health or the environment.

7) If the project site was used for agricultural, livestock or related activities, onsite soils and groundwater might contain pesticides, agricultural chemical, organic waste or other related residue. Proper investigation, and remedial actions, if necessary, should be conducted under the oversight of and approved by a government agency at the site prior to construction of the project.

8) If it is determined that hazardous wastes are, or will be, generated by the proposed operations, the wastes must be managed in accordance with the California Hazardous Waste Control Law (California Health and Safety Code, Division 20, Chapter 6.5) and the Hazardous Waste Control Regulations (California Code of Regulations, Title 22, Division 4.5). If it is determined that hazardous wastes will be generated, the facility should also obtain a United States Environmental Protection Agency Identification Number by contacting (800) 618-6942. Certain hazardous waste treatment processes or hazardous materials,

handling, storage or uses may require authorization from the local Certified Unified Program Agency (CUPA). Information about the requirement for authorization can be obtained by contacting your local CUPA.

9) DTSC can provide cleanup oversight through an Environmental Oversight Agreement (EOA) for government agencies that are not responsible parties, or a Voluntary Cleanup Agreement (VCA) for private parties. For additional information on the EOA or VCA, please see www.dtsc.ca.gov/SiteCleanup/Brownfields, or contact Ms. Maryam Tasnif-Abbasi, DTSC's Voluntary Cleanup Coordinator, at (714) 484-5489.

If you have any questions regarding this letter, please contact Rafiq Ahmed, Project Manager, by e-mail at rahmed@dtsc.ca.gov, or by phone at (714) 484-5491.

Sincerely,

Rafiq Ahmed

Rafiq Ahmed
Project Manager
Brownfields and Environmental Restoration Program

cc: Governor's Office of Planning and Research
State Clearinghouse
P.O. Box 3044
Sacramento, California 95812-3044
state.clearinghouse@opr.ca.gov.

CEQA Tracking Center
Department of Toxic Substances Control
Office of Environmental Planning and Analysis
P.O. Box 806
Sacramento, California 95812
Attn: Nancy Ritter
nritter@dtsc.ca.gov

CEQA # 3672

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
75 Hawthorne Street
San Francisco, CA 94105-3901

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Jeffery Childers, Project Manager
California Desert District Office, BLM
22835 Calle San Juan De Los Lagos
Moreno Valley, California 92553

Subject: Notice of Intent to Prepare a Joint Environmental Impact Statement and Environmental Impact Report for the Proposed Soda Mountain Solar Project, San Bernardino County, California and Possible Land Use Amendments to the California Desert Conservation Area Plan and a Public Lands Segregation

Dear Mr. Childers:

The U.S. Environmental Protection Agency has reviewed the October 23, 2012 Notice of Intent to prepare an Environmental Impact Statement for the proposed Soda Mountain Solar Project in San Bernardino County, California which may include an amendment to the California Desert Conservation Area Plan and a Public Lands Segregation. Our comments are provided pursuant to the National Environmental Policy Act, Council on Environmental Quality regulations (40 CFR Parts 1500-1508) and Section 309 of the Clean Air Act.

The EPA continues to support increasing the development of renewable energy resources, as recommended in the National Energy Policy Act of 2005. Using renewable energy resources such as solar power can help the nation meet its energy requirements without generating greenhouse gas emissions. The EPA believes that early analyses of key resources and the identification of compensatory mitigation lands should be completed as early as possible to determine a project's viability and avoid potential project delays. We are most concerned about direct and cumulative impacts to aquatic, air, cultural, and biological resources, including threatened and endangered species. Since cumulative impacts often occur at the landscape or regional level, we are particularly concerned about the impacts associated with the influx of large-scale renewable energy projects in San Bernardino County. Resources in the desert are particularly vulnerable to such large-scale development. To assist in the scoping process for this project, we have identified several issues for your attention in the preparation of the EIS.

We appreciate the opportunity to review this NOI and are available to discuss our comments. Please note that starting October 1, 2012, EPA Headquarters will not accept paper copies or CDs of EISs for official filing purposes. Submissions after October 1, 2012, must be made through the EPA's new electronic EIS submittal tool: e-NEPA. To begin using e-NEPA, you must first register with the EPA's electronic reporting site - https://cdx.epa.gov/epa_home.asp. Electronic submission does not change requirements for distribution of EISs for public review and comment, and lead agencies should still provide one hard copy and one electronic media copy of each Draft and Final EIS released for public circulation to the EPA Region 9 office in San Francisco (Mail Code: CED-2). If you have any questions, please contact me at (415) 972-3238, or contact Scott Sysum, the lead reviewer for this project, at (415) 972-3742 or sysum.scott@epa.gov.

Sincerely,

Tom Plenys
Environmental Review Office (CED-2)
Communities and Ecosystems Division

Enclosures: EPA's Detailed Comments

US EPA DETAILED COMMENTS ON THE NOTICE OF INTENT TO PREPARE A JOINT ENVIRONMENTAL IMPACT STATEMENT AND ENVIRONMENTAL IMPACT REPORT FOR THE PROPOSED SODA MOUNTAIN SOLAR PROJECT, SAN BERNARDINO COUNTY, CALIFORNIA AND POSSIBLE LAND USE AMENDMENTS TO THE CALIFORNIA DESERT CONSERVATION AREA PLAN AND A PUBLIC LANDS SEGREGATION, NOVEMBER 21, 2012

Statement of Purpose and Need

The Draft Environmental Impact Statement should clearly identify the underlying purpose and need to which the Bureau of Land Management is responding in proposing the alternatives (40 CFR 1502.13). The *purpose* of the proposed action is typically the specific objectives of the activity, while the *need* for the proposed action may be to eliminate a broader underlying problem or take advantage of an opportunity.

> *Recommendation:*
> The purpose and need should be a clear, objective statement of the rationale for the proposed project. The DEIS should discuss the proposed project in the context of the larger energy market that this project would serve; identify potential purchasers of the power produced; and discuss how the project will assist the state, and potential purchasers of the energy in meeting their renewable energy portfolio standards and goals.

Alternatives Analysis

The National Environmental Policy Act requires evaluation of reasonable alternatives, including those that may not be within the jurisdiction of the lead agency (40 CFR Section 1502.14(c)). A robust range of alternatives will include options for avoiding significant environmental impacts. The DEIS should provide a clear discussion of the reasons for the elimination of alternatives which are not evaluated in detail. Reasonable alternatives should include, but are not necessarily limited to, alternative sites, capacities, and technologies as well as alternatives that identify environmentally sensitive areas or areas with potential use conflicts. The alternatives analysis should describe the approach used to identify environmentally sensitive areas and describe the process that was used to designate them in terms of sensitivity (low, medium, and high).

The environmental impacts of the proposal and alternatives should be presented in comparative form, thus sharply defining the issues and providing a clear basis for choice among options by the decision maker and the public (40 CFR 1502.14). The potential environmental impacts of each alternative should be quantified to the greatest extent possible (e.g., acres of wetlands impacted, tons per year of emissions produced).

The U. S. Environmental Protection Agency strongly encourages the BLM and other interested parties to pursue the siting of renewable energy projects on disturbed, degraded, and contaminated sites, including permanently fallow or abandoned agricultural lands before considering large tracts of undisturbed public lands. While we are encouraged by the proposed siting of this project near existing roadways and utility rights-of-way, we would suggest that the DEIS describe the current condition and functionality of the land selected.

Recommendations:
The DEIS should describe how each alternative was developed, how it addresses each project objective, and how it will be implemented. The alternatives analysis should include a discussion of reduced acreage, reduced megawatt and modified footprint alternatives, as well alternative sites, capacities, and generating technologies, including different types of solar technologies, and describe the benefits associated with the proposed technology.

The DEIS should clearly describe the rationale used to determine whether impacts of an alternative are significant or not. Thresholds of significance should be determined by considering the context and intensity of an action and its effects (40 CFR 1508.27).

The EPA recommends that the DEIS identify and analyze an environmentally preferred alternative. This alternative should consider options such as downsizing the proposed project within the project area and/or relocating sections/components of the project in other areas to reduce environmental impacts.

The DEIS should describe the current condition of the land selected for the proposed project, discuss whether the land is classified as disturbed, and describe to what extent the land could be used for other purposes into the future.

<u>Water Resources</u>

Water Supply and Water Quality

We understand that solar photovoltaic installations need much less water than solar thermal plants that use water for cooling. The DEIS should estimate the quantity of water the project will require (including during construction and operations) 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 clearly depict reasonably foreseeable direct, indirect, and cumulative impacts to this resource. If groundwater is to be used, the potentially-affected groundwater basin should be identified and any potential for subsidence and impacts to springs or other open water bodies and biologic resources should be analyzed.

Recommendations:
The DEIS should include:
- A discussion of the amount of water needed for construction and operation of the proposed solar PV generation facility and where this water will be obtained.
- A discussion of availability of groundwater within the basin and annual recharge rates.
- A description of the water right permitting process and the status of water rights within that basin, including an analysis of whether water rights have been over-allocated. Discuss groundwater adjudication in the project vicinity if applicable.
- A discussion of cumulative impacts to groundwater supply within the hydrographic basin, including impacts from other proposed large-scale developments, if applicable.
- An analysis of different types of technology that can be used to minimize or recycle water, including minimizing, or eliminating, water use for washing PV panels. Note First Solar's

Desert Sunlight Solar PV project in Riverside County committed to eliminate PV panel washing during operations.

- A discussion of whether it would be feasible to use other sources of water, including potable water or wastewater.
- An analysis of the potential for the proposed project and alternatives to cause adverse aquatic impacts such as impacts to water quality and aquatic habitats, both directly, indirectly and cumulatively.

The DEIS should address the potential effects of project discharges, if any, on surface water or ground water quality. Specific discharges should be identified and potential effects of discharges on designated beneficial uses of affected waters should be analyzed. If the facility is a zero discharge facility, the DEIS should disclose the amount of process water that would be disposed of onsite and explain methods of onsite containment.

The EPA encourages the BLM to include in the DEIS a description of all water conservation measures that will be implemented to reduce water demands. Project designs should maximize conservation measures such as the use of recycled water for landscaping and industry, xeric landscaping, a water pricing structure that accurately reflects the economic and environmental costs of water use, and water conservation education. Water saving strategies can be found in the EPA's publications *Protecting Water Resources with Smart Growth* at www.epa.gov/piedpage/pdf/waterresources_with_sg.pdf, and *USEPA Water Conservation Guidelines* at www.epa.gov/watersense/docs/app_a508.pdf.

In addition, the DEIS should describe water reliability for the proposed project and clarify how existing and/or proposed sources may be affected by climate change. At a minimum, the EPA expects a qualitative discussion of impacts to water supply and the adaptability of the project to these changes.

Clean Water Act Section 404

The project applicant should coordinate with the U.S. Army Corps of Engineers to determine if the proposed project requires a Section 404 permit under the Clean Water Act. Section 404 regulates the discharge of dredged or fill material into waters of the United States, including wetlands and other *special aquatic sites*. The DEIS should describe all waters of the U.S. that could be affected by the project alternatives, and include maps that clearly identify all such waters within the project area. The discussion should include acreages and channel lengths, habitat types, values and functions of these waters. The EPA recommends that the BLM include a jurisdictional delineation for all WOUS, including ephemeral drainages in the DEIS. A jurisdictional delineation will confirm the presence or absence of WOUS in the project area and help determine whether or not the proposed project would require a Section 404 permit.

If a permit is required, the DEIS should discuss compliance with *Federal Guidelines for Specification of Disposal Sites for Dredged or Fill Materials* (40 CFR 230), promulgated pursuant to Section 404(b)(1) of the CWA. Pursuant to 40 CFR 230, any permitted discharge into WOUS must be the *least environmentally damaging practicable alternative* available to achieve the project purpose. The Final EIS should include an evaluation of the project alternatives in this context in order to demonstrate the project's compliance with the 404(b)(1) Guidelines. If, under the proposed project, dredged or fill material would be discharged into WOUS, the DEIS should discuss alternatives to avoid those discharges.

Recommendations:
The DEIS should include a jurisdictional delineation for all WOUS, including ephemeral drainages, in accordance with the 1987 *Corps of Engineers Wetlands Delineation Manual*, the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region* (Version 2.0) (Regional Supplement USACE, 2008) and *A Field Guide to the Identification of the Ordinary High Water Mark (OHWM) in the Arid West Region of the Western United States: A Delineation Manual* (USACE, 2008). A jurisdictional delineation will confirm the presence of WOUS in the project area and help determine impact avoidance or if state and federal permits would be required for activities that affect WOUS.

The DEIS should describe all WOUS that could be affected by the project alternatives, and include maps that clearly identify all WOUS within the project area. The discussion should include acreages and channel lengths, habitat types, values, and functions of these WOUS.

Drainages, Ephemeral Washes, and Floodplains

Natural washes perform a diversity of hydrologic, biochemical, and geochemical functions that directly affect the integrity and functional condition of higher-order waters downstream. Healthy ephemeral waters with characteristic plant communities control rates of sediment deposition and dissipate the energy associated with flood flows. Ephemeral washes also provide habitat for breeding, shelter, foraging, and movement of wildlife. Many plant populations are dependent on these aquatic ecosystems and adapted to their unique conditions. The potential damage that could result from disturbance of flat-bottomed washes includes alterations to the hydrological functions that natural channels provide in arid ecosystems, such as adequate capacity for flood control, energy dissipation, and sediment movement; as well as impacts to valuable habitat for desert species.

Recommendations:
The EPA recommends that the DEIS characterize the functions of any aquatic features that could be affected by the proposed project and are determined not to constitute waters of the U.S., and discuss potential mitigation.

To avoid and minimize direct and indirect impacts to desert washes (such as erosion, migration of channels and local scour), the EPA recommends:

- Avoid placement of support structures in washes.
- Utilize existing natural drainage channels on site and more natural features, such as earthen berms or channels, rather than concrete-lined channels.

- Discuss the feasibility of higher profile panel installations (e.g. greater ground clearance) to allow for less disturbance of natural contours, drainage channels and vegetation on site.
- Commit to the use of natural washes, in their present location and natural form and including adequate natural buffers, for flood control to the maximum extent practicable.
- Minimize the number of road crossings over washes and designing necessary crossings to provide adequate flow-through during storm events.
- Avoid complete clearing and grading of the site if practicable to maintain natural vegetation and reduce impacts to drainages.

Discuss the availability of sufficient compensation lands within the project's watershed to replace desert wash functions lost on the project site.

Construction Stormwater Discharge Permit

The California State Water Resources Control board requires owner/operators to obtain coverage under the General Permit for Discharges of Storm Water Associated with Construction Activity if the project will disturb more than one acre of soil. Given the disturbance area for this project, California State Water Resources Control Board General Permit associated with construction activity Construction General Permit Order 2009-0009-DWQ would likely be required. Additionally, a Stormwater Pollution Prevention Plan, that includes erosion control measures, would need to be generated for the project and implemented on-site.

The SWPPP would include the elements described in the Construction General Permit, including a site map(s) showing the construction site perimeter, existing and proposed buildings, lots, roadways, storm water collection and discharge points, general topography both before and after construction, and drainage patterns across the project. The SWPPP also would list Best Management Practices, including erosion control BMPs that would be used to protect stormwater runoff, and include a description of required monitoring programs.

Additionally, the SWPPP must contain a visual monitoring program; a chemical monitoring program for "non-visible" pollutants to be implemented if there is a failure of BMPs; and a sediment monitoring plan if the site discharges directly to a water body listed on the 303(d) list for sediment. Section A of the Construction General Permit describes the elements that must be contained in a SWPPP. Guidance from other documents, such as the EPA document entitled "Developing Your Stormwater Pollution Prevention Plan: A Guide for Construction Sites" also could be used in the development of the SWPPP[1].

Recommendation:
The EPA recommends that the applicant determine the need for a California State Water Resources Control Board General Permit associated with construction activity Construction General Permit Order 2009-0009-DWQ. If such a permit is required, include a description of the proposed stormwater pollution control and mitigation measures in the DEIS.

[1] United Sates Environmental Protection Agency, Developing Your Stormwater Pollution Prevention Plan, A Guide for Construction Sites, EPA 833- R-06-004. May 2007. http://www.epa.gov/npdes/pubs/sw_swppp_guide.pdf

Air Quality

The DEIS should provide a detailed discussion of ambient air conditions (baseline or existing conditions), National Ambient Air Quality Standards, criteria pollutant nonattainment areas, and potential air quality impacts of the proposed project (including cumulative and indirect impacts). Such an evaluation is necessary to assure compliance with State and Federal air quality regulations, and to disclose the potential impacts from temporary or cumulative degradation of air quality.

The DEIS should describe and estimate air emissions from potential construction and maintenance activities, as well as proposed mitigation measures to minimize those emissions. The EPA recommends an evaluation of the following measures to reduce emissions of criteria air pollutants and hazardous air pollutants (air toxics).

Recommendations:

- *Existing Conditions* – The DEIS should provide a detailed discussion of ambient air conditions, National Ambient Air Quality Standards, and criteria pollutant nonattainment areas in the vicinity of the project. The DEIS should identify all Class I Prevention of Significant Deterioration areas located within 100 kilometers of the proposed project site. Class I areas even further away could potentially be affected. Potential impacts to Class I Prevention of Significant Deterioration areas, including visibility impacts, should be discussed.

- *Quantify Emissions* – The DEIS should estimate emissions of criteria pollutants from the proposed project and discuss the timeframe for release of these emissions over the lifespan of the project. The DEIS should describe and estimate emissions from potential construction activities, as well as proposed mitigation measures to minimize these emissions.

- *Specify Emission Sources* – The DEIS should specify the emission sources by pollutant from mobile sources, stationary sources, and ground disturbance. This source specific information should be used to identify appropriate mitigation measures and areas in need of the greatest attention.

- *Construction Emissions Mitigation Plan* – The DEIS should include a draft Construction Emissions Mitigation Plan and ultimately adopt this plan in the Record of Decision. In addition to all applicable local, state, or federal requirements, we recommend the following control measures (Fugitive Dust, Mobile and Stationary Source and Administrative) be included in the Construction Emissions Mitigation Plan in order to reduce impacts associated with emissions of particulate matter and other toxics from construction-related activities:

    - Fugitive Dust Source Controls: The DEIS should identify the need for a Fugitive Dust Control Plan to reduce PM_{10} and $PM_{2.5}$ during construction and operations. We recommend that the plan include these general commitments:

- Stabilize heavily used unpaved construction roads with a non-toxic soil stabilizer or soil weighting agent that will not result in loss of vegetation, or increase other environmental impacts.
- During grading, use water, as necessary, on disturbed areas in construction sites to control visible plumes.
- Vehicle Speed
    - Limit speeds to 25 miles per hour on stabilized unpaved roads as long as such speeds do not create visible dust emissions.
    - Limit speeds to 10 miles per hour or less on unpaved areas within construction sites on un-stabilized (and unpaved) roads.
    - Post visible speed limit signs at construction site entrances.
- Inspect and wash construction equipment vehicle tires, as necessary, so they are free of dirt before entering paved roadways, if applicable.
- Provide gravel ramps of at least 20 feet in length at tire washing/cleaning stations, and ensure construction vehicles exit construction sites through treated entrance roadways, unless an alternative route has been approved by appropriate lead agencies, if applicable.
- Use sandbags or equivalent effective measures to prevent run-off to roadways in construction areas adjacent to paved roadways. Ensure consistency with the project's Storm Water Pollution Prevention Plan, if such a plan is required for the project.
- Sweep the first 500 feet of paved roads exiting construction sites, other unpaved roads en route from the construction site, or construction staging areas whenever dirt or runoff from construction activity is visible on paved roads, or at least twice daily (less during periods of precipitation).
- Stabilize disturbed soils (after active construction activities are completed) with a non-toxic soil stabilizer, soil weighting agent, or other approved soil stabilizing method.
- Cover or treat soil storage piles with appropriate dust suppressant compounds and disturbed areas that remain inactive for longer than 10 days. Provide vehicles (used to transport solid bulk material on public roadways and that have potential to cause visible emissions) with covers. Alternatively, sufficiently wet and load materials onto the trucks in a manner to provide at least one foot of freeboard.
- Use wind erosion control techniques (such as windbreaks, water, dust suppressants, and/or vegetation) where soils are disturbed in construction, access and maintenance routes, and materials stock pile areas. Keep related windbreaks in place until the soil is stabilized or permanently covered with vegetation.

- o Mobile and Stationary Source Controls:
  - If practicable, lease new, clean equipment meeting the most stringent of applicable Federal[2] or State Standards[3]. In general, commit to the best available emissions control technology. Tier 4 engines should be used for project construction equipment to the maximum extent feasible[4].
  - Where Tier 4 engines are not available, use construction diesel engines with a rating of 50 hp or higher that meet, at a minimum, the Tier 3 California Emission Standards for Off-Road Compression-Ignition Engines[5], unless such engines are not available.
  - Where Tier 3 engine is not available for off-road equipment larger than 100 hp, use a Tier 2 engine, or an engine equipped with retrofit controls to reduce exhaust emissions of nitrogen oxides and diesel particulate matter to no more than Tier 2 levels.
  - Consider using electric vehicles, natural gas, biodiesel, or other alternative fuels during construction and operation phases to reduce the project's criteria and greenhouse gas emissions.
  - Plan construction scheduling to minimize vehicle trips.
  - Limit idling of heavy equipment to less than 5 minutes and verify through unscheduled inspections.
  - Maintain and tune engines per manufacturer's specifications to perform at CARB and/or EPA certification levels, prevent tampering, and conduct unscheduled inspections to ensure these measures are followed.

- o Administrative controls:
  - Develop a construction traffic and parking management plan that maintains traffic flow and plan construction to minimize vehicle trips.
  - Identify any sensitive receptors in the project area, such as children, elderly, and the infirm, and specify the means by which impacts to these populations will be minimized (e.g. locate construction equipment and staging zones away from sensitive receptors and building air intakes).
  - Include provisions for monitoring fugitive dust in the fugitive dust control plan and initiate increased mitigation measures to abate any visible dust plumes.

Biological Resources and Habitat

The DEIS should identify all petitioned and listed threatened and endangered species and critical habitat that might occur within the project area. The document should identify and quantify which species or

[2] EPA's website for nonroad mobile sources is http://www.epa.gov/nonroad/.
[3] For California, see ARB emissions standards, see: http://www.arb.ca.gov/msprog/offroad/offroad.htm.
[4] See: http://www.epa.gov/otaq/documents/nonroad-diesel/420f04032.pdf
[5] as specified in California Code of Regulations, Title 13, section 2423(b)(1)

critical habitat might be directly, indirectly, or cumulatively affected by each alternative and mitigate impacts to these species. Emphasis should be placed on the protection and recovery of species due to their status or potential status under the Endangered Species Act. The EPA recommends the BLM work closely with the U. S. Fish and Wildlife Service and California Department of Fish and Game to determine potential impacts of the project on plant and wildlife species, especially species classified rare, threatened, endangered or special status on federal, state or agency lists.

Analysis of impacts and mitigation on covered species should include:

- Identify all petitioned and listed threatened and endangered species and critical habitat, as well as sensitive species, which may occur within the project area.
- Discuss how surveys were conducted for each species, the findings of each survey, and all follow-up surveys and monitoring that would be conducted before, during, and/or after site construction begins.
- A clear description of how avoidance, mitigation and conservation measures will protect and encourage the recovery of the covered species and their habitats in the project area.
- Monitoring, reporting and adaptive management efforts to ensure species and habitat conservation effectiveness.
- Discus how and when the BLM intends to meet its obligations under Section 7 of the Endangered Species Act, if applicable.
- Include the biological assessment by reference or as an appendix, if one is prepared.
- If a biological opinion is prepared by the USFWS, it should be summarized or included as an appendix in the DEIS to demonstrate that the preferred alternative is consistent with the biological opinion.

The EPA is also concerned about the potential impact of construction, installation, and maintenance activities (deep trenching, grading, filling, and fencing) on habitat. The DEIS should describe the extent of these activities and the associated impacts on habitat and threatened and endangered species. The EPA is also aware that shade and alteration of rainfall deposition patterns due to the PV arrays could impact vegetation and/or species in the project area. We encourage habitat conservation alternatives that avoid and protect high value habitat and create or preserve linkages between habitat areas to better conserve the covered species.

Recommendations:
The DEIS should indicate what measures will be taken to protect important wildlife habitat areas from potential adverse effects of proposed covered activities. We encourage the BLM to maximize options to protect habitat and minimize habitat loss and habitat fragmentation.

The DEIS should discuss the impacts associated with an increase of shade and alteration of rainfall deposition patterns on vegetation and/or species.

The DEIS should evaluate mounting PV arrays at sufficient height above ground to maintain natural vegetation and minimize drainage disturbance. Quantify acreage that would not require clearing and grading as a result. Compare results to existing alternatives and incorporate into site design and conditions of use.

The DEIS should provide detailed information on any proposed fencing design and placement, and its potential effects on drainage systems on the project site. Fencing proposed for this project should meet appropriate hydrologic, wildlife protection and movement, and security performance standards. Those standards should be described in the DEIS.

If the applicant has or is to acquire compensation lands, the location(s) and management plans for these lands should be discussed in the DEIS.

Recommendations:
Incorporate, into the DEIS, information on the compensatory mitigation proposals (including quantification of acreages, estimates of species protected, costs to acquire compensatory lands, etc.) for unavoidable impacts to WOUS, State waters and biological resources.

Identify compensatory mitigation lands or quantify, in the DEIS, available lands for compensatory habitat mitigation for this project, as well as reasonably foreseeable projects in the area. Specify, in the DEIS, provisions that will ensure habitat selected for compensatory mitigation will be protected in perpetuity.

Incorporate, into the DEIS, mitigation, monitoring, and reporting measures that result from consultation with the USFWS and the California Department of Fish and Game, and that incorporate lessons learned from other renewable energy projects and recently released guidance to avoid and minimize adverse effects to sensitive biological resources.

The DEIS should describe the potential for habitat fragmentation and obstructions for wildlife movement from the construction of this project and other projects in the area.

Discuss the need for monitoring, mitigation, and if applicable, translocation management plans for the sensitive biological resources, approved by the biological resource management agencies. This could include, but is not limited to, a Bird and Bat Conservation Strategy, a Raven Monitoring, Management, and Control Plan, and Special Status Plant Impact Avoidance and Mitigation Plan.

The DEIS should include assurances that the design of the transmission line, if applicable, would be in compliance with current standards and practices that reduce the potential for raptor fatalities and injuries. The commonly referenced source of such design practices is found within the Avian Power Line Interaction Committee documents: *Suggested Practices for Avian Protection on Power Lines: State of the Art in 2006* manual and *Mitigating Bird Collisions with Power Lines: The State of the Art in 1994*. Also, in consultation with the USFWS, determine the need for a Bird and Bat Conservation Strategy to be developed using the 2005 Avian Power Line Interaction Committee and U.S. Fish and Wildlife Service Avian Protection Plan Guidelines or the need for an Eagle Conservation Plan following the USFWS 2011 Draft Eagle Conservation Plan Guidance.

Invasive Species

Human actions are the primary means of invasive species introductions. PV power plant construction causes disturbance of soils and vegetation through the movement of people and vehicles along the PV arrays, access roads, and laydown areas. These activities can contribute to the spread of invasive species. Parts of plants, seeds, and root stocks can contaminate construction equipment and essentially "seed" invasive species wherever the vehicle travels. Invasive species infestations can also occur during periodic site maintenance activities especially if these activities include mowing and clearing of vegetation. Once introduced, invasive species will likely spread and impact adjacent properties with the appropriate habitat.

Executive Order 13112, *Invasive Species* (February 3, 1999), 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. Executive Order 13112 also calls for the restoration of native plants and tree species. If the proposed project will entail new landscaping, the DEIS should describe how the project will meet the requirements of Executive Order 13112.

In addition, we encourage alternative management practices that limit herbicide use, focusing instead on other methods to limit invasive species vegetation and decrease fire risk.

Recommendations:
The DEIS should describe the invasive plant management plan used to monitor and control noxious weeds. If herbicides or pesticides will be used to manage vegetation, the DEIS should disclose the projected quantities and types of chemicals. The invasive plant management plan should identify methods that can be used to limit the introduction and spread of invasive species during and post-construction. These measures can include marking and avoidance of invasives, timing construction activities during periods that would minimize their spread, proper cleaning of equipment, and proper disposal of woody material removed from the site.

Because construction measures may not be completely effective in controlling the introduction and spread of invasives, the DEIS should describe post-construction activities that will be required such as surveying for invasive species following restoration of the construction site and measures that will be taken if infestations are found.

Visual Impacts – Glint and Glare

Assessment of the potential hazards of glint and glare from solar power plants is an important requirement to ensure public safety. Glint is defined as a momentary flash of light, while glare is defined as a more continuous source of excessive brightness relative to the ambient lighting. Hazards from glint and glare from concentrating solar power plants include the potential for permanent eye injury (e.g., retinal burn) and temporary disability or distractions (e.g., flash blindness), which may impact people working nearby, pilots flying overhead, or motorists driving alongside the site. Surfaces that produce glare include mirrors, metal roofs, still waters, and glass. While concentrating solar power projects that use mirrors have a greater propensity to produce glare, solar PV systems, although designed to be absorptive of sunlight, can produce glare in certain instances because of its glass surface and aluminum frame.

> *Recommendation:*
> The DEIS should include a glint and glare study and analysis to evaluate the potential hazards of glint and glare to motorists driving on Interstate 15, people working on the site and pilots flying overhead.

Indirect and Cumulative Impacts

The cumulative impacts analysis should provide the 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 (CEQ's Forty Questions, #18). The DEIS should clearly identify the resources that may be cumulatively impacted, the time over which impacts are going to occur, and the geographic area that will be impacted by the proposed projects. The DEIS should focus on resources of concern – those resources that are "at risk" and/or are significantly impacted by the proposed projects, before mitigation. In the introduction to the *Cumulative Impacts Section*, identify which resources are analyzed, which ones are not, and why. For each resource analyzed, the DEIS should:

- Identify the current condition of the resource as a measure of past impacts. For example, the percentage of species habitat lost to date.
- Identify the trend in the condition of the resource as a measure of present impacts. For example, the health of the resource is improving, declining, or in stasis.
- Identify all on-going, planned, and reasonably foreseeable projects in the study area that may contribute to cumulative impacts.
- Identify the future condition of the resource based on an analysis of impacts from reasonably foreseeable projects or actions added to existing conditions and current trends.
- Assess the cumulative impacts contribution of the proposed alternatives to the long-term health of the resource, and provide a specific measure for the projected impact from the proposed alternatives.
- Disclose the parties that would be responsible for avoiding, minimizing, and mitigating those adverse impacts.
- Identify opportunities to avoid and minimize impacts, including working with other entities.

As an indirect result of providing additional power, it can be anticipated that these projects will allow for development and population growth to occur in those areas that receive the generated electricity.

Recommendations:
The DEIS should describe the reasonably foreseeable future land use and associated impacts that will result from the additional power supply. The document should provide an estimate of the amount of growth, its likely location, and the biological and environmental resources at risk.

The DEIS should consider the direct and indirect effects of the inter-connecting transmission line for the proposed project, as well as the cumulative effects associated with the transmission needs of other reasonably foreseeable projects.

Climate Change

Scientific evidence supports the concern that continued increases in greenhouse gas emissions resulting from human activities will contribute to climate change. Global warming is caused by emissions of carbon dioxide and other heat-trapping gases. On December 7, 2009, the EPA determined that emissions of GHGs contribute to air pollution that "endangers public health and welfare" within the meaning of the Clean Air Act. A report by the California Energy Commission states that observed changes over the last several decades across the western United States reveal clear signals of climate change. The report states substantially higher temperatures, more extreme wildfires, and rising sea levels are just some of the direct impacts experienced in California that can be attributed, at least partially, to climate change[6]. The report indicates that climate change could result in the following changes in California: poor air quality; more severe heat; increased wildfires; shifting vegetation; declining forest productivity; decreased spring snowpack; water shortages; a potential reduction in hydropower; a loss in winter recreation; agricultural damages from heat, pests, pathogens, and weeds; and rising sea levels resulting in shrinking beaches and increased coastal floods.

Recommendations:
The DEIS should consider how climate change could potentially influence the proposed project and mitigation measures and assess how the projected impacts could be exacerbated by climate change.

The DEIS should quantify and disclose the anticipated climate change *benefits* of solar energy. We suggest quantifying greenhouse gas emissions from different types of generating facilities including solar, geothermal, natural gas, coal-burning, and nuclear and compiling and comparing these values.

Hazardous Materials/Hazardous Waste/Solid Waste

The DEIS should address potential direct, indirect and cumulative impacts of hazardous waste from construction and operation. The document should identify projected hazardous waste types and volumes, and expected storage, disposal, and management plans. It should address the applicability of state and federal hazardous waste requirements. Appropriate mitigation should be evaluated, including measures

[6] Moser, Susie, Ekstrom, Julia and Guido, Franco. 2012. Our Changing Climate 2012, A Summary Report on the Third Assessment from the California Climate Change California Energy Commission, CEC-500-2012-007.

to minimize the generation of hazardous waste (i.e., hazardous waste minimization). Alternate industrial processes using less toxic materials should be evaluated as mitigation. This potentially reduces the volume or toxicity of hazardous materials requiring management and disposal as hazardous waste.

PV Production/Recycling

The full product life cycle of PV production should be addressed, from raw material sourcing through end of life collection and reuse or recycling. PV companies can minimize their environmental impacts during raw material extraction and minimize the amount of rare materials used in the product. PV manufacturing facilities exist that are zero waste and have no air or water emissions. PV companies can facilitate future material recovery for reuse or recycling. Several solar companies have developed approaches to recycling solar modules that enable treatment and processing of PV module components into new modules or other projects. Solar companies can facilitate collection and recycling through buy-back programs or collection and recycling guarantees. Several companies provide recycling programs that pay all packaging, transportation, and recycling costs.

> *Recommendation:*
> The EPA recommends that the proponent strive to address the full product life cycle by sourcing PV components from a company that: 1) minimizes environmental impacts during raw material extraction; 2) manufactures PV panels in a zero waste facility; and 3) provides future PV disassembly for material recovery for reuse and recycling.

<u>Incorporating Best Management Practices, Design Features and Resource Assessments from other Regional Renewable Energy Siting Efforts.</u>

The California Desert Renewable Energy Conservation Plan, scheduled for completion in 2013, is intended to advance State and federal conservation goals in the desert regions while also facilitating the timely permitting of renewable energy projects in California. The DRECP has developed a list of Best Management Practices for the development of renewable energy projects in the arid regions of California. The Solar Programmatic EIS was developed by the Department of Energy and Bureau of Land Management and is intended to apply to future solar energy development applications. The Solar Programmatic EIS also contains a listing of Best Management Practices or Design Features associated with siting and design, construction, operation and maintenance, and decommissioning of solar energy projects to be developed on public lands.

> *Recommendations:*
> The DEIS should incorporate, as applicable, Best Management Practices or design features from the Best Management Practices and Guidance Manual: Desert Renewable Energy Projects, Dec 2010, Publication #REAT-1000-2010-009-F and the BLM Solar Programmatic FEIS and Record of Decision.

The DEIS should discuss and reconcile what the DRECP has developed regarding biological reserve designs, habitat modeling, and connectivity corridors with the applicants studies completed for the site.

Coordination with Tribal Governments

Executive Order 13175, *Consultation and Coordination with Indian Tribal Governments* (November 6, 2000), was issued in order to establish regular and meaningful consultation and collaboration with tribal officials in the development of federal policies that have tribal implications, and to strengthen the United States government-to-government relationships with Indian tribes.

Recommendation:
The DEIS should describe the process and outcome of government-to-government consultation between the BLM and each of the tribal governments within the project area, issues that were raised (if any), and how those issues were addressed in the selection of the proposed alternative.

National Historic Preservation Act and Executive Order 13007

Consultation for tribal cultural resources is required under Section 106 of the National Historic Preservation Act. Historic properties under the NHPA are properties that are included in the National Register of Historic Places or that meet the criteria for the National Register. Section 106 of the NHPA requires a federal agency, upon determining that activities under its control could affect historic properties, consult with the appropriate State Historic Preservation Officer/Tribal Historic Preservation Officer. Under NEPA, any impacts to tribal, cultural, or other treaty resources must be discussed and mitigated. Section 106 of the NHPA requires that Federal agencies consider the effects of their actions on cultural resources, following regulation in 36 CFR 800.

Executive Order 13007, *Indian Sacred Sites* (May 24, 1996), requires federal land managing agencies to accommodate access to, and ceremonial use of, Indian sacred sites by Indian Religious practitioners, and to avoid adversely affecting the physical integrity, accessibility, or use of sacred sites. It is important to note that a sacred site may not meet the National Register criteria for a historic property and that, conversely, a historic property may not meet the criteria for a sacred site.

Recommendation:
The DEIS should address the existence of Indian sacred sites in the project areas. It should address Executive Order 13007, distinguish it from Section 106 of the NHPA, and discuss how the BLM will avoid adversely affecting the physical integrity, accessibility, or use of sacred sites, if they exist. The DEIS should provide a summary of all coordination with Tribes and with the SHPO/THPO, including identification of NRHP eligible sites, and development of a Cultural Resource Management Plan.

Environmental Justice and Impacted Communities

Executive Order 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations* (February 11, 1994) and the *Interagency Memorandum of Understanding on Environmental Justice* (August 4, 2011) direct federal agencies to identify and address disproportionately high and adverse human health or environmental effects on minority and low-income populations, allowing those populations a meaningful opportunity to participate in the decision-making process. Guidance[7] by CEQ clarifies the terms low-income and minority population (which includes Native Americans) and describes the factors to consider when evaluating disproportionately high and adverse human health effects.

> *Recommendations:*
> The DEIS should include an evaluation of environmental justice populations within the geographic scope of the projects. If such populations exist, the DEIS should address the potential for disproportionate adverse impacts to minority and low-income populations, and the approaches used to foster public participation by these populations. Assessment of the projects impact on minority and low-income populations should reflect coordination with those affected populations.
>
> The DEIS should describe outreach conducted to all other communities that could be affected by the project, since rural communities may be among the most vulnerable to health risks associated with the project.

Children's Health and Safety

Executive Order 13045, *Protection of Children from Environmental Health Risks and Safety Risks* (April 21, 1997), directs each Federal agency, to the extent permitted by law and appropriate, to make it a high priority to identify and assess environmental health and safety risks that may disproportionately affect children, and to ensure that its policies, programs, activities, and standards address these risks. The Executive Order recognizes that some physiological and behavioral traits of children render them more susceptible and vulnerable than adults to environmental health and safety risks. Children may have a higher exposure level to contaminants because they generally eat more food, drink more water, and have higher inhalation rates relative to their size. Children also exhibit behaviors such as spending extensive amounts of time in contact with the ground and frequently putting their hands and objects in their mouths that can also lead to much higher exposure levels to environmental contaminants. In addition, a child's neurological, immunological, digestive, and other bodily systems are also potentially more susceptible to exposure related health effects. It has been well established that lower levels of exposure can have a negative toxicological effect in children as compared to adults, and childhood exposures to contaminants can have long-term negative health effects. Examples include life-long neurological deficits resulting from exposure to lead, mercury and other metals, and the increased susceptibility to particulate matter and other asthma triggers in the environment.

[7] Environmental Justice Guidance under the National Environmental Policy Act, Appendix A (Guidance for Federal Agencies on Key Terms in Executive Order 12898), CEQ, December 10, 1997.

It is well documented that children are more susceptible to many environmental factors that are commonly encountered in EIS reviews, including exposure to mobile source air pollution, particulate matter from construction or diesel emissions and lead and other heavy metals present in construction and demolition debris or mining waste. We recommend that an analysis of potential impacts to children be included in a DEIS if disproportionate impacts on children caused by the proposed action are reasonably foreseeable. Childhood exposures at each lifestage, including those experienced via pregnant and nursing women, are relevant and should be considered when addressing health and safety risks for children.

Recommendations:
The EPA recommends that the DEIS assess children's potential exposures and susceptibilities to the pollutants of concern, including the following:

- Identification of the pollutants and sources of concern: Consider whether the pollutants and sources of concern pose a particular hazard to children's health (for example, PM_{10}, dust, heavy metals, or air pollution from near construction or roadway exposures).
- Exposure Assessment: Describe the relevant demographics of affected neighborhoods, populations, and/or communities and focus exposure assessments on children who are likely to be present at schools, recreation areas, childcare centers, parks, and residential areas in close proximity to the proposed project, and other areas of apparent frequent and/or prolonged exposure.
- Baseline health conditions: Consider obtaining and discussing relevant, publicly available health data/records for the populations, neighborhoods, and/or communities of concern.
- Impacts from Mobile Source Air Pollutant Emissions: Consider exposure and impacts to children from mobile source air pollutants from project construction and operations, including significant increases in traffic predicted as a result of the project. Children are believed to be especially vulnerable due to higher relative doses of air pollution, smaller diameter airways, and more active time spent outdoors and closer to ground-level sources of vehicle exhaust. Identify children's proximity to project emission sources, including transportation corridors and construction sites.
- Respiratory Impacts/Asthma: Within the discussion on air pollution impacts, consider data on existing asthma rates and asthma severity among children and the general community living, working, playing, and attending school and daycare near the project site. To the extent feasible, identify potential for increased health risks of the project with respect to asthma rates and severity in children near the project site and discuss associated potential costs.
- Noise Impacts: Consider impacts from noise on health and learning, especially near homes, schools, and daycare centers.
- Impacts from Other Chemical or Physical Exposures: Consider potential impacts to children from other site activities, such as pesticide application, demolition, etc.

Coordination with Land Use Planning Activities

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 areas. The term "land use plans" includes all types of formally adopted documents for land use planning, conservation, zoning and related regulatory requirements. Proposed plans not yet developed should also be addressed it they have been formally proposed by the appropriate government body in a written form (CEQ's Forty Questions, #23b).

Implementation of Adaptive Management Techniques for Mitigation Measures

Adaptive management is an iterative process that requires selecting and implementing management actions, monitoring, comparing results with management and project objectives, and using feedback to make future management decisions. The process recognizes the importance of continually improving management techniques through flexibility and adaptation instead of adhering rigidly to a standard set of management actions. Although adaptive management is not a new concept, it may be relatively new in its application to specific projects. The effectiveness of adaptive management monitoring depends on a variety of factors including:

- The ability to establish clear monitoring objectives.
- Agreement on the impact thresholds being monitored.
- The existence of a baseline or the ability to develop a baseline for the resources being monitored.
- The ability to see the effects within an appropriate time frame after the action is taken.
- The technical capabilities of the procedures and equipment used to identify and measure changes in the affected resources and the ability to analyze the changes.
- The resources needed to perform the monitoring and respond to the results.

Recommendation:
The EPA recommends that BLM consider adopting a formal adaptive management plan to evaluate and monitor impacted resources and ensure the successful implementation of mitigation measures. The EPA recommends that BLM review the specific discussion on Adaptive Management in the NEPA Task Force Report to the Council on Environmental Quality (CEQ) on *Modernizing NEPA*[8].

[8] CEQ, The NEPA Task Force Report to the Council on Environmental Quality: Modernizing NEPA Implementation (Sept. 2003), available at http://ceq.hss.doe.gov/ntf/report/totaldoc.html.

United States Department of the Interior

NATIONAL PARK SERVICE
Mojave National Preserve
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Barstow, California 92311

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CALIF. DESERT DISTRICT
MORENO VALLEY, CA

In Reply Refer To:
1.B. Temporary (long-term) (Formerly L3215) (MOJA)

November 21, 2012

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San Bernardino, CA 92415-0182

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Dear Mr. Slowik:

Dear Mr. Childers:

The National Park Service (NPS) appreciates the opportunity to comment on the Notice of Intent/Preparation (NOI/NOP) of the Draft Environmental Impact Statement/Environmental Impact Report (EIS/EIR) for the Soda Mountain Solar Project (project). NPS supports renewable energy projects on public lands as long as such projects can be constructed and operated in an environmentally responsible manner that serves the public interest, protects natural resources, and protects our treasured landscapes. It is the role of NPS to contribute to the process and the analysis of renewable energy projects to help ensure that they meet the Secretary's goal that such projects on public lands are "Smart from the Start." Our goal is to provide expertise and practical and specific feedback in order to avoid significant adverse impacts to the resources of Mojave National Preserve (Preserve).

NPS has reviewed the project description, location, and potential environmental effects as described in your NOI/NOP dated October 23, 2012, and October 26, 2012. Our comments are as follows:

NPS has significant concerns related to potential project impacts to two federally listed endangered species, one California species of special concern, loss of wildlife connectivity and potential habitat de-fragmentation, viewshed degradation, air quality, storm water management, and hydrogeology and groundwater. The proximity of the proposed Soda Mountain Solar Project to the Preserve is less than one mile. Direct and indirect impacts associated with the project have potential to impact park resources significantly that have been mandated by Congress in the Organic Act of 1916 and the California Desert Protection Act of 1994 (PL 103-433 §2) to be protected by the Preserve.

Hydrogeology and Groundwater

During construction, the project proponent intends to pump approximately 60 acre-feet per year followed by approximately 6 acre-feet per year for operations during the life of the project. The

Hydrogeologic Conditions and Groundwater Modeling Report (RMT Inc. 2011) submitted by the project proponent inadequately addresses potential impacts to the springs at Zzyzx that are habitat for the endangered Mohave tui chub. The report supports the proposal to pump groundwater from the alluvial sediments underlying the project site and lacks subsurface data from boreholes on groundwater levels or geologic formation properties. It assumes an overly high recharge rate for this low-elevation area, incorporates unsupported assumptions in the model, does not account for the possibility of permeable bedrock, and neglects to account for potentially adverse impacts to the springs at Zzyxz that are habitat for the endangered Mohave tui chub.

The groundwater flow model employed a distributed recharge rate ranging between 0.125 and 0.5 inches per year (3.5% - 14% of direct precipitation) and a recharge rate 26 times greater at the boundary nodes on the assumption that mountainous areas act as precipitation collectors and funnel precipitation directly into the subsurface. Based on these assumptions, total recharge was calculated at a range of 343 to 1,373 acre-feet per year (af/y) over an area of 33,000 acres. These assumptions likely substantially overestimate the actual recharge rate for the project area. For example, the Maxey-Eakin method commonly used for estimating recharge in this arid region, would predict about zero recharge at this low an elevation. Recharge efficiency (percent of total precipitation that enters the subsurface as aquifer recharge) for total annual precipitation in the range of 10 cm/year that occurs in the project area is likely less than 3% and probably closer to zero (Dettinger 1989). Other groundwater studies in the eastern Mojave Desert (e.g. Izbicki et al. 1995) show groundwater with carbon-14 dates in the range of 20,000 years before present; this indicates very low to no modern recharge. The model used to estimate impacts from groundwater pumping for this project (RMT Inc. 2011), however, simply assumed a recharge rate and used it to calibrate the parameters of a flow model with no actual measured formation properties for comparison or analyses of recharge using accepted methodologies. The baseline model assumes impermeable, no-flow boundaries in the Soda Mountains and underlying bedrock. The only subsurface data presented in the report, however, comes from an existing well in fractured bedrock, which does not support the assumption of impermeable bedrock. This well near Rasor was drilled to 760 feet and produces up to 1,500 gallons per day (RMT Inc. 2011).

The Soda Springs at Zzyzx lie less than one mile from the Soda Mountain Solar project site and include MC Spring, which is habitat for the source population of the endangered Mohave tui chub (*Siphateles mohavensis bicolor*). The Mohave tui chub is listed as endangered under both the federal Endangered Species Act and the California Endangered Species Act. The no-flow boundary assumptions used in the model preclude analyses of potential effects of groundwater pumping on this spring-fed habitat. For example, one possible source of recharge for Soda Springs is the mountains west of the project site. One possible flow path for this recharge is through the location of the proposed pumping, along the northerly end of the Soda Mountains, and then along the westerly edge of Soda Dry Lake following the permeable beach and colluvial sediments at the playa margin. Pumping at the proposed project location might extract groundwater that would otherwise discharge from the springs. Estimates of groundwater discharge at Zzyzx are in the range of 50 af/y (Barthel 2008), less than the amount proposed to be pumped by the project during the construction phase. The groundwater modeling report does not address this potential flow path, and data used to support the model are limited to surface electrical resistivity surveys. The groundwater modeling and analyses need to be based on actual field data, including recharge estimates obtained by accepted methods (e.g. chloride mass balance) and subsurface data from boreholes on groundwater levels and aquifer formation properties. Project analysis should consider alternatives to the water use described in the project proposal. The proponent should consider alternatives to groundwater pumping, such as use of dust palliatives, panel cleaning by air blowing, dust cloths, or other means.

For each facility site with a drainage system crossing it, the proponent should include a map identifying all surface water resources within the vicinity and include a narrative discussion of the delineation methods used to discern those surface waters in the field and what modifications would occur from project implementation. Specific information regarding the potential impacts to surface waters should be addressed, including both permanent and temporary impacts. Alternatives and mitigation measures to reduce and/or eliminate such impacts should be addressed. If impacts are unavoidable, then impacts need to be minimized, with the project designed such that it would maintain existing hydrologic features and patterns. All unavoidable impacts should be mitigated to ensure no net loss of function and value as the result of project implementation.

Storm water management needs to be considered as a significant component in the project design and implementation. In particular, storm water runoff collects into channels and natural drainage systems. Without adequate design, the consequences of combining these flows will likely be aggradation and head-cutting upstream of the confluence and channel incision, increased sediment transport, and eventual widening downstream of the confluence. The proponent needs to evaluate all potential storm water impacts, describe controls needed during construction, mitigation necessary for potential post-construction hydrologic impacts, and describe specific best-management practices that, when implemented, would reduce those potential impacts to insignificant levels. Where feasible, consideration should be given to design alternatives that maintain the existing hydrology of the site and/or redirect excess flows created by hardscapes and reduced permeability from surface waters to areas where they will dissipate by percolation into the landscape. All potential impacts associated with changes in drainage patterns, changes in water volume, velocity, quantity, quality, soil erosion and sedimentation in streams and water courses on or near the project site need to be modeled and analyzed. Mitigation measures to alleviate such impacts shall be included in the project proposal and environmental documents. The practice of channelizing, straightening, and lining streambeds would change a stream's hydrology by decreasing water storage capacity and increasing water flow velocity, and this, in turn, would lead to increases in the severity of peak discharges. These hydrologic changes can exacerbate flooding, erosion, scouring, and sedimentation, and could lead to loss of natural functions and values.

Biological Resources

The construction site for the proposed project includes desert tortoise habitat modeled by the U.S. Geological Survey to be high quality, in the range of 0.7 to 0.9 on a scale of 0 to 1 (Nussear et al. 2009). Recent population collapses, perhaps due to disease and/or drought (Tracy et al. 2004), make location of cryptic desert tortoises (*Gopherus agassizii*) even more difficult. Thus, absence of live tortoise observations during relatively brief field surveys, as reported by the project proponent, should not be used as justification for destruction of otherwise high-quality habitat as this would preclude the possibility for recovery of tortoise populations in the area and reoccupation of habitat.

The Soda Mountains are habitat for a recently established herd of desert bighorn sheep (*Ovis canadensis nelsoni*). This herd established itself at the Soda Mountains without human intervention with the source population unknown. Even in the absence of an active sheep population, however, the Soda Mountains are a high priority for desert bighorn sheep conservation (John Wehausen, personal communication, 2012) due to the presence of a number of significant bridges under Interstate 15 that serve as rare and important opportunities for gene flow between the northern and north-central bighorn sheep metapopulation segments (Epps et al. 2007). Construction of the proposed solar energy project would preclude desert bighorn sheep gene flow to the north under Interstate 15 as well as to the south with the population in the Cady Mountains. Further fragmentation of the habitat is likely to irreversibly harm the viability of species metapopulations. High mountain habitat is no longer adequate to support permanent populations of sheep (Bleich et al. 2005). All areas used by sheep, including the lower elevation habitat connecting mountain ranges, are essential for the long-term survival of the species.

The Soda Mountain Solar project might also impact other wildlife, including raptors, song birds, and bats. A two-year or longer inventory, depending on environmental conditions, utilizing accepted protocols is needed to identify all potentially impacted species. Modeling techniques should be used to estimate flight patterns and periods of use of birds and bats and to identify potential impacts and potential mitigations. The project should identify significant direct and indirect loss of plant and wildlife habitat from all aspects of the project, including installing towers, constructing, improving, or re-routing roads, burying lines, and constructing ancillary facilities. This analysis needs to identify impacts to all species during each season. Species should include locally unique species, rare natural communities, wetlands, threatened and endangered species, California threatened, endangered, and species of special concern. The inventory needs to list all species present in the project area and include a distribution map with potential migratory and dispersal routes. It should demonstrate how the project will affect wildlife and plant distributions under each alternative. The analysis needs to address the potential loss of wildlife connectivity, include impacts from non-native and invasive plants, and address the association of invasive plants with disturbance, including the cumulative effects of the Rasor Off-Highway Vehicle Area and other disturbed areas.

The project proponent needs to develop a salvage plan for any special-status plants or species associated with habitat loss in the project area. Plant salvage needs to address, at a minimum, location of the mitigation site, plant species, schematic of the mitigation area, schedule, exotic vegetation control, planned monitoring, and plans for long-term conservation of the mitigation site.

Physical Resources

Mojave National Preserve is renowned for its dark night skies. NPS manages the Preserve to protect this valued and increasingly rare resource. The General Management Plan for the Preserve identifies as a resource protection goal "to partner with communities and local government agencies to minimize reflected light and artificial light intrusion on the dark night sky". All exterior lighting should comply with International Dark-Skies standards and should be hooded to prevent light from shining up into the sky and shielded and directed to aim it at the places where it is needed to prevent light from spilling off the site. Low-pressure sodium lamps and fixtures of a non-glare type are required.

Potential impacts to all visual and natural sound need to be evaluated and analyzed. The scenic vistas associated with Mojave National Preserve are considered unique, as described in the California Desert Protection Act of 1994 (PL 103-433 §2). An assessment of visual impacts must include analyses of scenic vistas from specific key observation points, both towards the Preserve and from the Preserve towards the project site. In order to protect the natural soundscapes of Mojave National Preserve, analyses are needed of noises created during both the construction and operation phases of the project, including timing, intensity, duration, frequency spectrum, and impacts to both people and wildlife. Soundscape assessment needs to address the number of vehicle trips per day for delivering personnel, equipment, and supplies to the project during both construction and operational phases of the project. Construction and operation traffic could affect wildlife, soundscapes, and air quality. A traffic study needs to address project impacts to the roads and surrounding environment and to address mitigation measures needed to reduce the impacts. Such analysis should be consistent with the California Department of Transportation's Guide for the Preparation of Traffic Impact Studies.

An analysis of ambient air quality according to the National Ambient Air Quality Standards is needed, including potential air quality impacts of the proposed project (cumulative and indirect impacts). The analysis needs to identify all potential impacts from temporary or cumulative degradation of air quality. It should describe and estimate air emissions from potential construction and maintenance activities and propose avoidance or minimization measures. Emission sources should be identified by pollutant from mobile sources, stationary sources, and ground disturbance. The environmental analyses should include a Construction Emissions Mitigation Plan that addresses degradation of air quality and wilderness values.

A Fugitive Dust Control Plan should be prepared. Dust is the primary source of PM-10 (Particulate Matter 10 microns or smaller) pollution in the Mojave Desert. The environmental analyses needs to model the sources of dust that presently occur from the project area, then show their timing, duration, and transport on- and off-site. Modeling should also identify variations during construction and operational phases of the project for each alternative. Human health and the environment of sensitive receptors should be protected during any construction or demolition activities. If necessary, a health risk assessment should be conducted to determine if there are, have been, or will be, any releases of hazardous materials that might pose a risk to human health or the environment.

Cumulative Impacts

Direct and indirect cumulative impacts need to be analyzed as they apply to both the project site and the greater vicinity. Plans for past, present, and anticipated future projects should all be analyzed relative to their impacts to Mojave National Preserve.

The Soda Mountain Solar project has potential for causing significant impacts to Mojave National Preserve. Potential impacts include decreased spring discharge at Zzyzx as a consequence of groundwater pumping, loss of habitat for the endangered Mohave tui chub, loss of high-quality desert tortoise habitat, increased habitat fragmentation for desert bighorn sheep, and loss of important conservation opportunities. In addition, there are potential impacts from the project to air quality, storm water management, and scenic vistas. We believe that the environmental analysis of these potential impacts has been inadequately addressed in the documents provided by the project proponent.

If you have any questions, feel free to contact Mr. Ted Weasma at (760) 252-6106 or at ted_weasma@nps.gov.

Sincerely,

Stephanie R Dubois

Stephanie R. Dubois
Superintendent

cc:
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CALIFORNIA DESERT STUDIES CONSORTIUM
The California State University

November 27, 2012

Jeffery Childers, Project Manager
Bureau of Land Management
California Desert District Office
22835 Calle San Juan de Los Lagos
Moreno Valley, CA 92553-9046

SUBJECT: Soda Mountain Solar Project

The Desert Studies Center, located at Zzyzx, is the primary education and research facility for the California Desert Studies Consortium, a consortium of seven (7) universities of the California State University System. The Center is situated at a site and in a region that will potentially be impacted by the proposed development of the Soda Mountain's solar project. As such, we would like to submit official comment for purposes of scoping for the project. These comments are issued on behalf of the Desert Studies Center and the California Desert Studies Consortium members.

Impact on Water Resources

In deserts water is the most limiting resource for all plant and animal life and for human activities. The operation of the Desert Studies Center, as an educational entity and as stewards of endangered and threatened species, is no exception. For this reason, it is critical that water use and net consumption by the Soda Mountain Solar Project be rigorously addressed, not just in terms of the Project's needs, but also in terms of the Project's extended impacts. Most of the larger-scale projects in the Mojave are designed to use a significant amount of water which may negatively affect local aquifers, groundwater recharge, and overland flow to recharge areas.

The Desert Studies Center and its habitat for the Mojave Tui chub, a federally listed endangered species of fish, are totally dependent upon the aquifer that underlies the Soda Mountain Solar Project. In addition to the chub, bighorn sheep that reside in the mountain range between Rasor and Soda Lake Basin are frequent visitors to the open water sources at the Desert Studies Center, especially in summer when water and vegetation are scarce in this mountain range. The quantity and quality of water from the underlying aquifer are extremely important, and their maintenance is critical. We are concerned that removal of water from the aquifer, as well as release of water used by the Project, could lead to diminished water quality, and even impact the chemical balance that is essential to survival of the threatened Mojave Tui chub.

Recommendations

Because of these threats, a full investigation of the aquifer and the potential impacts on it are essential in the EIR/EIS. In addition, the extent of land use by bighorn sheep on the west side

C/O Department of Biology, CSU Fullerton, PO Box 6850, Fullerton, CA 92834-6850 . (714) 278-2428

of the Soda Mountains is poorly known, and this too should be addressed and understood before project development moves forward.

Thank you for the opportunity to provide input into this process. We look forward to the continued review and analysis of the project when the Draft EIS/EIR is available.

Respectfuly yours,

William J Presch

Dr. William Presch
Director, Desert Studies Center

Darren R. Sandquist

Dr. Darren R. Sandquist
Chair, California Desert Studies Consortium

LAND USE SERVICES DEPARTMENT

PLANNING DIVISION
385 North Arrowhead Avenue, San Bernardino, CA 92415-0181
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COUNTY OF SAN BERNARDINO

CHRISTINE KELLY
Director

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MORENO VALLEY, CA

November 30, 2012

Richard Drury/Tony Stearns
Lozeau Drury LLP
410 12th Street, Suite 250
Oakland, CA 94607

RE: SODA MOUNTAIN ENVIRONMENTAL REVIEW APPLICATION; REQUEST TO BE ADDED TO THE NOTICE LIST; AP20120014

Dear Mr. Drury and Mr. Stearns:

Thank you for your letter of November 2, 2012, wherein you requested to be added to the Notice List for the Soda Mountain Environmental Review Application/Project. Your firm has been added (on November 5, 2012) to the Notice List for the Soda Mountain Environmental Review Application/Project, as stated below:

Richard Drury/Tony Stearns
Lozeau Drury LLP
410 12th Street, Suite 250
Oakland, CA 94607
Richard@lozeaudrury.com; tony@lozeaudrury.com

If you have any questions, please contact me at (909) 387-4372 and/or mslowik@lusd.sbcounty.gov. Thank you.

Sincerely,

Matthew Slowik, MURP, MPA
Senior Planner
Land Use Services Department

Cc: Jeff Childers, Bureau of Land Management
Laura Welch, Clerk of the Board of Supervisors

Slowik/Projects/Soda Mountain letter to Lozeau-Drury-11-30-2012

Basin and Range Watch

November 22nd, 2012

Attn: Jeffery Childers, Soda Mountain Solar Project Manager, 22835 Calle San Juan De Los Lagos, Moreno Valley, CA 92553 sodamtnsolar@blm.gov

We would like to submit the following scoping comments for Soda Mountains Solar Energy Project (CACA 49584).

Basin and Range Watch is a group of volunteers who live in the deserts of Nevada and California, working to stop the destruction of our desert homeland. Industrial renewable energy companies are seeking to develop millions of acres of unspoiled habitat in our region. Our goal is to identify the problems of energy sprawl and find solutions that will preserve our natural ecosystems and open spaces. We have visited the site of the proposed Soda Mountains Solar Project and believe it would inflict both direct and cumulative damage the resources of the area.

We would like to request that the following topics be considered in the scoping process.

Purpose and Need Statement: The Purpose and Need Statement should reflect the need to preserve wildlife linkage, connectivity corridors, the visual integrity of the adjacent Mojave National Preserve, the air quality of the project site and the adjacent Mojave National Preserve, water resources that are important to maintain the wetlands at Soda Springs and habitat for the Federally Endangered Mojave Tui Chub, rare plants, cultural resources and recreational access to public lands.

The management objectives in The Energy Policy Act 2005 (EPAct), Title II, Section 211, set forth the "sense of Congress" that the Secretary of the Interior should seek to have approved non-hydropower renewable energy projects on the public lands with a generation capacity of at least 10,000 MW by 2015.

In October, 2012, the Interior Department announced that the goal was achieved when Secretary Salazar signed the Record of Decision for the Chokecherry and Sierra Madre Wind Energy Project in Wyoming. Since 2009, the Department of the Interior has authorized 18 utility-scale solar projects, 7 industrial-scale wind projects, and 8 geothermal plants on the public lands. When built, these projects will generate over 10,000 MW of electricity.

The goals of Section 4 in Secretarial Order 3283 clearly state a need for environmental responsibility: *"the permitting of **environmentally responsible** wind, solar, biomass, and geothermal operations and electrical transmission facilities on the public lands.*

The Soda Mountains Solar Project in its proposed location would impact rare plants, endangered wildlife, cultural resources, air quality and the adjacent Mojave National Preserve. It will need over 4 square miles of desert habitat for space to develop. It would be inconsistent with the Best Management Practices concerning the National Environmental Policy Act, the Endangered Species Act, and the Federal Lands Management Policy Act, etc and can, in no way, be considered "environmentally responsible".

Alternatives:

Following the guidelines of the National Environmental Policy Act, a full range of alternatives should be considered in every Environmental Impact Statement.

Also following the guidelines of the National Environmental Policy Act, the final EIS should present the environmental impacts of the proposal and the alternatives in comparative form, thus sharply defining the issues and providing a clear basis for choice among options by the decision maker and the public. In this section agencies shall:

(a) Rigorously explore and objectively evaluate all reasonable alternatives, and for alternatives which were eliminated from detailed study, briefly discuss the reasons for their having been eliminated.

(b) Devote substantial treatment to each alternative considered in detail including the proposed action so that reviewers may evaluate their comparative merits.

(c) **Include reasonable alternatives not within the jurisdiction of the lead agency.**

(d) Include the alternative of no action.

(e) Identify the agency's preferred alternative or alternatives, if one or more exists, in the draft statement and identify such alternative in the final statement unless another law prohibits the expression of such a preference.

(f) Include appropriate mitigation measures not already included in the proposed action or alternatives.

We would like to request that the following alternatives be included in the Draft Environmental Impact Statement.

1. **A No Action Alternative** that designates a **Conservation Status** to the project site. This could be referred to as Watershed Conservation Alternative. This could also designate the project site inappropriate for solar development.

2. **Brownfields and Degraded Lands Alternative:** The US Environmental Protection Agency has identified over 15 million acres of brownfields in the United States that would be suitable for utility scale solar development. See here: http://www.epa.gov/oswercpa/

http://www.wvbrownfields.org/conferences/2010/presentations/Evans%20Paul%20-%20Jobs.pdf

The Arizona BLM is reviewing the "The Restoration Design Energy Project" http://www.blm.gov/az/st/en/prog/energy/arra_solar.html (RDEP), funded by the American Recovery and Reinvestment Act of 2009, which supports the Secretary of Interior's goals to build America's new energy future and to protect and restore treasured landscapes. The following statement is made: **"Emphasis will be on lands that are previously disturbed, developed, or where the effects on sensitive resources would be minimized. The BLM intends to use the results of the EIS to amend its land use plans across Arizona to identity areas that are considered to be most suitable for renewable energy projects.**

While these amendments will only apply to BLM-managed lands, the EIS will examine all lands in Arizona and serve as a resource to the public, policy makers, and energy planners."

3. **Distributed Generation Alternative:** Distributed generation in the built environment should be given much more full analysis, as it is a completely viable alternative. This project will need just as much dispatchable baseload behind it, and also does not have storage. But environmental costs are negligible with distributed generation, compared with this project. Distributed generation cannot be "done overnight," but neither can large transmission lines across hundreds of miles from remote central station plants to load centers. Most importantly, distributed generation will not reduce the natural carbon-storing ability of healthy desert ecosystems, will not disturb biological soil crusts, and will not degrade and fragment habitats of protected, sensitive, and rare species.

Alternatives should be looked at that are in load centers, not closest to the project site. There is a need to consider the "macro" picture, the entire state, to look at maximum efficiency.

A master comprehensive plan should exist before large expensive inefficient solar plants are sited and built out in the wildlands. This plan should carefully analyze the recreational and biodiversity resources on public lands. A list of assumptions should be included detailing the plan for integrating various fuels mixes and technologies into each utility's plan, an overall state plan, and a national plan. Loads should be carefully analyzed to determine whether additional capacity is needed for peaking, intermediate, or baseload purposes. Unit size, which impacts capital and operating costs and unit capacity factors, has a direct bearing on the relative economics of one technology over another. A plan might recommend that smaller units built in cities and spaced in time offer a less risky solution than one large unit built immediately.

Right now there is no utility plan, no state plan, and no national plan. Large-scale central station energy projects have been sited very far from load centers out in remote deserts, with the only criterion being nearness to existing transmission lines and natural gas lines. Very little thought has been given to the richness of biological resources, the cumulative impacts on visual scenery to tourists, the proximity to ratepayers, or the level of disturbance of the site.

There will be a need to build many new efficient natural gas peaker or baseload plants to back up the renewable projects planned. Instead, the renewables should be distributed generation in load centers, which will provide much more efficiency, rather than inefficient remote central station plants that reduce biodiversity and require expensive transmission lines. This reduces the risk, as distributed generation is a known technology and has been proven in countries like Germany where incentive programs have been tested. Incentive programs can be designed in an intelligent manner to vastly increase distributed generation. Incentives for large remote projects are unproven to lower risk and may actually raise debt levels with runaway costs associated with poor sighting and higher-than-anticipated operating and maintenance costs. Many renewable project developers have failed to consider reasonable or viable alternatives that could serve as solutions that everybody could live with. In the case of this particular project, conflicts with endangered species, cultural resources, storm water drainage erosion, viewscapes from National Parks and wilderness areas could all be avoided with a distributed generation alternative.

Alternatives under the Desert Renewable Energy Conservation Plan: Several alternatives are now under review for the Desert Renewable Energy Conservation Plan (DRECP). Among these alternatives are No Action designations for specific areas in the California Desert. The DRECP has indentified the project site as an important wildlife linkage area for species like the desert tortoise, bighorn sheep and burrowing owl. A wildlife linkage conservation alternative should be considered under the DRECP.

Affected Environment/Environmental Consequences:

The Soda Mountains Solar Project will have adverse impacts on biological, cultural, recreational, visual and other resources. We have the following concerns:

Air Quality:

Construction activity will go on for 2 to 3 years and will degrade air quality resources.

The DEIS will need to analyze the health impacts that airborne particulates from construction dust will have on the local residents of the area. Coccidioidomycosis (Valley Fever) is a common issue that impacts desert communities when dust is stirred up. Valley fever has the potential to impact the community of Baker and the Zzyzx Desert Studies Center.

Removal of stabilized soils and biological soil crust creates a destructive cycle of airborne particulates and erosion. As more stabilized soils are removed, blowing particulates from recently eroded areas act as abrasive catalysts that erode the remaining crusts thus resulting in more airborne particulates.

The DEIS should analyze the cumulative impacts on air quality that will result from the removal so much stabilized soil and biological soil crust.

We are concerned that industrial construction in the region will compromise the air quality to the point where not only visual resources, but public health will be impacted.

We are also concerned that Nextera will have no choice but to use more water in an already over-drafted aquifer to control the large disturbance they intend to create.

Construction should not be permitted during days of high winds. Wind speeds of 10 MPH and higher should be determining factors that limit construction. Construction should also be limited during the hottest months of the year. Evaporation rates will be greatest during the months of June, July and August.

It is unfortunate that local communities are getting almost no benefit from these large, recently approved industrial developments.

The following four photos show that there is a consistent failure of large solar and wind project developers to control and mitigate the dust emissions that have resulted from the large disturbances caused by recently approved high profile renewable energy projects. In spite of the fact that all of these developers have promised that dust emissions would not be an issue, we are finding that they are falling short of their mitigation requirements.

Ocotillo Wind Express Project, May 2012:

Dust storm from the Genesis Solar Energy Project, April, 2012. Naturally occurring dust from Ford Dry Lake was combined with newly disturbed surface soils from project construction.

Desert Sunlight Project near Desert Center, California, April, 2012. These dust storms were reported to be rare before the construction of the project began.

Ivanpah Solar Electric Generating System, October, 2010

Mitigation of Fugitive Dust: The applicant's Plan of Development talks very little about how fugitive dust would be mitigated. Most solar and wind projects are using water, but since that is having questionable success, many developers are looking to use synthetic and organic polymers The use of these products in single applications can fall within acceptable limits for their use, however continued use within the same area and the build up over time has not been studied and therefore no restrictions have been made for any product.

Synthetic polymers are generally considered acrylic or acetate based or from similar chemicals. The information available shows that they can decompose to components which are considered hazardous by themselves.

Some polymer based products create very hard crusts, is that when they start breaking down they will break down into clumps that are difficult to rework into the existing soil. This makes the restoration of the site problematic for decommissioning. This would make the reestablishment of biological soil crusts very difficult and ultimately make the ecological restoration of the project site unlikely.

Another concern is that polymers would erode into the drainage of the project site and end up in the Soda Springs system. What impacts would synthetic polymers have on species like the Mojave Tui Chub?

Dust Control for Low-Volume Roads: Update on Public Lands Highway Discretionary Program Project "Environmental Effects of Dust Suppressant Chemicals on Roadside Plant and Animal Communities"

Bethany K. Williams, Edward E. Little, and Susan E. Finger. USGS Columbia Environmental Research Center, Columbia, MO January 26, 2011

Climate Change/C02 emissions: What would be the entire carbon footprint of this project? How many vehicles will be used for construction, maintenance and decommissioning of the project? How much C02 sequestration will be eliminated by removing close to 3,000 acres of topsoil? How much organic matter will be removed? How much caliche will be removed? Both sequester C02 very well.

Groundwater: According to the Plan of Development and Betchel staff at the 2 p.m. November 14th scoping meeting in Barstow, all groundwater estimates are based on the applicant's flow models. While geophysical studies and test borings were conducted to refine estimates of the sediment thickness and depth to groundwater and bedrock, It appears that no monitoring wells were set up to actually study the groundwater. Most large energy projects do a much better job of estimating groundwater supplies and recharge of the local area. The California Energy Commission has required that monitoring wells be constructed before approval of some big solar projects. This information is available from the Energy Commission website. For the pending Hidden Hills Solar Project, the Energy Commission has required the applicant to install monitoring wells so their water use can be better evaluated.

It appears that the Soda Mountains Solar Project got very far in the review process only using groundwater flow models instead of actual tests from monitoring wells. That presents a potential risk to the Soda Springs that provide some of the last habitat for the Endangered Mojave Tui Chub *(Gila bicolor mohavensis).* It is believed that the Soda Lake Groundwater Basin supplies the Soda Springs with their water. Any water withdrawal could potentially lower water levels at these springs which would remove some of the last remaining habitat for the Mojave Tui Chub.

The Plan of Development for this project claims that only 55,000 gallons of water per day would be used for this project. In a 3 year construction period, that would equate to roughly 60, 225,000 gallons or 184 acre feet. We believe that is an underestimate. The Silver State North Project in Clark County, Nevada is a photovoltaic project on 400 acres of public land. If you reference the Affected Environment section of the Silver State South Draft Environmental Impact Statement, you will see that 300 acre feet of water were used for the first year of construction for the Silver State North Project and 200 acre feet were used for the second year before completion. So 500 acre feet of water was used for construction for the Silver State North Project which is only 400 acres – about 1/6th the size of the proposed Soda Mountains Solar Project. The numbers can be referenced on page 3-12 of the Silver State South DEIS and can be viewed here:
http://www.blm.gov/pgdata/etc/medialib/blm/nv/field_offices/las_vegas_field_office/energy/silver_state_south/chapter_3.Par.83355.File.dat/DSEIS%20for%20Silver%20State%20Solar%20Project-Chapter%203.pdf

In the Plan of Development and during the scoping meetings, the applicant claimed that the panels would only be washed two times per year and that five acre feet of water would be used per year for washing. The applicant, however, does not know what photovoltaic technology they would like to use. Some photovoltaic panels require more wash water than others. Thin film can use light more efficiently. How can the applicant predict how much water would be used for panel washing when they do not know what photovoltaic technology they will use?

If the applicant washes only twice a year, how much efficiency will be lost from these solar panels if dust is allowed to accumulate for about 180 days at a time? The site is located very close to a dry lakebed. Dry lakes can be major source of dust.

The below photograph shows 4 days worth of dust accumulation on a small solar panel that we left outside. This is in typical Mojave Desert conditions at about the 2,500 foot elevation.

^Dusty photovoltaic panel

Cone of Depression and Phreatophytes:

The applicant's Plan of Development predicts a one foot drawdown from the water wells for a surrounding 3,000 feet. How will this drawdown impact the smoke tree (*Psorothamnus spinosus*) populations near the north site? Smoke trees are found in the washes leading to Soda Dry Lake. Would these be impacted by water use?

Storm water diversion:

Will diversion of storm runoff impact groundwater levels downstream from the project site?

The project site contains numerous ephemeral washes with a high amount of alluvial activity. Flooding to us appears to be common, and the area not geomorphologically stable. Ecological processes are apparent here. The entire project site lies in what the Desert Renewable Energy Conservation Plan calls a "High Conflict Development Focus Area".

Flash Floods:

Some of the recently approved large energy projects on public lands have experienced damage from large flood events.

Below are photos of three projects which experienced damage from flash floods. Each one of these projects was "Fast Tracked" or "Prioritized" for approval by the Interior Department. Mitigation and planning has been deferred for many of the issues that came up. These large energy projects are being built in poorly chosen locations. While these flood events are referred to as 100 Year Floods by the applicants, it is obvious that these events take place more commonly than every 100 years. Projects that span 5 square miles may sustain flood damage on a yearly basis on different parts of the site. The Soda Mountains Solar Project will be no exception. It has significant alluvial drainages throughout the project site.

These three projects received significant flood damage in less than one year under construction. It makes us wonder how wise it really is to build a project in an unstable alluvial flood zone when the goal is for that project to last three decades.

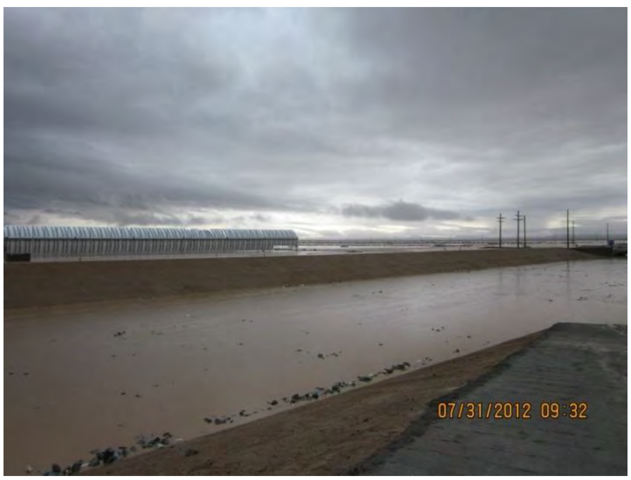
^Ivanpah Solar Electric Generating System: desert tortoise exclusion fence removed by floods. July, 2011

^Flooded wind turbine construction site; Ocotillo Wind Express project Site, June 2011

Unknown leftover foam from a chemical dust suppressant was spread everywhere when the Ocotillo Wind Express project site flooded in June, 2012

^The biggest flood took place at NextEra's Genesis Project on July 31st, 2012. The close proximity to a dry lake and alluvial fans make this project location one of the poorest choices to site a large solar project.

^Genesis Solar Project flood, July 31st, 2012



^Genesis Solar Project flood, July, 2012

The BLM should require Betchel to truck all of the water in from somewhere else. It is not worth the risk to sensitive hydrology resources to allow the applicant to remove water from the aquifer.

Biological Resources:

Plants:

At the scoping meeting on November 14th 2012, the applicant described the vegetation on the site as "sparse". The project site is characterized by the creosote bush scrub community. The site supports a host of annual vegetation during favorable years with adequate precipitation. The lack of reliable water in this region has made it difficult to otherwise develop and urbanize. As a result, many ecosystems in the Mojave Desert have remained untrammeled by humans and many plants.

We consulted botanists who are familiar with the Mojave Desert about this region and received this list of potential rare plants within ten kilometers of the site:

Androstephium breviflorum
Astragalus lentiginosus var. *borreganus*
Astragalus mohavensis var. *hemigyrus*
Astragalus preussii var. *preussii*
Camissonia (Eremothera) boothii subsp. *boothii*
Castela emoryi
Chamaesyce parryi
Cryptantha costata (on the project site for sure)
Cryptantha holoptera
Cynanchum (Funastrum) utahense
Eriastrum harwoodii
Juncus cooperi
Mentzelia puberula
Mentzelia tridentata
Muilla coronata
Nemacaulis denudata var. *gracilis*
Pediomelum castoreum
Penstemon albomarginatus (not likely, but should be searched for)
Phacelia parishii
Psorothamnus arborescens var. *arborescens*
Salvia funerea
Sibara deserti
Wislizenia refracta subsp. *refracta*

Surveys should be conducted at different times of years to search for these plants. Dry years should be avoided. Surveys should be conducted in both spring and fall.

A full evaluation of potential spreading weeds as well as the risks of using herbicides to control those weeds should be analyzed in the DEIS.

Wildlife:

Connectivity

Information presented at the Desert Renewable Energy Conservation Plan (DRECP) Stakeholder Committee Meeting on July 25 and 26, 2012, indicate that the project site is in the midst of an essential connectivity corridor and an area of high biological sensitivity. The designation indicates that the project should be delayed until further biological surveys are carried out by a third party (not the applicant) and detailed data collected on desert tortoise, Mojave fringed-toed lizard, and bighorn sheep movements across habitat patches. High population densities are not necessary to indicate important connectivity habitat, rather geographical considerations are crucial. We have hiked across the project site and the extent of natural areas is large for movement of animals. Large-scale connectivity areas are needed more than ever currently with the cumulative impact of renewable energy development on public lands across the deserts.

Desert Tortoise *(Gopherus agassizii)*

The Desert Renewable Energy Conservation Plan identified the project site as an important wildlife linkage/connectivity for different species. The main concern is that the project will be close to the mountains and will block a substantial portion of the basin not leaving much open basin for movement. The applicant claimed that the site would not support desert tortoises because it was mostly desert pavement and is too rocky for tortoises to dig burrows. This is not the case. The north site has several large washes that would be suitable for the tortoise. The south sites have a lot of loose soil. The below photo shows the north project site and as you can see, would not present a problem for burrowing wildlife:

^North Project Site Substrate

The site lies at a low elevation for desert tortoise and that would be more of a reason for the low numbers. But the site may be important to the connectivity for the populations. In the last ten years, there has been substantial precipitation on certain years to make the entire project site bloom with native annuals. Among these annuals have been fields of Desert Dandelion *(Malacothrix glabrata)* Of special note should be the winter of 2005/2006. The precipitation produced a bumper crop of annuals

At the November 14th scoping meeting, the applicant told us that they found two desert tortoise burrows on the northern section of the actual site.

The applicant claims that fragmentation from I-15 is a reason for the lack of desert tortoises, yet there are culverts under the highway that would be suitable for movement.

The applicant also claims that desert tortoise populations are low due to the intense off highway vehicle activity. On our visit to the north site, we found zero off highway vehicle tracks. On our visit to the southern sites, we have found less than 5 percent disturbed by OHV activity. In spite of the fact that the site is near Rasor Road, there is not much disturbance.

Desert Bighorn Sheep *(Ovis canadensis nelsoni)*

The applicant is claiming that the site is not important to desert bighorn sheep and conflicts with information we have heard that there have been actual sightings on the project site. A large population of sheep is located in the Soda Mountains south of Highway 15. Culverts under Highway 15 provide linkage to sheep.

The northern Soda Mountains provide a large, uninterrupted swath of habitat for sheep and would potentially connect the populations from the southern Soda Mountains, Old Dad Mountains and Cady Mountains to the Avawatz Mountains to the north. The California Department of Fish and Game has identified the northern Soda Mountains as a potentially important connectivity corridor for desert bighorn sheep.

Past discussions with California Department of Fish and Game suggest that the project site may have important function as connectivity habitat for bighorn sheep moving from the dense population in the Cady Mountains to the southwest, through Cave Mountain and then to the Soda Mountains. From the Soda Mountains sheep have been known to move between here and the Avawatz Mountains to the north, another area with a larger sheep population. Bighorn sheep have been sighted in the Soda Mountains south of I-15, using the springs and forage along the edges of Soda Dry Lake. Historically sheep have used the north Soda Mountains periodically, and have been sighted recently just north of I-15 and Zzyzzx Road. Underpasses such as Opah Ditch can be used as movement corridors to cross the highway, and reports suggest sheep will even cross on overpass roads such as the ZZyzzx turn-off. The chain of mountains from south to north connecting the Cady Mountains with the Avawatz Mountains is thus very important as a regional linkage to maintain genetic flow. The north and south Soda Mountains serves as a connection between these populations, and sheep would be expected to cross alluvial fans such as the project site to access these mountains.

Kit Fox (*Vulpes macrotis)*

Kit fox occur on the project site. Since a canine distemper outbreak has occurred during construction on the Genesis Solar Energy Project in Chuckwalla Valley, the applicant should develop a regional Kit Fox Monitoring Plan to be able to detect and prevent the spread of disease in the local kit fox population. The applicant should monitor kit foxes in cooperation with California Department of Fish and Game and develop procedures in case kit fox mortality occurs. Hazing techniques should be reviewed and modified to not cause stress to the foxes during relocation from dens during construction, and coyote urine should not be used at all until it is tested for disease.

Burrowing Owls (*Athene cunicularia hypugaea*):

The location of off-site compensation lands should be determined and made public before the approval of the project, so that any lands can be surveyed to see if they are adequate for burrowing owls, and how many resident owls already occupy the area, if any California Department of Fish and Game guidelines from 1993 should be followed, as providing the strongest protective measures for the species (Burrowing Owl Survey Protocol and Mitigation Guidelines. 1993. Prepared by the California Burrowing Owl Consortium. www.dfg.ca.gov/wildlife/nongame/docs/boconsortium.pdf, accessed November 10,

2009) The CDFG burrowing owl guidelines (ibid.:i) emphasizes "maintaining burrowing owls and their resources in place rather than minimizing impacts through displacement or owls to an alternate site."

Avian fauna:

The BLM has talked little about polarized glare or the "lake effect" that can occur with huge photovoltaic projects.

^Copper Mountain Thin Film Solar Farm, Boulder City, Nevada

The Nature Conservancy has just released their Mojave Desert Ecoregional Assessment. In the assessment, they discuss the impacts of polarized light pollution on birds and insects:
"Light and noise pollution associated with electrical power plants can be problematic for wildlife. Polarized light pollution from PV panels can attract aquatic insects and other species that mistake the panels for bodies of water, potentially leading to population decline or even local extinction of some organisms (Horvath et al. 2010). Nighttime lighting for security or other reasons may negatively impact a variety of Mojave Desert species, many of which have developed nocturnal behavior to escape the daytime heat of the desert. *(Mojave Desert Ecoregional Assessment September 2010, The Nature Conservancy of California 201 Mission Street, 4th Floor San Francisco, CA 94105)* p. 50"

The California Energy Commission has recently determined that over 4,000 birds a year will be killed by the pending Rio Mesa Solar Electric Generating System. Some of these birds will be killed by the solar flux, other would be liked by the lake effect. The Rio Mesa Project will not use PV panels but heliostats. Both PV panels and heliostats will produce a lake effect. More on the Rio Mesa Project here:
http://www.energy.ca.gov/sitingcases/riomesa/index.html

The Soda Mountains Solar Project will be located near important wetlands at Soda Springs. The Draft Environmental Impact Statement should make a list of all the potential birds that could be threatened by collision with solar panels.

Would the polarized light pollution result in any Takes under the Bald and Golden Eagle Protection Act?

Mojave fringe-toed lizards *(Uma scoparia)*

Fringe-toed lizards have been spotted crossing Rasor Road on the southern part of the project site. How will loss of linkage habitat for Mojave fringe-toed lizards be mitigated?

Visual Resources:

This project would be built adjacent to outstanding conservation areas and the impact to visual resources will degrade the visitor experience. The project would be placed next to the Soda Mountains Wilderness Study Area and the Mojave National Preserve.

The BLM should require more KOP simulations that depict all of the visual impact scenarios. All of the most potentially visible angles of light and time of day should be considered to depict the worst case scenario.

The following BLM required factors to be considered:

(2) Angle of Observation. The apparent size of a project is directly related to the angle between the viewer's line-of-sight and the slope upon which the project is to take place. As this angle nears 90 degrees (vertical and horizontal), the maximum area is viewable.

(3) Length of Time the Project Is In View. If the viewer has only a brief glimpse of the project, the contrast may not be of great concern. If, however, the project is subject to view for along period, as from an overlook, the contrast may be very significant.

(4) Relative Size or Scale. The contrast created by the project is directly related to its size and scale as compared to the surroundings in which it is place.

The 2,700 acre size of the project is large and will have the potential to impact different VRM zones of different classes. Some of the public lands on the Soda Mountains Wilderness Study Area should considered a Class One Visual Resource Management Zone. BLM defines the objective of this class *"to preserve the existing character of the landscape. This class provides for natural ecological changes; however, it does not preclude very limited management activity. The level of change to the characteristic landscape should be very low and must not attract attention".*

All impacts should be evaluated from VRM Class One Standards due to the large visual cumulative impacts.

The following Key Observation Point simulations should be included in the Visual Resources Analysis:

1. Simulations from Rasor Road

2. Simulations from the adjacent Mojave National Preserve

3. Simulations of dust plumes and potential dust blackout events from construction activity.

4. Two simulations from the Soda Mountains Wilderness Study Area

5. Two dark sky simulations of construction lighting and security lighting.

Cultural Resources: What cultural resources will be destroyed by this project? How will this be mitigated? Is BLM consulting with tribes?

Access on Rasor Road:
The applicant wants to re-route Rasor Road which will disrupt public land access for many people. Expediting approval of so many large energy projects on lands that belong to all of us is not consistent with the BLM's multiple use philosophy. Giving up so much land of one interest excludes the rest of the public.

Comment deadline next to a holiday:

Did BLM do this on purpose? By putting the comment deadline right next to the Thanksgiving holiday, you will not get nearly as many comments as you usually would. Please give the public an additional two weeks to provide scoping comments.

Conclusion:

The Soda Mountains Solar Project will destroy 2,700 acres of public land. It will be a visual eyesore to the Mojave National Preserve and the Soda Mountains Wilderness Study Area. The applicant is using poorly researched information to determine that there would be small impacts to hydrologic and biological resources. If the project is approved and the applicant needs to use so much water for construction, that would put an unneeded risk on Soda Springs and potentially threaten the survival of an Endangered Mojave Tui Chub population.

There are several alternatives to trashing important resources with this project. The BLM has an opportunity to do the right thing by selecting a No Action Alternative for this project.

Thank you,

Kevin Emmerich

Laura Cunningham

Basin and Range Watch

P.O. Box 70

Beatty, Nevada 89003

CALIFORNIA
Water Boards

Lahontan Regional Water Quality Control Board

Edmund G. Brown Jr.
Governor

Matthew Rodriquez
Secretary for
Environmental Protection

2012 NOV 29 AM 9:32

NOV 2 6 2012

Mathew Slowik
County of San Bernardino, Land Use Services Department
385 N. Arrowhead Avenue, First Floor
San Bernardino, CA 92415-0182

COMMENTS REGARDING THE NOTICE OF PREPARATION OF A DRAFT ENVIRONMENTAL IMPACT REPORT FOR THE SODA MOUNTAIN SOLAR PROJECT, SAN BERNARDINO COUNTY

California Regional Water Quality Control Board, Lahontan Region (Lahontan Water Board) staff received the Notice of Preparation (NOP) of an environmental document for the above-referenced project (Project) on October 31, 2012. The proposed project involves construction and operation of a 350-megawatt solar photovoltaic energy generating facility that includes an on-site substation, operations and maintenance buildings, access roads, realignment of an existing road, and water wells. These Project structures and facilities would occupy approximately 2,700 acres of an approximately 4,400-acre right-of-way on public lands managed by the Bureau of Land Management (BLM).

Our comments are submitted in compliance with California Environmental Quality Act (CEQA) Guidelines, California Code of Regulations, title 14, section 15096, which requires responsible agencies to specify the scope and content of the environmental information germane to their statutory responsibilities, and lead agencies to include that information in their EIR.

The State Water Resources Control Board (State Water Board) and the Lahontan Water Board regulate discharges of waste to protect the quality of waters of the State, broadly defined as "the chemical, physical, biological, bacteriological, radiological, and other properties and characteristics of water which affects its use" (California Water Code §13050). The Lahontan Water Board implements the *Water Quality Control Plan for the Lahontan Region* (Basin Plan) and is a responsible agency pursuant to CEQA for the proposed project. As such, the Lahontan Water Board must ensure compliance with CEQA when taking discretionary actions on this project.

Lahontan Water Board staff, acting as a responsible agency, has reviewed the above-referenced document in context as to how well the proposed project protects water quality, and ultimately, the beneficial use of waters of the State. There a number of potentially significant impacts to water quality and water resources that must be adequately addressed in the environmental review. Without adequate mitigation, Project implementation could result in significant adverse impacts to water quality and may result in cumulative impacts that have the potential to permanently alter the hydrological and ecological function of the aquatic water resources within the Project area, thereby adversely affecting beneficial uses of waters of the State.

AUTHORITY

State law assigns responsibility for protection of water quality in the Lahontan region to the Lahontan Water Board. The Basin Plan contains policies that the Lahontan Water Board uses with other laws and regulations to protect water quality within the region. All surface waters and ground waters are considered waters of the State. Surface waters include, but are not limited to, drainages, streams, washes, ponds, pools, or wetlands, and may be permanent or intermittent. All waters of the State are protected for beneficial uses under California law. Additional protection is provided for waters of the United States (U.S.) under the Federal Clean Water Act (CWA). Based on our review of the NOP, project components may involve alteration, dredging, filling, and/or excavating activities in waters of the State. Such activities constitute a discharge of waste[1], as defined in California Water Code (CWC), section 13050, and could affect the quality of waters of the State.

The State Water Resources Control Board (State Water Board) and the Lahontan Water Board regulate discharges in order to protect the water quality for beneficial uses of waters of the State. The Basin Plan provides guidance regarding water quality and how the Lahontan Water Board may regulate activities that have the potential to affect water quality within the region. The Basin Plan includes prohibitions, water quality standards, and policies for implementation of standards. The Basin Plan can be accessed via Lahontan Water Board's web site at http://www.waterboards.ca.gov/lahontan/water_issues/programs/basin_plan/references.shtml.

We request that the environmental document analyze compliance with policies in the Basin Plan in the hydrology and water quality analyses and require that the Project proponent comply with all applicable water quality standards and prohibitions, including provisions of the Basin Plan concerning industrial wastes, wetlands, floodplains, construction activities, and land development.

PERMITS

A number of activities associated with the Project may require permits or other orders issued by either the State Water Board or Lahontan Water Board because they have the potential to impact waters of the State. The requirements may include the following:

- Alteration of streambeds (including ephemeral channels) and/or discharge of fill material to a surface water may require a CWA, section 401 water quality certification (WQC) for impacts to federal waters (waters of the U.S.), or waste

[1] "Waste" is defined in the Basin Plan to include any waste or deleterious material including, but not limited to, waste earthen materials (such as soil, silt, sand, clay, rock, or other organic or mineral material) and any other waste as defined in the California Water Code, section 13050(d).

discharge requirements (WDRs) for dredge and fill impacts to non-federal waters of the state.

- Land disturbance of 1 acre or more may require a CWA, section 402(p) National Pollutant Discharge Elimination System (NPDES) General Construction Storm water Permit obtained from the State Water Board, or an individual storm water permit obtained from the Lahontan Water Board;

- Discharge of low threat wastes to a surface water including, but not limited to, diverted stream flows, construction and/or dredge spoils dewatering, and well construction and hydrostatic testing discharge, may require an NPDES permit for Limited Threat Discharges to Surface Waters issued by the Lahontan Water Board;

- Discharge of low threat wastes to land, including clear water discharges, small dewatering projects, and inert wastes, may require General Waste Discharge Requirements (WDRs) for Discharges to Land with a Low Threat to Water Quality issued by the Lahontan Water Board; and

Some waters of the State are "isolated" from waters of the U.S.; for purposes of dredged or fill material discharges, determinations of the jurisdictional extent of the waters of the U.S. are made by the United States Army Corps of Engineers (USACE). Projects that have the potential to impact surface waters will require the appropriate jurisdictional determinations. Water Board analyses typically follow on determinations by the USACE and/or sometimes the California Department of Fish and Game (CDFG) concerning aquatic habitats. These determinations are necessary to discern if the proposed surface water impacts will be regulated under section 401 of the CWA or through WDRs issued by the Water Board.

We request that Project proponent consult with the USACE and CDFG and perform the necessary jurisdictional determinations for surface waters within the Project area. In addition, we request that the environmental document list the permits that may be required, as outlined above, and identify the specific operations, maintenance, and/or minor construction activities and their impact mitigation measures that will be employed under these permitting actions in the appropriate sections of the environmental document. Information regarding these permits, including application forms, can be downloaded from our web site at http://www.waterboards.ca.gov/lahontan.

POTENTIAL IMPACTS TO SURFACE WATERS

Surface waters perform a variety of important hydrologic and biogeochemical functions that affect water quality. In particular, stream channel corridors and riparian areas associated with both perennial streams and ephemeral drainages provide a natural buffer and help mitigate and control water quality impacts by removing pollutants and sediment from surface runoff. Truncation, realignment, channelization, lining, and/or infilling of surface water resources has the potential to impair a number of beneficial uses by reducing the available riparian habitat, thereby eliminating the natural buffer system to filter runoff and enhance water quality. In addition, the practice of channelizing, straightening, and lining streambeds changes a stream's hydrology by decreasing water storage capacity and increasing water flow velocity, which in turn leads to increases in the severity of peak discharges. These hydrologic changes tend to exacerbate flooding, erosion, scouring, sedimentation and may ultimately lead to near-total loss of natural functions and values, thereby resulting in the increased need for engineered solutions to re-establish the disrupted flow patterns. The EIR must address the above-cited potential impacts, which are considered significant.

BENEFICIAL USES OF WATER

Beneficial uses associated with the Soda Lake Hydrologic Subarea include municipal and domestic supply (MUN); agricultural supply (AGR); groundwater recharge (GWR); freshwater replenishment (FRESH); water contact recreation (REC-1); non-contact water recreation (REC-2); warm freshwater habitat (WARM); cold freshwater habitat (COLD); wildlife habitat (WILD); preservation of biological habitats of special significance (BIOL); rare, threatened, and endangered species (RARE); spawning, reproduction and development (SPWN); water quality enhancement (WQE); and flood peak attenuation/flood water storage (FLD). Truncation, realignment, channelization, lining, and/or infilling of these surface waters will result in changes in the stream channel functions and may adversely affect these beneficial uses, particularly GWR, RARE, WQE, FLD, and WILD.

The EIR must identify the prescribed beneficial uses of surface waters within the Project area, evaluate the Project's potential impacts to water quality with respect to those beneficial uses, and provide alternatives to avoid those impacts or describe specific mitigation measures that, when implemented, will minimize unavoidable impacts to a less than significant level.

HYDROLOGY

For each facility site that has a drainage system that crosses the site, we request that the environmental document include a map identifying all surface water resources within the vicinity of the Project area, and include a narrative discussion of the delineation methods used to discern those surface water features in the field. In particular, the facility sites 1, 2 and 10 (RE Rosamond One, RE Rosamond Two, and RE Barren Ridge) appear to significant drainages, but others may have them as well.

The proposal to install grids of photovoltaic systems on the site has the potential to hydrologically modify these natural drainage systems. The environmental document must provide specific information regarding the potential impacts to surface waters with respect to the proposed activities. The environmental document must describe and quantify all impacts to surface waters and identify whether those impacts are either permanent or temporary. The environmental document should identify alternatives and other mitigation measures to reduce and/or eliminate such impacts. If impacts are unavoidable, then we request that the impacts be minimized to the extent practical and that the Project be designed such that it would maintain existing hydrologic features and patterns to the extent feasible. All unavoidable impacts to waters of the State must be mitigated to ensure that no net loss of function and value will occur as a result of Project implementation.

STORM WATER

Storm water management must be considered a significant component in the environmental review process. Of particular concern is the collection of storm water runoff into channels and the discharge of that storm water to natural drainage systems. Without adequate design, the consequences of combining these flows will likely be aggradation and headcutting upstream of the confluence and channel incision, increased sediment transport, and eventual widening downstream of the confluence. The environmental document must evaluate all potential storm water impacts, describe controls needed during construction, and needed to mitigate potential post-construction hydrologic impacts, and describe specific best management practices that, when implemented, will reduce those potential impacts to a less than significant level. Where feasible, we request that you consider design alternatives that maintain the existing hydrology of the site. Excess flows created by hardscapes and reduced permeability should be redirected from surface waters to areas where they will dissipate by percolation into the landscape.

Thank you for the opportunity to comment on the NOP for the Project. Early consultation with Lahontan Water Board staff is encouraged as Project modifications may be required to avoid and minimize impacts to waters of the State. We look forward to working with you in your efforts to protect water quality. If you have any questions regarding this letter, please contact me at (530) 542-5430 (aemiller@waterboards.ca.gov) or Tobi Tyler at (530) 542-5435 (ttyler@waterboards.ca.gov).

Alan Miller

Alan Miller, P.E.
Chief, North Basin Regulatory Unit

cc: State Clearinghouse

TT/clhT: Soda Mountain Solar NOP comments 11-14-12 TT.doc
File: Pending / San Bernardino County / Soda Mountain Solar Project

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November 26, 2012

Mr. Matthew Slowik
Senior Planner
County of San Bernardino Land Use Services Department
Planning Division
385 North Arrowhead Avenue, 1st Floor
San Bernardino, CA 92415
Mslowik@lusd.sbcounty.gov

RE: SCAG Comments on the Notice of Preparation of a Draft Environmental Impact Report for the Soda Mountain Solar Project [I20120260]

Dear Mr. Slowik:

Thank you for submitting the Notice of Preparation of a Draft Environmental Impact Report for the Soda Mountain Solar Project to the Southern California Association of Governments (SCAG) for review and comment. SCAG is the authorized regional agency for Inter-Governmental Review (IGR) of programs proposed for federal financial assistance and direct development activities, pursuant to Presidential Executive Order 12372. Additionally, SCAG reviews the Environmental Impact Reports of projects of regional significance for consistency with regional plans pursuant to the California Environmental Quality Act (CEQA) and CEQA Guidelines.

SCAG is also the designated Regional Transportation Planning Agency under state law, and as such is responsible for preparation of the Regional Transportation Plan (RTP) including its Sustainable Communities Strategy (SCS) component pursuant to SB 375. As the clearinghouse for regionally significant projects per Executive Order 12372, SCAG reviews the consistency of local plans, projects, and programs with regional plans.[1] Guidance provided by these reviews is intended to assist local agencies and project sponsors to take actions that contribute to the attainment of the regional goals and policies in the RTP/SCS.

SCAG staff has reviewed the Notice of Preparation of a Draft Environmental Impact Report for the Soda Mountain Solar Project and determined that this proposed project is regionally significant per CEQA Guidelines, Sections 15125 and 15206. The proposed project consists of a 350-megawatt solar photovoltaic energy generating facility occupying approximately 2,700 acres in unincorporated northeast San Bernardino County, California.

When available, please send environmental documentation to SCAG's *main office in Los Angeles* providing, at a minimum, the *full comment period for review.*

If you have any questions regarding the attached comments, please contact Pamela Lee at (213) 236-1895 or leep@scag.ca.gov. Thank you.

Sincerely,

Jonathan Nadler
Manager, Compliance and Performance Assessment

[1] SB 375 amends CEQA to add Chapter 4.2 Implementation of the Sustainable Communities Strategy, which allows for certain CEQA streamlining for projects consistent with the RTP/SCS. Lead agencies (including local jurisdictions) maintain the discretion and will be solely responsible for determining "consistency" of any future project with the SCS. Any "consistency" finding by SCAG pursuant to the IGR process should not be construed as a finding of consistency under SB 375 for purposes of CEQA streamlining.

COMMENTS ON THE NOTICE OF PREPARATION OF AN ENVIRONMENTAL IMPACT REPORT FOR THE SODA MOUNTAIN SOLAR PROJECT [SCAG NO. I20120260]

CONSISTENCY WITH RTP/SCS

SCAG reviews environmental documents for regionally significant projects for their consistency with the adopted RTP/SCS.

RTP/SCS Goals

The 2012-20135 RTP/SCS links the goal of sustaining mobility with the goals of fostering economic development, enhancing the environment, reducing energy consumption, promoting transportation-friendly development patterns, and encouraging fair and equitable access to residents affected by socio-economic, geographic and commercial limitations (see http://rtpscs.scag.ca.gov). The goals included in the 2012 RTP/SCS may be pertinent to the proposed project. These goals are meant to provide guidance for considering the proposed project within the context of regional goals and policies. Among the relevant goals of the 2012-2035 RTP/SCS are the following:

SCAG 2012-2035 RTP/SCS GOALS	
RTP/SCS G1:	*Align the plan investments and policies with improving regional economic development and competitiveness*
RTP/SCS G2:	*Maximize mobility and accessibility for all people and goods in the region*
RTP/SCS G3:	*Ensure travel safety and reliability for all people and goods in the region*
RTP/SCS G4:	*Preserve and ensure a sustainable regional transportation system*
RTP/SCS G5:	*Maximize the productivity of our transportation system*
RTP/SCS G6:	*Protect the environment and health for our residents by improving air quality and encouraging active transportation (non-motorized transportation, such as bicycling and walking)*
RTP/SCS G7:	*Actively encourage and create incentives for energy efficiency, where possible*
RTP/SCS G8:	*Encourage land use and growth patterns that facilitate transit and non-motorized transportation*
RTP/SCS G9:	*Maximize the security of the regional transportation system through improved system monitoring, rapid recovery planning, and coordination with other security agencies*

For ease of review, we encourage the use of a side-by-side comparison of SCAG goals with discussions of the consistency, non-consistency or non-applicability of the policy and supportive analysis in a table format. Suggested format is as follows:

SCAG 2012-2035 RTP/SCS Goals		
Goal		**Analysis**
RTP/SCS G1:	*Align the plan investments and policies with improving regional economic development and competitiveness.*	*Consistent: Statement as to why* *Not-Consistent: Statement as to why* *or* *Not Applicable: Statement as to why* *DEIR page number reference*
RTP/SCS G2:	*Maximize mobility and accessibility for all people and goods in the region.*	*Consistent: Statement as to why* *Not-Consistent: Statement as to why* *or* *Not Applicable: Statement as to why* *DEIR page number reference*
RTP/SCS G3:	*Ensure travel safety and reliability for all people and goods in the region.*	*Consistent: Statement as to why* *Not-Consistent: Statement as to why* *or* *Not Applicable: Statement as to why* *DEIR page number reference*
etc.	etc.	etc.

Regional Growth Forecasts

The Notice of Preparation of an Environmental Impact Report for the Soda Mountain Solar Project should reflect the most recently adopted SCAG forecasts (see http://scag.ca.gov/forecast/index.htm), which are the 2012-2035 RTP/SCS population, household and employment forecasts. The forecasts for the region and applicable jurisdictions are below.

	Adopted SCAG Region Wide Forecasts		Adopted San Bernardino County Forecasts	
Forecast	**Year 2020**	**Year 2035**	**Year 2020**	**Year 2035**
Population	19,663,000	22,091,000	2,268,000	2,750,000
Households	6,458,000	7,325,000	698,000	847,000
Employment	8,414,000	9,441,000	810,000	1,059,000

MITIGATION

SCAG staff recommends that you review the SCAG 2012-2035 RTP/SCS Final Program EIR List of Mitigation Measures Appendix for additional guidance, as appropriate. The SCAG List of Mitigation Measures may be found here: http://scag.ca.gov/igr/pdf/SCAG_IGRMMRP_2012.pdf

November 26, 2012
Mathew Slowik, Senior Planner
County of San Bernardino Land use Services Department
Planning Division
385 N. Arrow Head Ave, First Floor
San Bernardino, Ca. 92415-0182

RE: Soda Mountain Solar

My name is Bob Burke; I am the Vice-President of the Society for the Conservation of Bighorn Sheep (SCBS). We are very concerned about the Bighorn Sheep in the Soda Mountain Range. at late as this past two weeks there have been sheep sightings near the razor road exit all the way to Zzyzx with in 300 yards of Interstate 15. The solar project will cut off the sheep range between the North and South Soda Mountains.

We are surveying the area of the proposed culverts with Trail Cameras to document any movement in that area. Any fence around the project will stop the sheep from crossing in that area.

Thank you for the opportunity to provide comments on the draft Environmental Impact Statement. I strongly advocate that the Soda Mountain Solar Project be mindful of its impacts to wildlife on both sides of the I-15 in that area, and that it be moved to a more amenable location as to not interfere with Bighorn Sheep habitat.

Sincerely,

Bob Burke,

Vice-President,

SCBS

760-617-9261

1980 E. Main St #50

Barstow, Ca 92311

760-617-9261

From: Brendan Hughes [mailto:jesusthedude@hotmail.com]
Sent: Sunday, December 02, 2012 8:02 AM
To: BLM_CA_Soda_Mtn_Solar
Subject: Scoping Comments for Soda Mountains Solar

To whom it may concern:

My name is Brendan Hughes and I would like to provide scoping comments for the proposed Soda Mountains Solar farm. I have grave concerns about the proposed location of this facility. It is adjacent to the iconic Mojave National Preserve, which I visit often and enjoy for its unblemished state, including its surroundings. BLM has to consider the context in which these solar plants are situated. If BLM allows one solar plant adjacent to this unit of the National Park Service, then what's to prevent all surrounding lands to be developed for solar? Will wilderness, parks, and DWMAs be the only parts of the desert left after this large-scale solar scourge? This project proponent should be politely but forcefully encouraged to move its proposal to one of the SEZs developed by BLM itself or to previously-disturbed agricultural lands. Or better yet, invest the billion dollars they plan to spend on this project into rooftop solar within Los Angeles and the Inland Empire, where this power will be used.

Additionally, there are other serious environmental issues with this project. It will cut off wildlife corridors for bighorn sheep and other animals, as well as draw down the water table, stealing it from Zzyzx and the Mojave National Preserve. This could endanger the survival of the Tui chub. Also, supposedly there are no tortoises on this land. But didn't BrightSource say there were only 16 or so tortoises on the Ivanpah site before it was developed? BLM needs to require a 100% coverage survey of all lands proposed for this development BEFORE the draft EIS is sent out for public review. And preferably BLM would require the project proponent to use competent, experienced biologists for the tortoise surveys. I probably would have tripped over more tortoises than BrightSource's initial surveyors found. It was unethical, unconscionable, and probably (or should have been) illegal to go through with Ivanpah after all the tortoises were discovered there. The public needs to know the full impact of this Soda Mountains project before we can be asked to make reasoned, informed comments.

Thank you for your consideration.

Brendan Hughes
60444 Onaga Trail
Joshua Tree, CA 92252
jesusthedude@hotmail.com

DESERT TORTOISE COUNCIL
P.O. Box 1568
Ridgecrest, California 93556
www.deserttortoise.org

Date: 13 December 2012

To: Mr. Jeffery Childers, Soda Mountain Solar Project Manager
22835 Calle San Juan De Los Lagos
Moreno Valley, CA 92553
sodamtnsolar@blm.gov

From: Ed LaRue, Ecosystems Advisory Committee

RE: Public scoping comments on the proposed Soda Mountain Solar project (CACA 49584)

Dear Mr. Childers,

The Desert Tortoise Council (Council) is a private, non-profit organization comprised of hundreds of professionals and laypersons who share a common concern for wild desert tortoises and a commitment to advancing the public's understanding of this species. Established in 1976 to promote conservation of tortoises in the deserts of the southwestern United States and Mexico, the Council regularly provides information to individuals, organizations and regulatory agencies on matters potentially affecting the desert tortoise within its historical range.

Herein the Council formally requests to be considered an "Affected Party," and asks that all correspondence regarding analysis of this potential project be sent to the address given above, attention Ed LaRue.

It was my pleasure yesterday to spend about eight hours in the field on the proposed project site to become familiar with biological resources, then to attend the public scoping meeting held in Lenwood, California between 4:00 and 6:00 p.m. During those eight hours, I walked approximately 11 miles through the three proposed array areas, referred to on a project map (Panorama Environmental, Inc., dated 9/14/2012) as "North Array," "South Array," and "East Array." The Council also appreciates the time and effort spent by Mr. Michael Radakovich, tortoise biologist, who accompanied LaRue on those surveys.

I was able to review the following documents before visiting the site:

● Panorama Environmental, Inc. July 2012. Analysis of habitat suitability and connectivity in the Soda Mountain area, San Bernardino County, California (herein, "Panorama")
● RMT, Inc. March 2011. Plan of Development, Soda Mountain Solar Project (herein "RMT")
● Soda Mountain Solar, LLC. 9 August 2012. Comments from Ms. Adriane Wodey representing this subsidiary of Bechtel Development Company, Inc. (herein "Ms. Wodey")

All three documents extensively reference 2009 focused desert tortoise surveys of the 4,400 acres± performed by URS (2009). However, when I asked for a copy of that document during the public scoping meeting, Mr. Childers indicated that the document was currently under internal review and not available to the public. This is unfortunate, as all documents I reviewed before visiting the site refer to URS results that the Council cannot review for an independent assessment of those results. If there are problems with that document, the Bureau of Land Management (BLM) should be forthcoming with that information, or publicly reject the report. In the meantime, the limited information available to the Council comes from third parties citing the URS 2009 document as if it is good science. As described below, we have good reason to believe that it is not good science.

Furthermore, when Mr. Childers was asked if there had been any recent surveys performed, he was hesitant and noncommittal. We are aware that there have been additional surveys, but it is not clear why these materials are being withheld. The Council would be much better informed if existing materials had been made available. It is important that the BLM remain independent in its assessment of this project, and not become a project proponent.

All three documents reviewed thus far come across as being subjectively one-sided, first reporting published results of other studies then, without good scientific basis, rejecting those results. For example, Ms. Wodey's assertion on page 16 that the site be reclassified from "High Biological Sensitivity – Public" to "Unclassified Land" is self-serving and not supported by any data. Similarly, there is no evidence that the site should be removed from its current designation as a "High Conflict Development Focus Area," as identified in the Desert Renewable Energy Conservation Plan. We sincerely hope and expect that the draft EIS will not be fraught with preconceived conclusions promoting development of this project in the current location.

The Council strongly feels that the following issues must be pursued and resolved in the draft EIS:

1. The Bechtel representative at the meeting indicated that this was one of five potential sites, that the other four had been rejected, and that this one was the preferred alternative. The draft EIS should clearly report the data behind this decision, both the reasons the other sites are not suitable and the reason this site is preferred. How have these sites already been rejected in the absence of rigorous analyses that would presumably result from an EIS-level review?

2. The Council would like to see additional sites (not just those already rejected) analyzed in the draft EIS. We support the determination that this particular site at Soda Mountains be identified as an alternative considered but rejected.

3. All three documents suggest that the three arrays are substantially affected by their proximity to the BLM's Rasor Open Area. This is simply not true. The North Array is separated from the open area by Interstate 15. According to the odometer on my GPS unit, I walked 4.72 miles of transects on the southern half of the North Array area. I observed only 15 cross-country vehicle tracks along those 4.7 miles of transects. The substrates are dissected by numerous washes and far too cobbly to accommodate most off-road vehicles. I also walked 6.97 linear miles of transects through the South Array, which is on the same side of I-15 and contiguous to the open area. There I tallied 45 tracks alongside the eastern hills and 88 tracks throughout the property. Most of these were along the south side of my survey area, adjacent to Rasor Road. In any case, these numbers are not indicative of degraded habitats.

4. Rather than make unsubstantiated statements about habitat degradation due to the proximity to the open area, additional studies should assess the levels of impacts in all three array areas and situate a few transects inside the Rasor open area for comparison. We are confident that such a comparison will reveal that the proposed sites are not nearly degraded as Ms. Wodey and Panorama would have us believe.

5. As per U.S. Fish and Wildlife Service (USFWS 2010) survey protocol, which states that survey results will remain valid for the period of one year, the 2009 tortoise surveys are now outdated. Assuming the site is not rejected based on scoping comments, new surveys should be performed to see if tortoises are truly absent. There should be complete disclosure of surveyor qualifications. If tortoises do occur in low densities, inexperienced surveyors should not be employed. The current tendency given the USFWS four-month survey period is to have hydrologists, geologists, ornithologists, even office staff and secretaries perform tortoise surveys. We strongly believe that only qualified tortoise biologists should perform any new surveys.

6. Based on what I saw yesterday, particularly throughout the North Array, which is very cobbly, the new survey should tighten up the survey intervals from the proposed 10-meter intervals to perhaps 5-meter intervals. It would also be prudent to orient transects in an east-west direction to facilitate detection in washes. I and Radakovich visually inspected about 150 wood rat middens for tortoise scat and carcass pieces on surveyed portions of the North Array. There must be thousands of such middens, which should be individually checked for tortoise signs. If tortoises occur at low densities as Ms. Wodey and Panorama suggest, this heightened survey methodology would be warranted.

7. Prior to beginning any new surveys, project proponents and intended biologists should confer with USFWS biologists to determine an affected "action area" (see definition in USFWS 2010) for this project. In 2009, only the project footprint was surveyed. Had a larger action area encompassing both direct and indirect impact areas been surveyed, we are certain that tortoises or their signs would have been detected in the hills immediately adjacent to the project footprint. Failure to survey the action area for this project would violate the USFWS 2010 protocol.

8. Even if new surveys do not find tortoises within the North Array area, the BLM should conclude that the project "May Effect" tortoises based on the 2001 AMEC findings at the Opah Ditch Mine, which is located within a half-mile to the west (see Figure 10 in Panorama 2012). During that survey, 5 burrows, 3 rock cover sites, 9 scat, and 3 carcasses were found, demonstrating that tortoises are in the immediate vicinity of the proposed project. Based on this information, the Council believes that the "May Effect" determination is warranted. As such, there should also be formal consultation with USFWS as required on page 6 of the survey protocol (USFWS 2010).

9. Although Ms. Wodey (apparently referring to the URS 2009 survey on page 11 in her letter) concludes that there is no habitat for Mojave fringe-toed lizard, I believe that there are suitable habitats within the eastern portions of both the East and South arrays, in sand fields against the west slopes of Soda Mountains. If not already, the Council believes that additional surveys are warranted for this species.

10. The Council did not have access to the URS 2009 document, so we are not sure what information sources were used therein to determine tortoise occurrence, but Ms. Wodey's letter cites only the AMEC 2001 study. The draft EIS must review additional materials to determine the potential local and regional impacts to tortoises. At the very least, this should include reviews of the Fort Irwin expansion data, any findings associated with the proposed high-speed rail line, and any data Caltrans may have.

11. Radakovich found burrowing owl sign in three locations on the northern portion of the North Array. This species was not identified in the RMT assessment. There should be focal surveys for burrowing owl and the results presented in the draft EIS.

12. Although not mentioned in any of the materials reviewed, both LaRue and Radakovich found evidence of American badger in all three array areas. The draft EIS should analyze the extent of impacts to this species, which is a California Species of Special Concern.

13. Citing the URS 2009 survey, which was not available to the Council for review, Ms. Wodey (page 9) states "…that conditions are not likely to support populations of desert tortoise because: the elevation of the area (less than 1,600 feet) is low for desert tortoise; vegetation is sparse with low diversity; soils are very rocky; habitat is fragmented by Interstate-15; and disturbance from off-highway vehicle use and construction of two transmission lines, a cellular tower, a distribution line, a fiber optic cable, and two fuel pipelines." Similarly on page 38, Panorama (2012) states: "The presence of surrounding mountains, abundant rocks and cobbles, sparse vegetation, low vegetation diversity, low elevation (below 470 meters), sand and gravel soils, and level of human disturbance indicate that the habitat is fragmented and not highly suitable for desert tortoise."

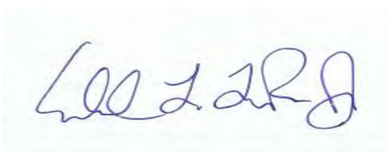
In fact, none of these conditions preclude tortoises from the three arrays. Though not common at very low elevations, I have observed tortoises at 500-feet elevation. Elevations ranging from about 1,200 to 1,600 feet throughout the three arrays are entirely suitable for tortoise occurrence. Though as I observed yesterday the creosote bushes *are* sparse, this represents a natural condition; I have observed tortoises in these exact same conditions. The sites are not too rocky for tortoises to occur. Though, regionally, habitats are fragmented by Interstate 15, this does not mean that some 4,000 acres of adjacent habitats are not capable of supporting tortoises. As mentioned above, the impacts associated with the adjacent open area are likely minimal compared to those occurring inside the open area. From what I saw yesterday, habitats have not been compromised by their proximity to the open area. Nor has serious habitat fragmentation occurred as a result of the transmission lines and other linear impacts; habitats within several hundred feet of these existing developments are intact and entirely capable of supporting tortoises.

14. As stated in their abstract, Nussear et al. (2009) indicate that their habitat modeling exercise is intended to provide "…output of the statistical probability of habitat potential that can be used to map potential areas of desert tortoise habitat." Both Ms. Wodey and Panorama report that Nussear's analysis produced a habitat rating of 0.6 to 0.8, where 1.0 is the most suitable habitat. Both then go on to say that this estimate is too high because no tortoise sign was found by URS in 2009. Nussear is not predicting the likely occurrence of tortoises, he is predicting habitat suitability. Just because tortoises are not abundant onsite does not dismiss Nussear's relatively high habitat suitability index for this site.

In conclusion, there is a real concern that the environmental documents reviewed thus far are subjective in favor of the proposed project. Claiming that the Opah Ditch Mine is better tortoise habitat than adjacent undisturbed lands is an example. All three documents claim that low elevations, existing disturbances, cobbly substrates, and sparse vegetation warrant the development of this site. That was not my impression yesterday. Although the arrays are not "crawling with tortoises," none is considered unsuitable or highly disturbed. Had I not visited the site, I would have assumed from the three documents I reviewed that low shrub cover is due to excessive impacts from cross country vehicle travel. In fact, shrub cover is naturally sparse and vehicle impacts seem minimal.

We sincerely hope that the draft EIS does not continue to interpret biological baseline data in such a skewed, subjective manner so as to present to the public the impression that this is an ideal location to destroy about 4,000 acres of an intact, functioning habitat.

Regards,



Desert Tortoise Council
Edward L. LaRue, Jr.
Ecosystems Advisory Committee

Literature Cited:

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Nussear, K.E., Esque, T.C., Inman, R.D., Gass, Leila, Thomas, K.A., Wallace, C.S.A., Blainey, J.B., Miller, D.M., and Webb, R.H. 2009. Modeling habitat of the desert tortoise (*Gopherus agassizii*) in the Mojave and parts of the Sonoran Deserts of California, Nevada, Utah, and Arizona: U.S. Geological Survey Open-File Report 2009-1102, 18 p.

Panorama Environmental, Inc. 2012. Analysis of habitat suitability and connectivity in the Soda Mountain area, San Bernardino County, California. An unpublished report prepared by Susanne Heim and Laurie Hietter, dated July 2012. San Francisco, CA.

RMT, Inc. 2011. Plan of Development, Soda Mountain Solar Project. Unpublished report prepared for BLM, submitted by Caithness Soda Mountain, LLC, dated 15 March 2011. San Mateo, CA.

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U.S. Fish and Wildlife Service. 2010. Preparing for any action that may occur within the range of the Mojave desert tortoise (*Gopherus agassizii*). USFWS Desert Tortoise Recovery Office. Reno, NV.

CITY OF FONTANA CALIFORNIA

City of Fontana
CALIFORNIA

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November 13, 2012

County of San Bernardino
Land Use Services Dept.
Planning Division
Attn: Matthew Slowik
385 N. Arrowhead Avenue
San Bernardino, CA 92415-0182

Re: **Notice of Preparation of a Draft Environmental Impact Statement/Environmental Impact Report for the Soda Mountain Solar Project**

Dear Mr. Slowik,

On November 7, 2012, the City of Fontana Planning Division received the Notice of Preparation of a Draft Environmental Impact Statement/Environmental Impact Report for the Soda Mountain Solar Project. The proposed project is a request to construct/operate a 350-megawatt solar photovoltaic energy generating facility that includes an on-site substation, operations and maintenance buildings, access roads, realignment of an existing road, and water wells on approximately 4,400 acres of right-of-way on public lands managed by the federal Bureau of Land Management. The proposed project is located in an unincorporated area of northeast San Bernardino County approximately 6 miles southwest of the community of Baker. The public review period began on October 26, 2012, through November 26, 2012. At this time, the City has no comments or concerns. Thank you for allowing the City of Fontana to participate in the public review process.

Sincerely,
COMMUNITY DEVELOPMENT DEPARTMENT
PLANNING DIVISION

Stephanie Hall

Stephanie Hall, Senior Planner

SH: am

www.fontana.org
8353 SIERRA AVENUE FONTANA, CALIFORNIA 92335-3528 (909) 350-7600

Soda Mountain Solar Project Scoping Comments

December 14, 2012

Jeffrey Childers
Soda Mountain Solar Project Manager
22835 Calle San Juan De Los Lagos
Moreno Valley, CA 92553
Via email: sodamtnsolar@blm.gov

Dear Mr. Childers:

The Amargosa Conservancy is a regional conservation organization dedicated to preserving the land, water and beauty of the Amargosa region, which includes proposed location of the Soda Mountain Solar Project.

The Conservancy endorses the scoping comments filed today by The Wilderness Society and other conservation organizations. (copy attached) We believe that the proposed location for the project is inappropriate for development for the reasons set forth in that letter.

The proposed location comprises biologically core habitat, project wells would pump water from a groundwater system that supports vital springs, and the project would mar currently undisturbed wilderness vistas that draw visitors to our region. Alternative locations, within the BLM's recently designated Solar Energy Zones, should be given preference.

Sincerely,

Katherine Boxer
Executive Director
Amargosa Conservancy

From: Randy Banis [mailto:RBanis@DeathValley.com]
Sent: Friday, December 14, 2012 5:04 PM
To: BLM_CA_Soda_Mtn_Solar
Subject: Soda Mountain Solar (CACA 49584) - Scoping Period Comments

Dear BLM,

Kindly accept these scoping period comments on the proposed Soda Mountain Solar commercial energy production complex. I serve on the Desert Renewable Energy Conservation Plan (DRECP) Stakeholder Committee on behalf of the California Off Highway Vehicle Association. I submit these comments also on behalf of the California Trail Users Coalition as their renewable energy issues coordinator.

1. Previously undisturbed public lands should not be used for large-scale, commercial energy development while so many more appropriate sites are still open and available on previously disturbed private lands.

2. The project analysis must thoroughly describe the proposed activities with regard to the BLM's Solar Programmatic EIS and the DRECP.

3. The project analysis must describe all alternatives to re-routing the Rasor Road and the thousands of vehicles that travel the road each year.

4. Alternatives must include a buffer zone around the Rasor OHV Open Area so that the use of this popular area for recreation does not negatively impact the proposed project in any way.

5. Conditions for the project must include protections for the Rasor OHV Open Area in the event of future unforeseen conflicts arise from increased recreational use. Under no situation shall conflicts between OHV recreation the project result in the closure or reduction of acreage of the Rasor OHV Open Area, or any restrictions on access to or current uses of the OHV Open Area.

6. Proposed footprint alternatives should include a project that is wholly within the Interstate 15 corridor, and that does not extend south and east of Arrowhead Trail and the current Razor Road.

7. OHV and other motorized access on the either side of Interstate 15 must not be blocked or restricted due to critical recreational connectivity provided by designated routes. The proposed project location is within a transportation choke point through which all north-south vehicle travel, on and off road, must occur.

8. The project must be fully analyzed with regards to the already approved XpressWest high speed rail project, and how the two might combine to further choke OHV and other motorized access through the Rasor area choke point.

9. Impacts to travelers along the historic Mojave Road must be analyzed so that the project does not diminish the remote, wilderness experience that is so unique to this important back country route. There must be no visual impacts to travelers of the Mojave Road, including those on the night sky. Travelers on the Mojave Road in the Rasor area currently enjoy a 360-degree view with virtually no visual traces of modern human activity -- even the railroad across the sink is not visible without a train on the tracks. There are no power lines or highways within the view shed and the project must not be allowed to create such a negative visual impact.

10. Visual impacts from the Mesquite Hills, both daytime and nighttime, must be fully analyzed.

11. Visual impacts from the south rim of Afton Canyon (accessed via Baxter Wash) must also be analyzed.

12. The project should conduct much greater outreach toward the OHV and recreation communities than it has.

Thank you for your kind consideration of my comments.

Sincerely,

Randy Banis
44404 16th Street West
Suite 204
Lancaster, CA 93534
(661) 942-2429

From: Seth Shteir [mailto:sshteir@npca.org]
Sent: Friday, December 14, 2012 4:41 PM
To: BLM_CA_Soda_Mtn_Solar
Subject: Biological References for the Soda Mountains Solar Project

Dear Mr. Childers:

Please accept the following documents as part of the public record for scoping comments for the Soda Mountains Solar Project.

The documents should be considered in the DRAFT EIS and used to identify and guide research topics for this project.

Thank you for your time and Consideration.

Sincerely,

Seth Shteir

Seth Shteir
California Desert Field Representative
National Parks Conservation Association
61325 Twentynine Palms Highway, Suite B
Joshua Tree, CA 92252
760-366-7785- Office
760-332-9776- Cell

Development of Science Priorities for the Desert Landscape Conservation Cooperative: A Comprehensive Assessment of Science Needs

By

Desert LCC Science Working Group

August 2012

Acknowledgments

This assessment was approved by the Desert LCC Steering Committee and included significant volunteer time and effort by the Desert LCC Science Working Group. We appreciate the extensive guidance and input provided by our partners to complete this collaborative effort.

Desert LCC Science Working Group:

Sergio Avila – Conservation Program Manager, Sky Island Alliance
Carol Beardmore – Science Coordinator, Sonoran Joint Venture
Leanna Begay – Climate Change Coordinator, Navajo Nation
John Bradford – Landscape Ecologist, Southern Rockies LCC
Margarita Caso – Director of Ecosystem Conservation, Mexico National Institute of Ecology
Deborah Finch – Program Manager, USDA Rocky Mountain Research Center
Gary Garrett – Fisheries Biologist, Texas Parks and Wildlife
Juan Carlos Guzmán – Coordinator, Chihuahuan Desert Grassland Alliance
Matt Leivas – Agricultural Director, Chemehuevi Tribe
Teresa Lewis – Leader, Dexter Fish Health Center US Fish and Wildlife Service
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Wayne Robbie – Regional Soil Scientist & Inventory Coordinator, US Forest Service, Southwest Region
Aimee Roberson – Biologist, US Fish and Wildlife Service
Esther Rubin – Terrestrial Research Program Manager, Arizona Game and Fish Department
Kurt Russo – Executive Director, Native American Land Conservancy
Cecil Schwalbe – Research Biologist, US Geological Survey
Abe Springer – Professor, Northern Arizona University
James Weigand – Ecologist, Bureau of Land Management

Desert LCC Steering Committee:

Scott Boruff – Deputy Executive Director for Operations, Texas Parks and Wildlife
Grant Buma – Acting Water Resources Director, Colorado River Indian Tribes
Margaret Cook – Executive Director, Gila River Indian Community
Julie Decker – Deputy State Director, Bureau of Land Management
Fon Duke – Desert Managers Group Coordinator, Department of Defense
Terry Fulp – Deputy Regional Director, Bureau of Reclamation
Armand Gonzales – Special Advisor, California Department of Fish and Game
Mary Gustafson – Coordinator, Rio Grande Joint Venture
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Sharon Pinto – Acting Regional Director, Bureau of Indian Affairs
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Laura Richards – Biologist, Nevada Department of Wildlife
Mark Sogge – Associate Regional Executive, US Geological Survey

John Stewart – Director of Environmental Affairs, California Association of Four Wheel Drive Clubs
Dave Stewart – Director for Rangeland Management, US Forest Service Southwest Region
Keisha Tatem – State Conservationist, Natural Resources Conservation Service
Benjamin Tuggle – Regional Director, US Fish and Wildlife Service
Larry Voyles – Director, Arizona Game and Fish Department (Chair of Desert LCC)

Desert LCC Science Coordinators:

Christina Vojta, US Fish and Wildlife Service, Science Coordinator (2010-March 2012, Retired)
Mark Kaib, US Fish and Wildlife Service, Acting Science Coordinator (May-July 2012)
Carol Beardmore, US Fish and Wildlife Service, Acting Science Coordinator (August-September 2012)

Table of Contents

Development of Science Priorities for the Desert LCC: A Comprehensive Assessment of Science Needs

Introduction

The Desert Landscape Conservation Cooperative (LCC) Science Working Group was tasked by the Desert LCC Steering Committee to conduct a comprehensive assessment of science needs over the Desert LCC region and to prioritize those needs to guide the allocation of future resources towards meeting those science needs. To accomplish this task, the Science Working Group identified 553 science needs from forty published technical documents and resource assessments over the Desert LCC region, six outreach meetings and workshops, and personal communication. Priority needs were then identified through criteria established by the Steering Committee in January, 2012. This report describes the process that was used to identify and prioritize science needs for the Desert LCC. Further, this report presents a list of priority science needs approved by the Steering Committee and describes the comprehensive science needs assessment that served as the basis for establishing these priorities.

The Science Working Group is recommending 23 priority science needs that fall into four categories: Terrestrial, Water, Cultural, and Monitoring. These categories will be further refined through ongoing Science Working Group science prioritization, scoping, and strategic planning processes (e.g., inclusion of water policy, aquatic resources, social science, and socioeconomics within existing categories). The priority science needs within categories were organized into first and second tiers. Tier-one science needs should be generally considered the priority, however depending on specific budget opportunities or project objectives; it is helpful to have both tiers available for funding flexibility.

These priorities will not likely be addressed simultaneously or through the same funding mechanisms. Partners within the LCC may choose to focus on priorities that specifically meet certain needs of a particular interest. Moreover, the Steering Committee may wish to focus resources on particular needs as the urgency to meet a certain goals changes. Monitoring needs are listed separately from the other categories because there are several long-term monitoring programs that may be well- positioned to meet these needs (e.g., the National Park Service Inventory and Monitoring Networks, the U.S. Fish and Wildlife Service National Wildlife Refuge Inventory and Monitoring Program, and the Long-Term Ecological Research programs).

The top science needs were identified out of 553 needs. The priority science needs (p 2-3) were drawn from this list of 46 top science needs that best met the criteria established by Steering Committee in September 2011 (Table 1, page 9). This larger list provides context for recommended science priorities.

The next steps for the science priorities are as follows:

1. Identify existing information that has addressed or is addressing science priorities.
2. Identify science projects that are currently underway that address science needs.
3. Identify opportunities to facilitate science efforts across agencies and organizations.
4. Provide funding opportunities that are targeted to meet specific science priorities.
5. Collaborate with the Southwest Climate Science Center and address science needs through long-term monitoring programs.
6. Re-evaluate science priorities annually and revisit list of priorities every three to five years.

Recommended Science Priorities for the Desert LCC

Terrestrial Resources

First tier

- Develop spatial models of predicted shifts in the distribution and composition of ecosystems and major plant communities in response to climate change.
- Investigate the effects of climate change on ecosystem elements, including plants, vertebrates, and invertebrates (especially pollinators), and evaluate the relative vulnerability of different elements.
- Identify key habitat corridors to preserve migration pathways and genetic diversity as land use changes become more prevalent, as well as preserving the future need for corridors and refugia that would enable species to persist and/or to shift distributions in response to climate change.
- Establish scientifically-sound best management practices for riparian restoration, including time of restoration activities, water needs, control of invasive plans, and use of local seed to encourage the full complement of the desired ecological condition.

Second tier

- Investigate the effects of climate variation on ecosystem processes and interconnected landscapes (e.g., uplands adjacent to riparian).
- Provide more accurate spatially-explicit models of stressor distributions.
- Provide a sensitivity analysis of ecosystem metrics in response to climate change impacts, particularly those that are more sensitive to extremes or variability.
- Investigate and model the potential physiological responses of species to climate change.

Water and Aquatic Resources

First tier

- Investigate climate change impacts to surface water and groundwater dependent habitats and species.
- Investigate the interactive impacts of climate change and water management approaches to water availability and natural and cultural resources.
- Investigate climate impacts to future water supply for humans and ecosystems.
- Predict potential impacts to water supply and quality due to changes in the timing and magnitude of climatic events.

Second tier

- Investigate the combined impacts of climate change and land management (e.g., brush control, forest thinning, burning) on watersheds.
- Improve modeling methodologies for predicting water availability through better understanding of snowpack dynamics and agricultural water use.

Cultural and Socioeconomics

First tier (only one tier)

- Evaluate the potential social and economic vulnerability of different human communities to climate change (e.g., Native American, urban, agricultural).
- Evaluate the efficacy of different types of incentive programs, both punitive and non-punitive, to promote conservation among landowners.
- Identify potential impacts of climate and other stressors to the persistence of plants and animals that are important to tribal and indigenous communities and on traditional cultivation of corn and other crops.
- Research and compile past and current indigenous and tribal management practices for maintaining productive populations of desert plants.
- Conduct a climate vulnerability assessment of archeological resources to identify those resources which are most vulnerable, causes of vulnerability, and possible ways to mitigate and/or adapt to anticipated impacts.

Monitoring

First tier

- Identify and initiate monitoring for the priority species of conservation concern and invasive species that might extend or shift range.

Second tier

- Monitor habitat changes in relation to changes in species' populations in order to build better habitat suitability models and to better understand the effects of stressors.
- Select a small suite of indicator/keystone species within each of the 3 deserts (Mojave, Sonora, and Chihuahua) that would be monitored consistently.
- Monitor selected sensitive ecosystems and their species (e.g., dune systems, sky islands, and springs).

Comprehensive Assessment of Science Needs

Background

In November 2010, an ad-hoc Science Sub-Committee for the Desert LCC completed a rapid assessment of science needs (Appendix A) that provided a general understanding of the types of information needs that were shared by Desert LCC partners. This assessment resulted in the collation of 115 science needs that were drawn from fifteen documents and five outreach meetings and that were prioritized using a set of criteria that the Science Sub-Committee developed. The rapid assessment was useful because it resulted in the collation of numerous significant science needs and enabled Desert LCC partners to test a process for identifying science priorities. Shortcomings of the rapid assessment were identified, which included a relatively small number of referenced documents, a relatively narrow breadth of scientific expertise represented on the Science Sub-Committee, and limited criteria used for identifying priorities.

To overcome the identified shortcomings, the Steering Committee asked the Science Working Group to conduct a more comprehensive assessment of Desert LCC science needs. In September 2011, the Steering Committee approved membership of a Desert LCC Science Working Group (Appendix B), and this group identified a process for conducting a comprehensive assessment of science needs that built from the strengths and lessons learned from the rapid assessment. The Science Working Group membership was based on a broader base of scientific expertise than the original Science Sub-Committee. The working group increased the number of reports from which science needs would be extracted from fifteen to forty. A new set of criteria was developed by the Science Working Group for prioritizing science needs and subsequently approved by the Steering Committee.

Objective

The assessment will help set priorities for future funding of science needs beyond 2012. As of February, 2012, the Science Working Group had collated over 550 science needs that were drawn from state wildlife action plans, partnership strategy documents, T &E recovery plans, Desert LCC outreach meetings, climate change workshops, and input from individual scientists, managers, and tribal members. In order to evaluate and rank the science needs, the Steering Committee needed to adopt a set of criteria that the Science Working Group could apply to these science needs.

The comprehensive science needs assessment consisted of 4 steps:

1. Extract science needs from reports, workshops, and direct communication from partners;
2. Develop criteria for scoring the science needs;
3. Apply the criteria prioritize science needs; and
4. Identify priority needs through an online survey and discussion among Science Working Group members.

Step 1: Identify science needs

The Science Working Group collated 553 science needs from partnership documents , state wildlife action plans, Threatened and Endangered Species (T &E) recovery plans, Desert LCC outreach meetings, climate change workshops, and input from individual scientists, managers, and tribal members.

Appendix C provides a list of documents from which science needs were extracted, the names, dates, and locations of all workshops, and the names and agencies of all individuals that submitted science needs. Needs derived from published reports and documents, as well as workshops and individual contributions, are located in an online database at http://dlcc.mojavedata.gov. This database lists the report, author, date, specific need, grouping (e.g., terrestrial, water, etc.), geographic scope, and topic area. To view the full information, please contact the Desert LCC Science Coordinator.

Members of the Science Working Group entered each of the 553 science needs into an online database that was created and maintained by the Mojave Desert Ecosystem Program. The database indicated the source of the science need, the source date, and the source type (publication, workshop, individual). The full science need was then copied and pasted into the database, along with the page number (if it came from a publication) so that it could be revisited if necessary for context. Each science need was assigned to one or more of the following topic areas identified by the Steering Committee in September, 2011: water, ecosystems, wildlife populations, wildlife habitat, soils, stressors, monitoring, cultural, and tools/communication. Each science need was also described from a list of approximately forty sub-topics or keywords, such as connectivity, disease, human water, restoration, and vulnerability.

The full list of 553 science needs will continue to reside in the database and can be used at any time to aid in the decision making process when allocating resources towards meeting science needs within the Desert LCC. For example, if an agency or organization has funds for developing decision support tools, the database can be queried to get information on the types of decision support tools that would be most useful to partners. The database can be used to extract all science needs related to only one of the three principal deserts (Mojave, Sonora, or Chihuahua), or to a species of interest (e.g., desert tortoise or Sonoran pronghorn). Because there is a column for date, the database can be continually updated, and only science needs that fall within a certain date range might be selected for future priority setting.

Step 2: Establish criteria for scoring science needs

The Steering Committee developed a list of possible criteria through a brainstorming session at their meeting in Albuquerque, NM in September, 2011. The Science Coordinator then combined these criteria with a list of criteria used to rank science needs during the 2010 rapid assessment, and consolidated redundancies among similar criteria.

This resulted in a preliminary list of 16 criteria. Members of the Science Working Group then evaluated the usefulness of each criterion in an online survey in early December, 2011. Each participant (N = 11) rated each criterion as to whether it was (1) “highly important”; (2) “somewhat important”; (3) “neutral”; or (4) “not useful or could result in undesirable ranking” of the science needs. Participants were also invited to submit new criteria for evaluation after the survey.

Results of the survey indicated a strong preference for five of the criteria, moderate to no preference for seven, and aversion to four criteria. Two of the criteria received full support from all participants of the online survey. Participants also submitted five new criteria for consideration (Appendix D).

A sub-committee consisting of the Science Coordinator and four members of the Science Working Group evaluated the survey results and selected eight criteria for ranking science needs. These were then discussed and approved by the full Science Working Group in December 2011. Five of the criteria are those that had the highest support based on results from the on-line survey. Two were moderately-rated criteria as recommended by the sub-committee, and one is a new criterion called Preserves Knowledge. These criteria and associated bullets are listed below. The bullets are either elaborations of the main theme or considerations to make when ranking a science need. A science need does not have to meet all of the bullet statements under a criterion in order to rank high.

During the January 12, 2012 conference call, the Steering Committee discussed and approved these criteria.

In February 2012, the Science Working Group tested the criteria on a subset of science needs to see if the criteria produced expected results. One of the criteria, "preserves knowledge", resulted in the broadest range of scores and the most confusion over its meaning. Some participants felt than any form of data collection could be viewed as "preserving knowledge", whereas most participants felt that it only applied to the preservation of traditional knowledge, historic information, and data that could be lost if not archived. Also, participants found it difficult to assign a numeric value that assessed the degree to which the science need would preserve knowledge. Participants clarified that "preserves knowledge," should be "preserves historic or cultural knowledge," and agreed that it was better integrated under criteria number 3 ("ecological and/or cultural significance) and criteria number 7 ("role as a building block"). In addition, however, this criteria was retained as a "yes/no" sorting mechanism that could be utilized later to identify which science needs have the added value of preserving historic or cultural knowledge.

Criteria for Ranking Desert LCC Science Needs

(bullets serve as examples, not sub-criteria)

1. Mission/goals
   - Relates to broad scale stressors such as climate change or land use change
   - Provides information relevant to adaptive management of resources and adaptation to climate change
   - Provides information relevant to climate mitigation through carbon sequestration or energy use reduction
   - Provides information on natural and cultural resources of the Desert LCC

2. Scope
   - Broad geographic extent of the original science need
   - Broadly recognized as a need by numerous partners
   - Broad applicability of results to numerous partners or within several disciplines
   - Provides opportunity to integrate with other science needs, to address more complex issues

3. Ecological and/or cultural significance
   - Improves understanding of species, landscapes, stressors
   - Improves understanding of indigenous worldviews and other stakeholders' perceptions
   - Preserves historic or cultural knowledge, e.g.:
     - Oral history

  - Traditional ecological knowledge
  - Tribal and indigenous perceptions of landscapes and processes
  - Cultural perceptions of landscapes and resources, including traditional ranching
  - Cultural sites
  - Historic photos
  - Data stored on outdated media

4. Urgency
   - There is a limited window of opportunity to address this science need
   - Addresses a species , an ecological community, or a human community that is on the brink of undesired change
   - Addresses a critical situation that needs immediate attention

5. Applicability
   - Provides useful tools for on-the-ground management
   - Provides useful tools and strategies for climate change adaptation
   - May have specific applicability to tribes or is useful to tribes

6. Scalability
   - Scalable up – one of many, similar small-scale science needs that can be addressed together and rolled up. This includes inventory and monitoring needs.
   - Scalable down – a broad scale science need that can be downscaled to address local conditions

7. Role as a building block
   - Provides a critical step for addressing other science needs
   - Contributes to landscape baseline data
   - Could potentially contribute to long-term monitoring
   - Preserves historic or cultural knowledge, e.g.:
     - Oral history
     - Traditional ecological knowledge
     - Tribal and indigenous perceptions of landscapes and processes
     - Cultural perceptions of landscapes and resources, including traditional ranching
     - Cultural sites
     - Historic photos
     - Data stored on outdated media

8. Preserves historic or cultural knowledge
   - Scored as Yes if the science need would be filled by preserving existing knowledge or information, as opposed to contributing new information. Used to tag science needs that relate to traditional knowledge, historical significance, or archiving needs.

Step 3: Apply the criteria to identify top science needs

The Science Working Group met in Tucson on February 13-14, 2012 to identify priority science needs from the full list of science needs. The group agreed to use a scale of 0 – 4 to apply each criterion, except for criterion 8 which was simply applied as yes/no. The group tested the criteria on a subset of science needs to help calibrate the range of responses among individuals. Following this exercise, the Science Working Group separated into four breakout groups with approximately 135 science needs assigned to each group.

The meeting participants agreed that it would be impossible to score all science needs within their breakout group within the available time. For efficiency, the participants agreed to reduce the list by focusing on the science needs that generally seemed to fit the criteria, without going through the scoring process for each specific science need; rather, broad level science needs that captured multiple, specific , science needs were developed and scored. Each breakout group developed scores for each science need identified (Table 1). It is important to recognize that the scores shown in Table 1 may be indicative of priorities within each category but can't be used to compare across categories.

Table 1 shows the priority 46 science needs identified by all four breakout groups combined. The list originally contained 56 science needs, but 10 science needs were sufficiently similar to other science needs across breakout groups that they were combined, and the final wording was changed to ensure that the specific intent of each science need was incorporated into the wording of the combined version.

Table 1. The top 46 science needs and their criteria scoring. Scores can be compared within the table sub-topics because each sub-topic was scored by the same set of people in a breakout group setting. Scores cannot be compared between sub-topics because they were scored by different breakout groups.

TERRESTRIAL RESOURCES								
Science Need	**Mission & Goals**	**Scope**	**Signi-ficance**	**Urgency**	**Applic-ability**	**Scal-ability**	**Building Block**	**Total (max = 28)**
Climate effects on ecosystems and species								
Model predicted changes in ecosystem composition and distribution from climate change (includes range shift modeling)	3.5	3.75	4.0	3.0	3.5	3.75	3.5	25
Investigate the effects of climate change on ecosystems, plant communities, vertebrates and invertebrates (especially invertebrate pollinators) and evaluate which ecosystems and taxa are most vulnerable to climate change	4.0	3.6	3.8	3.2	3.2	2.8	3.4	24.2
Investigate the effects of climate variation on interconnected landscapes and ecosystem processes	4.0	3.8	3.6	3.0	3.2	3.2	3.4	24.2
Investigate and model the effects of climate change on fire regimes	4.0	3.6	3.8	3.6	3.8	3.4	3.4	25.6
Investigate the effects of climate change on invasive species	4.0	4.0	3.8	3.4	3.6	3.0	3.2	25
Investigate the interactive effects of forest management activities and climate change on forest ecosystems and hydrology	3.8	3.8	3.6	2.8	3.0	3.0	3.4	23.2
Investigate and model potential physiological responses of species to climate change								23.0
Identify potential adaptation strategies for species in response to predicted climate change effects	4.0	4.0	4.0	2.8	3.6	3.2	2.8	24.4

Science Need (Terrestrial, continued)	**Mission & Goals**	**Scope**	**Signi-ficance**	**Urgency**	**Applic-ability**	**Scal-ability**	**Building Block**	**Total (max = 28)**
Estimate the relative contribution of biotic crusts, different vegetation types, and soils toward total carbon sequestration in arid environments. Compare the contribution of these components to the potential contribution of underground carbon storage.	4	4	4	2	1	4	4	23
Provide information on which environments and processes are sensitive to climate change mean values, and which are more sensitive to extremes or variability	4	4	4	2	1	4	4	23
Develop conceptual approaches to tailor the climate change message for different cultural and socio-economic groups so that people are motivated to respond effectively.	4	4	0	4	4	4	0	20
Baseline inventories								
Create baseline maps of vegetation	3.75	3.75	3.25	3.0	3.5	3.5	3.75	24.5
Provide updated distribution maps for species of conservation concern	3.25	3.0	3.0	3.5	3.0	2.25	2.75	20.75
Provide more accurate spatially explicit models of stressor distributions	3.5	3.25	3.25	3.25	3.25	3.25	3.75	23.5
Build a central database that identifies the distribution of aquatic invasive species in relation to sensitive habitats and species of conservation concern								xx
Provide a seamless soil type/texture mapping across Desert LCC at fine spatial scale (1 km). This is a key building block to understanding water holding capacity, soil erosion, and potential shifts in plant communities.	4	4	2	2	1	4	4	21

Corridors and connectivity								
Identify key habitat corridors to preserve migration pathways and genetic diversity	3.5	3.75	3.75	3	2.75	2.75	2.75	22.25
Identify refugia and corridors that could enable species to adapt to climate change	3.8	3.8	3.6	3.0	3.6	2.6	2.6	23.0
Identify key areas on the U.S. - Mexico border where wildlife crossings are particularly important or significant.	3.0	3.25	3.0	3.5	3.75	2.75	3.0	22.25
Identify seasonal connectivity between specific breeding and nonbreeding locations of migratory birds.	3.0	3.75	3.0	2.5	3.0	2.25	2.25	19.75
Other terrestrial science needs								
Conduct landscape-scale analyses of both vegetation communities and landscape features to provide a coarse filter for identifying conservation areas.	3.5	3.75	3.5	3.0	3.75	2.5	3.75	23.75
Establish scientifically sound best management practices for riparian restoration including timing of restoration activities, water needs, control of invasive plants, and use of local seed to encourage a full complement of the desired ecological condition or community.	2.75	3.0	3.0	3.0	3.5	2.25	2.0	19.5
Conduct a comprehensive analysis of the environmental effects of energy development in the Desert LCC: wind, solar, oil & gas, hydro, and geothermal.	4	4	4	4	3	4	4	27
Conduct a sensitivity analysis of how and which decisions regarding land, water, or energy uses could result in major long-term changes	4	4	4	3	2	4	3	24
Identify the effects of stressors (primarily climate change, invasive species, and land uses) on soil formation, erosion, and fertility.	4	4	4	3	1	4	4	24

WATER AND AQUATIC RESOURCES								
Science need	**Mission & Goals**	**Scope**	**Signi-ficance**	**Urgency**	**Applic-ability**	**Scal-ability**	**Building Block**	**Total (max = 28)**
Investigate climate change impacts on future water supply for humans and ecosystems	4	4	4	4	4	4	4	28
Investigate climate change impacts to surface water and groundwater dependent habitats and species	4	4	4	4	4	4	4	28
Predict potential impacts to water supply and quality due to changes in the timing and magnitude of climatic events	4	4	4	4	4	4	4	28
Investigate the interactive impacts of climate change and land management (brush control, forest thinning, burning) on watershed hydrology	4	4	4	4	4	4	4	28
Investigate the effects of water management and policy (including managed flows and releases, and reclaimed water) on aquatic resources	4	4	4	4	4	4	4	28
Investigate the effects of different flow regimes on the abundance and potential expansion of aquatic invasive species (fish, Quagga mussels, salvinia) and riparian invasive plants (tamarisk).								26
Initiate or complete research that will help us better manage the threats of Bd (disease) and non-native predators on amphibians.								26
Improve modeling methodologies for predicting water availability through better understanding of snowpack dynamics and better estimation of agricultural water use.	3	4	4	3	2	4	4	24
Develop communication and education tools related to water use and management	4	4	4	3	2	3	3	23
Improve current water monitoring programs to provide more strategic data collection	2	3	2	3	2	1	4	17

Investigate the effects of water use by renewable energy development on ecosystems.	2	2	3	3	2	3	1	16
CULTURAL RESOURCES								
Science Need	**Mission & Goals**	**Scope**	**Signi-ficance**	**Urgency**	**Applic-ability**	**Scal-ability**	**Building Block**	**Total (max = 28)**
Evaluate the potential social and economic vulnerability of different human communities to climate change (e.g., Native American, urban, agricultural)	4	4	2	2	1	4	4	21
Evaluate the efficacy of different types of incentive and disincentive programs to promote conservation among landowners.	4	4	0	3	3	4	1	19
Identify potential impacts of climate and other stressors on the persistence of plants and animals that are important to tribal and indigenous communities, and on traditional cultivation of corn and other crops	4	3	3	2	1	2	3	18
Research and compile past and current indigenous and tribal management practices for maintaining productive populations of desert plants								24
Conduct a climate vulnerability assessment for archeological resources to identify which are most vulnerable, the causes of vulnerability, and possible ways to mitigate the anticipated effects.								24
MONITORING								
Science Need	**Mission & Goals**	**Scope**	**Signi-ficance**	**Urgency**	**Applic-ability**	**Scal-ability**	**Building Block**	**Total (max = 28)**
Select a small suite of indicator/ keystone species within each of the 3 major deserts that would be monitored in a	4	4	4	2	1	2	4	21

consistent way across each specific desert								
Monitor selected sensitive ecosystems and their species: dune systems, sky islands, springs	4	2	4	3	1	2	4	20
Partner with the National Phenology Network to contribute to phenology monitoring.	4	3	3	2	1	3	4	20
Monitor habitat changes in relation to changes in species' populations in order to build better habitat suitability models and to better understand the effects of stressors	4	2	4	2	2	2	4	20
Identify and initiate monitoring for the priority species of conservation concern and invasive species that might extend or shift range from Mexico into the U.S. (This will require collaboration with Mexico to identify most likely species).	4	2	4	3	1	2	3	19

Step 4: Identify priority science needs

After the Tucson meeting, an online survey was created containing the 46 top science needs identified at the Tucson meeting. Members of the Science Working Group were asked to select a subset of the top science needs that they felt should be carried forward to the Steering Committee as science priorities. In order to ensure that terrestrial, aquatic, and monitoring science needs were given equal weight, the members were asked to select top science needs within each category rather than across categories. Rather than include cultural resource science needs in the online survey, all five of the top cultural resource science needs were carried forward as priorities.

After the survey was completed, the Science Working Group convened by phone to discuss survey results. The group evaluated the scores and saw that within each category, there were obvious break-points in the number of points that each science need received. These break-points served to divide the list of science priorities into two tiers.

Future applications of the comprehensive science needs assessment

The immediate purpose of the comprehensive science needs assessment is to identify priority science needs within the Desert LCC. The voices of numerous managers, scientists, and conservationists have been heard through the process of extracting science needs from existing documents, workshops, outreach meetings, and individuals. From this extensive list, the Science Working Group has identified priority science needs by applying criteria that reflect the goals of the LCC, importance of the science needs to managers, and the relative urgency, applicability, and scalability of each science need.

The next steps for the science priorities are as follows:

1. **Identify existing information that has addressed or is addressing identified science priorities.**
   Science Working Group members are aware of existing research and products that address aspects of the science priorities. The Science Working Group can ensure that Desert LCC partners are aware of this information through a Desert LCC portal that would link each science priority to the suite of existing products that address it.

2. **Identify science projects that are currently underway that could fill the science needs.**
   The Desert LCC Steering Committee can invite partners to submit science projects that are currently underway that specifically address science priorities. This would provide opportunities to increase the success of ongoing projects through additional funding support or form of collaboration.

3. **Identify opportunities to initiate new science efforts across agencies and organizations.**
   The Desert LCC steering committee can serve as a forum for initiating new collaborations across partners that build on the strengths of different agencies and organizations.

4. **Provide funding opportunities that are targeted as specific science priorities.**
   Any agency or organization in the Desert LCC can choose to offer available funds in support of priority science needs through a funding opportunity announcement, a request for proposals, or an interagency or cooperative agreement. At the present time, the Bureau of Reclamation is the

primary agency providing funding opportunities; however, other agencies and organizations need to invest in addressing science priorities that do not receive Reclamation funding.

5. **Address the science priorities through the Southwest Climate Science Center and through long-term monitoring programs.**
   The list of top science needs (Table 1) are divided into sub-topics that include climate, baseline inventories, and monitoring in order to communicate these science needs directly to the Southwest Climate Science Center , GIS mapping services, and a variety of long-term monitoring programs that are funded to meet particular types of science needs. These entities may be able to address specific science priorities through their funding mechanisms or through collaborations with one or more agencies and organizations in the Desert LCC.

6. **Review the science priorities annually and refresh the list approximately every three years.**
   The process of collating science needs was a major effort that took several months, and the database of science needs can serve to inspire science projects for many years. However, science priorities will shift over time in response to new information and new challenges. Therefore, we recommend that science priorities are reviewed and reestablished approximately every three to five years.

APPENDIX A: Rapid Science Needs Assessment

2010-2011

BACKGROUND

In November 2010, an ad-hoc Science Sub-Committee for the Desert LCC conducted a rapid assessment of science needs in order to get a general understanding of the types of information needs that were shared by LCC partners. This process began shortly after the Desert LCC was established, at a time when the Bureau of Reclamation and the Fish and Wildlife Service were jointly conducting outreach meetings to assess partnership interest in the LCC.

The sub-committee was comprised of volunteers from a number of agencies and organizations within the Desert LCC, and most members were self-selected. The sub-committee began the assessment by identifying reports, documents, and workshop summaries that mentioned science needs for natural resource management within the boundaries of the Desert LCC. Individuals within the sub-committee collated the science needs that were listed in these documents and then grouped the needs into several topic areas for efficiency.

The topic areas were presented to participants of 5 outreach meetings in the fall of 2010, to allow the attendees to add more science needs to each of the topic areas. At the first meeting, participants also identified an additional topic area (soils) that was then carried forward to all subsequent outreach meetings. The combination of 15 reports and 5 outreach meetings resulted in the identification of 120 science needs across 10 topic areas.

The sub-committee developed a set of 8 criteria in order to assess priorities among the science needs. The topic areas were divided among sub-committee members, with 1-3 members per topic area, and members individually used the criteria to rank the priorities of all science needs within a specific topic area. For topic areas evaluated by 2-3 people, the average value for each science need served as the science need's rank within that topic area. In general, sub-committee members only ranked science needs within one topic area, and the sub-committee did not attempt to rank the relative importance of topic areas.

The Science Coordinator evaluated the range of scores across all science needs and identified cut-off points between high, medium, and low ranks. This enabled the science needs within each topic area to be placed within one of the ranking categories. This process was completed in November, 2010, and was documented in outline/bullet form in a file called Desert LCC Science Needs: Rapid Assessment by the Science Sub-Committee.

AN EVALUATION OF THE SCIENCE NEEDS ASSESSMENT PROCESS

The rapid assessment was useful because it resulted in the collation of numerous significant science needs, and it enabled partners to test a process for ranking science priorities. The advantages and shortcomings of the assessment are listed here so that we can learn from this experience before starting the process of a comprehensive science needs assessment.

Advantages

- Most sub-committee members were highly familiar with the science-management interface (e.g., scientists who worked on management issues and managers with strong science backgrounds).
- Most of the science needs were from published documents that reflected careful thought by multiple authors.
- The use of topic areas helped avoid competition between different sciences areas (e.g., water, plant and wildlife habitat, or infrastructure).
- Most of the science needs were broad in scope and therefore could apply to large geographic areas or to the entire LCC.

Shortcomings

- The sub-committee did not represent the full range of science areas or the full range of partnership perspectives. For example, none of the sub-committee members were cultural resource specialists, and there were no members from universities, state agencies or tribes. Only one member was from Mexico.
- Important science needs in existing documents may have been missed because 1) they were not clearly worded; 2) they were clearly worded but buried in surrounding text; or 3) they were not recognized as science needs by the sub-committee member due to perspective or experience.
- Some potentially important nuances were lost when specific science needs were combined into generalized statements for the sake of efficiency.
- The criteria used to rank science priorities were subject to interpretation, and the sub-committee members did not have time to calibrate their individual interpretations.
- Some topic areas were ranked by only one individual, and very rarely did an individual work on more than one topic area. Therefore, variation in response between topic areas was high.
- Science needs that ranked low were often necessary steps to achieving the science needs that ranked high.

Lessons Learned

- The new Science Working Group (Science Working Group) represents a broad range of science areas, including cultural resources. Members will be drawn from federal (U.S. and Mexico) and state agencies, tribes, NGOs, and universities, but will represent specific science areas rather than source of employment.
- Group members will ensure that the science needs from the 15 original documents were accurately reported and that no science needs within the scope of the Desert LCC were missed.
- The list of documents will be broadened.
- Existing criteria will be evaluated for effectiveness, and new criteria will be added if needed.
- The group will explore approaches for displaying dependencies between different science needs (e.g., “G” needs to be done before accomplishing “B”).
- The use of each criterion will be calibrated across Working Group members before ranking begins.
- Each topic area will be evaluated by at least 3 members.

PROPOSED PROCESS FOR A COMPREHENSIVE ASSESSMENT OF SCIENCE NEEDS

The Science Working Group will be charged with conducting a comprehensive assessment of science needs for the Desert LCC, including a process that ranks the science needs according to potential funding priorities. This assessment will be completed by June 2012, or a date that will make it available prior to the spring meeting of the Steering Committee.

The comprehensive assessment will build from the strengths of the rapid assessment and strive to overcome the identified shortcomings. The process will consist of three major steps: collating science needs, creating evaluation criteria, and ranking science priorities. The multi-stakeholder Desert LCC Steering Committee will provide input at each of these steps in the process to ensure that these management perspectives are incorporated into the identification of needs and criteria, and, ultimately, that there is consensus within the Steering Committee on the priority needs for the Desert LCC.

Collating Science Needs

Members of the Science Working Group will identify documents that are relevant to the scope of the Desert LCC science needs assessment but were not included in the rapid assessment, such as state wildlife action plans, tribal reports, and outcomes from workshops. To be relevant to the task, the science needs within these documents should be related to the effects of climate change, land use change, or broad scale landscape issues on any natural or cultural resource within the Mojave, Sonoran, or Chihuahuan Desert. Science needs that pertain to small, local areas can be included if the results can be applied to other localities. Science Working Group members will volunteer to look through one or more of the documents to identify science needs stated in the document. In addition, Science Working Group members will revisit the original 15 documents used in the rapid assessment to ensure that science needs were accurately recorded and that relevant science needs were not overlooked.

The Science Working Group will draw science needs from three additional sources of stakeholder input: two outreach meetings that occurred in December 2010 after the rapid assessment was completed, and input from the Steering Committee during their upcoming meeting in September, 2011. After the collation process, the Science Working Group will determine whether to use the topic areas of the rapid assessment or develop a different structure for organizing the science needs. The Steering Committee will review the final list of source documents and will also provide input to the structure used for organizing the science needs.

Developing Evaluation Criteria

The Science Working Group will assess the criteria used in the rapid assessment and modify, drop, or add criteria as needed. The group will also explore ways to highlight dependencies and relationships between science needs. The group will test the subjectivity of each criterion by applying each to a subset of the science needs and looking for the variation in rank scores generated by each criterion. If the Science Working Group concludes that the spread in scores for any of the criteria is unacceptable, those criteria will either be dropped or reworded. The Steering Committee will review and approve the final list of criteria.

Ranking Science Priorities

Ideally, the process of ranking science needs will take place during a face-to-face meeting so that Science Working Group members have a greater opportunity to calibrate their personal styles of ranking. The meeting would begin with one or more ranking exercises to enable members to self-calibrate their rank outcomes. After the group is comfortable with the ranking process, a minimum of 3 Science Working Group members will rank all science needs within a topic area, and each member will apply ranks within a minimum of 2 topic areas. The topic areas, or whatever form of organization that the Science Working Group uses to group science criteria, will not be ranked. For example, the topic of water-related science needs will not be ranked relative to wildlife or to cultural resources. The ranking will only occur inside of each topic area.

After each science needs has a numerical rank, the Science Working Group will assess the ranking process to look for inconsistencies or irrational rank orders that ignore a necessary flow of events. The Science Working Group will then look for clustering of rank scores that suggest breaks for high, moderate, and low categories. These categories will be presented to the Steering Committee for evaluation and approval, and the Steering Committee will use the final, approved product for funding priorities.

Periodic review to identify new or emerging needs

The product from the comprehensive science needs assessment will guide the funding priorities of the Steering Committee for a minimum of two years. However, because natural and cultural resource managers frequently face new challenges that require new forms of information, the science needs assessment will need to be periodically updated. The need for an update will either be recommended by the Science Working Group or requested by the Steering Committee. At that time, the Science Working Group will recommend whether to continue with the process outlined here, or to create or modify the process as needed.

Timeline for accomplishing the comprehensive science needs assessment. Completion date assumes Steering Committee approval of that process step.

PROCESS STEP	ANTICIPATED COMPLETION DATE
Collate Science Needs	January 2012
Develop Evaluation Criteria	February 2012
Develop Ranked Priorities	April 2012
Steering Committee Approval	Spring Meeting 2012

APPENDIX B. Desert LCC Science Working Group Members

NAME	TITLE	AGENCY/ORG	LOCATION	SCIENCE EXPERTISE
Christina Vojta	Desert LCC Science Coordinator	US Fish and Wildlife Service	Flagstaff, AZ	
Sergio Avila	Conservation Program Manager	Sky Island Alliance	Tucson, AZ	Mammalogist
Carol Beardmore	Science Coordinator	US Fish and Wildlife Service, Sonoran Joint Venture	Phoenix, AZ	Avian ecologist
Leanna Begay	Climate Change Coordinator	Navajo Nation	Window Rock, NM	Climate change
John Bradford	Landscape Ecologist	US Geological Survey, Southern Rockies LCC	Flagstaff, AZ	Landscape Ecologist
Margarita Caso	Director of Ecosystem Conservation	Mexico National Institute of Ecology	Mexico City, MX	Conservation Planner, Mexico
Deborah Finch	Program Manager, Desert and Shrubland Ecosystems	US Forest Service, Rocky Mountain Research Center	Albuquerque, NM	Aridlands Ecologist
Gary Garrett	Fisheries Biologist	Texas Parks and Wildlife	Mountain Home, TX	Aquatic ecologist, desert fish
Juan Carlos Guzmán	Coordinator	Chihuahuan Desert Grassland Alliance	Chihuahua, MX	Socio-economics, land use planning
Matt Leivas	Agricultural Director	Chemehuevi Tribe	Havasu Lake, CA	Traditional Ecological Knowledge
Teresa Lewis	Leader, Dexter Fish Health Center	US Fish and Wildlife Service	Dexter, NM	Aquatic Animal Health
W. Paul Miller	Hydrologic Engineer	Bureau of Reclamation	Boulder City, NV	Hydrologist, large rivers
Andrew Rhodes	Director of Climate Change Strategies	CONANP	Mexico City, MX	Climate specialist

Wayne Robbie	Regional Soil Scientist & Inventory Coordinator	US Forest Service, Southwest Region	Albuquerque, NM	Soil Scientist
Aimee Roberson	Fish and Wildlife Biologist	US Fish and Wildlife Service	Alpine, TX	Structured Decision Making
Esther Rubin	Terrestrial Research Program Manager	Arizona Game and Fish Department	Phoenix, AZ	Population ecologist
Kurt Russo	Executive Director	Native American Land Conservancy	Palm Springs, CA	Cultural Resource Specialist
Cecil Schwalbe	Research Biologist	US Geological Survey	Tucson, AZ	Herpetologist
Abe Springer	Professor, Hydrology	Northern Arizona University	Flagstaff, AZ	Hydrologist, ground-surface relationships
James Weigand	Ecologist	Bureau of Land Management	Sacramento, CA	Socio-economics, recreation

APPENDIX C. Science Needs Sources

The Science Working Group extracted science needs related to climate change and other stressors from published reports and documents, located in an online database at http://dlcc.mojavedata.gov. This database lists the specific need, grouping (e.g., terrestrial, water, etc.), geographic scope, and topic area. For more information or to view this information, please contact the Desert LCC Science Coordinator.

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<u>Partners were asked to provide their science needs at the following Desert LCC outreach meetings and workshops:</u>

Desert LCC outreach meeting, Henderson, NV 8/17/10
Desert LCC outreach meeting, San Bernardino, CA 8/19/10
Desert LCC outreach meeting, Tucson, AZ 9/21/10
Desert LCC outreach meeting, Alpine, TX 9/23/2010
Desert LCC outreach meeting, Las Vegas, NV 10/23/10

<u>Science needs were provided by the following individuals:</u>

Carol Beardmore – Sonoran Joint Venture, Fish and Wildlife Service
Greg Beatty – Fish and Wildlife Service, lead for Southwestern willow flycatcher
Deborah Finch – Rocky Mountain Research Station, U.S. Forest Service
Kirsten Gallo - Chihuahuan Desert Network, National Park Service
Grant Harris – Fish and Wildlife Service, National Wildlife Refuges
Debra Hughson - Mojave Desert Network, National Park Service
Lacrecia Johnson – Fish and Wildlife Service, National Wildlife Refuges
Ken Nussear – U.S. Geological Survey
Aimee Roberson – Fish and Wildlife Service
Duane Pool - Rocky Mountain Bird Observatory
Unknown - Navajo Nation
Christina Vojta – Fish and Wildlife Service

APPENDIX D. Preliminary Criteria for Evaluating Science Needs

Approved by the Desert LCC Steering Committee
Conference call - January 12, 2012

Objective

The Desert LCC Steering Committee asked the Science Working Group to conduct a comprehensive assessment of Desert LCC science needs by April, 2012. The assessment will help set priorities for future funding of science needs beyond 2012. As of February, 2012, the Science Working Group had collated over 550 science needs that were drawn from state wildlife action plans, partnership strategy documents, T &E recovery plans, Desert LCC outreach meetings, climate change workshops, and input from individual scientists, managers, and tribal members. In order to evaluate and rank the science needs, the Steering Committee needed to adopt a set of criteria that the Science Working Group could apply to these science needs.

Process

The final criteria that the Science Working Group proposed to the Steering Committee were established through the following process. First, the Steering Committee developed a list of possible criteria through a brainstorming session at their meeting in Albuquerque in September, 2011. The Science Coordinator then combined these criteria with a list of criteria used to rank science needs during the 2010 rapid assessment, and consolidated redundancies among similar criteria. The result was a list of 16 criteria (Table 2).

Members of the Science Working Group evaluated the usefulness of each criterion in an on-line survey in early December, 2011. Each participant (N = 11) rated each criterion as to whether it was (1) highly important; (2) somewhat important; (3) neutral; or (4) not useful or could result in undesirable ranking of the science needs. Participants were also invited to submit new criteria for evaluation after the survey.

Results of the survey indicated a strong preference for five of the criteria, moderate to no preference for seven, and aversion to 4 criteria. Two of the criteria received full support from all participants of the online survey. Participants submitted 5 new criteria for consideration (Table 2, page 28).

A sub-committee consisting of the Science Coordinator and four members of the Science Working Group evaluated the survey results during a conference call in late December, 2012. Members of the sub-committee made several observations about the criteria during this evaluation:

1. By rephrasing the top five criteria as one- or two-word phrases, some of the secondary criteria could be subsumed under the top five criteria as bullets.
2. Some of the apparently undesirable criteria would be better for ranking project proposals rather than science criteria.
3. The desire for inclusivity of tribal values could be included in one of the top five, as well as under a new criterion called "Preserves Knowledge", as explained under Results.

The sub-committee discussed two criteria that relate to tribal values:

1. Does the science need have added value to tribes and traditional land uses?
2. Is the science need constructed in a manner that includes Native American concepts of geographical space and landscapes?

Results from the on-line survey indicated that the first criterion could result in undesirable ranking because it could result in some important science needs being ranked low simply because they are not related to tribes and traditional land uses. The second criterion was new and therefore required an evaluation by the sub-committee. The sub-committee affirmed a need for inclusivity of Native American values when ranking the science needs, and acknowledged that tribes are in immediate need of climate change science because tribes are disproportionately affected by climate change. Also, traditional ecological knowledge has a role when addressing climate change and other broad-scale stressors. However, neither of the proposed criteria seemed to completely address these aspects. Therefore, the sub-committee recommended that tribal values be included in three of the top five criteria as follows. The criterion named Ecological Significance was broadened to Ecological and/or Cultural Significance. Under the criterion named Urgency, a bullet was added to address human communities, as well as species and ecosystems that are on the brink of collapse. Under the criterion named “Applicability”, a bullet was added to address applicability to tribal lands. A new criterion was proposed, called “Preserves Knowledge”. It evaluates whether a science need contributes to the conservation of knowledge, including oral histories, traditional ecological knowledge, indigenous perceptions of landscapes, cultural sites, historic photos, and data stored on outdated media.

The Science Working Group reviewed the recommendations of the sub-committee and provided input that has been incorporated into this document. One suggestion by a Science Working Group member that was not incorporated is that the criterion, “Feasibility” be retained rather than dropped. The Steering Committee will want to consider whether this criterion, along with other criteria that were dropped, should be incorporated into the final list.

<u>Results</u>

As described earlier in this document, the Science Working Group then selected eight criteria for ranking science needs.

Table 2. Evaluation of the preliminary 16 criteria, based on an on-line survey conducted by the Science Working Group (11 participants) and an evaluation performed by a sub-committee of the Science Working Group. Criteria are presented from highest to lowest survey results.

CRITERIA	% SURVEY RESPONSES, HIGHLY + SOMEWHAT IMPORTANT	% SURVEY RESPONSES, UNDESIRABLE	COMMENTS
Relationship to goals and objectives of the LCC (e.g., is it related to climate change or other broad-scale stressors?)	100	0	Retained as “Mission/goals”
Can results be broadly applied, even if science need was narrowly focused?	100	0	Retained as “Scope”
Ecological significance – How well will this information improve our understanding of species, habitat, landscapes, and stressors?	91	0	Retained but broadened: “Ecological and/or cultural significance”
Immediacy of the need – is this information urgently needed?	90	0	Retained as “Urgency”
Applicability for on-the-ground management – will it provide useful techniques or tools?	82	0	Retained as “Applicability”
Geographic Scope of the Science need	82	0	Is a bullet under “Scope”
Does it have value in the future, if not immediately?	82	0	Dropped. Future value would be difficult to determine. May fit better as a criterion for evaluating project proposals.
Does it provide a critical step to get to other science needs?	72	0	Retained as “Building block”
Contributes to landscape baseline data	64	0	Is a bullet under “Building block”
Scalability – can the information be scaled up?	63	0	Retained as “Scalability”

CRITERIA	% SURVEY RESPONSES, HIGHLY + SOMEWHAT IMPORTANT	% SURVEY RESPONSES, UNDESIRABLE	COMMENTS
Broad practicality for conservation community – will this information contribute to diverse interests and responsibilities of LCC partners?	55	0	Is a bullet under "Scope"
Feasibility – how difficult will it be to address the science need, and are other steps needed first in order to make it more feasible?	54	0	Difficult to assess science needs with this criterion. May be better as a criterion for evaluating project proposals.
The next four criteria all had some level of negative responses by the Science Working Group			
Will this science need generate data that can be rolled into long-term monitoring or into other designs?	72	9	Ability to serve as long-term monitoring should not be a criterion for all science needs. However, it has value so it is now a bullet under both "Scalability" and "Building block"
Is the science need prevalent through numerous documents and workshops? (numerical tally of number of docs with this science need)	54	18	Science needs that are frequently mentioned in older documents may have already been filled. Emerging issues that are infrequently stated may be more important. Is now a bullet under "Scope".
Is it cost-effective to address this science need?	45	9	Cost will depend on how thoroughly the science need is addressed (coarse or fine scale). May be better as a criterion for evaluating project proposals.
Does the science need have added value to tribes and traditional land uses?	36	27	Science WG may not know this for each science need. However, value to tribes is important so it is captured as bullets under 4 other criteria.

CRITERIA	% SURVEY RESPONSES, HIGHLY + SOMEWHAT IMPORTANT	% SURVEY RESPONSES, UNDESIRABLE	COMMENTS
The next four criteria were new ones proposed by Science Working Group members during the survey			
Inclusivity-Is the science need constructed in a manner that includes Native American concepts of geographical space and landscapes?	New - not evaluated during survey		Included as a bullet under "Ecological and/or cultural significance" and under "Preserves Knowledge"
Will the science need provide information relevant to adaptive management of resources and related to climate change and other broad-scale stressors?	New - not evaluated during survey		Is now a bullet under "Mission/goals".
Relevance for recovery efforts of T&E species	New - not evaluated during survey		No criterion should pertain to a specific topic area. This is now a bullet under "Urgency"
Relevance to securing future supplies of essential human needs (especially water)	New - not evaluated during survey		No criterion should pertain to a specific topic area. Is now implied under "Urgency"
Relevance to reducing energy consumption, reducing carbon emissions, and carbon storage on the part of human communities	New - not evaluated during survey		Not necessary to evaluate all science needs by this criterion, but it has value. It is now a bullet under "Mission/goals"
Contributes to the preservation of ecological or cultural knowledge	Added by the sub-committee as a way to address indigenous and other cultural values, as well as data preservation		Proposed as a new criterion.

Wildlife Conservation and Solar Energy Development in the Desert Southwest, United States

JEFFREY E. LOVICH AND JOSHUA R. ENNEN

Large areas of public land are currently being permitted or evaluated for utility-scale solar energy development (USSED) in the southwestern United States, including areas with high biodiversity and protected species. However, peer-reviewed studies of the effects of USSED on wildlife are lacking. The potential effects of the construction and the eventual decommissioning of solar energy facilities include the direct mortality of wildlife; environmental impacts of fugitive dust and dust suppressants; destruction and modification of habitat, including the impacts of roads; and off-site impacts related to construction material acquisition, processing, and transportation. The potential effects of the operation and maintenance of the facilities include habitat fragmentation and barriers to gene flow, increased noise, electromagnetic field generation, microclimate alteration, pollution, water consumption, and fire. Facility design effects, the efficacy of site-selection criteria, and the cumulative effects of USSED on regional wildlife populations are unknown. Currently available peer-reviewed data are insufficient to allow a rigorous assessment of the impact of USSED on wildlife.

Keywords: solar energy development, Mojave Desert, Sonoran Desert, wildlife, desert tortoises

The United States is poised to develop new renewable energy facilities at an unprecedented rate, including in potentially large areas of public land in the Southwest. This quantum leap is driven by escalating costs and demand for traditional energy sources from fossil fuels and by concerns over global climate change. Attention is focused largely on renewable forms of energy, especially solar energy. The potential for utility-scale solar energy development (USSED) and operation (USSEDO) is particularly high in the southwestern United States, where solar energy potential is high (USDOI and USDOE 2011a) and is already being harnessed in some areas. However, the potential for USSEDO conflicts with natural resources, especially wildlife, is also high, given the exceptional biodiversity (Mittermeier et al. 2002) and sensitivity (Lovich and Bainbridge 1999) of arid Southwest ecosystems, especially the Mojave (Randall et al. 2010) and Sonoran Deserts, which are already stressed by climate and human changes (CBI 2010). In addition, the desert Southwest is identified as a "hotspot" for threatened and endangered species in the United States (Flather et al. 1998). For these reasons, planning efforts should consider ways to minimize USSEDO impacts on wildlife (CBI 2010). Paradoxically, the implementation of large-scale solar energy development as an "environmentally friendly" alternative to conventional energy sources may actually increase environmental degradation on a local and on a regional scale (Bezdek 1993, Abbasi and Abbasi 2000) with concomitant negative effects on wildlife.

A logical first step in evaluating the effects of USSEDO on wildlife is to assess the existing scientific knowledge. As renewable energy development proceeds rapidly worldwide, information is slowly accumulating on the effects of USSEDO on the environment (for reviews, see Harte and Jassby 1978, Pimentel et al. 1994, Abbasi and Abbasi 2000). Gill (2005) noted that although the number of peer-reviewed publications on renewable energy has increased dramatically since 1991, only 7.6% of all publications on the topic covered environmental impacts, only 4.0% included discussions of ecological implications, and less than 1.0% contained information on environmental risks. A great deal of information on USSEDO exists in environmental compliance documents and other unpublished, non-peer-reviewed "gray" literature sources. Published scientific information on the effects on wildlife of any form of renewable energy development, including that of wind energy, is scant (Kuvlesky et al. 2007). The vast majority of the published research on wildlife and renewable energy development has been focused on the effects of wind energy development on birds (Drewitt and Langston 2006) and bats (Kunz et al. 2007) because of their sensitivity to aerial impacts. In contrast, almost no information is available on the effects of solar energy development on wildlife.

From a conservation standpoint, one of the most important species in the desert Southwest is Agassiz's desert

BioScience 61: 982–992. ISSN 0006-3568, electronic ISSN 1525-3244. doi:10.1525/bio.2011.61.12.8

tortoise (*Gopherus agassizii*; figure 1). Distributed north and west of the Colorado River, the species was listed as *threatened* under the US Endangered Species Act in 1990. Because of its protected status, Agassiz's desert tortoise acts as an "umbrella species," extending protection to other plants and animals within its range (Tracy and Brussard, 1994). The newly described Morafka's desert tortoise (*Gopherus morafkai*; Murphy et al. 2011) is another species of significant conservation concern in the desert Southwest, found east of the Colorado River. Both tortoises are important as ecological engineers who construct burrows that provide shelter to many other animal species, which allows them to escape the temperature extremes of the desert (Ernst and Lovich 2009). The importance of these tortoises is thus greatly disproportionate to their intrinsic value as species. By virtue of their protected status, Agassiz's desert tortoises have a significant impact on regulatory issues in the listed portion of their range, yet little is known about the effects of USSEDO on the species, even a quarter century after the recognition of that deficiency (Pearson 1986). Large areas of habitat occupied by Agassiz's desert tortoise in particular have potential for development of USSED (figure 2).

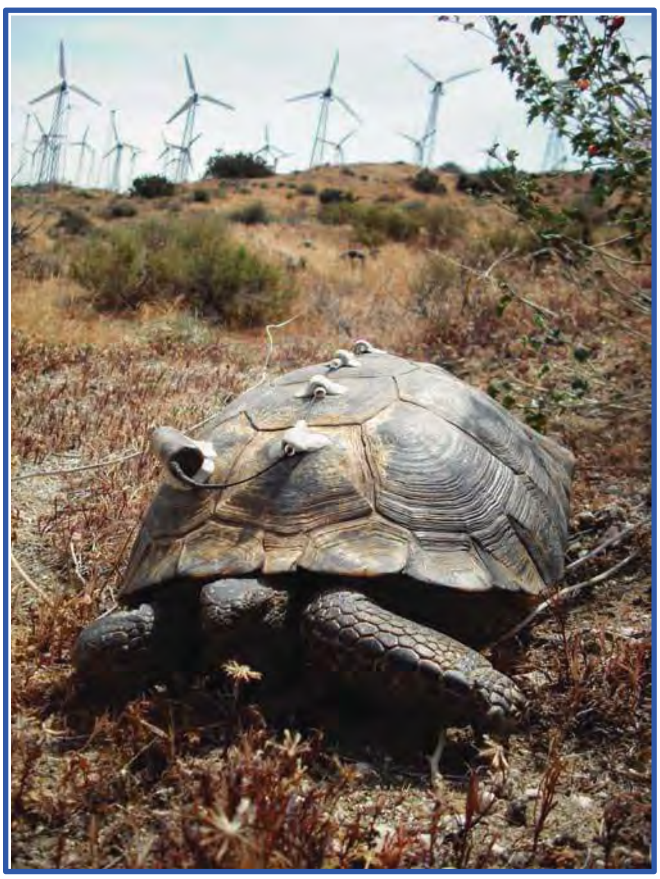

*Figure 1. Agassiz's desert tortoise (*Gopherus agassizii*). Large areas of desert tortoise habitat are developed or being evaluated for renewable energy development, including for wind and solar energy. Photograph: Jeffrey E. Lovich.*

In this article, we review the state of knowledge about the known and potential effects, both direct and indirect, of USSEDO on wildlife (table 1). Our review is based on information published primarily in peer-reviewed scientific journals for both energy and wildlife professionals. Agassiz's desert tortoise is periodically highlighted in our review because of its protected status, wide distribution in areas considered for USSEDO in the desert Southwest, and well-studied status (Ernst and Lovich 2009). In addition, we identify gaps in our understanding of the effects of USSEDO on wildlife and suggest questions that will guide future research toward a goal of mitigating or minimizing the negative effects on wildlife.

Background on proposed energy-development potential in the southwestern United States

The blueprint for evaluating and permitting the development of solar energy on public land in the region, as is required under the US National Environmental Policy Act (USEPA 2010), began in a draft environmental impact statement (EIS) prepared by two federal agencies (USDOI and USDOE 2011a). The purpose of the EIS is to "develop a new Solar Energy Program to further support utility-scale solar energy development on BLM [US Bureau of Land

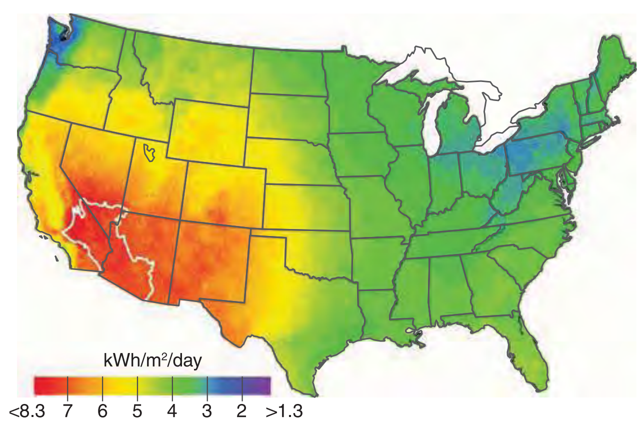

Figure 2. Concentrating solar energy potential (in kilowatt-hours per square meter per day [kWh/m²/day]) of the United States. The map shows the annual average direct normal solar resource data based on a 10-kilometer satellite-modeled data set for the period from 1998 to 2005. Refer to NREL (2011) for additional details and data sources. The white outline defines the approximate composite ranges of Agassiz's (west of the Colorado River) and Morafka's (east of the Colorado River) desert tortoises (Murphy et al. 2011) in the United States, both species of significant conservation concern. This figure was prepared by the National Renewable Energy Laboratory for the US Department of Energy (NREL 2011). The image was authored by an employee of the Alliance for Sustainable Energy, LLC, under Contract no. DE-AC36-08GO28308 with the US Department of Energy. Reprinted with permission from NREL 2011.

Table 1. List of known and potential impacts of utility-scale solar energy development on wildlife in the desert Southwest.

Impacts due to facility construction and decommissioning	Impacts due to facility presence, operation, and maintenance
Destruction and modification of wildlife habitat	Habitat fragmentation and barriers to movement and gene flow
Direct mortality of wildlife	Noise effects
Dust and dust-suppression effects	Electromagnetic field effects
Road effects	Microclimate effects
Off-site impacts	Pollution effects from spills
Destruction and modification of wildlife habitat	Water consumption effects
	Fire effects
	Light pollution effects, including polarized light
	Habitat fragmentation and barriers to movement and gene flow
	Noise effects

Management] -administered lands… and to ensure consistent application of measures to avoid, minimize, or mitigate the adverse impacts of such development" (p. ES-2). As of February 2010, the BLM had 127 active applications for solar facilities on lands that the BLM administers. According to USDOI and USDOE (2011a), all of the BLM-administered land in six states (California, Arizona, Utah, Nevada, New Mexico, and Colorado) was considered initially, for a total of 178 million hectares (ha). Not all of that land is compatible with solar energy development, so three alternative configurations are listed by USDOI and USDOE (2011a) for consideration, ranging from 274,244 to 39,972,558 ha. The larger figure is listed under the *no action alternative* where BLM would continue to use existing policy and guidance to evaluate applications. Of the area being considered under the two action alternatives, approximately 9 million ha meet the criteria established under the BLM's preferred action alternative to support solar development. Twenty-five criteria were used to exclude certain areas of public land from solar development and include environmental, social, and economic factors. The *preferred alternative* also included the identification of proposed *solar energy zones* (SEZs), defined as "area[s] with few impediments to utility-scale production of solar energy" (USDOI and USDOE 2011a, p. ES-7). By themselves, these SEZs constitute the nonpreferred action alternative of 274,244 ha listed above. Maps of SEZs are available at *http://solareis.anl.gov/documents/dpeis/index.cfm*.

Several sensitive, threatened, or endangered species are being considered within the EIS, but Agassiz's desert tortoise is one of only four species noted whose very presence at a site may be sufficient to exclude USSED in special cases (see table ES.2-2 in USDOI and USDOE 2011a). The potential effects of USSEDO are not trivial for tortoises or other wildlife species. Within the area covered in the draft EIS by USDOI and USDOE (2011a), it is estimated that approximately 161,943 ha of Agassiz's desert tortoise habitat will be directly affected. However, when including direct and indirect impacts on habitat (excluding transmission lines and roads that would add additional impacts; see Lovich and Bainbridge 1999, Kristan and Boarman 2007), it is estimated that approximately 769,230 ha will be affected. Some SEZs are adjacent to critical habitat designated for the recovery of Agassiz's desert tortoise, and this proximity is considered part of the indirect impacts.

On 28 October 2011, while this article was in press, the BLM and US Department of Energy released a supplement to the EIS (USDOI and USDOE 2011b, 2011c) after receiving more than 80,500 comments. The *no action alternative* remains the same as in the EIS. The new *preferred alternative* (slightly reduced to 8,225,179 ha as the *modified program alternative*) eliminates or adjusts SEZs (now reduced to 115,335 ha in 17 zones as the *modified SEZ alternative*) to ensure that they are not in high-conflict areas and provides incentives for their use. The new plan also proposes a process to accommodate additional solar energy development outside of SEZs and to revisit ongoing state-based planning efforts to allow consideration of additional SEZs in the future.

The impacts of USSED on wildlife: Effects due to construction and decommissioning

The construction and eventual decommissioning of solar energy facilities will have impacts on wildlife, including rare and endangered species, and on their habitats in the desert (Harte and Jassby 1978). These activities involve significant ground disturbance and direct (e.g., mortality) and indirect (e.g., habitat loss, degradation, modification) impacts on wildlife and their habitat (Kuvlesky et al. 2007). Solar energy facilities require large land areas to harness sunlight and convert it to electrical energy. According to Wilshire and colleagues (2008), photovoltaic panels with a 10% conversion efficiency would need to cover an area of about 32,000 square kilometers, or an area a little smaller than the state of Maryland, to meet the current electricity demands of the United States. Many of the areas being considered for the development of solar energy in the Mojave and Sonoran Deserts are, at present, relatively undisturbed (USDOI and USDOE 2011a).

The extent of surface disturbance of USSED is related to the cooling technology used. Because of the scarcity of water in the desert Southwest region, dry-cooling systems, which consume 90%–95% less water than wet-cooling systems (EPRI 2002), are becoming a more viable option for concentrating solar facilities. Although wet-cooling systems are more economical and efficient, they consume larger amounts of water per kilowatt-hour (Torcellini et al. 2003). Unlike wet-cooling systems, dry-cooling systems use ambient air, instead of water, to cool the exhaust steam from the turbines. However, to achieve a heat-rejection efficiency similar to that in a wet-cooling system, Khalil and colleagues (2006) estimated that a direct dry-cooling system will require a larger footprint and would thus affect more wildlife habitat.

Although we found no information in the scientific literature about the direct effects of USSED on wildlife, the ground-disturbance impacts are expected to be similar to those caused by other human activities in the desert (Lovich and Bainbridge 1999).

Dust and dust suppressants. USSED transforms the landscape substantially through site preparation, including the construction of roads and other infrastructure. In addition, many solar facilities require vegetation removal and grading. These construction activities produce dust emissions, especially in arid environments (Munson et al. 2011), which already have the potential for natural dust emission. Dust can have dramatic effects on ecological processes at all scales (reviewed by Field et al. 2010). At the smallest scale, wind erosion, which powers dust emission, can alter the fertility and water-retention capabilities of the soil. Physiologically, dust can adversely influence the gas exchange, photosynthesis, and water usage of Mojave Desert shrubs (Sharifi et al. 1997). Depending on particle size, wind speed, and other factors, dust emission can physically damage plant species through root exposure, burial, and abrasions to their leaves and stems. The physiological and physical damage to plant species inflicted by dust emissions could ultimately reduce the plants' primary production and could indirectly affect wildlife food plants and habitat quality.

From an operational perspective, dust particles reduce mirror and panel efficiency in converting solar energy into heat or electricity. To combat dust, solar energy facilities apply various dust suppressants to surfaces with exposed soil (e.g., graded areas, areas with vegetation removed, roads). There are eight categories of common dust suppressants used for industrial applications: water, salts and brines, organic nonpetroleum products, synthetic polymers, organic petroleum, electrochemical substances, clay additives, and mulch and fiber mixtures (reviewed in Piechota et al. 2004). In a study conducted in the Mojave Desert in which the hydrological impacts of dust suppressants were compared, Singh and colleagues (2003) reported that changes did occur in the volume, rate, and timing of runoff when dust suppressants were used. In particular, petroleum-based and acrylic-polymer dust suppressants drastically influenced the hydrology of disturbed areas by increasing runoff volume and changing its timing. When it is applied to disturbed desert soils, magnesium chloride ($MgCl_2$), a commonly used salt-based dust depressant, does not increase runoff volume but does, however, increase the total suspended solids loads in runoff (Singh et al. 2003).

Others have highlighted the fact that there is a dearth of scientific research and literature on the effects of dust suppressants on wildlife, including the most commonly used category of dust depressant: brines and salts (Piechota et al. 2004, Goodrich et al. 2008). However, the application of $MgCl_2$ to roads was correlated with a higher frequency of plant damage (Goodrich et al. 2008). Because chloride salts, including $MgCl_2$, are not confined to the point of application but have the ability to be transported in runoff (White and Broadly 2001), the potential exists for a loss of primary production associated with plant damage in the habitats surrounding a solar facility, which could directly affect wildlife habitat.

Mortality of wildlife. We are not aware of any published studies documenting the direct effects of USSED on the survival of wildlife. However, subterranean animals can be affected by USSED, including species that hibernate underground. In the Sonoran Desert portion of California, Cowles (1941) observed that most reptiles in the Coachella Valley hibernated at depths of less than 33 centimeters (cm), with many at considerably shallower depths. Included in his observations were flat-tailed horned lizards (*Phrynosoma mcallii*)—a species of special concern in the region because of solar energy development (USDOI and USDOE 2011a)—and the federally protected Coachella Valley fringe-toed lizard (*Uma inornata*). Even lightweight vehicles like motorcycles are capable of causing greatly increased soil density (soil compaction) at a depth of 30–60 cm as their tires pass over the surface (Webb 1983). These observations suggest that vehicular activities in the desert have the potential to kill or entrap large numbers of subterranean animals (Stebbins 1995) through compressive forces or burrow collapse. Similar or greater impacts would be expected from the heavy equipment associated with the construction activities at an energy facility.

Destruction and modification of wildlife habitat. Despite the absence of published, peer-reviewed information on the effects of USSED on wildlife and their habitats, a considerable body of literature exists on the effects of other ground-disturbing activities on both ecological patterns and processes that are broadly comparable. Ground-disturbing activities affect a variety of processes in the desert, including soil density, water infiltration rate, vulnerability to erosion, secondary plant succession, invasion by exotic plant species, and stability of cryptobiotic soil crusts (for reviews, see Lovich and Bainbridge 1999, Webb et al. 2009). All of these processes have the ability—individually and together—to alter habitat quality, often to the detriment of wildlife. Any disturbance and alteration to the desert landscape, including the construction and decommissioning of utility-scale solar energy facilities, has the potential to increase soil erosion. Erosion can physically and physiologically affect plant species and can thus adversely influence primary production (Sharifi et al. 1997, Field et al. 2010) and food availability for wildlife.

Solar energy facilities require substantial site preparation (including the removal of vegetation) that alters topography and, thus, drainage patterns to divert the surface flow associated with rainfall away from facility infrastructure (Abbasi and Abbasi 2000). Channeling runoff away from plant communities can have dramatic negative effects on water availability and habitat quality in the desert, as was shown by Schlesinger and colleagues (1989). Areas deprived of runoff from sheet flow support less biomass of perennial and annual plants relative to adjacent areas with uninterrupted water-flow patterns.

The impacts of roads. Roads are required in order to provide access to solar energy infrastructure. Both paved and unpaved roads have well-documented negative effects on wildlife (Forman and Alexander 1998), and similar effects are expected in utility-scale solar energy facilities. Although road mortality is most easily detected on the actual roadway, the effects of roads extend far beyond their physical surface. In a study of the effects of roads on Agassiz's desert tortoise populations in southern Nevada, von Seckendorff Hoff and Marlow (2002) examined transects along roads with traffic volumes varying from 25 to 5000 vehicles per day. Tortoises and tortoise sign (e.g., burrows, shells, scat) decreased with their proximity to a road. On roads with high traffic volumes, tortoises and tortoise sign were reduced as far as 4000 meters from the roadside. Roads with lower traffic volumes had fewer far-reaching effects.

Another effect of roads in the desert is the edge enhancement of plants and arthropod herbivores (Lightfoot and Whitford 1991). Perennial plants along the roadside are often larger than those farther away, and annual plant germination is often greatest along the shoulders of roads. It is possible that increased runoff due to impervious pavement or compacted soil contributes to this heterogeneity of vegetation in relationship to a road. Agassiz's desert tortoises may select locations for burrow construction that are close to roads, perhaps because of this increased productivity of food plants (Lovich and Daniels 2000). Although this situation suggests potentially beneficial impacts for herbivorous species of wildlife, such as tortoises, it increases their chance of being killed by vehicle strikes, as was shown by von Seckendorff Hoff and Marlow (2002).

Off-site impacts. Direct impacts on wildlife and habitat can occur well outside the actual footprint of the energy facility. Extraction of large amounts of raw materials for the construction of solar energy facilities (e.g., aggregate, cement, steel, glass); transportation and processing of those materials; the need for large amounts of water for cooling some installations; and the potential for the production of toxic wastes, including coolants, antifreeze, rust inhibitors, and heavy metals, can affect wildlife adjacent to or far from the location of the facility (Abbasi and Abbasi 2000). Abbasi and Abbasi (2000) summarized data suggesting that the material requirements for large-scale solar facilities exceed those for conventional fossil-fuel plants on a cost-per-unit-of-energy basis. In addition, water used for steam production at one solar energy facility in the Mojave Desert of California contained selenium, and the wastewater was pumped into evaporation ponds that attracted birds that fed on invertebrates. Although selenium toxicity was not considered a threat on the basis of the results of one study, the possibility exists for harmful bioaccumulation of this toxic micronutrient (Herbst 2006). In recognition of the hazard, Pimentel and colleagues (1994) suggested that fencing should be used to keep wildlife away from these toxic ponds.

The impacts of USSED on wildlife: Effects due to operation and maintenance

This category includes the effects related to the presence and operation of the solar facility, not the physical construction and decommissioning of the same. Some of the effects (e.g., mortality of wildlife and impacts caused by roads) are similar to those discussed previously for construction and decommissioning and are not discussed further.

Habitat fragmentation. Until relatively recently, the desert Southwest was characterized by large blocks of continuous and interconnected habitat. Roads and urban development continue to contribute to habitat fragmentation in this landscape. Large-scale energy development has the potential to add to and exacerbate the situation, presenting potential barriers to movement and genetic exchange in wildlife populations, including those of bighorn sheep (*Ovis canadensis*), deer (*Odocoileus* spp.), tortoises, and other species of concern and social significance. Research conducted on the effects of oil and gas exploration and development (OGED) on wildlife in the Intermountain West provides a possible analog to USSEDO, since comparable data are not available for the desert Southwest. The potential effects on mule deer (*Odocoileus hemionus*) and other wildlife species include impediments to free movement, the creation of migration bottlenecks, and a reduction in effective winter range size. Mule deer responded immediately to OGED by moving away from disturbances, with no sign of acclimation during the three years of study by Sawyer and colleagues (2009). Some deer avoidance resulted in their use of less-preferred and presumably less-suitable habitats.

Despite a lack of data on the direct contributions of USSEDO to habitat fragmentation, USSEDO has the potential to be an impediment to gene flow for some species. Although the extent of this impact is, as yet, largely unquantified in the desert, compelling evidence for the effects of human-caused habitat fragmentation on diverse wildlife species has already been demonstrated in the adjacent coastal region of southern California (Delaney et al. 2010).

Noise effects. Industrial noise can have impacts on wildlife, including changes to their habitat use and activity patterns, increases in stress, weakened immune systems, reduced reproductive success, altered foraging behavior, increased predation risk, degraded communication with conspecifics, and damaged hearing (Barber et al. 2009, Pater et al. 2009). Changes in sound level of only a few decibels can elicit substantial animal responses. Most noise associated with USSEDO is likely to be generated during the construction phase (Suter 2002), but noise can also be produced during operation and maintenance activities. Brattstrom and Bondello (1983) documented the effects of noise on Mojave

Desert wildlife on the basis of experiments involving off-highway vehicles. Noise from some of these vehicles can reach 110 decibels—near the threshold of human pain and certainly within the range expected for various construction, operation, and maintenance activities (Suter 2002) associated with USSEDO. This level of noise caused hearing loss in animals, such as kangaroo rats (*Dipodomys* spp.), desert iguanas (*Dipsosaurus dorsalis*), and fringe-toed lizards (*Uma* spp.). In addition, it interfered with the ability of kangaroo rats to detect predators, such as rattlesnakes (*Crotalus* spp.), and caused an unnatural emergence of aestivating spadefoot toads (*Scaphiopus* spp.), which would most likely result in their deaths. Because of impacts on wildlife, Brattstrom and Bondello (1983) recommended that "all undisturbed desert habitats, critical habitats, and all ranges of threatened, endangered, or otherwise protected desert species" (p. 204) should be protected from loud noise.

Although many consider solar energy production a "quiet" endeavor, noise is associated with their operation. For example, facilities at which wet-cooling systems are used will have noises generated by fans and pumps. As for facilities with dry-cooling systems, only noise from fans will be produced during operation (EPRI 2002). Because of the larger size requirements of dry-cooling systems, there will be more noise production associated with an increase in the number of fans.

Electromagnetic field generation. When electricity is passed through cables, it generates electric and magnetic fields. USSEDO requires a large distribution system of buried and overhead cables to transmit energy from the point of production to the end user. Electromagnetic fields (EMFs) produced as energy flows through system cables are a concern from the standpoint of both human and wildlife health, yet little information is available to assess the potential impact of the EMFs associated with USSEDO on wildlife. Concerns about EMFs have persisted for a long time, in part because of controversy over whether they're the actual cause of problems and disagreement about the underlying mechanisms for possible effects. For example, there is presently a lack of widely accepted agreement about the biological mechanisms that can explain the consistent associations between extremely low-frequency EMF exposure from overhead power lines and childhood leukemia, although there is no shortage of theories (Gee 2009).

Some conclude that the effects of EMFs on wildlife will be minor because of reviews of the often conflicting and inconclusive literature on the topic (Petersen and Malm 2006). Others suggest that EMFs are a possible source of harm for diverse species of wildlife and contribute to the decline of some mammal populations. Balmori (2010) listed possible impacts of chronic exposure to athermal electromagnetic radiation, which included damage to the nervous system, disruption of circadian rhythm, changes in heart function, impairment of immunity and fertility, and genetic and developmental problems. He concluded that enough evidence exists to confirm harm to wildlife but suggested that further study is urgently needed. Other authors suggest that the generally inconsistent epidemiological evidence in support of the effects of EMFs should not be cause for inaction. Instead, they argue that the precautionary principle should be applied in order to prevent a recurrence of the "late lessons from early warnings" scenario that has been repeated throughout history (Gee 2009).

Magnetic information is used for orientation by diverse species, from insects (Sharma and Kumar 2010) to reptiles (Perry A et al. 1985). Despite recognition of this phenomenon, the direct effects of USSEDO-produced EMFs on wildlife orientation remains unknown.

Microclimate effects. The alteration of a landscape through the removal of vegetation and the construction of structures by humans not only has the potential of increasing animal mortality but also changes the characteristics of the environment in a way that affects wildlife. The potential for microclimate effects unique to solar facilities was discussed by Pimentel and colleagues (1994) and by Harte and Jassby (1978). It has been estimated that a concentrating solar facility can increase the albedo of a desert environment by 30%–56%, which could influence local temperature and precipitation patterns through changes in wind speed and evapotranspiration. Depending on their design, large concentrating solar facilities may also have the ability to produce significant amounts of unused heat that could be carried downwind into adjacent wildlife habitat with the potential to create localized drought conditions. The heat produced by central-tower solar facilities can burn or incinerate birds and flying insects as they pass through the concentrated beams of reflected light (McCrary et al. 1986, Pimentel et al. 1994, Tsoutsos et al. 2005, Wilshire et al. 2008).

A dry-cooled solar facility—in particular, one with a concentrating-trough system—could reject heated air from the cooling process with temperatures 25–35 degrees Fahrenheit higher than the ambient temperature (EPRI 2002). This could affect the microclimate on site or those in adjacent habitats. To our knowledge, no research is available to assess the effects of USSEDO on temperature or that of any other climatic variable on wildlife. However, organisms whose sex is determined by incubation temperatures, such as both species of desert tortoises, may be especially sensitive to temperature changes, because small temperature changes have the potential to alter hatchling sex ratios (Hulin et al. 2009).

Pollutants from spills. USSEDO, especially at wet-cooled solar facilities, has a potential risk for hazardous chemical spills on site, associated with the toxicants used in cooling systems, antifreeze agents, rust inhibitors, herbicides, and heavy metals (Abbasi and Abbasi 2000, Tsoutsos et al. 2005). Wet-cooling solar systems must use treatment chemicals (e.g., chlorine, bromine, selenium) and acids and bases (e.g., sulfuric acid, sodium hydroxide, hydrated lime) for the prevention of fouling and scaling and for pH control of the water used in their recirculating systems (EPRI 2002).

Solar facilities at which a recirculating system is used also have treatment and disposal issues associated with water discharge, known as *blowdown*, which is water with a high concentration of dissolved and suspended materials created by the numerous evaporation cycles in the closed system (EPRI 2002). These discharges may contain chemicals used to prevent fouling and scaling. The potentially tainted water is usually stored in evaporative ponds, which further concentrates the toxicants (Herbst 2006). Because water is an attraction for desert wildlife, numerous species could be adversely affected. The adverse effects of the aforementioned substances and similar ones on wildlife are well documented in the literature, and a full review is outside the scope of this article. However, with the decreased likelihood of wet-cooling systems for solar facilities in the desert, the risk of hazardous spills and discharges on site will be less in the future, because dry-cooling systems eliminate most of the associated water-treatment processes (EPRI 2002). However, there are still risks of spills associated with a dry-cooling system. More research is needed on the adverse effects of chemical spills and tainted-water discharges specifically related to USSEDO on wildlife.

Water consumption (wet-cooled solar). The southwestern United States is a water-poor region, and water use is highly regulated throughout the area. Because of this water limitation, the type of cooling systems installed at solar facilities is limited as well. For example, a once-through cooling system—a form of wet cooling—is generally not feasible in arid environments, because there are few permanent bodies of water (i.e., rivers, oceans, and lakes) from which to draw cool water and then into which to release hot water. Likewise, other wet-cooling options, such as recirculating systems and hybrid systems, are becoming less popular because of water shortage issues in the arid region. Therefore, the popularity of the less-efficient and less-economical dry-cooling systems is increasing on public lands. Water will also be needed at solar facilities to periodically wash dust from the mirrors or panels. Although there are numerous reports in which the costs and benefits were compared both environmentally and economically (EPRI 2002, Khalil et al. 2006) between wet- and dry-cooled solar facilities, to our knowledge no one has actually quantified the effects of water use and consumption on desert wildlife in relation to the operation of these facilities.

Fire risks. Any system that produces electricity and heat has a potential risk of fire, and renewable energy facilities are no exception. Concentrating solar energy facilities harness the sun's energy to heat oils, gases, or liquid sodium, depending on the system design (e.g., heliostat power, trough, dish). With temperatures reaching more than 300 degrees Celsius in most concentrated solar systems, spills and leaks from the coolant system increase the risk of fires (Tsoutsos et al. 2005). Even though all vegetation is usually removed from the site during construction, which reduces the risk of a fire propagating on and off site, the increase of human activity in a desert region increases the potential for fire, especially along major highways and in the densely populated western Mojave Desert (Brooks and Matchett 2006).

The Southwest deserts are not fire-adapted ecosystems: fire was historically uncommon in these regions (Brooks and Esque 2002). However, with the establishment of numerous flammable invasive annual plants in the desert Southwest (Brown and Minnich 1986), coupled with an increase in anthropogenic ignitions, fire has become more common in the deserts, which adversely affects wildlife (Esque et al. 2003). For Agassiz's desert tortoise, fire can translate into direct mortality at renewable energy facilities (Lovich and Daniels 2000) and can cause reductions in food and habitat quality. To our knowledge, however, there is no scientific literature related to the effects of USSEDO-caused fire on wildlife.

Light pollution. Two types of light pollution could be produced by solar energy facilities: ecological light pollution (ELP; Longcore and Rich 2004) and polarized light pollution (PLP; Horváth et al. 2009). The latter, PLP, could be produced at high levels at facilities using photovoltaic solar panels, because dark surfaces polarize light. ELP can also be produced at solar facilities in the form of reflected light. The reflected light from USSEDO has been suggested as a possible hazard to eyesight (Abbasi and Abbasi 2000). ELP could adversely affect the physiology, behavior, and population ecology of wildlife, which could include the alteration of predation, competition, and reproduction (for reviews, see Longcore and Rich 2004, Perry G et al. 2008). For example, the foraging behavior of some species can be adversely affected by light pollution (for a review, see Longcore and Rich 2004). The literature is limited regarding the impact of artificial lighting on amphibians and reptiles (Perry G et al. 2008), and, to our knowledge, there are no published studies in which the impacts on wildlife of light pollution produced by USSEDO have been assessed. However, light pollution is considered by G. Perry and colleagues (2008) to be a serious threat to reptiles, amphibians, and entire ecological communities that requires consideration during project planning. G. Perry and colleagues (2008) further recommended the removal of unnecessary lighting so that the lighting conditions of nearby habitats would be as close as possible to their natural state.

Numerous anthropogenic products—usually those that are dark in color (e.g., oil spills, glass panes, automobiles, plastics, paints, asphalt roads)—can unnaturally polarize light, which can have adverse effects on wildlife (for a review, see Horváth et al. 2009). For example, numerous animal species use polarized light for orientation and navigation purposes (Horváth and Varjú 2004). Therefore, the potential exists for PLP to disrupt the orientation and migration abilities of desert wildlife, including those of sensitive species. In the review by Horváth and colleagues (2009), which was focused mostly on insects but included a few avian references, they highlighted the fact that anthropogenic products that produce PLP can appear to be water bodies to wildlife and can become ecological traps for insects and, to a lesser degree, avian species. Therefore, utility-scale solar energy facilities at which photovoltaic technology is used in the desert Southwest could create a direct effect on insects (i.e., ecological trap), which could have profound but unquantified effects on the ecological community surrounding the solar facility. In addition, there may be indirect effects on wildlife through the limitation of plant food resources, especially if pollinators are negatively affected. As was stated by Horváth and colleagues (2009), the population- and community-level effects of PLP can only be speculated on because of the paucity of data.

Unanswered questions and research needs

In our review of the peer-reviewed scientific literature, we found only one peer-reviewed publication on the specific effects of utility-scale solar energy facility operation on wildlife (McCrary et al. 1986) and none on utility-scale solar energy facility construction or decommissioning. Although it is possible that we missed other peer-reviewed publications, our preliminary assessment demonstrates that very little critically reviewed information is available on this topic. The dearth of published, peer-reviewed scientific information provides an opportunity to identify the fundamental research questions for which resource managers need answers. Without those answers, resource managers will be unable to effectively minimize the negative effects of USSEDO on wildlife, especially before permitting widespread development of this technology on relatively undisturbed public land.

Before-and-after studies. Carefully controlled studies are required in order to tease out the direct and indirect effects of USSEDO on wildlife. Pre- and postconstruction evaluations are necessary to identify the effects of renewable energy facilities and to compare results across studies (Kunz et al. 2007). In their review of wind energy development and wildlife, with an emphasis on birds, Kuvlesky and colleagues (2007) noted that experimental designs and data-collection standards were typically inconsistent among studies. This fact alone contributes measurably to the reported variability among studies or renders comparisons difficult, if not impossible. Additional studies should emphasize the need for carefully controlled before-after-control-impact (BACI) studies (Kuvlesky et al. 2007) with replication (if possible) and a detailed description of site conditions. The potential payoff for supporting BACI studies now could be significant: They could provide answers for how to mitigate the negative impacts on wildlife in a cost-effective and timely manner.

What are the cumulative effects of large numbers of dispersed or concentrated energy facilities? Large portions of the desert Southwest have the potential for solar energy development. Although certain areas are targeted for large facilities because of resource availability and engineering requirements (e.g., their proximity to existing transmission corridors), other areas may receive smaller, more widely scattered facilities. A major unanswered question is what the cumulative impacts of these facilities on wildlife are. Would it be better for wildlife if development is concentrated or if it is scattered in smaller, dispersed facilities? Modeling based on existing data would be highly suspect because of the deficiency of detailed site-level published information identified in our analysis. Except for those on habitat destruction and alteration related to other human endeavors, there are no published articles on the population genetic consequences of habitat fragmentation related to USSED, which makes this a high priority for future research.

What density or design of development maximizes energy benefits while minimizing negative effects on wildlife? We are not aware of any published peer-reviewed studies in which the impacts on wildlife of different USSED densities or designs have been assessed. For example, would it benefit wildlife to leave strips of undisturbed habitat between rows of concentrating solar arrays? Research projects in which various densities, arrays, or designs of energy-development infrastructure are considered would be extremely valuable. BACI studies would be very useful for addressing this deficiency.

What are the best sites for energy farms with respect to the needs of wildlife? The large areas of public land available for renewable energy development in the desert Southwest encompass a wide variety of habitats. Although this provides a large number of choices for USSED, not all areas have the same energy potential because of resource availability and the limitations associated with engineering requirements, as was noted above. Detailed information on wildlife distribution and habitat requirements are crucially needed for proper site location and for the design of renewable energy developments (Tsoutsos et al. 2005). Public-resource-management agencies have access to rich geospatial data sets based on many years of inventories and resource-management planning. These data could be used to identify areas of high value for both energy development and wildlife. Areas with overlapping high values could be carefully studied through risk assessment when it appears that conflicts are likely. Previously degraded wildlife habitats, such as old mine sites, overgrazed pastures, and abandoned crop fields, may be good places to concentrate USSED to minimize its impacts on wildlife (CBI 2010).

Can the impacts of solar energy development on wildlife be mitigated? The construction of solar energy facilities can cause direct mortality of wildlife. In addition, building these facilities results in the destruction and fragmentation of wildlife habitat and may increase the possibility of fire, as was discussed above. Beyond these effects, essentially nothing is known about the operational effects of solar energy facilities on wildlife. Current mitigation strategies for desert tortoises and other protected species include few alternatives other than translocation of the animals from the footprint of the development into other areas. Although this strategy may be appealing at first glance, animal translocation has a checkered history of success, especially for reptiles and amphibians (Germano and Bishop 2008, CBI 2010). Translocation has yet to be demonstrated as a viable long-term solution that would mitigate the destruction of Agassiz's desert tortoise habitat (Ernst and Lovich 2009, CBI 2010).

Conclusions

All energy production has associated social and environmental costs (Budnitz and Holdren 1976, Bezdek 1993). In their review of the adverse environmental effects of renewable energy development, Abbasi and Abbasi (2000) stated that "renewable energy sources are not the panacea they are popularly perceived to be; indeed, in some cases, their adverse environmental impacts can be as strongly negative as the impacts of conventional energy sources" (p. 121). Therefore, responsible, efficient energy production requires both the minimization of environmental costs and the maximization of benefits to society—factors that are not mutually exclusive. Stevens and colleagues (1991) and Martín-López and colleagues (2008) suggested that the analyses of costs and benefits should include both wildlife use and existence values. On the basis of our review of the existing peer-reviewed scientific literature, it appears that insufficient evidence is available to determine whether solar energy development, as it is envisioned for the desert Southwest, is compatible with wildlife conservation. This is especially true for threatened species such as Agassiz's desert tortoise. The many other unanswered questions that remain after reviewing the available evidence provide opportunities for future research, as was outlined above.

The shift toward renewable energy is widely perceived by the public as a "green movement" intended to reduce greenhouse-gas emissions and acid rain and to curb global climate change (Abbasi and Abbasi 2000). However, as was noted by Harte and Jassby (1978), just because an energy technology is simple, thermodynamically optimal, renewable, or inexpensive does not mean that it will be benign from an ecological perspective. The issue of wildlife impacts is much more complex than is widely appreciated, especially when the various scales of impact (e.g., local, regional, global) are considered. Our analysis shows that, on a local scale, so little is known about the effects USSEDO on wildlife that extrapolation to larger scales with any degree of confidence is currently limited by an inadequate amount of scientific data. Therefore, without additional research to fill the significant information void, accurate assessment of the potential impacts of solar energy development on wildlife is largely theoretical but needs to be empirical and well-founded on supporting science.

Acknowledgments

Earlier versions of the manuscript benefited from comments offered by Linda Gundersen, Marijke van Heeswijk, John Mathias, Misa Milliron, Ken Nussear, Mary Price, Mark Sogge, Linda Spiegel, and Brian Wooldridge. Special thanks to Emily Waldron and Caleb Loughran for their assistance with literature searches. The research was generously supported by a grant from the California Energy Commission, Research Development and Demonstration Division, Public Interest Energy Research program (contract # 500-09-020). Special thanks to Al Muth for providing accommodations at the Philip L. Boyd Deep Canyon Research Center of the University of California, Riverside, during the development of the manuscript. Any use of trade, product, or firm names is for descriptive purposes only and does not imply endorsement by the US government.

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F-153
B-253

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DESERT DEVELOPMENT ISSUES

Solar Power in the Desert: Are the current large-scale solar developments really improving California's environment?

Gaps in Desert Research

Michael F. Allen, Director
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California deserts are faced with unprecedented anthropogenic change. Impact factors range from expanding urban centers and military bases, to potential significant habitat loss from solar and thermal power expansions (including ground water exploitation and depletion beyond recovery, land stripping for power generation units, and fragmentation from power and associated transportation corridors), and climate change. Together these factors threaten remaining suitable habitat for endangered and for other endemic desert species. Other individuals and studies have commented on the use of out-moded technologies employed in the current American Recovery and Reinvestment Act of 2009 (ARRA) projects, and the economic subsidies that are enabling individual site development and the creation of new transmission corridors in remote, previously undisturbed, areas rather than focusing on existing degraded lands and power corridors. We want to be clear that although we question the current project implementation in this article, we strongly support a transition from a fossil-fuel based energy system to one that will not further exacerbate our current trajectories of anthropogenic climate change, as well as providing energy independence and economic stimulus for our country.

Our goal here is to outline the scope of environmental changes that are underway, and to outline research needs necessary to provide long-term sustainability of federally- and state-listed species and their habitats, ensuring that energy developments are also fully compliant with the letter and intent of state and federal resource protection statutes. We identified several topic areas that are of concern to land managers and project developers in the California deserts. These represent topic areas badly in need of research using state-of-the-art techniques coupled with known expertise, tailored to the desert areas to be impacted by the proposed developments. These include the following issues and their interactions:

- Climate change and shifts in endangered species habitat location and migration potential
- Sources, recharge, and loss of groundwater from large-scale solar steam generator systems
- Persistence of endangered, threatened, and unlisted endemic species in current protected areas, and in new areas where habitat suitability is altered from climate and anthropogenic land-use change
- Exotic invasive species migration pathways, competitive abilities and productivity
- Interactions among vegetation composition, production, fire, pollution and climate change
- Carbon budgets and net carbon loss or sequestration.

Unfortunately, many federal and state agencies, as well as several non-government organizations, whose goal is to protect habitats appear to have overlooked previous results suggesting unacceptable levels of "take" for endangered species, and overlooked existing literature addressing net carbon fluxes that would be affected by the proposed solar developments. Nor have they employed state-of-the art research tools capable of integrating new ecosystem and habitat modeling approaches coupled with carefully-collected spatial and temporal data.

Most of the large-scale solar power projects utilize large quantities of water as steam power generators. The largest of these plants are steam-based thermal plants, using up to 2.9 to 3m^3/MWh (US DOE 2006). Assuming 12h/day of active use, a 1,000MW would drain 35,280m^3/day, or 28.6 acre-feet of water per day, or 10,435 acre-feet/year. One groundwater basin, such as the Palo Verde Mesa Groundwater Basin recharges only 800 acre-feet per year, largely from recharge by underflow from the Chuckwalla Valley (Department of Water Resources 2003). Even with a low water system, with less energy efficiency, the water use may still likely be well more than the recharge rates. The use of water affects agriculture, existing housing and businesses, the mining industry, military training grounds, and wildlife habitats. Plant species, such as the *Amargosa niterwort* (Hasselquist & Allen 2009), and animals including the desert pupfish populations in Ash Meadows (Deacon et al. 2007, Martin 2010) that are dependent upon surface waters and a high groundwater level are once again threatened this time by solar development. Despite the Department of Interior's call that conservation is a high priority, this is not apparent for these developments.

While researchers in the region, including UC Riverside scientists, have been addressing factors that challenge the ability of desert ecosystems to sustain themselves with state-of-the-art analyses, many state and federal agencies have continued to employ outdated models and decision tools (e.g., see "Harness sun wisely" Riverside Press-Enterprise 12/26/2010, and "energy developers need better tortoise counts, officials say" Riverside Press-Enterprise 11/4/10).

Federally-listed species such as the desert tortoise and those of concern like the Mohave fringe-toed lizard (Fig 1) are already impacted by new energy developments (e.g., the Ivanpah bulldozing of prime tortoise habitat), roads and urbanization, invasive plants, and changes in military base activities. Relocating species like the tortoises to unoccupied habitats, even those postulated "suitable" by experts, is conceptually flawed. Over 50 percent mortality is reported in short-term experiments (Desert Tortoise Council 2010). If environmental factors like climate change is included, the potential habitat in the desert is reduced even further (Fig 2).

Figure 1. Species that are directly impacted by the current and proposed developments in the California deserts, include the desert tortoise (a federally-listed endangered species) and the Mojave fringe-toed lizard (local populations are of concern to ecologists) (photographs by Cameron Barrows).

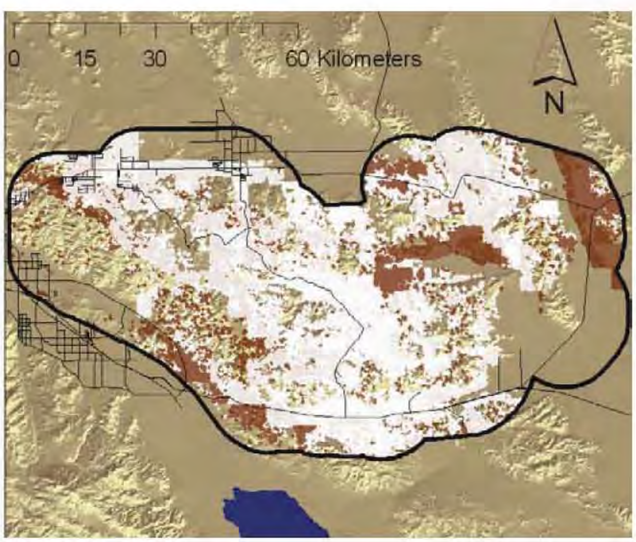

Figure 2. Potential response of desert tortoise to projected climate change at Joshua Tree National Park (C. Barrows). The white plus brown areas represents current habitat. White is the area lost with a 1°C increase in temperature, and a 75mm drop in precipitation, with the brown showing the remaining habitat. Transplanting animals, such as the desert tortoise is conceptually suspect, and the data presented to date suggest that this is not a viable approach. Even if accepted, "unoccupied" habitats are both currently suspect, and certainly have not been vetted against future climate change.

Solar development is essential to reduce carbon inputs to the atmosphere and global warming. But solar development needs to incorporate the best available science into planning and production efforts. The proposed large scale solar developments in California will impact dramatically current habitat and potential habitat of species of concern. We already understand that development patterns can dramatically affect current and potential habitat, as published for the Coachella Valley fringe-toed lizard (Barrows et al. 2010). Coupling climate change and development impacts could easily lead to local extinction for many populations of these species, and even extinction in some cases (Barrows et al. 2010).

Infrastructure and transportation associated with urban expansion and energy development is likely to impact significantly desert environmental quality. Almost all areas outside of the National Parks, and the existing military bases are among areas potentially subject to these developments (Fig 3). A decade ago, we demonstrated that in developed areas, such as along highway 62, nitrogen in the

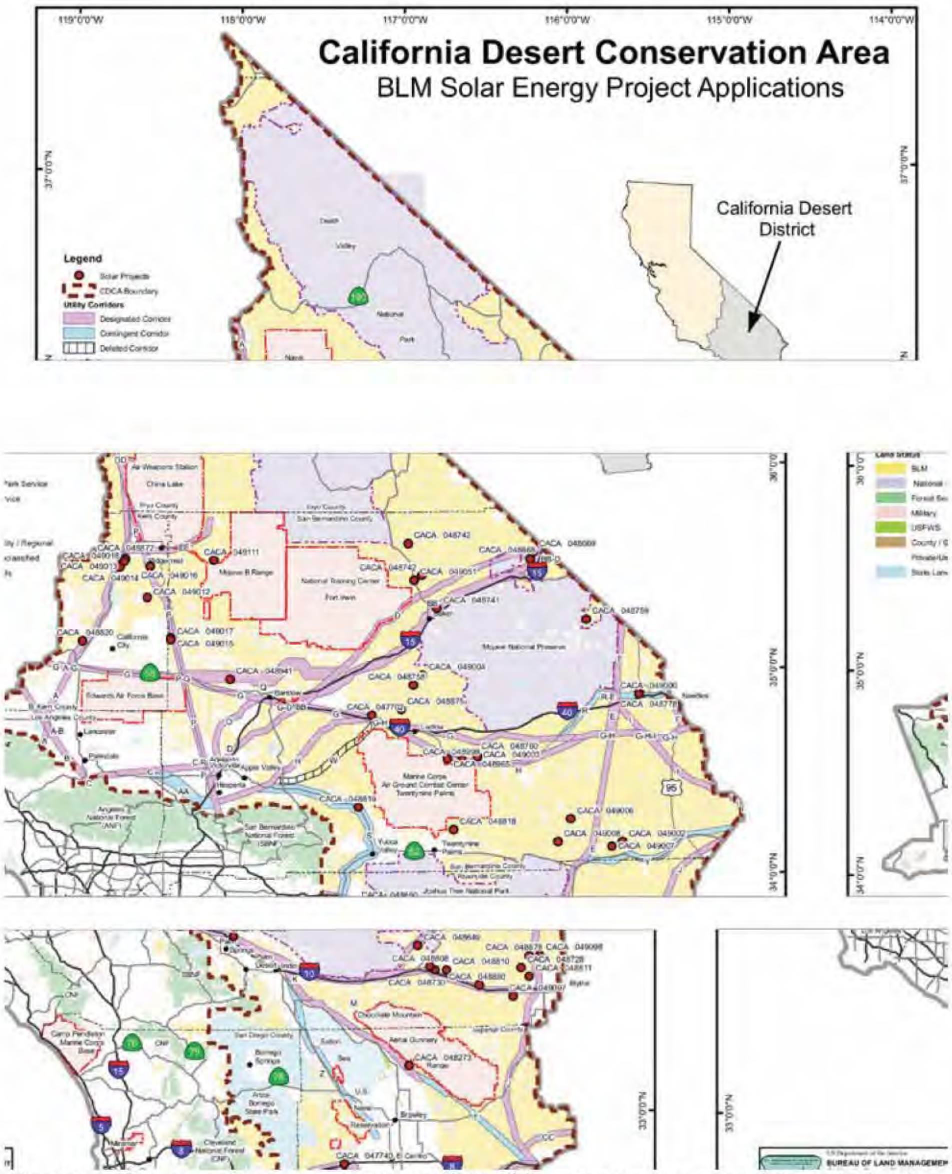

Figure 3. Proposed large-scale energy projects (http://www.energy.ca.gov/siting/solar/cdd_energy_points_8_5x11_solar.pdf). These areas will be subject to increased habitat fragmentation, vehicular traffic and development resulting in significantly increased air pollution, and N deposition.

soil accumulated during the dry season from vehicular-derived air pollution (Fig 4, M. Allen unpublished data). These soil depositions functioned as fertilizer and were subsequently leached and absorbed by vegetation during the wet season, contributing to the massive increase in exotic grass production, to a level capable of carrying fire (Rao et al. 2010). Regional nitrogen deposition models (Fig 5) show that the military bases and solar developments are in locations undergoing increasing air pollution, threatening endangered species and land management protocols. Continued disregard of these changes likely will have dramatic impacts on the natural resource management issues of the region.

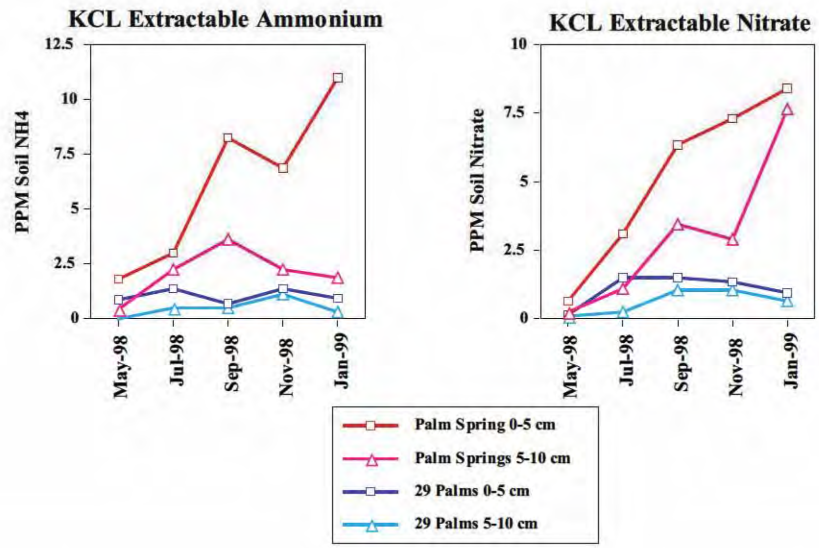

Figure 4. N changes in soil in response to development activity (M Allen unpublished data) showing seasonal increase in N in a developed area (near Palm Desert) versus a remote site (29 Palms Marine Corps base) in 1998. As the Yucca Valley and other desert regions continue to develop, and new energy developments are placed, the potential for more problems with N deposition, fire, and invasive species continues to grow.

Many of the areas that are proposed to be developed for the solar development include Microphyll woodlands (Fig 6). The dominant plants (legume trees) have deep roots capable of reaching groundwater (several meters). When desert plants grow, they absorb carbon dioxide (CO_2). The carbon (C), as sugars, moves into roots and soil organisms. Carbon dioxide is respired back into the soil, part of which reacts with calcium (Ca) in the soil to form calcium carbonate. This is how our deserts sequester large amounts of C and thus function to reduce atmospheric CO_2. ***The magnitude of this carbon storage process is still a crucial research question and remains unknown for our California deserts.*** However, values of up to 100g/m2/y of C-fixation are reported for deserts in Baja and Nevada (Serrano-Ortiz et al. 2010). After vegetation is removed to make

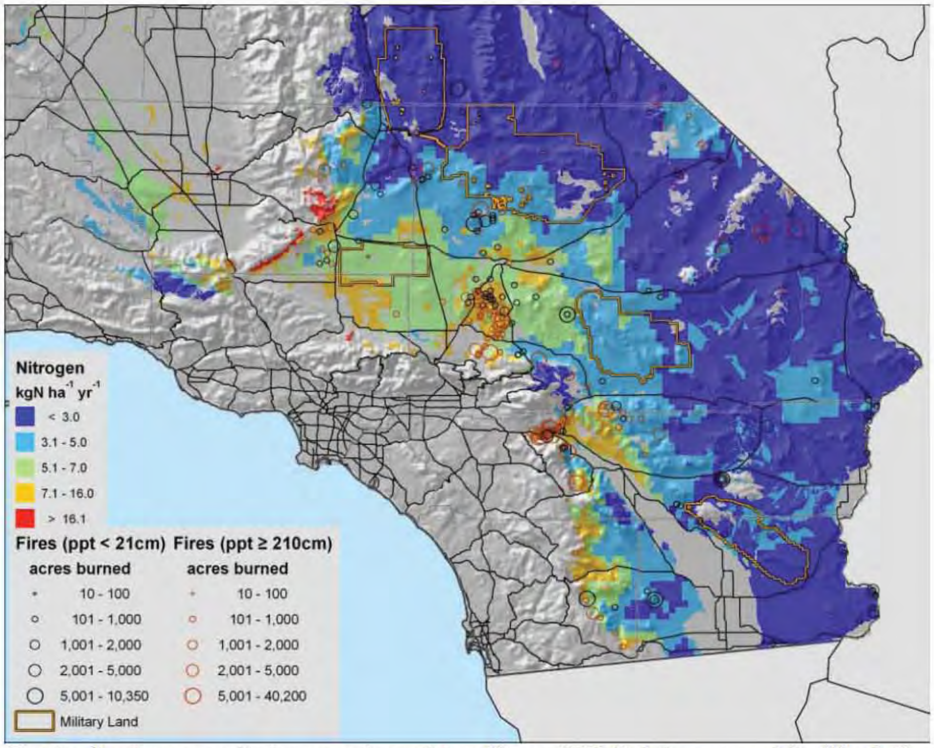

Figure 5. Fire in the desert and nitrogen deposition (from CCB, R. Johnson and E. Allen). Research in the Mojave desert (Rao et al. 2010) shows that in these regions, N deposition (largely from transportation and suburban development) above 3-9 kg/ha/y is above the "critical load" that facilitates exotic grass production, can result in fire and permanent ecosystem degradation. As development increases surrounding these areas, the potential for invasive species, land degradation, and risk of fire increases as it has in other developing areas.

Figure 6. Microphyll woodlands are among the most productive ecosystems that will be affected by solar power facilities. There are no data documenting the amount of carbon sequestration that will be lost with the loss of these stands. However, because these stands access groundwater, they are among the most productive of desert ecosystems.

way for solar arrays, carbon dioxide will be left to return to the atmosphere that ordinarily would have been used to form soil organic matter buried up to several meters deep, or released by roots and soil microbes as soil CO_2, which in turn, binds with soil Ca to form caliche.

Our deserts have large amounts of CO_2, stored as caliche ($CaCO_3$). The amount of C in caliche, when accounted globally, may be equal to the entire C as CO_2 in the atmosphere. This caliche is formed from weathering of Ca in desert soils binding to carbonates that originate in large part from respiration of roots and soil organisms. Most of the caliche in our deserts was formed during the ice ages, when vegetation was more dense and more productive. These deposits likely have been stable since (Schlesinger 1985). Being stable, though, means that inputs equal exports. Carbon in caliche may in fact be released, especially when vegetation and soils are disturbed. Mielnick et al. (2005) reported losses of up to 145g C/m^2/y. Additional research is needed to understand and quantify these exchanges (Schlesinger et al. 2009, Serrano-Ortiz et al. 2010), as there are C exchanges in desert ecosystems that we do not understand. This loss may be especially critical following removal of the vegetation for thermal solar power units. The net C loss due to a loss of native desert vegetation could be as high as 50g C/m^2/y plus weathering and dissolution of carbon dioxide from caliche up to 150g/m^2/y for an area of 7,000 acres (a common size for solar plants of 1,000MW). This translates to an annual loss of nearly 6,000 metric tons of C released by caliche, or retained in the atmosphere due to the loss of vegetation. This does not include the land disturbed by transmission corridors and maintenance roads through desert lands.

Solar power units that generate 1,000MW would save nearly 560,000 metric tons of C per year. However, we do not know the life-span of these solar power units. This net loss of caliche could continue or even increase as temperatures warm for centuries or more, given the incredibly large amount stored in our California desert valleys and vegetation recovery following disturbance for developing desert lands can also take a century or more (Fig 7). If we include the C savings from an active use of photovoltaic cells in the locations where demand is heavy (see Warmann and Jenerette 2010), then the entire regional C balance becomes even less weighted toward the large desert thermal developments.

Finally, what is the life-expectancy of a thermal solar energy development? A common presumption is that these extend indefinitely into the future. But water quality is a crucial issue for solar development, because water from both the Colorado River and the groundwater basins of the regions are highly corrosive to the project plumbing. This means additional land disturbance from maintenance and replacement activities, and a reduced lifespan of these solar projects. Given changes in government subsidies, the over-exploitation of groundwater supplies, and the heavy replacement and maintenance costs associated with the corrosive water quality, this may not be a reasonable assumption. Even when plant re-establishment occurs, disturbed lands will be dominated by annual grasses and forbs with shallow roots instead of deep-rooted shrubs, potentially for a century or more. Soil organic C likely will rapidly cycle back to the atmosphere. We do not know how soil inorganic C behaves. Understanding the lifespans of the solar plants, compared with this long-term slow C balance is a critical need for determining if these solar developments represent a net long-term reduction in greenhouse gases. Does calcium carbonate then weather back into CO_2 with no plants to replenish the soil CO_2? Could large-scale solar developments in our deserts actually increase atmospheric greenhouse gas levels over the next centuries?

Figure 7. Overlook from Desert Center, CA, looking eastward across lands designated for solar power development. The combination of developments has the potential to fragment populations of desert species, degrade soils, and reduce carbon sequestration potential of these arid lands.

The areas of the California deserts where the mega- solar projects are to be built are mainly in areas where water is the limiting factor for production and organism survival. Precipitation is highly variable in space and time, and hydrology is not well documented. The basins are interconnected. Yet we know little about the rates or even directions of the subsurface flows and small transient perched water pockets created by earthquake fault lines that support plants whose roots must reach the groundwater, such as palms, ironwood and mesquite. Water extraction at large scales could have critical impacts on desert ecosystems, including animal species like deer, bighorn sheep, and mountain lions, more than just tortoises. Microphyll woodlands and mesquite stands support various endangered species and species of concern, both directly as habitat and food, and indirectly by supporting annual forbs that serve as food sources as the soil dries out. We do not know how or where water is connected between basins, nor if the water used for individual projects is continually recharged, or comprised of water laid down in the Pleistocene.

Concluding Remarks

These development impacts are particularly questionable given the incredible surface area located in regions with high solar radiation such as southern California. Warmann and Jenerette (2010) estimated that 10 percent of the rooftop areas suitable for solar photovoltaic systems could supply 80 percent of the annual energy requirements for the region. Given the large acreages of private, already disturbed lands scattered across the California deserts, use of more pristine habitat of endangered species like the desert tortoise and the *Amargosa niterwort* seems counterproductive.

Again, we are not objecting to renewable energy development in the California deserts. Indeed, we have worked for decades with military installations and with energy companies to enhance environmental management and restoration. We can do the same with renewable energy projects. However, without careful planning and management, massive detrimental impacts over extremely large areas could result from the current energy development proposals. For society to benefit from solar energy while preserving our desert ecosystems, we must obtain and use sound existing scientific methods, and fund credible new science based on accepted review and award principles, as practiced by agencies with experience in peer-reviewed funding such as National Science Foundation or National Institute of Health. We must apply principles as judged by published peer-reviewed literature in top journals, and defendable, innovative ideas judged by scientific experts without conflicts of interest.

If the construction of poorly placed solar arrays in California leads to the loss of endangered species, destruction of plant and animal habitat, increased environmental contaminants, diversion of water and increased global warming due to more carbon dioxide in the atmosphere, then any justification for placing solar arrays in our deserts is seriously undermined.

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A CONSTRAINTS STUDY
OF CULTURAL RESOURCE SENSITIVITY
WITHIN THE CALIFORNIA DESERT

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July 2008

TABLE OF CONTENTS

TABLE OF CONTENTS
(continued)

Chapter **Page**

ACKNOWLEDGMENTS

Many people and organizations assisted in the completion of this document. My gratitude goes to them. Among those who assisted with the vision of producing such a document are Joan Taylor, Elden Hughes, Buford Crites, representatives and staff of the Mojave Desert Land Trust, and many other members of the environmental community in the California Desert. John Cook, Susan Hector, Don Laylander, Jerry Schaefer, Catherine Wright, Marcia Sandusky, Alice Brewster, Zee Malas, Tyshanna Belcher and Russell Tanner from ASM all played an important part in making certain that this study was completed and met standards demanded by those who practice cultural resource management. Dennis Casebier from the Mojave Desert Heritage and Cultural Association, Goffs, California; Clifford Walker from the Mojave Desert Museum in Barstow, Jay von Werlhof from the Imperial Valley Museum, Dee Schroth and Robin Laska from the San Bernardino County Museum and California Historic Resources Information System (CHRIS), Rolla Queen, Ken Wilson, Sally Murray, Wanda Raschkow and Ruth Musser, from the Bureau of Land Management all gave tremendous support in making certain information was available to complete the study. Thanks to one and all.

PREFACE

Having an inkling of what is culturally important within the state of California is a concept that that is long overdue. During over 30 years of working for three departments of federal service, as well as serving on the California Historical Resources Commission as the Governor's representative for Prehistoric Archaeological Resources during the late 1990s, I was always surprised that the public wrote few comments on cultural resource issues. The exception was that the public often commented on issues related to the modification or impacts on historic era buildings, particularly "California Bungalows." In over three years of serving as a political appointee, there was not a single comment by the public to me as a commissioner on any prehistoric cultural resource. Even attempting to recruit such comments failed. It was the historic built environment that often received passionate comments. Since the prehistoric archaeological sites throughout California are scientifically and culturally important, and in they are in danger of being lost, I often wondered why the public chose not to provide comments. I think that much of the reason for this is that the reviewing public is often confused about prehistoric resources; even the terminology used, such as cultural resource or historic property, is not within the mainstream vocabulary of most people.

This is a first attempt at providing the Mojave Desert Land Trust and other environmental organizations with information that will help them decide when and where to best put their scarce resources to work and to comment upon proposed projects that may affect the significant or important heritage values found within the California Desert. This is not all-inclusive but is a building block from which to make those decisions to provide comments on projects, provide input on land exchanges or sales, and be able to work with agency personnel and talk about the preservation or the removal of historic properties that are important to the local communities found within the broad desert of southern California. The information contained within this report primarily focuses on those resources found on the public lands within the California Desert Conservation Area. The Bureau of Land Management (BLM) is responsible for the management of the resources. This is report documenting the Areas of Critical Environmental Concern (ACEC) established because of important cultural resources. It also contains proposed ACECs that for one reason or another were not adopted by the BLM, and information gathered from professional archaeologists, both working for agencies, academia and consulting fields. Lastly, information presented here was gathered from concerned citizens who care about cultural resources as a part of the overall environmental setting.

There is no law that prohibits the planned destruction of the resources as long as a legal process had been adhered to. However, by using the designated process outlined in the laws that are described in this document, I believe that a more meaningful process can be instituted which allows a better analysis of the impact of proposed projects on cultural resources throughout the California Desert. The attached discussion of identified significant places will help decide which cultural resources should be identified as those that should not be disturbed without very careful planning, review, and consideration. In the vernacular sense, the locations that are presented in this document are “places that matter, and places that count.” If they are lost to future generations our nation will be the poorer.

1. INTRODUCTION AND BACKGROUND

THE BASIS FOR THE INFORMATION CONTAINED WITHIN THIS REPORT

This document serves as the narrative for an overview of the sensitive cultural resources within the California Desert Conservation Area (CDCA). It is called a Constraints Study because the study uses cultural resource information to identify and locate the known constraints of the numerous polygons that have been placed on maps and discussed within the narrative of this report (See Cultural Resources Constraints Map). The polygons do not display exact boundaries of the cultural resources, but are spots on the map where the public should be able to raise questions to decision-makers about consumptive use of the land as it is impacting important historic, prehistoric, or traditional cultural places. This in not an exhaustive study, rather a starting place for the public to begin understanding the importance of some of the cultural heritage sites located within the CDCA.

WHAT INFORMATION HAS BEEN GLEANED FROM THE CALIFORNIA DESERT PLAN?

The draft, final, and amended versions of the California Desert Plan were used extensively in the preparation of this document. Personal knowledge regarding the cultural resources found in and around the California Desert, perusals of personal notes and remembrances, and interviews with knowledgeable archaeologists, historians, ethnographers, and avocationalists who have knowledge that needs to be captured were extensively used. Some of the folks knowledgeable about the issues have passed on, but to the best of my ability, knowledge important to this study has been documented and was used here. Institutional knowledge from people who know the cultural resources in this huge Desert landscape needs to be recorded while it is possible to do so. The first generation of cultural resource managers is retiring; those hired during the early 1970s have information regarding the vast array of cultural resources found within the study area, and much of their knowledge needs to be preserved while it can be. This could be done through an Oral History program; but that is the subject of another study.

This is not a comprehensive look at all of the cultural resources found within the CDCA, but instead a capsule view of cultural resources that are considered to be particularly important. In this context, "important" means that the resources are significant and that they are sensitive to disturbance from projects proposed on or near them. Disturbance is construed to mean any alteration of the physical cultural resource or it's setting. Such effects should be examined and carefully analyzed before disturbance of the resource is permitted. Vandalism or unsanctioned disturbance of the resources is not covered in this document, but this should be discouraged through education, inculcation of conservation ethics, and law enforcement action. In terms of federal preservation law, the resources that are covered here are those listed in or eligible for listing in the National Register of Historic Places (NRHP), which was created in 1966 by the passage of the National Historic Preservation Act (NHPA). California also has a state Register of Historical Resources. In this document, the two registers are considered to be equivalent.

All archaeological, historical, ethnohistoric, or Native American sites mentioned in the following text are considered to be potentially sensitive even if they have not been studied. There are some caveats concerning sensitivity. Intensively used areas that once contained important cultural resources may now contain only vestiges of those resources, but careful consideration is essential, since many archaeological site contexts are three dimensional: sites may be buried or covered with wind-blown dust.

Interstate highways (I-8, I-10, I-15 and I-40) have traversed through sensitive archaeological sites and probably destroyed many of them before consideration of cultural resources was a mandatory part of environmental analysis. Generally, the Interstate Highway System in California extended across many areas near important archaeological sites but, looking at archaeological site maps at the California Historical Resources Information System (CHRIS), it appears as the highways either avoided extremely sensitive sites or destroyed them in the process of construction. so only remnants of the resources are left. There are exceptions: one that is discussed in this document and that has known cultural resources which is traversed by Interstate 40 is the Troy Dry Lake area. There are undoubtedly others.

CERTAIN TYPES OF SITES SHOULD ALWAYS BE CONSIDERED TO BE SIGNIFICANT

All rock art sites are significant, sensitive, and important both to science and to native peoples. There are thousands of these sites within the CDCA; the majority have not been properly documented. Rock art sites include petroglyphs, which are images chiseled into stone; pictographs, which are images painted on rock surfaces (pictographs can also be painted onto petroglyphs, as is evidenced in the Rodman Mountains); rock alignments, which are just as the phrase suggests; geoglyphs, which are rock alignments that make designs that are often abstract; and intaglios, which are geoglyphs formed by tamping the earth repeatedly so the tamping leaves an impression.

An excellent reference to the rock art of the desert is David S. Whitley's 1996 book entitled "A Guide to Rock Art Sites Southern California and Southern Nevada." One would also need to read volumes 1 and 2 of Jay von Werlhof's "Spirits of the Earth" published in 1987 and 2004, for an overview of the significant geoglyphs found throughout the areas of the desert. The geoglyphs located in the Colorado Desert have been listed in the National Register of Historic Places, but those found throughout the remainder of the California Desert have not been listed in the NRHP. This simply means no one has taken the time to fill out the forms to list them. Several geoglyphs have been identified as Areas of Critical Environmental Concern, particularly in Imperial County, and others such as the large geoglyphs in Panamint Valley were transferred to the National Park Service and are managed by Death Valley National Park.

Many riparian areas, springs, and dry lakebeds contain significant cultural resources, or contained them at one time. Not all dry lakebeds are culturally significant; one has to look at each one on a case-by-case basis. There are dry lakebeds that have few extant cultural resources, and others having so many that the story of the peopling of the Americans could be told from the material remnants of culture found on their shorelines. Lake Cahuilla in the Coachella and Imperial valleys, Searles Lake in the Searles Valley, Troy Lake near Barstow, China Lake near Ridgecrest, Palen Lake near Desert Center, and Panamint Lake near Trona are just a few examples of extinct lakes that may be able to assist in telling this story. These geological features also were significant during the historic era, since many contained surface water in the 1800s, which influenced stage routes to be built to them, or mineral deposits, which attracted historic mining interests, or water close to the surface, which attracted early agricultural ventures. An excellent reference on ancient Lake Cahuilla is the Salton Sea Atlas published by ESRI Press in 2002 and its article on the importance of the lake by Dr. Jerry Schaefer.

Often, the older the archaeological site the more it is valued by scientists. Questions of when North America was occupied and by who is an important question scientifically and for the heritage of some Native Americans. Sites to which Native peoples can trace their lineage or ancestry are significant.

Also, I cannot think of a cemetery, either an aboriginal cemetery or one containing people who immigrated here, that is not significant to someone. California Health and Safety Code, Section 7050.5 makes all burial locations a cemetery, subject to California cemetery laws. When encountering a burial, the county Coroner has to be informed and it is up to the Coroner to determine whether the remains are those of a deceased individual or of a crime victim and whether the individual is suspected to be Native American and if the California Native American Heritage Commission should be contacted.

Reviewers should use the present document cautiously. Any ground-disturbing project needs to have the lands within its Area of Potential Effects (APE) examined prior to any decision made about the effect ofland disturbance.

The term APE comes from 36 CFR 800 regulations. In 36 CFR 800.4 (a)(1), the regulation states that, as part of the scoping of a project, the APE must be defined. The APE is defined by the agency in consultation with various interested parties, but always including the State Office of Historic Preservation (OHP). It is a geographically identified area where the project may have effects on significant cultural resources, which, for the purpose of compliance with federal cultural resource laws, are called historic properties. An APE may involve a much greater areal extent of land than those identified to be physically disturbed as the result of a proposed project. As an example, a right-of-way for a power line may be 100 feet in width but, considering potential construction and maintenance activities during the life of the project, the APE may be defined as 500 feet or 1000 feet in width. Or, an APE may be considered to be an identified Cultural Landscape encompassing a viewshed which may be an entire valley or drainage. Just when and where an APE begins and ends is often determined by dialogues among various entities.

If there are questions concerning an APE, or if a project may affect a significant cultural resource (historic property), the user of this document should consult a cultural resource specialist as a first step in understanding how the APE boundaries were determined. The public can then ask what options may be available to recommend modifying the identified APE.

Many of the identified sites that follow will jump out at the reader as being significant. The reader should remember that less than 12 percent of the desert has been inventoried in the last 35 years. At this rate of survey and documentation, it will take nearly 300 years before we can firmly state that we know everything we need to know about the location and distribution of the sensitive cultural resources of the desert.

GENERAL DESCRIPTION OF ARCHAEOLOGICAL RESOURCES CONTAINED WITHIN CDCA

The Federal Land Management and Policy Act (FLPMA) recognized that the California Desert contains irreplaceable cultural resources within its boundaries. The lands identified by Congress were to be managed as the CDCA. During the development of the California Desert Plan, the Bureau of Land Management (BLM) authorized the hiring of specialists to conduct a sample inventory of the public lands and to document and evaluate archaeological and historic resources. Contracts were also funded to conduct archaeological overviews and random sample surveys within most of the California Desert District. Native American cultural resources were also assessed as “sacred sites” and Native American Traditional Areas. In toto, approximately 1 percent of the CDCA was randomly or purposively inventoried by the BLM to plan for the long-term management of these resources. Predicting that another 4 % of the area had been inventoried by various individuals or organizations over the past 50 years, it appears that approximately 5% of the resources were documented in some manner.

The resources that were studied included the following:

- **Prehistoric Native American** resources, that is, those that exist as the result of people leaving evidence of having lived within the CDCA before the first advent of Europeans. Using current archaeological theory, this would date from approximately 12,000 Years Before The Present (BP) until around 1769 A.D. The first known incursion of Spanish into the California Desert was probably that of Melchior Díaz, who crossed the lower Colorado River in 1540, but a substantial presence came only in the late eighteenth century. Father Serra founded Mission San Diego and traveled up California’s west coast in 1769. The Anza expeditions of 1774 and 1775-1776 crossed the Colorado Desert. In 1776 Father Garcés crossed the Mojave Desert and made contact with the indigenous native peoples. In the California deserts, archaeological sites dating to before 1769 are considered prehistoric.

- **Historic-era** resources are considered ethnohistoric if they contain artifacts identified as being primarily from aboriginal cultures but dating to after European contact.
- Artifacts of historic American (European-based culture) are those that date to after 1769, and generally after 1800. There has been some suggestion that Spanish or Mexican miners may have worked gold and silver mines in the California Desert, for instance at Tumco in the Cargo Muchacho Mountains in Imperial County, in earlier times but there is no documented evidence to support these claim.

Prehistoric sites were described during the BLM inventory stage as villages, temporary camps, utilized shelters/caves, milling stations, lithic scatters, quarry sites, pottery loci (scatters), cemeteries, cremation loci, intaglios, rock alignments, petroglyphs, pictographs, trails, roasting pits, isolated finds, cairns, and the catch all, “others”.

Historic sites were classified as towns, camps, homesteads, roads, trails, mines, railroads, graveyards, trash dumps, military sites, and “others”.

By the end of 1980, 14,200 archaeological sites were known, of which 2,903 were documented as a result of the Desert Plan inventory (see Volume D, Final Environmental Impact Statement and Proposed Plan, Appendix VII Cultural Resources and Appendix VIII Native American, September 1980). The BLM felt comfortable that it knew the location of approximately 5 percent of the archaeological sites within the CDCA. Today, the figures vary from 7 to 15 percent. There has been no general inventory of the CDCA since the time of the Desert Plan; most of the inventory work has related to looking for archaeological sites as the result of proposed projects such as power lines, pipelines, wind projects, mines, dumps, and other ground-disturbing activities.

SOME IMPORTANT DEFINITIONS TO BETTER UNDERSTAND CULTURAL RESOURCE MANAGEMENT (CRM)

What is a cultural resource?

For the purposes of this document, a cultural resource is an archaeological site or place, an historic site or place, a place important to Native peoples in the California Desert because of its association with the sacred or the traditional, or any place important to Americans as a location containing a vestige of something important to carrying on a vestige of their American culture.

It can be defined as a place with physical manifestations of culture or with intangible resources, such as a landscape where a *creator* discussed in the lore of Native peoples did something, lived, or died. Such places are present within the CDCA. They are identified as “Traditional Cultural Places” or shortened to TCPs.

Some people would say the Integretron, built in the 1950s near Giant Rock in Johnson Valley, San Bernardino County is a special place (although it is not listed here, because it is on private land) and would be considered a traditional cultural resource by people who consider Mr. George Van Tassel, an extraordinary individual and to have been a representative of their point of view regarding extra-terrestrial contacts in the desert.

Still, others may think of the Loskot Meteorite fields near Baker, California, as a cultural resource even though it is not cultural but a physical location. Mt. Shasta, in Northern California and Tecate Peak (Cuchama) along the Mexico/California border, are both physical landmarks that are cultural resources because of their use by people as places that matter to the lives of individuals and/or groups. The Topock Maze, an unusual series of rock alignments near Needles, California could be an important TCP due to the practices which created it and Edom Hill near Palm Springs could be a TCP because it is associated with Coyote Stories which have been important to Cahuilla people.

However, with the above caveat, most people think of a cultural resource as a place such as an archaeological site with physical remains that someone left of their use of the location. That is how agencies and the general public generally treat it.

What is Cultural Resource Management (CRM)?

Cultural Resource Management is a relatively young discipline in the United States. It is essentially, a process of identifying, evaluating and administering (managing) the scarce elements of the cultural heritage. Often equated with archaeology, CRM in fact includes a range of types of feature including, but not limited to: "cultural landscapes, archaeological sites, historical records, social institutions, expressive cultures, old buildings, religious beliefs and practices, industrial heritage, folklife, artifacts [and] spiritual places."

These resources do not exist in a vacuum, of course. Instead they are situated in an environment where people live, work, have children, build new buildings and new roads, require sanitary landfills and parks, need safe and protected environments. Dr. Thomas F. King has written extensively and very clearly about cultural resource management in a series of books, some of which are identified in the References Section of this study. Instead of calling practicioners of this discipline archaeologists, they are often generically called "Cultural Resource Management Specialists or Cultural Resource Specialists." Throughout much of the world cultural resource management is a synonym for historic preservation.

What is an historic property?

It is a cultural resource that may be a district, site, building, structure, or object and that is either listed or eligible for listing in the NRHP according to the criteria found within 36 CFR 60. The term relates to the NHPA and is not generally used outside of contexts involving compliance with federal historic preservation laws. It is used in this document as interchangeable with significant cultural resource.

What is a cultural landscape?

Thomas F. King, in his 2007 book entitled "Saving Places That Matter," defined it as "a broad term embracing a range of landscape types, other times to refer to a landscape that has some kind of special cultural value, such as a battlefield or a landscape associated with the traditions of an Indian tribe or other community." The landscapes within the California Desert can be as varied as an archaeological sites situated on an alluvial fan, the World War II-era Desert Training Center and associated tank tracks found on the impacted desert pavement, or the archaeological sites associated with the visually identifiable Lake Cahuilla shoreline. There are also landscapes, for example, associated with Route 66, the 20 Mule Team Borax Road, and the Panamint Valley Geoglyphs.

What is an Effect Or Affect?

These two words are always used in federal CRM reports and are linked to federal regulations dealing with reviews under Section 106 of the NHPA. Federal regulations will be discussed later in this document. These terms generally mean that there is an impact to a resource, in this case a cultural resource or historic property. There are many types of effects to cultural resources: effects from noise, impacts on the viewshed, and direct, indirect, or even perceived effects, such as a purported social impact to the property. For landowners there can also be an economic effect to a property caused by an undertaking. The words effect and affect is a homophone pair and are often used interchangeably but incorrectly. Effect is a noun and affect is a verb. Example: "What are the effects of the project to archaeological sites?" How did the project affect the archaeological site?" Had the writers of the regulations stuck with the word impact, describing results of projects to resources would have been much simpler for most people. In the jargon of CRM an action can only affect a historic property listed in or eligible for listing in the NRHP.

What is an undertaking?

This has nothing to do with an undertaker or mortician. It is federal jargon within the Section 106 process of the NHPA that indicates that a land use action is proposed. When the project is approved it is often stated that the undertaking was approved, or Section 106 requirements were completed for the undertaking. It is something the federal agency undertakes or does.

What is the State Office of Historic Preservation (OHP)?

OHP is the state agency, headed by the state official who is designated by the governor, that administers programs under the NHPA. This office must be consulted with under the NHPA in every step of the Section 106 process. The authority of the SHPO is limited to lands within their state. Projects that involve more than one state are generally governed by a Programmatic Agreement document signed by the various involved states, agencies and the Advisory Council on Historic Preservation. The State Historic Preservation Officer is referred as the SHPO (in the western U.S., pronounced "Ship-O"; in the eastern U.S. generally pronounced "Sha-Poh."

What is a Tribal Historic Preservation Officer (THPO)?

The THPO serves the same function as the SHPO for lands contained within tribal lands. Like SHPOS, THPOS have no regulatory authority outside of their reservation. THPOS often have interest in the cultural resources outside their reservation boundaries because the archaeological sites on lands outside of their reservations can be attributed to the ancestors of members of tribe. The National Park Service designates a tribe as a THPO after the tribe makes an application. The THPO is pronounced as “Thip-O” or “Tip-O.” Several tribes have been approved as THPOS within the CDCA. These include: the Agua Caliente, Big Pine, Bishop, and Timbisha tribes.

What is the Advisory Council on Historic Preservation (?)

It is an independent federal agency established as a result of the NHPA that oversees and issues regulations for Section 106 review. It is also referred to as the Advisory Council or just the Council. The Council negotiates agreement documents on Section 106 undertakings including agency responsibilities to tribes. The Council is advisory and cannot approve or deny a project based upon identified or affected resources. They may only comment on effects of the undertaking.

HISTORY OF BLM INVOLVEMENT: WHAT HAS AND WHAT HAS NOT BEEN DONE

Archaeological inventory and data gathering, artifact collection, the gathering of ethnographic accounts, and some levels of historic preservation have occurred within the greater California Desert since Europeans occupied the deserts. First, the desert was a place to cross to get to the gold fields of California or to the transportation centers along the coast. The accounts of such explorers as Garcés, Jedediah Smith, U.S. Army Captain Carlton, the Anza Expedition and the Manly Party of Death Valley Forty-Niners sparked an interest in the desert due to its desolation and the potential for instant riches.

Miners and homesteaders made their ways and focused their energy on mineral deposits and spring sites. These were the same spring sites that had been occupied by the Native American inhabitants of the land. The aboriginal inhabitants were moved from the most productive lands, leaving their artifacts and their remains, and subsequent technologies were left behind with every episode of land use. By the early 1900s large tracts of the land had gone into private ownership through purchase, homesteading, or railroad grants (alternate sections of land for 20 mi. north and south of the railroad). Communities sprang up to meet the needs of the railroad, agriculture, mining, or recreation. During the 1940s the military used desert lands in order to prepare for World War II. Nearly 2,000,000 acres of land were withdrawn from the Public Lands, which were then administered by the Government Land Office (GLO), the predecessor to the BLM.

With the close of WWII, technology such as the conversion of the Jeep from military to civilian use and the advent of other off-road vehicles such as motorcycles opened up the desert to intense recreation. Some of the recreation, particularly north of Los Angeles, near Barstow, and near El Centro, was considered to be extremely destructive and caused Congress to mandate that BLMadminister its lands more effectively. In 1976, FLPMA became the organic act for the BLM, and among other things, it charged the agency to locate and manage archaeological sites for the public benefit.

The first archaeologist hired as a BLM employee was either Herrick "Rick" Hanks who was hired in California or Richard Fike who was hired by the BLM in Utah. The issue has been the subject of a friendly debate between the two for the past three decades. Both "Rick" and "Rich" were hired in 1972. Prior to that, the National Park Service (NPS) approved scientific permits for work on BLM lands. They authorized the only legal archaeology undertaken on public lands by recognized institutions under the American Antiquities Act of 1906. Much illicit collecting and excavation occurred, but the activity was largely unmanaged due to a lack of federal staff.

The earliest systematic archaeological surveys conducted by an organization in the California desert was by the Archaeological Survey Association of Southern California (ASA), which was formed in 1947. Much of ASA's work was undertaken on the public lands. Sometimes they had permits issued by the NPS, but frequently they did not. They sometimes catalogued, mapped, and wrote about the work they did, but often they did not do so; their interest was in locating and saving the resources, not in what is now called curation. Curation of the artifacts they collected was not systematic.

The ASA archives are now housed as the ASA Foundation (ASF) at SRI in Redlands, California due to the generosity of money willed to the ASA by Ruth DeEtte Simpson. Over the past few years, the collections have been made available to scholars, with some stipends to help fund research. As of this writing the ASF plans to dissolve and transfer its collections to the Department of Anthropology at California State University San Bernardino. The long-term challenge of these collections, as is the case with many early archaeological collections, is that the records were not well managed; the documentation of surveys, excavations, and cataloguing of artifacts were inconsistent and often lacked oversight. There will always be information gaps in their archival data because the people responsible for collecting the materials are now deceased and the records are gone; some were lost, others were never completed or retrieved from volunteers, and still others may have been destroyed as a result of a number of calamities such as in a legendary house fire which supposedly burned an inordinate amount of Mojave Desert collections in the 1960s.

When the BLM began staffing for the cultural resource component of the California Desert Plan, they faced almost 100 years of undocumented and haphazard collection of artifacts from sites, nearly 60 years of the NPS issuing permits for scientific investigation, and nearly 30 years of intensive collecting by the ASA and other local archaeological societies, museums, and clubs. The Desert Plan Staff (DPS) had to collect existing data and verify them in the field.

It also had to develop a standardized approach to information collecting and compile it in a useable format. The archaeologists devised a system of randomly placed sample transects; first the transects were quarter mi. squares (160 acres), then the system changed to survey units 1/16 mi. wide and 1 mi. long (80 acres).

This survey work was done before the advent of global positioning systems (GPS), using a compass and, if the surveyors were lucky, a 7.5-minute USGS quad map. Sometimes the maps used were 15-minute quads. Accuracy was "the best one could do under the circumstances." Transects sometimes fell on inhospitable terrain such as the side of mountains in the Whipple Mountains, or on the dry playa of Palen Lake. Other times as a result of random sampling significant areas such as North Searles Valley, the Sierra Nevada Canyons, or parts of the Lake Cahuilla shoreline were omitted. Less than 5 percent of the California Desert was inventoried, which meant that BLM needed to learn about 95 percent of the landscape.

Many of the publically important or sensitive sites had been known for a long time; Corn Spring, in Riverside County, even had a county historical plaque permanently adhered among the petroglyphs panels. These known resources were a part of the database that was gathered before going into the field. Some spectacular sites were found by using the random sample transects, such as the work done by Eric Ritter, Richard Brook, and their crew in Saline Valley and Ritter's identification of a standing wickiup and ethnohistoric-era pictographs in the Panamint Mountains.

Largely, though, the work of identifying the wide variety of cultural resources in the desert was to remain to be done during the implementation phase of the California Desert Plan, requiring money, staff, libraries, management plans, and research and management drive. It did not happen that way. American politics changed significantly in 1980, and the funding needed to implement the Plan was not allocated. Instead, a piecemeal approach was undertaken, and to this day, much of the archaeological identification effort relies on staff archaeologists in field offices, working with volunteers and site stewards, documenting archaeological resources, or else it relies on project-specific data collected by archaeologists working on behalf of proponents for projects such as power lines, gas lines, highway expansions, wind energy proposals, or solar energyprojects.

The bulk of data in the CHRIS database have been collected as a result of proposed projects. Due to a general lack of federal funding, many of the idealistic goals of the Cultural Resources Element of the California Desert Plan have not been realized. It is not due to any lack of interest on the part of staff archaeologists. There are simply too many projects to review to be a proactive, as the mandates require. Conflicting interests are often at odds in multiple-use agencies such as the BLM or the US Forest Service; many of the decisions are politically driven, as the designation of Areas of Critical Environmental Concern (ACECs) and their boundaries often were. Mining, recreation, energy corridors, grazing issues, and other concerns have sometimes compromised the boundaries of ACECs, which are often modified, based upon public input. An example of an ACEC designation that recognized that much more extensive areas of public land contain archaeological resources is Corn Spring in the

Chuckawalla Mountains, where the area of known archaeological resources is several times larger than the ACEC. The boundary reflects the interplay between multiple-use determinations and the protecting resources during any public process. The recognition of archaeologically sensitivity areas were implied by the designation of ACECs and by the processes which were to occur as the California Desert Plan was implemented. As noted, this did not occur, and the identification process is still in progress nearly more than 35 years after the Department of the Interior recognized the need to identify and protect the desert's cultural resources.

The CDCA planning efforts produced significant archaeological reports edited first by Desert District Archaeologist Eric Ritter and then by Russell Kaldenberg. Nearly 20 volumes of archaeological data were published. These have been reproduced and made available again by Coyote Press of Salinas, California. Key general documents on the results of the work undertaken by the Desert Plan staff include:

- The Draft California Desert Conservation Area Plan Alternatives and Environmental Impact Statement, published in February 1980
- The Final Environmental Statement and Proposed Plan: California Desert Conservation Area, published in September 1980
- The California Desert Conservation Plan 1980, As Amended, published in March 1999

The Plan's discussion of cultural resource significance is found in Volume D, Appendix D, Volume VII, Part 4, which is the section that dealt with Cultural Resource Sensitivity/Significance Determinations. The sections states:

> The concept of significance has been used in most laws, directives and regulations pertaining to cultural resource management (see Part 12) and is the key to the Sensitivity Mapping Record (which was developed for use in the Draft Plan) developed by staff. Inasmuch as each archaeological site contains bits and pieces of information that may enhance our understanding of past human activities, each site is potentially significant. However, it is generally accepted that defining significance of an archaeological phenomena requires some frame of reference, problem orientation, or geographic, temporal or other content. In the course of DPS's sensitivity analysis, locations or small regions containing or believed to contain one or a complex of sites were deemed more or less significant following the attached criteria.

The criteria employed in the sensitivity analysis were discussed in form order. Since the criteria were designed for the determination of areas of (1) very high, (2) high, and (3) moderate, low, or unknown cultural resource sensitivity/significance, comments were added which indicated that "because of the nature of the plan and the cultural resource inventories to date, the resources in all cases were given the benefit of the doubt." The approach then was "a liberal evaluation of significance because so much of the desert is simply unknown in terms of prehistoric or historic remains" (Volume VIII, Part 2, pg 32-33).

The criteria used to evaluate sensitivity were by broad desert subregions and were defined by the following criteria:

1) site density
2) site variance
3) site distribution
4) site diversity
5) site complexity
6) uniqueness/rarity of the resource
7) current field research interests
8) potential scientific use
9) aesthetic values for recreation
10) integrity of the surrounding environment
11) socio-cultural (ethnic) use or concern
12) historic-ethnohistoric documentation, which was also called heritage interest.

For example, using criterion 1, site density, a mathematical model based upon the data that were collected found that the highest-ranking geographic subregion was the Anza-Borrego and Yuha areas, because they had the highest site densities. The Southwestern Great Basin, Mojave Basin, eastern Colorado Desert and western Colorado Desert subregions were high, and the lowest rankings based entirely on site density were the central Colorado Desert (generally east of Indio to the Colorado River) and the northeast Mojave (near the Nopah Range).

In order to reach a conclusion as to the significance of resources in the CDCA according the Desert Plan, each of the variables was combined with intuitive and judgmental knowledge of the geographic regions studied and polygons were drawn indicating the areas of significance and sensitivity.

This pioneering effort formed the basic framework for identifying sensitive cultural resources and for managing them. This management framework is still used today to identify and manage the cultural resources of the CDCA. It has withstood the test of time, but as discussed previously, monies have come only sparingly.

THE REGULATORY CONTEXT OF CULTURAL RESOURCE MANAGEMENT

The Antiquities Act of 1906 (34 Stat. 225, 16 U.S.C. 431-433) marked the beginning of American governmental policy concerning historic preservation on public lands. It established that no person may appropriate, excavate, injure, or destroy any historic or prehistoric ruin or monument or any object of antiquity on lands owned or controlled by the federal government without permission of the governmental department having jurisdiction over the lands on which such antiquities are located. Criminal penalties in the form of fines and/or imprisonment were established for those found guilty of violating this provision. The act established the authority of the Secretaries of the Interior, Agriculture, and War (now Defense) to issue permits to qualified institutions for the study of such ruins and collection of materials covered under the act.

The permit system authorized under the 1906 act was substantially revised by the 1979 Archaeological Resources Protection Act (ARPA; Public Law 96-95; 16 U.S.C. 470aa-mm), which defined much more clearly what was meant by archaeological resources, established severer penalties for the illegal removal of resources located on public lands or Indian lands, and in Section 4 refined the definition of who is qualified to obtain a permit for "furthering archaeological knowledge in the public interest." Permits are issued to qualified individuals and firms to document and evaluate archaeological resources pursuant to the tenets of the NHPA.

The Historic Sites Act of 1935 (49 Stat U.S.C. 666, 16 U.S.C. 461-467) declared "it is national policy to preserve for public use historic sites, buildings, and objects of national significance for the inspiration and benefit of the people of the United States." The Department of the Interior was directed to secure, collate, and survey sites and buildings commemorating or illustrating the history of the United States. This law was the basis for the establishment of the Historic American Buildings Survey/Historic American Engineering Records, the Historic American Landscapes Survey, and the National Historic Landmarks Program. The Act directed tablets to be placed at historic or prehistoric places of national or archaeological significance.

The National Historic Preservation Act (NHPA) (Public Law 89-255, 16 U.S.C. 470, et seq.), as amended more than 20 times, is the foundation for the practice of historic preservation and cultural resources management in the United States. Congress found, among other declarations, that:

- "the spirit and direction of the Nation are founded upon and reflected in its historic heritage:"
- "the historical and cultural foundations of the Nation should be preserved…in order to give a sense of orientation to the American people;"
- "historic properties significant to the Nation's heritage are being lost…;"
- "preservation…is in the public interest…;"
- "increased knowledge of our historic resources [and] the establishment of better means of identifying and administering them…will improve…planning…;"
- It is necessary for the Federal Government to accelerate its historic preservation programs and activities.
- "It shall be the policy of the Federal Government, in cooperation with other nations and in partnership with the States, local governments, Indian tribes, and private organizations and individuals to…provide leadership in the preservation of the prehistoric and historic resources of the United States…administer federally owned,

administered or controlled prehistoric and historic resources in a spirit of stewardship for the inspiration and benefit of present and future generations…contribute to the preservation of nonfederally owned prehistoric and historic resources." (16 U.S.C. 470, 470-1).

NHPA established the NRHP and the President's Advisory Council on Historic Preservation (ACHP), and provided that states may establish State Historic Preservation Officers to carry out some of the functions of NHPA. Most significantly for federal agencies responsible for managing cultural resources, Section 106 of the act directed that "The head of any Federal agency having direct or indirect jurisdiction over a proposed Federal or federally assisted undertaking in any State and the head of any Federal department or independent agency having authority to license any undertaking shall, prior to the approval of the expenditure of any Federal funds on the undertaking or prior to the issuance of any license, as the case may be, take into account the effect of the undertaking on any district, site, building, structure, or object that is included in or eligible for inclusion in the National Register." Section 106 also affords the Advisory Council on Historic Preservation a reasonable opportunity to comment on the undertaking (16 U.S.C 470f).

36 CFR 800 implements Section 106 of NHPA. It defines the steps necessary to identify historic properties (those cultural resources listed in or eligible for listing in the NRHP), including consultation with federally-recognized Native American tribes to identify resources of concern to them; to determine whether or not they may be adversely affected by a proposed undertaking; and the process for eliminating, reducing, or mitigating the adverse effects. Resolution of adverse effects may require development of agreement documents between consulting and interested parties to an undertaking.

Section 110 outlines the responsibilities of federal agencies to establish programs to identify, record, evaluate, and nominate properties under their jurisdiction to the NRHP. Agencies often develop internal guidance, in concert with the local SHPO and the ACHP, which implements Sections 106 and 110 of NHPA. The BLM has codified its implementation of NHPA in a series of manuals that are identified as 8100-8170.

36 CFR 60.4 defines criteria for determining eligibility for listing in the NRHP. BLM evaluates the signifance of cultural resources identified during inventory phases in consultation with the SHPO to determine if the resources are eligible for inclusion in the NRHP. Cultural resources may be considered eligible for listing if they possess integrity of location, design, setting, materials, workmanship, feeling, and association and meet one or more of the criteria:

- Criterion A: associated with events that have made a significant contribution to the broad patterns of America's history
- Criterion B: associated with the lives of persons significant to our past
- Criterion C: embodies the distinctive characteristics of a type, period or method of construction, or represents the work of a master, or possesses high artistic value or

represents a significant and distinguishable entity whose components may lack individual distinction

- Criterion D: has yielded or may be likely to yield information important in prehistory or history.

As an example, the BLM in Nevada has facilitated the evaluation of cultural resources by devising state level Manuals with specific as agreed upon guidelines for inventorying and determining the eligibility of prehistoric and historic sites. The guidelines supplement the NRHP criteria for evaluation and provide consistency on BLM lands across the state. These "Cultural Resource Inventory General Guidelines" have been revised to keep pace with current developments in the field of cultural resource management.

BLM in California relies upon the National BLM 8100 Series Manuals and the various State of California Guidelines for Cultural Resources along with a series of agreement documents signed by the California State Director and the California State Historic Preservation Officer. These are supplemented by Instruction Memoranda which are regularly sent to the various Field Offices.

The National Trails System Act of 1968, as amended (16 U.S.C. 1241 et seq.) established a national trails system and provided that federal rights in abandoned railroads may be retained for trail purposes. Emigrant Trails that cross the CDCA include the Old Spanish Trail and the De Anza Trail. These National Historic Trails are managed by the BLM and the National Park Service.

The National Environmental Policy Act of 1969 (NEPA), as amended (P.L. 91-190, 42 U.S.C. 4321-4347 et seq.) was enacted "to declare a national policy which will encourage productive and enjoyable harmony between man and his environment." Section 101 (42 U.S.C. 4331 (b)) directs the federal government to use all practicable means, consistent with other essential considerations of national policy, to improve and coordinate federal plans, functions, programs, and resources to the end that the Nation may "preserve important historic, cultural, and natural aspects of our national heritage and maintain, wherever possible, an environment which supports diversity, and variety of individual choice."

The BLM also recognizes the importance cultural resources through FLPMA (sometimes referred to as BLM's organic act) (PL 94-579, 90 Stat, 2743). FLPMA recognizes the following:

- The public lands (will) be managed in a manner that will protect the quality of scientific, scenic, historical…and archaeological values
- Multiple use means management of the public lands so that they are utilized in the combination that will best meet the present and future needs of the American people…those needs are including but not limited to scientific and historic values

- Areas of Critical Environment Concern may be identified to protect and prevent irreparable damage to important historic, cultural or scenic values (43 U.S. C. 170).
- Title VI of FLPMA, Section 601 (1) states that the California desert contains historical, scenic, archaeological, environmental, biological, cultural, scientific, educational, recreational…resources that are uniquely located adjacent to an area of large population
- Title VI of FLPMA, Section 601 (2) states the California desert environment is a total ecosystem that is extremely fragile, easily scarred, and slowly healed; and that
- (3) the California desert environment and its resources, including certain rare and endangered species of wildlife, plants, and fishes, and numerous archaeological and historic sites are seriously threatened….
- The Cultural Element of the California Desert Plan (1980:22) states "Prehistoric and historic remains within the California Desert are being depleted at a rate which approaches 1 percent per year. Significant losses of paleontological values area are also apparent. These remains represent a national treasure with importance to the public, scientists, Native American, and others. Preservation and protection or proper data recovery is essential." The element then identifies goals, planned actions and implementation procedures.
- The Native American Element of the California Desert Plan (1980:26) states "Prominent features of the CDCA landscape, wildlife species, prehistoric and historic sites of occupation, worship, and domestic activities, and many plant and mineral resources are of traditional cultural values in the lives of the Desert's Native people. In some cases these resources have a religious value. Specific sites or regions may be important because of their role in ritual or the mythic origin of an ethnic group. These values will be considered in all CDCA land-use and management decisions." Goals are then outlined and actions planned and methods of implementation procedures are discussed.

In 1999, the Desert Plan was reprinted. During this time period the Plan Goals were reexamined. The Cultural Resources Element goals were changed from:

1) Conduct inventory to the fullest extent possible to broaden the archaeological and paleontological knowledge of the California Desert and to further the achievement of the following goals;
2) Protect and preserve to the greatest extent possible representative samples of the full array of the CDCA's cultural and paleontological resource for the benefit of scientific and socio-cultural use by present and future generations;
3) Ensure that cultural and paleontological resources are given full consideration in land use planning and management decisions;

4) Manage cultural and paleontological resources so that their scientific and socio-cultural values are maintained and enhanced;

5) Ensure that the Bureau's activites avoid inadvertent damage to cultural and paleontological resources; and

6) Achieve proper data recovery where adverse impacts may not be avoided,

to:

1) Broaden the archaeological and historical knowledge of the CDCA through continuing inventory efforts and the use of existing data. Continue the effort to identify the full array of CDCA's cultural resources,

2) Preserve and protect representative sample(s) of the full array of the CDCA's cultural resources,

3) Ensure that cultural resources are given full consideration in land use planning and management decisions, and ensure that BLM authorized actions avoid inadvertent impacts;

4) Ensure proper data recovery of significant (National Register quality) cultural resources where adverse impacts can [sic] (cannot) be avoided.

5) Ensure that paleontological resources are given the consideration in land use planning and in management decisions,

6) Preserve and protect a representative sample of the full array of the CDCA's paleontological resources,

7) Ensure proper data recovery of significant paleontological resources where adverse impacts cannot be avoided or otherwise mitigated (1999:22).

The American Indian Religious Freedom Act (AIRFA) of 1978 (Public Law 95-341, 42 U.S.C. 2996 and 1996a) establishes the policy of the United States to protect and preserve for the American Indian, Eskimo, Aleut, and Native Hawaiian the inherent right of freedom to believe, express, and exercise their traditional religions. The BLM has a responsibility to Native Americans to ensure compliance with this act.

The Native American Graves Protection and Repatriation Act of 1990 (NAGPRA; 32 U.S.C. 3001 et seq.) provides a process for federal agencies to consult with Native Americans for the excavation and/or removal of "cultural items", including human remains, funerary objects, sacred objects, and objects of cultural patrimony. It also provides a process for federal agencies to return cultural items to lineal descendants and culturally affiliated tribes. BLM's 8120 manual guides the process.

The Programmatic Agreement Among the Bureau of Land Management, Advisory Council on Historic Preservation, and the National Conference of State Historic Preservation Officers

Regarding the Manner in Which BLM Will Meet its Responsibilities Under the National Historic Preservation Act (BLM's national PA) defines how the BLM will carry out its legal mandates under Sections 106, 110, and 111 (a) of NHPA through the agreed upon mechanisms in the national PA (see Appendix 1).

The State Protocol Agreement Between BLM California and the California State Historic Preservation Office (OHP) describes the means by which the BLM will conduct its cultural resources management program and details the manner in which the California SHPO and BLM California will interact and cooperate to implement the various laws and guidance for historic preservation in California (see Appendix 2).

"America's Priceless Heritage: Cultural and Fossil Resources on Public Lands, California, 2003" is an excellent overview of the BLM's heritage resources in California. It provides a statistical overview through Fiscal Year 2002 of the CRM program accomplishments made on the approximately 17 million acres of public lands administered by the Bureau.

Executive Orders (EO) which are important for managing cultural properties include:

- EO 11593 Protection and Enhancement of the Cultural Environment (May 13, 1971) which directed federal agencies to locate, inventory, nominate and protect federally owned cultural resources eligible for listing in the NRHP and to ensure that their plans and programs contribute to preservation and enhancement of non-federally owned resources. The date to complete the directed tasks was 1973.
- EO 12898 Federal Action to Address Environmental Justice in Minority Populations and Low-Income Populations (February 11, 1994) directed agencies to make achieving environmental justice part of their mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority and low-income populations. This is seen to include analyzing the effects of undertakings on Native Americans' their traditional use areas and their cultural resources.
- EO 13006 Locating Federal Facilities on Historic Properties in Our Central Cities (May 21, 1996) encouraged federal facilities to be located within historic buildings or districts rather than constructing new facilities.
- EO 13007 Indian Sacred Sites (May 21, 1996) established access to and ceremonial use of Indian sacred sites by Indian religious practitioners on federal lands. The federal agencies shall avoid adversely affecting the physical integrity of such places and maintain the confidentiality of the sites. A sacred site is defined as "any specific, discrete, narrowly delineated location on Federal land that is identified by an Indian tribe, or Indian individual determined to be an appropriately authoritative representative of an Indian religion, as sacred by virtue of its established religious significance to, or ceremonial use by, an Indian religion; provided that the tribe or appropriately authoritative representative of an Indian religion has informed the agency of the existence of such a site."

- EO 13175 Consultation and Coordination with Indian Tribal Governments (November 9, 2000) directs federal agencies to consult with and have government-to-government relationships with Indian Tribes. It also calls for reports to address any changes necessary to accommodate access to and ceremonial use of Indian sacred sites; procedures to implement or proposed to facilitate consultation with appropriate Indian tribes and religious leaders; and the expeditious resolution of disputes related to agency action on Federal lands that may adversely affect access to, ceremonial use of, and physical integrity of sacred sites.

WHAT HAS TO OCCUR LEGALLY BEFORE A PROJECT CAN BE APPROVED?

Section 106 of NHPA, as amended, and 36 CFR 800 must be complied with. This means that before spending any federal money on any project, the agency must conduct a cultural resource analysis which may lead to an on-the-ground inventory to see if any cultural resources are present that may be eligible for inclusion in the NRHP.

This means that any time a project is proposed for any given parcel of land, by any federal agency requiring an expenditure of federal funds, or requiring the issuance of a permit or a license, cultural resources must be considered. A professional archaeologist either working for the agency or under permit to the BLM must examine records maintained at a CHRIS repository and usually those at local museums. Then, based upon the gathered data, usually the specialist has to look at the ground, prepare a report, and evaluate the archaeological sites against the standards set forth in 36 CFR 60 and the BLM 8100 Manuals. The methods of assessing the cultural resources must be in compliance with stipulations agreed to in the Programmatic Agreement Document signed between the BLM and the California SHPO.

The APE, as described earlier, must be identified. It must have boundaries. A CRM Specialist, on behalf of the federal agency, must evaluate any potential historic property, which may be affected as a result of the proposed project. You should keep in mind that the agency only has to evaluate and mitigate the effects of projects related to sites eligible for inclusion in the NRHP. Cultural resources not eligible for listing in the NRHP can be protected through the various guidelines in BLM manuals and codes of federal regulation.

How Does the Public Become Involved?

The public is an important aspect of the project. The regulations state that an agency must consult with the SHPO and Indian tribes; they also state that an agency may consult with a concerned property owner or an organization. The regulations are somewhat murky here, since consultation slows down projects. 36 CFR 800.16(f) states that "Consultation means the process of seeking, discussing, and considering the views of other participants, and where, feasible, seeking agreement with them regarding matters arising in the section 106 process."

The Secretary's '*Standards and Guidelines for Federal Agency Preservation Programs pursuant to the National Historic Preservation Act*' provide further guidance on consultation.

An interested party, which means a person or any organization that may construe itself as a stakeholder in a proposed undertaking (or project), may have to be consulted with. Or, it may identify itself as a group that wants to be consulted with. The regulations that provide for this opportunity are found at 36 CFR 800.2(c)(5) and again are not as explicit as they might be but they are meant as guidance which is usable by organizations or individuals who have a stake in the outcome of the decision on an undertaking. The regulations state: "Certain individuals and organizations with a demonstrated interest in the undertaking may participate as *consulting parties* due to the nature of their legal or economic relation to the undertaking or affected properties, or their concerns with the undertaking's effect on historic properties." This says that the interested public has a right to know how and what cultural resources will be impacted before a decision is made.

In many cases it would serve the interest of organizations or individuals to request to be Consulting Parties to any action that may adversely affect historic properties. The request should be directed at the local BLM field manager, not to the local archaeologist. The archaeologist is never the decision maker. Sometimes it might be useful to have the request for participation to come from an attorney. Attorney letters seem to get more attention than a letter from the general public.

The request should be respectful but forceful, according to the recommendations of Thomas F. King (see "Saving Places that Matter: A Citizen's Guide to the National Historic Preservation Act," 2007). Becoming a Consulting Party may mean that the party will be signatory to a Memorandum of Agreement that could involve the SHPO as well as the BLM. In general terms, a Consulting Party to the undertaking/action has the authority to terminate the agreement, so everyone involved will want to make certain that all of the agreed conditions of the project regarding historic properties (and also Native American concerns) are implemented. If one party of the Consulting Parties withdraws from the agreement document the entire document becomes null and void and the must be renegotiated before the project can proceed.

In some cases the SHPO will work with the BLM and interested parties closely but will negotiate with the interested public to become a participant in historic preservation as a Concurring Party and not a Consulting Party. The responsibilities are similar with one huge difference. If an individual or organization is invited to become a Concurring Party if they do not sign the agreement document and the Consulting Parties sign the document the agreement is implemented. Also, if a Consulting Party to the agreement decides to withdraw from the agreement, the agreement is still in effect and the agreed upon conditions of the document are not modified.

The difference between a Consulting and a Concurring Party is the level of the involvement allowed to the stakeholder. If a Consulting Party withdraws from the agreement document, the entire MOA is voided by the Consulting Party's action. If a Concurring Party decides they no longer support the agreed upon approach or wish to terminate their involvement, the document is still in effect and the lead agency does not have to renegotiate the terms of the document.

It is highly recommended that if an interested party desires to fully participate in the process that they write letters to the SHPO and to the BLM early in the process requesting the level of involvement that they are seeking. It is unlikely that either the OHP or BLM will contact anyone asking them to become technically involved. Their workload generally prohibits this type of proactive approach and they might not know who or which organization has a significant level of interest in the project. It is certain that they will not know if the public is interested in the project if they are not contacted through letters or via the telephone.

WHAT SHOULD TRIGGER PUBLIC REVIEW OR INVOLVEMENT?

Any proposal that results in ground disturbance or disruption to an archaeological site or its setting, including Native American religious and cultural values, may be a trigger for public concern and subsequent review. Historically, the public has often not commented on effects to archaeological sites, and sites have been destroyed or seriously impacted because of a lack of public involvement. Sometimes the public feels that archaeological sites are secret and they cannot know about them. Sometimes agencies feel that it is all scientific data that the public would not be concerned with or cannot understand. These assumptions are not correct. The public and organizations that care about resources should be able to understand the effects of any undertaking to cultural resources.

Information concerning the location of archaeological sites are protected from the Freedom of Information Act disclosure under section 9 of ARPA and Section 304 of NHPA, but when archaeological sites are subject to impact as a result of a project supported by agency decisions, the public is a part of the decision-making process and has a right to know that historic properties will be impacted or destroyed and to comment on the project. If the agency refuses to comply with a request to provide data adequate enough to understand where the historic properties are located and what will be impacted, letters to the Keeper of the NRHP and the ACHP stating the concerns of the interested party might be appropriate.

NATIVE AMERICAN INVOLVEMENT IN THE REVIEW OF PROJECTS UNDER NHPA

The use of the terms Native American, Indians or American Indians within this document is meant to be interchangeable. Most of the legislation dealing with Indians issues use the term "Indian" and not Native American. There are exceptions. Before 1871 the United States entered into treaties with the various tribes as though they were independent nations. Since 1871 tribes have been recognized through various other legal means such as legislation, Presidential proclamations (Executive Orders), or by petitioning to the Acknowledgement branch of the Bureau of Indian Affairs (BIA).

Indian Tribes are specifically mentioned in laws such as ARPA, AIRFA, NAGPRA, and the various Executive Orders dealing with places of importance to American Indians. Most of the laws deal explicitly with "federally recognized Indian Tribes" which are classified by the United States government as being domestic dependent sovereign nations. Out of over 560 recognized tribes in the United States, there are over 100 federally recognized tribes within or adjacent to the state that were its native inhabitants at the time of contact. One of the most unusual is the Modoc Tribe of Oklahoma which was forced from California to Oklahoma in 1873 after the Modoc War. They are California's only removed tribe.

The CDCA contains over thirty federally recognized tribes. The Timbisha in Death Valley were recognized in 1983 and were landless until they received 7,700 acres of land in 2000 through the Timbisha Homelands Act.

California also has many non-federally recognized Indian people, many of which continue to petition for federal recognition. The Kawaiisu, the Kawaaymii, and the Tejon Indians are just three examples of historical/cultural tribes with ties to the CDCA who have not been granted federal recognition. The federal government generally differentiates between federally recognized and non-federally-recognized tribes in their responsibilities and interaction with them. Some programs of the BIA do not differentiate. For the purposes of cultural resource management, the BLM works with the unrecognized groups also; however, they sometimes fall through the proverbial crack because BLM is a federal agency and non-federally recognized tribes do not appear on lists provided to them by the BIA. The California Native American Heritage Commission provides updated information on the unrecognized tribes as "most likely descendents" for the purposes of cultural resource management and project coordination.

Indian tribes must be consulted, and information must be requested that would assist in making a sound management decision as to whether the project should be approved as designed. Indians do not have to respond, and it is a burden for many of them to do so. Many of the tribes lack staff or resources to respond to the many letters agencies send. Just because they do not respond does not mean they have no interest in the project. However, an agency cannot take into consideration the viewpoints of tribes unless they respond. The ACHP has become more proactive to ensure that agencies give Native Americans lead-time for consultation. There is no established time frame within the CFRs for response by tribes.

SPECIFIC SENSITIVE AREAS WITHIN THE CDCA.

Sensitive areas within the CDCA are those areas and/or cultural resources that are extremely important to science, history, or the values of people who live in or care about the historic values of the CDCA. Again, this listing is not exhaustive, but it is a building block, and new places that count should be added as they are discovered. This list generally excludes locations within designated wilderness areas, within property managed by the NPS, the Forest Service and the State or County Park System. It also does not include Indian traditional use areas or sacred sites except, as they are common knowledge or have been adopted as an ACEC by the BLM's planning process. Places special to American Indians are generally identified by Indians to a trusted individual and locations can change as a result of spiritual beliefs related to visions or healing ceremonies. Often, unless there is a threat to a particular place, the locations are not revealed to non-Indians.

2. THE IDENTIFICATION AND DESCRIPTIONS OF PLACES THAT MATTER WITHIN THE CDCA

These are areas and/or cultural resources that are extremely important to science, history, or the values of people who live in or care about the cultural history of the CDCA. Again, this listing is not exhaustive, but it is a building block, and new places that count should be added as they are identified. The following are generally alphabetically by county. Exceptions are broad classes of cultural resources that are located throughout the CDCA.

IMPERIAL COUNTY

1. **San Sebastian Marsh (Harpers Well) ACEC** contains remains from Native American occupations and scattered artifacts. Explorer Juan Bautista de Anza visited the area in 1774 when some 400 Native people lived in a single village there and provided water for travelers. The area has also brought "treasure hunters" to the area looking for buried Spanish plunder and the quest for the lost Spanish ship that supposedly sailed into the south end of the Salton Sea and was trapped in the receding waters of Lake Cahuilla.

2. **Coyote Mountains ACEC** in western Imperial County contains very old cultural materials in a dissected wash area to the east of the Coyote Mountains. The area has been heavily impacted by off-highway vehicle (OHV) activity. It is a sensitive cultural area and should be managed as such.

3. **Yuha Basin is an ACEC** in southwestern Imperial County that has been studied for many years by Jay von Werlhof. He considers it to be one of the most important areas to study prehistoric aboriginal occupation in western North America. Trails, geoglyphs, lithic scatters, occupation areas, and historic emigrant trails dot the area. Some fencing has occurred, and a portion of the Yuha Basin has been listed in the NRHP for its geoglyphs as a portion of the Colorado Desert Geoglyph District. A previously unknown geoglyph was located as recently as April 2008.

4. **Indian Pass ACEC** is one of the most significant complexes of surface archaeological sites in the California desert. The location of the cultural resources, in the Chocolate Mountains in eastern Imperial County, has been known for at least 90 years. The archaeological resources include trails, cleared circles, petroglyphs, potsherds, firepits, lithic scatters, tools, and locations that are identified as Quechan trails of dreams, religious locations that are found nowhere else. The area has been threatened by OHV activity, general camping, prospecting, and large-scale mining. Casual use by "snowbirds" can also affect the important cultural resources here.

5. **East Mesa ACEC** is another area linked to ancient Lake Cahuilla. This portion of the Lake Cahuilla shoreline is located north of Interstate 8 and west of the Coachella Canal. Sand and gravel operations have threatened the resources, as has geothermal

development. This area should be considered as a portion of a Lake Cahuilla management plan area.

6. **The Plank Road ACEC**. This area is considered to be eligible for listing in the NRHP and is designated by the BLM as an ACEC due to the historic engineering accomplishments it represents. The Plank Road was one of the first automobile roadbeds used between World War I and the mid 1920s. It is believed to be the only wooden automobile road still existing in the United States. A segment 6.5 mi. long runs through the southern end of the Algondones Dunes. A portion of it has been set aside as a kind of a landmark. Many of the boards have been used in campfires over the years, and it is not certain how much of the resource remains. It warrants another look to see if it has any integrity.

7. **Pilot Knob ACEC** was nominated by the Desert Plan staff to protect archaeological and Native American values located around Pilot Knob, which is a sacred Mountain to the Quechan Indians. Geoglyphs, sleeping circles, trails, and habitation sites are situated within and near this ACEC. Geoglyphs have been listed in the NRHP's Colorado Desert Geoglyph nomination; include the horse geoglyphs immediately west of Pilot Knob.

8. **Golden Basin-Rand ACEC** was set aside to better manage intaglios in eastern Imperial County that are extremely fragile. When the Desert Plan was developed, it was believed that the only way to save these vulnerable resources from destruction was by withdrawing the area from mineral development, fencing the intaglios, and monitor them from the air. The intaglios are also referred to as the Snyder geoglyphs

9. **Tumco Historic Site** was recommended as an ACEC by the Desert Plan staff in order to provide protection for the historic mining district. It is also a ritual area for the Quechan and Cocopa tribes. The ACEC designation was rejected because it was felt that attention would be called to the resources if it were designated.

   Today, BLM El Centro has a web site dedicated to Tumco. The web site says that Tumco "is an abandoned gold mining town and is also one of the earliest gold mining areas in California. It has a history spanning some 300 years, with several periods of boom and bust. Gold was first discovered by Spanish colonists as they moved northward from Sonora, Mexico. According to legend, two young boys came into their camp one evening with their shirts filled with gold ore. These muchachos cargados (loaded boys) were the namesake for the Cargo Muchacho Mountains, where the Tumco deposits occur. Following the first discovery of gold, numerous small mines were operated by Mexican settlers for many years. In 1877, the Southern Pacific Railroad completed the Yuma to Los Angeles line of its transcontinental route. With the presence of the mountains, a gold rush into the area began. This initial rush to stake mining claims soon gave way to mining companies that moved into the area purchased claims and developed the mines on a large scale. A 12-mile wood pipeline pumped over 100,000 gallons of water from the Colorado River per day, and the railroad carried mine timbers from northern Arizona for use in the expansive underground workings. Ultimately, over 200,000 ounces of gold was taken from the mines in the area. Tumco was a typical mining town of its day. Historical accounts talk of rich eastern investors, unscrupulous charlatans and colorful characters in the raucous townsite and the mining boom ultimately leading to financial ruin. The Tumco townsite went through several periods of boom and bust and, although the town site has long been abandoned, gold mining was recently conducted near the western end of this valley. This latest episode in the history of Tumco began in early 1995, when American Girl Mining Joint Venture began operations near the site of some of the early mines in the area. Although little can be seen of Tumco, during the boom time of the 1890´s, it supported a population of at least 500 people and the 40 and 100 stamp mills of the mine produced $1,000 per day in gold." No mention is made of the Native American significance. The Desert Plan states it is an area of significance to Native people.

10. Lake Cahuilla No. 2 ACEC was nominated by the BLM in order to protect two extensive aboriginal habitation sites along the shoreline of ancient Lake Cahuilla in east-central Imperial County. This should be included in an overall area of sensitivity for what is left of the Lake Cahuilla shoreline in Riverside and Imperial counties.

11. **Lake Cahuilla No. 3 ACEC** was nominated in order to protect a very large complex site within what was an undisturbed area of prehistoric sites along the old shoreline of Lake Cahuilla near the ACEC designated as Lake Cahuilla No. 2. This should also be grouped into an overall larger area encompassing what remains of the visible Lake Cahuilla shoreline and its associated artifacts and features.

12. **Lake Cahuilla No. 5 ACEC** was nominated because of its association with ancient Lake Cahuilla. This ACEC is bounded on the west by the All American Canal and developed agricultural fields, on the south by State Route 98, on the north by Interstate 8, and on the east by a utility line. This should also be added to the Lake Cahuilla shoreline sensitivity area as needing special protection.

13. **Lake Cahuilla No. 6 ACEC** was nominated by the Desert Plan staff in order to protect the extensive prehistoric campsites situated along the ancient Lake Cahuilla shoreline. It is located in Imperial County, bounded on the north and west by the All American Canal and on the south by Mexico. This is an area that is significant to local Native American tribes, and a portion of the area was the subject of a cultural landscape analysis in 2002 by Dr. Jamie Cleland.

14. **Southwest Lake Cahuilla Recessional Shoreline National Register District** is located near Salton City on lands withdrawn by the U.S. Navy. The district contains archaeological resources ranging from rock rings and fish traps to habitation sites and was listed in the NRHP in 1999 as a condition of the return of the lands to BLM El Centro management. This is an important array of significant cultural resources and should be carefully protected by the BLM.

15. **Plaster City archaeological sites** were proposed by the Desert Plan staff as being important enough to warrant ACEC designation. The area is composed of alluvial flats with gravel ridges dissected by small washes. The known cultural resource values represent an important aspect of human occupation in the region and are composed of

habitation camps, lithic scatters, and human cremation locations. The area is located south of the town of Plaster City and north of Interstate 8.

INYO COUNTY

16. **Panamint Valley**, north of Trona, is wedged between the Argus Mountains of China Lake Naval Air Weapons Station and the Panamint Mountains which form the western boundary of Death Valley National Park. Much of valley itself and the foothills of the Slate, Argus, and Panamint mountains are managed by BLM. The Desert Protection Act of 1993 transferred the northern portion of Panamint Valley, including Lake Hill Island, north of Highway 178, to the National Park Service. Much of the valley contains geoglyphs and has seen limited study by Dr. Emma Lou Davis, Daniel McCarthy, and Jay von Werlhof, and most recently by Julie Burcell and Judyth Reed. The area also contains cairns, massive lithic quarries and lithic reduction sites, aboriginal trails, trail markers, and 11 easily identifiable landforms in the southern portion of Panamint Valley that were islands when water stood in the lake. These land forms sit due west of the Briggs Gold Mine and are very visible. Recent radiocarbon dates have provided an age of over 4,000 years for one of the sites. Obsidian and yellow chert dominate the lithic materials which are found scattered throughout the valley. These materials were used prehistorically to make stone tools. Historically Panamint Valley was also important. The Manly Party of 1849 traversed it, leaving two of their party in its vicinity. The boom town of Ballarat (where a cemetery containing the remains of Seldom Seen Slim Ferge lies on private property) is situated in Panamint Valley. The 1880s town of Reilly is on its western edge, complete with several dozen rock structures, and the Remi Nadeau Shotgun Road runs most of the length of the valley. James Barnes conducted M.A. research on the townsite of Reilly and at the Anthony Mill ruins in the foothills of the Argus Mountains. The site has been interpreted by the BLM, but most of Panamint Valley has not been inventoried to professional standards. Sentiment exists among some to have the entire valley as far as the China Lake Navy boundary added to Death Valley National Park. The Desert Plan staff recommended that Warm Sulphur Spring and Ballarat be identified as an ACEC. The ACEC would have included the Panamint Stage Station, as well as Post Office Spring. The Stage Station was stabilized and fenced by the National Park Service on behalf of the BLM. The "Chinese Wall" and the townsite of Reilly have also been stabilized by the NPS. The townsite of Ballarat is privately owned. Many of its buildings were made with using tamped earth. Few buildings remain. The Ballarat Cemetery is still in use and contains the burial sites of people such as "Seldom Seen Slim" Ferge.

17. **North Searles Lake**, north of Trona and sandwiched in between the Argus Mountains and the Slate Range, contains some of the best intact Pleistocene/Holocene lake sediments, particularly where the stream flow exited Homewood Canyon and deposited sediments against the Slate Range. Artifacts include geoglyphs, massive lithic reduction

areas, aboriginal trails and rock rings. No formal inventory has ever taken place on BLM lands. Immediately south of the BLM holdings, on China Lake Naval Air Weapons Station, is one of the largest stone cairn complexes known in the Mojave Desert. This complex continues into Pilot Knob Valley and was informally inventoried by Dr. Gerald Smith. Based upon casual observation, it appears as these resources may all be related in time. Kish LaPierre has recently studied the stone cairn complex just off the BLM Searles Lake boundary for a Masters thesis at California State University, Bakersfield. Jim Fairchild has informally noted many sites during his 45 years working with the Searles Valley Minerals Company and as a geologist his interests focus on the distribution of lithics.

18. **The East Front of the Sierra Nevada Mountains in Inyo and Kern Counties**. From Mojave to Lone Pine, nearly every eastwardly draining canyon contains middens that are deep, stratified, rich in artifacts and data, and have been the subject of looting over the past 100 years. Seed grinding sites are visible on many of the large granitic outcrops, containing both bedrock mortars, bedrock metates, and grinding slicks. The Los Angeles Aqueduct and associated transmission lines transit through many of the sites. Many of the sites area also known to contain prehistoric cemeteries. A report by URS, Chico, California, documents several hundred prehistoric sites and evaluates their importance to California prehistory.

19. **Slate Range Geoglyphs**. These may be the highest-elevation geoglyphs in the Mojave Desert and may be contain alignments that are both historic and prehistoric. The vista from the site includes North Searles and South Panamint valleys. The immediate area contains a number of prehistoric aboriginal trails as well as nineteenth and twentieth century mining trails and associated cairns. The entire Slate Range has not been surveyed; however, BLM archaeologists and Dr. David Whitley have done casual inventory. The sites are extremely fragile.

20. **Fish Slough ACEC**. It is a large administrative unit, co-managed by several organizations and government entities. Its primary focus is habitat, with rare fish and unusual vegetation standing out within interesting geological structures, but as it is within the Volcanic Tablelands east of the Sierra Nevada, it also contains Native American petroglyphs and other sensitive archaeological sites. The entire area is a significant feature within the desert landscape.

21. **Surprise Canyon ACEC** is situated adjacent to the Death Valley National Park. It has been the center of significant controversy as to access rights to Panamint City, which is within Death Valley National Park. While the issues surrounding the use of the old road into the Panamint Mining District have overshadowed the other issues, historic mining remains, ethnohistoric archeological sites, and other historic sites are located on both sides of the washed-out road. The area should be considered as significant for historic mining from the 1880-1930s and for Native American pinyon-collecting activities. Pictographs dating to the 1880s are on both sides of the road within the NPS-managed lands, and are also likely to exist within the uninventoried BLM-administered parcels. The entire Panamint Mountains range is significant and needs to be fully analyzed.

22. **White Mountain City ACEC** is located in the foothills of the White Mountains, at the northeast end of Deep Springs Valley. The area contains a large prehistoric village site with petroglyphs and a rock shelter with pictographs. White Mountain City was also a short-lived mining town dating to the late nineteenth century. Remains of stone buildings are still in evidence. Julian Stewart described the petroglyphs in the 1920s.

23. **Rose Springs ACEC** is the archaeological type site for the Rose Springs (Haiwee) Tradition. It was the subject of a doctoral dissertation by Robert Yohe, now at California State University, Bakersfield, and has been excavated both legally and illegally for over a century. The site is a complex containing deep, rich midden resulting from hundreds of years of occupation, burials, and bedrock milling. It is covered with lithic scatters, primarily originating from the Sugarloaf obsidian quarry. Lying east of Highway 395, it has been affected by the construction of the Los Angeles Aqueduct and pumping station. The site should be listed in the NRHP as a place of national archaeological importance.

24. **Fossil Falls ACEC** is both a BLM campground and a site with a high concentration of midden material, trails, and rock art. It was prehistorically connected to the Rose Springs site. Disturbance has occurred to the site through looting, campground construction, and camping use over the past several decades. However, the site is still important, and additional disturbance might affect its overall integrity. It is open to public visitation. The site was listed in the NRHP in 1980.

25. **Great Falls Basin is an ACEC** in the Argus Mountains that was nominated for its wildlife and recreation uses. The area saw significant use by Native Americans and by the Trona Potash Company in the late 1800s and in the 1900s as a source of domestic water. This may be Providence Springs as identified by the Manly party in 1849, water from which saved the lives of the members of the party. It is a significant resource culturally as well as for wildlife. The nearby Indian Joe Spring is in public ownership and it is also significant for its riparian and historic component. Over 3,000 pounds of fruit was collected in June 1917 from Indian Joe Springs.

26. **Salt Creek Hills ACEC** contains prehistoric and historic archaeological sites. It is a large riparian vegetation zone and supports a variety of important wildlife habitat and archaeological properties with midden areas representative of long-term habitation. It was found to be important to Native peoples as well as for its scientific values.

27. **Portuguese Bench** is situated on the eastern flank of the Sierra Nevada west of the Coso Volcanic cones. The sites contain deep midden indicating long-term occupation. They were test excavated in the early 1990s by UCLA and were the subject of a Master's thesis by Dr. Mark Allen. The archaeological sites are very significant to the prehistory of the area.

28. **Amargosa Rings** just south of Shoshone were reported in *Desert Magazine* and by the San Diego Museum of Man as aboriginal rock rings. Debate has occurred over the decades as to whether they were aboriginal or related to borax mining. In either case,

they are significant features on the landscape. Bill Mann discussed them in his books regarding historic sites to visit in the Mojave Desert.

29. **South Owens Lake-Keeler Area** contains prehistoric and ethnohistoric site material including rock cairns that have burials. These burials may be the result of U.S. cavalry and Indian interaction in the late 1800s. This area is particularly sensitive.

30. **Olancha Dunes** was an area that Numic peoples used for gathering plant materials. It is a dune system that is open to unfettered OHV use. As the sands shift, they cover and uncover archaeological materials. A recent inventory by ASM Affiliates found very few archaeological sites. Native peoples of the Great Basin have indicated the area could be significant to their traditions. It may be a Traditional Cultural Property, that is, a place important in group cultural identity, and it should be studied as such.

31. **The Amargosa River ACEC** is located in Inyo and San Bernardino counties. It was set aside by the BLM for wildlife habitat purposes, but also includes riparian related cultural resources and elements of the Tidewater Tonopah Railroad. The archaeological sites range from the earliest era of human occupation about 12,000 years ago to the ethnographic present when Chemeuhevi and Mohave peoples occupied the area.

32. **The Volcanic Cones** are located on the northwest side of China Lake Naval Air Weapons Station, north of Little Lake on the east side of Highway 395. The area includes dense obsidian scatters and habitation sites. The cones left from the volcanic activity are being mined for the commercial rock and pumice contained within them. New obsidian sources, such as the Stewart Obsidian source near the Coso Geothermal facility, are frequently identified by chemical source analysis.

33. **Zinc Hill, Inyo County, near Darwin, California** was proposed for nomination as an ACEC by the Desert Plan Cultural Resources Group. It was not designated as such because it was placed in a Class L designation and it was proposed to be listed in the National Register of Historic Places and for a National Architectural and Engineering Record to be completed for its historic components. There is no evidence that this has happened. The town of Darwin itself is significant historically. The Anaconda Copper Company produced a significant amount of copper ore through the middle of the 20th century. Their historic plant and employee housing is a significant feature on the landscape. The Darwin Cemetery is still used. Among its patrons are Elizabeth Mecham, desert historian, and numerous Native Americans who called the Coso Range their home.

34. **Cerro Gordo** is another mining community nestled in the pinyon juniper forest just west of Saline Valley. The town itself is privately owned but the surrounding landscape is public lands. Historic buildings and a cemetery contribute to its historic setting. The ACEC was set aside to provide protection for historic resources scattered throughout it as well as the biotic community. The Saline Valley Salt Tram is located within the ACEC. One of the associated buildings has been stabilized in the past decade. According to information provided by the BLM, the ACEC was transferred to the National Park Service. The map provided by BLM on the internet looks otherwise.

KERN COUNTY

(See also #18, above.)

35. **The Jawbone/Butterbredt Canyon ACEC** is nestled against the South Sierra Nevada and extends east into the Joshua Tree woodland zone of the Mojave Desert. The area is considered to be significant to the Kawaiisu Indians who once lived in the area. OHV groups have used the area extensively, as it abuts an OHV Open Area. Still, the area has significant archaeological resources including pictographs, campsites, lithic scatters and historic resources including work camps for the construction of the Los Angeles Aqueduct and Civilian Conservation Corps watering tanks built during the 1930s. A recent report by URS, Chico, California details the significance of the archaeological resources. Other recent work has been conducted by archaeologists from Ancient Enterprises and by students from California State Polytechnic University, Pomona. Archaeological sites continue to be regularly impacted by recreational use.

36. **Last Chance Canyon ACEC** was listed in the NRHP in 1972. It is more than 100 mi.^{2} and is located in the Black Hills, El Paso Mountains, and Last Chance Canyon, east of Highway 14. The site diversity is high, including villages, cryptocrystalline quarries, camp sites, burial areas, rock art sites, lithic scatters, milling stations, stacked stone structure, rock shelters, cremations, and historic mining evidence dating from the 1860s to the 1940s. The area includes resources found within a much larger area, bordered by Red Rock Canyon State Park. In earlier times a petrified forest existed on its western flanks. Recent research by archaeologists Dr. Alan Garfinkle, Alexander Rogers, and Dr. Brian Dillon (UCLA) indicates that the area is one of the most significant in the Mojave Desert. Burro Schmidt's Tunnel is situated in the area and has drawn wide public attention; it is listed in the NRHP as a twentieth century mining site. At the top of El Paso Peak are large rock rings which appear to be related to prehistoric ceremonies. Historic rock hounding activities are notable at some of the opal quarries. The patented Old Dutch Cleanser Mine operated from 1923-1947, quarrying pumicite and seismotite which was used as a household cleaner and as an additive to cement and paint.

RIVERSIDE COUNTY

37. **The Lake Cahuilla Shoreline** (also in Imperial County) is possibly one of the most important archaeological site complexes in the western U. S., but is in danger of being lost. Lake Cahuilla filled much of the Coachella and Imperial valleys intermittently during much of the last 100,000 years, depending upon the growth of the Colorado River's delta near the current communities of Yuma, Arizona and Mexicali, Baja California, and the shifting of the river's lower course. The lake was a key element in the lives of the Cahuilla, Kamia, and Quechan Indians until it finally desiccated around 1700. Associated archaeological features include fish traps (rock alignments made

purposively to harvest fish), trails, rock art, habitation sites, human remains, milling features, beads, agave roasting pit features, and every other kind of artifact one could imagine associated with prehistoric fishing in a freshwater lake surrounded by the Colorado Desert. Housing, transportation corridors, transmission lines, sand and gravel operations, OHV activity, agriculture, military operations, casual recreation, and vandalism have impacted the resources. The land is divided among State of California, private, BLM, Bureau of Reclamation, local irrigation districts, county parks, and urban and rural uses in Mexico. The polygon is mapped to include many associated sites and feature. Much of the old lake bed has been used for agricultural purposes for over a century. Housing developments, geothermal plants and other industrial uses have modified much of the shoreline over the past several decades. Much of this use has destroyed the integrity of the cultural resources associated with the shoreline. Many pieces of the Lake Cahuilla shoreline are extant. Several “spot” ACECs have been set up to attempt to save portions of the shoreline in Imperial County. The Fish Trap Riverside County Park is an important designation for archaeological sites located along the western shore of Lake Cahuilla. There is presently no management plan for this geographic feature and it is timely to have one completed before it is too late.

38. **Whitewater Canyon ACEC**, north of the old trout farm and fish hatchery, contains the Whitewater River and its associated vegetation community. The ACEC also contains Native American collecting, occupation, trail, and ritual sites. Bean has interviewed Cahuilla elders who indicated that Whitewater Canyon was a place of spiritual power. The BLM set it aside as an ACEC because of its diverse vegetative community as well as to recognize it a special place to the Cahuilla. Ethnographer Dr. Lowell Bean has worked with Cahuilla for many decades. He says “Cahuilla values were clearly related to basic environmental and economic circumstances.” Oral interviews conducted by him suggest that Whitewater Canyon was a place of power where vision quests may have taken place and where oral tradition relating to the Cahuilla culture may be recounted in the telling of Cahuilla bird songs. Some archaeological inventory has been conducted within the ACEC as result of the construction of the Pacific Crest Trail. Stashed ceramic ollas and baskets have been recovered from the vicinity of the ACEC.

39. **Dale Lake ACEC**, southeast of Twenty-nine Palms, was nominated as an ACEC, but during the Desert Plan amendment process it was removed as lacking the values needed to sustain it as an ACEC. The lake contains shoreline sites that appear to have been deposited when the lake contained fresh water. This could have occurred intermittently or during the early Holocene, at least 9,000 years ago. The Dale Lake mining area is located nearby and is significant for early twentieth century mining activities.

40. **Patton’s Iron Mountain Divisional Camp ACEC** is one of several temporary campsites associated with preparation for Patton’s assaults during World War II in North Africa and Italy. All of the sites associated with Patton throughout the California, Nevada, and Arizona deserts should be considered to be significant and fragile. Some have little remaining, but the tracks of the heavy armor can be found throughout the desert pavements in eastern Riverside and southeastern San Bernardino counties. Patton’s Iron Mountain Divisional Camp contains sensitive archaeological resources

including the altar [perhaps clarify what this is], parade grounds, and tent foundations, and is memorialized at the George S. Patton Museum at Chiriaco Summit. The site was recently listed in the NRHP.

41. **Corn Spring ACEC**, in the Chuckawalla Mountains, is listed in the NRHP as Corn Spring(s) Archaeological Site as the Gus Lederer Archaeological District to the northeast. Corn Spring is an ACEC identified for prehistoric archaeology and contains a BLM campground. The archaeological resources and the historic sources are primarily on public lands, but some are contained on private lands to the west. The extent of the resources is much greater than the ACEC. Corn Spring was the collected by Malcolm Rogers of the San Diego Museum of Man, and Roger Desautels excavated the site in about 1968 as a result of the installation of the Corn Spring Campground. More recent studies by Dr. Gerrit Fenenga (1979) and Dr. William Clewlow (2002) documented some of the archaeological sites. Sites include aboriginal trails, rock art, historic mining-era foundations, rock rings, lithic scatters, and habitation sites. Rock features include spirit breaks, rock rings, rock "ducks" (also called trail markers), and geoglyphs. Among the outstanding features of the area are the highly discernable aboriginal trails leading into the site.

42. **Painted Canyon in the Mecca Hills** is an area that is important to Cahuilla people, as it is discussed in their origin stories and in their Bird Songs. Dr. Lowell Bean has collected ethnographic information concerning the area. This area should be considered to be culturally significant and might be a Traditional Cultural Property.

43. **Sidewinder Well ACEC**, west of Palen Lake, contains prehistoric habitation sites, mesquite processing sites, and lakeshore sites. It is an ACEC and is one of the rare sites in the central portion of Riverside County, an area that had a low density of occupation due to lack of water and other resources upon which aboriginal populations depended.

44. **Palen Dry Lake ACEC**, north of Desert Center, was proposed as an ACEC for the prehistoric resources located on the eastern side of the lakeshore. Archaeologists such as John Cook, Dr. Emma Lou Davis, Dennis Gallegos, Judyth Reed, and Eric Ritter surveyed the area and concluded that all of the shorelines contain significant archeological resources associated with stands of fresh water that once filled the lake. The entire area surrounding the dry lakebed is extremely sensitive. Palen Dry Lake's geographic area of significance is indiscernible from Sidewinder Well and the polygon indicating the geographic extent of the two ACEC is combined on the map accompanying this document.

45. **Alligator Rock ACEC**, southwest of Desert Center, contains petroglyphs and quarried materials dating to prehistoric periods. The quarry was also a biface manufacturing site. Lithic specialist Clay Singer located two halves of a bifaces, one at the Alligator Rock Quarry and the other at McCoy Springs more than 20 mi. to the northeast. Rock art at the Kingdom of Zion petroglyphs site, located less than 5 mi. to the east, also warrants protection. The site is listed in the NRHP as the North Chuckwalla Mountains Quarry District and the North Chuckwalla Mountains Petroglyph District

46. **The Mule Mountains ACEC,** southwest of Blythe, contains natural water tanks in lava flows that attracted aboriginal populations. It was designated as an ACEC due to its dense collection of prehistoric features, including trails, geoglyphs, rock art, rock shelters, and a pottery drop. Malcolm Rogers first documented the location in the 1920s. It also has an association with military maneuvers dating from World War II or possibly more recently. The geoglyphs and human trails are embedded in desert pavement. The site was listed as the Mule Tank Discontiguous Archaeological District in the NRHP.

47. **The South McCoy Mountains** was proposed as an ACEC but was rejected because Class L designation would seemingly protect the resources. The McCoy Wash Petroglyph Site was documented by Daniel McCarthy and listed in the NRHP as the result of his Masters thesis project for the University of California, Riverside. A power line forms the western boundary of the archaeological complex. The petroglyphs site is just inside the McCoy Mountains Wilderness Area. This area is extremely sensitive to any ground disturbance.

48. **Ford Dry Lake** was proposed by the Desert Plan staff as a potentially important location of cultural resources. It was proposed as an ACEC but rejected because of a "lack of importance." Inventories over the past two decades have produced little in the way of significant sites, but it should be restudied. Ephemeral sheep grazing occurred in the area until the late 1990s.

49. **The Sheephole Mountains** are virtually unknown, but it appears to some anthropologists that they are discussed within the salt stories of the Chemehuevi Indians. They form the divide between Bristol and Dale lakes, both of which contain some evidence of the activity of early humans within the California desert.

50. **Big Morongo Canyon** is managed as an ACEC for wildlife. It also contains significant archaeological sites that may also be significant to the Cahuilla Indians. One the largest habitation sites, with rich, black midden, might be the village site of Morongo as described by Alfred Kroeber in the 1920s.

51. **The Santa Rosa/San Jacinto Mountains National Monument** is the backdrop to the Coachella Valley. It was established as a National Monument by an Act of Congress on October 24, 2000 "in order to preserve the nationally significant biological, cultural, recreational, geological, educational, and scientific values found" within its boundaries. The cultural resources found there are important to the Cahuilla Indians and for research and heritage values. Andreas Canyon and the Martinez Rock houses are both listed in the NRHP as being significant historical resources. Habitation sites, food processing sites, lithic scatters, and places special to native peoples should all be considered as eligible for listing in the NRHP.

SAN BERNARDINO COUNTY

(Note: Greenwater Canyon and Clark Mountain ACEC are not discussed here since management was transferred to the National Park Service in 1993.)

52. **The Black Hills** are south of the China Lake Naval Air Weapons Station's Echo Range, north of Blackwater Well, and east of the Twenty Mule Team Route as it leaves Granite Well and heads towards Boron. The area contains hundreds of talus pits that may have been used for game hunting or religious purposes, as well as petroglyphs. Many of the rocks which form the outlines of the pits are pockmarked as if the were pounded to process food or to make noise. This location is unique for the large numbers of talus pits.

53. **Blackwater Well**, northeast of Cuddeback Lake, was rejected during the Desert Plan analysis because it was placed in a Class L management category, which was considered adequate protection. The Blackwater Well Archaeological District is listed in the NRHP for its prehistoric archaeology. Over the last decade, all of the ranching-era buildings and watering sites have been removed. Nothing is left of the association with the Twenty Mule Team route. The archaeological sites, dating to over 2,000 years of age, are very sensitive. A deep rich midden which is attributable to a prehistoric village is located near the intermittent spring site. According to local sources is called Blackwater Well because the water ran through black soil, which is the midden. The 20 Mule Team used the water source at times, but the site was not a location of a permanent station.

54. **The Rodman Mountains ACEC** is southeast of Barstow and south of Newberry Springs. Both an ACEC and a Wilderness designation cover much of the area, which is rich in prehistoric Native American cultural resources, including rock art (petroglyphs and some pictographs), rock rings, geoglyphs, cairns, trails, habitation sites with midden, and rock shelters. The Newberry Cave archaeological site is situated within a designated wilderness area on the north slope of the Newberry Mountains, north of the Rodman Mountains. It is listed in the NRHP.

55. **Troy Dry Lake,** east of Newberry Springs, was the subject of work in the 1950s by Ruth D. Simpson. The area, which has no designation, has been partially inventoried, but most has not been surveyed to professional standards. Based upon information from the San Bernardino County Museum and personal field visits, the area contains geoglyphs, habitation sites, lithic scatters, rock art, and isolated hearths on both sides of Interstate 40.

56. **Von Trigger Springs** has no designation by the BLM, but the area has historically been important to Native Americans in the eastern Mojave Desert. The area contains both private and public lands. Information from the San Bernardino County Museum indicates that the archaeological sites include rock shelters, lithic scatters, village sites, and sites with pictographs and petroglyphs.

57. **The Calico Mountains and Harvard Hill**, east of Barstow, arguably contain some of the oldest archaeological sites in the Mojave Desert. Most of the archaeological sites are lithic reduction areas. The archaeological resources within the Calico Mountains Archaeological District cover much of the Calico Mountains and a portion of Pleistocene Lake Manix. An exact boundary has not been identified as it has often been redefined as inventory occurs. The archaeological sites are listed in the NRHP and as an ACEC and are referred to as the Calico Early Man Site. This is an offensive name to some and is more often referred to as the Calico Mountains Archaeological site or just the Calico site. This site has been excavated for 40 years and is open intermittently to the public. The Lake Mojave Complex is found in this area and contains bifaces and other artifacts that are in excess of 8,000 years old. Harvard Hill may be the eastern boundary of the archaeological district. Impacts are occurring from transmission line corridors, recreation, and natural erosion. Professional archaeological study is occurring in parts of the Calico site and with the collection at San Bernardino County Museum.

58. **The Cronese Lakes** are east of Barstow and west of Baker, on the north side of Interstate 15. The ACEC encompasses much of geographic features. Both West and East Cronese (or Cronise) contain rich midden sites, including sandy deposits that contain fresh water mussel (*Anadonta* sp.) that were present in the Mojave River as it ended its run in Lake Mojave or Silver Lake, north of Baker. The Cronese Lakes were rich environments with water and waterfowl. A dissertation by Dr. Christopher Drover indicated that the area was used in early prehistoric times but also was occupied during contact times in the early to mid 1800s. The area contains burials as well as habitation/exploitation sites. Artifacts include pottery, projectile points, milling implements, lithic reduction remains, and beads. According to archaeologist Malcolm Rogers from the San Diego Museum of Man, a Southwestern Puebloan outlier may have been located here. Rogers proposed that the Anasazi peoples occupied the area while collecting turquoise in nearby Halloran Springs (mostly private lands). Silver lake is within the Mojave National Preserve. The lakes are sometimes filled by the Mojave River during heavy episodes of rain in the San Bernardino Mountains.

59. **The Manix ACEC** is referred to as Bassett Point by archaeologists and paleontologists. It is south of Interstate 15 and north of Newberry Springs. It contains a vestige of some of the earliest archaeological sites in the Mojave Desert, and according to archaeologist Fred Budinger may rival the nearby Calico Hills archaeological district in its antiquity and significance. The site also contains Pleistocene and Holocene era paleontological sites associated with the peopling of America. The BLM has designated a portion of this as an ACEC. The beds of Lake Manix and Lake Mojave traverse a portion of the resource. The CDCA Plan established an ACEC near Manix siding in order to protect paleontological resources. No management plan for this ACEC was ever prepared. Nearby Afton Canyon was established as an ACEC for biological and scenic resources, and it also contains cultural resources.

60. Mesquite Lake ACEC in northeastern San Bernardino County contains significant cultural resources associated with aboriginal use along its shoreline and within the

dunes system. The area has been looted in the past but contains resources that should be protected.

61. Denning Spring ACEC is located in north-central San Bernardino County, sandwiched between Ft. Irwin and Death Valley National Park. A rock shelter was test excavated by Dr. Mark Sutton in the early 1980s. Kaldenberg documented a large serpentine geoglyph within the northern portion or the site. Its location within the Avawatz Mountains helps protect the resource. The geoglyphs should be viewed as being irreplaceable.

62. **The Twenty Mule Team Borax** route began at Harmony Borax Works in Death Valley National Park, traversed over Wingate Pass and through the China Lake Naval Air Weapons Station to the railhead at Boron in the western Mojave Desert. One of the best examples of a freight wagon road in the California desert is found extending from the boundary of China Lake near Granite Springs southwest through Cuddeback Dry Lake and east of the community of Red Mountain. This route was determined eligible for listing in the NRHP in 1968 but is not yet listed. It should either be listed in the NRHP or considered as a National Historic Trail. Southwest of Cuddeback Lake, particularly as the route trends through California City, it is difficult to see since much of the trail has been lost due to heavy vehicle use.

63. **Christmas Canyon ACEC** is located on the east side of the Teagle Wash. It has been the subject of intensive inventory by archaeologists Drs. William Clewlow, David Whitley, Eric Ritter, Emma Lou Davis and Mark Becker as well as Judyth Reed, David Scott, and Russell Kaldenberg. The inventory was based upon work originally done by Sylvia Winslow and Emma Lou Davis in the 1960s. The area contains artifacts embedded in the desert pavement, stacked stone cairns, Indian trails deeply embedded in the pavement, rock shelters, camp sites, and highly patinated artifacts with extremely early dates that might be associated with the peopling of the Americas. The sites extend into the China Lake Naval Weapons Station, Echo Range and are often associated with embayments that existed when Searles Lake contained water. A Master's thesis by Luz Ramirez de Bryson at the University of Wisconsin argued that the area contained water from springs throughout the Holocene Epoch. The ACEC is threatened, because it is adjacent to an OHV Open Area. In 2002 correspondence from the California OHP to the BLM considered all of the archaeological sites to be eligible for listing in the NRHP.

64. **Bedrock Springs is an ACEC** located in the Summit Range on the north edge of the Lava Mountains. It is a relatively small area but possesses an incredible array of archeological resources, including petroglyphs, pictographs, extremely deep midden sites associated with collapsed rock shelters, rock alignments, and milling sites. The major village site has been looted, but BLM did data recovery projects at the site twice in the early 2000s to understand the extent of the looting. The site dated to 2,000 years ago. Faunal materials included bovine (perhaps bison), deer, bird, and fish bones. It has been determined to be eligible for listing in the NRHP.

65. **Steam Well Archaeological District is an ACEC** in the Lava Mountains. It is primarily a rock art site, with milling stations and scatters of prehistoric artifacts. The site was vandalized in the 1960s, but with the help of volunteers the BLM removed much of the spray paint. The site is eligible for listing in the NRHP and is managed as such. It is within a designated Wilderness area.

66. **Squaw Spring ACEC** is now referred to as Red Mountain Spring. The name on maps is considered offensive by the California Native American Heritage Commission and by many Native people. It is a complex of prehistoric archaeological sites situated in a valley and contained on several ridges east of Red Mountain. The district is listed in the NRHP and has recently been extensively mapped and studied by Dr. Mark Allen of California State Polytechnic University, Pomona. Petroglyphs and stacked stone structures are found throughout the district, as well as midden and milling stations. The site complex seems to date from the late prehistoric time period of about 1,000 years ago up until the late 1900s. The foundations of Squaw Spring Well, which supplied water to the gold and silver mines of the tri-cities of Randsburg, Red Mountain [Osdick or Sin City], and Johannesburg, are found along with the prehistoric archaeological sites.

67. **The Black Mountain and Inscription Canyon ACEC** was set aside for the outstanding petroglyphs and rock rings, occupation sites, trial shrines and cairns found throughout this area, as well as the resources contained at Opal Mountain and Milk Dry Lake. The area is listed in the NHRP. The resources are fragile. Inscription Canyon has been significantly vandalized. It was in private ownership until the 1990s. The late Wilson Turner and Gerald S. Smith undertook significant archaeological documentation on behalf of the San Bernardino County Museum through Earthwatch. The late Dr. Robert Heizer assisted in the research in the late 1970s.

68. **The Dead Mountains ACEC** was set aside because of information from the Mohave and Chemehuevi tribes. The range contains significant locations of salt trail songs identified by Robert Laidlaw and Carobeth Laird and also contains sites principally significant to the origin myths of the Mohave tribe and others.

69. **Kramer Hills ACEC** was located on the south side of Highway 58, on both sides of Highway 395. It was removed as an ACEC by a Desert Plan amendment. The area was once rich with aboriginal quarries. Impacts by transmission lines, pipelines, rock hounds, and OHV activities have degraded the resource. Recent work by Dr. William Self and Associates have analyzed the archaeological collections made Al Mohr and Agnes Bierman at the Kramer Hills quarries in the late 1940s as well as other lithic sites within the general vicinity. It may be worth a closer look to determine whether the archaeological sites have integrity of materials or location.

70. **Rainbow Basin and Owl Canyon** are located north of Barstow. Rainbow Basin is a Natural National Landmark and is known for its spectacular geology and fossils. Dr. Mark Sutton has documented some of the archaeology of Owl Canyon. Many of the archaeological resources are lithic scatters and quarries where opal, chalcedony, and agate were found. Fossil Canyon, on the northeast side of Rainbow Basin, contains

unique Coso-style petroglyphs carved into the welded tuft. This small archaeological site is listed in the NRHP. Fossil palm fronds are found within these canyons, as well as mammalian fossils dating to over 20 million years ago.

71. **Crucero is an ACEC** that contains many archaeological sites situated in sandy, windblown dunes and along the old watercourse of the Mojave River, southwest of Baker and east of Barstow. Sites include habitation sites, lithic scatters, milling stations, geoglyphs, and pottery scatters. Aboriginal trials have also been reported from the area. Impacts from OHVs have diminished the quality of the resources but the ever-shifting dunes serve to protect some resources.

72. **Silver Mountain Mines ACEC** was nominated to preserve two silver mines, the Yankee Maid and the Oro Grande. This ACEC is located north of Victorville in an area with scattered public lands.

73. **Juniper** Flats ACEC is situated on the north flanks of the San Bernardino Mountains, close to the boundary of San Bernardino National Forest. The ACEC contains a rich village site, temporary campsites, rock shelters, milling sites, and reported burial areas, and it has been impacted by OHV use and wildfire. Erosion was stabilized as a result of work by the Barstow Field Office archaeologist and the U.S. Forest Service. The site was studied by the late Del Fortner, who produced a monograph about his work at the site.

74. **Black Buttes in Pipes Canyon** is reported to contain important petroglyphs. According to the San Bernardino County Museum, the petroglyphs are situated in Pipes Wash and have not been professionally recorded. The museum staff concluded that all of Pipes Canyon and Pipes Wash might contain extremely significant cultural resources and need inventory and analysis.

75. **The North Slope of the San Bernardino Mountains** contain sites which are scattered much like those in the east-facing canyons of the Sierra Nevada. The entire watershed should be considered to be highly significant until it is adequately inventoried. This includes U.S. Forest Service, BLM, and private lands. Examples of archaeological sites such as the Bobo Springs Maze Petroglyph and the "Willie Boy" Stone Corral indicate that significant sites are present and span the prehistoric and historic periods.

76. **Amboy Crater is a National Natural Landmark** (NNL) and is managed as such by the BLM. It is situated just off Route 66 near Amboy. The San Bernardino County Museum staff indicates that the lava flow has significant archaeological sites. Little archeological survey has been conducted on the BLM-administered portion of the Landmark but archaeological resources are suspected there. A reported obsidian source may be located in or near the NNL.

77. **Lanfair Valley** in the east Mojave Desert contains interspersed public and private lands. The area is largely unsurveyed, but according to the San Bernardino County Museum it has some of the best examples of twentieth century homesteading left in the California desert. The homesteading landscape is considered to be significant, and any

large-scale development should be viewed as potentially impacting the historic-era landscape.

78. **Lost Lake** within the Owl Hole Mountains is squeezed in between Ft. Irwin and Death Valley National Park. The area has not been adequately inventoried, but information recorded by Dr. Emma Lou Davis indicates that the area contains significant cultural resources, including rock alignments and shoreline sites dating to the Paleo-Indian time period.

79. **The Whipple Mountains ACEC**, southwest of Needles, represent one of the most extensively used and concentrated distributions of culturally sensitive resources in the California Desert. This ACEC contains rock shelters, caves, trails, and habitation sites, as well as mythological and religious sites important to the Mohave. Much of the area has been designated as wilderness, which will assist in the preservation of the sites. Archaeological research has been proposed, and a nomination package for the NRHP was prepared by University of Nevada, Las Vegas archaeologists Linda Blair and Jeff Wedding.

80. **Spangler Hills** is adjacent to an OHV open area. It contains prehistoric resources associated with the collection of lithic resources, as well as historic mining sites dating to the late 1800s. The area was proposed for ACEC designation but the BLM did not "anticipate additional degradation of cultural resource values because of the irregular topography and lack of roads" (BLM Volume C, Appendix IV, 1980:63). Recent surveys by Giambiastini have found that the area contains more sites than previously reported.

81. **The Baxter Mountain Range** southwest of Barstow in Stoddard Valley once contained quarry sites and seed processing areas with bedrock grinding slicks. It is located in a Class I, or Open Area. Little may be left of the resource, but the area should be viewed as having some significance.

82. **The south end of the Providence Mountains** within the Mojave Desert Preserve contains some of the densest concentrations of archaeological sites within the central portion of the Mojave Desert. Rock shelters containing pictographs and petroglyphs and interspersed habitation sites make this one of the most significant archaeological areas within the California desert. While pressures to develop it are not pronounced as on public lands, it still should be noted as an area with extremely significant resources and development could impact a cultural landscape.

83. **Sunflower Springs** is located in the east Mojave Desert. As with most spring sites in the California desert, it is a significant cultural resource. It is privately owned, with public lands surrounding the site. It should be considered sensitive.

84. **Kingston Mountains ACEC** was set aside for the management of wildlife and botanical resources. The area also contains significant cultural resources in the form of nearly intact archaeological sites. Pygmy agave was harvested here by the local Native American population. Agave roasting pits are ubiquitous in ACEC. A report was

prepared in the 1980s as the result of work undertaken by students from the University of California, Santa Cruz.

85. **Clark Mountain ACEC**, like the Kingston Mountains, was established for the management of plants and animals. It also contains archaeological sites with agave roasting pits. A part of the ACEC was transferred to the NPS as a result of the establishment of the Mojave Desert Preserve.

86. **West Well** was proposed by the BLM cultural resource staff to protect prehistoric cultural values in the Chemehuevi Wash in eastern San Bernardino County near the Colorado River. The area contains large concentrations of rock rings which have been impacted by use. The area was rejected because management was limited to existing roads and trails

87. **The Afton Canyon ACEC** is situated east of Barstow and West of Baker, California. Archaeological resources are dominated by sites representing the late prehistoric period. These sites include habitation areas and cave sites. Extensive studies have been conducted by Dr. Joan Schneider. The Old Government Road crosses through the ACEC, as does the Burlington Northern/Santa Fe Rail line. The ACEC contains a campground and much vegetation restoration has occurred along the banks of the Mojave River as it surfaces in the ACEC.

88. Halloran Wash ACEC is located just north of Interstate 15 at the southern end of Shadow Valley in the east Mojave Desert. It was identified as an ACEC due to its significant prehistoric cultural resources which include significant rock art sites (petroglyphs), habitation sites, lithic quarries, and trail segments.

SAN DIEGO COUNTY

89. **Table Mountain ACEC** is within the McCain Valley Management unit of San Diego County. The area is also listed in the NRHP for its significant prehistoric resources. It is also significant to Native Americans, as it was used by the local tribes as a food gathering and cultural site until late in the 1800 or early 1900.

90. **Inkopah ACEC** is partially within the CDCA and within the McCain Valley Management unit. Like Table Mountain, it contains archaeological and cultural resources that are significant scientifically and culturally. The ACEC was not established for its cultural but for other resource sensitivity.

HISTORIC ROUTES AND OTHER LARGE-SCALE FEATURES

91. **The Old Government Road** or the Mojave Trail was used and built by the US Army. Its major period of use was 1860-1880. The majority of it bisects the Mojave National Preserve, but it enters the preserve and exits it on public lands. The route is roughly

220 mi. long, beginning in the east at Fort Mohave and ending near Camp Cady, east of Newberry Springs. The setting is important for this trail, much of which is two wheel ruts. It is one of the most important historic trails in the California desert and needs to be considered as a significant resource. It was originally recommended by the Desert Plan cultural resources staff as an ACEC but was rejected due to manageability concerns.

92. **The Old Salt Lake Trail** is a National Historic Trail managed jointly by the National Park Service and the BLM. This trail went from Santa Fe, New Mexico to Los Angeles. Beginning in 1829, commercial caravans brought goods for trade. Although in the California desert it skirts the East Mojave National Preserve and near Barstow trends through the eastern edge of Ft. Irwin, there are segments of the trail that probably traversed the Preserve. In some places power lines dominate the landscape. The Desert Plan staff proposed Spanish Canyon in the Alvord Mountain as an ACEC but the proposal was rejected since Multiple Use Class M would have served as adequate protection. The wagon ruts that were very visible in the late 1970s have been obscured by OHVs using the area for hill climbs. This trail is of national significance, and its setting should be considered significant.

93. **Route 66** through the California desert from Newberry Springs to near Needles was constructed in 1926 and caught the imagination of the nation as the major east-west automobile route between Los Angeles and Chicago between the 1920s and the 1960s. The setting along the route is important to those who traverse it. Several organizations are interested in the preservation and management of the Route 66 experience. The BLM has exercised leadership in its preservation, as has the County of San Bernardino. The landscape adjacent to Route 66 should be considered to a significant aspect of twentieth century history.

94. **The Bradshaw Trail** from near Blythe to Dos Palmas was an early historic route constructed in 1862. Its 70-mi. route is partially graded and partly requires four-wheel drive. It crosses some archaeological sites in the eastern portion of the route and provides access to historic mining properties along its route. It is a significant resource, and along with other trails in the California desert, its setting is significant. Public concern regarding the Dos Palmas Preserve and its historical ranch house add significance to the connecting trail that now bypasses the preserve.

95. **The Juan Bautista De Anza National Historic Trail** and the parallel Butterfield Stage Route in Imperial County have been designated as a National Historic Trail and are administered by the National Park Service. The route traverses public lands in Imperial County, but often parallels paved roads. In some places it is a horseback and hiking trail. The Butterfield Stage Route parallels much of the DeAnza Trail. It provided access for gold seekers, postal couriers, and the railroad from about 1860 until the end of the nineteenth century. The area was proposed as an ACEC and as an historic trail by the BLM cultural resources staff, but the proposal was rejected due to its course through an OHV open area at Plaster City. Any impact to its setting should be carefully evaluated.

96. **The Manix Basin Aboriginal Trails** were identified and publish by avocational archaeologist E. Henry James. They are located northeast of Newberry Springs, between Interstate 15 and Interstate 40 in San Bernardino County. The trails intersect archaeological sites and are often difficult to see unless the light from the sun is at a suitable angle. The trails cross sandy hummocks and open patches of dune blowouts. They compose a changing landscape that has been poorly documented. Information is documented at the San Bernardino County Museum.

97. **Colorado Desert Aboriginal Trails** are found within the desert pavements from the Colorado River to the Coachella Valley in Riverside and Imperial counties. The trails have been studied by Daniel McCarthy and Francis Johnson. They are unmapped, except in so far as they have been documented in the course of archaeological site recordation. Trails are ephemeral, but within the desert pavement they will survive many more decades unless they are disrupted by land alteration or vehicle use. As discussed in connection with Mule Mountains (#45), trails there bisect a trail circle and a geoglyphs; they are visible even after heavy vehicle traffic use over the last 60 years. Generally trails also contain stone markers, often called "rock ducks," and spirit or trail breaks which are a simple line of rocks placed across a trail. While these have not been adequately mapped, they are scattered throughout the Colorado desert, and caution should be used in siting projects or allowing OHV uses. An inventory of the trail systems even if done by air would be an important contribution.

98. **Mojave River Corridor in San Bernardino County**. The headwaters of the Mojave River are within the San Bernardino National Forest. Like many rivers in the West, the headwaters of the Mojave River were dammed for erosion control, flood control, and water conservation. Silverwood Lake was created by the damming of the Mojave River. The Mojave River drains into Pleistocene Silver Lake and Lake Mojave, in the interior of the Mojave Desert near Baker. It drains. It provided a substantial resource for aboriginal populations, including not only fresh water but shellfish, river-dwelling freshwater fish, and animals that were attracted to the water. All along the river's channel were places that people lived in both the aboriginal and historic times. Camp Cady, an army fortification, is situated where it is because of the proximity of the Mojave River. Much of the land between Silverwood Lake and Newberry Springs is private and has been developed. Some of it is still undeveloped, and public lands along the river should be considered to be sensitive. The entire Mojave River corridor should be considered a cultural landscape from its beginnings to its terminus.

99. **Historic nineteenth- and early twentieth-century ranching complexes** are scattered throughout the CDCA, have been not been completely studied, and are poorly understood. Ranching complexes should be considered to be significant for the purposes of evaluation. Oral histories should be undertaken where possible during any undertaking that affects the associated cultural resource. Eventually they will all be gone, because most of the associated artifacts are perishable.

100. **Historic nineteenth- and twentieth-century mining complexes** associated with the early mineral exploration and development of the CDCA should be considered

significant because many are undocumented. Historic research through county and state mining records and oral histories should be conducted on these complexes scattered throughout the CDCA.

101. **The New and Alamo Rivers** in Imperial County enter the United States from Baja Norte, Mexico. On the American side much of the lands have been subjected to tiling for agricultural purposes for a century. Archaeologist Jay von Werlhof feels that important archaeological sites may still be intact along some of the riverbanks. These include a village located near Brawley, California.

102. **Sites within the Ancient Lake Cahuilla Shoreline Area, Imperial County**, California. Jay von Werlhof has indicated a series of archaeological sites, including fish traps and rock art which are within the band of shoreline sites in Imperial County that have not been previously noted in the archaeological record. These sites are on the east and west side of the Salton Sea and should be noted as significant features on the landscape. The sites should be considered to be fragile and are in need of documentation.

103. Sites Identified by the Public. Concerned members of the public have indicated that they have concern for several archaeological sites within the CDCA which are familiar to them due to their intimate knowledge of the California Desert. Several of the sites are within the bounds of National Parks and others ware in designated wilderness area. Geoglyphs scattered throughout the desert are not identified for this project except unless they are ACEC's or listed in the NRHP. Sites that have been placed on the map include:

a. Coyote Hole Springs near Joshua Tree National Park. This site is primarily on private lands and contains petroglyphs and deposits that appear to be representative of an ethnohistoric era village. There may be interest in the site by tribes.

b. Painted Rock, site containing rock art and habitation debris such as lithics is located in the Old Woman Mountains in eastern San Bernardino County and is on private lands owned by a non-profit organization

c. Newberry Cave situated near Newberry Springs, San Bernardino County is in designated wilderness. It has been added to the map due to concerns about impacts by projects east of Barstow. The site is also listed in the NRHP. It has been the subject of an excavation report and a Masters Thesis.

d. A purported Papago Creation site north of Desert Center has been indicated on the map based upon public concern for the location. Research regarding the site needs to be conducted.

e. Geoglyphs along the Colorado River near have been of concern to some members of the public and Tribes for many years. Some of these are listed in the NRHP; others have been determined to be eligible for listing in the NRHP. A polygon north of Blythe has been placed on the map to indicate the location is sensitive.

SITES WITHIN THE CDCA LISTED IN THE NRHP

The following is an annotated list of Archaeological Sites within the CDCA which have been listed in the National Register of Historic Places All of the listed places are on federal lands unless otherwise noted. The significance of this list is that someone went to the trouble to complete the forms and the sophisticated process to get the place identified, evaluated, reviewed by the agency and the OHP staff, sent to the Keeper of the National Register of Historic Places, reviewed there, published in the Federal Register and then placed on the list maintained by the National Park Service. It is a long but worthwhile process. Most sites identified within the CDCA as being of National Register quality are never listed in the NRHP but determined eligible. Unfortunately most agencies have not kept good records of what sites have been determined to be eligible for listing. Someday such a list may be created, but it will be an incredibly long and complex task. A data retrieval system will have to be devised and old reports located which identify which sites have been so determined.

IMPERIAL COUNTY

Calexico Carnegie Library (added 2005 - **Building** - #05001085)
Also known as **Calexico Public Library**
420 Heber Ave., Calexico

Historic Significance: Event
Area of Significance: Education
Period of Significance: 1900-1924, 1925-1949, 1950-1974
Owner: **Local Gov't**
Historic Function: Education
Historic Sub-function: Library
Current Function: Vacant/Not In Use

Coyote Valley Site (added 1984 - **Site** - #84004083)
Also known as **Site P-15**
Address Restricted, Palo Verde

Owner: **Federal**

Desert View Tower ** (added 1980 - **Site** - #80000801)
SW of Ocotillo, Ocotillo

Historic Significance: Architecture/Engineering
Architect, builder, or engineer: Ratcliffe,M.T., Vaughn,Robert
Architectural Style: Other
Area of Significance: Art
Period of Significance: 1900-1924
Owner: **Private**
Historic Function: Recreation And Culture
Historic Sub-function: Museum
Current Function: Recreation And Culture
Current Sub-function: Museum

Fages-De Anza Trail-Southern Emigrant Road (added 1973 - **District** - #73002252)
Also known as **Anza-Borrego Desert State Park**
Anza-Borrego State Park, Borrego Springs

Historic Significance: Event, Information Potential
Area of Significance: Prehistoric, Historic - Non-Aboriginal, Military, Exploration/Settlement, Historic - Aboriginal
Cultural Affiliation: Shoshonan, Yuman
Period of Significance: 1499-1000 AD, 1900-1750 AD, 1700-1749
Owner: **Private** , **State**
Historic Function: Landscape, Transportation
Historic Sub-function: Road-Related, Underwater
Current Function: Landscape, Transportation
Current Sub-function: Park, Road-Related, Underwater

Hillside Figure (added 1984 - **Site** - #84004063)
Also known as **Site G-2**
Address Restricted, Palo Verde

Owner: **Federal**

Main Yuha Site (added 1984 - **Site** - #84004114)
Address Restricted, Palo Verde

Owner: **Federal**

North Cargo Muchacho (added 1984 - **Site** - #84004071)
Also known as **Site L-3**
Address Restricted, Palo Verde

Owner: **Federal**

Ocotillo Wells (added 1984 - **Site** - #84004111)
Also known as **Site P-13;322B**
Address Restricted, Palo Verde

Owner: **Federal**

Ogilby Site A (added 1984 - **Site** - #84004074)
Also known as **Site L-6**
Address Restricted, Palo Verde

Owner: **Federal**

Palo Verde Circles and Arrow (added 1984 - **Site** - #84004065)
Also known as **Site G-4**
Address Restricted, Palo Verde

Owner: **Federal**

Pilot Knob 18 (added 1984 - **Site** - #84004079)
Also known as **Site M-6**
Address Restricted, Palo Verde 1

Owner: **Federal**

Pilot Knob Anthropomorphic Figure (M-1) (added 1984 - **Site** - #84004075)
Also known as **Site M-1**
Address Restricted, Palo Verde
Owner: **Federal**

Pilot Knob Anthropomorphic Figure (M-8) (added 1984 - **Site** - #84004080)
Also known as **Site M-8**
Address Restricted, Palo Verde
Owner: **Federal**

Pilot Knob Horse (added 1984 - **Site** - #84004078)
Also known as **Site M-4**
Address Restricted, Palo Verde
Owner: **Federal**

Pilot Knob Lizard (added 1984 - **Site** - #84004076)
Also known as **Site M-2**
Address Restricted, Palo Verde
Owner: **Federal**

Pilot Knob Ring (added 1984 - **Site** - #84004077)
Also known as **Site M-3**
Address Restricted, Palo Verde
Owner: **Federal**

Pinto Wash (added 1984 - **Site** - #84004113)
Also known as **Site P-17**
Address Restricted, Palo Verde
Owner: **Federal**

Quail, The (added 1984 - **Site** - #84004073)
Also known as **Site L-5**
Address Restricted, Palo Verde
Owner: **Federal**

19 **Running Man** (added 1984 - **Site** - #84004069)
Also known as **Site L-1**
Address Restricted, Palo Verde
Owner: **Federal**

Singer Element 1-A (added 1984 - **Site** - #84004082)
Also known as **Site O-1**
Address Restricted, Palo Verde
Owner: **Federal**

Singer Element 1-B (added 1984 - **Site** - #84004084)
Also known as **Site O-2**
Address Restricted, Palo Verde
Owner: **Federal**

Singer Element 1-C (added 1984 - **Site** - #84004085)
Also known as **Site O-3**
Address Restricted, Palo Verde
Owner: **Federal**

Singer Element 1-D (added 1984 - **Site** - #84004086)
Also known as **Site O-4**
Address Restricted, Palo Verde
Owner: **Federal**

Singer Element 1-E (added 1984 - **Site** - #84004087)
Also known as **Site O-5**
Address Restricted, Palo Verde
Owner: **Federal**

Singer Element 1-F (added 1984 - **Site** - #84004088)
Also known as **Site O-6**
Address Restricted, Palo Verde
Owner: **Federal**

Singer Element 1-G (added 1984 - **Site** - #84004089)
Also known as **Site O-7**
Address Restricted, Palo Verde
Owner: **Federal**

Singer Element 1-H (added 1984 - **Site** - #84004090)
Also known as **Site O-8**
Address Restricted, Palo Verde
Owner: **Federal**

Singer Element 1-I (added 1984 - **Site** - #84004091)
Also known as **Site O-9**
Address Restricted, Palo Verde
Owner: **Federal**

Singer Element 1-J (added 1984 - **Site** - #84004092)
Also known as **Site O-10**
Address Restricted, Palo Verde
Owner: **Federal**

Singer Element 1-K (added 1984 - **Site** - #84004093)
Also known as **Site O-11**
Address Restricted, Palo Verde
Owner: **Federal**

Singer Element 1-L (added 1984 - **Site** - #84004094)
Also known as **Site O-12**
Address Restricted, Palo Verde
Owner: **Federal**

Singer Element 1-M (added 1984 - **Site** - #84004095)
Also known as **Site O-13**
Address Restricted, Palo Verde
Owner: **Federal**

Singer Element 2-A (added 1984 - **Site** - #84004096)
Also known as **Site O-14**
Address Restricted, Palo Verde
Owner: **Federal**

Singer Element 2-B (added 1984 - **Site** - #84004097)
Also known as **Site O-15**
Address Restricted, Palo Verde
Owner: **Federal**

Singer Element 2-C (added 1984 - **Site** - #84004098)
Also known as **Site O-16**
Address Restricted, Palo Verde
Owner: **Federal**

Singer Element R-1 (added 1984 - **Site** - #84004099)
Also known as **Site O-18**
Address Restricted, Palo Verde
Owner: **Federal**

Site G-3 (added 1984 - **Site** - #84004064)
Address Restricted, Palo Verde
Owner: **Federal**

Site L-2 (added 1984 - **Site** - #84004070)
Address Restricted, Palo Verde
Owner: **Federal**

Site L-4 (added 1984 - **Site** - #84004072)
Address Restricted, Palo Verde
Owner: **Federal**

Site M-11 (added 1984 - **Site** - #84004081)
Address Restricted, Palo Verde
Owner: **Federal**

Site M-9 (added 1984 - **Site** - #84004027)
Also known as **AZ-050-0416**
Address Restricted, Palo Verde
Owner: **Private**

Site P-14 (added 1984 - **Site** - #84004112)
Address Restricted, Palo Verde
Owner: **Federal**

Site P-8 (added 1984 - **Site** - #84004106)
Address Restricted, Palo Verde
Owner: **Federal**

Southwest Lake Cahuilla Recessional Shoreline Archeological District *** (added 1999 - **District** - #99001567)
Address Restricted, Salton City

Historic Significance: Event, Information Potential
Area of Significance: Prehistoric
Cultural Affiliation: Cahuilla, Kumeyaay
Period of Significance: 5000-6999 BC, 3000-4999 BC, 1000-2999 BC, 1000 AD-999 BC, 7500-7999 BC, 7000-7499 BC, 1499-1000 AD, 1500-1599
Owner: **Federal**
Historic Function: Domestic
Historic Sub-function: Camp
Current Function: Defense, Work In Progress
Current Sub-function: Military Facility

Spoke Wheel Rock Alignment (added 2003 - **Site** - #03000120)
Also known as **CA-IMP-6988**
Address Restricted, Ocotillo

Historic Significance: Architecture/Engineering, Information Potential
Architectural Style: Other
Area of Significance: Art, Prehistoric
Cultural Affiliation: Kummeyaay Tribe
Period of Significance: 1000-1499 BC, 500-999 BC, 499-0 BC, 499-0 AD, 1000-500 AD, 1499-1000 AD, 1749-1500 AD, 1900-1750 AD
Owner: **Federal**
Historic Function: Religion
Historic Sub-function: Ceremonial Site
Current Function: Other

Stonehead (L-7) *** (added 1987 - **Site** - #87001026)
Address Restricted, Yuma

Historic Significance: Information Potential
Area of Significance: Prehistoric
Cultural Affiliation: Native American
Period of Significance: 1499-1000 AD
Owner: **Private**
Historic Function: Recreation And Culture
Historic Sub-function: Work Of Art (Sculpture, Carving, Rock Art)
Current Function: Landscape
Current Sub-function: Unoccupied Land

Sweeney Pass Site (added 1984 - **Site** - #84004028)
Also known as **Site S-1**
Address Restricted, Ocotillo Wells

Owner: **State**

US Inspection Station--Calexico *** (added 1992 - **Building** - #91001749)
Also known as **US Border Station;Old Customs Building**
12 Heffernan Ave., Calexico

Historic Significance: Architecture/Engineering, Event
Architect, builder, or engineer: U,S. Treasury Department
Architectural Style: Other, Mission/Spanish Revival
Area of Significance: Hispanic, Politics/Government, Architecture
Period of Significance: 1925-1949
Owner: **Federal**
Historic Function: Government
Historic Sub-function: Customhouse
Current Function: Government
Current Sub-function: Customhouse

US Post Office--El Centro Main (added 1985 - **Building** - #85000125)
Also known as **El Centro Main Post Office**
230 S. 5th St., El Centro

Historic Significance: Architecture/Engineering
Architect, builder, or engineer: Simon,Louis A., Wetmore,James A.
Architectural Style: Beaux Arts, Classical Revival
Area of Significance: Architecture
Period of Significance: 1925-1949
Owner: **Federal**
Historic Function: Government
Historic Sub-function: Post Office
Current Function: Government
Current Sub-function: Post Office

Walter's Camp Linear Figure (added 1984 - **Site** - #84004068)
Also known as **Site I-1**
Address Restricted, Palo Verde

Owner: **Federal**

Winterhaven Anthropomorph (L-8) *** (added 1987 - **Site** - #87001025)
Address Restricted, Yuma

Historic Significance: Information Potential
Area of Significance: Prehistoric
Cultural Affiliation: Native American
Period of Significance: 1499-1000 AD
Owner: **Private**
Historic Function: Recreation And Culture
Historic Sub-function: Work Of Art (Sculpture, Carving, Rock Art)
Current Function: Landscape
Current Sub-function: Unoccupied Land

Winterhaven Anthropomorph and Bowknot, L-9 *** (added 1985 - **Site** - #85003429)
Also known as **L-9**
Address Restricted, Winterhaven

Historic Significance: Architecture/Engineering, Information Potential
Area of Significance: Prehistoric, Art
Cultural Affiliation: Native American
Period of Significance: 3000-4999 BC, 1000-2999 BC
Owner: **Private**
Historic Function: Domestic
Historic Sub-function: Camp
Current Function: Landscape

Yuha Basin Discontiguous District ** (added 1982 - **Site** - #82002185)
Address Restricted, Plaster City

Historic Significance: Information Potential
Area of Significance: Prehistoric
Cultural Affiliation: San Dieguito, Malpais
Period of Significance: 1499-1000 AD
Owner: **Local Gov't**
Historic Function: Domestic
Historic Sub-function: Camp
Current Function: Recreation And Culture
Current Sub-function: Outdoor Recreation

Yuha Schneider Site (added 1984 - **Site** - #84004107)
Also known as **Site P-9**
Address Restricted, Palo Verde

Owner: **Federal**

Yuha Shrine (added 1984 - **Site** - #84004110)
Also known as **Site P-12**
Address Restricted, Palo Verde

Owner: **Federal**

Yuha Site A (added 1984 - **Site** - #84004100)
Also known as **Site P-1**
Address Restricted, Palo Verde

Owner: **Federal**

Yuha Site B (added 1984 - **Site** - #84004101)
Also known as **Site P-2**
Address Restricted, Palo Verde

Owner: **Federal**

Yuha Site C (added 1984 - **Site** - #84004102)
Also known as **Site P-3**
Address Restricted, Palo Verde

Owner: **Federal**

Yuha Site E (added 1984 - **Site** - #84004103)
Also known as **Site P-4**
Address Restricted, Palo Verde

Owner: **Federal**

Yuha Site F (added 1984 - **Site** - #84004104)
Also known as **Site P-5**
Address Restricted, Palo Verde

Owner: **Federal**

Yuha Site G-1 (added 1984 - **Site** - #84004105)
Also known as **Site P-6**
Address Restricted, Palo Verde

Owner: **Federal**

Yuha Site H (added 1984 - **Site** - #84004108)
Also known as **Site P-10;322E**
Address Restricted, Palo Verde

Owner: **Federal**

Yuha Site I (added 1984 - **Site** - #84004109)
Also known as **Site P-11;322-G**
Address Restricted, Palo Verde

Owner: **Federal**

Yuma Crossing and Associated Sites *** (added 1966 - **District** - #66000197)
Banks of the Colorado River, Winterhaven

Historic Significance: Event
Area of Significance: Transportation, Exploration/Settlement
Period of Significance: 1850-1874, 1875-1899
Owner: **Private** , **State**
Historic Function: Defense, Transportation
Historic Sub-function: Military Facility, Water-Related
Current Function: Recreation And Culture
Current Sub-function: Museum

INYO COUNTY

Archeological Site CA-INY-134 ** (added 2003 - **Site** - #03000116)
Also known as **Ayer's Rock Pictograph Site; Bob Rabbit's Pictographs**
Address Restricted, Olancha

Historic Significance:	Architecture/Engineering, Information Potential
Architectural Style:	No Style Listed
Area of Significance:	Philosophy, Art, Historic - Aboriginal, Prehistoric, Religion
Cultural Affiliation:	Early, Middle, and Late Archaic, Late Prehistoric/Historic, Coso Shoshone/Kawaiisu/Numic
Period of Significance:	7000-7499 BC, 6500-6999 BC, 1900-1750 AD, 1900-1924
Owner:	**Federal**
Historic Function:	Agriculture/Subsistence, Domestic, Industry/Processing/Extraction, Recreation And Culture, Religion
Historic Sub-function:	Camp, Ceremonial Site, Processing, Processing Site, Work Of Art (Sculpture, Carving, Rock Art)
Current Function:	Landscape
Current Sub-function:	Unoccupied Land

Big and Little Petroglyph Canyons * (added 1966 - Site - #66000209)**
Address Restricted, China Lake

Historic Significance:	Architecture/Engineering, Information Potential
Architectural Style:	No Style Listed
Area of Significance:	Philosophy, Art, Historic - Aboriginal, Prehistoric, Religion
Cultural Affiliation:	Early, Middle, and Late Archaic, Late Prehistoric/Historic, Coso Shoshone/Kawaiisu/Numic
Period of Significance:	7000-7499 BC, 6500-6999 BC, 1900-1750 AD, 1900-1924
Owner:	**Federal**
Historic Function:	Agriculture/Subsistence, Domestic, Industry/Processing/Extraction, Recreation And Culture, Religion
Historic Sub-function:	Camp, Ceremonial Site, Processing, Processing Site, Work Of Art (Sculpture, Carving, Rock Art)
Current Function:	Landscape
Current Sub-function:	Unoccupied Land

Coso Hot Springs *** (added 1978 - District - #78000674)
Address Restricted, Little Lake

Historic Significance: Event, Architecture/Engineering, Information Potential
Architect, builder, or engineer: Unknown
Architectural Style: Other
Area of Significance: Architecture, Religion, Prehistoric, Historic - Aboriginal
Cultural Affiliation: Shoshone, Owens Valley Paiute
Period of Significance: 1499-1000 AD, 1900-1924
Owner: **Private**
Historic Function: Domestic, Recreation And Culture
Historic Sub-function: Camp, Outdoor Recreation
Current Function: Unknown

Coso Rock Art District *** (added 1999 - District - #99001178)
Also known as Big and Little Petroglyph Canyons National Historic Landmark
Address Restricted, China Lake

Historic Significance: Architecture/Engineering, Information Potential
Area of Significance: Art, Prehistoric
Cultural Affiliation: Late Archaic, Middle Archaic, Early Archaic
Period of Significance: 9000-10999 BC, 7000-8999 BC, 5000-6999 BC, 3000-4999 BC, 1000-2999 BC, 1000 AD-999 BC, 500-999 BC, 499-0 BC, 499-0 AD, 1000-500 AD, 1499-1000 AD, 1749-1500 AD
Owner: **Federal**
Historic Function: Agriculture/Subsistence, Domestic, Funerary, Recreation And Culture, Religion
Historic Sub-function: Camp, Ceremonial Site, Multiple Dwelling, Secondary Structure, Single Dwelling, Village Site, Work Of Art (Sculpture, Carving, Rock Art)
Current Function: Defense
Current Sub-function: Naval Facility

Death Valley Junction Historic District ** (added 1980 - District - #80000802)
CA 127 and CA 190, Death Valley Junction

Historic Significance: Event, Architecture/Engineering, Person
Architect, builder, or engineer: McCulloch,Alexander H.
Architectural Style: Mission/Spanish Revival
Historic Person: Becket,Marta
Significant Year: 1926, 1923
Area of Significance: Architecture, Performing Arts, Community Planning And Development, Industry, Transportation, Exploration/Settlement, Commerce
Period of Significance: 1900-1924, 1925-1949
Owner: **Private**
Historic Function: Domestic
Historic Sub-function: Hotel, Single Dwelling
Current Function: Commerce/Trade, Domestic, Education, Recreation And Culture
Current Sub-function: Hotel, Music Facility, Single Dwelling

Death Valley Scotty Historic District ** (added 1978 - District - #78000297)
Also known as Scotty's Castle & Ranch;Death Valley Ranch
NE of Olancha on CA 72 in Death Valley National Monument,
Olancha

Historic Significance: Event, Architecture/Engineering
Architect, builder, or engineer: Multiple
Architectural Style: Modern Movement
Area of Significance: Social History, Invention, Prehistoric, Art, Architecture
Period of Significance: 1875-1899, 1900-1924
Owner: **Federal**
Historic Function: Domestic, Domestic
Historic Sub-function: Camp, Hotel, Secondary Structure, Single Dwelling
Current Function: Domestic, Recreation And Culture
Current Sub-function: Museum, Single Dwelling

Eagle Borax Works ** (added 1974 - District - #74000338)
Also known as H.S.-1
Death Valley National Monument, Furnace Creek

Historic Significance: Event
Area of Significance: Industry, Transportation
Period of Significance: 1875-1899
Owner: **Federal**
Historic Function: Industry/Processing/Extraction
Historic Sub-function: Extractive Facility, Manufacturing Facility
Current Function: Landscape
Current Sub-function: Park

Fossil Falls Archeological District ** (added 1980 - District - #80004492)
Address Restricted, Little Lake

Historic Significance: Information Potential
Area of Significance: Prehistoric
Cultural Affiliation: Lake Mojave, Silver Lake, Pinto or Little Lake
Period of Significance: 7000-8999 BC, 5000-6999 BC, 3000-4999 BC, 1000-2999 BC
Owner: **Federal**
Historic Function: Domestic
Historic Sub-function: Camp
Current Function: Unknown

Harmony Borax Works * (added 1974 - District - #74000339)**
Also known as HS-2
Death Valley National Monument, Stovepipe Wells

Historic Significance: Event
Area of Significance: Industry, Transportation, Commerce
Period of Significance: 1875-1899
Owner: **Federal**
Historic Function: Domestic, Industry/Processing/Extraction
Historic Sub-function: Manufacturing Facility, Single Dwelling
Current Function: Landscape
Current Sub-function: Park

Inyo County Courthouse (added 1998 - Building - #97001664)
168 N. Edwards St., Independence

Historic Significance: Event, Architecture/Engineering
Architect, builder, or engineer: McCombs, William & Paul Daniel, Weeks, William W.
Architectural Style: Classical Revival
Area of Significance: Economics, Politics/Government, Architecture
Period of Significance: 1900-1924, 1925-1949
Owner: **Local Gov't**
Historic Function: Government
Historic Sub-function: Courthouse
Current Function: Government
Current Sub-function: Courthouse

Laws Narrow Gauge Railroad Historic District (added 1981 - District - #81000149)
Also known as Bishop Station;Laws Station
NE of Bishop, Bishop

Historic Significance: Event
Area of Significance: Industry, Historic - Non-Aboriginal, Transportation
Period of Significance: 1875-1899, 1900-1924
Owner: **Local Gov't**
Historic Function: Transportation
Historic Sub-function: Rail-Related
Current Function: Recreation And Culture
Current Sub-function: Museum

Leadfield (added 1975 - District - #75000221)
Also known as H.S.-3
Death Valley National Monument on Titus Canyon Trail, Death Valley

Historic Significance: Event
Area of Significance: Industry
Period of Significance: 1925-1949
Owner: **Federal**
Historic Function: Domestic, Industry/Processing/Extraction
Historic Sub-function: Extractive Facility, Single Dwelling
Current Function: Landscape
Current Sub-function: Park

Manzanar War Relocation Center, National Historic Site * (added 1976 - Site - #76000484)**
Also known as Manzanar Internment Camp;Manzanar Concentration Camp
6 mi. S of Independence on CA 395, Independence

Historic Significance: Event
Area of Significance: Asian, Military, Social History
Period of Significance: 1925-1949
Owner: **Local Gov't**
Historic Function: Domestic, Government
Historic Sub-function: Camp, Correctional Facility
Current Function: Vacant/Not In Use

Pawona Witu (added 1975 - District - #75000428)
Also known as South Fork,Bishop Creek
Address Restricted, Bishop

Historic Significance: Information Potential
Area of Significance: Prehistoric, Agriculture, Historic - Aboriginal
Cultural Affiliation: Eastern Mono, Northern Paiute
Period of Significance: 1499-1000 AD, 1749-1500 AD, 1900-1750 AD, 1800-1824, 1825-1849, 1850-1874, 1875-1899
Owner: **Local Gov't**
Historic Function: Agriculture/Subsistence, Domestic, Funerary
Historic Sub-function: Agricultural Fields, Graves/Burials, Village Site
Current Function: Agriculture/Subsistence, Recreation And Culture
Current Sub-function: Agricultural Fields, Outdoor Recreation

Reilly ** (added 2004 - Site - #03001358)
Also known as Anthony Mill Ruins
Address Restricted, Trona

Historic Significance: Event, Architecture/Engineering, Information Potential
Area of Significance: Historic - Non-Aboriginal
Cultural Affiliation: Chinese, Hispanic, Euro-American
Period of Significance: 1875-1899
Owner: **Federal**
Historic Function: Commerce/Trade, Domestic, Industry/Processing/Extraction
Historic Sub-function: Department Store, Extractive Facility, Multiple Dwelling, Secondary Structure, Single Dwelling, Water Works
Current Function: Vacant/Not In Use

16 Saline Valley Salt Tram Historic Structure ** (added 1974 - Structure - #74000514)
N of Keeler between Gordo Peak and New York Butte, Keeler

Historic Significance: Event, Architecture/Engineering
Architect, builder, or engineer: Unknown
Architectural Style: No Style Listed
Area of Significance: Architecture, Industry, Engineering, Transportation
Period of Significance: 1900-1924, 1925-1949
Owner: **Federal**
Historic Function: Transportation
Historic Sub-function: Rail-Related
Current Function: Recreation And Culture
Current Sub-function: Outdoor Recreation

Skidoo (added 1974 - District - #74000349)
Death Valley National Monument, Wildrose District, Death Valley

Historic Significance: Event
Area of Significance: Industry, Commerce
Period of Significance: 1900-1924, 1925-1949
Owner: **Federal**
Historic Function: Industry/Processing/Extraction
Historic Sub-function: Extractive Facility, Manufacturing Facility
Current Function: Landscape
Current Sub-function: Park

KERN COUNTY

Bandit Rock (added 1975 - **Site** - #75000431)
Also known as **Robbers Roost**
SW of Inyokern near jct. of CA 14 and 178, Inyokern

Historic Significance: Event, Person
Historic Person: Vasquez,Tiburico
Significant Year: 1874
Area of Significance: Social History
Period of Significance: 1850-1874
Owner: **Federal**
Historic Function: Domestic
Historic Sub-function: Camp
Current Function: Agriculture/Subsistence, Recreation And Culture
Current Sub-function: Agricultural Fields, Outdoor Recreation

Burro Schmidt's Tunnel (added 2003 - **Site** - #03000113)
Also known as **William Henry Schmidt's Tunnel**
Address Restricted, Ridgecrest

Historic Significance: Event, Person
Historic Person: Vasquez,Tiburico
Significant Year: 1874
Area of Significance: Social History
Period of Significance: 1850-1874
Owner: **Federal**
Historic Function: Domestic
Historic Sub-function: Camp
Current Function: Agriculture/Subsistence, Recreation And Culture
Current Sub-function: Agricultural Fields, Outdoor Recreation

Fort Tejon *** (added 1971 - **District** - #71000140)
Also known as **Fort Tejon State Historic Park**
3 mi. NW of Lebec, Lebec

Historic Significance: Event
Area of Significance: Architecture, Military, Transportation, Politics/Government
Period of Significance: 1850-1874
Owner: **State**
Historic Function: Defense
Historic Sub-function: Military Facility
Current Function: Landscape, Recreation And Culture
Current Sub-function: Museum, Park

Last Chance Canyon ** (added 1972 - **District** - #72000225)
Also known as **El Paso Mtns;Black Hills;Indian Wells**
Address Restricted, Johannesburg

Historic Significance: Information Potential

Area of Significance: Prehistoric, Historic - Aboriginal
Cultural Affiliation: Pinto-oid, Silverlake, Lake Mojave
Period of Significance: 9000-10999 BC, 7000-8999 BC, 5000-6999 BC, 3000-4999 BC, 1000-2999 BC, 1000 AD-999 BC, 1499-1000 AD, 1749-1500 AD, 1900-1750 AD
Owner: **Federal**
Historic Function: Domestic
Historic Sub-function: Camp
Current Function: Industry/Processing/Extraction, Recreation And Culture
Current Sub-function: Extractive Facility, Outdoor Recreation

Rogers Dry Lake *** (added 1985 - **Site** - #85002816)
Also known as **Muroc Dry Lake**
Edwards Air Force Base, Mojave Desert

Historic Significance: Event
Area of Significance: Military, Other
Period of Significance: 1925-1949, 1950-1974, 1975-2000
Owner: **Federal**
Historic Function: Landscape, Transportation
Historic Sub-function: Air-Related, Conservation Area
Current Function: Landscape, Transportation
Current Sub-function: Air-Related, Conservation Area

Walker Pass *** (added 1966 - **Structure** - #66000210)
60 mi. NE of Bakersfield on CA 178, Bakersfield

Historic Significance: Person, Event
Historic Person: Walker,Joseph R.
Significant Year: 1843, 1845, 1834
Area of Significance: Exploration/Settlement
Period of Significance: 1825-1849
Owner: **Private** , **Federal**
Historic Function: Transportation
Historic Sub-function: Road-Related
Current Function: Recreation And Culture, Transportation
Current Sub-function: Monument/Marker, Outdoor Recreation, Road-Related

3. RECOMMENDATIONS

This study is seen as a first step in identifying cultural resources in the California Desert that mean something important related to cultural resources. The places identified in this study matter to our heritage and should be protected in some form or another. The simple documentation of the cultural resources within the mapped polygons is the first step in adequately identifying what is there and what will be lost if the resources are not adequately documented, studied, and preserved. The polygons identified here are guides for your review and are not explicit locations for historic properties. No field verification occurred at any of the locations as a result of this study. If a project is proposed in or near any of these locations field visits should take place to identify any cultural resources which might be impacted as a result of ground-disturbing activities.

When projects are proposed the reader should actively review the Constraints map as a first step in identifying cultural resource issues which may exist within a specified geographic area. If cultural resources are identified ask about them. Ask what type of information was gathered and by who. Ask whether NHRP criteria were applied. Ask what impact the project will have on the resources. Ask why the resources cannot be avoided. Carefully review the report written by the agency and whatever documentation is made available from the agency staff or consultant. Learn to use the correct environmental language related to cultural resources. Become an interested party to the action. Ask to become a Consulting or Concurring Party to the process. If you are uncomfortable with the results of the environmental document you can hire a professional archaeologist to review the professional data submitted on behalf of the project proponent and to provide professional feedback to you. This should not be designed to discredit on anyone, but to have the best information you can receive so that you may be well informed. Many professional cultural resource specialists are listed in the Register of Professional Archaeologists (RPA). RPA is a peer-reviewed group and the names of the registered professional archaeologists are available on line. It is easy to use since the register is set up by region (states) and type of expertise the professional claims.

This report only briefly touches on American Indian traditional or spiritual sites. That is beyond the scope of the study. Places identified by native peoples to the BLM many years ago may or may not still be relevant to current tribal members. Many aspects of American Indian religious beliefs are related to individual experiences such as visions or stories related to the land. It is important to ask California Indian people what is important to them. This would have to be done through the use of existing data, some of which was collected by the BLM in the 1970s; other data has been collected by ethnographers, project proponents, agencies, and graduate students. This information should be compiled so that, with permission of tribal members, it could be used to identify places that matter to tribal members and to assist governing jurisdictions to make better land use decisions.

The report is a broad-brush approach to the cultural resources of the CDCA and, unless a cultural resource is pinpointed, such as the Plank Road, it does not contain specific locational data. This information would be obtained through an archaeological records search from one the CHRIS facilities called Information Centers or IC's for short. These ICs are located at the University of California, Riverside, Imperial County Museum, San Diego State University, San Bernardino County Museum and the Department of Anthropology at California State University, Bakersfield.

Records searches are an important aspect of knowing exactly what types of cultural resources are located within a specific geographic area and what additional research or inventory needs to be completed to identify the extent of the cultural property.

Cultural resources are fragile. Once they are gone they cannot be regrown or recreated. The people who left the information in the ground are gone; no ethnohistoric sites, no historic farmsteads or gold mines, aboriginal trail system, or paleo Indian site will ever be created again. The sites are subject to vandalism and increasing population pressure. Having a site in a box at a museum or curation facility is important, but not as important as leaving the site where it was found. The best management for cultural resources is, if possible, to keep it intact. This is particularly true of sites that are especially important to people as culturally relevant locations. The collection of information from those living today and the storing of information are particularly important. Losses of cultural resources are permanent.

4. SUGGESTED READING

Cultural Resource Management Sources That Are Useful:

Deloria, Vine Jr. and David E. Wilkins

1999 Tribes Treaties and Constitutional Tribulations. Austin, TX: University of Texas Press

Dorochoff, Nicholas

2007 Negotiating Basics For Cultural Resource Managers. Walnut Creek, CA: Left Coast Press.

Hardesty, Donald L. and Barbara J. Little

2000 Assessing Site Significance: A Guide for Archaeologists and Historians. Walnut Creek, California: Altamira Press.

Hutt, Sherry, Elwood W. Jones and Martin E. McAllister

1992 Archaeological Resource Protection. Washington, DC: The Preservation Press

Hutt, Sherry, Caroline Meredith Blanco, Walter E. Stern, and Stan N. Harris.

2004 Cultural Property Law: A Practitioner's Guide to the Management, Protection and Preservation of Heritage Resources. Washington, D.C.: American Bar Association.

King, Thomas F.

1998 Cultural Resource Laws and Practice: An Introductory Guide. Walnut Creek, California: Altamira Press.

2000 Federal Planning and Historic Places. Walnut Creek, California: Altamira Press

2002 Thinking about Cultural Resource Management: Essays from the Edge. Walnut Creek, California: Altamira Press.

2003 Places That Count: Traditional Cultural Properties in Cultural Resource Management. Walnut Creek, California: Altamira Press.

2005 Doing Archaeology: A Cultural Resource Management Perspective. Walnut Creek, California: Left Coast Press

2007 Saving Places That Matter. Walnut Creek, California: Left Coast Press

King, Thomas F., Patricia Parker Hickman and Gary Berg

1977 Anthropology in Historic Preservation. New York, New York: Academic Press, Inc.

Layton, R. editor

1994 Conflict in the Archaeology of Living Traditions. New York: Routledge.

National Center for Cultural Resources, National Park Service
2002 Federal Historic Preservation Laws. Washington, D.C.

Pevar, Stephen L.
2002 The Rights of Indians and Tribes. Carbondale: Southern Illinois University.

Richman, Jennifer R. and Marion P. Forsyth, editors
2003 Legal Perspectives on Cultural Resources. Walnut Creek, California: AltaMira Press.

Watkins, Joe
2000 Indigenous archaeology: American Indian Values and Scientific Practice. Walnut Creek, California: Altamira Press.

Bureau of Land Management Reports on the California Desert District that are Useful and Available from Coyote Press at www.coyotepress.com

Bean, L.J., S.B. Vane & J. Young
1981 *The Cahuilla and the Santa Rosa Mountain Region: Places and their Native American Association*. Submitted to Bureau of Land Management.

Brooks, R.H., R. Wilson & S. Brooks
1981 *An Archaeological Inventory Report of the Owlshead/Amargosa Mojave Basin Planning Units of the Southern California Desert Area*. Submitted to Bureau of Land Management.

Cook, J.R. and S. Fulmer (eds.)
1981 *The Archaeology of the McCain Valley Study Area in Eastern San Diego County, California: A Scientific Class II Cultural Resource Inventory*. Submitted to Bureau of Land Management.

Coombs, G.B.
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Coombs, G.B.
1979 *The Archaeology of the Western Mojave. Submitted to Bureau of Land Management.*

Gallegos, D., J. Cook, E.L. Davis, G. Lowe, F. Norris and J. Thesken
1980 *Cultural Resources Inventory of the Central Mojave and Colorado Desert Regions, California*. Submitted to Bureau of Land Management.

Gallegos, D.
1980 *Cultural Resources Inventory: East Mesa and West Mesa Regions, Imperial Valley, California--Appendices.*

King, C.D. and D.G. Casebier
1981 *Background to Historic and Prehistoric Resources of the East Mojave Desert Region.* Submitted to Bureau of Land Management.

Lyneis, M.M., D.L. Weide and E.V. Warren
(1980 *Impacts: Damage to Cultural Resources in the California Desert.* Submitted to Bureau of Land Management.

May, R.V.
1987 *The Table Mountain Complex [San Diego County, California] as Derived from a Synthesis of 124 Archaeological Sites Clustered in Stratified Biological, Geographical, and Geological Zones.* Authorized by Bureau of Land Management, El Centro.

Norwood, R.H., C.S. Bull & R. Quinn
1980 *A Cultural Resource Overview of the Eureka, Saline, Panamint and Darwin Region, East Central California.* Submitted to Bureau of Land Management.

Shackley, M. Steven
1984 *Archaeological Investigations in the Western Colorado Desert: A Socioecological Approach.* Submitted to San Diego Gas and Electric.

Stickel, E.G. & L.J. Weinman-Roberts
1980 *An Overview of the Cultural Resources of the Western Mojave Desert.* Submitted to Bureau of Land Management.

Warren, C.W., M. Knack & E. von Till Warren
1980 *A Cultural Resource Overview for the Amargosa-Mojave Basin Planning Units.* Submitted to Bureau of Land Management.

Weide, M.L. & J.P. Barker
1974 *Background to Prehistory of the Yuha Desert Region.* Submitted to Bureau of Land Management.

M.C. Hall & J.P. Barker
The Prehistory and Management of Cultural Resources in the Red Mountain 1981*Area:*Background to Prehistory of the El Paso/Red Mountain Desert Region. And R.L. Kaldenberg and J. Townsend: An Archaeological Protection and Stabilization Plan for the Squaw Spring Well Archaeological District near Red Mountain, California. Submitted to Bureau of Land Management.

The following publications are available at no charge by simply going to the BLM web site and clicking on the report titles. The web site is http://www.blm.gov//heritage/adventures/research/StatePages/PDF/California

Bean, Lowell John, Sylvia Brakke Vane, and Jackson Young.
1981 *The Cahuilla and the Santa Rosa Mountain Region: Places and their Native American Association*. BLM Cultural Resources Publication, Bureau of Land Management, California.

Busby, Colin I., John M. Findlay, and James C. Bard
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1982 *The Archaeology of the McCain Valley Study Area in Eastern San Diego County, California. A Scientific Class II Cultural Resource Inventory*. BLM Cultural Resources Publication, Bureau of Land Mangement, California.

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1979 *The Archaeology of the Western Mojave*. BLM Cultural Resources Publication, Bureau of Land Management, California.

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1980 *A Cultural Resource Management Plan for the Fossil Falls/Litlle Lake Locality*. BLM Cultural Resources Publication, Bureau of Land Management, California

Kaldenberg, Russell L. General Editor
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Lyneis, Margaret M., David L. Weide, and Elizabeth von Till Warren
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Russell, John C., Clyde M. Woods, and Jackson Underwood

2002 *An Assessment of the Imperial Sand Dunes as a Native American Cultural Landscape*. Edaw, Inc. for the California State Office, Bureau of Land Management,. [116 pp, 25 MB PDF--broadband connection recommended)

Stickel, E. Gary, Lois J. Weinman-Roberts, Rainer Berger, and Pare Hopa.

1980 *An Overview of the Cultural Resources of the Western Mojave Desert*. BLM Cultural Resources Publication, Bureau of Land Management, California.

von Till Warren, Elizabeth, Robert H. Crabtree, Claude N. Warren, Martha Knack, and Richard Mc Carty

1981 *A Cultural Resources Overview of the Colorado Desert Planning Units*. BLM Cultural Resources Publication, Bureau of Land Management, California.

Warren, Claude N., Martha Knack, and Elizabeth von Till Warren.

1980 *A Cultural Resource Overview for the Amargosa-Mojave Basin Planning Units*. BLM Cultural Resources Publication, Bureau of Land Management, California.

Weide, Margaret L.

1973 Archaeological Inventory of the California Desert: A Proposed Methodology. BLM Desert Planning Program, Bureau of Land Management, California.

Weide, Margaret L., and James P. Barker et.al.

1974 Background to Prehistory of the Yuha Desert Region. BLM Desert Planning Program, Bureau of Land Management, California, 1974.

Other Documents, Reports and References That Are Useful:

Codes of Federal Regulations (CFR)
25 CFR Indians (all)
36 CFR National Historic Preservation Act (Parts 60 and 800)
40 CFR Environmental Law and Regulations including the National Environmental Policy Act (Section 1500-1508)
43 CFR Administration, including historic preservation, mining, wilderness, BLM permits, NAGPRA, ARPA, etc.
Desert Plan Documents:

The Draft California Desert Conservation Area Plan Alternatives and Environmental Impact Statement, published in February 1980

The Final Environmental Statement and Proposed Plan: California Desert Conservation Area, published in September 1980

The California Desert Conservation Plan 1980, As Amended, published in March 1999

The Plan's discussion of cultural resource significance is found in Volume D, Appendix VII, Part 4, which is the section that dealt with Cultural Resource Sensitivity/Significance Determinations.

The Plan's discussion of Native American Resources is found in Volume D, Appendix VIII, Parts 1-5. A map of the Native American Element is found in the Draft California Desert Plan immediately preceding page 60. This map contains polygons of Native American Traditional Areas. It was not carried forward in either of the versions of the Desert Plan.

Estes, Allen, Kyle Brown, Lorraine Heartfield, Kimberly Popetz, James M. Allan, and William Self

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APPENDICES

APPENDIX A

National Programmatic Agreement Document Among the BLM, ACHP, NSHPOs

PROGRAMMATIC AGREEMENT
AMONG
THE BUREAU OF LAND MANAGEMENT,
THE ADVISORY COUNCIL ON HISTORIC PRESERVATION, AND
THE NATIONAL CONFERENCE OF STATE HISTORIC PRESERVATION OFFICERS
REGARDING
THE MANNER IN WHICH BLM WILL MEET ITS RESPONSIBILITIES
UNDER THE NATIONAL HISTORIC PRESERVATION ACT

Preamble

Bureau of Land Management. The Bureau of Land Management (BLM), consistent with its authorities and responsibilities under the Federal Land Policy and Management Act of 1976 (FLPMA), is charged with managing public lands principally located in the States of Alaska, Arizona, California, Colorado, Idaho, Montana, Nevada, New Mexico, Oregon, Utah, and Wyoming in a manner that will "protect the quality of scientific, scenic, historical, ecological, environmental, air and atmospheric, water resource, and archaeological values," and "that will provide for outdoor recreation and human occupancy and use."

The BLM also has specific responsibilities and authorities to consider, plan for, protect, and enhance historic properties and other cultural properties which may be affected by its actions in those and other States, including its approval for Federal mineral resource exploration and extraction, under the National Environmental Policy Act, the National Historic Preservation Act of 1966 (NHPA), the Archaeological Resources Protection Act, the Native American Graves Protection and Repatriation Act, the Historic Sites Act of 1935, the Antiquities Act, the American Indian Religious Freedom Act, the Religious Freedom Restoration Act, Executive Order 13007 ("Sacred Sites"), and related authorities.

In carrying out its responsibilities, the BLM has developed policies and procedures through its directives system (BLM Manual Sections 8100-8160) to help guide the BLM's planning and decision making as it affects historic properties and other cultural properties, and has assembled a cadre of cultural heritage specialists to advise the BLM's managers and to implement cultural heritage policies consistent with these statutory authorities.

State Historic Preservation Officers. State Historic Preservation Officers (SHPOs), as represented by the National Conference of State Historic Preservation Officers (NCSHPO), have responsibilities under State law as well as under Section 101(b)(3) of the National Historic Preservation Act that include to "advise and assist as appropriate, Federal and State agencies and local governments in carrying out their historic preservation responsibilities," and to "consult with the appropriate Federal agencies in accordance with [NHPA] on Federal undertakings that may affect historic properties, and the content and sufficiency of any plans developed to protect, manage, or to reduce or mitigate harm to such properties."

In certain cases others may be authorized to act in the SHPO's place. Where the Secretary has approved an Indian tribe's preservation program pursuant to Section 101(d)(2) of the NHPA, a Tribal Preservation Officer may perform some SHPO functions with respect to tribal lands. A local historic preservation commission acting through the chief local elected official may fulfill some SHPO-delegated functions, where the Secretary has certified the local government pursuant to Section 101(c)(1) of the NHPA, and its actions apply to lands in its jurisdiction. Pursuant to the regulations implementing Section 106 of the NHPA [36 CFR 800.1(c)], the Council may at times act in lieu of the SHPO.

Advisory Council on Historic Preservation. The Advisory Council on Historic Preservation (Council) has the responsibility to administer the process implementing Sections 106, 110(f), and 111(a) of the National Historic Preservation Act, to comment with regard to Federal undertakings subject to review under Sections 106, 110(f) and 111(a) in accordance with its implementing regulations (36 CFR Part 800), and to "review the policies and programs of Federal agencies and recommend to such agencies methods to improve the effectiveness, coordination, and consistency of those policies and programs with the policies and programs carried out under [NHPA]" under Section 202(a)(6) of the NHPA.

The above-named parties now wish to ensure that the BLM will organize its programs to operate efficiently, effectively, according to the spirit and intent of the NHPA, and in a manner consistent with 36 CFR Part 800; and that the BLM will integrate its historic preservation planning and management decisions with other policy and program requirements to the maximum extent. The BLM, the SHPOs, and the Council desire and intend to streamline and simplify procedural requirements, to reduce unnecessary paperwork, and to emphasize the common goal of planning for and managing historic properties under the BLM's jurisdiction and control in the public interest.

Basis for Agreement

Proceeding from these responsibilities, goals, and objectives, the parties acknowledge the
following basis for agreement:

WHEREAS the BLM's management of lands and mineral resources may affect cultural properties, many of which are historic properties as defined by the National Historic Preservation Act and are therefore subject to Sections 106, 110(f), and 111(a) of the NHPA; and

WHEREAS, among other things, the BLM's program established in response to Section 110(a)(2) and related authorities provides a systematic basis for identifying, evaluating, and nominating to the National Register historic properties under the bureau's jurisdiction or control; for managing and maintaining properties listed in or eligible for the National Register in a way that considers the preservation of their archaeological, historical, architectural, and cultural values and the avoidance of adverse effects in light of the views of local communities, Indian tribes, interested persons, and the general public; and that gives special consideration to the preservation of such values in the case of properties designated as having National significance; and

WHEREAS the BLM's program is also intended to ensure that the bureau's preservation-related activities are carried out in consultation with other Federal, State, and local agencies, Indian tribes, and the private sector; and

WHEREAS the BLM's program also has as its purpose to ensure that the bureau's procedures for compliance with Section 106 are consistent with regulations issued by the Council pursuant to Section 211 of the NHPA (36 CFR Part 800, "Protection of Historic Properties"), and provide a process for the identification and evaluation of historic properties for listing in the National Register and the development and implementation of agreements, in consultation with State Historic Preservation Officers, local governments, Indian tribes, and the interested public, as appropriate, regarding the means by which adverse effects on such properties will be considered; and

WHEREAS the BLM's program also intends to ensure that its Section 106 procedures recognize the historic and traditional interests of Indian tribes and other Native American groups in lands and resources potentially affected by BLM decisions, affording tribes and other groups adequate participation in the decisionmaking process in accordance with Sections 101(d)(6), 110(a)(2)(D), and 110(a)(2)(E)(ii) of the NHPA, and provide for the disposition of Native American cultural items from Federal or tribal land in a manner consistent with Section 3(c) of the Native American Graves Protection and Repatriation Act, in accordance with Section 110(a)(2)(E)(iii) of the NHPA; and

WHEREAS this agreement will not apply to tribal lands, but rather, a proposed BLM undertaking on tribal lands will require consultation among the BLM, the Tribal Preservation Officer, and the Council; or among BLM, tribal officials (where no Tribal Preservation Program exists) the SHPO, and the Council; and such consultation will be outside the compass of this agreement and will follow 36 CFR Part 800 or the Indian tribe's alternative to 36 CFR Part 800; and

WHEREAS the BLM's program, the elements of which were defined in the BLM Manual between 1988 and 1994, does not incorporate some recent changes in legal, regulatory, and Executive Order authorities and recent changes in the nature and direction of historic preservation relationships, rendering the program directives in need of updating, and this need is recognized by the BLM, the Council, and the NCSHPO as an opportunity to work jointly and cooperatively among themselves and with other parties, as appropriate, to enhance the BLM's historic preservation program; and

WHEREAS the States, particularly those containing a high percentage of public land under the BLM's jurisdiction and control, have a strong incentive in forming a cooperative relationship with the BLM to facilitate and promote activities of mutual interest, including direction and conduct of a comprehensive statewide survey and inventory of historic properties, identification and nomination of eligible properties to the National Register of Historic Places, preparation and implementation of comprehensive historic preservation plans, and development and dissemination of public information, education and training, and technical assistance in historic preservation, and

WHEREAS the parties intend that efficiencies in the Section 106 process, realized through this agreement, will enable BLM, SHPO, and Council staffs to devote a larger percentage of their time and energies to proactive work, including analysis and synthesis of data accumulated through decades of Section 106 compliance; historic property identification where information is needed, not just in reaction to proposed undertakings; long-term preservation planning; purposeful National Register nomination; planning- and priority-based historic resource protection; creative public education and interpretation; more efficient BLM, SHPO, and Council coordination, including program monitoring and dispute resolution; and other activities that will contribute to readily recognizable public benefits and to an expanded view of the Section 106 context, and

WHEREAS the BLM has consulted with the Advisory Council on Historic Preservation (Council) and the National Conference of State Historic Preservation Officers (NCSHPO) regarding ways to ensure that BLM's planning and management shall be more fully integrated and consistent with the above authorities, requirements, and objectives;

NOW, THEREFORE, the BLM, the Council, and the NCSHPO mutually agree that the BLM, after completing the actions summarized in 1. below, will meet its responsibilities under Section 106, 110(f), and 111(a) through the implementation of the mechanisms agreed to in this agreement rather than by following the procedure set forth in the Council's regulations (36 CFR Part 800), and the BLM will integrate the manner in which it meets its historic preservation responsibilities as fully as possible with its other responsibilities for land-use planning and resource management under FLPMA, other statutory authorities, and executive orders and policies.

Components Of Agreement

1. Applicability

The Council's regulations (36 CFR Part 800) and existing State programmatic agreements will continue to apply to BLM undertakings under a State Director’s jurisdiction until the Director and State Directors, with the advice of the Preservation Board, assisted by the Council, the NCSHPO, the SHPOS, and other participating parties, as appropriate, have updated and revised national BLM policies and procedures; developed State-specific BLM/SHPO operating protocols; and trained all field managers and their cultural heritage staffs in the operation of the policies, procedures, and protocols. Field offices under a State Director’s jurisdiction (including those under the jurisdiction of the Eastern States Director) will not begin to employ the streamlined procedures developed pursuant to this agreement until the Director has certified that the State Director’s organization is appropriately qualified to do so.

2. Establishment of Preservation Board

a. The BLM's Director will establish a Preservation Board to advise the Director, Assistant Directors, State Directors, and field-office managers in the development and implementation of BLM's policies and procedures for historic properties. Authority, responsibilities, and operating procedures for the Preservation Board will be specified in the BLM Manual.

b. The Preservation Board will be chaired by the BLM's Preservation Officer designated under Section 110(c) of the NHPA, and will include a professionally qualified Deputy Preservation Officer from each State Office. The field management organization will be represented by at least three line managers (i.e., officials who are authorized by the Director's or State Directors' delegation to make land-use decisions).

c. The Preservation Board will perform primary staff work and make recommendations to the Director and State Directors concerning policies and procedures (3. below); bureauwide program consistency (3. below); training (6. below); certification and decertification of field offices (8. below); monitoring of field offices' historic preservation programs (9. below); and responses to public inquiries (9. below).

d. In addition, the Preservation Board will confer regularly with the Council and NCSHPO and involve them in its activities, as appropriate, including the development of the items listed in 2.c. The Preservation Board will also confer regularly with individual SHPOs and such other parties as have identified themselves to the Board as interested parties, including Tribal Preservation Officers, local governments, and preservation associations, to promote consistency with State, regional, and national practice, to identify recurrent problems or concerns, and to create opportunities in general to advance the purposes of this agreement.

e. The BLM will provide assistance, where feasible and appropriate, with reasonable and prudent expenses of the Council related to its activities pursuant to 2.c. and 2.d. above.

3. Revision of "Cultural Resource Management" Procedures

a. Within 6 months from the date of its establishment under 2. above, the Preservation Board will provide notice to Indian tribes and the public and, in accordance with 2.c. above, will begin to review, update, revise, adapt, and augment the various relevant sections of its Manual (8100 Series). These are:

8100 - "Cultural Resource Management";
8110 - "Cultural Resource Identification";
8111 - "Cultural Resource Inventory and Evaluation";
8130 - "Cultural Resource Planning";
8131 - "Cultural Resource Management Plans";
8132 - "Cultural Resource Project Plans";
8140 - "Cultural Resource Protection";
8141 - "Physical and Administrative Protection";
8142 - "Recovery of Cultural Resource Data";
8143 - "Avoidance and/or Mitigation of Adverse Effects to Cultural Properties";
8150 - "Cultural Resource Utilization";
8151 - "Cultural Resource Use Permits";
8160 - "Native American Coordination and Consultation"; and
H-8160-1 - "General Procedural Guidance for Native American Consultation."

b. Manuals will be revised in consultation with the Council, NCSHPO, and the SHPOs, and will consider the views of other interested parties who have identified themselves in response to 2.d. (above).

c. Procedures will be revised to be consistent with the purposes of (1) this agreement, (2) the principles and standards contained in the Council's regulations, "Protection of Historic Properties" (36 CFR Part 800); (3) the Secretary of the Interior's *Standards and Guidelines for Archeology and Historic Preservation* regarding identification, evaluation, registration, and treatment, (4) the Office of Personnel Management's classification and qualification standards as revised under Section 112 of the NHPA, and (5) other applicable standards and guidelines, and will include time frames and other administrative details for actions referred to in this agreement.

d. The BLM will ensure adequate public participation and consultation with parties outside the BLM when revising policy and procedures under 3.a. The BLM's procedures for implementing the National Environmental Policy Act (NEPA) will be used as appropriate for ensuring adequate public participation in the BLM's historic preservation decision making. Provisions of Section 110 of the NHPA and the Council's regulations will be the basis for tailoring the NEPA procedures to historic preservation needs. Mechanisms for continuing public involvement in BLM's historic preservation process will be incorporated in BLM/SHPO protocols under 5. below.

e. The BLM will provide Indian tribes and other Native American groups with appropriate opportunities for involvement. Consultation with tribes pursuant to Sections 101(d)(6) and 110(a)(2)(E) of the NHPA will follow government-to-government conventions. Procedures to ensure timely and adequate Native American participation will follow the direction in Sections 101(d)(6) and 110(a)(2)(E) of the NHPA, and BLM Manual Section 8160 and Manual Handbook H-8160-1, as revised pursuant to a. and b. above. Revisions to the 8160 Manual Section and Manual Handbook will treat the cited NHPA direction as the minimum standard for Indian tribes' and other Native American groups' opportunities to be involved. Provisions for Native American participation in BLM's procedures for historic property identification, evaluation, and consideration of adverse effects will be incorporated in BLM/SHPO protocols under 5. below. For Indian tribes with historic preservation programs approved by the Secretary under Section 101(d)(2) of the NHPA, Tribal Preservation Officers will be involved in place of SHPOs when tribal land would be affected. Such involvement will occur under the Council's and/or the Tribe's procedures in all cases, not under this programmatic agreement.

f. It will be the Preservation Board's duty in accordance with 3.b. above to ensure that the policies and procedures, as revised pursuant to this section, are being followed appropriately by field offices. Where problems with implementation are found, it will be the Preservation Board's duty to move promptly toward effecting correction of the problems. This responsibility of the Preservation Board, among others, will be spelled out in the BLM Manual under 2.a. above.

4. Thresholds for Council Review

a. The BLM procedures will identify circumstances calling for the Council's review.

b. At a minimum, the BLM will request the Council's review in the following classes of undertakings:

(1) nonroutine interstate and/or interagency projects or programs;

(2) undertakings directly and adversely affecting National Historic Landmarks or National Register eligible properties of national significance;

(3) highly controversial undertakings, when Council review is requested by the BLM, an SHPO, an Indian tribe, a local government, or an applicant for a BLM authorization.

5. Cooperation and Enhanced Communication

a. Immediately following execution of this agreement, the BLM will offer each affected SHPO and the Council (and others who have identified concerns under 2.d. above) the following information, and will provide or update as needed:

- a reference copy of the existing BLM Manual Sections and Manual Handbooks related to "Cultural Resource Management;
- a copy of any Handbook, Manual Supplement, or other standard procedure for "Cultural Resource Management" used by the BLM within an individual State Office's jurisdiction
- a list of Preservation Board members;
- a list of BLM cultural heritage personnel within each State Office's jurisdiction;

- -- a map of the State showing BLM field office boundaries and responsibilities;
- -- the best available map of the State showing tribal lands, ceded lands, and ancestral use areas; and
- -- a brief summary of land holdings, major ongoing development projects or permitted uses, proposed major undertakings such as land exchanges or withdrawals, and particularly significant historic properties on BLM lands within each State Office's jurisdiction.

b. Within 6 months after revised policies and procedures become available, each State Director will meet with each pertinent SHPO to develop a protocol specifying how they will operate and interact under this agreement. Where a State Director has few interactions with an SHPO due to minimal public land holdings, protocols need not be pursued and historic preservation consideration will continue to be carried out under the procedures of 36 CFR Part 800. Adoption of protocols, as formalized by the State Director's and SHPO's signatures, will be a prerequisite for the certification described in 8. The Preservation Board and the Council will be kept informed of the progress of protocol development, and will receive an information copy of any signed BLM/SHPO protocol. The SHPO and State Director may ask the NCSHPO, the Preservation Board, and the Council to assist at any stage in developing protocols.

At a minimum, protocols will address the following:

- -- the manner in which the State Director will ensure the SHPO's involvement in the BLM State management process;
- -- data sharing, including information resource management development and support
- -- data synthesis, including geographical and/or topical priorities for reducing the backlog of unsynthesized site location and report information, and data quality improvement;
- -- public education and community involvement in preservation;
- -- preservation planning;
- -- cooperative stewardship;
- -- agreement as to types of undertakings and classes of affected properties that will trigger case-by-case review (case-by-case review will be limited to undertakings that BLM finds will affect historic properties; the parties to this agreement agree that such case-by-case review will be minimized);
- -- BLM/SHPO approaches to undertakings involving classes of, or individual examples of, historic properties for which the present BLM staff lacks specialized capabilities;
- -- provisions for resolving disagreements and amending or terminating the protocol; and
- -- relationship of the protocol to 36 CFR Part 800.

c. As agreed under the protocol, but at least annually, the BLM will regularly send to the SHPO copies of forms and reports pertaining to historic properties, in a format appropriate to the SHPO's established recording systems, and consistent with the confidentiality provisions of Section 304 of the NHPA, so that information can be shared to the maximum extent and contribute to State inventories and comprehensive plans as well as to BLM land use and resource management planning.

d. The State Director, with the assistance of the Preservation Board, will seek, as appropriate, the SHPO's active participation in the BLM's land-use planning and associated resource management activities so that historic preservation considerations can have a greater influence on large scale decisions and the cumulative effects of the more routine decisions, before key BLM commitments have been made and protection options have been limited. Where SHPO participation will be extensive, State Directors may provide funding, if available.

e. Relevant streamlining provisions of BLM Statewide programmatic agreements currently in force in Arizona, California, Colorado, Nevada, New Mexico, and Wyoming (and other programmatic agreements and/or formalized working arrangements between BLM and SHPOs in any State, relative to identifying undertakings, identifying properties, evaluating properties, determining effects, and protecting historic properties) may be incorporated in BLM/SHPO protocols as appropriate and as consistent with 5.b. above, after which the State Directors will notify the SHPO and Council that the Statewide agreements may be suspended for so long as this agreement remains in effect. Project and special purpose programmatic agreements will function normally according to their terms.

f. When potentially relevant to the purposes and terms of this agreement, the BLM will forward to the Council information concerning the following, early enough to allow for timely briefing and consultation at the Council's election:

- major policy initiatives;
- prospects for regulations;
- proposals for organizational change potentially affecting relationships addressed in this agreement;
- the Administration's budget proposals for BLM historic preservation activities;
- training schedules; and
- long-range planning and regional planning schedules.

6. Training Program

In cooperation with the Council and the NCSHPO, and with the active participation of individual SHPOs, the Preservation Board will develop and implement a training program to (a) instruct BLM line managers and cultural heritage program personnel on the policies underlying and embodied in this agreement, as well as specific measures that must be met prior to its implementation, and (b) enhance skills and knowledge of other BLM personnel involved with "Cultural Resource Management" activities, including land use planning and resource management staffs. Training sessions will be open to

Indian tribes, cultural resource consultants, and other parties who may be involved in the implementation of this agreement. The BLM may, where feasible and appropriate, reimburse the Council for assistance in developing training programs.

7. Professional Development

a. The Preservation Board, in consultation with the supervising line manager and cultural heritage specialist, will document each specialist's individual attainments as a preservation professional, consistent with OPM guidance and Section 112 of the NHPA and giving full value to on-the-job experience. Documentation will include any recommended limitations on the nature and extent of authorized functions. Where a field office manager's immediate staff does not possess the necessary qualifications to perform specialized preservation functions (e.g., historical architecture), the documentation will identify available sources of specialized expertise from outside the immediate staff, such as from other BLM offices, the SHPO, other Federal agencies, or non-governmental sources.

b. The Preservation Board, the supervising line manager, and the cultural heritage specialist will assess the manager's needs for special skills not presently available on the immediate staff, and the specialist's opportunities for professional development and career enhancement through training, details, part-time graduate education, and other means.

8. State Office Certification and Decertification

a. The Preservation Board, in consultation with the appropriate SHPO and the Council, will certify each BLM State Office to operate under this agreement upon determining that (1) managers and specialists have completed the training referred to in 7. above, (2) professional capability to carry out these policies and procedures is available through each field office's immediate staff or through other means, (3) each supervising line manager within the State has assigned and delimited cultural heritage specialists' duties, and (4) the State Director and the SHPO have signed a protocol outlining BLM/SHPO interaction in accordance with 5. above.

b. The Preservation Board may choose to review a field office's certification status. The field office's manager, the State Director, the Council, or the SHPO may request that the Preservation Board initiate a review, in which case the Preservation Board will respond as quickly as possible. If a field office is found not to have maintained the basis for its certification (e.g. the professional capability needed to carry out these policies and procedures is no longer available, or the office is not in conformance with the BLM/SHPO protocol, the procedures developed under 3. above, or this agreement) and the office's manager has not voluntarily suspended participation under this agreement, the Preservation Board will recommend that the State Director decertify the field office. If a suspended or decertified field office is found to have restored the basis for certification, the Preservation Board will recommend that the State Director recertify the office.

c. A State Director may ask the Director to review the Preservation Board's decertification recommendation, in which case the Director will request the Council's participation in the review.

d. The Preservation Board will notify the appropriate SHPO(s) and the Council if the status of a certified office changes.

e. When a field office is suspended or decertified, the responsible manager will follow the procedures of 36 CFR Part 800 to comply with Section 106.

9. Accountability Measures

a. Each State Director will prepare an annual report in consultation with the appropriate SHPO(s), outlining the preservation activities conducted under this agreement. The annual report's content will be specified in the revised Manual. The report will be provided to the Council and made available to the public.

b. Once each year, the Council, in consultation with the BLM, SHPOS, and interested parties, and with assistance from the BLM, may select a certified State or States, or field offices within a State, for a detailed field review limited to the implementation of this agreement. Selecting parties may consider including other legitimate affected parties as participants in the review, as appropriate. The Preservation Officer and the appropriate Deputy Preservation Officer(s) and SHPO(s) will participate in the review. Findings and recommendations based on this field review will be provided to the Director, the State Director, and the Preservation Board for appropriate action.

c. The Preservation Officer and Deputy Preservation Officers will prepare responses to public inquiries for the Director's or a State Director's signature. This applies only to inquiries about the BLM's exercise of its authorities and responsibilities under this agreement, such as the identification, evaluation, and protection of resources, and not to general inquiries. Preparing responses will include establishing the facts of the situation and, where needed, recommending that the Director or State Director prescribe corrections or revisions in a practice or procedure.

d. Each meeting of the Preservation Board will be documented by a report. The Preservation Board will provide a copy of each report to the Council, the NCSHPO, and participating SHPOs.

10. Reviewing and Changing the Agreement

a. The parties to this agreement may agree to revise or amend it at any time. Changes that would affect the opportunity for public participation or Native American consultation will be subject to notice and consultation, consistent with 3.e. above.

b. Should any party to this agreement object to any matter related to its implementation, the parties will meet to resolve the objection.

c. Any party to this agreement may terminate it by providing 90 days notice to the other parties, provided that the parties will meet during the period prior to termination to seek agreement on amendments or other actions that would avoid termination. In the event of termination, the BLM will comply with 36 CFR Part 800, including any relevant suspended State programmatic agreements (see 5.e. above).

d. Not later than the third quarter of FY 1999, and every two years thereafter, the parties to this agreement will meet to review its implementation.

Affirmation

The signatures below represent the affirmation of the Bureau of Land Management, the Advisory Council on Historic Preservation, and the National Conference of State Historic Preservation Officers that successful execution of the components of this agreement will satisfy the BLM's obligations under Sections 106, 110(f), and 111(a) of the National Historic Preservation Act.

/s/ Sylvia V. Baca — 3/26/97

Director, Bureau of Land Management — Date

/s/ Cathryn B. Slater — March 26, 1997

Chairman, Advisory Council on Historic Preservation — Date

/s/ Judith E. Bittner — Mar. 26, 1997

President, National Conference of State Historic Preservation Officers — Date

APPENDIX B

California Protocol Agreement Document between California BLM and the California SHPO

APPENDIX C

BLM ACEC Management Plans

Bound Separately

APPENDIX D

Map

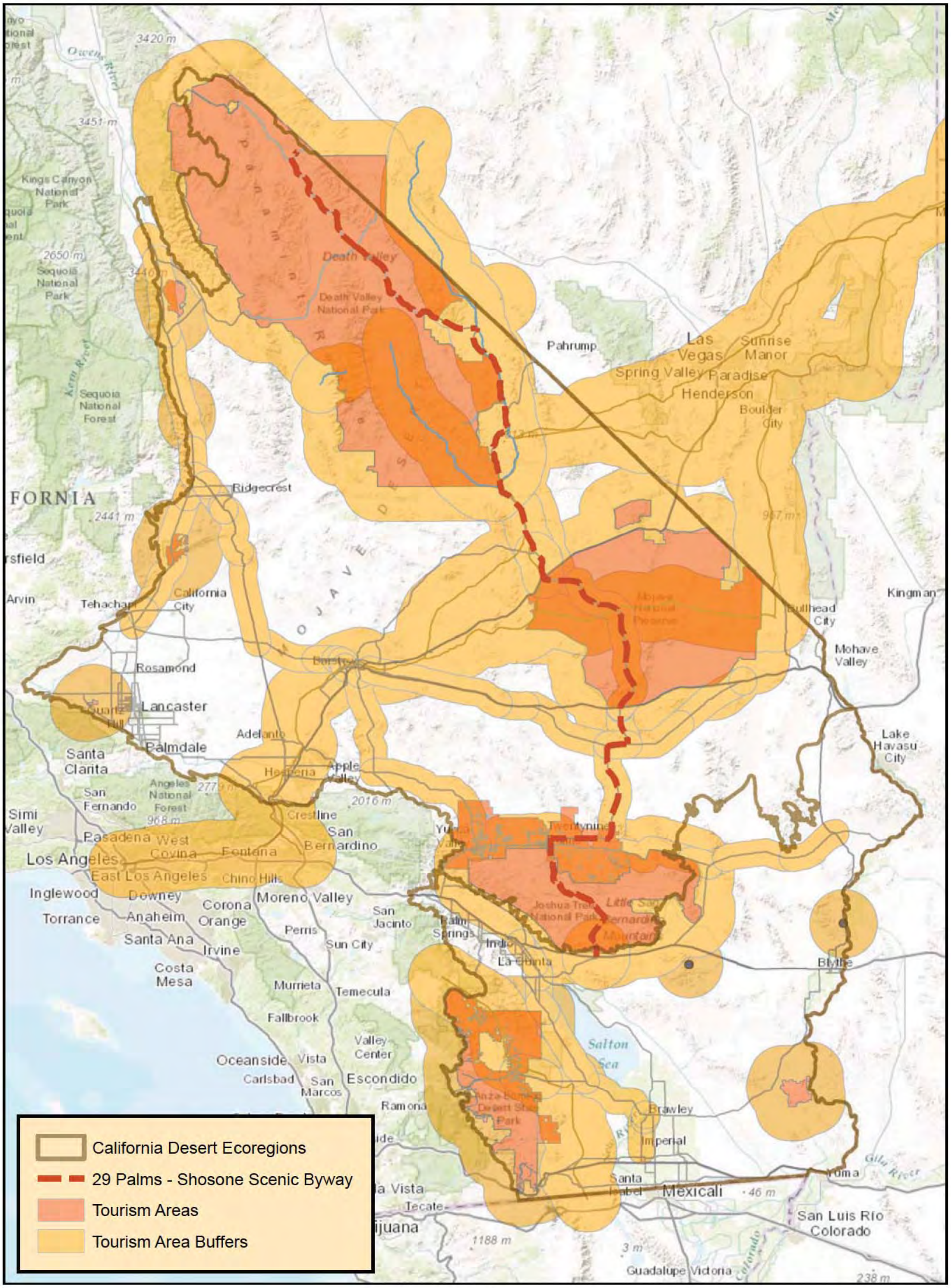
Located inside back cover pocket

1.San Sebastian Marsh ACEC
2.Coyote Mountains ACEC
3.Yuha Basin is an ACEC
4.Indian Pass ACEC
5.East Mesa ACEC
6.The Plank Road ACEC
7.Pilot Knob ACEC
8.Golden Basin-Rand ACEC
9.Tumco Historic Site
10.Lake Cahuilla No. 2 ACEC
11.Lake Cahuilla No. 3 ACEC
12.Lake Cahuilla No. 5 ACEC
13.Lake Cahuilla No. 6 ACEC
14.SW Lake Cahuilla Recessional Shoreline NR District
15.Plaster City archaeological sites
16.Panamint Valley
17.North Searles Lake
18.The East Front of the Sierra Nevada Mtns.
19.Slate Range Geoglyphs
20.Fish Slough ACEC
21.Surprise Canyon ACEC
22.White Mountain City ACEC
23.Rose Springs ACEC
24.Fossil Falls ACEC
25.Great Falls Basin ACEC
26.Salt Creek Hills ACEC
27.Portuguese Bench
28.Amargosa Rings
29.South Owens Lake-Keeler Area
30.Olancha Dunes
31.The Amargosa River ACEC
32.The Volcanic Cones
33.Zinc Hill, Inyo County
34.Cerro Gordo
35.The Jawbone/Butterbredt Canyon ACEC
36.Last Chance Canyon ACEC
37.The Lake Cahuilla Shoreline
38.Whitewater Canyon ACEC
39.Dale Lake ACEC
40.Patton's Iron Mountain Divisional Camp ACEC
41.Corn Spring ACEC

39.Dale Lake ACEC
40.Patton's Iron Mountain Divisional Camp ACEC
41.Corn Spring ACEC
42.Painted Canyon in the Mecca Hills
43.Sidewinder Well ACEC
44.Palen Dry Lake ACEC
45.Alligator Rock ACEC
46.The Mule Mountains ACEC
47.The South McCoy Mountains
48.Ford Dry Lake
49.The Sheephole Mountains
50.Big Morongo Canyon
51.The Santa Rosa/San Jacinto Mountains NM
52.The Black Hills
53.Blackwater Well
54.The Rodman Mountains
55.Troy Dry Lake
56.Von Trigger Springs
57.The Calico Mountains and Harvard Hill
58.The Cronese Lakes
59.The Manix ACEC
60.Mesquite Lake ACEC
61.Denning Spring ACEC
62.The Twenty Mule Team Borax Route
63.Christmas Canyon ACEC
64.Bedrock Springs ACEC
65.Steam Well Archaeological District
66.Squaw Spring ACEC
67.The Black Mountain and Inscription Canyon
68.The Dead Mountains ACEC
69.Kramer Hills ACEC
70.Rainbow Basin and Owl Canyon
71.Crucero ACEC
72.Silver Mountain Mines ACEC
73.Juniper Flats ACEC
74.Black Buttes in Pipes Canyon
75.The North Slope of the San Bernardino Mtns.
76.Amboy Crater
77.Lanfair Valley
78.Lost Lake
79.The Whipple Mountains ACEC
80.Spangler Hills
81.The Baxter Mountain Range
82.The south end of the Providence Mtns

80.Spangler Hills
81.The Baxter Mountain Range
82.The south end of the Providence Mtns
83.Sunflower Springs
84.Kingston Mountains ACEC
85.Clark Mountain ACEC
86.West Well
87.The Afton Canyon ACEC
88.Halloran Wash ACEC
89.Table Mountain ACEC
90.Inkopah ACEC
91.The Old Government Road
92.The Old Salt Lake Trail
93.Route 66
94.The Bradshaw Trail
95.The Juan Bautista De Anza National Historic Trail
96.The Manix Basin Aboriginal Trails
97.Colorado Desert Aboriginal Trails
98.Mojave River Corridor in San Bernardino County
99.Historic 19th- and early 20th-century ranching complexes
100.Historic 19th- and 20th-century mining complexes
101.The New and Alamo Rivers
102.Sites within the Ancient Lake Cahuilla Shoreline Area
103.(a) Coyote Hole Springs
103.(b) Painted Rock
103.(c) Newberry Cave
103.(d) Papago Creation Site
103.(e) Geoglyphs

Tourism Economics Commission Important Tourism Areas



Map for discussion purposes only
SJ Weigel Dec 2012
sweigel@sonoraninstitute.org
TourismEconomicsCommission.mxd

Soda Mountain Solar Stakeholder Meeting

December 12, 2012

We have agreed that the purpose of this meeting is to provide a forum for comments regarding the Soda Mountain Solar project. The Soda Mountain team is here to listen. This meeting is in addition to the two Scoping sessions already held for the project in November, and is not part of the official record of the project.

Comments made at the meeting may be noted and sent to the BLM as part of the Scoping process comment period. If anyone wishes for his or her comments to remain confidential, that request will be honored.

The purpose of the meeting is not to collect quotes or other information for media articles or blog posts. The agreement is that this session is closed to the Press.

To ensure that all attendees are heard, comments should be limited to 3 minutes. There will be an official timekeeper to ensure participants' comments stay within the allotted time. The tone of the discussion will remain respectful, and each participant has the right to be heard without interruption.

An agenda is attached.

SODA MOUNTAIN SOLAR

Output: 350 MW solar photovoltaic (PV)

Location: San Bernardino County
6 miles SW of Baker
along I-15 corridor

Area: Approximately 3,000 acres
of BLM–administered land

Interconnection: LADWP Marketplace-Adelanto
and SCE transmission lines
running adjacent to the property

Project benefits:

- Excellent solar radiation
- Providing clean energy to California consumers
- Using existing transmission lines
- Low environmental impact
- High-quality, local jobs

Site Selection

Criteria used for selecting the Soda Mountain Solar site:

- Avoidance of sensitive habitats
- Minimizing impact on rare, threatened, or endangered species
- Avoidance of cultural resources

Other desirable site attributes:

- Relatively flat slope
- Minimal vegetation
- Vehicular access via I-15
- Location within an existing utility corridor
- No known environmental or land use restrictions

About the Development Team

The Soda Mountain Team understands the need to balance today and tomorrow's energy needs with economic growth, human well-being, and environmental sustainability. Its developer is a world class contractor that delivers high quality, responsible development, and reliable project execution.

Soda Mountain Solar is owned by Bechtel, an internationally recognized project management, engineering and construction company. Bechtel is:

- Committed to environmental stewardship
- Experienced working in southern California
- Currently constructing other solar projects in the area

For more information call SMS Project Team Member Marthe Patterson at (415) 768-1842.

Statement from John Wehausen

I am a very recently retired research scientist with the University of California. Over the past 38 years I devoted most of my professional time to conducting conservation-oriented research on bighorn sheep in California. That has included 28 years of intensive research on desert bighorn sheep in this Mojave Desert region. During those decades I have also been integrally involved in conservation planning for this species. Most recently I drafted for the California Department of Fish and Game a conservation plan for most of the desert bighorn sheep in California, including the region of this proposed project.

The population structure of bighorn sheep is called a metapopulation. Metapopulations are networks of geographically distinct populations that are linked through movements of animals between the occupied habitat patches. For bighorn sheep the populations occur in desert mountain ranges and the movements between populations cross though intermountain habitat with less topography. This intermountain movement by bighorn sheep is essential for their persistence in part to counter the pervasive force of genetic drift that would otherwise cause a steady decline of genetic diversity in each population, eventually leading to inbreeding depression. This essential gene flow between desert bighorn sheep populations has been studied and measured in California. There is an inverse relationship between gene flow and distance between populations, but there is zero gene flow across the major freeways that cross the Mojave Desert. The result is that what was once one large metapopulation now consists of a series of metapopulation fragments.

The desert bighorn sheep conservation plan I have written focuses on metapopulation processes that are essential for this animal. Among other things, it calls for re-connecting the metapopulation fragments by re-establishing bighorn sheep movements across freeways. This has recently been accomplished in Arizona on Highway 93 south of Lake Mead by building carefully placed bridges across that highway specifically for bighorn sheep, and those sheep began using those bridges immediately. In California, one of the more promising locations to re-establish gene flow across a major freeway is between the North and South Soda Mountains where this proposed energy project would be located. There are two ways that regular gene flow might be re-established. One is for bighorn sheep to go under existing highway bridges and such bridges exist on Highway 15 between the North and South Soda Mountains. Gene flow measurements indicate that sheep are rarely crossing under such bridges if at all. However, it may be possible to use the addition of drinking water to bait sheep to begin using some existing bridges, but it remains to be determined if this approach will work. The other approach will be to build a bridge for bighorn sheep across the highway in a strategic location as has been done in Arizona. Neither of these potential methods will work if the habitat on either side of the highway is made impassible for bighorn sheep. Energy projects create such barriers. The potential to re-establish bighorn sheep gene flow between the South and North ~~Bristol~~ Mountains needs to be given full consideration relative to this proposed project. Soda

Public lands are set aside for ALL the people to use and enjoy not for corporations to make money. While solar and other "green" energies are more desirable than fossil fuels, they would be best incorporated and distributed where the energy is actually used, not hundreds of miles away and dependent on grids that come crashing down, because of human error as in southern california last year or extreme weather or earthquake events.

The mojave is very much alive! While some people traveling the I15 corridor from LA to Las Vegas may perceive this land as waste, it is because they do not take the time to stop and listen and look. But when they do, almost invariably they begin to understand it's true value. Silence and vast landscape remind us that there is something greater than ourselves. In places like the Soda Mountains and throughout the mojave geology is laid nearly bare and when we understand even a little we begin to perceive the vast amount of time mother earth has been creating this landscape. The amazing creatures that live here do not know boundaries and fences 4,000 plus acres is a lot of habitat and because resources are also spread apart many creatures will loose their homes and their migration paths. Of course there others who can speak much better to these points than myself.

What really irks me, is the shear nonsense of these large scale projects so far away from where the energy is to be consumed. These big projects in the mojave so far do nothing but negatively impact the small rural communities they impose on. For example traffic accidents on I15 because of the Bright Source Ivanpah project have gone up 30% directly related to that project's travel. Why not build projects along highways and already disturbed lands in the places where the power is consumed?! A project of this scope will also create noise pollution, again while the land seems empty, it's precisely because of the vast that noise will travel and pound into the mojave preserve and throughout the area. A project of this scope will also create light pollution further diminishing the precious night skies that cities have already lost. I know it may be hard to imagine that light from LA and Las Vegas pollute the Mojave Preserve and Death Valley National Park but they do -- look it up.

And then there more intangible things all people will loose. It's not just animals and plants that live and travel through these places, people do too and have for millennia they sing their songs and pray for the land and mother earth not just for themselves -- but for ALL of us.

I grew up in LA and lived a life there, raised my kids and worked for 21 years at the J. Paul Getty Museum as a Registrar and Project Manager. I've watched the cities in Southern California grow denser and denser nearly all open space is gone. Frankly, I believe it was my regular travel to the desert that kept me balanced. I've brought many people out to the mojave from all over the world over many years and even though they many never return, it is an experience that they cherish their whole lives. I've invested 30 years of work, living and savings into resurrecting a small desert hot springs resort about 50 mles north of the Soda Mountains because if places like this turn into factories to supply power and waste dumps for people who won't figure out how to make their cities self sustaining we all lose.

Thank you,
Amy Noel
Owner, Tecopa Hot Springs Resort
President, Death Valley Chamber of Commerce

Amy Granat,
Managing Director CORVA
1500 El Camino #352
Sacramento, CA 95833
916-710-1950
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December 17, 2012

Jeffery Childers
Soda Mountain Solar Project Manager
22835 Calle San Juan De Los Lagos
Moreno Valley, CA 92553

Via email: sodamtnsolar@blm.gov

Thank you for the opportunity to comment on the Notice of Intent to Prepare a Draft Environmental Impact Statement for the Soda Mountain Solar proposal. The California Off-Road Vehicle Association (CORVA) represents thousands of individuals throughout the state of California that use and enjoy motorized vehicles, as well as value their access to unique and scenic areas to pursue recreational experiences.

The geographic area under consideration in the Soda Mountain Solar proposal lies adjacent to the well-known and well-used Razor Off-Highway Vehicle (OHV) Open Area. Access to the OHV Area will require a realignment of Razor Road in order to accommodate the needs of the solar installation in its proposed configuration. What was once an open and scenic approach would now be marred by acres and acres of solar panels, forever changing the atmosphere and the experience of the average off-roader visiting the area. This change should be analyzed and considered in the draft document.

California desert areas industrialized due to alternative energy projects are forever changed, and public access lost to all forms of recreation and visitation. Because of this, each proposal must be analyzed with the greatest scrutiny to make sure that members of the public will not lose more than they stand to gain from the energy that may be produced at the site.

CORVA looks forward to learning more about the project as the analysis proceeds, and will be looking closely as the Draft Environmental Impact Statement for adherence to all National Environmental Policy guidelines. We also offer assistance and guidance with issues pertaining to the Razor OHV Open Area, including the potential for changes to designated routes that may be included in the proposal.

Sincerely,

Amy Granat
Managing Director
CORVA

APPENDIX C

Draft Decommissioning and Closure Plan

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Draft Decommissioning and Site Reclamation Plan

Soda Mountain Solar Project

BLM Case No. CACA 49584

July 2013

PANORAMA ENVIRONMENTAL, INC.

One Embarcadero Center, Suite 740 San Francisco, CA 94111 650-373-1200
www.panoramaenv.com

Draft Decommissioning and Site Reclamation Plan

Soda Mountain Solar Project

BLM Case No. CACA 49584

Submitted to:

U.S. Department of the Interior
Bureau of Land Management
California Desert District Office
22835 Calle San Juan De Los Lagos
Moreno Valley, CA 92553

Submitted by:

Soda Mountain Solar, LLC
5275 Westview Drive
Frederick, MD 21703-8306
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Prepared by:

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TABLE OF CONTENTS

List of Tables

List of Figures

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1 INTRODUCTION

1.1 BACKGROUND

Soda Mountain Solar, LLC (SMS), proposes to develop the Soda Mountain Solar Project (project) on 4,179 acres of public lands administered by the U.S. Department of the Interior, Bureau of Land Management (BLM), in unincorporated San Bernardino County, approximately 6 miles southwest of Baker, California (Figure 1.1-1).

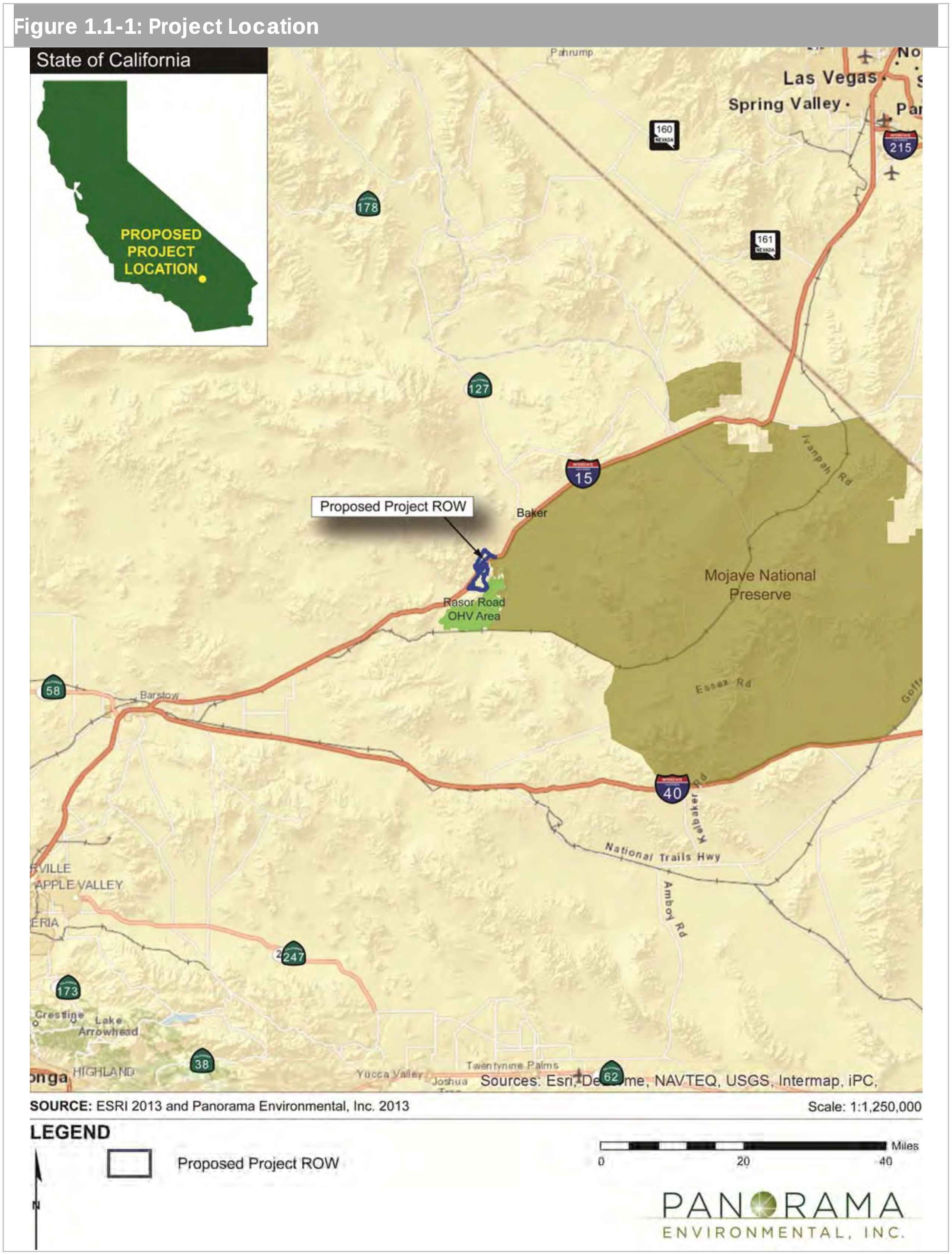
This Decommissioning and Site Reclamation Plan (Decommissioning Plan) describes the SMS decommissioning and site reclamation strategy for the project area after the solar generating facility permanently ceases operation. Permanent closure will occur as a result of facility age, damage to the facility beyond repair, economic conditions, or other reasons. The Decommissioning Plan will be reviewed at least 5 years prior to planned permanent closure and a Final Closure Plan will be prepared. The right-of-way (ROW) requested from BLM is anticipated to be 30 years in duration. The ROW may, if granted, be extended, subject to the discretion of BLM. The extension of the ROW may be subject to additional review under the National Environmental Policy Act.

The Decommissioning Plan addresses dismantling and removal of project components and reclamation of areas disturbed over the life of the project. Reclamation will primarily be accomplished through revegetation. Reclamation of areas that will be temporarily disturbed during project construction are addressed in a separate Vegetation Resources Management Plan (VRMP; CSESA 2013a). Invasive weeds in the project area will be controlled throughout the life of the project in accordance with the Integrated Weed Management Plan (IWMP; CSESA 2013b). This Decommissioning Plan supplements the VRMP and IWMP. Together, the three documents describe the overall approach to vegetation management, weed management, and site closure and reclamation to be implemented over the life of the project.

1.2 OBJECTIVE

The objective of project decommissioning and reclamation is to remove the installed power generation equipment and return the site to a condition as close to its preconstruction state as practical.

Figure 1.1-1: Project Location



2 PROJECT DESCRIPTION

2.1 PROJECT LOCATION AND SETTING

The proposed SMS project is located in a rural, undeveloped area of the Mojave Desert. The project area is bisected by Interstate 15 (I-15) and is located in an intermontane desert valley composed of alluvial fan deposits and surrounded by the Soda Mountains. The project will be entirely located on BLM lands and consists of generally undeveloped, natural open space. Portions of the project ROW are designated by BLM as multiple-use class I (Intensive Use), multiple-use class M (Moderate Use), and multiple-use class L (Limited Use). Portions of the project area are also located within the BLM-designated utility corridor, which includes two transmission lines, a distribution line, telephone line, fiber optic line, fuel pipeline, and a cellular tower.

The project ROW was defined using the Public Land Survey System (PLSS) (National Atlas 2011). The PLSS subdivides and describes land in the United States. The full legal description of the project area is included in the SMS Plan of Development (Panorama 2013a). The project area is located on the following land sections:

- T12N, R7E—Sections 1, 11 (portion), 12 (portion), 13 (portion), 14 (portion)
- T13N, R7E—Sections 25 (portion), 36
- T12N, R8E—Sections 6 (portion), 7 (portion), 8 (portion), 18 (portion)
- T13N, R8E—Sections 17 (portion), 18 (portion), 19, 20 (portion), 21 (portion), 29 (portion), 30, 31, 32 (portion)

All sections are surveyed with respect to the San Bernardino Baseline and Meridian. In some cases, only a portion of the section is included in the ROW. The ROW was designed to avoid other utility ROWs (e.g., Caltrans I-15 ROW, Kinder Morgan pipeline ROW, and transmission line ROWs), mining claims, private land, and sensitive resource areas (e.g., drainages and biological resources).

2.2 STRUCTURES AND FACILITIES

2.2.1 Solar Arrays and Ancillary Facilities

The proposed project is a solar photovoltaic (PV) electric generation facility that will generate a peak capacity of 350 megawatts of alternating current (AC) renewable energy. Major components of the project will include:

- PV panel arrays (North, South, and East Arrays), inverters, medium-voltage collector transformers, and ancillary equipment

- Unpaved access roads between the arrays
- 34.5-kilovolt (kV) buried collector lines to connect the panel arrays to the substation
- Substation and switchyard for interconnection to the adjacent, existing transmission line
- Water wells
- Water storage tanks
- Reverse osmosis (RO) water treatment system with brine ponds
- Control room/office building, maintenance facility, storage warehouse, and other ancillary structures
- Temporary storage facility for materials and supplies required during construction
- Earthen berms

Solar array fields will cover approximately 52 percent of the defined ROW. The remaining area will be used for stormwater control, access roads, ancillary buildings, and desert tortoise and/or cactus translocation. Project components are shown on Figure 2.2-1. The building layout is presented as Figure 2.2-2.

2.2.2 Site Preparation

SMS proposes to use site preparation techniques that will minimize earth movement and preserve existing runoff patterns to the extent possible. Stormwater drainage will flow through the site. Isolated grading is proposed at drainage washes along the alignment of the wash to create protective berms and smooth isolated bumps and dips. No topsoil will be stripped or otherwise segregated. Major drainage areas will be avoided. Fugitive dust will be controlled in accordance with a plan as required by the Mojave Desert Air Quality Management District.

SMS construction and site preparation activities will be designed to maintain existing vegetation to the extent possible. Areas containing the array blocks and other infrastructure will need to have larger vegetation cut back leaving the root structure and about 6 inches of stem in place. At select locations of the site, removal of vegetation and cut-and-fill will be required to smooth out isolated surface irregularities and to remove oversize rocks. Some areas within the solar array field may need to be cleared of vegetation and maintained as bare ground (e.g., access roads). Up to the maximum number of acres identified as the permanent disturbance area will be mowed.

The staging area, road corridors, building and substation location, and areas for other infrastructure will be cleared and graded. Rocks or boulders removed from the array area will be used as fill within earthen berms. The remaining fill to construct the earthen berms will be taken from areas immediately adjacent to the berms. Up to 1,155 acres will be graded.

Figure 2.2-1: Project Layout

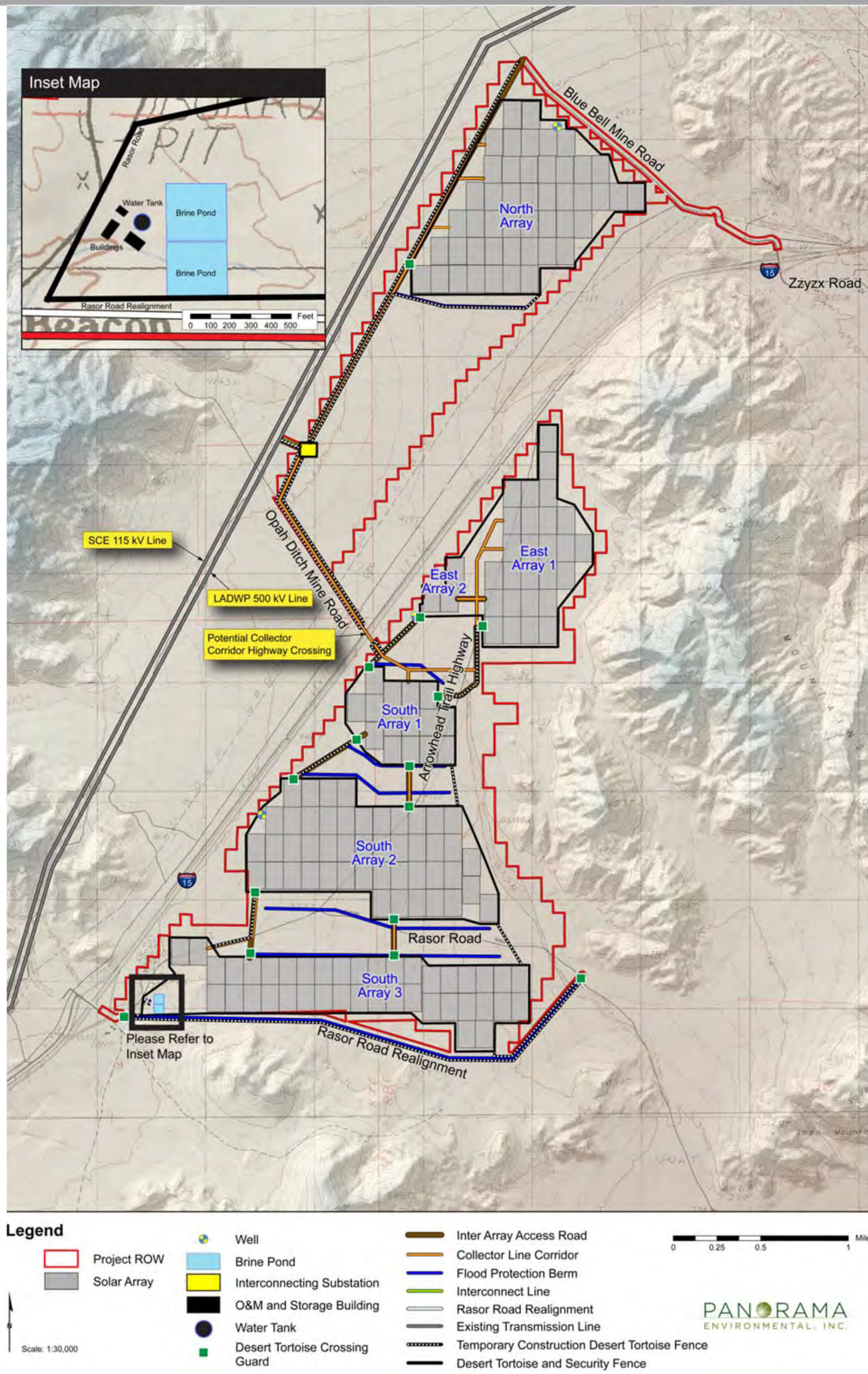
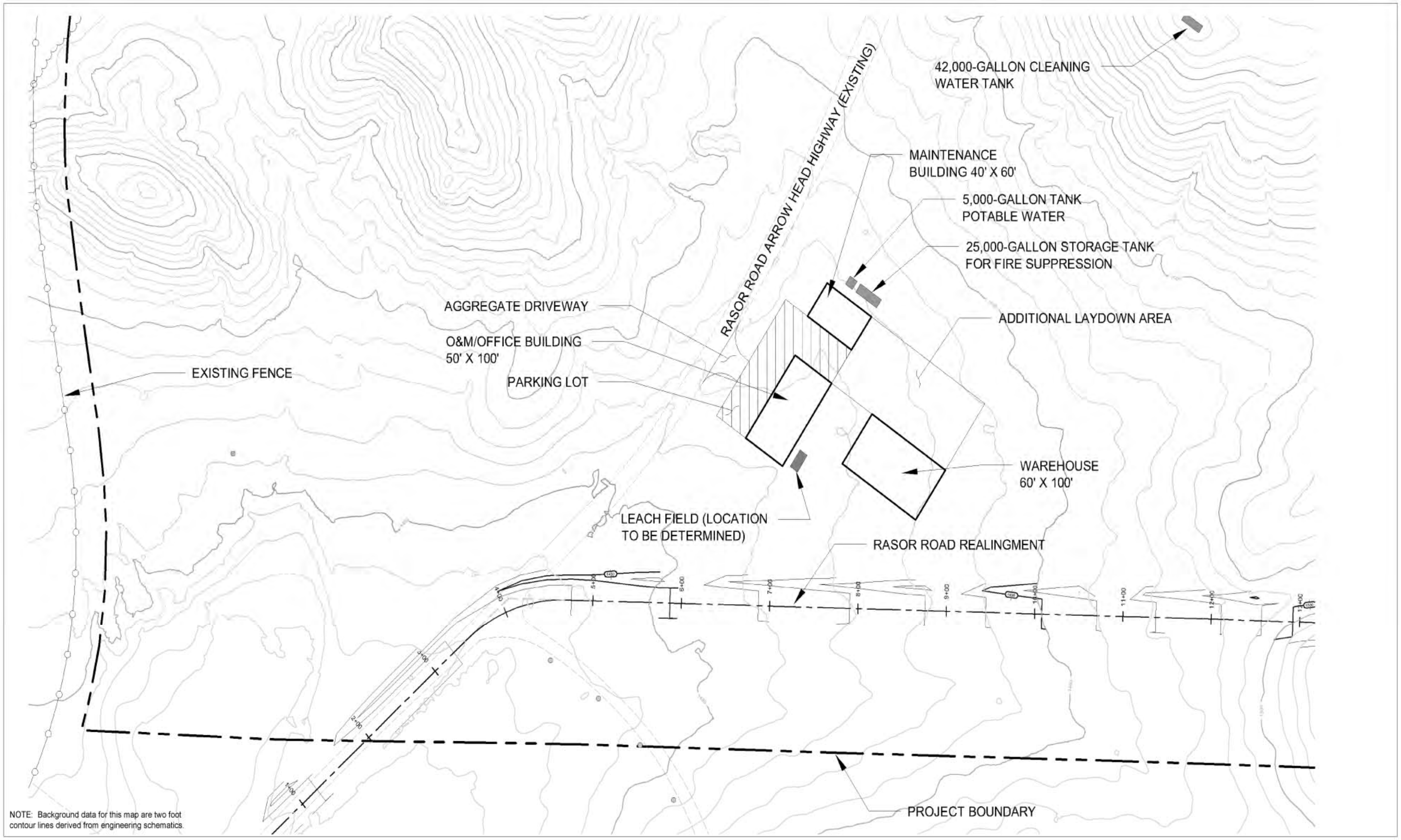


Figure 2.2-2: Building Layout



SOURCE: RMT Inc. 2009

LEGEND

Proposed Project Area Boundary; PV Panel Array; 2 Foot Contour Line; Existing Fence; Feet 0 100 200

2.2.3 Vegetation Management

The vegetation on the site is primarily creosote bush-white bursage scrub. The VRMP (CSESA 2013a) identifies specific techniques for vegetation management, which include transplanting cacti and planting blue palo verde and honey mesquite saplings. Blue palo verde and honey mesquite are protected by the California Desert Native Plants Act. Seeding or revegetation of the site is not anticipated.

Vegetation will be allowed to re-grow within the solar array areas and outside of access and maintenance roads. Vegetation under panels will not be allowed to grow above 18 inches in height to minimize attraction to wildlife, prevent fire hazard, and prevent disruption of panel performance.

3 EXISTING SITE CONDITIONS

3.1 LAND USE

The project area is bisected by I-15, an interstate highway that connects southern California and the Las Vegas area. The project ROW is surrounded by federally owned land, including several Wilderness Study Areas (WSAs), the Rasor Off-highway Vehicle (OHV) Area, and Mojave National Preserve, which is managed by the National Park Service. There is also private land adjacent to the ROW at the Rasor Road Service Station.

In addition to I-15, the valley in which the project is located contains the following features:

- Utility ROWs: Fuel pipelines, fiber optic, cellular, electrical distribution, telephone, and electrical transmission (115-kV Southern California Edison subtransmission line and 500-kV Los Angeles Department of Water and Power transmission line) immediately outside the project ROW boundaries
- Cellular towers
- Several mines and mining claims
- Several unpaved access roads located within and just outside the project ROW boundaries
- Service station and associated structures at Rasor Road exit on southeast side of I-15

There is currently a ROW proposal for an additional petroleum pipeline, and BLM has approved a high-speed railroad ROW west of I-15 and the project ROW.

3.2 TOPOGRAPHY

The project is located in an intermontane desert valley composed of alluvial fan deposits and surrounded by the Soda Mountains. The Soda Mountains north and west of the study area reach an elevation of approximately 3,600 feet. Lower-elevation mountains south and east of the study area form a discontinuous border and reach an elevation of approximately 2,400 feet.

A small portion of the project area consists of mountainous terrain with steep to shallow bedrock slopes. Slopes within the project area generally range from 2 to 4 percent. Elevations in the project vicinity range from approximately 1,550 feet in the north to 1,250 feet in the southeast. Surface morphology varies from smoothly undulating and relatively flat alluvial fan surfaces to incised young and active drainages cut into the elevated older alluvial fan surfaces. Local relief varies from several inches to approximately 10 feet.

3.3 CLIMATE

Prevailing winds in the Mojave Desert Air Basin (MDAB) are out of the west and southwest because of the basin's proximity to coastal and central regions and because the Sierra Nevada blocks wind movement to the north. Air masses move from these adjoining regions through mountain passes into the MDAB. The Pacific subtropical high cell, which sits offshore and inhibits cloud formation, results in daytime solar heating of the basin in the summer months (County of Riverside 2008). Wind direction in the Mojave Wash, near the project area, was monitored by the U.S. Geological Survey at the North Soda Lake and Crucero monitoring stations. The prevailing wind direction at North Soda Lake is from the south-southeast and the prevailing wind direction at Crucero is from the west (Urban 2012). Wind direction is significantly influenced by topography and there are seasonal variations at both locations (Urban 2012).

The MDAB generally is high enough in elevation to be above the regional inversion layer and experiences extreme temperature fluctuations, strong seasonal winds, and clear skies. The closest National Oceanic and Atmospheric Administration climate station to the project site is in Baker, approximately 6 miles to the northeast. Average temperature for Baker between 1971 and 2000 was 69 degrees Fahrenheit (°F), with summer temperatures typically between about 75 and 92°F, sometimes exceeding 100°F. Average winter temperatures typically were between about 45 and 70°F, sometimes dropping below 35°F (NOAA 2002). Most precipitation in Baker occurs between November and March (NOAA 2002). Precipitation averaged about 4 inches per year between 1971 and 2012 (WRCC 2012).

3.4 SOILS

The two major soil types present in the project region are entisols and aridosols (NPS 2006). Entisols are soils of recent origin that occur on older alluvial fans and terraces and in better-drained basins. Entisols typically have little to no subsurface horizon development. Stable remnant areas on older and higher surfaces are found between alluvial fan channels and may contain soils with poorly developed subsurface horizons, termed aridisols. Aridisols are dry most of the year and contain subsurface horizons in which clays, calcium carbonate, silica, salts, and/or gypsum have accumulated.

The U.S. Department of Agriculture Natural Resources Conservation Service has not mapped soil types in the project area (NRCS 2012; Houdeshell 2012). Field exploration and geologic characterization/mapping was conducted for the project area in 2010 (WGI 2011). Field exploration included preliminary geotechnical, geophysical and engineering geology investigations. Studies indicated that the predominant soils classifications within the upper 20 feet of alluvial deposits are poorly graded gravels, silty gravels, and silty sands (WGI 2011). Geophysical data indicate that the top 30 feet of soil in the project area is composed of young alluvium or weathered intermediate-age alluvial fan materials underlain by a more competent (harder, more compacted) zone of alluvial fan material (WGI 2011).

3.5 VEGETATION

3.5.1 Vegetation Communities

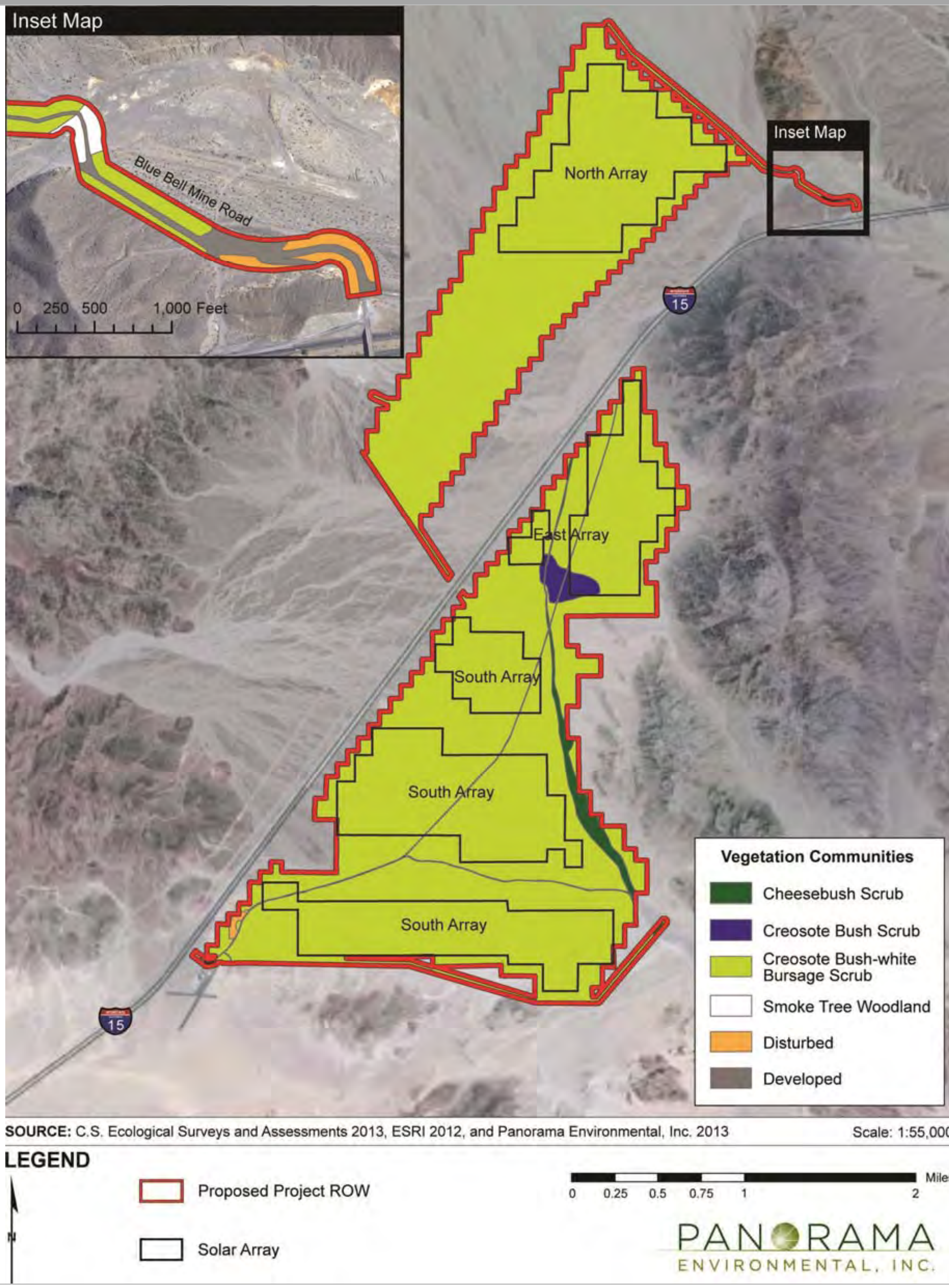
Vegetation communities within the project area were mapped in 2013 at the alliance level. Four vegetation alliances and two cover types (disturbed and developed ground) were observed within the ROW in 2013 (CSESA 2013). Vegetation alliances and associated species are presented in Table 3.5-1 and shown on Figure 3.5-1, and summarized below.

Table 3.5-1: Vegetation Alliance and Cover Type Acreages

Vegetation Alliance/Cover Type	Dominant Species	Understory and Associated Species	Acres
Creosote bush-white bursage scrub	Creosote bush (*Larrea tridentata*) White bursage (*Ambrosia dumosa*)	Saltbush species (*Atriplex* spp.) Leafy rattan (*Krameria erecta*) Cholla species (*Cylindropuntia* spp.) Sandmat species (*Chamaesyce* spp.) Hairy dalea (*Dalea mollissima*) Manybristle cinchweed (*Pectis papposa* var. *papposa*) Devil's spineflower (*Chorizanthe rigida*) Sweetbush (*Bebbia juncea* var. *aspera*) Woolly brickellbush (*Brickellia incana*) Slender poreleaf (*Porophyllum gracile*) Desert senna (*Senna armata*) Brittlebush species (*Encelia* spp.)	4,052
Cheesebush scrub	Cheesebush (*Ambrosia salsola*)	Sweetbush (*Bebbia juncea* var. *aspera*) Woolly brickellbush (*Brickellia incana*) Thurber's sandpaper plant (*Petalonyx thurberi* ssp. *thuberi*) White bursage (*Ambrosia dumosa*) Creosote bush (*Larrea tridentata*)	54
Creosote bush scrub	Creosote bush (*Larrea tridentata*)	White bursage (*Ambrosia dumosa*)	35
Smoke tree woodland	Smoke tree (*Psorothamnus spinosus*)	Cheesebush (*Ambrosia salsola*) Sweetbush (*Bebbia juncea* var. *aspera*) White bursage (*Ambrosia dumosa*)	1
Developed	N/A	N/A	28
Disturbed	N/A	N/A	9
		Total	**4,179**

SOURCE: CSESA 2013

Figure 3.5-1: Vegetation Communities



3.5.2 Vegetation Alliances

Descriptions of vegetation alliances were included in the Biological Resources Technical Report prepared for the project (Panorama 2013b) and are presented below.

Creosote Bush-White Bursage Scrub

The creosote bush-white bursage scrub vegetation community is common throughout the lower elevations of the Mojave Desert and covers about 97 percent of the project ROW. The dominant species are creosote bush (*Larrea tridentata*) and white bursage (*Ambrosia dumosa*), typically at low or moderate total cover. Widely scattered associated shrub and cactus species include saltbush (*Atriplex* spp.), leafy rattan (*Krameria erecta*), and cholla (*Cylindropuntia* spp.). There was little understory cover present during the surveys, and the most common living herbaceous species observed were sandmat (*Chamaesyce* spp.), hairy dalea (*Dalea mollissima*), and manybristle cinchweed (*Pectis papposa* var. *papposa*). Devil's spineflower (*Chorizanthe rigida*) was the predominant herbaceous species in areas of desert pavement.

The alluvial fans that support this vegetation type contain numerous intermittent braided channels, washes, and gullies that occasionally support species typical of desert washes such as sweetbush (*Bebbia juncea* var. *aspera*), woolly brickellbush (*Brickellia incana*), slender poreleaf (*Porophyllum gracile*), desert senna (*Senna armata*), and brittlebush (*Encelia* spp.). However, within the areas mapped as creosote bush-white bursage scrub, these wash species were typically not present in stands with enough cover or of sufficient size to warrant their mapping as separate vegetation alliances.

Cheesebush Scrub

The cheesebush scrub vegetation community is typically found in washes, intermittent channels, and arroyos in the Mojave Desert. Within the project ROW a large wash that runs southwest to northeast through the South Array and East Array was mapped as this alliance. Cheesebush scrub is dominated by cheesebush, and associated species include sweetbush, woolly brickellbush, Thurber's sandpaper plant (*Petalonyx thurberi* ssp. *thurberi*), white bursage, and creosote bush.

Creosote Bush Scrub

The creosote bush scrub vegetation community is similar to creosote bush-white bursage scrub, but white bursage is absent or present at less than 1 percent cover (Sawyer et al. 2009). One moderately sized area within the East Array was mapped as this alliance. Shrub diversity in this area was very low, consisting primarily of widely spaced creosote bush and occasional white bursage at very low cover.

Smoke Tree Woodland

The smoke tree woodland vegetation community is typically found in washes and arroyos in the Mojave Desert. Smoke trees (*Psorothamnus spinosus*) dominate and associated shrubs include cheesebush, sweetbush, and white bursage. Within the project ROW, smoke tree woodland community is limited to a wash crossed by Blue Bell Mine Road.

Developed and Disturbed Land

The existing dirt and gravel roads within the project ROW were mapped as developed land, and the disturbed area near the proposed operations and maintenance facility in the southwest corner of the South Array was mapped as disturbed ground.

4 DECOMMISSIONING METHODS

4.1 OVERALL STRATEGY

The life of the project is expected to be at least 30 years. When the project has reached the limit of utility, it will be decommissioned and land occupied by project components will be reclaimed. Reclamation will be conducted in accordance with the methods described in Section 5. Project decommissioning will be coordinated with BLM. Decommissioned and reclaimed material may be sold to offset the costs of reclamation.

Decommissioning activities are expected to involve a similar level of effort as project construction, requiring approximately 3,000 truck trips per month, an average workforce of approximately 150 workers, a maximum workforce of 250 workers, and approximately 24 months to complete.

The overall decommissioning strategy will include the following major elements, but may be modified at the time to reflect current best management practices and BLM direction:

- Recycling as much material as feasible
- Removal of all structures and facilities
- Removal of foundations to a depth of approximately 3 feet below final grade; removed foundation material will be demolished and hauled to a permitted facility for disposal
- In-place abandonment of foundations deeper than 3 feet below final grade
- Excavation and removal of belowground structures (cabling and conduit may be left in place)
- Removal and salvage of solar array rack posts
- Backfilling with native soils the voids created by foundation or post removal
- Removal of berm materials and replacement in adjacent, original borrow areas
- Remediation of any fuel, lubricant, or hazardous material spill to current regulatory standards
- Abandonment and recontouring of all service roads (except those used to connect existing trails) where necessary to make surface similar with surrounding topography.
- Adopting a take-back or recycling program for solar panels to ensure collection and recycling of the panels at the end of their useful life; the project owner will dismantle the arrays to avoid panel breakage and ship the panels to the manufacturer's nearest storage facility to be reused or recycled

- Minimal recontouring of land surface using standard grading equipment to maximize the likelihood of vegetation recovery over time and minimize soil erosion, dust generation, and weed invasion
- Permanent closure of wells and removal of surface facilities

The project owner will document Final Closure Plan implementation and compliance with environmental requirements during performance of decommissioning activities. Site monitoring will continue for 5 years following completion of decommissioning to assess achievement of reclamation success criteria.

4.2 PRE-DEMOLITION ACTIVITIES

Pre-decommissioning activities will consist of preparing the project area for demolition. A pre-demolition meeting that includes safety and environmental training will be held on site for pertinent project staff, all construction personnel, and environmental monitors. The solar power plant will be de-energized and completely disconnected from the substation per SMS health and safety program procedures. The site also will be surveyed and marked for demolition.

Pre-demolition activities will include removal of products such as diesel fuel, hydraulic oil, lubricants, mineral oil, and other materials to reduce personnel health and environmental risk during decommissioning work. Hazardous materials and petroleum containers and pipelines will be rinsed clean when feasible and the rinseate collected for off-site disposal. These materials generally will be transferred directly into tanker trucks or other transport vessels and removed from the site at the point of generation to minimize the need for hazardous material and waste storage at the project site.

Decommissioning operations are assumed to span about 2 years; therefore, fencing, electrical power, and water facilities will be maintained in place and operational to be available for limited use by decommissioning and site restoration workers.

Temporary desert tortoise exclusion fencing will be placed at the direction of biological and cultural monitors to keep construction crews out of sensitive environmental or cultural areas. Desert tortoise exclusion fencing will be installed around the perimeter of the project reclamation area prior to initiating decommissioning activities. Fencing will enclose construction work areas including Opah Ditch Mine Road. Any desert tortoise encountered within the reclamation area will be relocated in accordance with provisions included in the Desert Tortoise Translocation Plan (Panorama 2013c).

4.3 DECOMMISSIONING TASKS

Decommissioning activities will involve use of heavy machinery to disassemble and remove buildings and fixtures used during operations. To the extent possible, these activities will only occur within existing disturbed areas. Previously undisturbed areas that are inadvertently affected by project decommissioning activities will require recontouring and restoration. These areas will be included in the Final Closure Plan, which will include a requirement that areas disturbed during decommissioning be identified and included for restoration.

4.3.1 Demolition of Aboveground Structures

Mechanized equipment operated by trained personnel will be used to dismantle each structure or facility. Decommissioning will be undertaken using traditional heavy construction equipment including, but not limited to, front-end loaders, cranes, track-mounted and rubber-tired excavators, bulldozers, and scrapers. Dismantling and demolition of aboveground structures will be followed by concrete removal, as needed, to ensure that no concrete structure remains within 3 feet of final grade (i.e., floor slabs, belowground walls, and footings). Underground utilities associated with aboveground structures will then be dismantled and removed (Section 4.3.2). Excavation and removal of soils will be conducted, as needed (Section 4.3.4), following by final site contouring, as needed (Section 4.3.5).

Combining switchgear will be isolated from the substation using standard lock-out tag-out procedures. It will then be electrically disconnected, unbolted from its foundation, and lifted onto a truck for removal from the site. PV modules will be disconnected from each other and removed from the racks. They will be returned to PV manufacturer storage sites or recycling centers. Direct current (DC) string wiring that is connected to the racking will be removed and salvaged. Racks will be disassembled and removed from the site and delivered to recycling centers. Steel posts that support the PV racking system will be pulled out of the ground. Electrical cabling will be disconnected from combiner boxes, inverters, transformers, and overhead transmission poles. Inverter and transformer skids will be electrically disconnected, unbolted, and lifted onto trucks for removal from the site. The supervisory control and data acquisition (SCADA) system will be disconnected, removed, and salvaged by the electrical demolition contractor.

Electrical and mechanical systems will be properly isolated and demolished in the operations and maintenance building. Walls, doors, and windows will be removed and recycled or disposed of at an approved landfill. Parking lot gravel will be loaded into a dump truck and transported off site. All salvageable parts and parts to be disposed of will be removed from the site. Bathroom facilities provided through use of portable sanitary facilities will be removed by the leasing company. Aboveground foundations will be demolished and the rubble loaded onto dump trucks and transported to nearest landfill or recycling center.

Dismantled materials will be transported by heavy-haul dump truck to a central recycling/staging area where the debris will be processed for transport to an off-site recycler. A project recycling center (either one within each solar array area or one on either side of I-15) will be established to:

- Stage PV panels for transport to an off-site recycler
- Crush concrete and remove support posts and rebar
- Stage support posts and 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, or disposal facility

Limited quantities, if any, of aggregate are anticipated to be used on access roads to ensure surface stability. To the extent required, aggregate surfacing, if present, will be removed. Areas where aggregate surfacing has been removed will be graded to ensure suitable drainage. The removed aggregate will be loaded into a dump truck and the demolition contractor will take ownership of the aggregate for reuse. Site-related fencing, including special-status species exclusion fencing, will be maintained until near the end of project decommissioning (i.e., after initial reclamation efforts have been completed).

4.3.2 Demolition of Belowground Facilities and Utilities

Belowground facilities will include concrete slabs and footings that will be removed to a depth of 3 feet below grade after final contouring. Pipelines will be cleaned, closed off, and removed. Pipeline rinseate will be temporarily stored on site prior to transport to an off-site facility for disposal or recycling.

Underground cables will be removed and salvaged or kept in place, according to BLM requirements. Installations of underground electrical systems are typically trenched to a depth of 3 feet with cables directly buried (i.e., no conduit is used). If underground cabling is to be removed, underground DC cabling from module arrays to combiner boxes and from the combiner boxes to the DC fuse boxes will be removed and salvaged. AC cables from the inverter stations to switchgear will also be removed and salvaged, or kept in place. Inverters will be removed and salvaged, and the inverter housing and pad will be destroyed.

Removed materials will be excavated and transported to the on-site processing area for processing and transport prior to recycling. Any cavities resulting from structure removal will be backfilled with suitable material of similar consistency and permeability as the surrounding native materials and compacted according to the guidelines for revegetation prescribed by the Reclamation Specialist (see Section 5). All project access roads will be decompacted according to BLM requirements at the time.

4.3.3 Demolition Debris Management, Disposal, and Recycling

Demolition debris will be placed in temporary on-site storage area(s) pending treatment at the processing area, and final transportation and disposal/recycling according to the procedures listed below.

Demolition debris and removed equipment will be cut up or dismantled into pieces that can be safely lifted or carried with the on-site equipment. Most glass and steel will be processed for transportation and delivery to an off-site recycling center. Some specific equipment such as PV panels, transformers and generators may be transported as intact components, or size-reduced on site with cutting torches or similar equipment.

A front-end loader, backhoe, or other appropriate equipment will be used to crush or compact compressible materials. These materials will be laid out in a processing area to facilitate crushing or compacting with equipment prior to transport for disposal/recycling. Steel, glass, and other materials will be temporarily stockpiled at or near the processing location pending transport to an appropriate off-site recycling facility. Concrete foundations will be removed to a depth of at least 3 feet below final grade. Upon removal of rebar from concrete rubble, the residual crushed concrete may be layered beneath the ground surface to fill cavities but only at locations that will remain greater than 3 feet below final grade, which will reduce waste volume and transportation requirements.

A full-time crew will be responsible for maintaining site cleanliness during decommissioning. The crew will be responsible for cleaning up micro-trash at temporary facilities as well as at the various work areas. All trash will be collected in containers with secure lids. All hazardous and nonhazardous waste will be stored in appropriate containers for off-site disposal.

4.3.4 Soil Cleanup and Excavation

Evidence of the presence of contaminated soil or the release of hazardous materials or wastes observed during decommissioning activities will be reported to SMS and BLM. The need for, depth, and lateral extent of contaminated soil excavation will be evaluated by an environmental professional with experience in contaminated soils investigation procedures. The evaluation will be based on observation of soil conditions and analysis of soil samples after removal of hazardous materials storage areas, and upon closure of the temporary recycling center and waste storage areas used during project decommissioning. Soil excavation will be conducted to the extent required to meet regulatory cleanup criteria for the protection of soil, groundwater, and surface water resources. If contaminated soil removal occurs, excavations will be backfilled with clean (uncontaminated) native soil of similar permeability and consistency as the surrounding materials, and compacted and revegetated according to the guidelines prescribed by the Reclamation Specialist (see Section 5).

4.3.5 Recontouring

Minimal recontouring of affected areas of the site will be conducted using standard grading equipment to return the land surface to preconstruction conditions, to the extent possible. Grading activities will be limited to previously disturbed areas that require recontouring. Efforts will be made to minimize disturbance of natural drainage and vegetation. Concrete rubble, crushed to approximately 2 inches in diameter or smaller, will be placed in the lower portions of fill areas, at depths at least 3 feet below final grade. Backfill will be compacted by wheel- or track-rolling to avoid over-compaction of soils. Revegetation and habitat rehabilitation will be implemented as prescribed by the Reclamation Specialist (see Section 5).

4.3.6 Well Decommissioning

Water supply wells used during project operation will be decommissioned in accordance with California Well Standard Bulletin 74-90 (DWR 1991) and San Bernardino County Environmental

Health Services (SBCEHS) requirements. A well destruction permit will be obtained from SBCEHS prior to initiating well destruction activities. Wells will be abandoned in place by perforating the well casing using shape charges and by filling the well casing, filter pack, and formation immediately surrounding the well bore with bentonite grout or a similar material, as approved by SBCEHS, using pressure-grouting methods. Well casing and surface completion materials will be dug out to approximately 5 feet below ground surface and backfilled with native soils. All well destruction work will be performed by a California-licensed (C-57) water well driller. A well destruction report will be submitted to the California Department of Water Resources upon completion of well destruction activities. The well site will be revegetated according to provisions outlined by the Reclamation Specialist (see Section 5).

4.4 HAZARDOUS WASTE MANAGEMENT

Fuel, hydraulic fluids, and oils will be transferred directly to a tanker truck from the original storage containers. Storage containers will be rinsed and rinseate will also be transferred to tanker trucks. Storage containers will be disposed of properly according to requirements for the handling and disposal of such materials. Any other materials that may be deemed hazardous will be removed from the site and disposed of according to the hazardous materials handling requirements pertaining to the site. Other items that are not feasible to remove at the point of generation, such as small containers of lubricants, paints, thinners, solvents, cleaners, batteries, and sealants, will be maintained in a secured location with secondary containment, meeting all requirements for hazardous waste storage until removal for proper disposal. All oils and batteries will be recycled off site at an appropriately licensed facility. Site personnel involved in handling these materials will be trained to properly handle them. Containers used to store hazardous materials will be inspected regularly for any signs of failure or leakage.

As part of the preparation for closure, the Spill Prevention, Control, and Countermeasure Plan for the site will be updated to address measures for handling these materials during decommissioning activities. Procedures to minimize the potential for release of contaminants to the environment and contact with stormwater will be specified in a project-specific Best Management Practices (BMP) Plan.

Solid and hazardous waste quantity estimates and management approaches to be adopted during project decommissioning are provided in Table 4.4-1.

Additional hazardous materials may include, but not be limited to, the following:

- Sulfur hexafluoride in switchyard equipment
- Diesel no. 2 in generators and fuel pumps
- Mineral oil in transformers
- Lead solder in solar panels

Table 4.4-1: Decommissioning Waste and Waste Management

Waste Type	Composition	Quantity[1]	Frequency of Generation	Management Approach
Construction Waste (hazardous)	Empty hazardous material containers	1 cubic yard per week	Intermittent during construction	Accumulate on site for up to 90 days. Return to vendor or dispose at permitted hazardous waste disposal facility.
Construction Waste (hazardous)	Solvents, used oil, paint, oily rags	100 gallons	Every 90 days	Accumulate on site for up to 90 days. Recycle or dispose of at permitted hazardous waste disposal facility.
Spent batteries (universal waste)	Lead acid, alkaline type	10 in 2 years	Intermittent during construction	Accumulate on site for up to 90 days. Recycle.
Construction Waste (non-hazardous)	Scrap wood, concrete, steel, glass, plastic, paper	20 cubic yards per week	Intermittent	Recycle when feasible. Dispose to Class III landfill when not feasible to recycle.
Sanitary Waste (non-hazardous)	Portable chemical toilets, sanitary waste	100 gallons per day	On days of active construction.	Pump to tanker truck by licensed contractors, who will dispose of at wastewater treatment plant.
Office Waste (non-hazardous)	Paper, aluminum, food	1 cubic yard per week	Intermittent	Recycle when feasible. Dispose to Class III landfill when not feasible to recycle.

Note:
1 Calculations estimated from analysis of other solar PV projects and materials generated.

4.5 WORKER SAFETY

A site-specific Health and Safety Plan will be prepared to specify requirements for establishing and maintaining a safe working environment during implementation of the planned decommissioning and reclamation activities.

5 RECLAMATION METHODS

5.1 OVERALL STRATEGY

The goals of site reclamation are to restore the land to pre-project conditions; establish quality habitat for desert tortoise and other fauna; and minimize potential erosion through proper restoration activities and implementation of appropriate BMPs.

The overall reclamation strategy will include the following major elements:

- Rehabilitation and potential revegetation of disturbance areas that will create natural-appearing topography and reduce potential for erosion, especially through deflation
- Implementation of a practical revegetation program that will accelerate natural vegetation succession
- Establishment of a weed management program applicable to project decommissioning that will identify nonnative species requiring eradication and the means to accomplish that eradication
- Identification of means and methods to minimize long-term maintenance and support requirements, such as irrigation, weeding, or reseeding
- Reduction of visual contrasts between disturbed areas that have been decommissioned and adjacent undisturbed areas
- Habitat restoration to support wildlife breeding and foraging

The following tasks are proposed to implement the reclamation strategy:

- At least 5 years prior to planned closure, a Final Closure Plan will be prepared and submitted to BLM for review and approval. The Plan will include, among other things, timing for seed collection, if deemed necessary, to ensure that sufficient seed stock is available for restoration efforts.
- Once areas have been decommissioned and facilities and structures removed, the ground surface will recontoured to match the lines and grades of the natural gradient of the surrounding area. A BMP Plan will be prepared and appropriate BMPs will be implemented to provide an effective combination of erosion and sediment control until revegetation efforts have sufficiently stabilized the soil. It is anticipated that minimal recontouring will be required.
- Applicable areas may be re-seeded with native plant seed, in accordance with the VRMP.
- Transplanting succulents in accordance with the VRMP. Non-segmented succulents and small (<1 foot in diameter) segmented cactus will be completed using hand tools, without need for tractors or other specialized equipment. Access and transport of all cactus species will be performed using a pickup truck, sport utility vehicle, or a similar

vehicle. It is possible that large, non-segmented cacti may be encountered that would require a Bobcat or small tractor during salvage operations. Segmented cacti greater than 2 feet in diameter would be salvaged through propagation of pad cuttings. Succulents will be planted in such a way as to be representative of the density and diversity that existed prior to construction.

- Unless revised in the Final Closure Plan, weed management will be implemented as described in the IWMP.
- Wildlife exclusion fences will be removed and the area will be opened to wildlife for use as habitat. No restoration work will occur outside of fenced areas without the presence of an Authorized Biologist or Tortoise Monitor.
- Unless revised in the Final Closure Plan, revegetation monitoring will be implemented as described in the VRMP to ensure that revegetation efforts are successful. If revegetation does not meet these criteria, remediation measures will be implemented.
- Subject to confirmation in the Final Closure Plan, any and all desert tortoise sign noted during vegetation monitoring events will be recorded and reported.

Prior to initiating decommissioning activities, the project owner will contract with a qualified Reclamation Specialist to evaluate and prescribe specific reclamation measures throughout the project area. The Reclamation Specialist will coordinate with the designated Project Biologist and with the project owner to ensure that the measures are implemented as written.

5.2 SITE PREPARATION

SMS does not anticipate substantial grading or soil removal during site reclamation; therefore, measures for topsoil salvage, storage, or replacement are not included. Any trenches, bores, or other excavations created during decommissioning activities will be backfilled to original grade and recompacted in accordance with accepted engineering practices using native soils and as prescribed by the Reclamation Specialist.

Reclamation work will be determined on a site-by-site basis, based on the advantages and disadvantages of soil treatment or site preparation methods to restore natural contours, protect the site from damage by wind or water erosion, and maximize likelihood of vegetation recovery. Specific site preparation measures will be selected prior to initiation of reclamation work in coordination with BLM reclamation staff.

Soil decompaction can increase soil vulnerability to weeds or erosion, increase dust, or cause further damage to surviving rootstocks that may be present. The Reclamation Specialist will evaluate soil compaction and prescribe no treatment, limited treatment using hand tools, light harrowing or disking with a tractor, or deeper disking or ripping. Where soil decompaction is implemented, follow-up measures to control dust and erosion will also be prescribed.

Surface treatment such as soil imprinting may be prescribed, based on the extent of areas to be reseeded, soil condition, and availability of imprinting or similar equipment. Where decommissioning or prior project-related disturbance resulted in alterations to natural channel morphology or runoff patterns, the Reclamation Specialist will prescribe recontouring or other measures. Any BMP materials to be used at any project work site shall be certified weed-free, consistent with the IWMP.

Mulch used for erosion control will be produced from native vegetation cleared from the site, where feasible. The Reclamation Specialist may recommend stockpiling the vegetation removed during decommissioning for replacement onto the site either as crushed mulch, or as “vertical mulch” to reduce sun and wind exposure to the soil surface and germinating plants.

5.3 PLANT MATERIALS

The PV block sites will remain stable and vegetated throughout the operational life of the project. Upon removal of aboveground facilities, the vegetation will be allowed to restore itself to its natural condition without intervention.

SMS may re-seed reclaimed areas with a native seed mix. The determination whether to re-seed and, if so, seeding rates (i.e., pounds per acre) will be made by the Reclamation Specialist, based on the nature of disturbance and condition of soils and evidence (if any) of re-sprouting from remaining rootstocks, and provisions in the Final Closure Plan. The seed mix will consist primarily or exclusively of native early-successional species. There will be no re-seeding on sites where decommissioning and prior project activities have left sufficient native vegetation in place, or where vegetation has recovered to meet the success criteria listed in Section 5.6.

SMS will arrange for adequate seed supplies well in advance of scheduled seeding for each disturbed site. Seed cannot be reliably collected or acquired in any given year due to the unpredictable rainfall and drought conditions throughout the Mojave Desert region. Immediately following notification to BLM of planned closure, the Reclamation Specialist or Project Biologist will estimate the total number of acres to be reseeded, and determine quantities of seed needed. SMS will collect seed, or will contract with suppliers or collectors, to acquire and store enough seed for all projected reseeding work. The Reclamation Specialist will be responsible for maintaining a seed inventory.

The seed mix will consist of a selection of native species as listed in the VRMP, or according to BLM direction at the time. The preference will be to select early-successional species.

Total seeding rate will be no less than 20 pounds per acre. Specific proportions will be based upon seed availability and recommendations of the Reclamation Specialist. Depending on seed availability, other native species occurring on the site or nearby at similar exposure and elevation may be selected to replace those listed above. Any plant material used in revegetation must be locally native, and must occur on or near the project site. All seed to be used in revegetation will originate from the Mojave Desert region of California, between approximately sea level and 3,000 feet elevation. SMS will require the supplier to provide location and elevation for each seed lot, and will not purchase or use seed originating outside these geographic and topographic boundaries. Any seed from vendors or contracted collectors will be certified weed-free. The project owner may collect seed on site from project areas to be mowed or graded. The collection of adequate seed supplies will likely necessitate repeated visits to any given collection area, depending on seasonality and annual productivity of the target plants. The project owner will be responsible for acquiring adequate seed to implement this plan.

Seed collections by the project owner or its contractors or vendors will be made according to the following guidelines:

- Seed collection from plants to be removed or mown for project construction will be unrestricted.
- No seed will be collected from designated WSAs near the project site.
- Any seed collection on public lands other than the proposed project site will be done under authorization from BLM.
- No more than 40 percent of seeding plants in any collection area (excluding project disturbance areas) will be harvested. No more than 10 percent of mature seed on any single plant will be harvested.
- Access to collection areas will be via open, designated routes, or on foot; there will be no cross-country vehicle travel.
- Collectors will record and track seed lots, including collection date, collection location, elevation, dominant species at location, stand conditions, test data, bulk weight, and net weight (as pure live seed).

5.4 SEEDING METHODS AND SCHEDULE

Seeding methods and schedule will be prescribed by the Reclamation Specialist on a site-by-site basis, in coordination with BLM. Seeding methods may employ equipment (e.g., seed drill or hydroseeding equipment) for large areas. Some reclamation sites may be small or inaccessible to equipment. In these areas, seed will be broadcast using manually operated cyclone-type bucket spreaders, mechanical seed spreaders, blowers, or rubber-tired all-terrain vehicles equipped with mechanical broadcast spreaders. Seed in the spreader hoppers will be mixed to discourage separation of the component seed types. Where broadcast seeding is employed, seeded areas may be raked or harrowed to cover the seed, at the direction of the project Reclamation Specialist.

Reseeding will be scheduled to minimize potential seed loss to granivorous birds and small mammals and maximize exposure to seasonal rainfall. Seeding will be done in late summer or early fall to ensure that seed is in place prior to the onset of seasonal rain in late fall or early winter. Later seeding is likely to result in failed germination due to inadequate moisture availability.

Germination and establishment success of seeded plants is not predictable due to the arid climate and variable rainfall within the project region. Low germination success in the first year following reseeding may be consistent with the goal of this plan (i.e., to prevent or minimize further site degradation) during dry years, when erosion and weed cover are not problematic. However, SMS may need to take additional measures to minimize dust generation from sites where adequate plant cover does not reestablish (see Section 5.6).

5.5 RECLAMATION AND REVEGETATION SITE MAINTENANCE

Reclamation and revegetation sites will not be irrigated. The sites will be monitored for weed presence and abundance, and weed control will be implemented as needed, according to the project IWMP. Additional maintenance activities will consist of erosion control, soil stabilization, or other measures as needed, to be based on the results of monitoring.

5.6 SUCCESS CRITERIA

If the following success criteria have not been met within 3 years following recontouring and other reclamation activities, the project owner will be responsible for implementing remediation measures as needed. Following remediation work, the site will be subject to the success criteria and monitoring period as required for the initial reclamation, revegetation, or restoration.

1. At temporarily disturbed areas treated by vegetation trimming, drive and crush, or similar disturbance, at least 80 percent of the species observed within the area will be native species that naturally occur in local desert scrub habitats.
2. At temporarily disturbed areas treated by grading or scarification, so that native soils and rootstocks were lost, at least 60 percent of the species observed within the reclamation areas will be native species that naturally occur in local desert scrub habitats.
3. Cover and density of nonnative plant species within the reclamation areas will be no more than twice their cover and density in comparable adjacent lands that have not been disturbed by the project.
4. Soil stability and potential for erosion or dust source will be comparable to adjacent lands that have not been disturbed by the project.

5.7 MONITORING, REMEDIATION, AND REPORTING

Following implementation of reclamation measures, each site will be monitored annually to evaluate success, in terms of the success criteria above. Monitoring will continue for a period of no less than 3 years or until the defined success criteria are achieved.

Remediation activities (e.g., additional planting, removal of nonnative invasive species, or erosion control) will be performed during the 3-year monitoring period if necessary to ensure the success of the reclamation effort. If the site fails to meet the performance criteria after the 3-year maintenance and monitoring period, monitoring and remedial activities will continue on a yearly basis until the criteria are met.

If a fire or flood damages a reclamation site within the monitoring period, the project owner will be responsible for a one-time replacement. If a second fire or flood occurs, no replanting will be required unless the damage is caused by the project owner's activity (as determined by BLM or other firefighting agency investigation).

Throughout the decommissioning phase and for a minimum of 3 years following completion of decommissioning, the Project Biologist and Reclamation Specialist will be responsible for providing annual Closure and Reclamation Progress Reports to BLM, California Department of Fish and Wildlife, and U.S. Fish and Wildlife Service for review and approval. Each annual report will include the following components:

- Brief summary of decommissioning status, with a list of all sites treated or monitored during the preceding year
- Summary of reclamation progress and results since previous report, including a map of all reclamation activity since previous report
- Seed inventory that accounts for materials acquired or used since previous report and materials needed for coming 5-year period
- Summary of monitoring results and completion status for all sites
- Recommendations, as applicable, for remedial work such as reseeding, erosion control, weed control, or other maintenance activity
- Representative site photographs
- Notation of any other pertinent concerns (e.g., vehicle trespass)
- A comparison of annual success criteria with field conditions, identification of any shortcomings, and recommendations for remedial measures necessary for the success of the Plan

5.8 ADAPTIVE MANAGEMENT

Adaptive management will be implemented in the event of unforeseen or probable but unpredictable circumstances. Adaptive management is defined for the purposes of this plan as a flexible, iterative approach to the long-term management of the site. It will be directed over time by the results of ongoing monitoring activities and direct observation of environmental stressors that are producing adverse results within the site. Adaptive management will include use of monitoring data gathered in the field during the plan to assess the health and vigor of the reclamation sites. Following an event that causes damage to all or part of the site, these data will be used in part to drive management considerations for repair of the damaged areas. Individual environmental stressors such as flooding or prolonged drought could require additional measures be conducted to ensure success.

6 FINANCING OF DECOMMISSIONING AND RECLAMATION

As required by BLM, SMS will purchase a performance bond or similar security, which will be issued either by an insurance company or a financial institution to guarantee the satisfactory decommissioning and restoration of the project site. The bond will be obtained prior to the start of project construction and will be structured so the funds will be returned to the project owner upon completion of decommissioning and restoration activities (with an amount held in reserve until restoration monitoring is completed). It will also be structured in such a manner that BLM will be able access those funds to pay for the decommissioning and restoration of the site, in the event that the project owner becomes insolvent.

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APPENDIX D

Air Quality and Greenhouse Gas Technical Report

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Air Quality and Greenhouse Gas Impact Analysis

Soda Mountain Solar Project

May 2013

Air Quality and Greenhouse Gas Impact Analysis

Soda Mountain Solar Project

May 2013

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TABLE OF CONTENTS

Tables

Figures

Appendices

$\mu g/m^3$	micrograms per cubic meter
AB 32	Assembly Bill 32
BLM	Bureau of Land Management
CAA	Clean Air Act
CAAQS	California Ambient Air Quality Standards
CalEEMod	California Emissions Estimator Model
CARB	California Air Resources Board
CCAA	California Clean Air Act
CEQA	California Environmental Quality Act
CFCs	chlorofluorocarbons
CFR	Code of Federal Regulations
CH_4	methane
CO	carbon monoxide
CO_2	carbon dioxide
CO_2e	carbon dioxide equivalent
County	County of San Bernardino
DOI	Department of the Interior
EPA	U.S. Environmental Protection Agency
GHG	greenhouse gas
GWP	global warming potential
H_2O	water
HCFCs	hydrochlorofluorocarbons
HFCs	hydrofluorocarbons
IPCC	Intergovernmental Panel on Climate Change
lbs/day	pounds per day
MDAB	Mojave Desert Air Basin
MDAQMD	Mojave Desert Air Quality Management District
$MMTCO_2e$	million metric tons of carbon dioxide equivalent
$MTCO_2e$	metric tons of carbon dioxide equivalent
MY	model year
NAAQS	National Ambient Air Quality Standards
NHTSA	National Highway Traffic Safety Administration

NOA	naturally occurring asbestos
NO_2	nitrogen dioxide
NO_x	nitrogen oxides
N_2O	nitrous oxide
O_3	ozone
Pb	lead
PFCs	Perfluorocarbons
PM_{10}	particulate matter equal to or smaller than 10 microns in diameter
$PM_{2.5}$	particulate matter equal to or smaller than 2.5 microns in diameter
ppm	parts per million
ROG	reactive organic gas
SB 97	Senate Bill 97
SB 375	Senate Bill 375
Scoping Plan	California Air Resources Board Climate Change Scoping Plan
SMS	Soda Mountain Solar, LLC
SF_6	sulfur hexafluoride
SIP	State Implementation Plan
SO_2	sulfur dioxide
SOx	sulfur oxides
UNFCCC	United Nations Framework Convention on Climate Change
VOC	volatile organic compound
WRCC	Western Regional Climate Center

This report presents an assessment of potential air quality and greenhouse gas impacts associated with the proposed Soda Mountain Solar Project (hereinafter referred to as the “proposed project”).

Soda Mountain Solar, LLC (SMS) proposes to construct and operate a 350-megawatt photovoltaic solar electrical power generating facility on federal lands managed by the U.S. Department of the Interior (DOI), Bureau of Land Management (BLM), located in San Bernardino County, California.

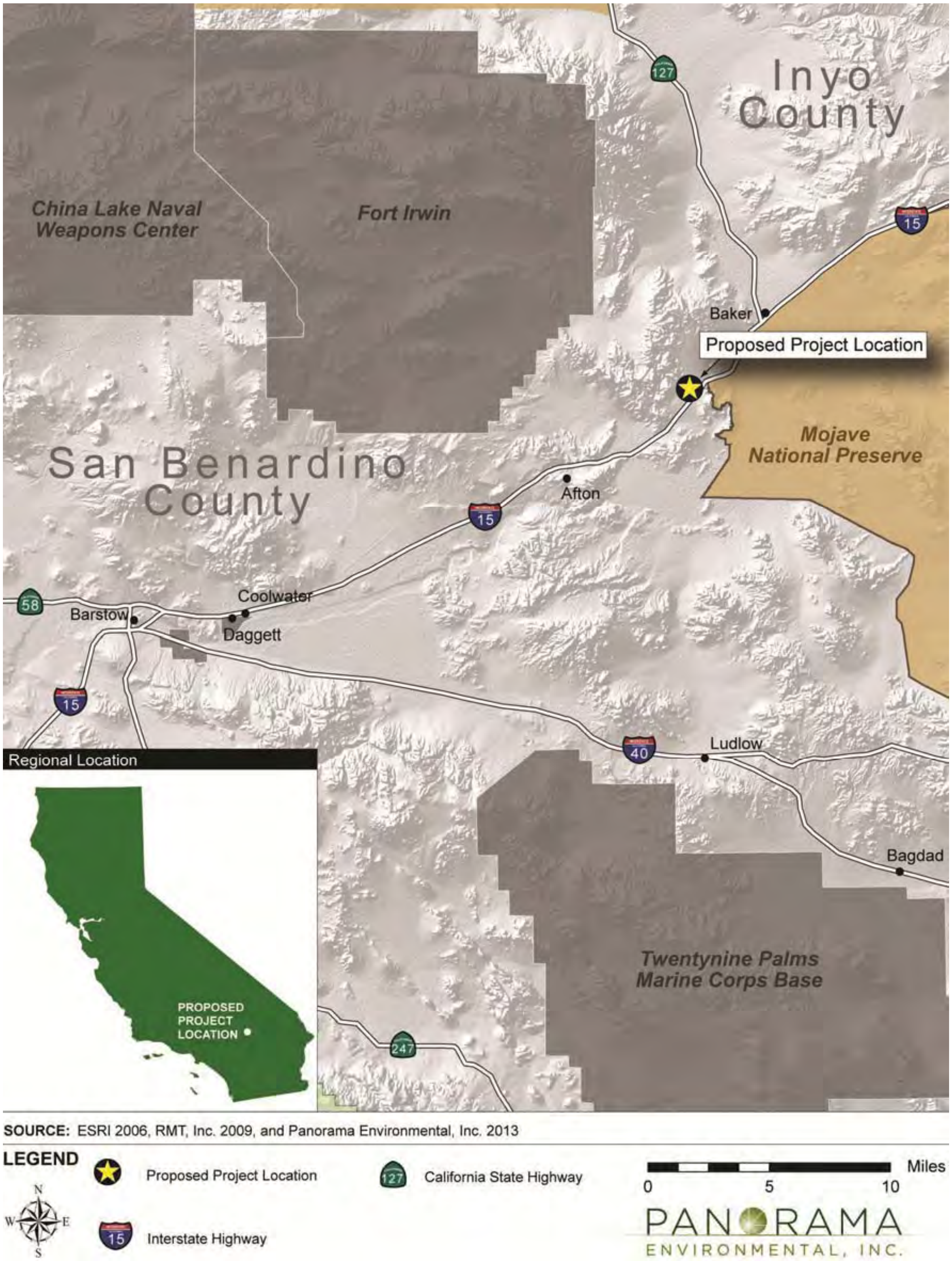
The project site is approximately six miles southwest of Baker, California, along Interstate 15. A location map of the project site is illustrated in Figure 1-1. The detailed project information is presented in the “Plan of Development, Soda Mountain Solar Project” (Plan of Development) prepared by Caithness Soda Mountain, LLC in 2011. The project applicant is now SMS, a wholly owned subsidiary of Bechtel Enterprises.

The principal elements of this air quality and greenhouse gas impact analysis, which are discussed in the sections of this report, are as follows:

- Description of the environmental setting for air quality (Section 2);
- Description of the environmental setting for greenhouse gases (Section 3);
- Construction impact analysis (Section 4);
- Operational impact analysis (Section 5);
- Decommissioning impact analysis (Section 6);
- Odor, naturally occurring asbestos (NOA), and visibility impact analyses (Section 7); and
- General conformity analysis (Section 8).

Please note that the cumulative impact and air toxics impact analyses are not included in this report. References used for this analysis are listed in Section 9. Project construction and operational activity data used in the emission modeling analysis are included in Appendix A. Air pollutant and greenhouse gas emission modeling files are presented in Appendix B.

Figure 1-1
PROPOSED PROJECT LOCATION MAP



2.1 CLIMATE/METEOROLOGY

The proposed project is in the Mojave Desert Air Basin (MDAB). According to the Mojave Desert Air Quality Management District (MDAQMD), the MDAB is an assemblage of mountain ranges interspersed with long, broad valleys that often contain dry lakes (2011). Many of the lower mountains that dot the vast terrain rise from 1,000 to 4,000 feet above the valley floor. Prevailing winds in the MDAB are from the west and southwest. These prevailing winds are due to the proximity of the MDAB to coastal and central regions and the blocking nature of the Sierra Nevada mountains to the north; air masses pushed onshore in southern California by differential heating are channeled through the MDAB.

During the summer, the MDAB is generally influenced by a Pacific Subtropical High cell that sits off the coast, inhibiting cloud formation and encouraging daytime solar heating. The MDAB is rarely influenced by cold air masses moving south from Canada and Alaska, as these frontal systems are weak and diffuse by the time they reach the desert. Most desert moisture arrives from infrequent warm, moist, and unstable air masses from the south.

The Western Regional Climate Center (WRCC) has recorded climatological data for Baker, California, which is approximately six miles northeast of the project site. According to WRCC, the recorded normal daily maximum temperature is 110.2°F in July, and the normal daily minimum temperature is 33.9°F in December in Baker, California (WRCC, 2012). The normal precipitation in Baker is 4.19 inches annually. Climatological data for Baker, California are summarized in Table 2-1.

Table 2-1
CLIMATOLOGICAL DATA SUMMARY
BAKER, CALIFORNIA

Month	Temperature (ºF)		Precipitation (inch)
	Average Maximum	Average Minimum	Average Monthly
Jan	63.1	34.6	0.47
Feb	68.6	39.4	0.71
Mar	76.8	45.6	0.51
Apr	84.3	51.7	0.20
May	94.9	61.3	0.11
Jun	104.8	70.2	0.07
Jul	110.2	77.0	0.27
Aug	107.9	75.4	0.46
Sep	100.2	67.2	0.41
Oct	87.1	54.7	0.25
Nov	72.6	42.8	0.31
Dec	62.4	33.9	0.41
Annual	86.1	54.5	4.19

Source: WRCC, 2012

2.2 EXISTING AIR QUALITY CONDITIONS

Criteria air pollutants for which national ambient standards have been established are ozone (O_3), sulfur dioxide (SO_2), carbon monoxide (CO), nitrogen dioxide (NO_2), lead (Pb), particulate matter with an aerodynamic diameter less than or equal to 10 microns (PM_{10}), and particulate matter with an aerodynamic diameter less than or equal to 2.5 microns ($PM_{2.5}$).

The closest air pollutant monitoring station is in Barstow, approximately 50 miles southwest of the project site. The Barstow station monitors ambient concentrations of O_3, CO, NO_2, and PM_{10}. The monitoring data for $PM_{2.5}$ and SO_2 are from the Victorville station, approximately 75 miles southwest of the project site. Tables 2-2 and 2-3 present summaries of the highest air pollutant concentrations monitored at these stations during the three most recent years (2009 through 2011) for which the California Air Resources Board (CARB) has recorded data (2013). The corresponding California Ambient Air Quality Standards (CAAQS) and National Ambient Air Quality Standards (NAAQS) are also presented in Tables 2-2 and 2-3, respectively.

According to the 2007 General Plan prepared by the County of San Bernardino (County), sources of air pollution include the adjoining South Coast Air Basin, military bases, highways and railroad facilities, cement manufacturing, and mineral processing (County, 2007). The worst air quality is in the southwest portion of the County, which is the area with the largest population and the largest number of vehicles (County, 2007).

Table 2-2
AMBIENT AIR QUALITY SUMMARY AND THE CAAQS
BARSTOW AND VICTORVILLE STATIONS

Pollutant	Average Time	CAAQS (1)	Maximum Concentrations (1)			Number of Exceedances (2)		
			2011	2010	2009	2011	2010	2009
O_3	1 hour	0.09	0.093	0.097	0.095	0	1	1
	8 hour	0.070	0.084	0.078	0.087	35	7	18
PM_{10}	24 hour	50	96.0	35.0	72.0	11.8 (2)	*(3)	11.8 (2)
	Annual	20	21.5	*(3)	25.0	1	*(3)	1
$PM_{2.5}$	Annual	12	*(3)	7.6	9.2	0	0	0
CO	8 hour	9.0	1.35	0.89	0.89	0	0	0
	1 hour	20	4.4	1.3	1.2	0	0	0
NO_2	Annual	0.030	0.017	0.017	0.016	0	0	0
	1 hour	0.18	0.077	0.062	0.060	0	0	0
SO_2	24 hour	0.04	0.007	0.007	0.005	0	0	0
	1 hour	0.25	0.013	0.052	0.028	0	0	0

Note: (1) The unit for O_3, CO, NO_2, and SO_2 is parts per million (ppm) and the unit for PM_{10} and $PM_{2.5}$ is micrograms per cubic meter (µg/m³).

(2) Measurements are usually collected every six days. Measured days include the days that a measurement is greater than the level of the standard; the number of exceedances is calculated mathematically to estimate days of the concentrations that would have been greater than the level of the standard. Therefore, the result may be presented as a fraction.

(3) Insufficient data.

Table 2-3
AMBIENT AIR QUALITY SUMMARY AND THE NAAQS
BARSTOW AND VICTORVILLE STATIONS

Pollutant	Average Time	NAAQS (1)	Maximum Concentrations (1)			Number of Exceedances		
			2011	2010	2009	2011	2010	2009
O_3	8 hour	0.075	0.083	0.078	0.086	9	1	5
PM_{10}	24 hour	150	98.0	38.0	76.0	0	0	0
$PM_{2.5}$	24 hour	35	15.0	18.0	20.0	0	0	0
	Annual	15	*(2)	7.2	8.9	0	0	0
CO	8 hour	9	1.35	0.89	0.89	0	0	0
	1 hour	35	4.4	1.3	1.2	0	0	0
NO_2	Annual	0.053	0.017	0.017	0.016	0	0	0
	1 hour	0.100	0.077	0.062	0.060	0	0	0
SO_2	Annual	0.030	0.001	0.000	0.000	0	0	0
	24 hour	0.14	0.007	0.007	0.005	0	0	0
	1 hour	0.075	0.013	0.052	0.028	0	0	0

Note: (1) The unit for O_3, CO, NO_2, and SO_2 is parts per million (ppm) and the unit for PM_{10} and $PM_{2.5}$ is micrograms per cubic meter ($\mu g/m^3$).

(2) Insufficient data.

2.3 REGULATORY SETTING

2.3.1 Federal

The NAAQS were established by the federal Clean Air Act (CAA) of 1970 and amended in 1977 and 1990. The NAAQS represent the maximum levels of pollution considered safe, with an adequate margin of safety, to protect public health and welfare. Seven air pollutants of concern for which the NAAQS have been established are O_3, SO_2, CO, NO_2, Pb, PM_{10}, and $PM_{2.5}$.

Table 2-4 presents the NAAQS for the criteria air pollutants at different averaging periods. National standards (other than O_3, particulate matter, and those based on annual arithmetic mean) are not to be exceeded more than once a year. The O_3 standard is attained when the fourth highest 8-hour concentration measured at each site in a year, averaged over three years, is equal to or less than the standard. For PM_{10}, the 24-hour standard is attained when the expected number of days per calendar year with a 24-hour average concentration above 150 $\mu g/m^3$ is equal to or less than one. For $PM_{2.5}$, the 24-hour standard is attained when 98 percent of the daily concentrations, averaged over three years, are equal to or less than the standard. The annual standards should never be exceeded.

The U.S. Environmental Protection Agency (EPA) and CARB have designated portions of the MDAQMD jurisdictional area as nonattainment for some air pollutants, and some of these designations have an associated classification. Table 2-5 presents a summary of the air quality designations and classifications for the MDAQMD area.

Table 2-4
NATIONAL AND CALIFORNIA
AMBIENT AIR QUALITY STANDARDS

Pollutant	Averaging Time	California Standards	National Standards	
			Primary	Secondary
Ozone (O_3)	1 Hour	0.09 ppm (180 μg/m^3)	---	---
	8 Hour	0.070 ppm (137 μg/m^3)	0.075 ppm (147 μg/m^3)	0.075 ppm (147 μg/m^3)
Carbon Monoxide (CO)	8 Hour	9.0 ppm (10 mg/m^3)	9 ppm (10 mg/m^3)	---
	1 Hour	20 ppm (23 mg/m^3)	35 ppm (40 mg/m^3)	---
Nitrogen Dioxide (NO_2)	Annual Arithmetic Mean	0.030 ppm (57 μg/m^3)	0.053 ppm (100 μg/m^3)	0.053 ppm (100 μg/m^3)
	1 Hour	0.18 ppm (339 μg/m3)	100 ppb (188 μg/m3)	---
Sulfur Dioxide (SO_2)	Annual Arithmetic Mean	--	0.030 ppm (for certain areas)	--
	24 Hour	0.04 ppm (105 μg/m3)	0.14 ppm (for certain areas)	---
	3 Hour	---	---	0.5 ppm (1,300 μg/m^3)
	1 Hour	0.25 ppm (655 μg/m3)	75 ppb (196 μg/m3)	---
Respirable Particulate Matter (PM_{10})	Annual Arithmetic Mean	20 μg/m3	---	---
	24 Hour	50 μg/m^3	150 μg/m^3	150 μg/m^3
Fine Particulate Matter ($PM_{2.5}$)	Annual Arithmetic Mean	12 μg/m3	15 μg/m3	15 μg/m3
	24 Hour	--	35 μg/m^3	35 μg/m^3
Sulfates	24 Hour	25 μg/m^3	---	---
Lead (Pb)	30 Day Average	1.5 μg/m^3	---	---
	Calendar Quarter	---	1.5 μg/m3 (for certain areas)	1.5 μg/m3 (for certain areas)
	Rolling 3-Month Average	---	0.15 μg/m^3	0.15 μg/m^3
Hydrogen Sulfide	1 Hour	0.03 ppm (42 μg/m^3)	---	---
Vinyl Chloride	24 Hour	0.01 ppm (26 μg/m^3)	---	---
Visibility Reducing Particles	8 Hour	Extinction coefficient of 0.23 per kilometer; visibility of 10 miles or more due to particles when the relative humidity is less than 70 percent.	---	---

Source: CARB, 2012

Table 2-5
AIR QUALITY DESIGNATIONS AND CLASSIFICATIONS

Pollutant	State Designation	National Designation
Ozone (O_3)	Nonattainment (Moderate)	Nonattainment (Severe) (portion of MDAQMD outside of Western Mojave Desert Ozone Nonattainment Area is unclassified/attainment)
Respirable Particulate Matter (PM_{10})	Nonattainment	Nonattainment (Moderate) (portion of MDAQMD in Riverside County is unclassified)
Fine Particulate Matter ($PM_{2.5}$)	Nonattainment (portion of MDAQMD outside Western Mojave Desert Ozone Nonattainment Area is unclassified/attainment)	Unclassified/Attainment
Carbon Monoxide (CO)	Attainment	Attainment
Nitrogen Dioxide (NO_2)	Attainment/Unclassified	Attainment/Unclassified
Sulfur Dioxide (SO_2)	Attainment/Unclassified	Attainment/Unclassified
Lead (Pb)	Attainment	Attainment
Sulfates	Attainment	---
Hydrogen Sulfide	Unclassified (Searles Valley Planning Area is nonattainment)	---
Visibility Reducing Particles	Unclassified	---

Source: MDAQMD, 2011 and 2013

2.3.2 State

In 1988, the state legislature adopted the California Clean Air Act (CCAA), which established a statewide air pollution control program. The CCAA's requirements include annual emission reductions, increased development and use of low-emission vehicles, and submittal of air quality attainment plans by air districts.

CARB is the state agency responsible for attaining and maintaining healthy air quality, protecting the public from exposure to toxic air contaminants, and providing innovative approaches for complying with air pollution control rules and regulations in California. CARB developed the CAAQS, which are listed in Section 70200 of Title 17 of the California Code of Regulations and are shown in Table 2-4. California standards for O_3, CO, NO_2, SO_2, and particulate matter (PM_{10}, $PM_{2.5}$, and visibility reducing particles) are values that are not to be exceeded. All other standards are not to be equaled or exceeded.

2.3.3 Local

MDAQMD has jurisdiction over air quality programs in the MDAB. MDAQMD regulates most air pollutant sources, except for motor vehicles, aircraft, and agricultural equipment, which are regulated by CARB or EPA. State and local government projects, as well as projects proposed by the private sector, are subject to requirements of the local air district if the sources are regulated by MDAQMD.

MDAQMD developed the "California Environmental Quality Act (CEQA) and Federal Conformity Guidelines" (MDAQMD, 2011), which established air quality thresholds to evaluate potential air quality impacts resulting from construction and operation of development projects in the area. Table 2-6 presents the MDAQMD air quality thresholds.

Table 2-6
MDAQMD AIR QUALITY THRESHOLDS

Pollutant	Emission Thresholds	
	lbs/day	tons/year
Carbon Monoxide (CO)	548	100
Oxides of Nitrogen (NO_x)	137	25
Volatile Organic Compounds (VOC)	137	25
Oxides of Sulfur (SO_x)	137	25
Particulate Matter (PM_{10})	82	15
Particulate Matter ($PM_{2.5}$)	82	15
Hydrogen Sulfide (H_2S)	54	10
Lead (Pb)	3	0.6

Source: MDAQMD, 2011

2.4 HEALTH EFFECTS OF AIR POLLUTANTS

Based on information published by EPA (2005) and CARB (2006 and 2010), the following paragraphs describe the health effects of air pollutants that would potentially be emitted during project construction and operations.

2.4.1 Carbon Monoxide

Carbon monoxide (CO) is a colorless, odorless, poisonous gas produced by incomplete burning of carbon-based fuels, including gasoline, oil, and wood. CO is also produced from incomplete combustion of many natural and synthetic products. For instance, cigarette smoke contains CO. When CO gets into the body, it combines with chemicals in the blood and prevents the blood from providing oxygen to cells, tissues, and organs. The body requires oxygen for energy, so high-level exposures to CO can cause serious health effects, with death possible from massive exposures.

2.4.2 Nitrogen Oxides

Nitrogen oxides (NO_x) is a general term pertaining to compounds, including nitric oxide, nitrogen dioxide (NO_2), and other oxides of nitrogen. NO_x are produced from burning fuels, including gasoline and coal. NO_x are smog formers that react with volatile organic compounds to form O_3. NO_x are also major components of acid rain.

2.4.3 Volatile Organic Compounds and Reactive Organic Gases

Volatile organic compounds (VOCs) are organic chemicals that contain the element carbon. Organic chemicals are the basic chemicals found in living things and in products derived from living things, such as coal, petroleum, and refined petroleum products. Many organic chemicals that we use do not exist in nature but are synthesized by chemists in laboratories. VOCs produce vapors readily; at room temperature and normal atmospheric pressure, vapors escape easily from volatile liquid chemicals. Reactive organic gases (ROG) are photochemically reactive chemical gases, composed of no-methane hydrocarbons that may contribute to the formation of smog. ROGs are sometimes referred to as non-methane organic gases.

2.4.4 Ozone

Ozone (O_3) is a strong-smelling, pale blue, reactive toxic chemical gas consisting of three oxygen atoms. It is a product of the photochemical process involving the sun's energy and O_3 precursors, primarily NO_x and VOCs. O_3, a major component of smog, exists in the upper atmosphere O_3 layer (stratospheric O_3), as well as near the Earth's surface in the troposphere. O_3 reacts chemically with internal body tissues, such as the lungs.

2.4.5 Particulate Matter

Airborne particulate matter consists of many different substances suspended in air in the form of particles (solids or liquid droplets) that vary widely in size. $PM_{2.5}$ is defined as particulate matter with a diameter less than or equal to 2.5 microns, and PM_{10} is defined as particulate matter with a diameter less than or equal to 10 microns. Particulates are produced by many sources, including burning of diesel fuels by trucks and buses, incineration of garbage, mixing and application of fertilizers and pesticides, dust from road construction, industrial processes such as steel making, mining operations, agricultural burning (field and slash burning), and operations of fireplaces and woodstoves. Particulate pollution can cause eye, nose, and throat irritation and other health problems.

2.4.6 Sulfur Oxides

Sulfur oxides (SO_x) are composed mainly of SO_2 and sulfates. SO_x are pungent, colorless gases (sulfates are solids) formed primarily by combustion of sulfur-containing fossil fuels, especially coal and oil. Some industrial processes, such as production of paper and smelting of metals, produce sulfur dioxide. SO_2 is closely related to sulfuric acid and plays an important role in the production of acid rain.

3.1 OVERVIEW

This section provides an overview of global climate change and greenhouse gases (GHGs) based on the "California Greenhouse Gas Emissions Inventory: 2000-2009" developed by CARB (2011a).

The Earth's atmosphere consists of nitrogen (78 percent), oxygen (21 percent), argon (~1 percent), water vapor (varies), and carbon dioxide (0.04 percent). The atmospheric composition of these gases is important for human survival because they are vital for global temperature control, human respiration, and precipitation. For example, if there was an absence of atmospheric gases, the Earth would have an average global temperature of -2.2ºF (-19ºC). The atmospheric gases that cause the Earth to have warmer temperatures than -2.2ºF are known as GHGs. GHGs include the natural atmospheric gases of water vapor (H_2O), carbon dioxide (CO_2), methane (CH_4), and nitrous oxide (N_2O). GHGs function by absorbing infrared radiation reflected from the Earth's surface and reradiating the infrared energy back toward the Earth's surface. The remaining infrared radiation that is not absorbed by these gases (because of incompatible absorption energies) escapes into space. This natural warming process that occurs in the Earth's atmosphere is known as the "greenhouse effect" (CARB, 2011a).

Prior to 1750 (pre-Industrial Revolution), natural atmospheric concentrations of CO_2, CH_4, and N_2O had remained fairly constant for the previous 10,000 years, leading to a relatively constant temperature (CARB, 2011a). Since 1750 (post-Industrial Revolution), the amount of GHGs in the atmosphere has increased mainly due to anthropogenic sources (e.g., combustion of fossil fuel). Additionally, synthetic GHGs such as chlorofluorocarbons (CFCs), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF_6) have been introduced into the atmosphere. The increase of GHGs in the atmosphere has led to a phenomenon referred to as the "enhanced greenhouse effect." The larger amount of GHGs and the introduction of synthetic GHGs into the atmosphere have led to more infrared radiation being reradiated to the Earth's surface and less radiation escaping into space, which leads to an overall warming of the Earth (CARB, 2011a).

3.2 EXISTING GREENHOUSE GAS EMISSIONS

3.2.1 California Greenhouse Gas Emissions

In 2011, CARB developed the statewide GHG emission inventory for 2000 through 2009 (CARB, 2011a). Table 3-1 shows the statewide GHG emissions and sinks estimated by CARB for 2000 through 2009. The global warming potential (GWP) for each GHG is used in the inventory. The GWP provides a comparison of the warming influence of various GHGs relative to CO_2. This allows for the calculation of a single, consistent GHG emission unit: the "carbon dioxide equivalent" (CO_2e) (Intergovernmental Panel on Climate Change [IPCC], 2007). According to CARB, total gross California GHG emissions in 2009 were 457 million metric tons of CO_2e ($MMTCO_2e$). The transportation sector accounted for approximately 38 percent of the total GHG emissions, whereas the industrial sector accounted for approximately 20 percent. Emissions from electricity generation were about 23 percent, with almost equal contributions from in-state and imported electricity (CARB, 2011a).

Table 3-1
CALIFORNIA GREENHOUSE GAS EMISSIONS AND SINKS 2000-2009

Economic Sector	Greenhouse Gas Emissions ($MMTCO_2e$)										% of Total in 2009	% Change in Emissions	
	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009		2000-2009	2008-2009
Agriculture	28.9	29.1	32.3	30.7	32.3	32.6	33.7	32.9	33.7	32.1	7.0%	11%	-4.6%
Commercial	12.8	12.4	14.2	13.0	13.3	13.0	13.3	13.3	13.4	14.3	3.1%	12%	6.9%
Electricity Generation (import)	46.2	59.4	59.4	64.9	66.4	63.2	55.0	60.1	66.2	48.4	10.6%	4.7%	-26.9%
Electricity Generation (in-state)	61.0	64.8	51.5	49.9	51.0	47.0	51.8	56.0	56.1	56.2	12.3%	-7.8%	0.2%
Forestry	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.04%	-0.7%	-0.1%
Industrial	103.8	100.5	101.4	98.7	100.6	100.2	99.9	97.3	94.9	89.3	19.5%	-14%	-6%
Residential	30.1	28.6	28.8	28.3	29.3	28.1	28.4	28.6	28.1	28.6	6.3%	-5.0%	1.7%
Transportation	171.7	174.8	181.3	179.4	183.2	186.1	186.6	187.1	178.0	172.9	37.9%	0.7%	-2.8%
Unspecified	8.9	9.6	10.3	11.0	11.7	12.3	12.9	13.3	14.2	14.7	3.2%	65.2%	3.8%
Total Gross Emissions	463.7	479.2	479.2	476.1	488.2	482.5	481.9	488.8	484.7	456.8	--	-1.5%	-5.8%
Forestry Net Emissions	*-4.5*	*-4.3*	*-4.2*	*-4.2*	*-4.2*	*-4.0*	*-3.9*	*-3.9*	*-3.8*	*-3.8*	--	--	--
Total Net Emissions	459.2	475.0	475.0	472.0	484.0	478.5	478.0	484.9	480.9	453.0	--	-1.3%	-5.8%

3.2.2 San Bernardino County Greenhouse Gas Emissions

The County of San Bernardino (County) developed the countywide GHG emission inventories in 2011 (County, 2011). Tables 3-2 and 3-3 present the estimated current external and internal GHG emissions in metric tons of CO_2e ($MTCO_2e$) for San Bernardino County.

Table 3-2
SAN BERNARDINO COUNTY EXTERNAL GHG EMISSIONS SUMMARY

Sector	Current GHG Emissions ($MTCO_2e$)	Percent
Stationary Sources	2,866,435	45.8
Transportation: On-road	1,631,666	26.1
Transportation: Off-road	157,185	2.5
Building Energy Use: Industrial	593,716	9.5
Building Energy Use: Residential	440,851	7.1
Building Energy Use: Commercial	246,364	3.9
Solid Waste/Landfills	213,191	3.4
Agriculture	64,619	1.0
Water-Related: Wastewater	27,994	0.4
Water-Related: Water Conveyance	10,696	0.2
Miscellaneous: Residential Fires and Cooking	346	0.01
Total	6,253,063	100

Source: County, 2011.

Table 3-3
SAN BERNARDINO COUNTY INTERNAL GHG EMISSIONS SUMMARY

Sector	Current GHG Emissions ($MTCO_2e$)	Percent
Solid Waste/Landfills	206,817	60.9
County Facilities	62,981	18.5
County Vehicle Fleet	34,958	10.3
Employee Commute	32,490	9.6
Water Pumping and Wastewater Treatment	2,192	0.7
Outdoor Lighting	276	0.1
Total	339,714	100

Source: County, 2011.

3.3 REGULATORY SETTING

This section provides regulatory actions by international, federal, state, and local agencies regarding climate change and GHG emissions.

3.3.1 International Actions

IPCC was established in 1988 by the World Meteorological Organization and the United Nations Environment Program to provide world governments with a clear scientific view of changes to the world's climate. IPCC reviews and assesses the most recent scientific, technical, and socioeconomic information produced worldwide relevant to the understanding of climate change.

In 1992, countries joined an international treaty, the United Nations Framework Convention on Climate Change (UNFCCC), to consider cooperatively what they could do to limit average global temperature increases and the resulting climate change (UNFCCC, 2012). By 1995, countries realized that emission reductions provisions in the UNFCCC were inadequate. In response, they launched negotiations to strengthen the global response to climate change and adopted the Kyoto Protocol, an international agreement, in Kyoto, Japan on December 11, 1997. The major feature of the Kyoto Protocol is that it sets binding targets for 37 industrialized countries and the European community for reducing GHG emissions. The major distinction is that the UNFCCC treaty encourages industrialized countries to stabilize GHG emissions, whereas the Kyoto Protocol commits them to do so (UNFCCC, 2012).

3.3.2 Federal Actions

On July 11, 2008, EPA published the “Advanced Notice of Proposed Rulemaking,” one of the steps that EPA has taken in response to the U.S. Supreme Court’s decision in “Massachusetts v. EPA” (EPA, 2012). In the decision, the Court found that the CAA authorizes EPA to regulate tailpipe GHG emissions if EPA determines they cause or contribute to air pollution that may reasonably be anticipated to endanger public health or welfare (EPA, 2012).

In 2009, EPA established the “Final Rule on Mandatory Reporting of Greenhouse Gases,” which requires reporting of GHG emissions from large sources and suppliers in the United States. Generally, the rule is referred to as 40 Code of Federal Regulations (CFR) Part 98 (Part 98). Part 98 is intended to collect accurate and timely emissions data to inform future policy decisions. Facilities that emit 25,000 metric tons of CO_2e or more per year are required to submit annual reports to EPA.

On December 7, 2009, the EPA Administrator signed two distinct findings regarding GHGs under Section 202(a) of the CAA:

- “Endangerment Finding: The Administrator finds that the current and projected concentrations of the six key well-mixed greenhouse gases – carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF_6) – in the atmosphere threaten the public health and welfare of current and future generations.”
- “Cause or Contribute Finding: The Administrator finds that the combined emissions of these well-mixed greenhouse gases from new motor vehicles and new motor vehicle engines contribute to the greenhouse gas pollution which threatens public health and welfare.”

These findings do not themselves impose any requirements on industry or other entities. This action, however, is a prerequisite for implementing GHG emissions standards for vehicles. In collaboration with the National Highway Traffic Safety Administration (NHTSA), EPA finalized the standards for light-duty vehicles (model years [MY] 2012-2016) in May 2010 and heavy-duty vehicles (MY 2014-2018) in August 2011.

On July 29, 2011, EPA and NHTSA announced plans to propose stringent federal GHG and fuel economy standards for MY 2017-2025 passenger cars and light-duty trucks. The standards under consideration are projected to reduce GHGs by approximately two billion metric tons and save four billion barrels of oil over the lifetime of MY 2017-2025 vehicles. These standards have significant benefits to American consumers by reducing their costs to fuel these more efficient vehicles.

On August 9, 2011, EPA and NHTSA announced the first-ever standards to reduce GHG emissions and improve the fuel efficiency of heavy-duty trucks and buses. The final combined standards of the Heavy-Duty National Program will reduce CO_2 emissions by approximately 270 million metric tons and save about 530 million barrels of oil over the life of MY 2014-2018 vehicles. The heavy-duty sector addressed in the EPA and NHTSA rules (including the largest pickup trucks and vans, semi trucks, and all types and sizes of work trucks and buses) accounts for nearly six percent of total GHG emissions in the United States and 20 percent of transportation emissions.

The DOI has established general policies related to renewable energy development and climate change. In 2001, Secretary Order 3226 established a requirement that each bureau or office within the DOI should consider and analyze potential climate change impacts when undertaking long-range planning, developing multiyear management plans, making major decisions on using resources under the DOI's purview, or setting priorities for scientific research and investigation. In March 2009, Secretary Order 3285 set a policy that encouraging the production, development, and delivery of renewable energy would be one of the DOI's highest priorities. In September 2009, Secretary Order 3289 reaffirmed the provisions of Secretary Order 3226 and established a DOI Carbon Storage Project to develop methods for geo-logical and biological carbon storage. In February 2010, Secretary Order 3289 was replaced with Secretary Order 3289, Amendment 1, which made minor editorial changes to the original order.

Executive Order 13514, "Federal Leadership in Environmental, Energy, and Economic Performance", directs all federal agencies to inventory, report, and reduce their direct and indirect GHG emissions in three categories: "scope 1" direct emissions from sources owned or controlled by the agencies; "scope 2" indirect emissions that result from the generation of electricity, heat, or steam that the agencies purchase; and "scope 3" indirect emissions from sources that are not owned or directly controlled by the agencies but that relate to their activities (e.g., employee commuting). Starting with a fiscal year 2008 baseline and a fiscal year 2010 inventory due in 2011, agencies must submit their annual GHG emissions inventories and reports to the Council on Environmental Quality and the Office of Management and Budget every January, for the preceding fiscal year. Under current guidance, agencies generally need not report GHG emissions associated with activities they authorize, but those emissions may be voluntarily reported.

3.3.3 State Actions

Executive Order S-3-05, signed in June 2005 by Governor Arnold Schwarzenegger, established the state's first GHG emissions targets. The statewide GHG emission reduction targets are: by 2010, to 2000 levels; by 2020, to 1990 levels; and by 2050, to 80 percent below 1990 levels. This Executive Order requires biannual reports on progress made toward meeting these targets and the global warming impact on California.

In 2006, the state legislature passed and Governor Schwarzenegger signed Assembly Bill 32 (AB 32), the Global Warming Solutions Act of 2006, which set the 2020 GHG emissions reduction goal into law. It directed CARB to begin developing discrete early actions to reduce GHG emissions while also preparing a scoping plan to identify how best to reach the 2020 limit. The "Climate Change Scoping Plan" (Scoping Plan) prepared by CARB was originally approved in 2008. In 2011, the Functional Equivalent Document for the Scoping Plan was amended. The Scoping Plan was reapproved by the CARB Board on August 24, 2011. The Scoping Plan provides the outline for actions to reduce California's GHG emissions (CARB, 2011b).

Senate Bill 97 (SB 97) was passed by the state legislature on August 21, 2007 and approved by Governor Schwarzenegger on August 24, 2007. SB 97 acknowledges that climate change is a prominent environmental issue that requires analysis under California Environmental Quality Act (CEQA). The California Natural Resources Agency adopted amendments to the CEQA Guidelines to address the analysis and mitigation of GHG emissions. The amendments to the CEQA Guidelines implementing SB 97 became effective on March 18, 2010.

Senate Bill 375 (SB 375), the Sustainable Communities and Climate Protection Act of 2008, was approved by Governor Schwarzenegger on September 30, 2008. SB 375 requires CARB to develop regional GHG emission reduction targets for passenger vehicles. Each of California's Metropolitan Planning Organizations then prepares a Sustainable Communities Strategy to demonstrate how the region will meet its GHG emission reduction target through integrated land use, housing, and transportation planning. If regions develop integrated land use, housing, and transportation plans that meet the SB 375 targets, new projects in these regions can be exempted from certain CEQA review requirements.

Senate Bill 1368 created GHG performance standards for new long-term financial investments in base-load electricity generation facilities serving California customers.

Reporting of GHG emissions by major sources is required by AB 32. In 2007, CARB established the "Regulation for the Mandatory Reporting of Greenhouse Gas Emissions." Revisions to this GHG reporting regulations were considered at the CARB Board hearing on December 16, 2010. The revised regulation was approved by the California Office of Administrative Law and became effective on January 1, 2012. Facilities that emit 10,000 metric tons CO_2e or more per year are required to submit annual reports to CARB. The reporting regulation exempts electricity generating facilities that are solely powered by solar energy from the reporting requirements.

3.3.4 Local Actions

In September 2011, the County published the "Greenhouse Gas Emissions Reduction Plan" (County, 2011). This plan presents a comprehensive set of actions to reduce San Bernardino County's internal and external GHG emissions to 15 percent below current levels by 2020 (County, 2011).

MDAQMD established the significance emission thresholds for GHG emissions in the "California Environmental Quality Act (CEQA) and Federal Conformity Guidelines" (MDAQMD, 2011). Table 3-4 presents the MDAQMD GHG significance emission thresholds.

Table 3-4
MDAQMD GHG EMISSION THRESHOLDS

Pollutant	Emission Thresholds	
	lbs/day	tons/year
Greenhouse Gases (CO_2e)	548,000	100,000 (90,718 metric tons/year)

Source: MDAQMD, 2011

3.4 HEALTH EFFECTS OF GREENHOUSE GASES

This section presents an overview of general terms of GHGs in accordance with the “Glossary of Terms Used in Greenhouse Gas Inventories” developed by CARB (CARB, 2012).

3.4.1 Greenhouse Gas

Greenhouse gas (GHG) is any gas that absorbs infrared radiation in the atmosphere. GHGs include, but are not limited to, water vapor, carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), hydrochlorofluorocarbons (HCFCs), ozone (O_3), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF_6).

3.4.2 Carbon Dioxide

Carbon dioxide (CO_2) is a naturally occurring gas and also a by-product of burning fossil fuels and biomass, as well as land-use changes and other industrial processes. It is the principal anthropogenic GHG that affects the Earth's radiative balance. CO_2 is the reference gas against which other GHGs are measured and therefore has a GWP of 1.

3.4.3 Chlorofluorocarbons

Chlorofluorocarbons (CFCs) are GHGs covered under the 1987 Montreal Protocol and used for refrigeration, air conditioning, packaging, insulation, solvents, or aerosol propellants. Because they are not destroyed in the lower atmosphere, CFCs drift into the upper atmosphere where, given suitable conditions, they break down O_3. These gases are being replaced by other compounds, including hydrochlorofluorocarbons and hydrofluorocarbons, which are GHGs covered under the Kyoto Protocol.

3.4.4 Hydrofluorocarbons

Hydrofluorocarbons (HFCs) are compounds containing hydrogen, fluorine, and carbon atoms. They were introduced as alternatives to O_3 depleting substances and serve many industrial, commercial, and personal needs. HFCs are emitted as by-products of industrial processes and are also used in manufacturing. They have GWPs ranging from 140 (HFC-152a) to 11,700 (HFC-23).

3.4.5 Methane

Methane (CH_4) is a hydrocarbon with a GWP most recently estimated at 25 times that of CO_2. CH_4 is produced through anaerobic (without oxygen) decomposition of waste in landfills, flooded rice fields, animal digestion, decomposition of animal wastes, production and distribution of natural gas and petroleum, coal production, and incomplete fossil fuel combustion.

3.4.6 Nitrous Oxide

Nitrous oxide (N_2O) has a GWP of 298 times that of CO_2. Major sources of N_2O include soil cultivation practices, especially the use of commercial and organic fertilizers, manure management, fossil fuel combustion, nitric acid production, and biomass burning.

3.4.7 Perfluorocarbons

Perfluorocarbons (PFCs) are human-made chemicals composed of carbon and fluorine. These chemicals were introduced as alternatives, along with hydrofluorocarbons, to the O_3 depleting substances. In addition, PFCs are emitted as by-products of industrial processes and are also used in manufacturing.

3.4.8 Sulfur Hexafluoride

Sulfur Hexafluoride (SF_6) is a colorless gas soluble in alcohol and ether, slightly soluble in water. It has a GWP most recently estimated at 22,800 times that of CO_2. SF_6 is used primarily in electrical transmission and distribution systems and as a dielectric substance in electronics.

3.4.9 Water Vapor

Water vapor (H_2O) is the most abundant GHG; it is the water present in the atmosphere in gaseous form. Water vapor is an important part of the natural greenhouse effect. While humans are not significantly increasing its concentration, it contributes to the enhanced greenhouse effect because the warming influence of GHGs leads to a positive water vapor feedback. In addition, water vapor plays an important role in regulating the temperature of the Earth.

4.1 OVERVIEW

Project construction activities would result in temporary increases in air pollutant emissions, which would be generated in the forms of fugitive dust emissions (PM_{10} and $PM_{2.5}$) and equipment and vehicle exhaust emissions (NO_x, SO_x, CO, ROG, $PM_{2.5}$, and PM_{10}). GHG emissions would also be generated temporarily during project construction. The associated GHGs include CO_2, CH_4, and N_2O.

4.2 PROJECT CONSTRUCTION

According to the Plan of Development, project construction would be expected to last approximately 24 to 30 months. The construction duration of 24 months (two years) was conservatively used in the model analysis. In the modeling analysis, project construction was assumed to begin in July 2014. Project construction would be conducted approximately six days per week and 302 days per year (10 nonworking holidays are excluded). The project would involve construction of multiple components, and in the modeling analysis, three construction phases/activities are established to estimate emissions associated with construction of all project components, as described below:

- ***Construction Phase I:*** Site Preparation
- ***Construction Phase II:*** Solar Array Construction
- ***Construction Phase III:*** Substation and Other Facilities Construction

The assumptions of each construction phase are summarized in Table 4-1.

Construction Phase I was assumed to begin in July 2014 and be completed in approximately 1.5 years (approximately 453 working days). This phase would include site clearance and grading, including grading of Rasor Road. According to the Plan of Development, the total disturbance area associated with project construction would be approximately 2,492 acres. The total grading area would be approximately 1,155 acres.

Construction Phase II includes solar array assembly. This phase was also assumed to begin in July 2014 and be completed in approximately two years (approximately 604 working days).

Construction Phase III includes substation construction and all project components and facilities construction, except for the solar array assembly. This phase was assumed to begin in July 2014 and be completed in approximately two years (approximately 604 working days). In this phase, three buildings of approximately 13,400 square feet would be constructed.

According to the Plan of Development, the construction workforce would consist of an average of 150 workers over the two-year period. The construction workforce would consist of up to 250 workers during the peak of construction. Worker one-way trip distance was conservatively assumed to be 50 miles per trip. The project-specific equipment and vehicle data were used in the modeling analysis. Phases I, II, and III would occur concurrently with site preparation proceeding just ahead of solar array layout and facility construction.

Table 4-1
ASSUMPTIONS – PROJECT CONSTRUCTION PHASES

Phase	Activities Included	General Assumptions	Duration
Phase I	Grading Vegetation Removal Rasor Road Realignment	2,492 acres disturbed 1,155 acres graded 40 truck trips per day and one-way truck traveling distance conservatively assumed 90 miles per trip. It was assumed that 98.33% of truck travel would be on-road (1-15) for annual emissions estimation, and 96.67% would be on-road for daily emissions estimation.	1.5 years (453 days)
Phase II	Solar Array Assembly	80 truck trips per day and one-way truck traveling distance conservatively assumed 90 miles per trip. It was assumed that 98.33% of truck travel would be on-road (I-15) for annual emissions estimation, and 96.67% would be on-road for daily emissions estimation.	2 years (604 days)
Phase III	Wells Collector Lines Operation and Maintenance Buildings RO Building and Brine Pond Substation/Switchyard and LADWP Interconnect	13,400 square feet of buildings 80 truck trips per day and one-way truck traveling distance conservatively assumed 90 miles per trip. It was assumed that 98.33% of truck travel would be on-road (1-15) for annual emissions estimation, and 96.67% would be on-road for daily emissions estimation.	2 years (604 days)
All Phases	Worker Vehicle Trips	300 average and 500 maximum worker vehicle trips per day and one-way traveling distance assumed to be 50 miles.	2 years (604 days)

The proposed project plans to use water from on-site wells. These wells have not been developed and it is possible that these wells would not have sufficient productivity to supply the proposed project. In addition, the National Park Service is concerned about impacts to Zzyzx Spring and the resident population of Mohave tui chub (fish) within the pond at Zzyzx Spring from project groundwater withdrawal. BLM stated that the proposed project may need to import water as mitigation for potential impacts to water resources. There would be additional emissions from water truck trips associated with importation of water to the site. Truck trips for water importation during construction are summarized in Table 4-2. Water truck one-way trip distance was assumed to be 10 miles per trip. Detailed modeling data to estimate emissions from water trucks used to import water are presented in Table A.1-6 in Appendix A of this report. The peak daily water truck use data were used to estimate both maximum daily and annual average emissions. A separate modeling analysis was conducted to estimate emissions from these water trucks. These emissions are analyzed separately because the proposed project includes the use of on-site groundwater wells without importation of water, and importation of water may not be needed if the wells have sufficient productivity and the project does not impact water resources at Zzyzx Spring.

Table 4-2
ASSUMPTIONS – WATER IMPORTATION

Activity	Quantity of Water	Truck Capacity	Trucks/Day	Truck Trips/Day
Construction Dust Control and Compaction	200,000 gallons per day average	10,000 gallon water pull	20	40
	300,000 gallons per day maximum	10,000 gallon water pull	30	60

4.3 METHODOLOGY

Air pollutant and GHG emissions associated with project construction activities were estimated using the California Emissions Estimator Model (CalEEMod) developed by the South Coast Air Quality Management District (SCAQMD, 2011). In a commenting letter from SCAQMD on the "Notice of Preparation of a CEQA Document for the Soda Mountain Solar Project," it recommends the use of CalEEMod to estimate criteria air pollutant and GHG emissions in the air quality analysis for the proposed project (SCAQMD, 2012). According to SCAQMD, their comments are recommendations regarding the analysis of potential air quality impacts from the proposed project that should be included in the draft CEQA document (SCAQMD, 2012).

As stated in the model user's guide, the purpose of CalEEMod is to provide a uniform platform for government agencies, land use planners, and environmental professionals to estimate potential emissions associated with both construction and operational use of land use projects. This model estimates both maximum daily and annual average emissions for criteria air pollutants and GHG emissions that can be used in support of analyses in CEQA documents (SCAQMD, 2011).

CalEEMod estimates construction emissions from variety of source types, including off-road equipment and vehicle usage, on-road vehicle travel, and fugitive dust emissions, which are the primary emissions sources associated with the project construction.

CalEEMod estimates air pollutant and GHG emissions from off-road equipment and vehicles based on CARB's OFFROAD2007 model methodologies. According to SCAQMD, CARB's OFFROAD2007 emission factors, horsepower ratings, and load factors are incorporated into CalEEMod. During its recent rulemaking, CARB identified changes in its emission inventory, including updates to population, activity, load factors, growth forecasts, and horsepower. The variations may decrease or increase emission results from off-road equipment currently produced by CalEEMod and this item will be modified in a future model upgrade (SCAQMD, 2013). In accordance with BLM recommendations (ESA 2013), the load factors from CARB's OFFROAD2011 are used in this analysis.

For on-road vehicle emissions, CalEEMod estimates emissions based on emission factors derived from EMFAC2007, along with vehicle trips and traveling distances. CalEEMod uses EPA AP-42 methodologies for fugitive dust emissions generated during site grading and vehicles traveling on paved and unpaved roads. Detailed methodologies regarding fugitive dust emission estimation used in CalEEMod are presented in Appendix A of the CalEEMod user's guide (SCAQMD, 2011). The default values for truck trip lengths were not used in this analysis; trucking miles are included in Appendix A.

The maximum daily emissions associated with project construction were estimated based on the worst-case daily equipment usage given multiple concurrent activities that may be likely for the project. The earliest possible peak construction time was assumed to be in August 2014. Peak daily construction activity data used as inputs to CalEEMod are presented in Tables A.1-1 through A.1-5 in Appendix A of this report.

The average project construction activity data were used to estimate annual emissions for construction years 2014, 2015, and 2016, respectively. The project data related to annual construction activities used in the modeling analysis are presented in A.2-1 through A.2-5 in Appendix A of this report.

4.4 APPLICANT PROPOSED MEASURES

The proposed project will implement the control measures listed in MDAQMD Rule 403.2, which requires the owner or operator of any construction or demolition source to:

- Use periodic watering for short-term stabilization of disturbed surface area to minimize visible fugitive dust emissions. For purposes of this rule, use of a water truck to maintain moist disturbed surfaces and actively spread water during visible dusting episodes shall be considered sufficient to maintain compliance;
- Take actions sufficient to prevent project-related visible bulk materials (trackout) onto paved surfaces;
- Cover loaded haul vehicles while operating on publicly maintained paved surfaces;
- Stabilize graded site surfaces upon completion of grading when subsequent development is delayed or expected to be delayed more than thirty days, except when such a delay is due to precipitation that dampens the disturbed surface sufficiently to eliminate visible fugitive dust emissions;
- Cleanup project-related visible bulk materials (trackout) or spills on publicly maintained paved surfaces within twenty-four hours; and
- Reduce non-essential earth-moving activity under high wind conditions. For purposes of this rule, a reduction in earth-moving activity when visible dusting occurs from moist and dry surfaces due to wind erosion shall be considered sufficient to maintain compliance.

To further reduce emissions, the proposed project will include the following additional control measures. The proposed project will:

- Limit the speed of vehicles traveling on unpaved roads and disturbed area to 15 miles per hour;
- Apply water twice daily to all unpaved roads and unpaved parking areas;

- Use off-road construction diesel engines that meet the Tier 3 California Emission Standards for Off-road Compression-Ignition Engines unless such engine is unavailable for a particular item of equipment. If a Tier 3 engine is unavailable, that engine would be equipment with retrofit controls providing NO_x and particulate matter emissions equivalent to a Tier 3 engine; and
- Apply Level 3 diesel particulate filters to diesel engines of off-road construction equipment.

4.5 CONSTRUCTION EMISSIONS

4.5.1 Project Emissions

Table 4-2 presents the estimated maximum daily air pollutant emissions in pounds per day (lbs/day) associated with project construction after implementation of the above project control measures. As described previously, the maximum daily emissions were estimated based on the worst-case scenario when all construction activities would occur concurrently. The earliest possible peak construction time was assumed to be in August 2014. Estimated mitigated annual air pollutant emissions of project construction in 2014, 2015, and 2016 are shown in Tables 4-3, 4-4, 4-5, respectively.

The estimated maximum daily GHG emissions are presented in Table 4-6. Tables 4-7, 4-8, and 4-9 show the estimated annual GHG emissions for 2014, 2015, and 2016, respectively. Please note that the total emissions in the model output summary tables may not be the mathematical sum of emissions when adding emissions of each phase due to the rounding errors. The model output files for project construction are included in Appendix B of this report.

Table 4-2
ESTIMATED MAXIMUM DAILY AIR POLLUTANT EMISSIONS
CONSTRUCTION IMPACT

Phase	Estimated Maximum Daily Air Pollutant Emissions - Mitigated (lbs/day)					
	ROG	NO_X	CO	SO_X	PM_{10}	$PM_{2.5}$
Phase I	15.50	128.36	121.28	0.28	117.46	13.92
Phase II	55.47	308.32	286.42	0.65	149.65	23.21
Phase III	16.92	164.68	141.39	0.39	146.82	20.99
Total	87.89	601.37	549.09	1.33	413.93	58.12
Emission Thresholds	137	137	548	137	82	82
Exceeds Threshold?	No	Yes	Yes	No	Yes	No

Table 4-3
ESTIMATED ANNUAL AIR POLLUTANT EMISSIONS
CONSTRUCTION IMPACT 2014

Phase	Estimated Annual Air Pollutant Emissions - Mitigated (tons/year)					
	ROG	NO_X	CO	SO_X	PM_{10}	$PM_{2.5}$
Phase I	0.49	2.51	4.75	0.00	3.99	0.73
Phase II	4.08	15.46	17.82	0.03	6.58	1.19
Phase III	0.62	3.15	5.46	0.01	5.44	0.51
Total	5.20	21.12	28.02	0.05	15.99	2.40
Emission Thresholds	25	25	100	25	15	15
Exceeds Threshold?	No	No	No	No	Yes	No

Table 4-4
ESTIMATED ANNUAL AIR POLLUTANT EMISSIONS
CONSTRUCTION IMPACT 2015

Phase	Estimated Annual Air Pollutant Emissions - Mitigated (tons/year)					
	ROG	NO_X	CO	SO_X	PM_{10}	$PM_{2.5}$
Phase I	0.89	4.64	8.39	0.02	6.55	0.97
Phase II	8.06	30.55	34.76	0.07	12.03	1.79
Phase III	1.21	6.16	10.28	0.02	10.76	0.98
Total	10.15	41.37	53.43	0.10	29.32	3.74
Emission Thresholds	25	25	100	25	15	15
Exceeds Threshold?	No	Yes	No	No	Yes	No

Table 4-5
ESTIMATED ANNUAL AIR POLLUTANT EMISSIONS
CONSTRUCTION IMPACT 2016

Phase	Estimated Annual Air Pollutant Emissions - Mitigated (tons/year)					
	ROG	NO_X	CO	SO_X	PM_{10}	$PM_{2.5}$
Phase I	0.00	0.00	0.00	0.00	0.00	0.00
Phase II	3.41	12.96	14.60	0.02	5.70	1.09
Phase III	0.50	2.60	4.20	0.01	4.57	0.42
Total	3.91	15.56	18.79	0.04	10.27	1.51
Emission Thresholds	25	25	100	25	15	15
Exceeds Threshold?	No	No	No	No	No	No

Table 4-6
ESTIMATED MAXIMUM DAILY GREENHOUSE GAS EMISSIONS CONSTRUCTION IMPACT

Phase	Estimated Maximum Daily GHG Emissions (lbs/day)			
	CO_2	CH_4	N_2O	Total CO_2e
Phase I	29,889.23	1.48	0.00	29,920.19
Phase II	66,880.71	3.69	0.00	66,958.07
Phase III	39,574.85	1.30	0.00	39,601.95
Total	136,344.79	6.45	0.00	136,480.20
Threshold				548,000
Exceeds Threshold?				No

Table 4-7
ESTIMATED ANNUAL GREENHOUSE GAS EMISSIONS CONSTRUCTION IMPACT 2014

Phase	Estimated Annual GHG Emissions (metric tons/year)			
	CO_2	CH_4	N_2O	Total CO_2e
Phase I	742.51	0.06	0.00	743.67
Phase II	3,049.58	0.25	0.00	3,054.89
Phase III	860.34	0.06	0.00	861.57
Total	4,652.42	0.37	0.00	4,660.12
Threshold				90,718
Exceeds Threshold?				No

Table 4-8
ESTIMATED ANNUAL GREENHOUSE GAS EMISSIONS
CONSTRUCTION IMPACT 2015

Phase	Estimated Annual GHG Emissions (metric tons/year)			
	CO_2	CH_4	N_2O	Total CO_2e
Phase I	1,372.99	0.09	0.00	1,374.91
Phase II	6,027.09	0.47	0.00	6,036.85
Phase III	1,690.19	0.11	0.00	1,692.47
Total	9,090.29	0.67	0.00	9,104.32
Threshold				90,718
Exceeds Threshold?				No

Table 4-9
ESTIMATED ANNUAL GREENHOUSE GAS EMISSIONS
CONSTRUCTION IMPACT 2016

Phase	Estimated Annual GHG Emissions (metric tons/year)			
	CO_2	CH_4	N_2O	Total CO_2e
Phase I	0.00	0.00	0.00	0.00
Phase II	2,556.78	0.18	0.00	2,560.62
Phase III	713.94	0.04	0.00	714.85
Total	3,270.73	0.23	0.00	3,275.47
Threshold				90,718
Exceeds Threshold?				No

4.5.2 Water Truck Emissions

As described previously, the analysis also estimated emissions generated from water trucks if water is not obtained from on-site wells and is instead imported to the site. Table 4-10 presents the estimated maximum daily air pollutant emissions associated with water truck use during project construction after implementation of the project mitigation measures. Estimated mitigated annual air pollutant emissions from water trucks are shown in Table 4-11. The estimated maximum daily GHG emissions are presented in Table 4-12. Table 4-13 shows the estimated annual GHG emissions. The model output files of water truck use are included in Appendix B of this report.

Table 4-10
ESTIMATED MAXIMUM DAILY AIR POLLUTANT EMISSIONS
CONSTRUCTION IMPACT – WATER TRUCKS

Item	Estimated Maximum Daily Air Pollutant Emissions - Mitigated (lbs/day)					
	ROG	NO_X	CO	SO_X	PM_{10}	$PM_{2.5}$
Maximum Daily Emissions	0.00	0.03	0.01	0.00	30.38	2.96
Emission Thresholds	137	137	548	137	82	82
Exceeds Threshold?	No	No	No	No	No	No

Table 4-11
ESTIMATED ANNUAL AIR POLLUTANT EMISSIONS
CONSTRUCTION IMPACT – WATER TRUCKS

Year	Estimated Annual Air Pollutant Emissions - Mitigated (tons/year)					
	ROG	NO_X	CO	SO_X	PM_{10}	$PM_{2.5}$
2014	0.00	0.00	0.00	0.00	2.19	0.21
2015	0.00	0.00	0.00	0.00	4.34	0.42
2016	0.00	0.00	0.00	0.00	1.84	0.18
Emission Thresholds	25	25	100	25	15	15
Exceeds Threshold?	No	No	No	No	No	No

Table 4-12
ESTIMATED MAXIMUM DAILY GREENHOUSE GAS EMISSIONS
CONSTRUCTION IMPACT – WATER TRUCKS

Item	Estimated Maximum Daily GHG Emissions (lbs/day)			
	CO_2	CH_4	N_2O	Total CO_2e
Maximum Daily Emissions	4.32	0.00	0.00	4.32
Threshold				548,000
Exceeds Threshold?				No

Table 4-13
ESTIMATED ANNUAL GREENHOUSE GAS EMISSIONS
CONSTRUCTION IMPACT – WATER TRUCKS

Year	Estimated Annual GHG Emissions (metric tons/year)			
	CO_2	CH_4	N_2O	Total CO_2e
2014	0.31	0.00	0.00	0.31
2015	0.61	0.00	0.00	0.61
2016	0.26	0.00	0.00	0.26
Threshold				90,718
Exceeds Threshold?				No

4.6 CONCLUSION

As shown in Tables 4-6, 4-7, 4-8, and 4-9, GHG emissions from the project construction were estimated to be below the corresponding significance thresholds. The estimated maximum daily air pollutant emissions of NO_x, CO, and PM_{10} would exceed the daily emission thresholds. The estimated emissions of PM_{10} would exceed the annual emission threshold in 2014, and emissions of NO_x and PM_{10} would exceed the annual emission thresholds in 2015. While implementation of the project control measures would reduce construction emissions substantially, air pollutant emissions of NO_x, CO, and PM_{10} during project construction would be potentially significant.

It should be noted that the air pollutant emission impacts associated with construction activities would cease after project construction is completed. Additionally, regional, long-term air quality benefits would be anticipated associated with the operation of the proposed project, which would result directly from reductions in electrical generation from fossil fuel facilities whose output would be reduced as a result of the electrical power generated from the proposed project.

Air pollutant and GHG emissions from water trucks during project construction were estimated to be below applicable significance thresholds; therefore, the use of water trucks for water delivery during construction would not have significant impacts.

5.1 OVERVIEW

This section presents the analysis of potential impacts resulting from air pollutant and GHG emissions associated with project operation and maintenance.

5.2 PROJECT OPERATION AND MAINTENANCE DESCRIPTION

According to the Plan of Development, operational needs at the project site would include monitoring and optimizing the power generated by the solar arrays and interconnection with the transmission lines, operating the solar array tracking system, and conducting panel washing activities periodically through the year. Maintenance activities would include inspecting, repairing, and maintaining the arrays and tracking systems and the supervisory control and data acquisition system and washing panels.

During project operations, it would be anticipated that the proposed project would require a workforce of approximately 25 to 38 workers. The proposed project plans to use water trucks to control fugitive dust by watering the site and unpaved roads twice daily and to perform pressure washing of solar panels. It was estimated that approximately 22 water truck trips per day would be anticipated during peak day operations (during solar panel washing when there is also a delivery of potable water), and the average water truck trips would be approximately 15 trips per day. As described previously, additional water trucks may be needed to import water to the site when on-site wells cannot meet water demand of project operation. Therefore, the analysis also estimated emissions associated with water trucks used to import water. Detailed modeling data for water trucks used to import water are provided in Table A.1-6 in Appendix A of this report. Peak daily data were conservatively used to estimate both maximum daily and annual average. Truck trip estimates are provided in Table 5-1.

Table 5-1
ASSUMPTIONS – WATER IMPORTATION

Activity	Quantity of Water	Truck Capacity	Trucks/Day	Truck Trips/Day
Operation Dust Control	23,200 gpd average	4,000 gallon water truck	6 average	12
Operations Potable Water	1,500 gpd average	4,000 gallon water truck	0.375 average 1 maximum	0.75 average 1 maximum
Operations Panel Washing	15,000 gpd for 120 days of washing	4,000 gallon water truck	1.125 average 4 maximum	2.25 average 8 maximum
Summary Operations			7.5 average 11 maximum	15 average 22 maximum

5.3 METHODOLOGY

CalEEMod was used to estimate criteria air pollutant and GHG emissions for the first year of project operation, which was assumed to be in 2015. CalEEMod quantifies direct emissions from project operations (mobile and area sources), as well as indirect emissions, such as GHG emissions from energy use, solid waste disposal, wastewater, and water use.

In the modeling analysis, project-specific data, including water use data, vehicle trips, trip distances, paved road percentages, and the square footage of three buildings, were entered as input data to CalEEMod. The remaining input data were based on CalEEMod default values, which include emission factors, natural gas usages, solid waste data, and area source data.

As described above, the proposed project plans to use water trucks to water the site and unpaved roads twice per day during project operations. The current version of CalEEMod does not calculate fugitive dust emission reductions associated with a watering program for operational phases. To estimate emissions under the project watering program, a 55 percent reduction rate was manually applied to total model-estimated emissions for PM_{10} and $PM_{2.5}$ to derive the emissions under the project watering program.

5.4 OPERATION AND MAINTENANCE EMISSIONS

5.4.1 Project Emissions

The operational emissions would be generated from mobile, area, and energy sources. Criteria air pollutants would include NO_x, SO_x, CO, ROG, $PM_{2.5,}$ and PM_{10}. The associated GHGs would include CO_2, CH_4, and N_2O, which would be generated from mobile, area, and energy sources. In addition, SF_6 insulated switchgear or breakers may be used. SF_6 insulated switchgear would have an emissions rate of less than one percent per year. Approximately less than one ton of SF_6 would be used to insulate switchgear or breakers during project operation.

The estimated maximum daily air pollutant emissions are presented in Table 5-2, and the estimated annual air pollutant emissions are shown in Table 5-3. The maximum daily and annual GHG emissions estimated by CalEEMod are shown in Tables 5-4 and 5-5, respectively. Detailed modeling output files are provided in Appendix B of this report.

Table 5-2
ESTIMATED MAXIMUM DAILY AIR POLLUTANT EMISSIONS OPERATIONAL IMPACT

Item	Estimated Maximum Daily Air Pollutant Emissions (lbs/day)					
	ROG	NO_X	CO	SO_X	PM_{10}	$PM_{2.5}$
Area	0.37	0.00	0.00	0.00	0.00	0.00
Energy	0.00	0.01	0.01	0.00	0.00	0.00
Mobile	1.25	11.13	20.84	0.05	69.91	6.95
Total	1.62	11.14	20.85	0.05	69.61	6.95
Emission Thresholds	137	137	548	137	82	82
Exceeds Threshold?	No	No	No	No	No	No

Table 5-3
ESTIMATED ANNUAL AIR POLLUTANT EMISSIONS OPERATIONAL IMPACT

Item	Estimated Annual Air Pollutant Emissions (tons/year)					
	ROG	NO_X	CO	SO_X	PM_{10}	$PM_{2.5}$
Area	0.07	0.00	0.00	0.00	0.00	0.00
Energy	0.00	0.00	0.00	0.00	0.00	0.00
Mobile	0.19	1.52	3.10	0.01	10.04	1.00
Waste	-	-	-	-	0.00	0.00
Water	-	-	-	-	0.00	0.00
Total	0.26	1.52	3.10	0.01	10.04	1.00
Emission Thresholds	25	25	100	25	15	15
Exceeds Threshold?	No	No	No	No	No	No

Table 5-4
ESTIMATED MAXIMUM DAILY GREENHOUSE GAS EMISSIONS OPERTIONAL IMPACT

Item	Estimated Maximum Daily GHG Emissions (lbs/day)				
	CO_2	CH_4	N_2O	SF_6	Total CO_2e
Area	0.00	0.00	0.00	0.00	0.00
Energy	15.76	0.00	0.00	0.00	15.86
Mobile	5,122.60	0.16	0.00	0.00	5,125.93
Switchgear/Breakers	0.00	0.00	0.00	0.05	1,309.59
Total	5,138.36	0.16	0.00	0.05	6,451.38
Threshold					548,000
Exceeds Threshold?					No

Table 5-5
ESTIMATED ANNUAL GREENHOUSE GAS EMISSIONS
OPERATIONAL IMPACT

Item	Estimated Annual GHG Emissions (metric tons/year)				
	CO_2	CH_4	N_2O	SF_6	Total CO_2e
Area	0.00	0.00	0.00	0.00	0.00
Energy	2.61	0.00	0.00	0.00	2.63
Mobile	693.92	0.01	0.00	0.00	694.22
Waste	33.48	1.98	0.00	0.00	75.02
Water	6.93	0.02	0.00	0.00	7.40
Switchgear/Breakers	0.00	0.00	0.00	0.01	216.77
Total	736.94	2.01	0.00	0.01	996.04
Threshold					90,718
Exceeds Threshold?					No

5.4.2 Water Truck Emissions

The estimated maximum daily air pollutant emissions associated with water trucks used to import water to the site are presented in Table 5-6, and the estimated annual air pollutant emissions are shown in Table 5-7. The maximum daily and annual GHG emissions associated with water importation using water trucks estimated by CalEEMod are shown in Tables 5-8 and 5-9, respectively. Detailed modeling output files are provided in Appendix B of this report.

Table 5-6
ESTIMATED MAXIMUM DAILY AIR POLLUTANT EMISSIONS
OPERATIONAL IMPACT – WATER TRUCKS

Item	Estimated Maximum Daily Air Pollutant Emissions (lbs/day)					
	ROG	NO_X	CO	SO_X	PM_{10}	$PM_{2.5}$
Total	0.38	4.95	1.89	0.01	14.17	1.56
Emission Thresholds	137	137	548	137	82	82
Exceeds Threshold?	No	No	No	No	No	No

Table 5-7
ESTIMATED ANNUAL AIR POLLUTANT EMISSIONS
OPERATIONAL IMPACT – WATER TRUCKS

Item	Estimated Annual Air Pollutant Emissions (tons/year)					
	ROG	NO_X	CO	SO_X	PM_{10}	$PM_{2.5}$
Total	0.05	0.63	0.28	0.00	1.84	0.20
Emission Thresholds	25	25	100	25	15	15
Exceeds Threshold?	No	No	No	No	No	No

Table 5-8
ESTIMATED MAXIMUM DAILY GREENHOUSE GAS EMISSIONS
OPERTIONAL IMPACT – WATER TRUCKS

Item	Estimated Maximum Daily GHG Emissions (lbs/day)			
	CO_2	CH_4	N_2O	Total CO_2e
Total	800.93	0.01	0.00	801.23
Threshold				548,000
Exceeds Threshold?				No

Table 5-9
ESTIMATED ANNUAL GREENHOUSE GAS EMISSIONS
OPERATIONAL IMPACT – WATER TRUCKS

Item	Estimated Annual GHG Emissions (metric tons/year)			
	CO_2	CH_4	N_2O	Total CO_2e
Total	93.80	0.00	0.00	93.84
Threshold				90,718
Exceeds Threshold?				No

5.5 CONCLUSION

As shown in Tables 5-1, 5-2, 5-3, and 5-4, the estimated air pollutant emissions and GHG emissions associated with project operation would be below applicable emission thresholds. The air quality and GHG emission impacts associated with project operation would not be significant.

The estimated air pollutant emissions and GHG emissions associated with water trucks used to import water to the site during project operation would also be below applicable emission thresholds (Tables 5-5, 5-6, 5-7, and 5-8). The air quality and GHG emission impacts associated with the water truck use to import water to the site during project operation would not be significant.

This section presents the analysis of potential impacts resulting from air pollutant and GHG emissions associated with project operation and decommissioning.

According to the Plan of Development, the proposed project is planned to be operate over the full 30-year term of the right-of-way agreement and beyond, pending renewal. At the end of the proposed project's life, the structures would be removed and demolished, and the site would be returned to its original condition. Decommissioning of the proposed project would require disassembly of the solar panels, demolition of on-site buildings, and removal of perimeter fencing. Equipment to be used for decommissioning would generally be similar to that used for construction, except that site grading and clearing would not be required. Because decommissioning of the proposed project would not involve site grading or clearing activities, the level of fugitive dust emissions would be less than emissions generated during project construction. Because decommissioning of the proposed project would occur after approximately 30 years of operations, equipment and vehicle engines would be more advanced and the fuels would be cleaner in the future as compared to current conditions because of implementation of state and federal rules and regulations on vehicle and equipment engines and fuels. Exhaust emissions from decommissioning equipment and vehicles would be expected to be lower than emissions levels from construction equipment and vehicles. Therefore, air pollutant emissions would be expected to be lower than the emissions estimated for project construction.

Although air pollutant emissions associated with project decommissioning would be lower than emission impact levels estimated for project construction, it would be difficult to determine the impacts of project decommissioning because of uncertainty of air quality conditions and federal and state regulatory standards in the future.

7.1 ODOR IMPACT ANALYSIS

Four major elements are involved in evaluating odor emissions: deductibility, recognition, intensity, and hedonic tone. Deductibility is the lowest concentration of an odorant that will elicit a sensory response; at this concentration, there is an awareness of the presence of an added substance but not necessarily of an odor sensation. Recognition, however, is the minimum concentration recognized as having a characteristic odor quality by a segment of the population. Odor intensity refers to the perceived strength of the odor sensation, and odorant character is the smell that the substance emits (e.g., rancid, hay, sewer, turpentine, ammonia, etc.). Hedonic tone is a judgment of the relative pleasantness or unpleasantness of the odor and is influenced by factors such as subjective experience and frequency of occurrence. The apparent presence of an odor in ambient air depends on the properties of the substance emitted, its concentration in facility emissions, and dilution of emissions between the emissions point and the receptors (person).

Certain amounts of odors would be generated from vehicles and equipment tailpipe exhaust emissions during construction and operational phases of the proposed project. Odors would be attributable to concentrations of unburned hydrocarbons from tailpipes. Unburned hydrocarbon emissions from vehicles and equipment are typically very small. The proposed project is not considered a land use that would generate significant odor impacts. Therefore, the odor impact associated with the project would be less than significant.

7.2 NATURALLY OCCURRING ASBESTOS (NOA) ANALYSIS

Asbestos is a term used for several types of naturally occurring fibrous minerals that are a human health hazard when airborne. Asbestos was identified as a toxic air contaminant by CARB in 1986. Asbestos can be released from serpentinite and ultramafic rocks when the rock is broken or crushed (Governor's Office of Planning and Research [OPR], 2008).

The "CEQA and Asbestos: Addressing Naturally Occurring Asbestos in CEQA Documents" published by OPR in 2008 provides guidelines to evaluate impacts related to NOA. In this document, OPR provides a list of the "Counties Containing Serpentinite and Ultramafic Rock." According to the document, these two rocks are not present in San Bernardino County; therefore, potential NOA impacts associated with the proposed project would be minimal.

7.3 VISIBILITY IMPACT ANALYSIS

EPA and other agencies have been monitoring visibility in national parks and wilderness areas since 1988. In 1999, EPA issued regulations to improve visibility, or visual air quality, in 156 national parks and wilderness areas across the country. On November 9, 2011, EPA issued a schedule to act on more than 40 state pollution reduction plans that will improve visibility in national parks and wilderness areas and protect public health from the damaging effects of the pollutants that cause regional haze.

Haze is caused when sunlight encounters tiny particles in the air. Some light is absorbed by particles. Other light is scattered away before it reaches an observer. More pollutants mean more absorption and scattering of light, which reduce the clarity and color of what people see. Some types of particles, such as sulfates, scatter more light, particularly during humid conditions.

There is no Class I area in the vicinity of the project site. The closest Class I area to the project site is the Joshua Tree National Park, approximately 70 miles south of the project site. The San Gorgonio Wilderness is approximately 80 miles southwest of the project site.

Project construction would not require the use of any major stationary sources that could permanently affect regional air quality or visibility at the Class I areas. Exhaust emissions from equipment and vehicles during project construction would occur at ground level. Fugitive dust emissions to be generated during construction phases would be controlled by the watering program to reduce visible plumes. Project operations would not use any major stationary sources that would generate high rising air pollutant emissions sources. Operational emissions were estimated to be below the applicable significance thresholds and would not adversely affect visibility of the distant Class I areas. The proposed project, therefore, would not produce an adverse impact on visibility of the subject Class I areas.

1990 Amendment to CAA Section 176 requires EPA to promulgate rules to ensure that federal actions conform to the appropriate state implementation plan (SIP). These rules, known as the General Conformity Rule (40 CFR Parts 51.850-51.860 and 93.150-93.160), require any federal agency responsible for an action in a nonattainment/maintenance area to determine whether that action conforms to the applicable SIP or is exempt from the General Conformity Rule requirements. This means that federally supported or funded activities would not (1) cause or contribute to any new air quality standard violation, (2) increase the frequency or severity of any existing standard violation, or (3) delay the timely attainment of any standard, interim emission reduction, or other milestones.

An action would conform to a SIP and be exempt from a conformity determination if the action is within one of the exemption categories specified by the General Conformity Rule. An action would conform to a SIP and be exempt from a conformity determination if an applicability analysis shows that the total direct and indirect emissions from the action construction and operational activities would be less than specified emission thresholds, known as federal *de minimis* levels.

The entire project area is located in the San Bernardino County portion of the MDAQMD area, which is designated as moderate nonattainment for the federal PM_{10} standard. The applicable federal general conformity *de minimis* level for PM_{10} for a moderate nonattainment area is 100 tons per year.

With regard to the federal O_3 standard, one portion of the project area is located in the Western Mojave Desert Ozone Nonattainment Area that is designated as severe nonattainment for federal O_3 standard (see Figure 8-1). The applicable federal general conformity *de minimis* levels for VOC and NO_x (O_3 precursors) are 25 tons per year and are shown in Table 8-1. The other portion of the proposed project is located in the federal unclassifiable/attainment area, which is outside the Western Mojave Desert Ozone Nonattainment Area. As stated in 40 CFR Part 93.150, “if an action would result in emissions originating in more than one nonattainment or maintenance area, the conformity must be evaluated for each area separately.” Therefore, the air quality conformity analysis with regard to the federal O_3 standard was performed separately for these two project portions because of two different attainment designations.

Approximately 56 percent of the project construction and grading activities would take place within the nonattainment area (Figure 8-1). Annual emissions for the project portion in nonattainment area were calculated by multiplying the total estimated project annual emissions by the percentage of the project area that is in the nonattainment area. Total project annual emissions from subject pollutants during project construction and operation were estimated using CalEEMod, which are described in Sections 4 and 5 of this report. Table 8-1 shows the estimated annual emissions for VOC and NOx resulting from project construction and operation conducted in the federal O_3 nonattainment area.

Pollutant emissions from construction activities in the federal unclassifiable/attainment area are not subject to federal conformity requirements.

Table 8-1
ESTIMATED ANNUAL AIR POLLUTANT EMISSIONS

Item	Estimated Annual Air Pollutant Emissions (tons/year)		
	VOC (1)	NO_X (1)	PM_{10}
Annual Construction Emissions (2014)	2.91	11.83	15.99
Annual Construction Emissions (2015)	5.68	23.17	29.32
Annual Construction Emissions (2016)	2.19	8.71	10.27
Annual Operational Emissions	0.15	0.85	10.04
General Conformity ***de minimis*** Levels	25	25	100
Exceeds Threshold?	No	No	No

Note: (1) Emissions for VOC and NOx are project emissions resulting from project construction and operations conducted in the nonattainment area.

As shown in Table 8-1, the air pollutant emissions associated with project construction and operation were estimated to be below the applicable federal *de minimis* levels. The proposed project conforms to the SIP and is exempt from the conformity determination.

Figure 8-1
PROJECT PORTION IN NONATTAINMENT AREA

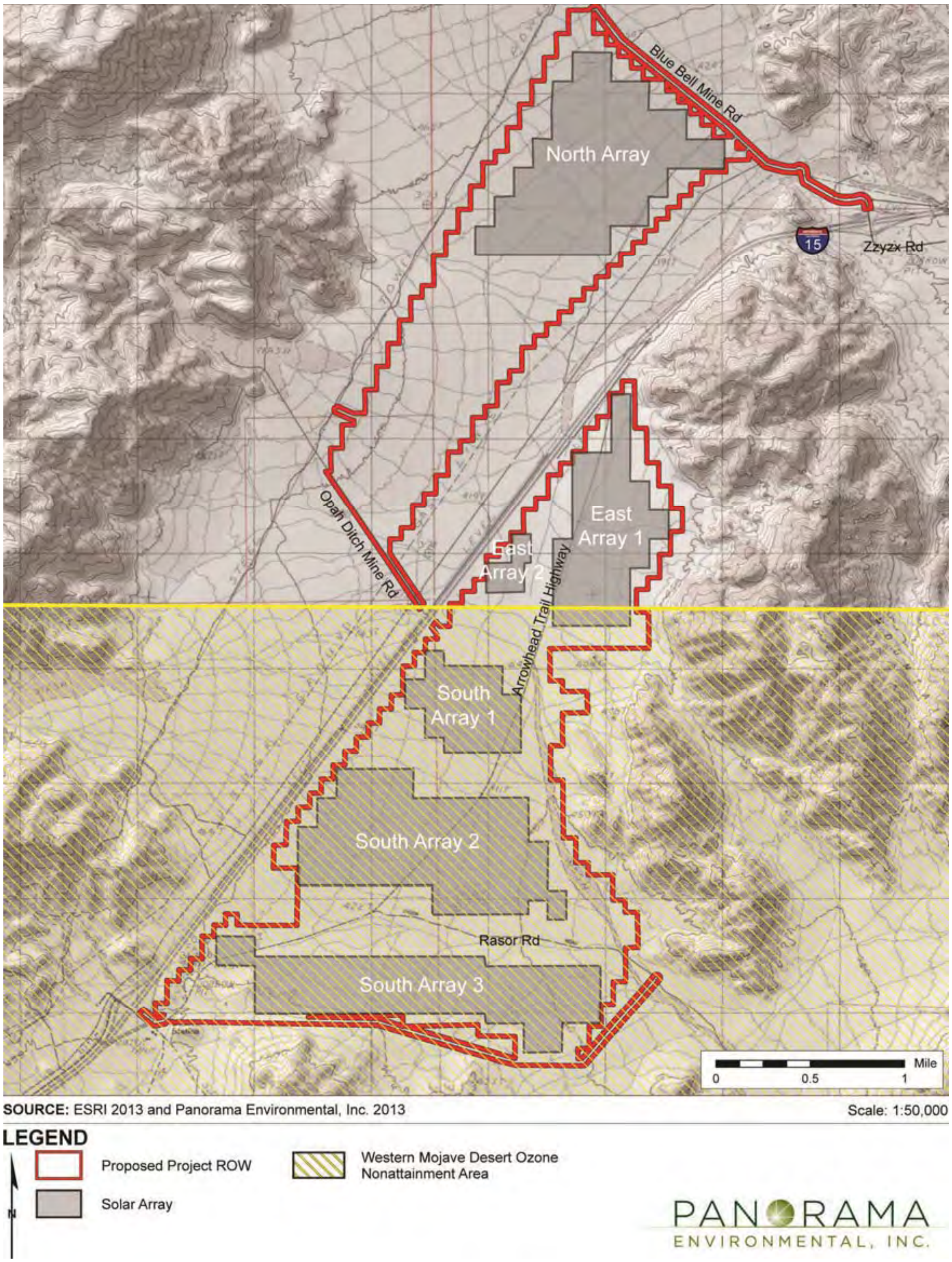


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Table A.1-1 Modeling Data - Peak Daily Construction Phase I - Site Preparation (1)

Model Equipment Type	Quantity per Day (2)	Hours per Day (2)	Horsepower (2)	Load Factor (3)	Site Area per Day (acres)	Grading Area per Day (acres)	Building Construction (square feet)	Paving Area (acres)	Materials Import/Export (tons)
Excavators	1	8.0	150	0.38	80	80	0	0	0
Graders	1	8.0	180	0.41	(3,484,800 sq. ft.)				
Off-Highway Trucks	2	8.0	307	0.38					
Other Construction Equipment	3	8.0	169	0.42					
Plate Compactor (4)	1	8.0	83	0.42					
Rubber Tired Dozers	2	8.0	496	0.4					
Tractors/Loaders/Backhoes	1	8.0	335	0.37					

Note:

1. The worst case peak daily emissions were assumed to occur on August 1 in 2014, the earliest possible day that peak daily activities would occur.
2. Equipment quantities, operating hours, and horsepower ratings are project data.
3. Load factors are from OFFROAD 2011.
4. Plate compactor load factor is the value for Other Construction Equipment

Table A.1-2 Modeling Data - Peak Daily Construction Phase II - Solar Array Construction (1)

Model Equipment Type	Quantity per Day (2)	Hours per Day (2)	Horsepower (2)	Load Factors (3)	Note
Air Compressors	6	6.2	8	0.34	Load factor is the value for Other General Industrial Equipment
Cranes	2	6.0	258	0.29	
Excavators	4	3.5	104	0.38	
Forklifts	8	7.0	103	0.20	
Generators	19	7.9	67	0.34	Load factor is the value for Other General Industrial Equipment
Off-Highway Trucks	15	6.1	316	0.38	
Other Construction Equipment	16	6.3	87	0.42	
Other General Industrial Equipment	14	2.6	24	0.34	
Plate Compactors	3	2.7	25	0.42	Load factor is the value for Other Construction Equipment
Rubber Tired Dozers	1	4.0	80	0.40	
Rubber Tired Loaders	1	4.0	149	0.36	
Sweepers/Scrubbers	1	4.0	84	0.46	
Tractors/Loaders/Backhoes	5	5.6	75	0.37	
Trenchers	1	8.0	250	0.50	

Note:

1. The worst case peak daily emissions were assumed to occur on August 1 in 2014, the earliest possible day that peak daily activities would occur.
2. Equipment quantities, operating hours, and horsepower ratings are project data.
3. Load factors are from OFFROAD2011.

Table A.1-3 Modeling Data - Peak Daily Construction Phase III - Substation and Other Facilities Construction (1)

Model Equipment Type	Quantity per Day (2)	Hours per Day (2)	Horsepower (2)	Load Factors (3)	Building Construction (Square feet)
Excavators	1	4.0	36	0.38	0
Forklifts	3	4.0	117	0.2	
Off-Highway Trucks	2	8.0	112	0.38	
Other Construction Equipment	1	4.0	435	0.42	
Skid Steer Loaders	1	4.0	92	0.37	
Tractors/Loaders/Backhoes	1	4.0	150	0.37	

Note:

1. The worst case peak daily emissions were assumed to occur on August 1 in 2014, the earliest possible day that peak daily activities would occur.
2. Equipment quantities, operating hours, and horsepower ratings are project data.
3. Load factors are from OFFROAD2011.

Table A.1-4 Modeling Data - Peak Daily Construction Vehicles - All Phases (1)

Vehicles	Type	Numbers per Day (2)	Trips per Day	Daily Trips in Each Phase (2)	Trip Distance (miles) (2)	Paved Roads (%) (2)	Note
Workers' Vehicles	passenger cars	250	500	Phase I 100	50	100	
				Phase II 200	50	100	
				Phase III 200	50	100	
Trucks	heavy duty trucks	100	200	Phase I 40	90	96.67% (87 miles paved roads)	
				Phase II 80	90		
				Phase III 80	90		

Note:

1. The worst case peak daily emissions were assumed to occur on August 1 in 2014, the earliest possible day that peak daily activities would occur.
2. Project data.

Table A.1-5 Modeling Data - Peak Daily Operations

Item	Type	Quantity per Day (1)	Daily Trips	One-Way Trip Distance (miles) (1)	Vehicle Percentage	Paved Road % (1)	Note
Workers' Vehicles	passenger cars	38	76	50	78%	100%	
Water Trucks (on-site)	medium heavy duty trucks	11	22	10	22%	0%	transport water to control dust and wash panels
Total			98		100	95%	

Note:
1. Project data.

Water, Electricity, Natural Gas, and Solid Waste Data

Item	Water (1)	Electricity (1)	Natural Gas Usage	Solid Waste	Note
O&M Buildings	1330 gal/day, and 485,450 gal/ year portable water	Use project generated electricity	model default	model default	Buildings size of 13,400 sq. ft. is used in the operational modeling.
Solar Panel Fields	1,575,000 gal/ year panel washing water	N/A	N/A	N/A	

Note:
1. Project data.

Table A.1-6 Modeling Data - Water Truck

Item	Data	Numbers per Day (2)	Trips per Day	Trip Distance (miles) (2)	Paved Roads (%) (2)	Note
Construction	Annual Average	20	40	10	90	All Phases
	Peak Daily	30	60	10	90	
Operation	Annual Average	7.5	15	10	90	
	Peak Daily	11	22	10	90	

Note:

1. The peak daily water truck use data were used to estimate peak daily and annual emissions.
2. Project data.

A.2-1 Modeling Data - Annual Construction Phase I - Site Preparation (July 2014, 453 working days)

Model Equipment Type	Quantity per Day (1)	Hours per Day (1)	Horsepower (HP) (1)	Load Factors (2)	Days per Year (3)	Total Site Area (acres)	Grading Area (acres)	Building Construction (square feet)	Paving Area (acres)	Materials Import/Export (tons)
Excavators	2	1.5	219	0.38	302	2,492	1,155	0	0	0
Graders	1	2.9	180	0.41	302	(108,551,520 sq. ft.)				
Off-Highway Trucks	2	4.4	189	0.38	302					
Other Construction Equipment	8	1.3	224	0.42	302					
Plate Compactor (4)	2	2.0	392	0.42	302					
Rubber Tired Dozers	3	3.3	287	0.4	302					
Scrapers	5	2.1	355	0.48	302					
Tractors/Loaders/Backhoes	1	1.9	335	0.37	302					

Note:
1. Project data.
2. Load factors are from OFFROAD2011.
3. Construction days are 6 days per week and 302 days per year.
4. Plate compactor load factor is the value for Other Construction Equipment.

Table A.2-2 Modeling Data - Annual Construction Phase II - Solar Array Construction (July 2014, 604 working days)

Model Equipment Type	Quantity per Day (1)	Hours per Day (1)	Horsepower (HP) (1)	Load Factors (2)	Days per Year (3)	Note
Air Compressors	6	6.2	8	0.34	302	
Cranes	2	7.4	243	0.29	302	
Excavators	5	3.0	135	0.38	302	
Forklifts	12	5.1	107	0.20	302	
Generators	34	6.5	56	0.34	302	
Off-Highway Trucks	29	4.5	343	0.38	302	water trucks, dump trucks, flat bed trucks
Other Construction Equipment	26	3.7	83	0.42	302	drivers, telehandlers, yard dogs
Other General Industrial Equipment	33	3.4	22	0.34	302	ATVs, water tower lift engines
Plate Compactor (4)	6	1.5	25	0.42	302	
Rubber Tired Dozers	4	2.5	79	0.42	302	
Rubber Tired Loaders	1	5.6	149	0.36	302	
Sweepers/Scrubbers	1	0.3	84	0.46	302	
Tractors/Loaders/Backhoes	8	4.4	83	0.37	302	
Trenchers	1	0.2	250	0.50	302	
Welders	14	5.5	22	0.34	302	

Note:

1. Project data.
2. Load factors are from OFFROAD2011.
3. Construction days are 6 days per week and 302 days per year.
4. Plate compactor load factor is the value for Other Construction Equipment.

Table A.2-3 Modeling Data - Annual Construction Phase III - Substation and Other Facilities Construction (July 2014, 604 working days)

Model Equipment Type	Quantity per Day (1)	Hours per Day (1)	Horsepower (HP) (1)	Load Factors (2)	Days per Year (3)	Building Construction (Square feet)
Bore/Drill Rigs	1	3.8	475	0.5	302	13400
Cranes	1	4.7	310	0.29	302	
Excavators	3	1.4	58	0.38	302	
Forklifts	5	1.5	119	0.2	302	
Off-Highway Trucks	13	3.9	224	0.38	302	
Other Construction Equipment	6	3.4	215	0.42	302	
Skid Steer Loaders	1	0.3	92	0.37	302	
Tractors/Loaders/Backhoes	3	2.2	120	0.37	302	
Trenchers	1	0.2	19	0.5	302	

Note:

1. Project data.
2. Load factors are from OFFROAD2011.
3. Construction days are 6 days per week and 302 days per year.

A.2-4 Modeling Data - Annual Construction Vehicles - All Phases

Vehicles	Type	Numbers per Day (1)	Trips per Day	Daily Trips in Each Phase (1)	Trip Distance (miles) (1)	Days per Year (3)	Paved Roads (%) (1)	Note
Workers' Vehicles	passenger cars	150 (average)	300	Phase I 100	50	302	100	
				Phase II 100	50	302	100	
				Phase III 100	50	302	100	
Trucks	heavy duty trucks	100	200	Phase I 40	90	302	98.33% (88.5 miles paved roads)	
				Phase II 80	90	302		
				Phase III 80	90	302		

Note:
1. Project data
2. Construction days are 6 days per week and 302 days per year.

Table A.2-5 Modeling Data - Annual Operations

Item	Type	Quantity per Day (1)	Daily Trips	One-Way Trip Distance (miles) (1)	Days per Week (2)	Weeks per Year (1)	Vehicle Percentage	Paved Road %	Note
Workers' Vehicles	passenger cars	38	76	50	5	50	84%	100%	
Water Trucks (on-site)	medium heavy duty trucks	7.5	15	10	7	52	16%	0%	transport water to control dust and wash panels
Total			91				100	96%	

Notes:
1. Project data
2. Modeling uses 7 days per week and 52 weeks per year.

Water, Electricity, Natural Gas, and Solid Waste Data

Item	Water (1)	Electricity (1)	Natural Gas Usage	Solid Waste	Note
O&M Buildings	1330 gal/day, and 485,450 gal/ year portable water	Use project generated electricity	model default	model default	
Solar Panel Fields	1,575,000 gal/ year panel washing water	N/A	N/A	N/A	

Notes:
1. Project data

Table B.1-1 SF6 Emission Calculations - Project Operation

	SF6 Usage (lb/year) (1)	Day per Year	SF6 Usage (lb/day)	SF6 Leak Rate (%)	Daily SF6 Leaked (lb/day)	Annual SF6 Leaked (tons/year)	Annual SF6 Leaked (MT/year)	SF6 GWP	CO2e (lb/day)	CO2e (MT/year)
	2000	365	5.48	1%	0.05	0.01	0.01	23900	1309.59	216.77

Note:

1. Project would use less than one ton SF6 per year and it conservatively uses one ton in SF6 emission calculations.

Soda Mountain

San Bernardino-Mojave Desert County, Summer

Peak Daily Emission Modeling

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric
General Light Industry	3484.8	1000sqft
Industrial Park	13.4	1000sqft

1.2 Other Project Characteristics

Urbanization	Rural	**Wind Speed (m/s)**	2.6	**Utility Company**	Southern California Edison
Climate Zone	10	**Precipitation Freq (Days)**	32		

1.3 User Entered Comments

Project Characteristics -

Land Use - The construction area: 80 acres. Buildings: 13,400 sq.ft.

Construction Phase - Phase I: Site Preparation
Phase II: Solar Array construction
Phase III: Substation and Other Facilities Construction

Off-road Equipment - Project data

Off-road Equipment - Project data

Off-road Equipment - Project data

Trips and VMT - workers' trips: 500
truck trips: 200

On-road Fugitive Dust - Paved roads for trucks: 96.67%

Grading - Maximum daily grading area 80 acres

Vehicle Trips - Workers' trips: 76; water truck trips -peak daily: 22

Vechicle Emission Factors - Passenger cars: 78%
Water trucks: 22%

Vechicle Emission Factors - Passenger cars: 78%
Water trucks: 22%

Vechicle Emission Factors - Passenger cars: 78%
Water trucks: 22%

Road Dust - Paved roads- peak daily: 95%

Energy Use - Buildings use on-site electricity generated with renewable energy

Water And Wastewater - Project data

Solid Waste - Buildings: solid waste, model default value

Construction Off-road Equipment Mitigation - Project mitigation measures

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2014	78.72	695.51	502.16	1.33	1,027.13	35.28	1,062.41	99.17	35.28	134.45	0.00	136,344.79	0.00	6.45	0.00	136,480.20
Total	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2014	87.89	601.37	549.09	1.33	392.46	21.47	413.93	36.65	21.47	58.12	0.00	136,344.79	0.00	6.45	0.00	136,480.20
Total	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	0.37	0.00	0.00	0.00		0.00	0.00		0.00	0.00		0.00		0.00		0.00
Energy	0.00	0.01	0.01	0.00		0.00	0.00		0.00	0.00		15.76		0.00	0.00	15.86
Mobile	1.25	11.13	20.84	0.05	155.04	0.31	155.35	15.14	0.31	15.45		5,122.60		0.16		5,125.93
Total	**1.62**	**11.14**	**20.85**	**0.05**	**155.04**	**0.31**	**155.35**	**15.14**	**0.31**	**15.45**		**5,138.36**		**0.16**	**0.00**	**5,141.79**

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	0.37	0.00	0.00	0.00		0.00	0.00		0.00	0.00		0.00		0.00		0.00
Energy	0.00	0.01	0.01	0.00		0.00	0.00		0.00	0.00		15.76		0.00	0.00	15.86
Mobile	1.25	11.13	20.84	0.05	155.04	0.31	155.35	15.14	0.31	15.45		5,122.60		0.16		5,125.93
Total	**1.62**	**11.14**	**20.85**	**0.05**	**155.04**	**0.31**	**155.35**	**15.14**	**0.31**	**15.45**		**5,138.36**		**0.16**	**0.00**	**5,141.79**

3.0 Construction Detail

3.1 Mitigation Measures Construction

Use Cleaner Engines for Construction Equipment

Use DPF for Construction Equipment

Water Exposed Area

Water Unpaved Roads

Reduce Vehicle Speed on Unpaved Roads

3.2 Site Preparation - 2014

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					96.88	0.00	96.88	6.63	0.00	6.63						0.00
Off-Road	10.08	83.35	44.75	0.10		3.47	3.47		3.47	3.47		10,993.34		0.90		11,012.18
Total	**10.08**	**83.35**	**44.75**	**0.10**	**96.88**	**3.47**	**100.35**	**6.63**	**3.47**	**10.10**		**10,993.34**		**0.90**		**11,012.18**

3.2 Site Preparation - 2014

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	5.63	74.48	26.53	0.13	179.41	3.63	183.04	17.95	3.63	21.58		14,170.03		0.27		14,175.67
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00		0.00		0.00
Worker	2.13	3.58	39.22	0.05	6.04	0.23	6.28	0.23	0.23	0.46		4,725.86		0.31		4,732.34
Total	**7.76**	**78.06**	**65.75**	**0.18**	**185.45**	**3.86**	**189.32**	**18.18**	**3.86**	**22.04**		**18,895.89**		**0.58**		**18,908.01**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					43.60	0.00	43.60	2.98	0.00	2.98						0.00
Off-Road	7.74	50.30	55.53	0.10		0.49	0.49		0.49	0.49	0.00	10,993.34		0.90		11,012.18
Total	**7.74**	**50.30**	**55.53**	**0.10**	**43.60**	**0.49**	**44.09**	**2.98**	**0.49**	**3.47**	**0.00**	**10,993.34**		**0.90**		**11,012.18**

3.2 Site Preparation - 2014

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	5.63	74.48	26.53	0.13	63.46	3.63	67.09	6.36	3.63	9.99		14,170.03		0.27		14,175.67
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00		0.00		0.00
Worker	2.13	3.58	39.22	0.05	6.04	0.23	6.28	0.23	0.23	0.46		4,725.86		0.31		4,732.34
Total	**7.76**	**78.06**	**65.75**	**0.18**	**69.50**	**3.86**	**73.37**	**6.59**	**3.86**	**10.45**		**18,895.89**		**0.58**		**18,908.01**

3.3 Solar Array Construction - 2014

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					3.01	0.00	3.01	1.66	0.00	1.66						0.00
Off-Road	28.35	210.31	120.96	0.28		11.87	11.87		11.87	11.87		29,088.93		2.53		29,142.06
Total	**28.35**	**210.31**	**120.96**	**0.28**	**3.01**	**11.87**	**14.88**	**1.66**	**11.87**	**13.53**		**29,088.93**		**2.53**		**29,142.06**

3.3 Solar Array Construction - 2014

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	11.25	148.96	53.05	0.27	358.81	7.26	366.07	35.91	7.26	43.17		28,340.06		0.54		28,351.33
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00		0.00		0.00
Worker	4.25	7.17	78.45	0.10	12.09	0.47	12.55	0.45	0.47	0.92		9,451.72		0.62		9,464.68
Total	**15.50**	**156.13**	**131.50**	**0.37**	**370.90**	**7.73**	**378.62**	**36.36**	**7.73**	**44.09**		**37,791.78**		**1.16**		**37,816.01**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					1.35	0.00	1.35	0.74	0.00	0.74						0.00
Off-Road	39.97	152.19	154.92	0.28		1.57	1.57		1.57	1.57	0.00	29,088.93		2.53		29,142.06
Total	**39.97**	**152.19**	**154.92**	**0.28**	**1.35**	**1.57**	**2.92**	**0.74**	**1.57**	**2.31**	**0.00**	**29,088.93**		**2.53**		**29,142.06**

3.3 Solar Array Construction - 2014

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	11.25	148.96	53.05	0.27	126.92	7.26	134.18	12.72	7.26	19.98		28,340.06		0.54		28,351.33
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00		0.00		0.00
Worker	4.25	7.17	78.45	0.10	12.09	0.47	12.55	0.45	0.47	0.92		9,451.72		0.62		9,464.68
Total	**15.50**	**156.13**	**131.50**	**0.37**	**139.01**	**7.73**	**146.73**	**13.17**	**7.73**	**20.90**		**37,791.78**		**1.16**		**37,816.01**

3.4 Substation and Other Facilities - 2014

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.53	11.53	7.70	0.02		0.62	0.62		0.62	0.62		1,783.07		0.14		1,785.94
Total	**1.53**	**11.53**	**7.70**	**0.02**		**0.62**	**0.62**		**0.62**	**0.62**		**1,783.07**		**0.14**		**1,785.94**

3.4 Substation and Other Facilities - 2014

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	11.25	148.96	53.05	0.27	358.81	7.26	366.07	35.91	7.26	43.17		28,340.06		0.54		28,351.33
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00		0.00		0.00
Worker	4.25	7.17	78.45	0.10	12.09	0.47	12.55	0.45	0.47	0.92		9,451.72		0.62		9,464.68
Total	**15.50**	**156.13**	**131.50**	**0.37**	**370.90**	**7.73**	**378.62**	**36.36**	**7.73**	**44.09**		**37,791.78**		**1.16**		**37,816.01**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.42	8.55	9.89	0.02		0.09	0.09		0.09	0.09	0.00	1,783.07		0.14		1,785.94
Total	**1.42**	**8.55**	**9.89**	**0.02**		**0.09**	**0.09**		**0.09**	**0.09**	**0.00**	**1,783.07**		**0.14**		**1,785.94**

3.4 Substation and Other Facilities - 2014

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	11.25	148.96	53.05	0.27	126.92	7.26	134.18	12.72	7.26	19.98		28,340.06		0.54		28,351.33
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00		0.00		0.00
Worker	4.25	7.17	78.45	0.10	12.09	0.47	12.55	0.45	0.47	0.92		9,451.72		0.62		9,464.68
Total	**15.50**	**156.13**	**131.50**	**0.37**	**139.01**	**7.73**	**146.73**	**13.17**	**7.73**	**20.90**		**37,791.78**		**1.16**		**37,816.01**

4.0 Mobile Detail

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	1.25	11.13	20.84	0.05	155.04	0.31	155.35	15.14	0.31	15.45		5,122.60		0.16		5,125.93
Unmitigated	1.25	11.13	20.84	0.05	155.04	0.31	155.35	15.14	0.31	15.45		5,122.60		0.16		5,125.93
Total	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
General Light Industry	0.00	0.00	0.00		
Industrial Park	98.09	98.09	98.09	1,471,006	1,471,006
Total	98.09	98.09	98.09	1,471,006	1,471,006

4.3 Trip Type Information

	Miles			Trip %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW
General Light Industry	14.70	6.60	6.60	59.00	28.00	13.00
Industrial Park	50.00	10.00	0.00	78.00	22.00	0.00

5.0 Energy Detail

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
NaturalGas Mitigated	0.00	0.01	0.01	0.00		0.00	0.00		0.00	0.00		15.76		0.00	0.00	15.86
NaturalGas Unmitigated	0.00	0.01	0.01	0.00		0.00	0.00		0.00	0.00		15.76		0.00	0.00	15.86
Total	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU	lb/day										lb/day					
General Light Industry	0	0.00	0.00	0.00	0.00		0.00	0.00		0.00	0.00		0.00		0.00	0.00	0.00
Industrial Park	134	0.00	0.01	0.01	0.00		0.00	0.00		0.00	0.00		15.76		0.00	0.00	15.86
Total		**0.00**	**0.01**	**0.01**	**0.00**		**0.00**	**0.00**		**0.00**	**0.00**		**15.76**		**0.00**	**0.00**	**15.86**

5.2 Energy by Land Use - NaturalGas

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU	lb/day										lb/day					
General Light Industry	0	0.00	0.00	0.00	0.00		0.00	0.00		0.00	0.00		0.00		0.00	0.00	0.00
Industrial Park	0.134	0.00	0.01	0.01	0.00		0.00	0.00		0.00	0.00		15.76		0.00	0.00	15.86
Total		**0.00**	**0.01**	**0.01**	**0.00**		**0.00**	**0.00**		**0.00**	**0.00**		**15.76**		**0.00**	**0.00**	**15.86**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	0.37	0.00	0.00	0.00		0.00	0.00		0.00	0.00		0.00		0.00		0.00
Unmitigated	0.37	0.00	0.00	0.00		0.00	0.00		0.00	0.00		0.00		0.00		0.00
Total	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.09					0.00	0.00		0.00	0.00						0.00
Consumer Products	0.29					0.00	0.00		0.00	0.00						0.00
Landscaping	0.00	0.00	0.00	0.00		0.00	0.00		0.00	0.00		0.00		0.00		0.00
Total	**0.38**	**0.00**	**0.00**	**0.00**		**0.00**	**0.00**		**0.00**	**0.00**		**0.00**		**0.00**		**0.00**

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.09					0.00	0.00		0.00	0.00						0.00
Consumer Products	0.29					0.00	0.00		0.00	0.00						0.00
Landscaping	0.00	0.00	0.00	0.00		0.00	0.00		0.00	0.00		0.00		0.00		0.00
Total	**0.38**	**0.00**	**0.00**	**0.00**		**0.00**	**0.00**		**0.00**	**0.00**		**0.00**		**0.00**		**0.00**

7.0 Water Detail

7.1 Mitigation Measures Water

8.0 Waste Detail

8.1 Mitigation Measures Waste

9.0 Vegetation

Soda Mountain

San Bernardino-Mojave Desert County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric
General Light Industry	108551.52	1000sqft
Industrial Park	13.4	1000sqft

1.2 Other Project Characteristics

Urbanization Rural

Wind Speed (m/s) 2.6

Utility Company Southern California Edison

Climate Zone 10

Precipitation Freq (Days) 32

1.3 User Entered Comments

Project Characteristics -

Land Use - The total area: 2,492 acres (108,551,520 sq. ft.); buildings: 13,400 sq. ft.

Construction Phase - Phase I: Site Preparation
Phase II: Solar Array Construction
Phase III: Substation and Other Facilities Construction

Off-road Equipment - Project equipment data

Off-road Equipment - Project equipment data

Off-road Equipment - Project equipment data

Trips and VMT - Average daily workers' trips: 300
Daily truck trips: 200

On-road Fugitive Dust - Pave roads for trucks - annually: 98.33%

Grading - 1155 acres

Vehicle Trips - Workers' trips: 76; water truck trips: 15

Vechicle Emission Factors - Passenger cars: 84%
Water trucks: 16%

Vechicle Emission Factors - Passenger cars: 84%
Water trucks: 16%

Vechicle Emission Factors - Passenger cars: 84%
Water trucks: 16%

Road Dust - Paved roads: 96%

Energy Use - Buildings use on-site electricity generated with renewable energy

Water And Wastewater - Portable water: 485,450 gal/year; solar panel washing water: 1,575,000 gal/year

Solid Waste - Buildings: solid waste, model default value

Construction Off-road Equipment Mitigation - Project mitigation measures

2.0 Emissions Summary

2.1 Overall Construction

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2014	4.25	29.63	22.56	0.05	39.78	1.47	41.25	5.54	1.47	7.01	0.00	4,652.42	4,652.42	0.37	0.00	4,660.12
2015	7.75	52.72	42.11	0.10	73.49	2.60	76.08	8.69	2.60	11.29	0.00	9,090.29	9,090.29	0.67	0.00	9,104.32
2016	2.66	17.60	14.38	0.04	25.83	0.88	26.71	3.46	0.88	4.34	0.00	3,270.73	3,270.73	0.23	0.00	3,275.47
Total	**14.66**	**99.95**	**79.05**	**0.19**	**139.10**	**4.95**	**144.04**	**17.69**	**4.95**	**22.64**	**0.00**	**17,013.44**	**17,013.44**	**1.27**	**0.00**	**17,039.91**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2014	5.20	21.12	28.02	0.05	15.74	0.25	15.99	2.15	0.25	2.40	0.00	4,652.42	4,652.42	0.37	0.00	4,660.12
2015	10.15	41.37	53.43	0.10	28.82	0.50	29.32	3.24	0.50	3.74	0.00	9,090.29	9,090.29	0.67	0.00	9,104.32
2016	3.91	15.56	18.79	0.04	10.09	0.18	10.27	1.32	0.18	1.51	0.00	3,270.73	3,270.73	0.23	0.00	3,275.47
Total	**19.26**	**78.05**	**100.24**	**0.19**	**54.65**	**0.93**	**55.58**	**6.71**	**0.93**	**7.65**	**0.00**	**17,013.44**	**17,013.44**	**1.27**	**0.00**	**17,039.91**

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	0.07	0.00	0.00	0.00		0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Energy	0.00	0.00	0.00	0.00		0.00	0.00		0.00	0.00	0.00	2.61	2.61	0.00	0.00	2.63
Mobile	0.19	1.52	3.10	0.01	22.28	0.04	22.32	2.17	0.04	2.22	0.00	693.92	693.92	0.01	0.00	694.22
Waste						0.00	0.00		0.00	0.00	33.48	0.00	33.48	1.98	0.00	75.02
Water						0.00	0.00		0.00	0.00	0.00	6.93	6.93	0.02	0.00	7.40
Total	**0.26**	**1.52**	**3.10**	**0.01**	**22.28**	**0.04**	**22.32**	**2.17**	**0.04**	**2.22**	**33.48**	**703.46**	**736.94**	**2.01**	**0.00**	**779.27**

2.2 Overall Operational

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	0.07	0.00	0.00	0.00		0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Energy	0.00	0.00	0.00	0.00		0.00	0.00		0.00	0.00	0.00	2.61	2.61	0.00	0.00	2.63
Mobile	0.19	1.52	3.10	0.01	22.28	0.04	22.32	2.17	0.04	2.22	0.00	693.92	693.92	0.01	0.00	694.22
Waste						0.00	0.00		0.00	0.00	33.48	0.00	33.48	1.98	0.00	75.02
Water						0.00	0.00		0.00	0.00	0.00	6.93	6.93	0.02	0.00	7.40
Total	**0.26**	**1.52**	**3.10**	**0.01**	**22.28**	**0.04**	**22.32**	**2.17**	**0.04**	**2.22**	**33.48**	**703.46**	**736.94**	**2.01**	**0.00**	**779.27**

3.0 Construction Detail

3.1 Mitigation Measures Construction

Use Cleaner Engines for Construction Equipment

Use DPF for Construction Equipment

Water Exposed Area

Water Unpaved Roads

Reduce Vehicle Speed on Unpaved Roads

3.2 Site Preparation - 2014

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					2.30	0.00	2.30	0.99	0.00	0.99	0.00	0.00	0.00	0.00	0.00	0.00
Off-Road	0.43	3.72	1.61	0.00		0.14	0.14		0.14	0.14	0.00	440.84	440.84	0.04	0.00	441.58
Total	**0.43**	**3.72**	**1.61**	**0.00**	**2.30**	**0.14**	**2.44**	**0.99**	**0.14**	**1.13**	**0.00**	**440.84**	**440.84**	**0.04**	**0.00**	**441.58**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.00	0.01	0.00	0.00	6.78	0.00	6.78	0.65	0.00	0.65	0.00	2.24	2.24	0.00	0.00	2.24
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Worker	0.15	0.28	2.53	0.00	0.43	0.02	0.45	0.02	0.02	0.04	0.00	299.43	299.43	0.02	0.00	299.85
Total	**0.15**	**0.29**	**2.53**	**0.00**	**7.21**	**0.02**	**7.23**	**0.67**	**0.02**	**0.69**	**0.00**	**301.67**	**301.67**	**0.02**	**0.00**	**302.09**

3.2 Site Preparation - 2014

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					1.04	0.00	1.04	0.45	0.00	0.45	0.00	0.00	0.00	0.00	0.00	0.00
Off-Road	0.34	2.22	2.22	0.00		0.02	0.02		0.02	0.02	0.00	440.84	440.84	0.04	0.00	441.58
Total	**0.34**	**2.22**	**2.22**	**0.00**	**1.04**	**0.02**	**1.06**	**0.45**	**0.02**	**0.47**	**0.00**	**440.84**	**440.84**	**0.04**	**0.00**	**441.58**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.00	0.01	0.00	0.00	2.48	0.00	2.48	0.22	0.00	0.22	0.00	2.24	2.24	0.00	0.00	2.24
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Worker	0.15	0.28	2.53	0.00	0.43	0.02	0.45	0.02	0.02	0.04	0.00	299.43	299.43	0.02	0.00	299.85
Total	**0.15**	**0.29**	**2.53**	**0.00**	**2.91**	**0.02**	**2.93**	**0.24**	**0.02**	**0.26**	**0.00**	**301.67**	**301.67**	**0.02**	**0.00**	**302.09**

3.2 Site Preparation - 2015

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					2.30	0.00	2.30	0.99	0.00	0.99	0.00	0.00	0.00	0.00	0.00	0.00
Off-Road	0.77	6.36	2.86	0.01		0.24	0.24		0.24	0.24	0.00	823.09	823.09	0.06	0.00	824.39
Total	**0.77**	**6.36**	**2.86**	**0.01**	**2.30**	**0.24**	**2.54**	**0.99**	**0.24**	**1.23**	**0.00**	**823.09**	**823.09**	**0.06**	**0.00**	**824.39**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.00	0.02	0.01	0.00	12.66	0.00	12.67	1.21	0.00	1.21	0.00	4.18	4.18	0.00	0.00	4.18
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Worker	0.25	0.47	4.23	0.01	0.80	0.03	0.84	0.03	0.03	0.07	0.00	545.72	545.72	0.03	0.00	546.44
Total	**0.25**	**0.49**	**4.24**	**0.01**	**13.46**	**0.03**	**13.51**	**1.24**	**0.03**	**1.28**	**0.00**	**549.90**	**549.90**	**0.03**	**0.00**	**550.62**

3.2 Site Preparation - 2015

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					1.04	0.00	1.04	0.45	0.00	0.45	0.00	0.00	0.00	0.00	0.00	0.00
Off-Road	0.64	4.15	4.15	0.01		0.04	0.04		0.04	0.04	0.00	823.09	823.09	0.06	0.00	824.39
Total	**0.64**	**4.15**	**4.15**	**0.01**	**1.04**	**0.04**	**1.08**	**0.45**	**0.04**	**0.49**	**0.00**	**823.09**	**823.09**	**0.06**	**0.00**	**824.39**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.00	0.02	0.01	0.00	4.63	0.00	4.63	0.41	0.00	0.41	0.00	4.18	4.18	0.00	0.00	4.18
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Worker	0.25	0.47	4.23	0.01	0.80	0.03	0.84	0.03	0.03	0.07	0.00	545.72	545.72	0.03	0.00	546.44
Total	**0.25**	**0.49**	**4.24**	**0.01**	**5.43**	**0.03**	**5.47**	**0.44**	**0.03**	**0.48**	**0.00**	**549.90**	**549.90**	**0.03**	**0.00**	**550.62**

3.3 Solar Array Construction - 2014

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					2.27	0.00	2.27	1.25	0.00	1.25	0.00	0.00	0.00	0.00	0.00	0.00
Off-Road	2.88	21.15	11.72	0.03		1.12	1.12		1.12	1.12	0.00	2,746.79	2,746.79	0.23	0.00	2,751.68
Total	**2.88**	**21.15**	**11.72**	**0.03**	**2.27**	**1.12**	**3.39**	**1.25**	**1.12**	**2.37**	**0.00**	**2,746.79**	**2,746.79**	**0.23**	**0.00**	**2,751.68**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.00	0.02	0.01	0.00	13.57	0.00	13.57	1.30	0.00	1.30	0.00	3.36	3.36	0.00	0.00	3.36
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Worker	0.15	0.28	2.53	0.00	0.43	0.02	0.45	0.02	0.02	0.04	0.00	299.43	299.43	0.02	0.00	299.85
Total	**0.15**	**0.30**	**2.54**	**0.00**	**14.00**	**0.02**	**14.02**	**1.32**	**0.02**	**1.34**	**0.00**	**302.79**	**302.79**	**0.02**	**0.00**	**303.21**

3.3 Solar Array Construction - 2014

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					1.02	0.00	1.02	0.56	0.00	0.56	0.00	0.00	0.00	0.00	0.00	0.00
Off-Road	3.93	15.16	15.28	0.03		0.15	0.15		0.15	0.15	0.00	2,746.79	2,746.79	0.23	0.00	2,751.68
Total	**3.93**	**15.16**	**15.28**	**0.03**	**1.02**	**0.15**	**1.17**	**0.56**	**0.15**	**0.71**	**0.00**	**2,746.79**	**2,746.79**	**0.23**	**0.00**	**2,751.68**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.00	0.02	0.01	0.00	4.96	0.00	4.96	0.43	0.00	0.44	0.00	3.36	3.36	0.00	0.00	3.36
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Worker	0.15	0.28	2.53	0.00	0.43	0.02	0.45	0.02	0.02	0.04	0.00	299.43	299.43	0.02	0.00	299.85
Total	**0.15**	**0.30**	**2.54**	**0.00**	**5.39**	**0.02**	**5.41**	**0.45**	**0.02**	**0.48**	**0.00**	**302.79**	**302.79**	**0.02**	**0.00**	**303.21**

3.3 Solar Array Construction - 2015

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					2.27	0.00	2.27	1.25	0.00	1.25	0.00	0.00	0.00	0.00	0.00	0.00
Off-Road	5.30	38.02	22.85	0.06		1.98	1.98		1.98	1.98	0.00	5,441.42	5,441.42	0.43	0.00	5,450.41
Total	**5.30**	**38.02**	**22.85**	**0.06**	**2.27**	**1.98**	**4.25**	**1.25**	**1.98**	**3.23**	**0.00**	**5,441.42**	**5,441.42**	**0.43**	**0.00**	**5,450.41**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.00	0.03	0.01	0.00	26.87	0.00	26.88	2.57	0.00	2.57	0.00	6.65	6.65	0.00	0.00	6.66
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Worker	0.27	0.49	4.48	0.01	0.85	0.04	0.89	0.04	0.04	0.07	0.00	579.02	579.02	0.04	0.00	579.78
Total	**0.27**	**0.52**	**4.49**	**0.01**	**27.72**	**0.04**	**27.77**	**2.61**	**0.04**	**2.64**	**0.00**	**585.67**	**585.67**	**0.04**	**0.00**	**586.44**

3.3 Solar Array Construction - 2015

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					1.02	0.00	1.02	0.56	0.00	0.56	0.00	0.00	0.00	0.00	0.00	0.00
Off-Road	7.79	30.03	30.27	0.06		0.30	0.30		0.30	0.30	0.00	5,441.42	5,441.42	0.43	0.00	5,450.41
Total	**7.79**	**30.03**	**30.27**	**0.06**	**1.02**	**0.30**	**1.32**	**0.56**	**0.30**	**0.86**	**0.00**	**5,441.42**	**5,441.42**	**0.43**	**0.00**	**5,450.41**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.00	0.03	0.01	0.00	9.82	0.00	9.82	0.86	0.00	0.86	0.00	6.65	6.65	0.00	0.00	6.66
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Worker	0.27	0.49	4.48	0.01	0.85	0.04	0.89	0.04	0.04	0.07	0.00	579.02	579.02	0.04	0.00	579.78
Total	**0.27**	**0.52**	**4.49**	**0.01**	**10.67**	**0.04**	**10.71**	**0.90**	**0.04**	**0.93**	**0.00**	**585.67**	**585.67**	**0.04**	**0.00**	**586.44**

3.3 Solar Array Construction - 2016

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					2.27	0.00	2.27	1.25	0.00	1.25	0.00	0.00	0.00	0.00	0.00	0.00
Off-Road	2.10	14.63	9.58	0.02		0.75	0.75		0.75	0.75	0.00	2,312.17	2,312.17	0.17	0.00	2,315.71
Total	**2.10**	**14.63**	**9.58**	**0.02**	**2.27**	**0.75**	**3.02**	**1.25**	**0.75**	**2.00**	**0.00**	**2,312.17**	**2,312.17**	**0.17**	**0.00**	**2,315.71**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.00	0.01	0.01	0.00	11.42	0.00	11.42	1.09	0.00	1.09	0.00	2.83	2.83	0.00	0.00	2.83
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Worker	0.10	0.19	1.73	0.00	0.36	0.02	0.38	0.02	0.02	0.03	0.00	241.78	241.78	0.01	0.00	242.08
Total	**0.10**	**0.20**	**1.74**	**0.00**	**11.78**	**0.02**	**11.80**	**1.11**	**0.02**	**1.12**	**0.00**	**244.61**	**244.61**	**0.01**	**0.00**	**244.91**

3.3 Solar Array Construction - 2016

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					1.02	0.00	1.02	0.56	0.00	0.56	0.00	0.00	0.00	0.00	0.00	0.00
Off-Road	3.31	12.76	12.86	0.02		0.13	0.13		0.13	0.13	0.00	2,312.17	2,312.17	0.17	0.00	2,315.71
Total	**3.31**	**12.76**	**12.86**	**0.02**	**1.02**	**0.13**	**1.15**	**0.56**	**0.13**	**0.69**	**0.00**	**2,312.17**	**2,312.17**	**0.17**	**0.00**	**2,315.71**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.00	0.01	0.01	0.00	4.17	0.00	4.17	0.37	0.00	0.37	0.00	2.83	2.83	0.00	0.00	2.83
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Worker	0.10	0.19	1.73	0.00	0.36	0.02	0.38	0.02	0.02	0.03	0.00	241.78	241.78	0.01	0.00	242.08
Total	**0.10**	**0.20**	**1.74**	**0.00**	**4.53**	**0.02**	**4.55**	**0.39**	**0.02**	**0.40**	**0.00**	**244.61**	**244.61**	**0.01**	**0.00**	**244.91**

3.4 Substation and Other Facilities - 2014

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.48	3.87	1.62	0.01		0.15	0.15		0.15	0.15	0.00	557.55	557.55	0.04	0.00	558.36
Total	**0.48**	**3.87**	**1.62**	**0.01**		**0.15**	**0.15**		**0.15**	**0.15**	**0.00**	**557.55**	**557.55**	**0.04**	**0.00**	**558.36**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.00	0.02	0.01	0.00	13.57	0.00	13.57	1.30	0.00	1.30	0.00	3.36	3.36	0.00	0.00	3.36
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Worker	0.15	0.28	2.53	0.00	0.43	0.02	0.45	0.02	0.02	0.04	0.00	299.43	299.43	0.02	0.00	299.85
Total	**0.15**	**0.30**	**2.54**	**0.00**	**14.00**	**0.02**	**14.02**	**1.32**	**0.02**	**1.34**	**0.00**	**302.79**	**302.79**	**0.02**	**0.00**	**303.21**

3.4 Substation and Other Facilities - 2014

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.47	2.85	2.92	0.01		0.03	0.03		0.03	0.03	0.00	557.55	557.55	0.04	0.00	558.36
Total	**0.47**	**2.85**	**2.92**	**0.01**		**0.03**	**0.03**		**0.03**	**0.03**	**0.00**	**557.55**	**557.55**	**0.04**	**0.00**	**558.36**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.00	0.02	0.01	0.00	4.96	0.00	4.96	0.43	0.00	0.44	0.00	3.36	3.36	0.00	0.00	3.36
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Worker	0.15	0.28	2.53	0.00	0.43	0.02	0.45	0.02	0.02	0.04	0.00	299.43	299.43	0.02	0.00	299.85
Total	**0.15**	**0.30**	**2.54**	**0.00**	**5.39**	**0.02**	**5.41**	**0.45**	**0.02**	**0.48**	**0.00**	**302.79**	**302.79**	**0.02**	**0.00**	**303.21**

3.4 Substation and Other Facilities - 2015

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.89	6.81	3.17	0.01		0.26	0.26		0.26	0.26	0.00	1,104.52	1,104.52	0.07	0.00	1,106.03
Total	**0.89**	**6.81**	**3.17**	**0.01**		**0.26**	**0.26**		**0.26**	**0.26**	**0.00**	**1,104.52**	**1,104.52**	**0.07**	**0.00**	**1,106.03**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.00	0.03	0.01	0.00	26.87	0.00	26.88	2.57	0.00	2.57	0.00	6.65	6.65	0.00	0.00	6.66
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Worker	0.27	0.49	4.48	0.01	0.85	0.04	0.89	0.04	0.04	0.07	0.00	579.02	579.02	0.04	0.00	579.78
Total	**0.27**	**0.52**	**4.49**	**0.01**	**27.72**	**0.04**	**27.77**	**2.61**	**0.04**	**2.64**	**0.00**	**585.67**	**585.67**	**0.04**	**0.00**	**586.44**

3.4 Substation and Other Facilities - 2015

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.94	5.64	5.79	0.01		0.05	0.05		0.05	0.05	0.00	1,104.52	1,104.52	0.07	0.00	1,106.03
Total	**0.94**	**5.64**	**5.79**	**0.01**		**0.05**	**0.05**		**0.05**	**0.05**	**0.00**	**1,104.52**	**1,104.52**	**0.07**	**0.00**	**1,106.03**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.00	0.03	0.01	0.00	9.82	0.00	9.82	0.86	0.00	0.86	0.00	6.65	6.65	0.00	0.00	6.66
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Worker	0.27	0.49	4.48	0.01	0.85	0.04	0.89	0.04	0.04	0.07	0.00	579.02	579.02	0.04	0.00	579.78
Total	**0.27**	**0.52**	**4.49**	**0.01**	**10.67**	**0.04**	**10.71**	**0.90**	**0.04**	**0.93**	**0.00**	**585.67**	**585.67**	**0.04**	**0.00**	**586.44**

3.4 Substation and Other Facilities - 2016

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.35	2.56	1.33	0.01		0.10	0.10		0.10	0.10	0.00	469.33	469.33	0.03	0.00	469.94
Total	**0.35**	**2.56**	**1.33**	**0.01**		**0.10**	**0.10**		**0.10**	**0.10**	**0.00**	**469.33**	**469.33**	**0.03**	**0.00**	**469.94**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.00	0.01	0.01	0.00	11.42	0.00	11.42	1.09	0.00	1.09	0.00	2.83	2.83	0.00	0.00	2.83
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Worker	0.10	0.19	1.73	0.00	0.36	0.02	0.38	0.02	0.02	0.03	0.00	241.78	241.78	0.01	0.00	242.08
Total	**0.10**	**0.20**	**1.74**	**0.00**	**11.78**	**0.02**	**11.80**	**1.11**	**0.02**	**1.12**	**0.00**	**244.61**	**244.61**	**0.01**	**0.00**	**244.91**

3.4 Substation and Other Facilities - 2016

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.40	2.40	2.46	0.01		0.02	0.02		0.02	0.02	0.00	469.33	469.33	0.03	0.00	469.94
Total	**0.40**	**2.40**	**2.46**	**0.01**		**0.02**	**0.02**		**0.02**	**0.02**	**0.00**	**469.33**	**469.33**	**0.03**	**0.00**	**469.94**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.00	0.01	0.01	0.00	4.17	0.00	4.17	0.37	0.00	0.37	0.00	2.83	2.83	0.00	0.00	2.83
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Worker	0.10	0.19	1.73	0.00	0.36	0.02	0.38	0.02	0.02	0.03	0.00	241.78	241.78	0.01	0.00	242.08
Total	**0.10**	**0.20**	**1.74**	**0.00**	**4.53**	**0.02**	**4.55**	**0.39**	**0.02**	**0.40**	**0.00**	**244.61**	**244.61**	**0.01**	**0.00**	**244.91**

4.0 Mobile Detail

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	0.19	1.52	3.10	0.01	22.28	0.04	22.32	2.17	0.04	2.22	0.00	693.92	693.92	0.01	0.00	694.22
Unmitigated	0.19	1.52	3.10	0.01	22.28	0.04	22.32	2.17	0.04	2.22	0.00	693.92	693.92	0.01	0.00	694.22
Total	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
General Light Industry	0.00	0.00	0.00		
Industrial Park	91.12	91.12	91.12	1,446,111	1,446,111
Total	91.12	91.12	91.12	1,446,111	1,446,111

4.3 Trip Type Information

	Miles			Trip %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW
General Light Industry	14.70	6.60	6.60	59.00	28.00	13.00
Industrial Park	50.00	10.00	10.00	84.00	16.00	0.00

5.0 Energy Detail

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Electricity Mitigated						0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Electricity Unmitigated						0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NaturalGas Mitigated	0.00	0.00	0.00	0.00		0.00	0.00		0.00	0.00	0.00	2.61	2.61	0.00	0.00	2.63
NaturalGas Unmitigated	0.00	0.00	0.00	0.00		0.00	0.00		0.00	0.00	0.00	2.61	2.61	0.00	0.00	2.63
Total	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU	tons/yr										MT/yr					
General Light Industry	0	0.00	0.00	0.00	0.00		0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Industrial Park	48910	0.00	0.00	0.00	0.00		0.00	0.00		0.00	0.00	0.00	2.61	2.61	0.00	0.00	2.63
Total		**0.00**	**0.00**	**0.00**	**0.00**		**0.00**	**0.00**		**0.00**	**0.00**	**0.00**	**2.61**	**2.61**	**0.00**	**0.00**	**2.63**

5.2 Energy by Land Use - NaturalGas

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU	tons/yr										MT/yr					
General Light Industry	0	0.00	0.00	0.00	0.00		0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Industrial Park	48910	0.00	0.00	0.00	0.00		0.00	0.00		0.00	0.00	0.00	2.61	2.61	0.00	0.00	2.63
Total		**0.00**	**0.00**	**0.00**	**0.00**		**0.00**	**0.00**		**0.00**	**0.00**	**0.00**	**2.61**	**2.61**	**0.00**	**0.00**	**2.63**

5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	ROG	NOx	CO	SO2	Total CO2	CH4	N2O	CO2e
Land Use	kWh	tons/yr				MT/yr			
General Light Industry	0					0.00	0.00	0.00	0.00
Industrial Park	0					0.00	0.00	0.00	0.00
Total						**0.00**	**0.00**	**0.00**	**0.00**

5.3 Energy by Land Use - Electricity

Mitigated

	Electricity Use	ROG	NOx	CO	SO2	Total CO2	CH4	N2O	CO2e
Land Use	kWh	tons/yr				MT/yr			
General Light Industry	0					0.00	0.00	0.00	0.00
Industrial Park	0					0.00	0.00	0.00	0.00
Total						**0.00**	**0.00**	**0.00**	**0.00**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	0.07	0.00	0.00	0.00		0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Unmitigated	0.07	0.00	0.00	0.00		0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.02					0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Consumer Products	0.05					0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Landscaping	0.00	0.00	0.00	0.00		0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	**0.07**	**0.00**	**0.00**	**0.00**		**0.00**	**0.00**		**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.02					0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Consumer Products	0.05					0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Landscaping	0.00	0.00	0.00	0.00		0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	**0.07**	**0.00**	**0.00**	**0.00**		**0.00**	**0.00**		**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

7.0 Water Detail

7.1 Mitigation Measures Water

	ROG	NOx	CO	SO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr				MT/yr			
Mitigated					6.93	0.02	0.00	7.40
Unmitigated					6.93	0.02	0.00	7.40
Total	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**

7.2 Water by Land Use

<u>Unmitigated</u>

	Indoor/Outdoor Use	ROG	NOx	CO	SO2	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	tons/yr				MT/yr			
General Light Industry	0 / 1.575					5.09	0.00	0.00	5.12
Industrial Park	0.48545 / 0					1.84	0.01	0.00	2.28
Total						**6.93**	**0.01**	**0.00**	**7.40**

7.2 Water by Land Use

Mitigated

	Indoor/Outdoor Use	ROG	NOx	CO	SO2	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	tons/yr				MT/yr			
General Light Industry	0 / 1.575					5.09	0.00	0.00	5.12
Industrial Park	0.48545 / 0					1.84	0.01	0.00	2.28
Total						**6.93**	**0.01**	**0.00**	**7.40**

8.0 Waste Detail

8.1 Mitigation Measures Waste

Category/Year

	ROG	NOx	CO	SO2	Total CO2	CH4	N2O	CO2e
	tons/yr				MT/yr			
Mitigated					33.48	1.98	0.00	75.02
Unmitigated					33.48	1.98	0.00	75.02
Total	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	ROG	NOx	CO	SO2	Total CO2	CH4	N2O	CO2e
Land Use	tons	tons/yr				MT/yr			
General Light Industry	0					0.00	0.00	0.00	0.00
Industrial Park	164.92					33.48	1.98	0.00	75.02
Total						**33.48**	**1.98**	**0.00**	**75.02**

Mitigated

	Waste Disposed	ROG	NOx	CO	SO2	Total CO2	CH4	N2O	CO2e
Land Use	tons	tons/yr				MT/yr			
General Light Industry	0					0.00	0.00	0.00	0.00
Industrial Park	164.92					33.48	1.98	0.00	75.02
Total						**33.48**	**1.98**	**0.00**	**75.02**

9.0 Vegetation

Soda Mountain - Water Trucks

San Bernardino-Mojave Desert County, Summer

Peak Daily Emission Modeling

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric
General Light Industry	108551.52	1000sqft
Industrial Park	13.4	1000sqft

1.2 Other Project Characteristics

Urbanization Rural

Wind Speed (m/s) 2.6

Utility Company Southern California Edison

Climate Zone 10

Precipitation Freq (Days) 32

1.3 User Entered Comments

Project Characteristics -

Land Use - Water Truck Emissions

Construction Phase - Water Truck Data - All Phase

Off-road Equipment - Project equipment data

Off-road Equipment - Water Truck Data - No Equipment

Trips and VMT - Water Truck Data

On-road Fugitive Dust - Paved roads for trucks - 90%

Grading - Water Truck Data - No Grading

Vehicle Trips - Water Truck Data - Operations

Vechicle Emission Factors - Water trucks HHD: 100%

Vechicle Emission Factors - Water trucks HHD: 100%

Vechicle Emission Factors - Water trucks HHD: 100%

Road Dust - Paved roads- peak daily: 90%

Energy Use - Water Truck Data - No Energy Use

Water And Wastewater - Water Truck Data

Solid Waste - Water Truck Data - No Solid Waste

Construction Off-road Equipment Mitigation - Project mitigation measures

Consumer Products - No consumer product

Area Coating - No architectural coating

Landscape Equipment - No Landscaping

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2014	0.00	0.03	0.01	0.00	88.94	0.00	88.94	8.81	0.00	8.81	0.00	4.32	0.00	0.00	0.00	4.32
2015	0.00	0.03	0.01	0.00	88.94	0.00	88.94	8.81	0.00	8.81	0.00	4.32	0.00	0.00	0.00	4.32
2016	0.00	0.02	0.01	0.00	88.94	0.00	88.94	8.81	0.00	8.81	0.00	4.32	0.00	0.00	0.00	4.32
Total	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2014	0.00	0.03	0.01	0.00	30.38	0.00	30.38	2.96	0.00	2.96	0.00	4.32	0.00	0.00	0.00	4.32
2015	0.00	0.03	0.01	0.00	30.38	0.00	30.38	2.96	0.00	2.96	0.00	4.32	0.00	0.00	0.00	4.32
2016	0.00	0.02	0.01	0.00	30.38	0.00	30.38	2.96	0.00	2.96	0.00	4.32	0.00	0.00	0.00	4.32
Total	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	0.00	0.00	0.00	0.00		0.00	0.00		0.00	0.00		0.00		0.00		0.00
Energy	0.00	0.00	0.00	0.00		0.00	0.00		0.00	0.00		0.00		0.00	0.00	0.00
Mobile	0.38	4.95	1.89	0.01	14.00	0.17	14.17	1.39	0.17	1.56		800.93		0.01		801.23
Total	**0.38**	**4.95**	**1.89**	**0.01**	**14.00**	**0.17**	**14.17**	**1.39**	**0.17**	**1.56**		**800.93**		**0.01**	**0.00**	**801.23**

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	0.00	0.00	0.00	0.00		0.00	0.00		0.00	0.00		0.00		0.00		0.00
Energy	0.00	0.00	0.00	0.00		0.00	0.00		0.00	0.00		0.00		0.00	0.00	0.00
Mobile	0.38	4.95	1.89	0.01	14.00	0.17	14.17	1.39	0.17	1.56		800.93		0.01		801.23
Total	**0.38**	**4.95**	**1.89**	**0.01**	**14.00**	**0.17**	**14.17**	**1.39**	**0.17**	**1.56**		**800.93**		**0.01**	**0.00**	**801.23**

3.0 Construction Detail

3.1 Mitigation Measures Construction

Water Exposed Area

Water Unpaved Roads

Reduce Vehicle Speed on Unpaved Roads

3.2 Water Truck Use - 2014

<u>Unmitigated Construction On-Site</u>

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.00	0.00	0.00	0.00	0.00	0.00						0.00
Off-Road	0.00	0.00	0.00	0.00		0.00	0.00		0.00	0.00		0.00		0.00		0.00
Total	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**		**0.00**		**0.00**		**0.00**

3.2 Water Truck Use - 2014

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.00	0.03	0.01	0.00	88.94	0.00	88.94	8.81	0.00	8.81		4.32		0.00		4.32
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00		0.00		0.00
Worker	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00		0.00		0.00
Total	**0.00**	**0.03**	**0.01**	**0.00**	**88.94**	**0.00**	**88.94**	**8.81**	**0.00**	**8.81**		**4.32**		**0.00**		**4.32**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.00	0.00	0.00	0.00	0.00	0.00						0.00
Off-Road	0.00	0.00	0.00	0.00		0.00	0.00		0.00	0.00	0.00	0.00		0.00		0.00
Total	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**		**0.00**		**0.00**

3.2 Water Truck Use - 2014

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.00	0.03	0.01	0.00	30.38	0.00	30.38	2.96	0.00	2.96		4.32		0.00		4.32
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00		0.00		0.00
Worker	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00		0.00		0.00
Total	**0.00**	**0.03**	**0.01**	**0.00**	**30.38**	**0.00**	**30.38**	**2.96**	**0.00**	**2.96**		**4.32**		**0.00**		**4.32**

3.2 Water Truck Use - 2015

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.00	0.00	0.00	0.00	0.00	0.00						0.00
Off-Road	0.00	0.00	0.00	0.00		0.00	0.00		0.00	0.00		0.00		0.00		0.00
Total	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**		**0.00**		**0.00**		**0.00**

3.2 Water Truck Use - 2015

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.00	0.03	0.01	0.00	88.94	0.00	88.94	8.81	0.00	8.81		4.32		0.00		4.32
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00		0.00		0.00
Worker	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00		0.00		0.00
Total	**0.00**	**0.03**	**0.01**	**0.00**	**88.94**	**0.00**	**88.94**	**8.81**	**0.00**	**8.81**		**4.32**		**0.00**		**4.32**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.00	0.00	0.00	0.00	0.00	0.00						0.00
Off-Road	0.00	0.00	0.00	0.00		0.00	0.00		0.00	0.00	0.00	0.00		0.00		0.00
Total	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**		**0.00**		**0.00**

3.2 Water Truck Use - 2015

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.00	0.03	0.01	0.00	30.38	0.00	30.38	2.96	0.00	2.96		4.32		0.00		4.32
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00		0.00		0.00
Worker	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00		0.00		0.00
Total	**0.00**	**0.03**	**0.01**	**0.00**	**30.38**	**0.00**	**30.38**	**2.96**	**0.00**	**2.96**		**4.32**		**0.00**		**4.32**

3.2 Water Truck Use - 2016

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.00	0.00	0.00	0.00	0.00	0.00						0.00
Off-Road	0.00	0.00	0.00	0.00		0.00	0.00		0.00	0.00		0.00		0.00		0.00
Total	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**		**0.00**		**0.00**		**0.00**

3.2 Water Truck Use - 2016

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.00	0.02	0.01	0.00	88.94	0.00	88.94	8.81	0.00	8.81		4.32		0.00		4.32
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00		0.00		0.00
Worker	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00		0.00		0.00
Total	**0.00**	**0.02**	**0.01**	**0.00**	**88.94**	**0.00**	**88.94**	**8.81**	**0.00**	**8.81**		**4.32**		**0.00**		**4.32**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.00	0.00	0.00	0.00	0.00	0.00						0.00
Off-Road	0.00	0.00	0.00	0.00		0.00	0.00		0.00	0.00	0.00	0.00		0.00		0.00
Total	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**		**0.00**		**0.00**

3.2 Water Truck Use - 2016

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.00	0.02	0.01	0.00	30.38	0.00	30.38	2.96	0.00	2.96		4.32		0.00		4.32
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00		0.00		0.00
Worker	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00		0.00		0.00
Total	**0.00**	**0.02**	**0.01**	**0.00**	**30.38**	**0.00**	**30.38**	**2.96**	**0.00**	**2.96**		**4.32**		**0.00**		**4.32**

4.0 Mobile Detail

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	0.38	4.95	1.89	0.01	14.00	0.17	14.17	1.39	0.17	1.56		800.93		0.01		801.23
Unmitigated	0.38	4.95	1.89	0.01	14.00	0.17	14.17	1.39	0.17	1.56		800.93		0.01		801.23
Total	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
General Light Industry	0.00	0.00	0.00		
Industrial Park	22.11	0.00	0.00	48,156	48,156
Total	22.11	0.00	0.00	48,156	48,156

4.3 Trip Type Information

	Miles			Trip %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW
General Light Industry	14.70	6.60	6.60	59.00	28.00	13.00
Industrial Park	14.70	10.00	6.60	0.00	100.00	0.00

5.0 Energy Detail

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
NaturalGas Mitigated	0.00	0.00	0.00	0.00		0.00	0.00		0.00	0.00		0.00		0.00	0.00	0.00
NaturalGas Unmitigated	0.00	0.00	0.00	0.00		0.00	0.00		0.00	0.00		0.00		0.00	0.00	0.00
Total	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**

5.2 Energy by Land Use - NaturalGas

<u>Unmitigated</u>

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU	lb/day										lb/day					
General Light Industry	0	0.00	0.00	0.00	0.00		0.00	0.00		0.00	0.00		0.00		0.00	0.00	0.00
Industrial Park	0	0.00	0.00	0.00	0.00		0.00	0.00		0.00	0.00		0.00		0.00	0.00	0.00
Total		**0.00**	**0.00**	**0.00**	**0.00**		**0.00**	**0.00**		**0.00**	**0.00**		**0.00**		**0.00**	**0.00**	**0.00**

5.2 Energy by Land Use - NaturalGas

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU	lb/day										lb/day					
General Light Industry	0	0.00	0.00	0.00	0.00		0.00	0.00		0.00	0.00		0.00		0.00	0.00	0.00
Industrial Park	0	0.00	0.00	0.00	0.00		0.00	0.00		0.00	0.00		0.00		0.00	0.00	0.00
Total		**0.00**	**0.00**	**0.00**	**0.00**		**0.00**	**0.00**		**0.00**	**0.00**		**0.00**		**0.00**	**0.00**	**0.00**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	0.00	0.00	0.00	0.00		0.00	0.00		0.00	0.00		0.00		0.00		0.00
Unmitigated	0.00	0.00	0.00	0.00		0.00	0.00		0.00	0.00		0.00		0.00		0.00
Total	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.00					0.00	0.00		0.00	0.00						0.00
Landscaping	0.00	0.00	0.00	0.00		0.00	0.00		0.00	0.00		0.00		0.00		0.00
Total	**0.00**	**0.00**	**0.00**	**0.00**		**0.00**	**0.00**		**0.00**	**0.00**		**0.00**		**0.00**		**0.00**

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.00					0.00	0.00		0.00	0.00						0.00
Landscaping	0.00	0.00	0.00	0.00		0.00	0.00		0.00	0.00		0.00		0.00		0.00
Total	**0.00**	**0.00**	**0.00**	**0.00**		**0.00**	**0.00**		**0.00**	**0.00**		**0.00**		**0.00**		**0.00**

7.0 Water Detail

7.1 Mitigation Measures Water

8.0 Waste Detail

8.1 Mitigation Measures Waste

9.0 Vegetation

Soda Mountain - Water Trucks

San Bernardino-Mojave Desert County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric
General Light Industry	108551.52	1000sqft
Industrial Park	13.4	1000sqft

1.2 Other Project Characteristics

Urbanization	Rural	**Wind Speed (m/s)**	2.6	**Utility Company**	Southern California Edison
Climate Zone	10	**Precipitation Freq (Days)**	32		

1.3 User Entered Comments

Project Characteristics -

Land Use - Water Truck Emissions

Construction Phase - Water Truck Data - All Phase

Off-road Equipment - Project equipment data

Off-road Equipment - Water Truck Data - No Equipment

Trips and VMT - Water Truck Data

On-road Fugitive Dust - Paved roads for trucks - 90%

Grading - Water Truck Data - No Grading

Vehicle Trips - Water Truck Data - Operations

Vechicle Emission Factors - Water trucks HHD: 100%

Vechicle Emission Factors - Water trucks HHD: 100%

Vechicle Emission Factors - Water trucks HHD: 100%

Road Dust - Paved roads- peak daily: 90%

Energy Use - Water Truck Data - No Energy Use

Water And Wastewater - Water Truck Data

Solid Waste - Water Truck Data - No Solid Waste

Construction Off-road Equipment Mitigation - Project mitigation measures

Consumer Products - No consumer product

Area Coating - No architectural coating

Landscape Equipment - No Landscaping

2.0 Emissions Summary

2.1 Overall Construction

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2014	0.00	0.00	0.00	0.00	6.41	0.00	6.41	0.64	0.00	0.64	0.00	0.31	0.31	0.00	0.00	0.31
2015	0.00	0.00	0.00	0.00	12.70	0.00	12.70	1.26	0.00	1.26	0.00	0.61	0.61	0.00	0.00	0.61
2016	0.00	0.00	0.00	0.00	5.39	0.00	5.40	0.53	0.00	0.53	0.00	0.26	0.26	0.00	0.00	0.26
Total	**0.00**	**0.00**	**0.00**	**0.00**	**24.50**	**0.00**	**24.51**	**2.43**	**0.00**	**2.43**	**0.00**	**1.18**	**1.18**	**0.00**	**0.00**	**1.18**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2014	0.00	0.00	0.00	0.00	2.19	0.00	2.19	0.21	0.00	0.21	0.00	0.31	0.31	0.00	0.00	0.31
2015	0.00	0.00	0.00	0.00	4.34	0.00	4.34	0.42	0.00	0.42	0.00	0.61	0.61	0.00	0.00	0.61
2016	0.00	0.00	0.00	0.00	1.84	0.00	1.84	0.18	0.00	0.18	0.00	0.26	0.26	0.00	0.00	0.26
Total	**0.00**	**0.00**	**0.00**	**0.00**	**8.37**	**0.00**	**8.37**	**0.81**	**0.00**	**0.81**	**0.00**	**1.18**	**1.18**	**0.00**	**0.00**	**1.18**

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	0.00					0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Energy	0.00	0.00	0.00	0.00		0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mobile	0.05	0.63	0.28	0.00	1.82	0.02	1.84	0.18	0.02	0.20	0.00	93.80	93.80	0.00	0.00	93.84
Waste						0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Water						0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	**0.05**	**0.63**	**0.28**	**0.00**	**1.82**	**0.02**	**1.84**	**0.18**	**0.02**	**0.20**	**0.00**	**93.80**	**93.80**	**0.00**	**0.00**	**93.84**

2.2 Overall Operational

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	0.00					0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Energy	0.00	0.00	0.00	0.00		0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mobile	0.05	0.63	0.28	0.00	1.82	0.02	1.84	0.18	0.02	0.20	0.00	93.80	93.80	0.00	0.00	93.84
Waste						0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Water						0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	**0.05**	**0.63**	**0.28**	**0.00**	**1.82**	**0.02**	**1.84**	**0.18**	**0.02**	**0.20**	**0.00**	**93.80**	**93.80**	**0.00**	**0.00**	**93.84**

3.0 Construction Detail

3.1 Mitigation Measures Construction

Water Exposed Area

Water Unpaved Roads

Reduce Vehicle Speed on Unpaved Roads

3.2 Water Truck Use - 2014

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Off-Road	0.00	0.00	0.00	0.00		0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.00	0.00	0.00	0.00	6.41	0.00	6.41	0.64	0.00	0.64	0.00	0.31	0.31	0.00	0.00	0.31
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Worker	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	**0.00**	**0.00**	**0.00**	**0.00**	**6.41**	**0.00**	**6.41**	**0.64**	**0.00**	**0.64**	**0.00**	**0.31**	**0.31**	**0.00**	**0.00**	**0.31**

3.2 Water Truck Use - 2014

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Off-Road	0.00	0.00	0.00	0.00		0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.00	0.00	0.00	0.00	2.19	0.00	2.19	0.21	0.00	0.21	0.00	0.31	0.31	0.00	0.00	0.31
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Worker	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	**0.00**	**0.00**	**0.00**	**0.00**	**2.19**	**0.00**	**2.19**	**0.21**	**0.00**	**0.21**	**0.00**	**0.31**	**0.31**	**0.00**	**0.00**	**0.31**

3.2 Water Truck Use - 2015

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Off-Road	0.00	0.00	0.00	0.00		0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.00	0.00	0.00	0.00	12.70	0.00	12.70	1.26	0.00	1.26	0.00	0.61	0.61	0.00	0.00	0.61
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Worker	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	**0.00**	**0.00**	**0.00**	**0.00**	**12.70**	**0.00**	**12.70**	**1.26**	**0.00**	**1.26**	**0.00**	**0.61**	**0.61**	**0.00**	**0.00**	**0.61**

3.2 Water Truck Use - 2015

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Off-Road	0.00	0.00	0.00	0.00		0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.00	0.00	0.00	0.00	4.34	0.00	4.34	0.42	0.00	0.42	0.00	0.61	0.61	0.00	0.00	0.61
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Worker	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	**0.00**	**0.00**	**0.00**	**0.00**	**4.34**	**0.00**	**4.34**	**0.42**	**0.00**	**0.42**	**0.00**	**0.61**	**0.61**	**0.00**	**0.00**	**0.61**

3.2 Water Truck Use - 2016

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Off-Road	0.00	0.00	0.00	0.00		0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.00	0.00	0.00	0.00	5.39	0.00	5.40	0.53	0.00	0.53	0.00	0.26	0.26	0.00	0.00	0.26
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Worker	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	**0.00**	**0.00**	**0.00**	**0.00**	**5.39**	**0.00**	**5.40**	**0.53**	**0.00**	**0.53**	**0.00**	**0.26**	**0.26**	**0.00**	**0.00**	**0.26**

3.2 Water Truck Use - 2016

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Off-Road	0.00	0.00	0.00	0.00		0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.00	0.00	0.00	0.00	1.84	0.00	1.84	0.18	0.00	0.18	0.00	0.26	0.26	0.00	0.00	0.26
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Worker	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	**0.00**	**0.00**	**0.00**	**0.00**	**1.84**	**0.00**	**1.84**	**0.18**	**0.00**	**0.18**	**0.00**	**0.26**	**0.26**	**0.00**	**0.00**	**0.26**

4.0 Mobile Detail

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	0.05	0.63	0.28	0.00	1.82	0.02	1.84	0.18	0.02	0.20	0.00	93.80	93.80	0.00	0.00	93.84
Unmitigated	0.05	0.63	0.28	0.00	1.82	0.02	1.84	0.18	0.02	0.20	0.00	93.80	93.80	0.00	0.00	93.84
Total	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
General Light Industry	0.00	0.00	0.00		
Industrial Park	22.11	0.00	0.00	48,156	48,156
Total	22.11	0.00	0.00	48,156	48,156

4.3 Trip Type Information

	Miles			Trip %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW
General Light Industry	14.70	6.60	6.60	59.00	28.00	13.00
Industrial Park	14.70	10.00	6.60	0.00	100.00	0.00

5.0 Energy Detail

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Electricity Mitigated						0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Electricity Unmitigated						0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NaturalGas Mitigated	0.00	0.00	0.00	0.00		0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NaturalGas Unmitigated	0.00	0.00	0.00	0.00		0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU	tons/yr										MT/yr					
General Light Industry	0	0.00	0.00	0.00	0.00		0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Industrial Park	0	0.00	0.00	0.00	0.00		0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		**0.00**	**0.00**	**0.00**	**0.00**		**0.00**	**0.00**		**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU	tons/yr										MT/yr					
General Light Industry	0	0.00	0.00	0.00	0.00		0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Industrial Park	0	0.00	0.00	0.00	0.00		0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		**0.00**	**0.00**	**0.00**	**0.00**		**0.00**	**0.00**		**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	ROG	NOx	CO	SO2	Total CO2	CH4	N2O	CO2e
Land Use	kWh	tons/yr				MT/yr			
General Light Industry	0					0.00	0.00	0.00	0.00
Industrial Park	0					0.00	0.00	0.00	0.00
Total						**0.00**	**0.00**	**0.00**	**0.00**

Mitigated

	Electricity Use	ROG	NOx	CO	SO2	Total CO2	CH4	N2O	CO2e
Land Use	kWh	tons/yr				MT/yr			
General Light Industry	0					0.00	0.00	0.00	0.00
Industrial Park	0					0.00	0.00	0.00	0.00
Total						**0.00**	**0.00**	**0.00**	**0.00**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	0.00					0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Unmitigated	0.00					0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.00					0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Landscaping						0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	**0.00**					**0.00**	**0.00**		**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

6.2 Area by SubCategory

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.00					0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Landscaping						0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	**0.00**					**0.00**	**0.00**		**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

7.0 Water Detail

7.1 Mitigation Measures Water

	ROG	NOx	CO	SO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr				MT/yr			
Mitigated					0.00	0.00	0.00	0.00
Unmitigated					0.00	0.00	0.00	0.00
Total	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**

7.2 Water by Land Use

Unmitigated

	Indoor/Outdoor Use	ROG	NOx	CO	SO2	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	tons/yr				MT/yr			
General Light Industry	0 / 0					0.00	0.00	0.00	0.00
Industrial Park	0 / 0					0.00	0.00	0.00	0.00
Total						**0.00**	**0.00**	**0.00**	**0.00**

Mitigated

	Indoor/Outdoor Use	ROG	NOx	CO	SO2	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	tons/yr				MT/yr			
General Light Industry	0 / 0					0.00	0.00	0.00	0.00
Industrial Park	0 / 0					0.00	0.00	0.00	0.00
Total						**0.00**	**0.00**	**0.00**	**0.00**

8.0 Waste Detail

8.1 Mitigation Measures Waste

Category/Year

	ROG	NOx	CO	SO2	Total CO2	CH4	N2O	CO2e
	tons/yr				MT/yr			
Mitigated					0.00	0.00	0.00	0.00
Unmitigated					0.00	0.00	0.00	0.00
Total	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	ROG	NOx	CO	SO2	Total CO2	CH4	N2O	CO2e
Land Use	tons	tons/yr				MT/yr			
General Light Industry	0					0.00	0.00	0.00	0.00
Industrial Park	0					0.00	0.00	0.00	0.00
Total						**0.00**	**0.00**	**0.00**	**0.00**

8.2 Waste by Land Use

Mitigated

	Waste Disposed	ROG	NOx	CO	SO2	Total CO2	CH4	N2O	CO2e
Land Use	tons	tons/yr				MT/yr			
General Light Industry	0					0.00	0.00	0.00	0.00
Industrial Park	0					0.00	0.00	0.00	0.00
Total						**0.00**	**0.00**	**0.00**	**0.00**

9.0 Vegetation