DRAFT ENVIRONMENTAL IMPACT STATEMENT

FOR THE

SILVER STATE SOLAR ENERGY PROJECT
(NVN-085077)

Prepared for and under the Direction of:
Bureau of Land Management
Las Vegas Field Office

Prepared by:

Ecology and Environment, Inc.

On Behalf of:
NextLight Renewable Power, LLC

April 2010

BLM/NV/LV/ES-10/21+1793

BLM Mission Statement

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

BLM/NV/LV/ES-10/21+1793

DOI No. DES 10-21

United States Department of the Interior

BUREAU OF LAND MANAGEMENT
Southern Nevada District Office
4701 N. Torrey Pines Drive
Las Vegas, NV 89130
http://www.blm.gov/nv/st/en/fo/lvfo.1.html

In Reply Refer To:
N-085077
2800 (NVS3100)

Dear Reader:
Enclosed for your review and comment is the Draft Environmental Impact Statement (EIS) for the Silver State Solar Project. The Bureau of Land Management (BLM) Renewable Energy Coordinating Office has prepared this Draft EIS in response to a right-of-way application submitted by NextLight Renewable Power, LLC to construct and operate a 400-megawatt photovoltaic solar plant and associated facilities on public lands approximately 2 miles east of Primm, in southern Clark County, Nevada. Cooperating Agencies for this Draft EIS include the Department of Defense, Clark County Department of Aviation, Southern Nevada Water Authority, Nevada Department of Transportation, Nevada Department of Wildlife, and Clark County. The purpose of this review is to assist BLM in its decision-making process with respect to the requested right-of-way.

This Draft EIS considers the expected environmental effects associated with granting the right-of-way on public land and subsequent construction and operation of the Silver State Solar Project. The BLM is interested in your review and comment on the accuracy and completeness of this document. The Silver State Solar Project Draft EIS will be available for review for 45 calendar days from the date the U.S. Environmental Protection Agency publishes the Notice of Availability in the Federal Register.

The BLM intends to hold public meetings in Nevada during the 45-day comment period. The BLM will announce all public meeting times and locations at least 15 days in advance through public notices, media news releases, or mailings. In addition, information will be posted online at the BLM website: http://www.blm.gov/nv/st/en.html. The DEIS will be available on the internet at http://blm.gov/nv/st/en/fo/lvfo/blm_programs/energy.html, as well as in the public room in the BLM Southern Nevada District Office.

Comments should be sent to:

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A Final EIS will be prepared that will consider comments received during the 45-day comment period.
For more information, please contact Greg Helseth at (702) 515–5173.

Environmental Impact Statement
for the Silver State Solar Energy Project

(X) Draft **( ) Final**

Lead Agency:	United States Department of the Interior Bureau of Land Management
Agencies Consulted:	U.S. Fish and Wildlife Service National Park Service Department of Defense U.S. Army Corps of Engineers Nevada Department of Wildlife Nevada State Historic Preservation Office Southern Nevada Water Authority Clark County Department of Aviation Clark County
Counties Directly Affected:	Clark County, Nevada

Environmental Impact Statement Contact:

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Date Draft EIS filed with U.S. Environmental Protection Agency: _____

Abstract

The Bureau of Land Management (BLM) Renewable Energy Coordinating Office has prepared this Draft Environmental Impact Statement (EIS) in response to a right-of-way application submitted by NextLight Renewable Power, LLC (Applicant or Proponent) to construct and operate the Silver State Solar Project. The proposed project would be located on BLM-administered lands, approximately 2 miles east of Primm, in Clark County, Nevada.

The Proponent is proposing to construct a concentrated solar thermal parabolic trough power plant facility approximately 2 miles southeast of Primm, NV, in Clark County. The facility is expected to operate for approximately 50 years. The proposed project would utilize solar photovoltaic technology, to produce 400 megawatts (MW) of renewable energy. The solar field and infrastructure would consist of single-axis tracker systems or fixed panels, underground and

overhead electrical power collection system, two step-up transformers, 230kV and 220kV transmission lines, an operation and maintenance (O&M) area, switchyard, paved access and maintenance roads, flood and drainage controls and a fire break.

Three alternatives were analyzed, including the no action alternative (Alternative 1) and two action alternatives. Alternative 2 is the Proponent's proposed action and would disturb up to 2,967 acres of land and would include the use of berms to reduce erosion. Alternative 3 would disturb up to 4,818 acres of land and would employ an alternate drainage and flood control design to control erosion. These acreages include temporary disturbance during construction. The permanent disturbance would be 2863 and 3216 acres, respectively. Alternative 2 is BLM's preferred alternative. Both action alternatives would use solar PV technology, although the specific types of arrays and trackers have not been determined at this time. The DEIS describes the different types of solar arrays and trackers and their respective impacts.

This Draft EIS considers the expected environmental effects associated with granting a right-of-way on public land and subsequent construction and operation of the proposed Project. The BLM will use the EIS, when rendering a decision about granting the requested right-of-way. The BLM's decision will be to grant, grant with modifications, or deny the request for right-of-way through public lands administered by the BLM. This Draft EIS satisfies the requirements of the National Environmental Policy Act, which mandates that federal agencies analyze the environmental consequences of major federal actions.

Official responsible for the environmental impact statement:

Robert B. Ross Jr.	4/6/10 Date

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Table of Contents

List of Tables xiii

List of Figures xvii

EXECUTIVE SUMMARY ES-1

1 PURPOSE AND NEED 1-1

1.1 Purpose and Need for the Proposed Action 1-1

1.1.1 BLM's Purpose and Need for the Proposed Action 1-1

1.1.1.1 Purpose 1-1

1.1.1.2 Need 1-1

1.1.2 Proponent's Objective for the Proposed Action 1-4

1.2 About This Document 1-5

1.3 Summary of Public Scoping and Issue Identification 1-6

1.3.1 Public Scoping Process 1-6

1.4 Policies and Programs 1-6

1.4.1 Relationship to Federal Policies, Plans, and Programs 1-6

1.4.1.1 General 1-6

1.4.1.2 Air Quality and Climate 1-7

1.4.1.3 Soils 1-9

1.4.1.4 Water Resources/Hydrology 1-9

1.4.1.5 Biological Resources 1-10

1.4.1.6 Cultural and Historic Resources 1-12

1.4.1.7 Paleontological Resources 1-14

1.4.1.8 Lands and Realty 1-14

1.4.1.9 Special Management Areas 1-15

1.4.1.10 Visual Resources 1-15

1.4.1.11 Human Health and Safety/Hazardous Materials 1-16

1.4.1.12 Energy and Minerals 1-18
1.4.2 Relationship to State and Local Plans, Policies, and Programs 1-19
1.4.2.1 Air Resources-Local 1-19
1.4.2.2 Noise – Local 1-20
1.4.2.3 Water Resources – State 1-22
1.4.2.4 Water Resources – Local 1-21
1.4.2.5 Special Status Species – State 1-21
1.4.2.6 Special Status Species – Local 1-22
1.4.2.7 Cultural Resources – State 1-23
1.4.2.8 Paleontology – State 1-23
1.4.2.9 Lands and Realty – Local 1-23
1.4.2.10 Human Health and Safety/Hazardous Materials – State 1-24
1.4.2.11 Human Health and Safety/Hazardous Materials – Local 1-25

1.5 Decisions to be Made 1-26

1.6 NEPA Process 1-27

1.7 Land Use Plan Conformance Determination 1-27

2 DESCRIPTION OF THE PROPOSED ACTION AND ALTERNATIVES 2-1

2.1 Introduction 2-1

2.2 Description of the Proposed Action and Alternatives 2-1

2.2.1 Alternatives Development 2-1
2.2.2 Alternatives Considered and Carried Forward for Detailed Analysis in the Environmental Impact Statement 2-1

2.3 Proposed Project Location and Setting 2-7

2.4 Technology Options 2-8

2.4.1 Tilted Tracker Option 2-8
2.4.2 Horizontal Tracker Option 2-11
2.4.3 Fixed Tilt Panel Option 2-14
2.4.4 Photovoltaic Technology Comparison 2-17

2.5 Proposed Project Components 2-18

2.5.1 Substations, Transmission Lines, and Interconnections 2-21

2.5.2 Electrical Components 2-23
2.5.3 Access Roads 2-24
2.5.4 Perimeter Fencing for Solar Field 2-25
2.5.5 Exterior Fire Break 2-25
2.5.6 Operations and Maintenance Area 2-25
2.5.7 Fire Protection System 2-25
2.5.8 Supervisory Control and Data Acquisition 2-26
2.5.9 Security 2-26
2.5.10 Lighting 2-26
2.5.11 Erosion Control and Stormwater Drainage (Earthen Berms) 2-26

2.6 Proposed Project Construction 2-29

2.6.1 Project Phasing 2-29
2.6.2 Site Access and Parking 2-29
2.6.3 Construction Workforce 2-29
2.6.4 Truck Trips and Deliveries 2-32
2.6.5 Construction Materials and Equipment 2-33
2.6.6 Construction Sequencing 2-34
2.6.7 Other Considerations for Construction of the Proposed Project 2-44

2.7 Proposed Project Operation and Maintenance 2-51

2.7.1 Operations Workforce 2-51
2.7.2 Operation and Maintenance Activities 2-52

2.8 Proposed Project Decommissioning 2-54

2.9 Federal, State, and Local Permitting 2-55

2.10 Comparison of Alternatives 2-55

3 AFFECTED ENVIRONMENT 3-1

3.1 Air Quality and Climate 3-2

3.1.1 Existing Ambient Air Quality 3-2
3.1.1.1 Air District Significance Thresholds 3-5
3.1.1.2 General Federal Actions 3-5
3.1.1.3 Existing Sources of Air Pollutants (Clark County 2008) 3-7
3.1.2 Climate Change 3-7
3.1.2.1 Potential Effects of Climate Change 3-8

3.1.2.2 Existing Greenhouse Gas Emissions 3-8
3.1.2.3 Federal Greenhouse Gas Guidance 3-10

3.2 Noise 3-10

3.2.1 Environmental Setting 3-10
3.2.2 Regional Setting 3-12
3.2.3 Local Setting 3-12

3.3 Geology, Topography, and Geologic Hazards 3-12

3.3.1 Topography 3-12
3.3.2 Geologic Setting 3-13
3.3.3 Seismicity 3-17
3.3.3.1 Faults 3-17
3.3.3.2 Earthquakes 3-17
3.3.3.3 Seismic Shaking 3-17
3.3.3.4 Landslides 3-19
3.3.3.5 Liquefaction 3-19

3.4 Soils 3-20

3.4.1 Tonopah-Arizo Association 3-20
3.4.2 Haleburu Association 3-20
3.4.3 Nippeno-Nipton Association 3-20
3.4.4 Erosion 3-21

3.5 Water Resources/Hydrology 3-22

3.5.1 Surface Water Resources 3-22
3.5.1.1 Surface Water Quality 3-24
3.5.1.2 Flooding 3-24
3.5.2 Groundwater Resources 3-25
3.5.2.1 Groundwater Quality 3-25
3.5.2.2 Water Use and Discharge 3-26
3.5.3 Jurisdictional Waters, Drainages, and Riparian Areas 3-26

3.6 Biological Resources 3-27

3.6.1 Vegetation 3-27
3.6.2 Wildlife 3-27
3.6.2.1 Survey Methodology 3-27
3.6.2.2 Wildlife Communities 3-28
3.6.3 Special Status Species 3-28
3.6.3.1 Plants 3-32

3.6.3.2 Reptiles ... 3-34
3.6.3.3 Mammals ... 3-40
3.6.3.4 Birds ... 3-42
3.6.4 Invasive Plants ... 3-45
3.6.5 Rangeland Resources ... 3-46
3.6.5.1 Regional Setting and Regulatory Framework ... 3-47
3.6.5.2 Current Conditions and Trends ... 3-50

3.7 Cultural Resources ... 3-52
3.7.1 Historic Background ... 3-52
3.7.2 Known Archaeological Resources ... 3-53
3.7.3 Tribal Consultation ... 3-55

3.8 Paleontological Resources ... 3-55
3.8.1 Existing Paleontological Resources ... 3-55
3.8.2 Assessment of Paleontological Potential ... 3-56

3.9 Lands and Realty ... 3-57
3.9.1 Utility Corridors and Rights-of-Way ... 3-57
3.9.2 Airports ... 3-59
3.9.3 Grazing Allotments ... 3-60
3.9.4 Mining Claims ... 3-60

3.10 Special Management Areas ... 3-60
3.10.1 Areas of Critical Environmental Concern ... 3-60
3.10.2 Desert Wildlife Management Areas ... 3-62
3.10.3 Special Recreation Management Areas ... 3-62
3.10.4 National Preserves ... 3-62
3.10.5 BLM Wilderness Areas ... 3-62

3.11 Recreation ... 3-63
3.11.1 Special Recreation Management Areas ... 3-63
3.11.2 Jean/Roach Lake Special Recreation Management Area ... 3-63
3.11.3 Special Recreation Permits and Off-Highway Vehicle Racing ... 3-64
3.11.4 Ivanpah Dry Lake Special Recreation Management Area ... 3-64

3.12 Visual Resources ... 3-66
3.12.1 Visual Resources Inventory ... 3-66
3.12.1.1 Visual Resource Contrast Rating ... 3-66
3.12.1.2 Distance Zone Mapping ... 3-67

3.12.1.3 Field Visits, Selection of Observation Points, and Modeling ... 3-68
3.12.1.4 Visual Contrast Rating ... 3-69
3.12.2 Existing Conditions ... 3-69
3.12.2.1 Regional Setting ... 3-69
3.12.2.2 Visual Resources Management Classes and Visual Sensitivity ... 3-70
3.12.2.3 Descriptions of KOPs and their Viewsheds ... 3-71

3.13 Transportation/Motorized Vehicle Access ... 3-83

3.13.1 Existing Traffic Volumes ... 3-83
3.13.2 Major Traffic Routes Within or Adjacent to the Proposed Project Site ... 3-84

3.14 Human Health and Safety/Hazardous Materials ... 3-86

3.14.1 Potential Hazardous Wastes/Contaminated Soil and Groundwater ... 3-86
3.14.2 Fire Hazards ... 3-88

3.15 Social and Economic Conditions ... 3-89

3.15.1 Social ... 3-89
3.15.1.1 Community Setting ... 3-89
3.15.1.2 Demographics and Social Trends ... 3-90
3.15.2 Economic ... 3-93
3.15.2.1 Economic Base and Trends: Employment, Earnings, and Income ... 3-93
3.15.2.2 Public Services and Utilities ... 3-100

3.16 Environmental Justice ... 3-102

3.16.1 Study Area ... 3-103
3.16.2 Minority Populations ... 3-103
3.16.3 Low-Income Populations ... 3-105
3.16.4 Surrounding Area ... 3-105

3.17 Energy and Minerals ... 3-107

3.17.1 (Fluid) Leasable Minerals ... 3-107
3.17.2 Locatable Minerals ... 3-107
3.17.3 Salable Mineral Resources ... 3-108

3.18 Fuels and Fire Management ... 3-109

3.18.1 Introduction and Methodology ... 3-109
3.18.2 Regional Setting and Regulatory Framework ... 3-109

3.18.2.1 Tortoise – Moderate Density (NV050-01) Fire Management Unit ... 3-109
3.18.2.2 Proposed Project Area ... 3-109
3.18.3 Current Conditions and Trends ... 3-109
3.18.3.1 Tortoise – Moderate Density (NV050-01) Fire Management Unit ... 3-110
3.18.3.2 Goodsprings-Primm (NV050-18) Fire Management Unit ... 3-112
3.18.3.3 Silver State Solar Project Area ... 3-112

3.19 Cumulative Scenario ... 3-112
3.19.1 Introduction ... 3-112
3.19.2 Cumulative Projects ... 3-112
3.19.2.1 Existing Projects ... 3-113
3.19.2.2 Foreseeable Renewable Projects ... 3-120
3.19.2.3 Other Foreseeable Projects ... 3-122

4 ENVIRONMENTAL CONSEQUENCES ... 4-1

4.1 Air Quality and Climate Impacts ... 4-3
4.1.1 Indicators ... 4-4
4.1.2 Direct and Indirect Effects by Alternative ... 4-4
4.1.3 Residual Effects ... 4-7

4.2 Noise Impacts ... 4-7
4.2.1 Indicators ... 4-7
4.2.2 Direct and Indirect Effects by Alternative ... 4-7
4.2.3 Residual Effects ... 4-15

4.3 Geology, Topography, and Geologic Hazards Impacts ... 4-15
4.3.1 Indicators ... 4-15
4.3.2 Direct and Indirect Effects by Alternative ... 4-15
4.3.3 Residual Effects ... 4-17

4.4 Soils Impacts ... 4-18
4.4.1 Indicators ... 4-18
4.4.2 Direct and Indirect Effects by Alternative ... 4-18
4.4.3 Residual Effects ... 4-20

4.5 Water Resources/Hydrology Impacts 4-20
4.5.1 Indicators 4-20
4.5.2 Direct and Indirect Effects by Alternative 4-20
4.5.3 Residual Effects 4-30

4.6 Biological Resources Impacts 4-31
4.6.1 Indicators – Biological Resources 4-35
4.6.2 Direct and Indirect Effects by Alternative – Vegetation 4-36
4.6.3 Residual Effects – Vegetation 4-40
4.6.4 Residual Effects – Sensitive Plant Species 4-42
4.6.5 Residual Effects – Wildlife 4-44
4.6.6 Residual Effects – Sensitive Wildlife Species 4-52
4.6.7 Indicators – Range 4-54
4.6.8 Direct and Indirect Effects by Alternative – Range 4-54
4.6.9 Mitigation Measures – Biological Resources 4-58

4.7 Cultural Resources Impacts 4-62
4.7.1 Indicators 4-62
4.7.2 Direct and Indirect Effects by Alternative 4-62
4.7.3 Residual Effects 4-64

4.8 Paleontological Resources Impacts 4-64
4.8.1 Indicators 4-64
4.8.2 Direct and Indirect Effects by Alternative 4-65
4.8.3 Residual Effects 4-66

4.9 Lands and Realty Impacts 4-66
4.9.1 Indicators 4-66
4.9.2 Direct and Indirect Effects by Alternative 4-67
4.9.3 Residual Effects 4-67

4.10 Special Management Areas Impacts 4-68
4.10.1 Indicators 4-68
4.10.2 Direct and Indirect Effects by Alternative 4-68
4.10.3 Residual Effects 4-70

4.11 Recreation Impacts 4-70
4.11.1 Indicators 4-70
4.11.2 Direct and Indirect Effects by Alternative 4-70
4.11.3 Residual Effects 4-73

4.12 Visual Resources Impacts 4-73
4.12.1 Indicators 4-73
4.12.2 Direct and Indirect Effects by Alternative 4-73
4.12.3 Residual Effects 4-83

4.13 Transportation/Motorized Vehicle Impacts 4-84
4.13.1 Indicators 4-84
4.13.2 Direct and Indirect Effects by Alternative 4-84
4.13.3 Residual Effects 4-87

4.14 Human Health and Safety/Hazardous Materials Impacts 4-87
4.14.1 Indicators 4-87
4.14.2 Direct and Indirect Effects by Alternative 4-88
4.14.3 Residual Effects 4-100

4.15 Social and Economic Impacts 4-100
4.15.1 Indicators 4-100
4.15.2 Direct and Indirect Effects by Alternative 4-101
4.15.3 Residual Effects 4-117

4.16 Environmental Justice Impacts 4-117
4.16.1 Indicators 4-117
4.16.2 Direct and Indirect Effects by Alternative 4-118
4.16.3 Residual Effects 4-121

4.17 Energy and Minerals Resources Impacts 4-121
4.17.1 Indicators 4-121
4.17.2 Direct and Indirect Effects by Alternative 4-121
4.17.3 Residual Effects 4-122

4.18 Fuels and Fire Management Impacts 4-123
4.18.1 Indicators 4-123
4.18.2 Direct and Indirect Effects by Alternative 4-124
4.18.3 Residual Effects 4-126

4.19 Cumulative Impacts 4-126
4.19.1 Air Quality and Climate 4-126
4.19.2 Noise 4-129
4.19.3 Geology, Topography, and Geologic Hazards 4-131
4.19.4 Soils 4-131

4.19.5 Water Resources/Hydrology 4-133
4.19.6 Biological Resources 4-137
4.19.7 Cultural Resources 4-142
4.19.8 Paleontology 4-142
4.19.9 Lands and Realty 4-143
4.19.10 Special Management Areas 4-143
4.19.11 Recreation 4-143
4.19.12 Visual Resources 4-145
4.19.13 Transportation/Motorized Vehicle Access 4-150
4.19.14 Human Health and Safety/Hazardous Materials 4-152
4.19.15 Socioeconomics 4-155
4.19.16 Environmental Justice 4-157
4.19.17 Energy and Minerals 4-158
4.19.18 Fuels and Fire Management 4-158

4.20 Other NEPA Requirements 4-158

4.20.1 Unavoidable Adverse Impacts and Irreversible and Irretrievable Commitments of Resources 4-158
4.20.1.1 Air Quality and Climate 4-159
4.20.1.2 Noise 4-159
4.20.1.3 Geology, Topography, and Geologic Hazards 4-159
4.20.1.4 Soils 4-159
4.20.1.5 Water Resources/Hydrology 4-160
4.20.1.6 Biological Resources 4-160
4.20.1.7 Cultural Resources 4-160
4.20.1.8 Paleontological Resources 4-160
4.20.1.9 Lands and Realty 4-161
4.20.1.10 Special Management Areas/Special Designations 4-161
4.20.1.11 Recreation 4-161
4.20.1.12 Visual Resources 4-161
4.20.1.13 Transportation and Traffic 4-161
4.20.1.14 Human Health and Safety/Hazardous Materials 4-162
4.20.1.15 Social and Economic Conditions 4-162
4.20.1.16 Environmental Justice 4-162
4.20.1.17 Energy and Minerals 4-162
4.20.1.18 Fuels and Fire Management 4-162
4.20.2 Relationship Between Short-Term Uses and Long-Term Productivity of the Environment 4-162

5 CONSULTATION AND COORDINATION 5-1

5.1 Public Participation Summary 5-1

5.1.1 Public Scoping Period..... 5-1
5.1.2 Scoping Meetings..... 5-1
5.1.3 Scoping Response 5-2
5.1.4 EIS Mailing List..... 5-7
5.1.5 Distribution of the Draft EIS..... 5-7
5.1.6 Final EIS Preparation and Distribution..... 5-7
5.1.7 Record of Decision 5-7

5.2 Consultation with Others 5-7

5.2.1 Federal, State, and Local Agencies..... 5-7
5.2.2 Non-Governmental Organizations 5-8
5.2.3 Native American Tribes..... 5-8

5.3 Names of Preparers 5-8

6 REFERENCES 6-1

7 ACRONYMS AND ABBREVIATIONS 7-1

APPENDICES

A Emissions Calculations

B Biological Mitigation Measures

C Visual Resources Contrast Rating Forms

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List of Tables

2 Description of the Proposed Action and Alternatives

2.2-1 Comparison of Alternative 2 and Alternative 3 2-5

2.2-2 Comparison of Solar Technologies Evaluated 2-6

2.3-1 Project Facilities by Legal Description 2-7

2.4-1 Solar Field Component Numbers – Tilted Trackers 2-11

2.4-2 Solar Field Component Numbers – Horizontal Trackers 2-14

2.4-3 Solar Field Component Numbers – Fixed Tilt Panels 2-14

2.4-4 Photovoltaic Technology Comparison 2-17

2.5-1 Proposed Project Facilities, Acreage, and Dimensions 2-20

2.6-1 Proposed Project Construction Phases 2-30

2.6-2 Truck Trips/Deliveries 2-32

2.6-3 Construction Equipment 2-33

2.6-4 Length and Area of Trenching Required for Each PV Technology 2-43

2.6-5 Wastes Generated during Construction 2-49

2.6-6 Wastes Potentially Generated by the Proposed Project 2-51

2.9-1 Federal, State, and Local Permits that may be Required for the Proposed Project 2-56

2.10-1 Comparison of Direct, Indirect, Mitigation Measures, and Cumulative Effects 2-66

3 Affected Environment

3.1-1 Major Criteria Air Pollutant Descriptions and Health Effects 3-3

3.1-2 State and Federal Ambient Air Quality Standards 3-4

3.1-3 Attainment Status in Clark County, Nevada 3-5

3.1-4 Regional Background Air Quality Concentrations in the Proposed Project Area 3-6

3.1-5 Exceedances of Air Quality Standards and Existing Maximum Concentrations near the Proposed Project Area 3-6

3.1-6 Nevada Greenhouse Gas Emissions ($MMTCO_2e$) 3-9

3.2-1 Typical Sound Levels Measured in the Environment and Industry 3-10

3.3-1 Proposed Project Site Surficial Geology, Presented in Descending Age Order 3-14

3.4-1 Summary of Soil Types and Limitations by Percent of the Proposed Project Site 3-21

3.6-1 Special Status Species with Potential to Occur in the Proposed Project Area 3-30

3.6-2 Status of Allotments Crossed by the Proposed Project Area 3-50

3.9-1 Existing Rights-of-Way within the Proposed Project Site 3-58

3.11-1 Recreation Areas in the Vicinity of the Proposed Project 3-63

3.12-1 VRM Degrees of Contrast and Criteria 3-67

3.12-2 Key Observation Points 3-71

3.13-1 Level of Service Classifications and Definitions 3-83

3.13-2 Routes Providing Direct or Indirect Access to the Proposed Project Site 3-84

3.13-3 Existing Traffic Volumes and Levels of Service 3-85

3.14.1 Mining Claims Located within the Proposed Project Area 3-87

3.14.2 Potentially Contaminated Sites in the Vicinity of the Proposed Project Area 3-87

3.14-3 Utility Crossings within the Proposed Project Boundary 3-89

3.15-1 Population Levels, Growth Rates, and Density 3-90

3.15-2 Housing Stock (2008 Number of Units by Housing Type) 3-91

3.15-3 Housing Stock Characteristics (2006 to 2008) 3-91

3.15-4 Labor Force, Employment, and Unemployment..... 3-94

3.15-5 Clark County Employment by Industry, Annual Total Wages, and Average Weekly Wage 3-96

3.15-6 Clark County Tourism Indicators 3-97

3.15-7 Measures of Income and Wealth..... 3-98

3.15-8 Clark County Revenues 2008 3-99

3.15-9 Fire Stations and Facilities in South County Planning Area..... 3-101

3.15-10 Public Service Locations in the Vicinity of the Project..... 3-102

3.16-1 Racial Composition and Percent Minority for the Study Area 3-104

3.16-2 Poverty Status for Geographic Comparison Areas 3-105

3.16-3 Percentage of American Indian and/or Alaska Native Populations near the Study Area..... 3-106

3.17-1 Locatable Mineral Resources Within 5 Miles of the Proposed Project Site 3-108

3.18-1 Live Fuel Moisture Averages for the Tortoise – Moderate Fire Management Unit (NV050-01)..... 3-111

3.19-1 List of Projects Considered Within or Near the Ivanpah Valley 3-115

4 Environmental Consequences

4.1-1 Summary of Yearly Construction Emissions Estimates 4-3

4.2-1 Construction Equipment Noise Levels for the Proposed Action (Alternative 2)..... 4-9

4.2-2 Construction Equipment Noise Levels versus Distance 4-10

4.6-1 Estimate of Permanent Impacts Within Solar Array..... 4-37

4.15-1 Construction Phase Economic Impacts to Clark County, Nevada..... 4-109

4.15-2 Annual Economic Impact Estimates to Clark County, Nevada during Project Operations 4-110

4.15-3 Summary of Estimated Range of Tax Revenues Generated during Construction 4-111

4.16-1 Racial Composition and Percent Minority for the Footprint of Alternative 2 and Alternative 3 Outside of the Study Area 4-120

4.19-1 Estimated Maximum Daily Construction Emissions of Criteria Pollutants for the Proposed Action and Other Foreseeable Projects 4-128

4.19-2 Existing and Foreseeable Projects within 2 Miles of Noise Receptors 4-130

4.19-3 Summary of Land Disturbance by Project Type 4-139

4.19-4 Impacts on Desert Tortoise Habitat from EITP and Other Proposed Projects 4-141

4.19-5 Summary of the Proposed Action's Visual Effect by KOP 4-147

4.19-6 KOPs Relative to Existing and Future Foreseeable Projects 4-147

List of Figures

1 Purpose and Need

1.1-1 Regional Map 1-2

1.1-2 Project Location Map 1-3

1.4-1 Annual Mean Temperature Change for Northern Latitudes (24 - 90° N) 1-8

2 Description of the Proposed Action and Alternatives

2.2-1 Alternative 2 Drainage Controls 2-3

2.2-2 Alternative 3 Drainage Controls 2-4

2.4-1 Tilted Tracker 1MW Block Detail 2-9

2.4-2 Tilted Tracker Solar Panels 2-10

2.4-3 Horizontal Tracker 1MW Block Detail 2-12

2.4-4 Horizontal Tracker Solar Panels 2-13

2.4-5 Fixed Tilt 1MW Block Detail 2-15

2.4-6 Fixed Tilt Solar Panels 2-16

2.5-1 Site Layout 2-19

2.5-2 Alternative 2 Drainage Controls 2-27

2.5-3 Alternative 3 Drainage Controls 2-28

2.6-1 Construction Phases 2-31

2.6-2 Conceptual Berm Design 2-45

3 Affected Environment

3.1-1 Relationship Between Global Temperature and Carbon Dioxide 3-8

3.3-1 Geology and Topography of Ivanpah Valley 3-15

3.3-2 Surficial Geology of the Proposed Project Site 3-16

3.3-3 Faultlines and Epicenters of M > 5.0 Earthquakes since 1900 within 100 miles of the Proposed Project Site 3-18

3.5-1 Hydrologic Features 3-23

3.10-1 Special Management Areas 3-61

3.11-1 OVH Designations and Recreation Management Areas 3-65

3.12-1 Key Observation Points 3-72

3.12-2 KOP 1 – View from Goodsprings Road 3-73

3.12-3 KOP 2 – View from I-15 near Jean 3-74

3.12-4 KOP 3 – View from the Roach Dry Lakebed 3-75

3.12-5 KOP 4 – View from Desert Oasis Apartment Complex 3-75

3.12-6 KOP 5 – View from Primm Valley Resort and Casino 3-78

3.12-7 KOP 6 – View from Lucy Gray OHV Trail 3-79

3.12-8 KOP 7 – View from Ivanpah Dry Lakebed 3-80

3.12-9 KOP 8 – View from I-15 at Nipton Road Overpass 3-81

3.12-10 KOP 9 – View from Entrance to Majave National Preserve 3-82

3.15-1 Regional and State Unemployment Rate 3-94

3.15-2 Clark County Nevada – Construction Employment 3-97

3.15-3 Growth in Per Capita Income – 1990 to 2007 3-99

3.19-1 Cumulative Projects 3-114

4 Environmental Consequences

4.5-1 Geologic Flood Hazard Class 4-27

4.12-1 KOP 1 – View from Goodsprings Road 4-75

4.12-2 KOP 2 – View from I-15 near Jean 4-76

4.12-3 KOP 3 – View from the Roach Dry Lakebed 4-77

4.12-4 KOP 4 – View from Desert Oasis Apartment Complex 4-78

4.12-5 KOP 5 – View from Primm Valley Resort and Casino 4-79

4.12-6 KOP 6 – View from Lucy Gray OHV Trail 4-80

4.12-7 KOP 7 – View from Ivanpah Dry Lakebed 4-80

4.12-8 KOP 8 – View from I-15 at Nipton Road Overpass 4-81

4.12-9 KOP 9 – View from Entrance to Majave National Preserve 4-82

4.15-1 Total Construction Labor Force by Quarter 4-106

4.15-2 Local Construction Labor Force and Payroll by Quarter 4-108

4.15-3 Construction Phase Total Economic Impacts by Year 4-110

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Executive Summary

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Executive Summary

Introduction

The following sections summarize the Draft Environmental Impact Statement (DEIS) for NextLight Renewable Power, LLC Silver State Solar Project (the Proposed Project). This information is provided as a convenient synopsis for the public, but is not a substitute for review of the complete DEIS. This summary provides a general overview of the Proposed Project and its purpose and need; briefly describes the Proposed Action and other alternatives; and summarizes major impacts for key resources associated with the Proposed Action and the alternatives.

NextLight Renewable Power, LLC (NextLight, or the Applicant) has applied to the Bureau of Land Management (BLM) for a right-of-way (ROW) grant on public land to develop a solar energy project. This section discusses the purpose and need for the Proposed Action, as required by the National Environmental Policy Act (NEPA). The BLM actions that require NEPA analysis are to approve or deny the ROW application (NVN-085077).

The Applicant is proposing to develop a 400-megawatt (MW) photovoltaic (PV) solar project on a site located in the Primm Valley, 40 miles south of Las Vegas, Nevada, in Clark County. Specifically, the site is on unincorporated land approximately 2 miles east of Primm, Nevada. The Proposed Project would be built in three phases. Phase I would consist of the construction and operation of a 60MW solar plant and associated facilities. Phase II would include construction and operation of a 140MW solar plant and associated facilities. Phase III would construct the remaining solar panels and infrastructure to complete the Project.

Purpose and Need for the Proposed Action

BLM's Purpose and Need for the Proposed Action

Purpose

The purpose of the Proposed Action is to consider a ROW grant to construct, operate, maintain, and decommission a solar energy project on public lands administered by the BLM. After conducting a feasibility study for other sites, the Applicant filed a ROW application and Plan of Development (POD) with BLM under the Federal Land Policy and Management Act of 1976 (FLPMA) (43 United States Code [U.S.C.] 1761) for this tract of public land. The BLM will consider the Applicant's Proposed Action in this EIS.

Need

The BLM is required to respond to the application under Title V of FLPMA for a ROW grant to construct, operate, maintain, and decommission a solar PV facility on BLM lands. The need for action is based on the Applicant's submittal of a ROW application to the BLM. In considering the need for the Proposed Action and in developing alternatives, the BLM has considered the requirements of federal mandates to encourage the use of public lands for renewable energy development. Additionally, the BLM has considered how the Proposed Action fits the region's overall energy market, including economic viability, proximity to energy consumers, and transmission line capacity and reliability factors.

Applicant's Objective for the Proposed Action

The Applicant's objective of the Proposed Action is to locate a 400MW utility scale solar project within the state of Nevada, south of Las Vegas, where it can interconnect directly into both the Nevada and California transmission systems. The Nevada portion of the Ivanpah Valley was selected because of its solar resource, the availability of suitable land, transmission accessibility to both NV Energy and California Independent System Operator transmission systems, and absence of land use constraints (i.e., Desert Wildlife Management Areas [DWMAs], Areas of Critical Environmental Concern [ACECs], designated Wilderness Areas, Wilderness Study Areas [WSAs], and other restrictive land use designations.

Public Involvement

An initial 30-day scoping period for the Proposed Project was held from June 30, 2009, to July 31, 2009. The BLM extended the scoping period to October 19, 2009, to ensure that all interested parties could participate in the process. The scoping period commenced with publication of the Notice of Intent (NOI) in the *Federal Register* (74 FR 124: 31306-07). The NOI announced a period for public scoping of alternatives, issues, impacts, and planning criteria. The NOI also requested the views of other agencies as to the scope and content of the environmental information that was relevant to the statutory responsibilities or areas of expertise for those agencies. Federal, state, and local agencies, as well as individuals or organizations that were interested or may be affected by the BLM's decision on this Proposed Project, were invited to participate in the scoping process and, if eligible, could request or be requested by the BLM to participate as a cooperating agency.

The BLM held three public scoping meetings near the Proposed Project location. Meeting locations, dates, and numbers of attendees are provided below:

Location	Date	No. of Attendees
Primm	August 11, 2009	20
Henderson/Las Vegas	August 12, 2009	83
Jean	August 18, 2009	60

About 90 comments covering the following resource topics were received during scoping from agencies, organizations, and the public, and became the basis for defining issues:

- Project Alternatives;
- Project Description;
- Purpose and Need;
- Air Quality (including Climate Change);
- Hydrology, Water Quality, and Water Resources;
- Biological Resources;
- Cultural Resources;
- Lands and Realty;
- Recreational Resources;
- Special Management Areas;
- Aesthetic/Visual Resources;
- Traffic and Transportation;
- Public Health and Safety;
- Social and Economic Considerations;
- Environmental Justice; and
- Cumulative Impacts.

Summary Description of the Proposed Action and Alternatives

This section describes the No Action Alternative, the Proposed Action (BLM's Preferred Alternative), and a modified site layout alternative. Proposed Project features and construction methods detailed in this section will serve as the basis of the environmental impact analysis in Chapter 4.

Alternative 2 Project facilities and related facilities would disturb a total area of 2,967 acres. The solar arrays would occupy 2,575 acres, the unimproved solar field access ways would occupy about 85 acres and the undeveloped portion of Project site consists of about 94 acres. Drainage controls would consist of a series of five small and wide earthen drainage control berms that would contain surface runoff flows to existing primary drainages (stormwater flow corridors) across the site. Four berms would be constructed within the solar field and one berm would be located outside the solar array area, and it would be directly aligned with the eastern edge of the perimeter fence (Figure 2.2-1, see Section 2.2, Description of the Proposed Action and Alternatives). The berms would be constructed to a height of 3 to 5 feet above grade with a top width of approximately 15 feet (Figure 2.2-2). The drainage structures would result in a temporary disturbance of 11 acres during construction and the final area of disturbance would be about 17 acres.

Construction of the Proposed Project would include a maximum of 700 trips per day (350 morning trips and 350 evening trips) due to the construction labor force traveling to the Project site.

Alternative 3 would be constructed and operated similar to Alternative 2, with the exception of the site drainage plan. Alternative 3 Project facilities and related facilities would disturb a total area of 4,818 acres. The solar arrays would occupy 2,748 acres, the unimproved solar field access ways would occupy 63 acres, and the undeveloped portion of Proposed Project site would consist of 452 acres. Several upstream drainage control structures, including level spreader detention basins, diversion berms (each 10 feet high), channels, and debris basins would be developed in a linear pattern along the entire eastern border of the Proposed Project site in north to south direction to protect the solar arrays from storm water runoff from adjacent canyons and slopes. The drainage structures would result in a temporary disturbance of 1,150 acres during construction, and the final area of disturbance would be 250 acres.

Comparison between Alternative 2 and Alternative 3

The solar field layout and acreage would be similar for Alternatives 2 and 3. The acreage of the unimproved solar field access ways for Alternative 2 would be slightly larger than Alternative 3. Alternative 2, through temporary construction and long-term operational impacts, would disturb 1,851 acres less than Alternative 3, which is directly related to the site drainage plan differences between the two alternatives. Construction disturbance acreage of Alternative 2 would be 1,139 acres less than Alternative 3, and the permanent acreage disturbance of Alternative 2 would be 232 acres less than Alternative 3.

Alternatives Considered but Eliminated from Detailed Analysis

Alternative Locations

Alternative BLM Land

One other site on BLM land was considered in the Ivanpah Valley, near Jean, Nevada. The Jean site, located on a broad alluvial fan west of Interstate 15 (I-15) and south of Goodsprings Road (State Route [SR] 161), was less desirable because of the distance to the interconnect with the Nevada and California transmission systems and incompatible land use. In addition to a less desirable transmission interconnection, other factors that weighed against the Jean site included its designation as desert tortoise relocation area, the presence of the Jean Water District's well field, and potential conflicts with the proposed Southern Nevada Supplemental Airport. Due to these land use conflicts, the Jean site was eliminated from further analysis.

Alternative Location in California

One suggestion raised during scoping was that the Proposed Project should be constructed in California. This alternative was eliminated from further analysis because the Project Proponent currently has several Projects planned in the state of California and this site is located near transmission lines with excess capacity and customers.

Alternative Project Design

During the scoping period, it was suggested that the Proposed Project be constructed on a grid 10 feet above the ground to minimize impacts to off-highway vehicle (OHV) use and vegetation. The alternative was eliminated from further analysis due to engineering and economic feasibility.

Alternative Project Size

No comments were received during scoping suggesting that the Proposed Project should have a smaller footprint or should be reduced in capacity.

Restrictions on Power Delivery Alternative

Several comments were received during scoping suggesting that the Proposed Project should not be built if the power would be delivered to customers in California. This alternative was eliminated because the BLM does not have the authority to dictate where resources produced on the public lands are used.

Environmental Impacts and Mitigation Measures

Proposed Action and Alternatives

The environmental effects of constructing, operating, maintaining, and decommissioning the solar facility as proposed (Alternative 2) are summarized below by resource area.

Air Quality

Air Quality effects include temporary moderate adverse impacts from fugitive dust, particulate matter with a mean aerodynamic diameter of 10 microns or less (PM_{10}), carbon monoxide (CO), and ozone (O_3) precursors which might contribute to ongoing exceedences of National Ambient Air Quality Standards (NAAQS) for which the area has been designated as non-attainment by the U.S. Environmental Protection Agency (EPA) (O_3).

Long-term air quality benefits include potential avoidance of emissions associated with avoided electric production from petroleum resources and beneficial impacts to greenhouse gases (GHG). This includes reducing the use of fossil fuels as an energy source will play an important role in reducing emissions of GHGs as well as criteria air pollutants.

See Section 4.1.1 for detailed discussion of the impacts to air resources.

Noise

Noise effects include short-term noise levels in a range from 55 to 90 dBA at 50 feet from the source as well as a temporary increase in traffic noise on Interstate 15 (I-15) and local roads as a result of equipment delivery and workers commuting to the site. However, predicted construction noise and vibration levels would be attenuated over distance and reduced to background levels at the closest sensitive receptor.

The composite noise of 400 transformers would result in a long-term increase in ambient noise levels; however, it would not result in a sound level at the closest receptor that would exceed 55

decibels (dB). Corona noise from the 34.5kilovolt (kV), 220kV and 230kV tie-in lines would be inaudible at the nearest receptor. There would be no long-term effects on existing ambient noise and vibration levels from operations and maintenance (O&M) of the Proposed Action.

See Section 4.1.2 for detailed discussion of the impacts to noise resources.

Geology, Topography, and Geologic Hazards

No effects to geology or topography would occur, nor would there be an increase in the geologic instability of the area and there would not be an increase in the risk of on- or off-site landslides, lateral spreading, subsidence, liquefaction, or collapse. There are no unique geologic features at the site and all Proposed Project structures would have to comply with applicable earthquake building codes.

See Section 4.1.3 for detailed discussion of the impacts to geology, topography and geologic hazards.

Soils

Effects on soil would occur from the disturbance of 2,966 acres of land as well as construction of impermeable surfaces throughout the Proposed Project site. Vegetation removal and grading, the potential for high winds and infrequent strong rains, and the use of vehicles and equipment on these areas would increase the potential for both wind- and water-driven erosion likely resulting in a localized loss of topsoil.

See Section 4.1.4 for detailed discussion of the impacts to soil resources.

Water Resources

Effects to water resources would occur during groundwater drawdown; however, this would only be a concern during peak water usage for dust suppression. Water would be supplied by on-site wells under a long-term contract from the Las Vegas Valley Water District (LVVWD). Peak use would be during construction for dust suppression (up to 600 acre-feet total, with no more than 200 acre-feet during any one year). O&M water requirements would be 21 AFA. Impervious areas of the Proposed Project would only cover 0.05 percent of the Ivanpah Valley groundwater basin, most of which is undeveloped.

Effects to groundwater from hazardous materials are unlikely due to the depth of the water table and Applicant proposed measures (APMs). The potential for increased erosion or siltation on site or off site is unlikely given the APMs and the Proposed Project site's topography.

See Section 4.1.5 for detailed discussion of the impacts to water resources.

Biological Resources

Vegetation

Effects on vegetation from implementation of the Proposed Project would result in adverse impacts on vegetation communities and individuals of special-status plants species. These impacts would be both short- and long-term (depending on whether the required ground

disturbance would be permanent or temporary) and localized to the footprint of the Proposed Project. Impacts also could be extensive due to the potential spread of introduced noxious and invasive plant species outside of the boundaries of the Proposed Project.

Wildlife

Effects on biological resources include ground-disturbing activities that could result in injury and mortality to slower-moving reptiles or reptiles occupying subsurface burrows. Adverse impacts to Gila monster and Chuckwalla would occur with the implementation of the Proposed Action. These impacts would be both short- and long-term and would be localized.

As currently designed, the Proposed Project would have localized, adverse, short- and long-term impacts on desert bighorn sheep. It would have localized adverse impacts on wild burros. It would have adverse, short- and long-term, and localized impacts on the American badger and adverse impacts on Migratory Bird Treaty Act (MBTA) protected species. These impacts would be both short- and long-term and would be localized.

Special Status Species

Adverse impacts on desert tortoise would occur with the implementation of the Proposed Project. These impacts would be both short- and long-term and would be localized and extensive and area-wide to the Proposed Project footprint. Impacts would be localized, as a result of the removal of all desert tortoises from the Project area and the loss of suitable desert tortoise habitat due to the construction of exclusionary fencing. Impacts would be extensive because the translocated individuals would most likely impact the fitness of the desert tortoises that occupy the translocation site, and the operation of the Project would remove 2,950 acres of suitable desert tortoise habitat from the Ivanpah Valley.

There is the potential for seven protected mammal species (bats) to occur within the Proposed Project area. The loss of native habitat may decrease the prey availability within the Project area for the nocturnal feeding bats. The bat foraging area of the Proposed Project is relatively small compared with the amount of foraging habitat in the region and the storage water pond is a temporary feature. The Proposed Project would result in a direct and short- and long-term loss of food and shelter for special status birds. These adverse impacts would be localized in spatial extent.

The Proposed Project would adversely affect the white margin penstemon, which is known to occur in the area. The Applicant will undertake a plant survey in the spring of 2010 to determine precise locations and abundance of this species.

Range

Direct effects to the existing forage ground cover for livestock and wildlife would occur from grading and surface disturbance for Project infrastructure. The majority of the Proposed Project footprint is in the Jean Lake allotment. The portion of the Roach Lake allotment that would be affected is the southeast corner of the allotment along the Nevada state line (to the south) and the boundary between the allotments (to the east). Some surface disturbance would be short-term. This includes the installation of temporary construction facilities, parking areas, staging areas, and berms; trenching of underground cables; and the free space within the solar arrays. Impacts

to rangeland vegetation in these areas would be short-term. Other Project infrastructure would be long-term (equal to or greater than 50 years) and rangeland forage acreage would be permanently impacted.

Installation of some Proposed Project infrastructure might disturb enclosure fencing within the Jean Lake allotment. Disturbing enclosure fencing could create opportunities for the plant populations or riparian areas to be disturbed or damaged by construction activities, OHV use, or wildlife grazing. Installation of some Project infrastructure might disturb interior pasture fencing, cattle guards, or water haul areas.

See Section 4.1.6 for detailed discussion of the impacts to biological and range resources.

Cultural Resources

The complete inventory of the entire area under the ROW application was considered the area of potential effect (APE) (7,967 acres) for the Proposed Project and the evaluation of the cultural resources. Two prehistoric sites considered eligible for listing on the National Register of Historic Places (NRHP) are located near the main access road. Monitoring during road improvement would mitigate any inadvertent effects. The three historic power transmission lines that cross the Proposed Project area would not be affected by this Project. Any unanticipated discoveries of cultural resources or human remains would follow the State Protocol Agreement between the BLM and the Nevada State Historic Preservation Office (SHPO) dated October 26, 2009.

See Section 4.1.7 for detailed discussion of the impacts to cultural resources.

Paleontological Resources

The majority of the Proposed Project area is underlain with sediments that have a low potential for fossil resources to be present. There would be no effects during implementation or decommissioning of either alternative unless Proposed Project trenching and excavation using heavy equipment would affect subsurface depths of more than 10 feet in the west half of Township 27 South, Range 59 East, Section 3 closer to the Roach Dry Lake. Given the low likelihood of discovery or impact to fossil resources, no mitigation measures would be required.

See Section 4.1.8 for detailed discussion of the impacts to fossil resources.

Lands and Realty

There would be no effect on existing lands and realty actions, including existing transmission lines, in the Proposed Project area.

See Section 4.1.9 for detailed discussion of the impacts to lands and realty resources.

Special Management Areas

The Proposed Action would permanently restrict access to the trails within the Proposed Project perimeter fence resulting in an adverse impact to the Jean/Roach Lake Special Recreation Management Area (SRMA). As the Proposed Action is immediately adjacent to the Ivanpah

DWMA, the Proposed Action could inadvertently introduce noxious weeds into the DWMA from construction equipment carrying seeds of noxious weeds.

Key observation points (KOPs), or places where sensitive viewers would notice changes in the landscape were identified for impacts to Special Management Areas (SMAs). These included the Mojave National Preserve (KOP 9), South McCullough Wilderness (KOP 6), the Ivanpah Dry Lake SRMA (KOP 7), and the Jean/Roach Lake SRMA (KOP 6). KOP 6 is used for both the Jean/Roach Lake SRMA and the South McCullough Wilderness Area. The proposed Project would be visible from all KOPs, but would not adversely affect the visual resource management (VRM) class objectives assigned to each KOP under the Las Vegas Resource Management Plan (LVRMP).

See Section 4.1.10 for detailed discussion of the impacts to SMAs.

Recreation

Construction of the Proposed Project fence would result in the loss of public access to entire site. A portion of the Jean Lake/Roach Lake SRMA would no longer be accessible to members of the public engaged in recreational model rocket launching, movie, commercial, and music video filming, big game hunting, horseback riding events, hiking, OHV riding and music festivals.

A temporary bypass route would be designated by BLM to enable backcountry access during construction of the county road. An unimproved 4-wheel-drive OHV route would be constructed to allow casual OHV uses to continue in the vicinity of the Proposed Project area. This OHV route would extend along the northern boundary of the Proposed Project site across Section 1, and then south along the eastern Project boundary within Sections 1 and 12.

The annual Primm 300 race, held during the fall, would be rerouted outside the Proposed Project site, however, it would still go through the same general portion of the Jean/Roach Lake SRMA. Construction of Alternative 2 would result in an increase in the level of use of other parts of the Jean Lake/Roach Lake SRMA by members of the public engaged in recreational model rocket launching, movie, commercial, and music video filming, big game hunting, horseback riding events, hiking, and music festivals since this portion of the SRMA would no longer be available to the public. Although some recreational users in the Jean Lake/Roach Lake SRMA would no longer have access to Proposed Project site, the analysis indicates that it would not cause substantial overcrowding by having a “spill over” effect to other recreation areas.

See Section 4.1.11 for detailed discussion of the impacts to recreational resources.

Visual Resources

The most notable effect to visual resources would be a short-term change from exposed soils created during construction. These exposed soils would contrast strongly with the surrounding colors and textures found adjacent to the site. The Proposed Project would contribute to the alteration of the viewshed from each of the nine KOPs. The Proposed Action would introduce moderate levels of contrast into each of the viewsheds (except for KOP 2), which is the maximum allowable level of change for VRM Class III areas. The Proposed Project would be consistent with the VRM Class III objectives that the BLM has established for the lands included within the Project area.

See Section 4.1.12 for detailed discussion of the impacts to visual resources.

Transportation and Traffic

Construction of the Proposed Project would result in short-term increases in traffic volume of a maximum of 700 trips per day (350 morning trips and 350 evening trips) due to the construction labor force (assuming they all drive separately). Additionally, construction of the Proposed Project would result in short-term-increases in traffic volume of a maximum of 112 trips per day (56 trips to the site and 56 trips leaving the site) due to delivery of construction equipment and supplies to the site, resulting in 812 vehicle trips per day.

A maximum of 812 additional vehicle trips per day would likely temporarily degrade the level of service (LOS) at the intersection of I-15 and East Primm Boulevard, as the LOS values at both the northbound and southbound off-ramps of I-15 at the Primm interchange are currently poor. The Proposed Action would result in short-term effects on traffic volume and would adversely affect traffic flow on local roadways during peak construction. Impacts to local streets would likely occur during the construction phase of the Proposed Project, as only minimal vehicle use is anticipated during O&M.

Construction of the Proposed Project would result in a beneficial effect on road conditions, as construction of the Project would result in the creation of a new paved county road.

See Section 4.1.13 for detailed discussion of the impacts to transportation and traffic.

Human Health and Safety

The potential impact of an accidental release of hazardous materials during construction would be short-term and localized. Proper implementation and monitoring of the Applicant's Facility Decommissioning Plan and other mitigation measures and compliance with federal, state, and local regulations addressing hazardous materials would minimize the potential of a spill and the risk of soil contamination or exposure of hazardous substances to humans or wildlife during decommissioning.

There is currently no evidence of soil or groundwater contamination within the Proposed Project site. There is the possibility that contaminated soils are present on site, which may be discovered during the Applicant's environmental site assessment prior to construction. The risk of exposure of people or structures to loss, injury, or death involving electrocution or excessive exposure to wildland fires would result in potential localized and short-term effects.

See Section 4.1.14 for detailed discussion of the impacts to human health and safety.

Social and Economic Conditions

The construction phase is expected to employ up to 350 workers during peak construction phases, which would have a short-term and beneficial impact on the Clark County population level. The impact would not cause a temporary population increase that would necessitate additional local public services or investment in infrastructure capacities that could not be provided from existing resources. The operational phase of the Proposed Project is expected to

employ 15 full-time permanent workers, which would have a long-term and beneficial impact on the area's population level.

The construction phase is expected to have a short-term and beneficial impact on the Clark County permanent and temporary housing stock. The impact would not cause a temporary strain that would necessitate additional local public services or investment in public infrastructure capacities that could not be provided from existing resources. The operational phase of the Proposed Project is anticipated to have a long-term beneficial effect on the area's housing stock.

The construction phase mobilization of resources (i.e., workforce, materials, supplies and equipment) will be beneficial to the region's economy that has been mired in recession. Project construction spending provides a non-recurrent demand stimulus that will invigorate other inter-dependent sectors, industries and households within Clark County over a four year period. During operations, the Project's permanent direct employment, payroll and O&M related spending would provide a long-term, beneficial, recurring stimulus to the region's economy.

The incremental demand on public services from the Proposed Project during construction, operations, and decommissioning is not anticipated to result in extraordinary stresses placed on service capacities or infrastructure that could not be met by existing and projected public resources (i.e., projected county operating budgets and capital expenditures already planned for to meet population growth).

There are a variety of affected groups and attitudes including members of the OHV community, environmental groups, local land owners, utility off takers, and workers, and their attitudes are representative of what one would expect from members of these organizations.

See Section 4.1.15 for detailed discussion of the impacts to socioeconomic resources.

Environmental Justice

There are no environmental justice communities in the Proposed Project area and, thus, there are no effects to minority or low income populations.

See Section 4.1.16 for detailed discussion of the impacts to environmental justice communities.

Energy and Minerals

A total of four now closed claims and 38 other claims are within a 1-mile radius of the Proposed Project site (BLM 2010), which were closed in the late 1980s.

See Section 4.1.17 for detailed discussion of the impacts to energy and mineral resources.

Fuels and Fire Management

There would be no adverse effects to fuels and fire management as a result of the Proposed Project.

See Section 4.1.17 for detailed discussion of the impacts to fuels and fire management.

Cumulative Impacts

Short- and long-term cumulative impacts are expected as a result of the construction and operation of the Proposed Project. These cumulative impacts are due to the fact that the Proposed Project would occupy sensitive species habitat, consume water resources, and contribute to air and water quality impacts in a region that has undergone significant development in the past, which expected to continue, especially from renewable energy and other projects. These activities, along with the Proposed Project, would add incrementally small, but potentially significant, cumulative environmental impacts.

See Section 4.19 for complete analysis of cumulative impacts.

Residual Impacts

Residual effects would occur to the following resources:

Soils

Although the Applicant has designed an extensive water erosion control system and committed to a series of best management practices (BMPs), localized wind-driven soil erosion could be expected. These residual impacts would be most prevalent on dry windy days and during monsoon events where water volume may exceed the capacity of the flood control system. See Section 4.1.3 for more information.

Recreation

A number of proposed renewable energy projects, and transmission/pipeline projects, would be constructed during the timeframe the Proposed Project is in operation. The First Solar, BrightSource, Cogentrix, Iberdrola, and Power Partners Southwest solar projects would collectively occupy over 20,000 acres of land if they were constructed. Since solar projects typically occupy 90 percent of their respective ROWs, these areas would be no longer accessible by the public. Recreational activities for the Jean Lake/Roach Lake SRMA would no longer be able take place in these areas and the public would be forced to move these activities to other areas which could cause a cumulative increase in activity in these locations.

OHV activity would be directly affected by the renewable energy projects because access through these project sites would be prohibited. OHV recreational activity and races would not be allowed within these areas and new routes would be designated.

These residual impacts could not be mitigated and would be unavoidable. See Section 4.11.3 for more information.

Visual Resources

After the voluntary mitigation measures would be implemented for this Proposed Project, the lasting effect of the facility would remain visible on the landscape. However, implementing the voluntary measures would reduce and minimize impacts to the lands managed as VRM Class III. See Section 4.12.3 for more information.

Transportation and Traffic

Under all action alternatives, there would be short-term and long-term increases in traffic volume that could not be eliminated completely through mitigation. Short-term increases would adversely affect the LOS of local roads in the Proposed Project area, particularly during peak traffic times (particularly on Fridays from 2:00 p.m. to 10:00 p.m. on northbound I-15). Long-term increases from O&M activities would be very small and would not likely affect the LOS at any intersection in the area. See Section 4.13.3 for more information.

Socioeconomics

During construction phases of the Proposed Action, there would be short-term, beneficial residual effects on population and housing, the regional economy, personal income and employment levels, public services, and tax revenues. During the O&M phase, there would be long-term, beneficial, residual effects on population and housing, the regional economy, and personal income and employment levels, public services, and tax revenues. Effects on social and economic conditions from decommissioning are also expected to be beneficial. See Section 4.15.3 for more information.

Energy and Minerals

The Proposed Action would result in residual impacts to mineral resources within the Proposed Project area. The presence of the solar field and other Proposed Project components would preclude excavation of mineral resources over the life of the Project. See Section 4.17.3 for more information.

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1 Purpose and Need

1.1 Purpose and Need for the Proposed Action 1-1

1.1.1 BLM's Purpose and Need for the Proposed Action 1-1

1.1.1.1 Purpose 1-1

1.1.1.2 Need 1-1

1.1.2 Proponent's Objective for the Proposed Action 1-4

1.2 About This Document 1-5

1.3 Summary of Public Scoping and Issue Identification 1-6

1.3.1 Public Scoping Process 1-6

1.4 Policies and Programs 1-6

1.4.1 Relationship to Federal Policies, Plans, and Programs 1-6

1.4.1.1 General 1-6

1.4.1.2 Air Quality and Climate 1-7

1.4.1.3 Soils 1-9

1.4.1.4 Water Resources/Hydrology 1-9

1.4.1.5 Biological Resources 1-10

1.4.1.6 Cultural and Historic Resources 1-12

1.4.1.7 Paleontological Resources 1-14

1.4.1.8 Lands and Realty 1-14

1.4.1.9 Special Management Areas 1-15

1.4.1.10 Visual Resources 1-15

1.4.1.11 Human Health and Safety/Hazardous Materials 1-16

1.4.1.12 Energy and Minerals 1-18

1.4.2 Relationship to State and Local Plans, Policies, and Programs 1-19

1.4.2.1 Air Resources-Local 1-19

1.4.2.2 Noise – Local 1-20

1.4.2.3 Water Resources – State 1-22

1.4.2.4 Water Resources – Local 1-21

1.4.2.5 Special Status Species – State 1-21

1.4.2.6 Special Status Species – Local 1-22

1.4.2.7 Cultural Resources – State 1-23
1.4.2.8 Paleontology – State 1-23
1.4.2.9 Lands and Realty – Local 1-23
1.4.2.10 Human Health and Safety/Hazardous Materials – State..... 1-24
1.4.2.11 Human Health and Safety/Hazardous Materials – Local..... 1-25

1.5 Decisions to be Made 1-26

1.6 NEPA Process 1-27

1.7 Land Use Plan Conformance Determination 1-27

1 Purpose and Need

This chapter describes the purpose and need for the Proposed Action; discusses the laws, plans, policies, and programs that affect the project and this Environmental Impact Statement (EIS); and briefly describes the issues raised during scoping that will be addressed in this EIS.

1.1 Purpose and Need for the Proposed Action

NextLight Renewable Power, LLC (NextLight; also the Applicant) has applied to the Bureau of Land Management (BLM) for a right-of-way (ROW) grant on public land to develop a solar energy project. This section discusses the purpose and need for the Proposed Action, as required by the National Environmental Policy Act (NEPA). The BLM actions that require NEPA analysis are to approve, approve with modifications, or deny the ROW application (NVN-085077).

The Applicant is proposing to develop a 400-megawatt (MW) photovoltaic (PV) solar project on a site located in the Primm Valley, 40 miles south of Las Vegas, Nevada in Clark County. Specifically, the site is on unincorporated land approximately 2 miles east of Primm, Nevada (Figure 1.1-1 and Figure 1.1-2). The Proposed Project would be built in three phases. Phase I would consist of the construction and operation of a 60-MW solar plant and associated facilities. Phase II would include construction and operation of a 140-MW solar plant and associated facilities. Phase III would construct the remaining solar panels (200 MW) and infrastructure to complete the Proposed Project.

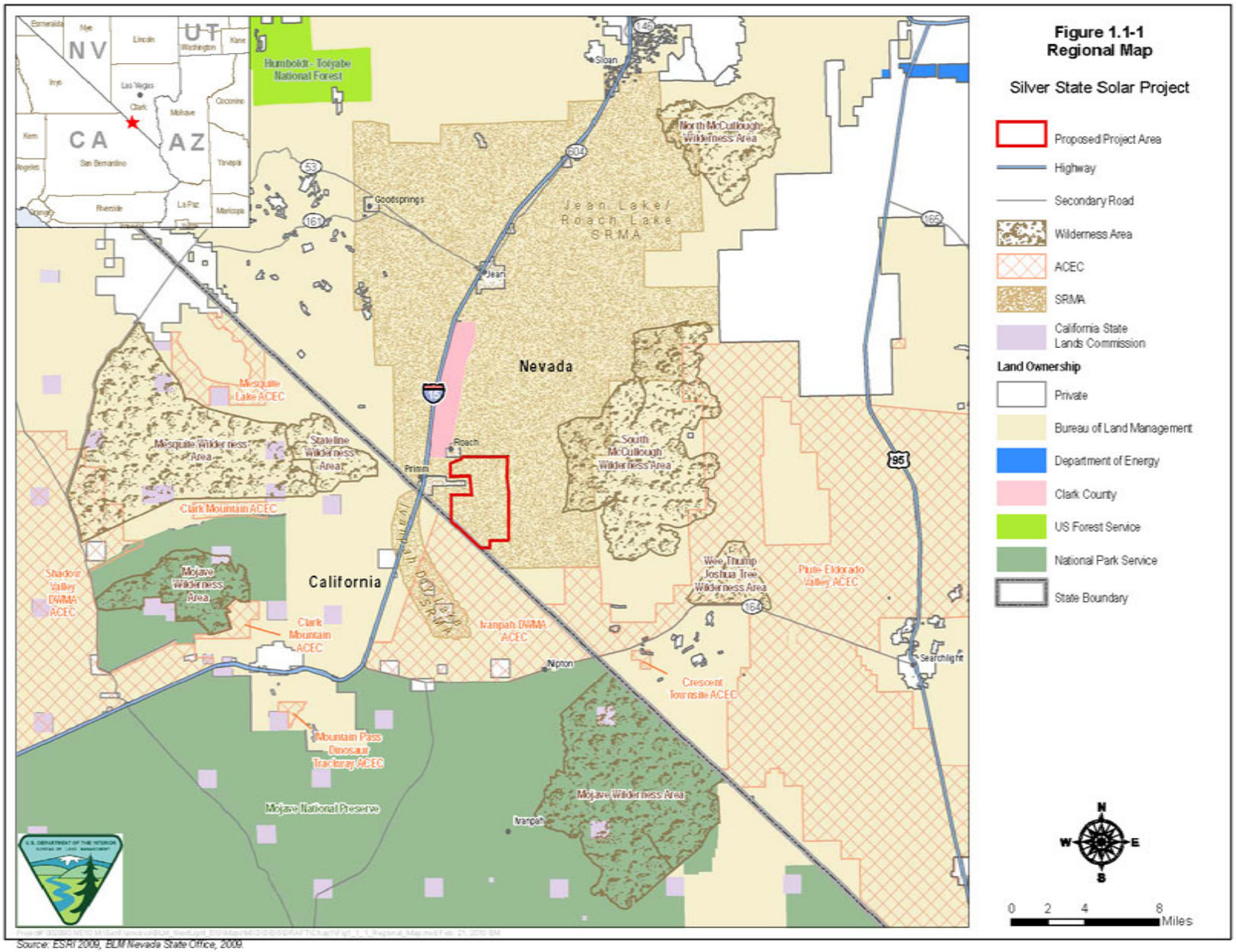
1.1.1 BLM's Purpose and Need for the Proposed Action

1.1.1.1 Purpose

The purpose of the Proposed Action is to consider a ROW grant application to construct, operate, maintain, and decommission a solar energy project on public lands administered by the BLM. After conducting a feasibility study for other sites, the Applicant filed a ROW application and Plan of Development (POD) with the BLM under the Federal Land Policy and Management Act of 1976 (FLPMA) (43 United States Code [U.S.C.] 1761) for this tract of public land. The BLM will consider the Applicant's Proposed Action through the analysis in this EIS.

1.1.1.2 Need

The BLM is required to respond to the application under Title V of FLPMA for a ROW grant to construct, operate, maintain, and decommission a solar PV facility on BLM lands.



Source: ESRI 2009, BLM Nevada State Office, 2009.

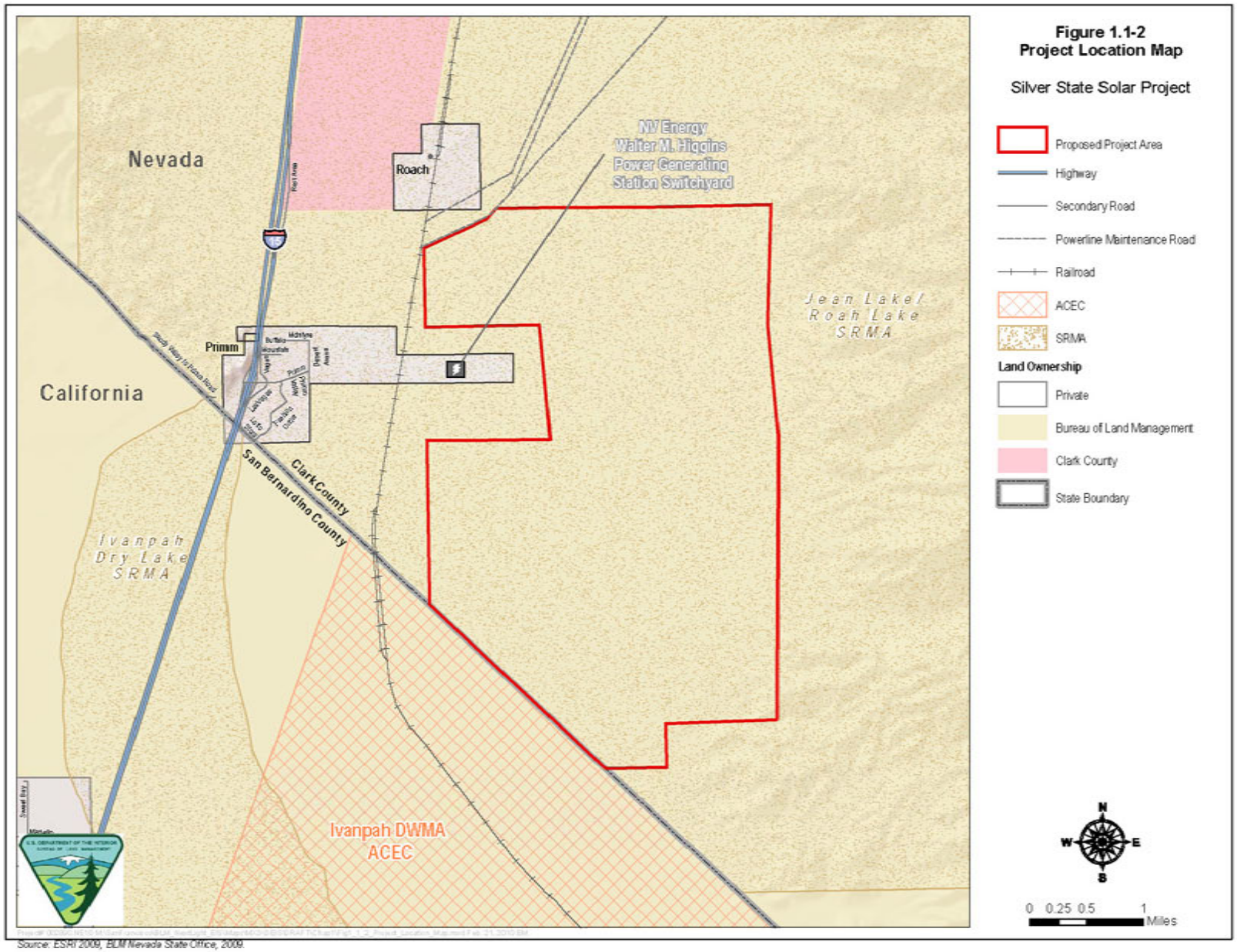


Figure 1.1-2
Project Location Map

Silver State Solar Project

Source: ESRI 2009, BLM Nevada State Office, 2009.

The need for action is based on the Applicant's submittal of a ROW application to the BLM. In considering the need for the Proposed Action and in developing alternatives, the BLM is acting under the requirements of federal mandates that encourage the use of public lands for renewable energy development. Additionally, the BLM has considered how the Proposed Action fits the region's overall energy market, including economic viability, proximity to energy consumers, and transmission line capacity and reliability factors.

Applicable mandates include the following federal laws, mandates, and regulations pertaining to the development of renewable energy resources, among others, are as follows:

- Sec. 211 of Energy Policy Act of 2005, enacted in August, 2005, which mandated up to 10,000 MW of non-hydropower renewable energy projects on public lands by 2015.
- Instruction Memorandum 2007-097, "Solar Energy Development Policy," dated April 4, 2007, establishes BLM policy to ensure the timely and efficient processing of energy ROWs for solar power on the public lands.
- Secretarial Order 3283 "Enhancing Renewable Energy Development on the Public Lands," signed January 16, 2009. This Secretarial Order facilitates the U.S. Department of the Interior's (DOI's) efforts to achieve the goals established in Sec. 211 of the Energy Policy Act of 2005.
- Secretarial Order 3285 "Renewable Energy Development by the DOI," signed March 11, 2009, establishes the development of renewable energy as a priority for the DOI and creates a Departmental Task Force on Energy and Climate Change.
- 43 Code of Federal Regulations (CFR) Part 2800 provides overall guidance for processing ROWs, including those for solar energy development. The Proposed Action requires a ROW to be processed under these regulations.

Based on these federal policies, the BLM is obligated to consider the proposal expeditiously in order to accommodate the potential increase in power generation that, if approved, would come on line on or before 2013. BLM will use this EIS to analyze terms, conditions, and mitigation to determine, which, if any, modifications to the Proposed Project are effective and would protect other resource values.

1.1.2 Proponent's Objective for the Proposed Action

The Proponent's objective of the Proposed Action is to locate a 400MW utility scale solar project within the State of Nevada, south of Las Vegas, where it can interconnect directly into both the Nevada and California transmission systems. The Nevada portion of the Ivanpah Valley was selected because of its solar resource, the availability of suitable land, transmission accessibility to both NV Energy and California Independent System Operator transmission systems, and absence of land use constraints (i.e., Desert Wildlife Management Areas (DWMAs), Areas of Critical Environmental Concern [ACECs], designated Wilderness Areas, Wilderness Study Areas [WSAs], and other restrictive land use designations).

1.2 About This Document

This document follows federal regulations of the Council on Environmental Quality (CEQ) for implementing the procedural provisions of NEPA (40 CFR 1500-1508); the BLM NEPA Handbook, H-1790-1; Sections 201, 202, and 206 of FLPMA; BLM's planning regulations (43 CFR 1600); and the BLM Land Use Planning Handbook, H-1601-1. This EIS describes the components of and reasonable alternatives to the Proposed Action and environmental consequences of the Proposed Action and the alternatives.

The EIS is divided into five chapters for ease of reading and to better organize information for decision making.

Chapter 1 – Introduction, provides general background information and explains the purpose of and need for the Proposed Action, decisions to be made, and authorities regulating the NEPA process. It also provides a summary of issues raised by the public during the scoping phase of the process that will be addressed in the EIS.

Chapter 2 – Proposed Action and Alternatives, presents a reasonable range of alternatives to address the stated purpose and need for the project, including the No Action Alternative and two action alternatives, including the Proposed Action (also BLM's Preferred Alternative). It also discusses alternatives not carried forward for detailed analysis and the agency-preferred alternative, and summarizes environmental effects for each alternative.

Chapter 3 – Affected Environment, describes the affected environment in the Proposed Project area and identifies projects with the potential to cause cumulative impacts.

Chapter 4 – Environmental Consequences, discloses potential direct, indirect, and cumulative environmental effects associated with all of the alternatives and discusses potential mitigation measures to reduce or minimize effects. It also describes the cumulative effects associated with the Proposed Action and other alternatives when added to other past, present, and reasonably foreseeable future actions in the cumulative effects study area.

Chapter 5 – Consultation and Coordination, lists state and federal agencies and other governmental bodies that were consulted or that contributed to the preparation of the EIS, describes Native American consultations and public participation during scoping, and lists agencies, organizations, and persons to whom the EIS will be sent or has been sent. In the Final EIS (FEIS), this chapter will summarize all substantive public and agency comments received on the Draft EIS (DEIS).

Appendices contain information that supplements or supports analyses in the body of the EIS.

1.3 Summary of Public Scoping and Issue Identification

1.3.1 Public Scoping Process

Chapter 5, Consultation and Coordination, contains an in-depth discussion of the scoping process and the issues raised by the public and other agencies during that process. In general, issues identified during the scoping process included:

- NEPA Process;
- Project Alternatives;
- Project Description;
- Purpose and Need;
- Air Quality;
- Water Resources;
- Vegetation Resources;
- Fish and Wildlife;
- Special Status Species;
- Cultural and Historic Resources;
- Lands and Realty;
- Recreation;
- Aesthetics and Visual Resources;
- Public Health and Safety;
- Socioeconomics and Environmental Justice; and
- Cumulative Impacts.

1.4 Policies and Programs

1.4.1 Relationship to Federal Policies, Plans, and Programs

The Proposed Project would be constructed on public land managed by the BLM. The BLM would issue a new ROW grant for construction of the Proposed Project. The Proposed Action is considered a major federal action that, under NEPA, requires an EIS. The following sections summarize the federal, state, and local policies, plans, and laws that apply to the Proposed Action.

1.4.1.1 General

Federal Land Policy and Management Act (FLPMA) of 1976

The FLPMA establishes the land management authority of the BLM and provides guidance for how public lands are to be managed by the BLM. The BLM manages public lands under

multiple use and sustained yield principles. Multiple use is a concept that directs management of public lands and their resource values in a way that best meets the present and future needs of Americans and is defined as "a combination of balanced and diverse resource uses that takes into account the long-term needs of future generations for renewable and nonrenewable resources" (FLPMA §103[c]). FLPMA directs the BLM to manage the public lands in a way that does not cause undue or unnecessary degradation to the environment.

National Environmental Policy Act (NEPA)

NEPA requires federal agencies to review the effects of their actions on the natural and human-made environment prior to taking action. The law requires all federal agencies to consider the direct, indirect, and cumulative effects of proposals and reasonable alternatives prior to making a decision. NEPA requires that all federal actions that could result in a significant effect on the environment to be subject to review by federal, state, local, and tribal environmental authorities, as well as by other affected parties and interested citizens.

1.4.1.2 Air Quality and Climate

Clean Air Act

The U.S. Environmental Protection Agency (EPA) implements and enforces the requirements of most federal environmental laws. EPA Region 9 administers federal air programs in Nevada, including oversight of the State of Nevada Department of Environmental Protection and Clark County Department of Air Quality and Environmental Management (DAQEM) which are responsible for implementing those programs within their jurisdiction. The Clean Air Act (CAA), most recently amended in 1990, provides EPA with the legal authority to regulate air pollution from stationary, area, and mobile sources.

General Conformity Rules

These regulations ensure that federal agencies will not engage, support, or provide financial assistance for licensing or permitting, or approve any activity which does not conform to an approved CAA implementation plan. Specifically, within nonattainment and maintenance areas, potential federal actions (directly or through use authorizations) should not: 1) cause or contribute to new violations; 2) increase the frequency or severity of existing violations; or 3) delay timely attainment or interim emission reductions.

As federal lead agency, the BLM must complete a conformity analysis and possibly a formal determination for a proposed action before it can be approved. The General Conformity Rule excludes activities which are accounted for in the approved State Implementation Plan (SIP), as well as certain specific actions which are assumed to conform. In addition, based on an assessment of reasonably foreseeable potential emissions of the specific air pollutant(s) for which the nonattainment and/or maintenance area were established, activities whose emissions would be below regulatory threshold levels are also assumed to conform. Potential emissions may incorporate BLM enforceable controls or mitigation measures.

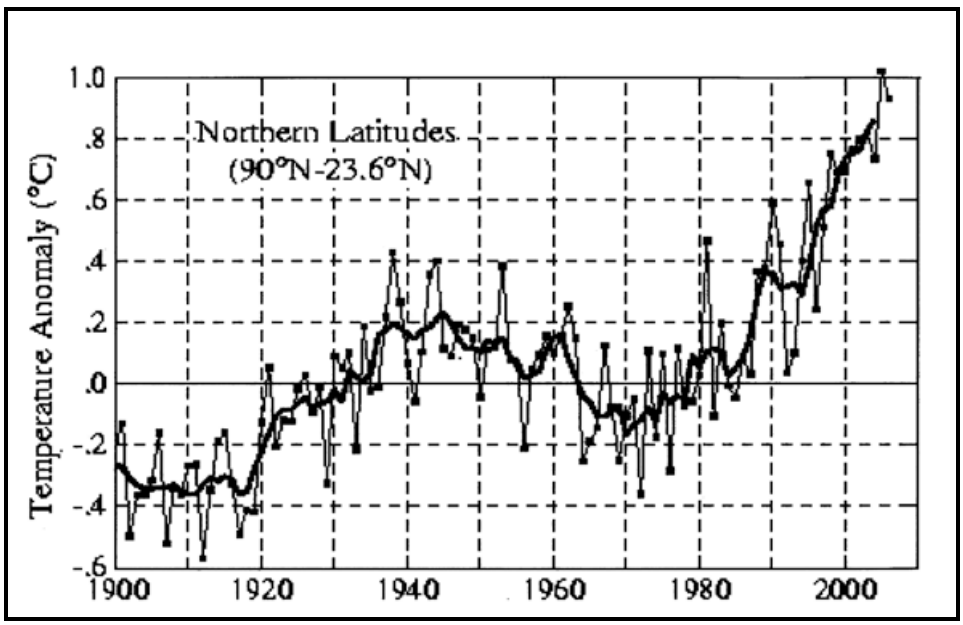
Activities which cannot be presumed to conform will require the BLM to prepare a formal General Conformity Determination for public comment, including preparation of a draft Determination, presentation to the public for formal comments, incorporation of changes based

on public review, and presentation of the final Determination. If the final Determination cannot demonstrate the activity will comply with applicable requirements of the CAA, the proposed activity will not be allowed to occur.

Climate Change

On-going scientific research has identified the potential impacts of so-called "greenhouse gas" (GHG) emissions (including carbon dioxide [CO_2]; methane [CH_4]; nitrous oxide [NO_X]; water vapor; and several trace gasses) on global climate. Through complex interactions on a regional and global scale, these GHG emissions cause a net warming effect of the atmosphere (making surface temperatures suitable for life on Earth), primarily by decreasing the amount of heat energy radiated by the Earth back into space. Although GHG levels have varied for millennia (along with corresponding variations in climatic conditions), recent industrialization and burning of fossil carbon sources have caused CO_2 concentrations to increase dramatically, and are likely to contribute to overall climatic changes, typically referred to as global warming. Increasing CO_2 concentrations also lead to preferential fertilization and growth of specific plant species.

Global mean surface temperatures have increased nearly 1.0 degree Celsius (°C) (1.8 degrees Fahrenheit [°F]) from 1890 to 2006 (Goddard Institute for Space Studies 2007). However, observations and predictive models indicate that average temperature changes are likely to be greater in the Northern Hemisphere. Figure 1.4-1 demonstrates that northern latitudes (above 24° N) have exhibited temperature increases of nearly 1.2°C (2.1°F) since 1900, with nearly a 1.0°C (1.8°F) increase since 1970 alone. Without additional meteorological monitoring systems, it is difficult to determine the spatial and temporal variability and change of climatic conditions, but increasing concentrations of GHG are likely to accelerate the rate of climate change.



Source: Goddard Institute for Space Studies (2007)

Figure 1.4-1. Annual Mean Temperature Change for Northern Latitudes (24 - 90° N)

In 2001, the Intergovernmental Panel on Climate Change (IPCC) indicated that by the year 2100, global average surface temperatures would increase 1.4 to 5.8°C (2.5 to 10.4°F) above 1990 levels. The National Academy of Sciences (2006) has confirmed these findings, but also indicated that there are uncertainties regarding how climate change may affect different regions. Computer model predictions indicate that increases in temperature will not be equally distributed, but are likely to be accentuated at higher latitudes. Warming during the winter months is expected to be greater than during the summer, and increases in daily minimum temperatures is more likely than increases in daily maximum temperatures.

Active tracking PV solar energy systems do not directly generate GHG emissions, but the equipment manufacturing process does emit GHGs. In addition, on-site construction and operations using combustion engines can specifically generate CO_2 and CH_4, although at levels much lower than equivalent coal, oil, or natural gas-fired electrical generation facilities.

1.4.1.3 Soils

Farmland Protection Policy Act

Federal regulations pertaining to agricultural land and soils include the Farmland Protection Policy Act. The program identifies and designates lands according to categories defined in the Farmland Protection Policy Act (7 U.S.C. 4201, et seq.) Agricultural regulations, however, do not pertain to the Proposed Project because it is not located on prime farmland.

1.4.1.4 Water Resources/Hydrology

Clean Water Act

In 1972, Congress passed the Federal Water Pollution Control Act, which was amended several times between 1977 and 2000 and renamed the Clean Water Act (CWA). The goal of the law is to eliminate pollution in the nation's waters by imposing uniform standards on all municipal and industrial wastewater sources based on the best available technology.

Sections 301 and 402 Permitting

Sections 301 and 402 of the CWA prohibit the discharge of pollutants from point sources to "Waters of the U.S.," unless authorized under a National Pollutant Discharge Elimination System (NPDES) permit. NPDES permits can be issued by the EPA or by agencies in delegated states. In Nevada, the NPDES permit program has been delegated to the Nevada Bureau of Water Quality Planning.

Safe Drinking Water Act

The Safe Drinking Water Act was originally passed by Congress in 1974 to protect public health by regulating the nation's public drinking water supply. The Act was amended in 1986 and 1996 and requires many actions to protect drinking water and its sources: rivers, lakes, reservoirs, springs, and groundwater wells. This Act authorizes the EPA to set national health-based standards for drinking water to protect against both naturally occurring and man-made contaminants that may be found in drinking water. The Act also mandates a Groundwater/ Wellhead Protection Program be developed by each state in order to protect groundwater resources that serve as a source for public drinking water.

National Flood Insurance Program

The National Flood Insurance Program (NFIP) is administered by the Federal Emergency Management Agency (FEMA), a component of the U.S. Department of Homeland Security. The NFIP is a federal program enabling property owners in participating communities to purchase insurance protection against losses from flooding. Participation in the NFIP is based on an agreement between local communities and the federal government which states that if a community adopts and enforces a floodplain management ordinance to reduce future flood risks to new construction in Special Flood Hazard Areas, the federal government makes flood insurance available within the community as a financial protection against flood losses.

In support of the NFIP, FEMA identifies flood hazard areas throughout the United States and its territories by producing Flood Hazard Boundary maps, Flood Insurance Rate maps, and Flood Boundary and Floodway maps. Several areas of flood hazards are commonly identified on these maps. One of these areas is the Special Flood Hazard Area, or high-risk area, defined as any land that would be inundated by a flood having a 1 percent chance of occurring in any given year (also referred to as the base flood).

1.4.1.5 Biological Resources

Endangered Species Act (16 U.S.C. §1531 et seq., and 50 CFR § 17.1 et seq.)

The Endangered Species Act (ESA) was passed by the U.S. Congress in 1973 and has since been amended several times. The ESA and 16 CFR 17.1 et seq. designate and provide for protection of threatened and endangered (T & E) plants and animals and their critical habitat. Procedures for addressing federally listed species follow two principal pathways, both of which require consultation with the U.S. Fish and Wildlife Service (USFWS), which administers the Act for all terrestrial species. The first pathway (ESA, Section 10[a] Incidental Take Permit) is set up for situations where a non-federal government entity (or where no federal nexus exists) must resolve potential adverse impacts to species protected under the Act. The second pathway (ESA, Section 7 Consultation) involves projects with a federal connection or requirement; typically, these are projects where a federal lead agency is sponsoring or permitting the Proposed Action. In these instances, the federal lead agency (e.g., BLM) initiates and coordinates the following steps:

- Informal consultation with USFWS to establish a list of target species;
- Preparation of a Biological Assessment assessing the potential for the project to adversely affect listed species;
- Coordination between state and federal biological resource agencies to assess impacts and proposed mitigation; and
- Development of appropriate mitigation for all significant impacts on federally listed species.

The USFWS ultimately issues a final Biological Opinion on whether the project would affect federally listed species. The Biological Opinion includes an incidental take statement that provides a statement of anticipated incidental take accompanied by the appropriate and reasonable mitigation measures to minimize such take.

Migratory Bird Treaty Act (16 U.S.C. §7.3-712; 50 CFR §10)

The Migratory Bird Treaty Act (MBTA) prohibits the "take" (i.e., killing, harassing, trapping, or attempting to do so) of native migratory bird species. The MBTA makes it unlawful to pursue, hunt, take, capture, kill, or sell birds listed under the Act. The statute does not discriminate between live or dead birds, and grants full protection to any bird parts, including feathers, eggs, and nests. Currently, 836 bird species are protected by the MBTA. The USFWS Migratory Birds and Habitat Program primarily operates under the auspices of the MBTA (USFWS 2009a).

Bald and Golden Eagle Protection Act (16 U.S.C. §668; 50 CFR §22 et seq.)

The Bald and Golden Eagle Protection Act prohibits any form of possession or taking of both bald eagles (*Haliaeetus leucocephalus*) and golden eagles (*Aquila chrysaetos*). A 1962 amendment to the Act created a specific exemption for possession of an eagle or eagle parts (e.g., feathers) for religious purposes of Indian tribes. Rule changes made in September 2009 finalized permit regulations to authorize limited take of these species associated with otherwise lawful activities. Take under the new ruling includes both disturbance and mortality. These new regulations establish permit provisions for intentional take of eagle nests under particular, limited circumstances (USFWS 2009b).

Cactus and Yucca Removal Guidelines, BLM

The BLM normally requires transplanting or salvage of certain native plant species that would be lost to development on lands under their jurisdiction. Species that typically require salvage regardless of their height in this region include yuccas (*Yucca spp.*), ocotillo (*Fouquieria splendens*), and cacti. For chollas (*Cylindropuntia* spp.), the plant must be less than 3 feet in height to require salvaging, as all plants greater than 3 feet in height will not be salvaged and converted into part of the 'vertical mulch' (BLM 2001).

Wild Horses and Burros: Protection, Management, and Control (16 U.S.C. §1331; 43 CFR §4700)

The Wild Free-Roaming Horses And Burros Act Of 1971 (Public Law 92-195) declared that wild, free-roaming horses and burros are living symbols of the historic and pioneer spirit of the West; that they contribute to the diversity of life forms within the Nation and enrich the lives of the American people; and that these horses and burros are quickly disappearing from the American landscape. The Act protects these animals from capture, branding, harassment, or death.

Invasive Plants and Noxious Weeds

Invasive plants and noxious weeds are managed on public lands by the BLM under the direction of the National Invasive Species Council (NISC) established in 1999 (Executive Order [EO] 13112). This statute defines invasive species as " …an alien (non-native) species whose introduction does, or is likely to cause, economic or environmental harm or harm to human health" (NISC 2008). In addition, much of the management of invasive plants and the listing of noxious weeds is regulated by the U.S. Department of Agriculture (USDA) under the Federal Noxious Weed Act (7 U.S.C. 2801 et seq. 1974). Invasive weeds are defined for this report as species of non-native plants that are included on the USDA weed lists for Nevada (USDA 2009),

as well as those plant species identified by the BLM in the Las Vegas Field Office Noxious Weed Plan (BLM 2006).

Range

For range resources, the following land use plans, policies, and regulations would be applicable:

- Las Vegas Resource Management Plan (1998);
- Jean Lake Allotment Management Plan (1998);
- Ephemeral Range Rule (1968);
- The Federal Land Policy and Management Act (1976);
- Clark County's Short Term Habitat Conservation Plan for the Desert Tortoise (1991); and
- 43 CFR 4180 Standards and Guidelines for Rangeland Health (1997).

1.4.1.6 Cultural and Historic Resources

This section provides an overview of the applicable plans, policies, and regulations that influence the management of cultural resources. Although some of the plans, policies, and regulations listed do not directly apply to the Proposed Action, they were applied as a basis for the analysis of potential impacts on cultural resources (Section 4.3.7, Cultural Resources Impacts).

American Indian Religious Freedom Act of 1978

The American Indian Religious Freedom Act (AIRFA) enforces the right of Native Americans to have access to their sacred places. If a place of religious importance to Native Americans may be affected by an undertaking, AIRFA promotes consultation with Indian religious practitioners, which may be coordinated with National Historic Preservation Act (NHPA) §106 consultation.

Antiquities Act of 1906

The Antiquities Act was the first law enacted to specifically establish that archaeological sites on public lands are important public resources, and the Act obligated federal land management agencies to preserve the scientific, commemorative, and cultural values of such sites on these lands.

Archaeological Resources Protection Act of 1979

The Archaeological Resources Protection Act (ARPA) provides for the protection of archaeological resources and sites that are on public lands and Indian lands. ARPA may impose additional requirements on an agency if federal or Indian lands are involved.

Archaeological and Historic Preservation Act of 1974

The Archaeological and Historic Preservation Act (AHPA) imposes additional requirements if a project would affect historic properties that have archaeological value, and notifies the DOI when an action under the AHPA does not comply with NHPA §106.

Executive Order 11593 (1971), Protection and Enhancement of the Cultural Environment

EO 11593 provides government leadership in preserving, restoring, and maintaining the historic and cultural environment of the Nation, addresses the National Register of Historic Places (NRHP), and provides guidance to those involved with federal properties that should be inventoried and nominated for listing on the NRHP.

Executive Order 13007 (1996), Protection and Preservation of Native American Sacred Sites

EO 13007 establishes that federal land stewards shall, to the extent practicable and permitted by law, and not clearly inconsistent with essential agency functions, accommodate access to and ceremonial use of Indian sacred sites by Indian religious practitioners and avoid adversely affecting the physical integrity of such sacred sites. Where appropriate, agencies shall maintain the confidentiality of sacred sites.

Executive Order 13287 (2003), Preserve America

EO 13287 requires that the federal government provide leadership in preserving America's heritage by actively advancing the protection, enhancement, and contemporary use of historic properties owned by the federal government.

Executive Order 11593 (1971), Protection and Enhancement of the Cultural Environment

EO 11593 requires federal agencies to administer the cultural properties under their control in a spirit of stewardship and trusteeship for future generations, and initiate measures necessary to direct their policies, plans, and programs in such a way that federally owned sites, structures, and objects of historical, architectural, or archaeological significance are preserved, restored, and maintained.

National Historic Preservation Act (§ 106; 36 CFR 800)

Section 106 of the NHPA requires federal agencies to take into account the effects of their undertakings on historic properties and seeks to accommodate historic preservation concerns with the needs of federal undertakings through consultation among the agency official and other parties. The goal of consultation is to identify historic properties potentially affected by the undertaking, assess effects, and seek ways to avoid, minimize, or mitigate any adverse effects on historic properties.

Native American Graves Protection and Repatriation Act of 1990

The Native American Graves Protection and Repatriation Act (NAGPRA) provides a requirement for federal agencies and institutions that receive federal funding to return certain Native American cultural items, including human remains, funerary objects, sacred objects, and objects of cultural patrimony, to lineal descendants and cultural affiliated Indian tribes. For activities on federal lands, NAGPRA requires consultation with "appropriate" Indian tribes prior to the intentional excavation, or removal after inadvertent discovery, of several kinds of cultural items, including human remains and objects of cultural patrimony.

1.4.1.7 Paleontological Resources

Paleontological Resources Preservation Act of 2009

The Paleontological Resources Preservation Act (PRPA) provides protection for vertebrate (i.e., animals with backbones) paleontological resources on federal lands by limiting the collection of vertebrate fossils and scientifically important fossils to permitted and qualified researchers.

Antiquities Act of 1906

The Federal Antiquities Act establishes that federal land management agencies are obligated to preserve the scientific, commemorative, and cultural values of such sites (National Park Service [NPS] 2007). The Antiquities Act does not refer to paleontological resources specifically; however, the protection of "objects of antiquity" is understood to include paleontological resources.

National Natural Landmarks Program

The National Natural Landmarks Program, administered by the NPS, encourages the preservation of the Nation's best examples of geologic features and identifies landmarks at risk of degradation or damage.

National Historic Preservation Act of 1966

The NHPA requires the analysis of the effect of federal undertakings on paleontological resources.

1.4.1.8 Lands and Realty

The Proposed Project site would be located on lands under the jurisdiction of the BLM. The land use plans, policies, and regulations that would be applicable to the Proposed Action are discussed below.

Federal Land Policy and Management Act of 1976

Title V of the FLPMA provides the BLM with its ROW authority, as implemented under the 43 CFR 2800 regulations. Section 302 of the FLPMA administers private and commercial use of public lands including development and amortization of capital investment, permits for short-term use with minimal land development, and easements to assure uses of public lands are compatible with non-federal lands. Land use authorizations for leases and permits are processed on a case-by-case basis by the BLM as proposals for certain uses are received.

Las Vegas Resource Management Plan

The Las Vegas Resource Management Plan (LVRMP) contains ROW development guidelines for the authorization of ROWs on public lands for a variety of uses including electrical transmission lines, electrical power plants and substations, and related power distribution lines. ROW authorizations are processed on a case-by-case basis by BLM as proposals for certain uses are received. The LVRMP emphasizes protecting unique habitats for threatened, endangered, and special status species, while providing various uses including recreation, community growth, and mineral exploration and development (BLM 1998a).

Federal Aviation Administration

Federal Aviation Administration (FAA) regulations address potential aircraft obstruction for structures taller than 200 feet or within 20,000 feet of an airport. Specifically, Federal Regulation Title 14, Part 77, establishes standards and notification requirements for objects that have the potential to affect navigable airspace. These standards are intended to: (1) evaluate the effect of the construction or alteration of structures on airport operating procedures; (2) determine if there is a potential hazard to air navigation; and (3) identify measures to enhance safety. Specifically, the FAA requires notification through the filing of FAA Form 7460, Notice of Proposed Construction or Alteration, if any of the following criteria are met with regards to a proposed action (Title 14, Part 77.13).

1.4.1.9 Special Management Areas

FLPMA Sec. 103(a) defines an ACEC as an area "within the public lands where special management attention is required (when such areas are developed or used or where no development is required) to protect and prevent irreparable damage to important historic, cultural, or scenic values, fish and wildlife resources, or other natural systems or processes, or to protect life and safety from natural hazards."

The Proposed Action is located within 5 miles of several designated wilderness areas and DWMAs, which also qualify as Special Management Areas (SMAs).

1.4.1.10 Visual Resources

Federal Land Policy and Management Act of 1976

The following sections of FLPMA relate to the management of aesthetic and visual resources on lands managed by BLM:

> The public lands [shall] be managed in a manner that will protect the quality of scientific, scenic, historical, ecological, environmental, air and atmospheric, water resource, and archeological values. Section 102(a).
>
> The Secretary shall prepare and maintain on a continuing basis an inventory of all public lands and their resources and other values (including…scenic values). Section 201(a).
>
> Each right-of-way shall contain terms and conditions which will (ii) minimize damage to the scenic and esthetic values. Section 505(a).

The Las Vegas Resource Management Plan (RMP) provides a comprehensive framework for managing visual resources in the 3.3 million acres of public land administered by the BLM in Clark and southern Nye counties, Nevada (BLM 1998).

Federal regulations regarding aesthetics and visual resources related to the Proposed Project are outlined in BLM published RMPs and are enacted through the application of Visual Resources Management (VRM) classification.

1.4.1.11 Human Health and Safety/Hazardous Materials

The BLM stated policy aims to reduce threats to public health and safety, and property on the lands that it administers. Under the FLPMA, the BLM is required to comply with state standards for public health and safety. This involves working with the EPA, state environmental quality departments, counties, and potentially responsible parties (both public and private) in hazardous materials management and emergency response actions, site evaluations, and prioritization of cleanups on BLM lands in accordance with laws and regulations.

The Occupational Safety and Health Administration (OSHA) administers Occupational Safety and Health Standards (29 CFR §§1910 and 1926), which: (1) provide regulations for safety in the workplace; (2) regulate construction safety; and (3) require a Hazard Communication Plan to include identification and inventorying of all hazardous materials for which Material Safety Data Sheets (MSDS) will be maintained, and employee training in safe handling of said materials.

Resource Conservation and Recovery Act

The Resource Conservation and Recovery Act of 1976 (RCRA) established a program administered by the EPA for the regulation of the generation, transportation, treatment, storage, and disposal of hazardous waste. The RCRA was amended in 1984 by the Hazardous and Solid Waste Act (HSWA), which affirmed and extended the "cradle to grave" system of regulating hazardous wastes. The use of certain techniques for the disposal of some hazardous wastes was specifically prohibited by HSWA.

The RCRA regulates solar PV product end-of-life disposal. If solar panels are determined to be hazardous waste by the regulatory authority, the requirements of RCRA would regulate their handling, recycling, reuse, storage, treatment, and disposal. Decommissioned or defective solar panels are currently considered hazardous waste if they do not meet the EPA Toxicity Characteristic Leaching Procedure (TCLP) standards (this determination varies depending on the technology used). Silicon-based panels typically last 20 to 25 years and a proactive recycling option can eliminate health and environmental risks of water stream and water contamination for municipalities.

Comprehensive Environmental Response, Compensation, and Liability Act

Under the authority of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA, or the Superfund Act) of 1980, as amended, and pursuant to the National Oil and Hazardous Substances Pollution Contingency Plan, the BLM has been delegated the responsibility for undertaking response actions with respect to the release or threat of release of oil, petroleum products, hazardous substances, or pollutants and contaminants that pose an actual or potential threat to human health or welfare, or to the environment.

CERCLA provides a federal Superfund to clean up uncontrolled or abandoned hazardous waste sites, as well as accidents, spills, and other emergency releases of pollutants and contaminants into the environment. CERCLA establishes requirements concerning closed and abandoned hazardous waste sites, provides for liability of persons responsible for releases of hazardous waste at these sites, and establishes a trust fund to provide for cleanup when no responsible party can be identified. Under this authority, the BLM may take an action to protect public land resources and users from hazardous substances that pose a threat or potential threat to human

health and the environment. As the lead federal agency for actions taken on BLM public land, the BLM is responsible for the identification of all environmental laws that pertain to any CERCLA cleanup actions.

CERCLA also enabled the revision of the National Contingency Plan (NCP). The NCP provided the guidelines and procedures needed to respond to releases and threatened releases of hazardous substances, pollutants, and/or contaminants. The NCP also established the National Priorities List (NPL).

Superfund Amendments and Reauthorization Act

The Superfund Amendments and Reauthorization Act (SARA) amended CERCLA and established a nationwide emergency planning and response program, and imposed reporting requirements for businesses that store, handle, or produce significant quantities of extremely hazardous materials. The Act requires states to implement a comprehensive system to inform local agencies and the public when a significant quantity of such materials is stored or handled at a facility. Additionally, SARA identifies requirements for planning, reporting, and notification concerning hazardous materials. SARA Title III contains the Emergency Planning and Community Right to Know Act.

Hazard Management and Resource Restoration Program

The Hazard Management and Resource Restoration (HMRR) Program is administered by the BLM. Its mission is to protect lives, resources, and property, and to improve the health of landscapes and watersheds by:

- Minimizing the environmental contamination on public lands;
- Reducing and eliminating risks associated with physical and environmental hazards;
- Restoring resources impacted by oil discharges and hazardous releases; and
- Administering CERCLA assessments.

Occupational Safety and Health Administration (OSHA) Electrical Safety Standards

OSHA regulations at 29 CFR, Part 1910.302 provide a description of concepts and principles associated with electrical hazards and basic electrical safety for individuals. OSHA's electrical standards for construction recommend following general industry electrical standards whenever possible for hazards that are not addressed by industry-specific standards. The standards address concerns that relate to electrical hazards and exposures to dangers such as electrical shock, electrocution, burns, fires, and explosions. OSHA's electrical standards help minimize these potential hazards by specifying safety aspects in the design and use of electrical equipment and systems.

National Fire Protection Association 780, National Electrical Code

The National Electrical Code (NEC) addresses electrical hazards through guidance related to installation of any electrical power system, including PV systems (NEC 2009). The NEC covers the installation of electrical conductors, equipment, and raceways; signaling and communications conductors; and equipment and optical fiber cables for public and private premises. The

activities of the Proposed Project may require special permission from the Clark County Fire Department, which has jurisdiction for the enforcement of this Code. Article 690 of the NEC specifically covers installation and operational requirements for solar PV systems.

Clean Water Act 33 U.S.C. Section 1251 et seq.

The CWA was enacted with the intent of restoring and maintaining the chemical, physical, and biological integrity of the waters of the United States. It requires a written Spill Prevention, Control, and Countermeasures (SPCC) Plan to be prepared for any facility with more than 1,320 gallons of aboveground oil storage capacity. Since its enactment, the CWA has formed the foundation for regulations detailing specific requirements for pollution prevention and response measures. The EPA implements provisions of the CWA through a variety of regulations, including the NCP and the Oil Pollution and Prevention Regulations. Implementation of the CWA is the responsibility of each state.

SPCC plans must be prepared, certified by a professional engineer, and implemented by facilities which store, process, transfer, distribute, use, drill, produce, or refine oil or oil production.

Safe Drinking Water Act

The Safe Drinking Water Act (SDWA) was originally passed by Congress in 1974 to protect public health by regulating the nation's public drinking water supply. The law was amended in 1986 and 1996 and requires many actions to protect drinking water and its sources including rivers, lakes, reservoirs, springs, and ground water wells (SDWA does not regulate private wells which serve fewer than 25 individuals). SDWA authorizes the EPA to set national health-based standards for drinking water to protect against both naturally occurring and man-made contaminants that maybe found in drinking water. EPA, states, and water systems then work together to make sure that these standards are met.

Clean Air Act of 1990 (42 U.S.C. 7401 et seq. as amended)

The CAA establishes a nationwide emergency planning and response program, and imposes reporting requirements for businesses that store, handle, or produce significant quantities of extremely hazardous materials. The CAA section on Risk Management Plans (42 U.S.C. §112(r)) requires states to implement a comprehensive system to inform local agencies and the public when a significant quantity of such materials is stored or handled at a facility.

Hazardous Materials Communications, Emergency Response Information, Training Requirements, and Security Plans (49 CFR 172.800)

This regulation requires that the suppliers of hazardous materials prepare and implement security plans in accordance with U.S. Department of Transportation (USDOT) regulations.

1.4.1.12 Energy and Minerals

If, during construction of the facility, there is a need for mineral material or disposal of excess mineral material, their acquisition would be processed under the Materials Act of 1947, as amended (July 31, 1947) and the Surface Resources Act of 1955.

1.4.2 Relationship to State and Local Plans, Policies, and Programs

1.4.2.1 Air Resources – Local

Clark County Department of Air Quality and Environmental Management

The Clark County DAQEM has been delegated the authority, under the provisions of Nevada Revised Statute (NRS) 445B.500 and by direction of the Governor of the state of Nevada and the Clark County Board of County Commissioners, to implement and enforce an air pollution control program in Clark County, Nevada. DAQEM applies and enforces the Air Quality Regulations, which establish requirements for sources that emit or release air contaminants into the atmosphere (Clark County 2008). Air quality regulations applicable to the Proposed Action include:

- **Section 41, Fugitive Dust**: This section establishes that any person engaged in activities involving grading, clearing of land, public or private construction, the operation of machines and equipment, the grading of roads, trenching operations, the operation and use of unpaved parking facilities, and operation and use of raceways for motor vehicles shall take all reasonable precautions to abate fugitive dust from becoming airborne from such activities. Reasonable precautions may include sprinkling, compacting, enclosure, chemical, or asphalt sealing, cleaning up, sweeping, or such other measures as the control officer may specify to accomplish satisfactory results. Reasonable precautions are not limited to the conditions agreed upon by the DAQEM permit for the Proposed Action.

- **Section 45, Idling of Diesel- Powered Motor Vehicles**: This section sets the rules for diesel- powered motor vehicle idling. A person shall not idle the engine of a diesel truck or a diesel bus for more than 15 consecutive minutes.

- **Section 90, Fugitive Dust from Open Areas and Vacant Lots (90.2.1)**: This section sets rules for open areas and vacant lots greater than 5,000 square feet that are disturbed by any means, including motor vehicles and/or off-road motor vehicles. The rule charges that owners of open areas shall implement all control measures necessary to limit the disturbance of open areas and vacant lots in accordance with the requirements of the regulation. Finally, it requires the use of reclaimed water to the greatest extent practicable to conserve water.

- **Section 94, Permitting and Dust Control for Construction Activities**: The purposes of this section are: (a) to limit the emission of particulate matter into the ambient air by preventing, controlling, and mitigating fugitive dust from construction activities; and (b) to establish fugitive dust control standards for Clark County, define reasonable precautions for the prevention and control of fugitive dust from all construction activities, and to establish thresholds for enforcement of these standards.

Although the State of Nevada has numerous policies that focus on renewable energy and energy-efficiency, there are no finalized statewide laws or policies addressing GHG emissions specifically.

On April 10, 2007, the Governor signed an Executive Order (EO) that created the Nevada Climate Change Advisory Committee (NCCAC). The EO directed the NCCAC to propose

recommendations by which GHG emissions can be further reduced in Nevada. In 2008, the NCCAC issued a final report that details 28 recommendations and prioritizes six of those:

- Developing a State Climate Action Plan;
- Utility Environmental Protection Act siting restrictions;
- GHG reduction (Intensity);
- Energy transmission corridors;
- Renewable Portfolio Standard Modification Proposal; and
- Streamlining governmental permitting and review process at state and federal levels.

These recommendations are still under consideration by the State of Nevada, and no formal rulemaking has been completed; therefore, there are currently no direct effects on the Proposed Project. Additionally, none of the recommendations outlined by the Clark County report specifically address GHG emissions from construction.

1.4.2.2 Noise – Local

The Applicant will need to adhere with the following county and local noise ordinances in the construction and operation of the Proposed Project.

Clark County

Sec 30.68.020 (h): Requirements of this section do not apply to construction and/or demolition activities when conducted during daytime hours.

Sec 30.68.020 (b): The maximum permissible sound pressure level of any continuous, regular, or frequency source of sound produced by any activity shall be established by time period and type of zoning district (per Table 30.68-1 in the Clark County regulations).

Sec 30.68.020 (e): Impulsive type noises shall be subject to the standards described in Table 30.68-2, provided they are capable of being accurately measured with the equipment described in the ordinance (e.g., a sound level meter and associated octave band filter).

1.4.2.3 Water Resources – State

State water quality standards allow water bodies to be managed by establishing goals based on: (1) designated uses of the water; (2) criteria set to protect human and aquatic organism health; and (3) anti-degradation requirements to prevent current water quality from deterioration. Waters listed as 'impaired' do not fully support their designated uses. Section 305(b) of the CWA requires states to submit biennial water quality reports to the EPA that provide a state-wide assessment of all waters. Section 303(d) requires states to provide a list of impaired waters only, identifying possible pollutants and prioritizing those waters for further pollution controls.

Nevada Revised Statute 444A.420 and Nevada Administrative Code 445A.118-225

The NRS and NAC regulate surface water within the state and also assign responsibility for implementing CWA §401 through 402 and 303(d) in Nevada. The Nevada Division of

Environmental Protection's (NDEP) Bureau of Water Pollution Control is the state entity in charge of governing the water statutes. Nevada establishes both numeric and narrative water quality standards for surface waters. None of the drainage features that would be encountered by the Proposed Project in Nevada have established numeric water quality standards. However, both Roach Dry Lake and Ivanpah Dry Lake and all ephemeral washes must meet narrative water quality standards, which primarily concern protection of the features from pollutants and toxics.

Construction General Stormwater Permit

CWA §402 regulates construction-related stormwater discharges to surface waters through the NPDES program. The Nevada Bureau of Water Pollution Control manages construction stormwater permits. In Nevada, the NDEP has been delegated the authority by the EPA to administer the NPDES program through the Bureau of Water Pollution Control. The construction stormwater permit is required for all sites greater than 1 acre. A waiver is possible if the site is less than 5 acres and meets certain stipulations. The permit will require the Applicant to prepare and enforce a Stormwater Pollution Prevention Plan (SWPPP) during construction. Industrial stormwater permits and septic system permits are also managed under NDEP. Nevada does not have specific regulations pertaining to the treatment of fuel spills during construction. All petroleum-contaminated materials must be disposed of in accordance with applicable state and local regulations.

Groundwater Protection Areas and Wellhead Protection

The NDEP also administers the Wellhead Protection Program, which is developed and implemented at the local level, such as the public water system, city, or township. The NDEP offers guidance to the local districts and endorsement of Wellhead Protection Programs, enforces regulatory setbacks to protected groundwater and wellhead areas, and keeps track of specific areas delineated as wellhead and source water protection areas.

1.4.2.4 Water Resources – Local

As there are no perennial surface waters in the basin, there is no local governing water authority for the area. The management and allocation of water resources for the basin is under the authority of the Nevada Division of Water Resources (NDWR) State Engineer. The NDWR is responsible for the appropriation and reallocation of public waters, including quantifying existing water rights, monitoring water use, and distributing water in accordance with court decrees.

Floodplain Management

The Clark County Regional Flood Control District has a comprehensive floodplain management program in place that includes a regulatory program that establishes standards and requirements for flood hazard management. Clark County has adopted revised "Uniform Regulations for the Control of Drainage" that comply with national FEMA standards and provide regulatory control over land development in floodplain areas. These regulations outline when and where Floodplain Use Permits are required, as well as the process for review of local development permit applications in compliance with these regulations.

Stormwater Management

A Stormwater Quality Management Committee has been formed as a partnership entity among the cities of Las Vegas, North Las Vegas, Henderson, the Clark County Regional Flood Control District, and Clark County. This committee manages stormwater program development and compliance efforts in accordance with the State of Nevada's NPDES Program. For inclusion of a project under the state's General Stormwater Permit, project proponents must submit a notice of intent and a SWPPP for all soil disturbing activities. The criteria for soil disturbing activities include those where one or more acres will be disturbed, stormwater (free-flow or via storm drains) will be discharged to a natural receiving water, and/or detention basins will need to be constructed for on-site stormwater treatment.

1.4.2.5 Special Status Species – State

The State of Nevada protects several endangered plants under NAC Chapter 527 and NRS 501. NRS 501, supplemented by the NAC, is the Nevada State Law that covers administration and enforcement of wildlife resources within the state. Chapter 527 gives the Nevada Natural Heritage Commission the ability to protect native flora by listing them on their protected species list:

> "It is unlawful . . . to cut, destroy, mutilate, remove or possess any Christmas tree, cactus, yucca or branches thereof, or knowingly transport or sell any from any of the lands owned by or under the jurisdiction of the State of Nevada or its counties, or on any reserved or unreserved lands owned by the United States, or from any privately owned lands, without written permission from the legal owner, or his duly authorized agent, specifying locality by legal land description and number of plants to be removed or possessed" (NRS 527.101).
>
> "The removal or possession of cacti, yucca, and evergreen trees requires a permit and tags from the Nevada State Forester Firewarden, Nevada Division of Forestry" (NRS 527.091).

1.4.2.6 Special Status Species – Local

Clark County Multiple Species Habitat Conservation Plan – 2000

The Clark County Multiple Species Habitat Conservation Plan (MSHCP) and the resultant USFWS Section 10(a) incidental take permit are designed to allow the incidental take of species covered by the ESA on non-federal lands (Clark County 2000). The MSHCP provides for the long-term conservation and recovery of native species of wildlife and plants and their habitats, while allowing for regulated development of lands within Clark County. The MSHCP is designed to comply with statutory and regulatory requirements of the ESA and the NEPA. The plan represents a county-wide conservation strategy that emphasizes ecosystem level management of natural resources, and which replaces earlier species-specific conservation efforts.

There are four designated classes of management under the MSHCP, and mitigation ratios and fees are applied to projects based upon these classes. Intensively Managed Areas (IMAs) are "Core, High Priority Conservation Areas" set aside for one or more species, and no uses other

than preservation are allowed. Less Intensively Managed Areas (LIMAs) are buffers between IMAs and other lands that preserve much of the natural resource values, while allowing low impact uses/development. Multiple Use Managed Areas (MUMAs) allow a variety of development (usually surrounding existing development and transportation and utility corridors), but mitigation is still required for species impacts. Impacts to LIMAs generally require higher mitigation ratios than MUMAs. Unmanaged Areas (UMAs) are developed areas with little natural resource value and few requirements for natural resource preservation.

1.4.2.7 Cultural Resources – State

Removal of Remains for Sale or Dissection; Purchases; Punishment: Nevada Revised Statute 451 et seq.

This statute ensures the protection of all human remains on public and private land by establishing penalties of imprisonment, fines, or a combination thereof. The penalties are applicable to both the person who collects the remains as well as to any person who receives or purchases any such remains. Section 451.045 establishes a permit obtainable from a local health officer for the disinterment or removal of human remains.

Nevada Revised Statute 383.150 to 383.190

This statute protects Native American graves on private and public land.

1.4.2.8 Paleontology – State

Nevada Revised Statute 381.195-255

This statute governs the issuance of antiquities permits in the state of Nevada.

1.4.2.9 Lands and Realty – Local

Clark County Comprehensive Plan

This general plan provides long-term planning goals and policies for Clark County's future growth. The Clark County Comprehensive Plan has goals and policies related to land use, energy, and utilities which are applicable to the Proposed Project. Clark County's Utilities Policy UT 1-6 encourages the development of transmission capability and interconnectivity for distributed energy, cogeneration, and alternative energy sources, including regional interconnectivity and transmission capability. Energy Policy CV7-1.6 states that "Clark County supports partnerships and cooperation with local, regional, and federal agencies to further promote energy conservation and efficiency, renewable energy projects, and sustainable development" (Clark County 2006).

Clark County Department of Aviation (CCDOA) has created a Southern Nevada Regional Airport System Plan, the goal of which is to accommodate all of the various aviation needs of Southern Nevada. The Airport System Plan provides the framework by which the regional airport system can be developed, considering the following constraints: (1) land availability; (2) airspace complexity; (3) surrounding natural conditions (particularly terrain); (4) environmental considerations; and (5) financial considerations. Within this framework, the Airport System Plan optimizes use of individual airports (both existing and planned), as well as the airspace, navigational, and other aviation facilities that are shared by aircraft operating at one or all of the

airports in Southern Nevada. The Airport System Plan identifies the need for the planned supplemental commercial service airport in the Ivanpah Valley that will be adjacent to the Proposed Action.

South County 2008 Land Use Plan

There is an additional land use plan that governs the communities within the southern unincorporated areas of Clark County including Primm, Nevada; the plan is called the South County 2008 Land Use Plan. The Plan has a land use policy for energy transmission line facilities that states, "Energy transmission facilities should be located adjacent to existing energy transmission facilities. New pipelines and power lines should be limited to existing corridors and their placement within the corridors should be as close together as possible" (Clark County 2008).

1.4.2.10 Human Health and Safety/Hazardous Materials − State

Nevada State Plan

The Nevada State Plan is administered by the Division of Industrial Relations (DIR), Department of Business and Industry. Enforcement of the Plan is provided by the Nevada OSHA, and consultation is provided by the Nevada Safety Consultation and Training Section (SCATS). The State of Nevada, under an agreement with OSHA, operates an occupational safety and health program in accordance with Section 18 of the Occupational Safety and Health Act of 1970. Initial approval of the Nevada state plan was published on January 4, 1974, and final approval was published on April 18, 2000.

Nevada Revised Statute – Hazardous Materials, Chapters 459 and 477

NRS Chapter 459 regulates hazardous materials in the state of Nevada, including radioactive materials, highly hazardous substances, and explosives. This Chapter, Section 459.400 et seq., also includes provisions, definitions, and jurisdictional responsibilities for hazardous waste disposal. NRS 477.045 and NRS 477.047 establish provisions for training programs for response to spills; permits for storage; surcharges for permits; and a mobile training team for volunteer firefighters to respond to incidents involving hazardous materials. This regulation states that the Nevada State Fire Marshal establishes a statewide training program for response to spills of hazardous materials and related fires, and also requires persons who store hazardous materials to obtain a permit to do so. The revenue derived by the State Fire Marshal, pursuant to this section, is deposited to the Contingency Account for Hazardous Materials.

Nevada Revised Statute – Emergency Management, Chapter 414

General provisions of the Emergency Management Statute (NRS 414.200 et seq.) include the following:

- Eliminate or reduce the probability that an emergency will occur, or reduce the effects of unavoidable disasters;
- Periodically test plans for emergency operations to ensure that the activities of state and local government agencies, private organizations, and other persons are coordinated; and

- Restore the operation of vital community life-support systems and return persons and property affected by an emergency or disaster to a condition that is comparable to or better than what existed before the emergency or disaster occurred.

Nevada Division of Environmental Protection, Department of Conservation and Natural Resources

NDEP is the state agency responsible for the response and remediation of hazardous materials incidents, as designated by the State Comprehensive Emergency Management Plan.

Nevada Division of Emergency Management, Nevada Department of Public Safety

The Nevada Division of Emergency Management (NDEM) operates under the authority of NRS 414. The NDEM is responsible for staffing the State Emergency Operations Center (SEOC) when a disaster or emergency threatens, as well as prior to and during large-scale events. The Clark County and Las Vegas fire departments provide emergency response.

Nevada Task Force 1

Nevada Task Force 1 (NV TF-1) is one of 28 FEMA Urban Search and Rescue task forces prepared to respond to state or federal disasters throughout the United States. The task force can be deployed by FEMA for the rescue of victims due to man-made or natural disasters. NV TF-1 consists of members from the Clark County Fire Department, Las Vegas Fire and Rescue, the Henderson and North Las Vegas fire departments, as well as civilians from several private companies.

1.4.2.11 Human Health and Safety/Hazardous Materials − Local

Clark County Fire Department

The Clark County Fire Department maintains first responder responsibility for incidents within unincorporated areas of Clark County. Specific responsibilities include:

- Urban fire services;
- Rural fire services;
- Aircraft rescue fire fighting;
- Emergency medical services including basic, intermediate, and advanced life support (paramedic program);
- Hazardous materials response team;
- Fire prevention;
- Fire investigation;
- Disaster and emergency preparedness;
- Public education; and
- Technical rescue including Urban Search and Rescue (FEMA National Response Team), Confined Space Rescue, Heavy Rescue, and Swift Water Rescue. Clark County Office of Emergency Management Code, Chapter 3.04

The Clark County Office of Emergency Management created an integrated emergency management public safety division that facilitates the coordination of multi-agency public safety projects, including emergency management planning, preparation activities such as training and exercises, response support coordination during emergencies (Ord. 2762 (part), 2002; Ord. 1881 §1 (part), 1996). The Office of Emergency Management provides coordination support for the mitigation, preparation, response and recovery activities necessary for the protection of lives and property within Clark County.

Clark County Multi-Jurisdictional Hazard Mitigation Plan

The Clark County Multi-Jurisdictional Hazard Mitigation Plan establishes a strategy to implement improvements and programs to reduce community and regional impacts in the event of a natural disaster. The Plan covers the unincorporated area of Clark County and the following cities: Boulder City, Henderson, Las Vegas, North Las Vegas, and Mesquite. The Clark County Fire Department is the lead agency for hazardous events. The Clark County and Las Vegas fire departments are responsible for the continued update of emergency evacuation plans for wildland fire incidents for Hazard Mitigation Planning in Clark County.

Clark County Fire Code (Title 79 and 80)

All hazardous material storage, use, manufacturing, and or repackaging system installations, erected located or relocated within Clark County are required to obtain plans review, and required permits from the Clark County Fire Department. An applicant must submit a Combined Plan/Permit application. After the plan is accepted, a site inspection is performed. A “Permit” is issued after the required inspection is completed.

The Combined Plan/Permit application includes, among other items, a detailed site plan that includes where hazardous materials would be stored and used on site, and the location of hazardous materials storage cabinets, flammable liquid storage cabinets, special fire extinguishing systems, or automatic sprinklers in buildings.

1.5 Decisions to be Made

This EIS will provide the information and environmental analysis necessary to inform BLM’s authorized officer and the public about the potential environmental consequences of the Proposed Action and alternatives. BLM’s decisions will:

- Approve the Proposed Action or alternative and grant a ROW to the Applicant;
- Approve the Proposed Action or alternative with additional mitigation measures; or
- Deny the ROW application.

Federal, state, and local permits and approvals would be required before construction and operation of the Proposed Project could proceed. A list of the major permits, approvals, and consultations required is presented in Table 2.9-1 in Section 2.9, Federal, State, and Local Permitting. The Applicant would be responsible for obtaining all permits and approvals required to build, operate, and maintain the Proposed Project if the ROW grant is approved by the BLM.

1.6 NEPA Process

A summary of the NEPA process is given below.

1. **Conduct Scoping:** This is the initial phase, in which the BLM announced its intent to prepare an EIS to consider the Applicant's ROW application. The purpose of scoping is to notify the public and federal, state, and local agencies and tribal governments of the Proposed Action and to gather information on potential impacts.
2. **Collect Data:** Based on the issues raised during scoping, all relevant resource data and management information is collected for the assessment of direct and indirect impacts.
3. **Develop Alternatives:** A range of reasonable alternatives is developed to meet the purpose and need for the EIS. This document will include a No Action Alternative and two action alternatives, including the Proposed Action (BLM's Preferred Alternative).
4. **Assess Impacts:** Using accepted scientific methods, the direct, indirect, cumulative, and residual impacts of the Proposed Action and alternatives are assessed.
5. **Circulate Draft EIS and Hold Public Comment Period:** The DEIS is circulated for public and agency review and comment. Meetings are usually held to explain the findings of the DEIS and to collect additional comments.
6. **Revise EIS:** The document is revised based on input from the public and other agencies.
7. **Circulate Final EIS:** The BLM circulates the FEIS, along with its preferred alternative, for a 30-day review period by the public.
8. **Issue Decision:** The BLM's authorized officer will sign the Record of Decision (ROD), which includes all approved mitigation measures.
9. **Hold Appeal Period:** After the ROD is signed, participants in the EIS process who have legal standing can file an appeal of this implementation decision to the Interior Board of Land Appeals if they disagree with the decision of the BLM.

1.7 Land Use Plan Conformance Determination

The Proposed Action is in conformance with the Approved LVRMP/ROD dated October 1998, which allows for energy ROWs on public lands managed by the BLM. Specifically:

> Objective RW-1: "Meet public demand and reduce impacts to sensitive resources by providing an orderly system for…major utility lines and related facilities" (Appendix A, p. 19); and
>
> The Proposed LVRMP EIS shows the project being directly adjacent and possibly intersecting a proposed utility corridor (Volume II, Map 2-4).

The LVRMP is currently undergoing revision. The Proposed Project has been evaluated under the current RMP, but all future actions and approvals will be considered under the revised RMP once it is approved.

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2 Description of the Proposed Action and Alternatives

2.1 Introduction 2-1

2.2 Description of the Proposed Action and Alternatives 2-1

2.2.1 Alternatives Development 2-1

2.2.2 Alternatives Considered and Carried Forward for Detailed Analysis in the Environmental Impact Statement 2-1

2.3 Proposed Project Location and Setting 2-7

2.4 Technology Options 2-8

2.4.1 Tilted Tracker Option 2-8

2.4.2 Horizontal Tracker Option 2-11

2.4.3 Fixed Tilt Panel Option 2-14

2.4.4 Photovoltaic Technology Comparison 2-17

2.5 Proposed Project Components 2-18

2.5.1 Substations, Transmission Lines, and Interconnections 2-21

2.5.2 Electrical Components 2-23

2.5.3 Access Roads 2-24

2.5.4 Perimeter Fencing for Solar Field 2-25

2.5.5 Exterior Fire Break 2-25

2.5.6 Operations and Maintenance Area 2-25

2.5.7 Fire Protection System 2-25

2.5.8 Supervisory Control and Data Acquisition 2-26

2.5.9 Security 2-26

2.5.10 Lighting 2-26

2.5.11 Erosion Control and Stormwater Drainage (Earthen Berms) 2-26

2.6 Proposed Project Construction 2-29

2.6.1 Project Phasing 2-29

2.6.2 Site Access and Parking 2-29

2.6.3 Construction Workforce 2-29

2.6.4 Truck Trips and Deliveries 2-32
2.6.5 Construction Materials and Equipment 2-33
2.6.6 Construction Sequencing 2-34
2.6.7 Other Considerations for Construction of the Proposed Project..... 2-44

2.7 Proposed Project Operation and Maintenance 2-51

2.7.1 Operations Workforce..... 2-51
2.7.2 Operation and Maintenance Activities..... 2-52

2.8 Proposed Project Decommissioning 2-54

2.9 Federal, State, and Local Permitting 2-55

2.10 Comparison of Alternatives 2-55

2 Description of the Proposed Action and Alternatives

2.1 Introduction

This chapter describes the NextLight Renewable Power, LLC (NextLight; also the Applicant) Silver State Solar Project elements from construction, operations and maintenance (O&M), and decommissioning (hereafter, the Proposed Project). This chapter also describes the No Action Alternative and two action alternatives, as required by the National Environmental Policy Act (NEPA) of 1970, and several alternatives considered by the Applicant and the Bureau of Land Management (BLM), but eliminated from further analysis. These alternatives and the rationale for dismissing them from detailed analysis are also discussed.

Unless otherwise cited, details regarding the Proposed Project, including all structural components, construction procedures, and maintenance activities, are drawn entirely from the Silver State Solar Project Plan of Development (NextLight 2010).

2.2 Description of the Proposed Action and Alternatives

2.2.1 Alternatives Development

This section outlines the process used by the BLM to develop reasonable alternatives to the Proposed Action. Alternatives considered by the Applicant and the BLM, along with those suggested by the public during the scoping process, were evaluated using the following criteria:

- Does the alternative fulfill the BLM's purpose and need, as outlined in Chapter 1?
- Does the alternative minimize impacts to human/environmental resources?
- Is the alternative technically and/or economically feasible to construct, operate, maintain, and decommission?

2.2.2 Alternatives Considered and Carried Forward for Detailed Analysis in the Environmental Impact Statement

This section describes the No Action Alternative, the Proposed Action, and an alternative that includes an optional erosion control system that satisfied the purpose and need for the Environmental Impact Statement (EIS) project. Proposed Project features and construction methods detailed in this section serve as the basis of the environmental impact analysis in Chapter 4, Environmental Consequences.

Alternative 1: No Action

Under NEPA, the BLM must consider an alternative that assesses impacts that would occur if the Proposed Action were not approved and the application rejected. The No Action Alternative assumes that the right-of-way (ROW) application is denied and the Proposed Project is not built. Under this alternative, the purpose and need for the Proposed Action would be provided by other means.

Alternative 2: Proposed Action (BLM's Preferred Alternative)

The Proposed Action would authorize the Applicant to construct, operate, maintain, and decommission a 400-megawatt (MW) solar photovoltaic (PV) power plant on BLM-managed lands in Clark County, Nevada, 2 miles east of Primm, Nevada, along the California/Nevada state line. The Proposed Project would begin generating power as soon as the Proposed Project substation is completed. For the purposes of the Council on Environmental Quality (CEQ) regulations and BLM's NEPA handbook, this is the agency's Preferred Alternative.

Alternative 2 Project facilities and related facilities would disturb a total area of 2,967.47 acres. The solar arrays would occupy 2,575 acres, the unimproved solar field access ways would occupy 84.7 acres, and the undeveloped portion of Proposed Project site would consist of 93.8 acres. Drainage controls would consist of a series of five small and wide earthen drainage control berms that would contain surface runoff flows to existing primary drainages (stormwater flow corridors) across the site. Four berms would be constructed within the solar field and one berm would be located outside the solar array area, and would be directly aligned with the eastern edge of the perimeter fence (Figure 2.2-1). The berms would be constructed to a height of 3 to 5 feet above grade with a top width of approximately 15 feet. The drainage structures would result in a temporary disturbance of 11 acres during construction, and the final area of disturbance would be 17.7 acres.

Alternative 3: Modified Site Layout Alternative

Except for a modified approach to control erosion and small changes in solar array positioning, Alternative 3 would be constructed and operated similar to Alternative 2. Alternative 3 Project facilities would disturb a total area of about 4,818 acres. The solar arrays would occupy about 2,748 acres, the unimproved solar field access ways would occupy 63 acres, and the undeveloped portion of Proposed Project site would consist of about 452 acres. Several upstream drainage control structures including level spreader detention basins, diversion berms (each 10 feet high), channels, and debris basins would be developed in a linear pattern along the entire eastern border of the Proposed Project site in a north to south direction to protect the solar arrays from stormwater runoff from adjacent canyons and slopes (Figure 2.2-2). The drainage structures would result in a temporary disturbance of 1,150 acres during construction and the final area of disturbance would be 250 acres.

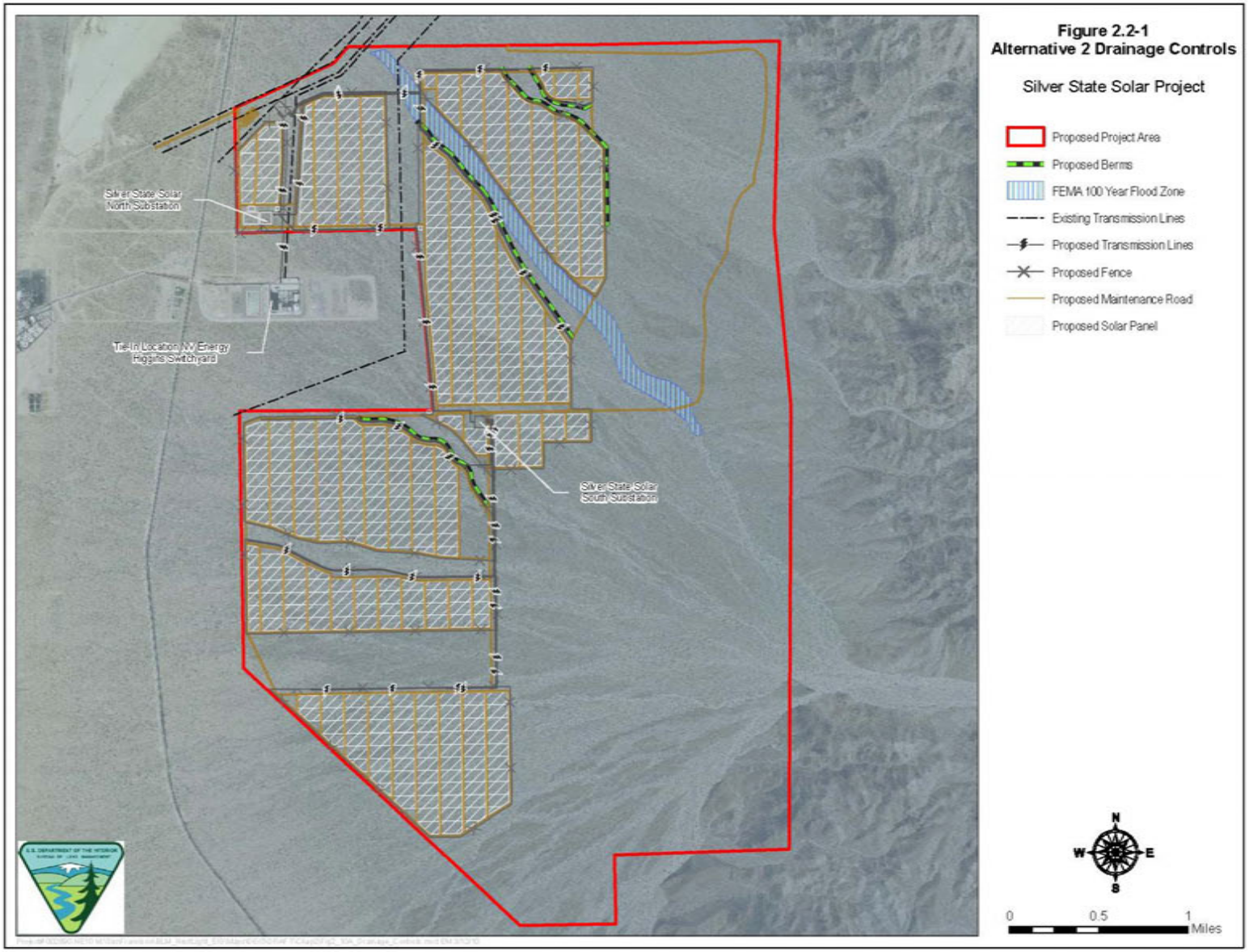


Figure 2.2-1
Alternative 2 Drainage Controls

Silver State Solar Project

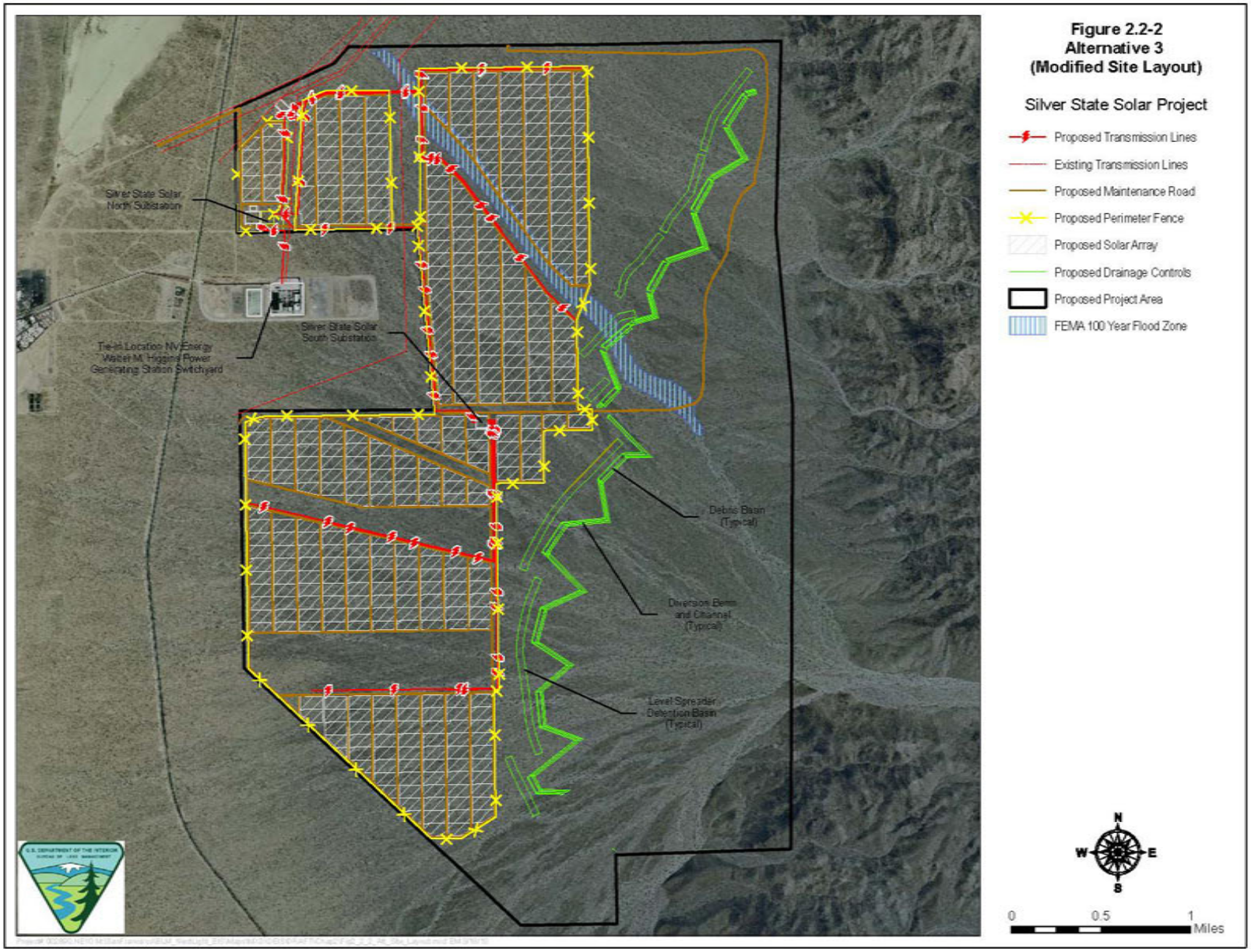


Figure 2.2-2
Alternative 3
(Modified Site Layout)

Silver State Solar Project

Comparison between Alternative 2 and Alternative 3

The solar field layout and acreage would be similar for Alternatives 2 and 3. The acreage of the unimproved solar field access ways for Alternative 2 would be slightly larger than Alternative 3. Alternative 2, through temporary construction and long-term operational impacts, would disturb 1,851 acres less than Alternative 3, which is directly related to the site drainage plan differences between the two alternatives. As presented in Table 2.2-1, the construction disturbance acreage of Alternative 2 would be 1,139 acres less than Alternative 3, and the permanent acreage disturbance of Alternative 2 would be 232.3 acres less than Alternative 3.

Table 2.2-1. Comparison of Alternative 2 and Alternative 3

Project Components	Alternative 2 Proposed Project Acreage	Alternative 3 Modified Site Layout Acreage	Differences
Solar field	2,575.0	2,748.0	Alt. 2 solar field area would be 173 acres smaller than Alt. 3
Unimproved solar field access ways	84.7	63.7	Alt. 2 access way area would be 21 acres larger than Alt. 3
Undeveloped area	93.8	452.2	Alt. 2 undeveloped area would be 358.4 acres smaller than Alt. 3
34.5-kV line	31.5	19.1	Alt. 2 transmission line would be 12.4 miles longer than Alt. 3
Drainage control berm (temporary construction disturbance)	11.0	1,150.0	Alt. 2 temporary area of disturbance would be 1,139 acres smaller than Alt. 3
Drainage control berms (permanent construction disturbance)	17.7	250.0	Alt. 2 drainage control berm area would be 232.3 acres smaller than Alt. 3
Other ancillary facilities and site disturbance	153.77	135.8	
Total Proposed Project facilities and related facilities	2,967.47	4,818.8	Alt. 2 total Proposed Project area would be 1,851.33 acres smaller than Alt. 3

The site drainage plan of Alternative 2 would disturb less acreage as a result of construction stormwater berms and would reduce the overall size of the solar field because its site drainage plan would allow solar panels in areas not feasible under the Alternative 3 site drainage plan. Alternative 2 would reduce the amount of water needed for dust control because less acreage would be disturbed, which would require less water for dust suppression. Additionally, Alternative 2 would preserve a greater amount of desert tortoise habitat, Joshua trees, yuccas, and other plant and animal species in the area than would Alternative 3.

Alternative Technology

The Applicant evaluated two solar technologies for the Proposed Project: concentrating solar power (CSP) technology and PV technology. CSP technology was rejected because it would require disturbing a larger area to produce the same 400 MW of renewable energy. This increased disturbance acreage would affect more BLM-designated off-highway vehicle (OHV)

routes, and would require addition water use for dust suppression. CSP technology would also require additional water for cooling components. Due to increased land and water needs, the use of CSP technology was eliminated from further analysis. Conversely, PV technology was selected for its reduced water consumption, reduced grading requirements, reduced impact on OHV use, and reduced visual impact. Table 2.2-2 compares the two alternative technologies.

Table 2.2-2. Comparison of Solar Technologies Evaluated

Factor	Concentrating Solar Power (CSP) Technology	Photovoltaic (PV) Technology
Annual Operational Water Requirements	300 to 3,000 acre-feet.	21 acre-feet.
Grading	Major grading for terracing of site.	Minor grading for roads and pads.
Off-Highway Vehicle (OHV) Use	Requires major reroute of BLM-designated OHV roads and trails.	Requires minor reroute of BLM-designated OHV roads and trails.
Visual Resources	Large visual modification due to grading and equipment.	Moderate visual modification due to panel field.

Alternative Location

Alternative BLM Land

One other site on BLM land was considered in the Ivanpah Valley, near Jean, Nevada. The Jean site, located on a broad alluvial fan west of Interstate 15 (I-15) and south of Goodsprings Road (State Route [SR] 161), was less desirable because of the distance to the interconnect with the Nevada and California transmission systems and incompatible land use. In addition to a less desirable transmission interconnection, other factors that weighed against the Jean site included its designation as desert tortoise relocation area, the presence of the Jean Water District's well field, and potential conflicts with the proposed Southern Nevada Supplemental Airport. Due to these land use conflicts, the Jean site was eliminated from further analysis.

Alternative Location in California

One suggestion raised during scoping was that the Proposed Project should be constructed in California. This alternative was eliminated from further analysis because the Proposed Project Proponent currently has several projects planned in the state of California. The Proponent believes that the Proposed Project, and those it has proposed in California and other states, as well as project other developers have proposed throughout the Southwest, will help states and the federal government meet renewable energy goals.

Alternative Project Design

During the scoping period, it was suggested that the Proposed Project be constructed on a grid 10 feet above the ground to minimize impacts to OHV use and vegetation. The alternative was eliminated from further analysis because of engineering and economic feasibility.

Alternative Project Size

No comments were received during scoping suggesting that the Proposed Project should have a smaller footprint or should be reduced in capacity.

Restrictions on Power Delivery Alternative

Several comments were received during scoping suggesting that the Proposed Project should not be built if the power would be delivered to customers in California. This alternative was eliminated because BLM does not have the authority to dictate where resources produced on the public lands are used.

2.3 Proposed Project Location and Setting

The Proposed Project would be located adjacent to the California/Nevada border in an unincorporated portion of Clark County, Nevada, approximately 40 miles south of Las Vegas, and 2 miles east of Primm. The ROW application covers approximately 7,925 acres of federal BLM-managed lands.

The Proposed Project site is bounded by the NV Energy Walter M. Higgins Generating Station and the Union Pacific Railroad (UPRR) to the west. The southwest boundary is the California/Nevada state line. The Lucy Gray Mountains are to the east, and a major electric transmission line corridor is located to the north and west.

The Proposed Project components would be constructed in T27S, R59E, Mount Diablo Base and Meridian. The legal description, township/range, and section for the entire Proposed Project are shown in Table 2.3-1.

Table 2.3-1. Project Facilities by Legal Description (Mount Diablo Base and Meridian)

Facility	Township/Range	Section
Project footprint (area enclosed by perimeter fence)	27S 59E	2, 3, 11, 14, 15, 22, 23, 26, 27
Project access road (county road; I-15 frontage to facility gate)[a]	27S 59E	3, 4
230-kilovolt (kV) transmission line (North Substation to Bighorn Substation)	27S 59E	3, 10
Bighorn Substation expansion	27S 59E	10
220kV transmission line (South Substation to switchyard)	27S 59E	3, 11, 14
34.5kV collection lines	27S 59E	2, 3, 11, 14, 22, 23
O&M area	27S 59E	3
North Substation	27S 59E	3
South Substation	27S 59E	14
Switchyard	27S 59E	3
Internal access:		
Maintenance road	27S 59E	2, 3, 11, 13, 14
Perimeter road	27S 59E	2, 3, 11, 14, 15, 22, 23, 26, 27
Solar field access ways	27S 59E	2, 3, 11, 14, 15, 22, 23, 26, 27
Solar field (PV equipment, inverters, transformers)	27S 59E	2, 3, 11, 14, 15, 22, 23, 26, 27
Drainage controls	27S 59E	2, 11, 14

Table 2.3-1. Project Facilities by Legal Description (Mount Diablo Base and Meridian)

Facility	Township/Range	Section
Fire break	27S 59E	2, 3, 11, 14, 15, 22, 23, 26, 27
Service road	27S 59E	1, 2, 12
Alternate Proposed Project access road	27S 59E	10

Note:
[a] Project access road from I-15 frontage road to the Proposed Project site entrance will be permitted and approved by Clark County and will be a public road.

2.4 Technology Options

The Applicant is evaluating three solar PV technology options for the Proposed Project: tilted trackers; horizontal trackers; and fixed tilt (non-tracking) solar arrays. One of these three technology types will be selected during the development of the Proposed Project, depending on cost and market availability. Each of the three technology options would fit within the 7,925-acre ROW and produce 400 MW of renewable energy. Each technology option is described in detail below.

2.4.1 Tilted Tracker Option

The description of the tilted tracker units in this section is based on the SunPower T-20 tracker; actual equipment would be similar to this technology and would be selected based on cost and market availability.

A 1MW block layout using T-20 trackers is shown in Figure 2.4-1. The tilted tracker units would be arranged in east-west oriented rows connected by drive shafts to drive motors that rotate the solar panels from east to west to follow the sun on a single axis throughout the day. Typical tracker layout and spacing is shown in Figure 2.4-2. On T-20 trackers, the PV modules would be mounted facing south and tilted at 15 to 20 degrees from horizontal. The highest point on these units (i.e., the uppermost solar panel) would be approximately 12 to 15 feet above the ground surface. The height of the individual panels may be slightly higher depending on site conditions.

The foundation design for the tilted tracker units would be a precast or cast-in-place concrete ballast foundation that would sit on the ground surface. However, the tracker units may be mounted on embedded foundations. The foundations would be located at the north and south ends of each tracker unit. The ballast foundations would be approximately 10 feet long by 2 feet wide and 1.5 feet high. The northern end of the tracker would be attached to two separate foundations such that each tracker would share a foundation with an adjoining tracker. This shared foundation design would provide necessary support in strong wind conditions.

The 0.5-horsepower electric drive motors would be located approximately 700 feet apart along each east-west row, and each motor would drive up to 700 feet of trackers. The Proposed Project design would include mounting the drive motors on concrete foundations, approximately 7 feet by 12 feet in area and approximately 2 feet thick. Hydraulic drive systems would not be used.

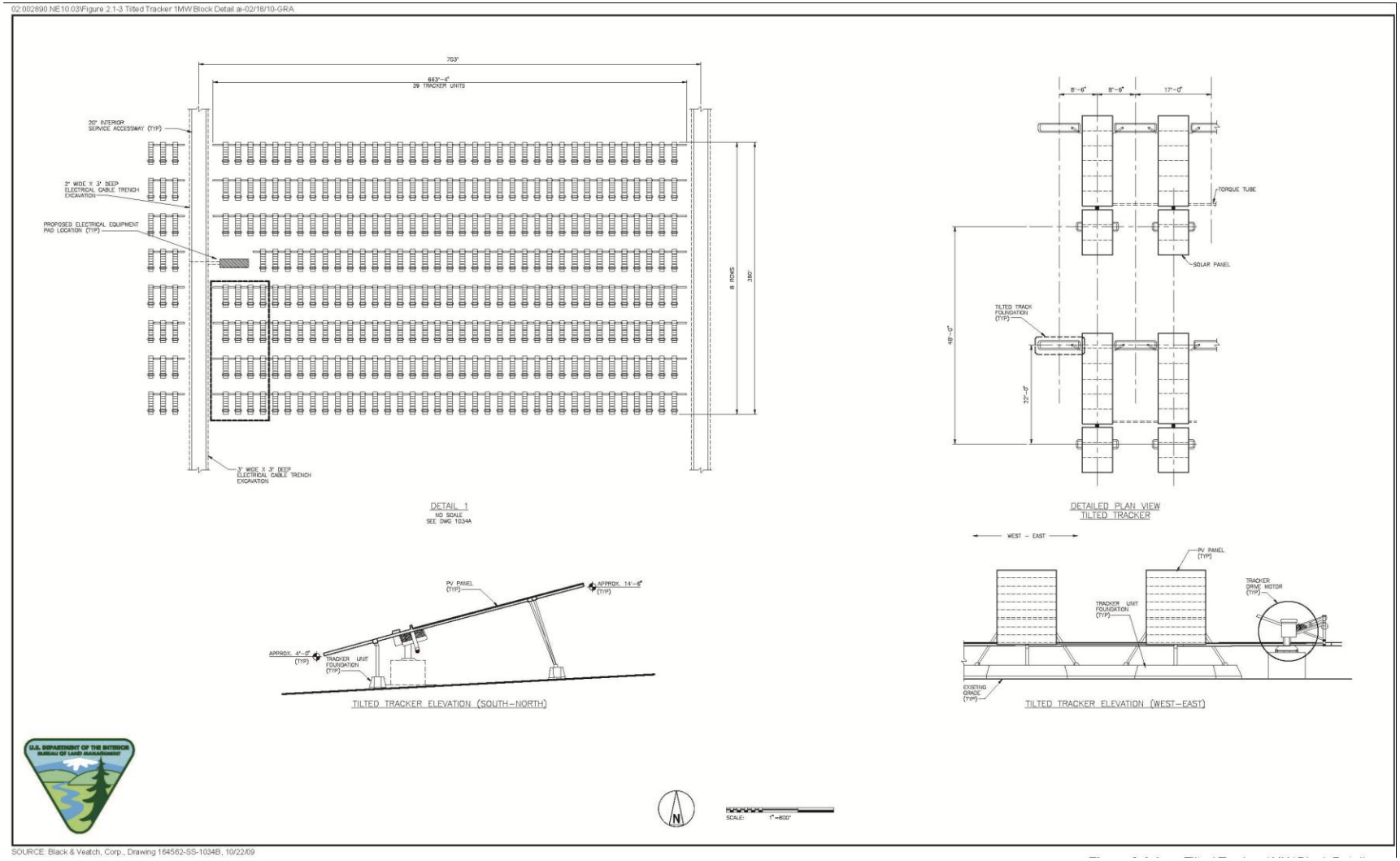


Figure 2.4-1. Tilted Tracker 1MW Block Detail
Silver State Solar Project – NextLight Solar Facility

02:002890.NE10.03\Figure 2.1-4 Tilted Tracker Solar Panel.ai-02/18/10-GRA

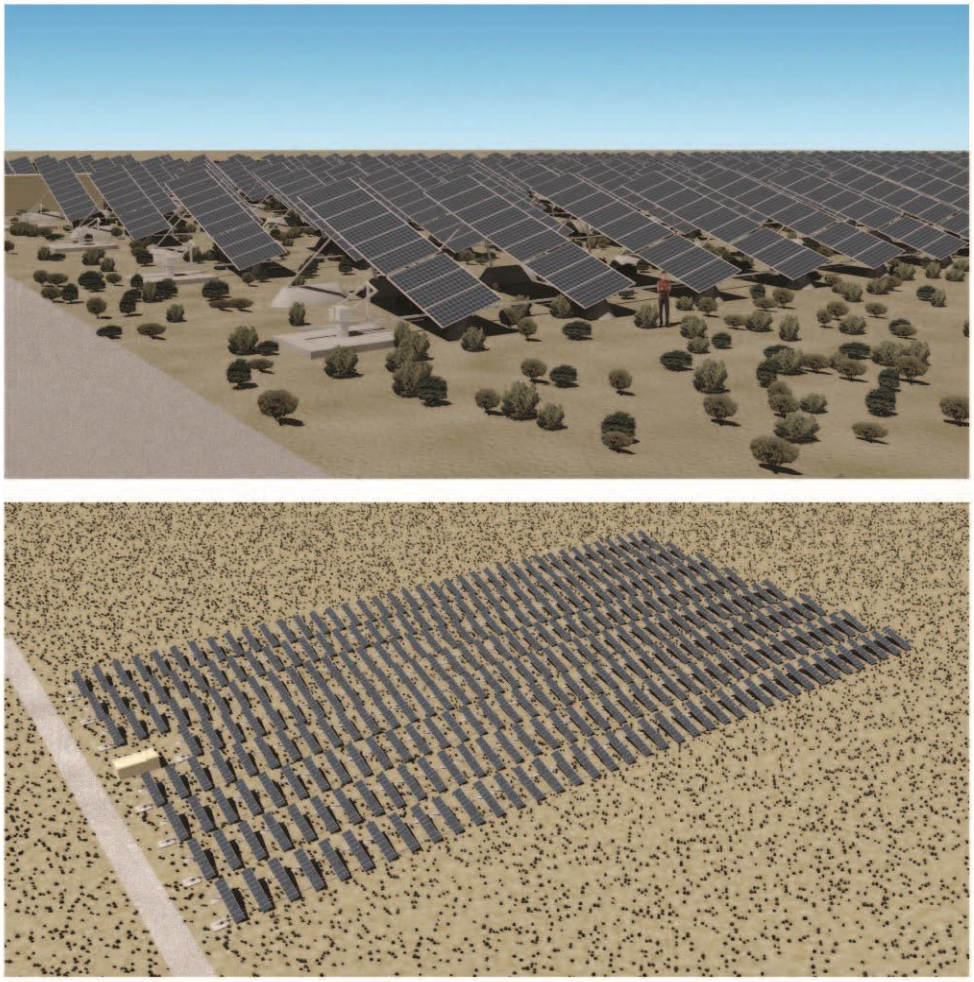


Figure 2.4-2. Tilted Tracker Solar Panels
Silver State Solar Project – NextLight Solar Facility

The type and number of the solar field components that would be utilized for 400 MW of power generation are provided in Table 2.4-1.

Table 2.4-1. Solar Field Component Numbers – Tilted Trackers

Component	Number
PV solar modules	1,054,800
Single-axis tracker systems	117,200
Tracker foundations	257,800
Drive motor foundations	3,200
Pad-mounted inverters	800
Pad-mounted transformers	400

2.4.2 Horizontal Tracker Option

The description of the horizontal tracker units in this section is based on the BP Solar horizontal tracker; actual equipment would be similar to this technology and would be selected based on cost and market availability.

A 1MW block layout using horizontal trackers is shown in Figure 2.4-3. On horizontal trackers, the PV modules would be mounted horizontally and would not be tilted to the south. The tracker units would be arranged in north-south oriented rows and drive motors would rotate the solar panels from east to west to follow the sun (on a single axis) throughout the day. The highest point for a horizontal tracker (approximately 8 feet above ground surface) would be achieved during the morning and evening hours when the trackers would be tilted at their maximum angle. When the solar modules were roughly parallel to the ground, the overall height of the tracker unit would be approximately 5 feet. The height of the individual panels may be slightly higher depending on site conditions. Visual renderings of horizontal tracker units are provided in Figure 2.4-4.

The vertical support legs at each end of the trackers would consist of foundations that may include: (1) concrete piers approximately 18 to 24 inches in diameter and 6 to 8 feet deep; or (2) driven piers approximately 4 inches in diameter and 10 feet deep. The precise design would be dependent on site conditions.

The 0.5-horsepower electric drive motors for horizontal trackers would be located approximately 700 feet apart along each north-south row, with each motor driving up to 700 feet of trackers. The Proposed Project design includes mounting the drive motors on concrete foundations, approximately 7 feet by 12 feet in area and approximately 2 feet thick. Alternatively, depending on specific horizontal tracking technology selected, tracking motors may be mounted directly to the tracker structures. In this configuration, each tracker assembly would have its own drive system and there would be no motor foundation or mechanical linkage from one tracker to the next.

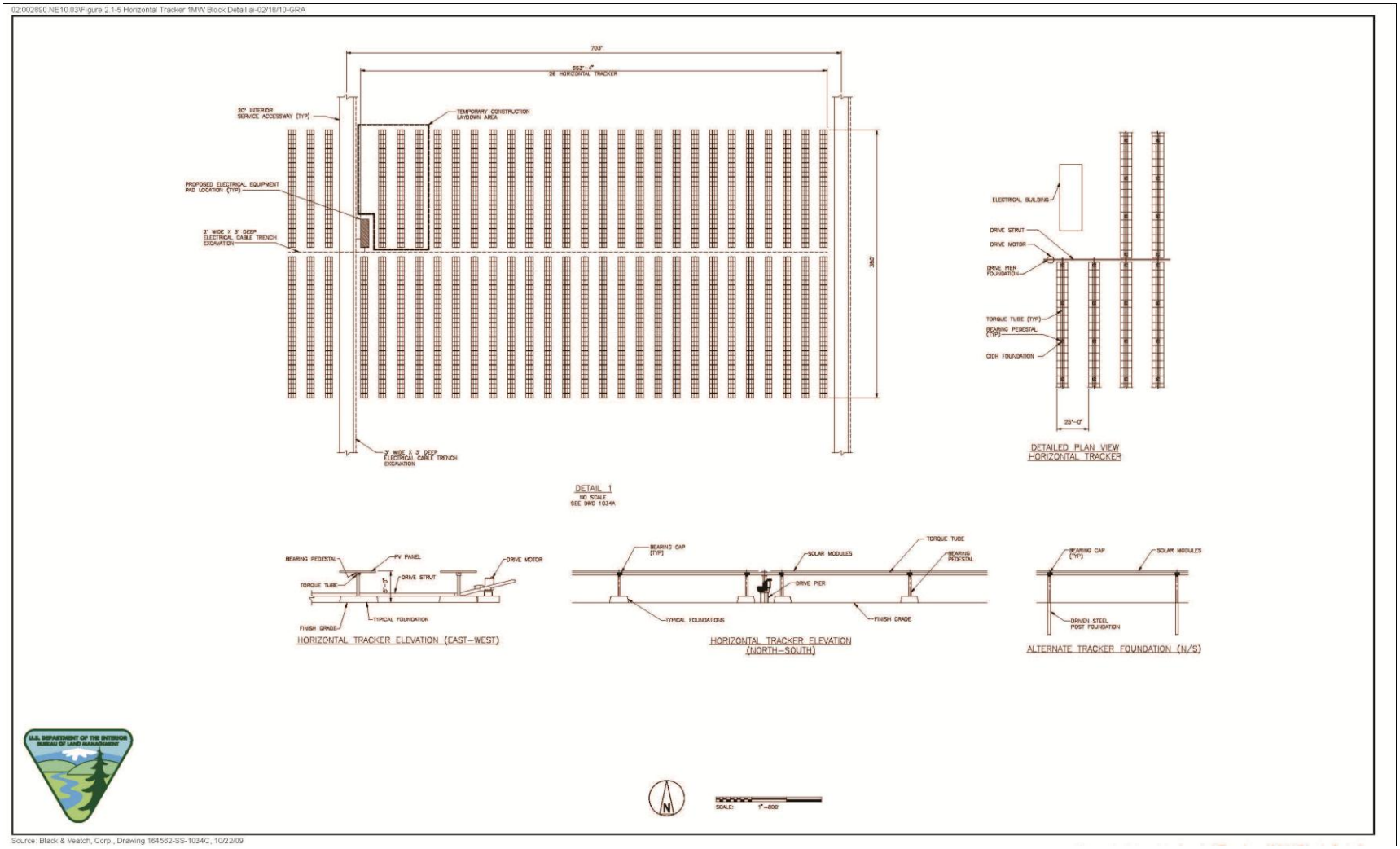


Figure 2.4-3. Horizontal Tracker 1MW Block Detail
Silver State Solar Project – NextLight Solar Facility

02:002860.NE10.03\Figure 2.1-6 Horizontal Tracker Solar Panel.ai-02/18/10-0RA

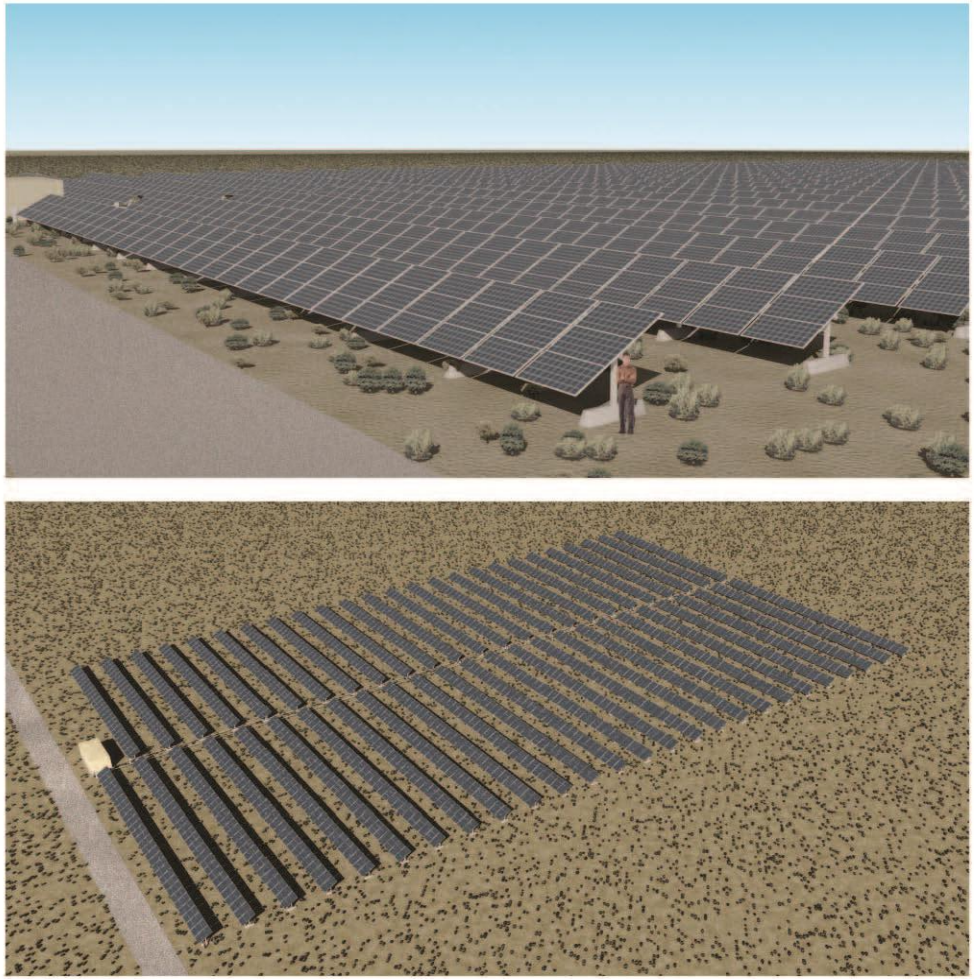


Figure 2.4-4. Horizontal Tracker Solar Panels
Silver State Solar Project – NextLight Solar Facility

The numbers and dimensions of the solar field components for 400 MW of power generation are provided in Table 2.4-2.

Table 2.4-2. Solar Field Component Numbers – Horizontal Trackers

Component	Number
PV solar modules	1,686,000
Single-axis tracker systems	20,400
Tracker foundations	138,490
Drive motor foundations	800
Pad-mounted inverters	800
Pad-mounted transformers	400

2.4.3 Fixed Tilt Panel Option

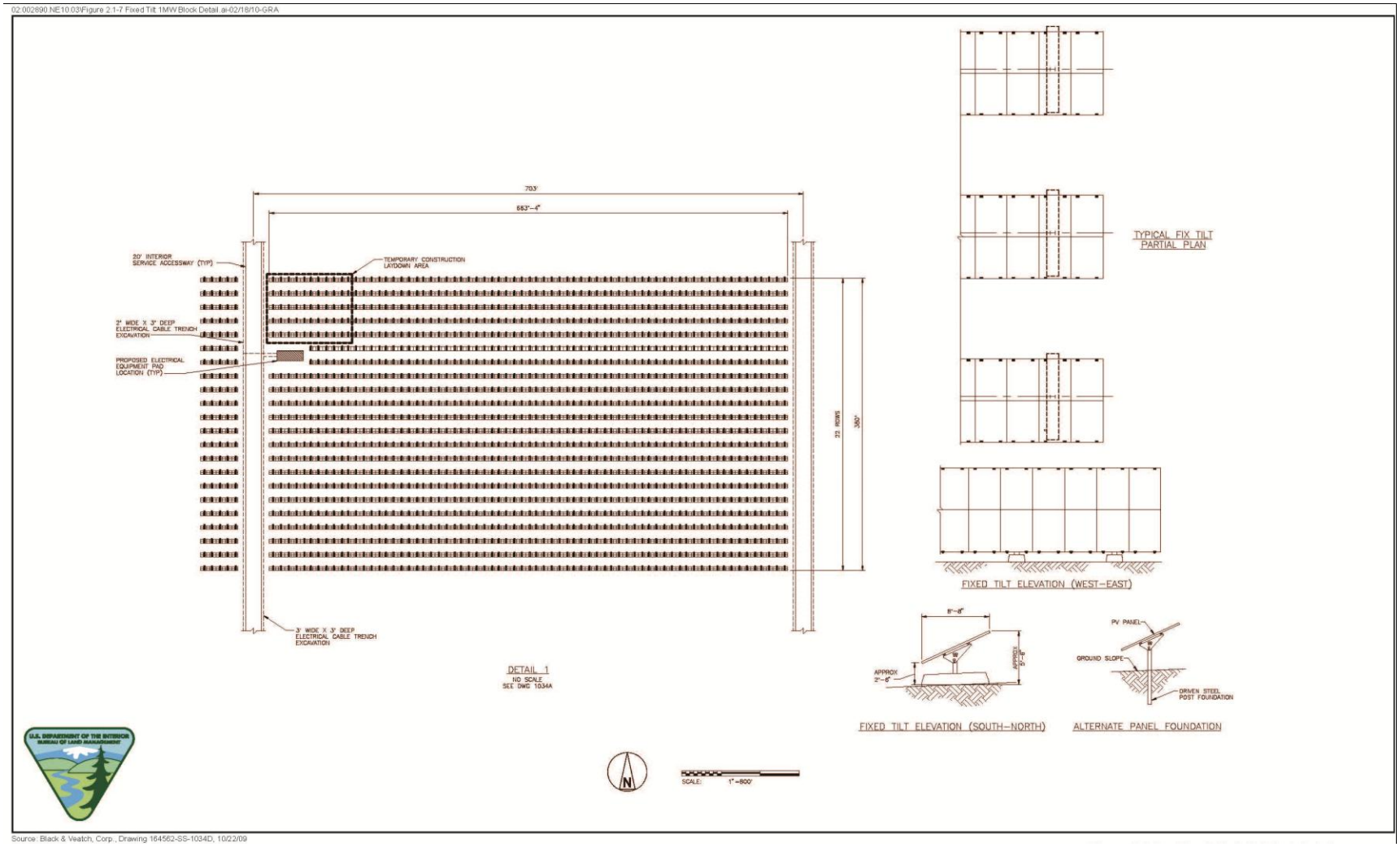
Fixed tilt panels would be constructed in east-west oriented rows. The fixed tilt panels would be positioned to receive optimal solar energy; however, the panels would not track the sun. A 1MW block layout using fixed panels is shown in Figure 2.4-5. Fixed tilt panels would be approximately 5 to 6 feet off the ground surface at the highest point. Visual renderings of fixed tilt units are provided in Figure 2.4-6.

The vertical support for the fixed tilt units would consist of foundations that may include: (1) ballast foundations approximately 10 feet long by 2 feet wide and 1.5 feet high; or (2) driven piers approximately 4 inches in diameter and 10 feet deep.

The numbers and dimensions of the solar field components for 400 MW of power generation are provided in Table 2.4-3.

Table 2.4-3. Solar Field Component Numbers – Fixed Tilt Panels

Component	Number
PV solar modules	3,576,000
Fixed-tilt panel systems	8,800
Foundations	460,000
Pad-mounted inverters	800
Pad-mounted transformers	400



Source: Black & Veatch, Corp., Drawing 164562-SS-1034D, 10/22/09

Figure 2.4-5. **Fixed Tilt 1MW Block Detail**
Silver State Solar Project – NextLight Solar Facility

02:002890.NE10.03\Figure 2.1-8 Fixed Tilt Solar Panel.ai 02/18/10 GRA

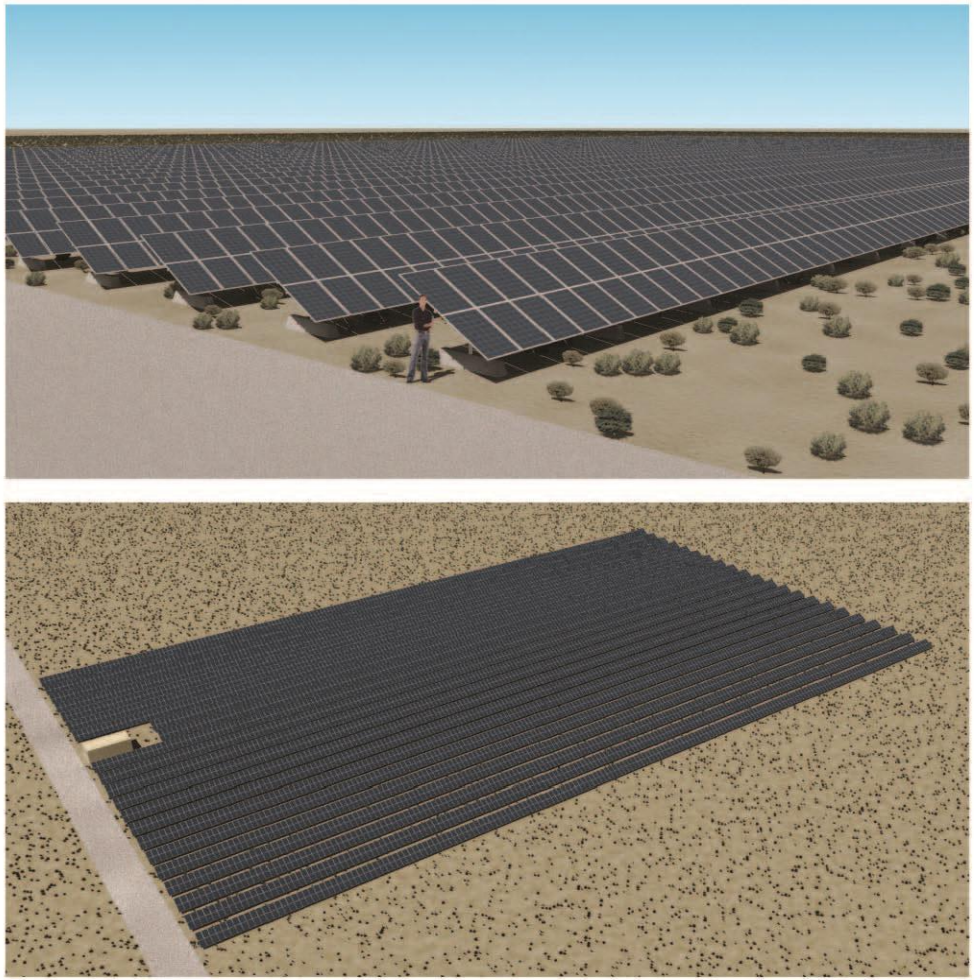


Figure 2.4-**6. Fixed Tilt Solar Panels**
Silver State Solar Project – NextLight Solar Facility

2.4.4 Photovoltaic Technology Comparison

A comparison of the three PV technology options (tilted tracker, horizontal tracker, and fixed tilt panels) is provided in Table 2.4-4.

Table 2.4-4. Photovoltaic Technology Comparison

	Single Axis Tilted Tracker	Single Axis Horizontal Tracker	Fixed Tilt Panels
Mounting direction	South-facing	Horizontal	South-facing
Degrees from horizontal (ground surface)	15-20°	0°	20-25°
Arrangement of rows	East to west	North to south	East to west
Drive motor	Yes	Yes	No
Tracks movement of sun	Yes	Yes	No
Foundation	Concrete ballasts or embedded pier foundations	Concrete ballasts or embedded pier foundations	Concrete ballasts or embedded pier foundations
Elevation from finished grade (foundation) to the top of the panel	12 to 15 feet above ground	5 to 8 feet above ground	5 to 6 feet above ground
Dimensions of foundations (i.e., ballasts or driven piers)	10 feet long 2 feet wide 1.5 feet in height (above ground)	1) Concrete piers 18 to 24 inches in diameter 6 to 8 feet deep 2) Driven piers 4 inches in diameter 10 feet deep (below ground)	The vertical support for the fixed units are as follows: 1)Ballast foundations 10 feet long 2 feet wide 1.5 feet in height OR 2) Driven piers 4 inches in diameter 10 feet deep (below ground)
PV solar modules	1,054,800	1,686,000	3,576,000
Single-axis tracker systems	117,200	20,400	8,800
Tracker foundations	257,800	138,490	460,000
Drive motor foundations	3,200	800	800
Pad-mounted inverters	800	800	400
Electric drive motors	0.5-1.25 horsepower Drive motor foundations, approximately 7 x 12 by 2 feet thick.	0.5-1.25 horsepower Drive motors on concrete foundations, approximately 7 x 12 by 2 feet thick.	No motor

2.5 Proposed Project Components

This section describes components that would be constructed or modified as part of the Proposed Project (see Figure 2.5-1). Placement of Proposed Project components and modification to existing infrastructure would occur both inside and outside of the Proposed perimeter fence, but within the larger Proposed Project area. The Proposed Project would include the following main elements:

- PV solar modules;
- Single-axis tracker systems or fixed panels, mounted on cement ballasts or embedded pier foundations;
- Power inverters;
- Three-phase pad-mounted transformers that convert the output of each inverter to 34.5 kilovolts (kV);
- An underground and overhead 34.5kV collection system to convey electricity from the solar field to the onsite substations;
- Two 2.8-acre on-site substations (designated North and South), each with 34.5kV to 220kV/230kV step-up transformers (SUT);
- Interconnections to deliver renewable energy from the Proposed Project into both the Nevada market via NV Energy's Bighorn Substation and the California market via Southern California Edison's (SCE's) proposed 220kV upgrade to the existing 115kV line, known as the Eldorado-Ivanpah Transmission Project (EITP);
- An expansion of NV Energy's Bighorn Substation;
- A 0.45-mile-long, 230kV transmission line from the North Substation in T.27S., R.59E., Section 3 to the 230kV bus at the existing substation adjacent to NV Energy's Walter M. Higgins Generating Station;
- A 2.5-mile-long, 220kV transmission line to connect the South Substation with SCE's proposed EITP noted above;
- A new switchyard, at the connection point with SCE's EITP line;
- A 3.6-acre O&M area in T.27S., R.59E., Section 3 to accommodate the O&M building, parking area, temporary covered assembly areas, and other associated facilities;
- A 3.85-mile-long paved interior maintenance road;
- A new service road to provide access to the east side of the Proposed Project site;
- Improvement of a segment of an existing road to provide access to the Proposed Project site, referred to as the Proposed Project access road;
- Construction of an alternate access road in the event that the proposed access road is not developed by Clark County;
- Drainage controls composed of a series of berms designed to contain surface runoff flows to existing primary drainages (stormwater flow corridors) across the site; and

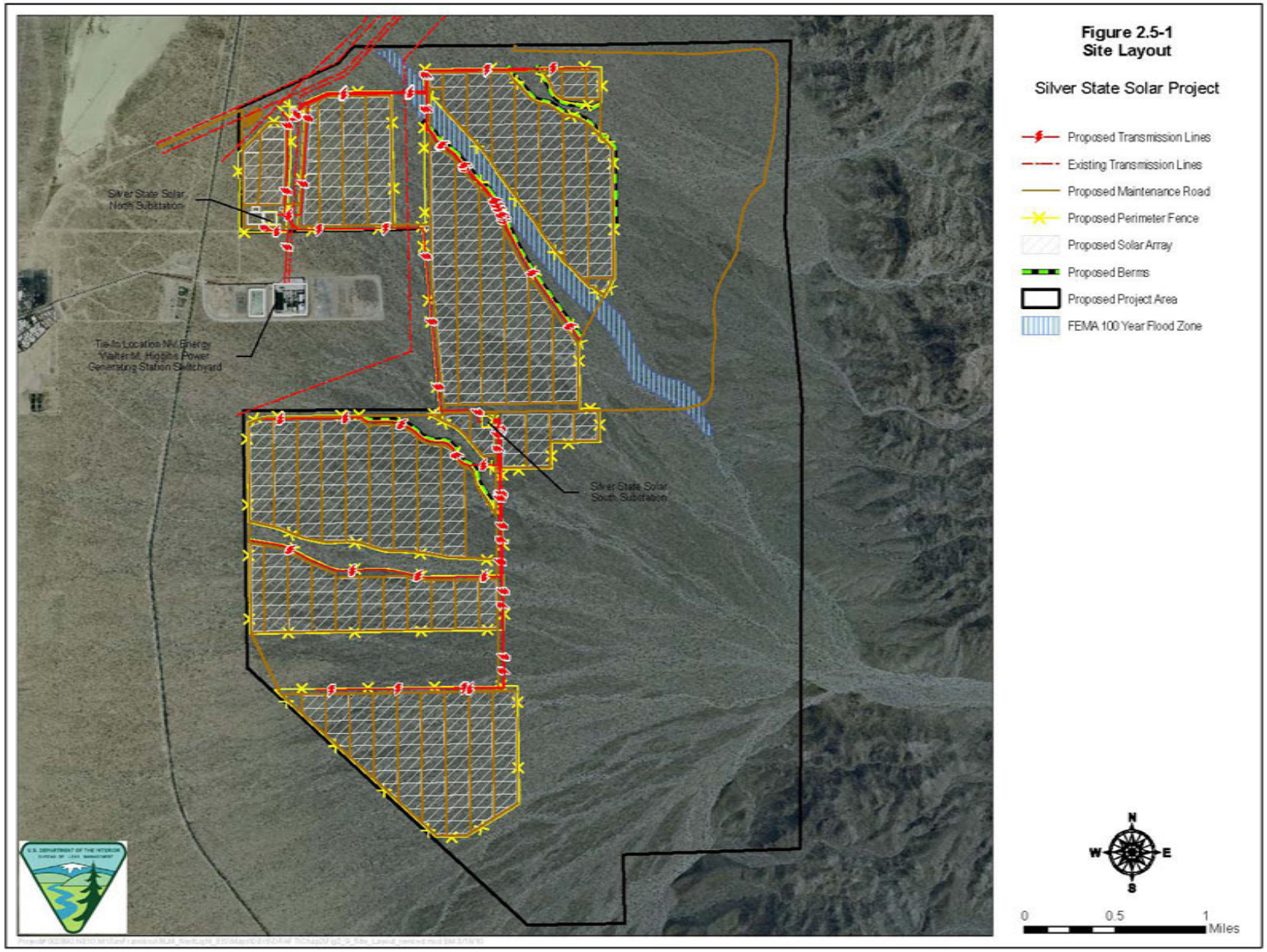


Figure 2.5-1
Site Layout

Silver State Solar Project

- A 20-foot-wide fire break around the exterior of the perimeter fence.

Acreage and dimensions of specific Proposed Project components and additional details regarding these components are detailed in Table 2.5-1.

Table 2.5-1. Proposed Project Facilities, Acreage, and Dimensions

Facility	Acreage	Length	Width
Facilities Within Perimeter Fence[a]			
Solar Field	2,575	—	—
230kV Transmission Line[b] (North Substation to Bighorn Substation)	1.0	0.15 mile	—
220kV Transmission Line (South Substation to switchyard)	16.3	2.5 miles	—
34.5kV Collection Lines	31.5	Variable	Variable
O&M Area	3.6	350 ft	450 feet
North Substation	2.8	350 ft	350 feet
South Substation	2.8	350 ft	350 feet
Internal Access:			
Maintenance Road	12.5	3.43 miles	30 feet
Perimeter Road	41.0	13.45 miles	25 feet
Solar Field Access Ways	84.7	34.9 miles	20 feet
Undeveloped Area [c]	93.8	—	—
Total	**2,865**		
Facilities Outside Perimeter Fence			
230kV Transmission Line[d] (North Substation to Bighorn Substation)	1.8	0.30 mile	—
34.5kV Collection Lines	4.1	0.8 mile	Variable
Switchyard	2.6	460 feet	240 feet
Drainage Control Berms[e]	17.7	3.95 miles	Variable
Drainage Control Berm Temporary Construction Area[f]	11.0	3.95 miles	Variable
Firebreak	33.1	13.65 miles	20 feet
Extension of Maintenance Road	1.5	0.42 mile	30 feet
Construction Worker Parking (Temporary)	3.8	550 feet	300 feet
Service Road	8.27	4.54 miles	15 feet
Alternate Project Access Road[g]	1.1	0.3 mile	30 feet
Total	**84.97**		
Project Facilities Total Area	**2,949.97**		
Related Facilities			
Project Access Road (County road from I-15 frontage to facility)[h]	7.5	1.55 miles	40 feet
Bighorn Substation Expansion (NV Energy)	10.0	450 feet	950 feet

Table 2.5-1. Proposed Project Facilities, Acreage, and Dimensions

Facility		Acreage	Length	Width
Related Facilities	**Total Area**	**17.5**		
Project Facilities and Related	**Total Area**	**2,966.8**		

Notes:
[a] The entire area within the perimeter fence is assumed to be disturbed.
[b] Portion of 230kV transmission line within perimeter fence.
[c] Area within perimeter fence not occupied by equipment, but assumed to be disturbed.
[d] Portion of 230kV transmission line outside perimeter fence.
[e] Area occupied by drainage control berms.
[f] Additional area anticipated to be disturbed during construction of drainage control berms.
[g] Although the preferred access road is the county road, this alternate access road is included in the Proposed Project acreage because it would be built by the Applicant for Project access if Clark County did not proceed with construction of the county road.
[h] Project access road would be permitted and improved by Clark County and would be a county road.

2.5.1 Substations, Transmission Lines, and Interconnections

The Proposed Project includes the construction of two electrical substations (North and South substations) that would each encompass a 350-foot by 350-foot area. Each substation area would include an uninhabited control house, medium- and high-voltage switchgear and conductor structures, and two 50-percent-rated transformers (each approximately 30 feet wide by 15 feet long by 15 feet high). Additionally, the Bighorn Substation would be expanded to accommodate additional equipment required to connect the Proposed Project to the NV Energy grid.

Each transformer would contain approximately 8,700 gallons of dielectric fluid (mineral oil) and would be located on a concrete pad approximately 30 feet long by 15 feet wide, surrounded by a 6-inch earthen or concrete containment berm/curb approximately 50 feet long by 30 feet wide. The containment area would be lined with an impermeable membrane covered with gravel, and would drain to an underground storage tank. Any stormwater or fluid drained to the tank would be inspected for a sheen prior to disposal. If a sheen was observed, the tank contents would be removed by vacuum truck and disposed at an approved disposal site. If no sheen or contaminants were detected, the stormwater would be drained on site. The containment/storage tank/holding pond system would be designed to accommodate the volume of the dielectric fluid in the transformer plus an allowance for precipitation.

The 220kV/230kV transmission gen-tie lines would be single-circuit and supported on galvanized or color-treated steel monopole towers. Although final transmission line design has not been completed, an estimated combined total of 22 steel monopole towers would likely be required for construction of the 220kV/230kV lines. The Proposed Project has been designed to deliver power to both the Nevada market, via NV Energy's Walter M. Higgins Power Generating Station, and the California market, via SCE's proposed 220kV upgraded EITP transmission line.

NV Energy Interconnection

230kV Transmission Line

The 0.45-mile-long, 230kV transmission line running from the north substation in T.27S., R.59E., Section 3 to the 230kV bus at the existing Walter M. Higgins Power Generating Station would provide a connection to the Nevada market. The Bighorn Substation would be expanded to accommodate the additional equipment required to interconnect the Proposed Project.

The Proposed Project would connect with the NV Energy transmission grid at the existing Walter M. Higgins Power Generating Station. Three-phase conductors would terminate on steel angle pull-off structures and would be insulated from the structure by porcelain insulators. Line disconnects would be included for disconnect of any of the incoming lines for maintenance or repair without complete disruption of power flow. All bus, cable, hardware, and electrical equipment ratings would be determined during detailed design. The switchyard would include a control building to house protective relay equipment, communication, and metering.

Switchyard

Switchyard site and construction power may be supplied from an NV Energy distribution line near the switchyard and a distribution transformer within the switchyard. Switchyard area and control room lighting, convenience power, and protection and communication hardware power would be supplied via a 480-208Y/120V lighting and distribution panel. The grounding system would be designed in accordance with all applicable codes and standards to protect equipment and personnel from available fault currents. As part of this system, metal-oxide lightening arrestors may be included at line terminations near the steel angle pull-off structures to protect the equipment and personnel from surges caused by lightning strikes. A roadway would be included around the perimeter with sufficient width for maintenance vehicles. A barbed-wire perimeter fence with a lockable gate wide enough for truck traffic would keep pedestrian traffic out of the switchyard.

Bighorn Substation

The Bighorn Substation would need to be expanded to accommodate the additional equipment required to interconnect the Proposed Project. The additional equipment would include one 230kV circuit breaker, disconnects, and bus work.

California ISO Interconnection

220kV Transmission Line

Connection to the California ISO would be made by a tap into the 220kV EITP transmission line. A new 2.5-mile, 220kV transmission line (gen-tie) would connect the South Substation to the switchyard. The switchyard would include a 34.5kV to 220kV SUT for step-up power generated in the northern half of the Proposed Project. The switchyard would contain 220kV circuit breakers and bus-work to combine the output of the north portion of the Proposed Project with the 220kV transmission line from the South Substation and interconnect to SCE's EITP transmission line.

Switchyard

For the California ISO interconnection, the Proposed Project switchyard would be a 220kV, three-breaker, ring bus configured switchyard, composed of three 220kV, sulfur hexafluoride (SF_6) –insulated, dead tank circuit breakers. Each breaker would be isolatable by two 220kV, non-load break disconnect switches, one with grounding terminals. Instrument transformers would be tapped off the 220kV bus for line protection and metering. Three lines would terminate on steel angle pull-off structures and would be insulated from the structure by porcelain insulators.

This configuration would support additional reliability by allowing for loss of any one breaker without Project transmission or SCE line disconnect. Line disconnects would be included for disconnect of any of the incoming lines for maintenance or repair without complete disruption of power flow. All bus, cable, hardware, and electrical equipment ratings would be determined during detailed design. The switchyard would include a control building to house protective relay equipment, communication, and, potentially, utility metering.

Switchyard site and construction power may be supplied from a local distribution line near the switchyard and a distribution transformer within the switchyard. Switchyard area and control room lighting, convenience power, and protection and communication hardware power would be supplied via a 480-208Y/120V lighting and distribution panel. The grounding system would be designed in accordance with all applicable codes and standards to protect equipment and personnel from available fault currents. As part of this system, metal-oxide lightening arrestors may be included at line terminations near the steel angle pull-off structures to protect the equipment and personnel from surges caused by lightning strikes. A roadway would be included around the perimeter with sufficient width for maintenance vehicles. A barbed-wire perimeter fence with a lockable gate wide enough for truck traffic would keep pedestrian traffic out of the switchyard.

Collection Lines

An underground and overhead 34.5kV collection system would transfer power from the individual solar panels to the substations.

2.5.2 Electrical Components

Electrical System for Plant Auxiliaries

Plant auxiliaries are secondary electrical components that would ensure the uninterrupted operation of the solar facility—in this case, providing night lighting for plant security, outside electricity at night to keep the transformers energized, and for rotating the tracker units to their start position (east position) for electricity generation the next day.

Power for plant auxiliaries would be supplied by back feed from the electrical grid, and/or a new distribution service line from the electrical utility's distribution system. Power from the distribution service would be stepped down (lowered) to an appropriate voltage to support plant auxiliaries, and connected to a switchgear/motor control center. The motor control center would distribute power to the various plant loads when the solar field is not generating electricity.

Cathodic Protection Systems

Cathodic protection is used to slow electrochemical corrosion of exposed iron and steel. Two types of cathodic protection are: (1) active, in which a low-voltage (usually 40- to 50-volt) direct current is imposed between the exposed parts of a structure and the ground; and (2) passive, in which an anode (positive electrode) made of a more reactive metal (such as a magnesium alloy) is sacrificed to protect a structure by acting as a cathode (negative electrode).

Cathodic protection is not anticipated at this time, but may be necessary if recommended from the geotechnical investigation's soil corrosivity data. A sacrificial, anode-type, cathodic

protection system would be employed if cathodic protection is recommended. Guidelines from the Institution of Electrical Engineers, Electric Power Research Institute, and the National Association of Corrosion Engineers would be used in establishing the necessity, type, and extent of cathodic protection equipment. All cathodic protection equipment would be included within the areas already designated for substations and switchyards.

Solar Meteorological Stations

The Applicant would install four solar meteorological stations (SMSs) within the Proposed Project site to gather information on air temperature, wind direction and speed, and solar transmissivity. The SMSs would consist of two tripods, 2 and 3 meters in height. Each tripod would penetrate the ground with a small stake at each foot and a single ground rod, with electrical power provided by a small PV panel.

2.5.3 Access Roads

County Road

In order to access the Proposed Project site, the Proponent is pursuing with Clark County to construct and maintain a new 1.55-mile-long, 40-foot-wide, paved public road. The road would be constructed on the alignment of the existing road from the I-15 frontage road to the Proposed Project site. Clark County would maintain the road and install and maintain necessary lights and crossing gates at the UPRR crossing.

In the event the Proposed Project access road described above is not constructed, the Applicant would construct an alternate 0.3-mile-long, 30-foot-wide paved road across private property and BLM-administered lands. This alternate access road would extend from the existing Primm Boulevard to the Proposed Project site using the UPRR overpass that currently provides access to the NV Energy Walter M. Higgins Power Generating Station. Construction of the alternate access road would require private agreements for use of the existing road and overpass.

Perimeter Road

A new gravel (aggregate rock) perimeter road, 13.45 miles long and 25 feet wide, would be constructed just inside the site's perimeter fence to allow access by maintenance and security personnel. The use of aggregate rock for the perimeter road would facilitate access through the site for non-four-wheel-drive vehicles and minimize dust related to O&M vehicles. Gravel roads do not minimize dust emissions and are still considered unpaved roads under Clark County dust regulations. Proper mitigation would be required under Section 91, Unpaved Roads, Department of Air Quality and Environmental Management (DAQEM).

Maintenance Road

A new paved maintenance road would be constructed from the Proposed Project area to the O&M area. This road would be 3.85 miles long and 30 feet wide.

Solar Field Access Ways

Within the solar field, new access ways would be graded and compacted to provide two-wheel-drive vehicle access to the solar equipment (PV modules, inverters, transformers) during O&M. These 20-foot-wide access ways would be spaced approximately 700 feet apart, totaling 34.9 miles. No off-site material would be used to harden the access ways. These access ways would also be subject to unpaved road regulations (Section 91, Unpaved Roads, DAQEM).

Service Road

An 4.54-mile-long and 15-foot-wide service road would be constructed outside the perimeter fence.

2.5.4 Perimeter Fencing for Solar Field

The Proposed Project would include an 8-foot-high, chain-link, perimeter fence with barbed-wire security strands at the top. To discourage burrowing by tortoises, the perimeter fencing would include 0.5-inch hardware cloth metal mesh against the lower 2 feet of the fence that would be extended an additional 1 foot below the ground angled off site. A fence made of frangible materials would be required in some areas to mitigate possible changes in flow due to debris build-up.

2.5.5 Exterior Fire Break

A 20-foot-wide and 13.65-mile-long fire break would be constructed outside the Proposed Project perimeter fence to prevent the spread of wildfire from entering or exiting the Proposed Project site.

2.5.6 Operations and Maintenance Area

The Proposed Project O&M area would contain a 100-foot by 200-foot O&M building, with a height of approximately 27.5 feet. The O&M building would house administrative staff O&M equipment and personnel. A gravel parking lot would be constructed adjacent to the O&M building.

2.5.7 Fire Protection System

The Proposed Project's fire protection system would include two water storage tanks located near the O&M building, holding a minimum of 2 hours of full-flow runtime (approximately 220,000-gallon capacity). One electric- and one diesel-fueled backup firewater pump would deliver water to the fire protection water-piping network. A smaller, electric motor-driven, jockey pump would maintain pressure in the piping network. If the jockey pump were unable to maintain a set operating pressure in the piping network, a main fire protection pump would start automatically. All fire protection system pumps would be required to be shut off manually.

The electrical equipment enclosures that house the inverters and transformers would be either metal or concrete structures. Any fire that would potentially occur would be contained within the structures, which are designed to meet National Electric Manufacturers Association (NEMA) 1 or NEMA 3R IP44 standards for electrical enclosures (heavy-duty sealed design to withstand harsh outdoor environmental conditions).

2.5.8 Supervisory Control and Data Acquisition

The Proposed Project would have a Supervisory Control and Data Acquisition (SCADA) system located in the O&M building. The SCADA would allow for the remote monitoring and control of inverters and other Proposed Project components, monitor Project output and availability, and remotely run diagnostics on equipment.

Additionally, the SCADA system would provide control, monitoring, alarm, and data storage functions for the power plant systems. Redundant capability would be provided for critical SCADA components such that no single component failure would cause a plant outage. The SCADA would be linked to the PV module control systems and to the solar field controls. All field instruments and controls would be hard-wired to local panels. Local panels would be hard-wired to the plant's distributed control system. Wireless technology would be reviewed as an alternative during the Proposed Project's design phase.

2.5.9 Security

Security at the Proposed Project site would include fencing, lighting, and security patrols. The Proposed Project site would be staffed 24 hours per day, seven days per week. The staff would include full-time security personnel who would conduct security patrols. An unlighted perimeter security system would be installed, if determined necessary by the Applicant.

2.5.10 Lighting

Permanent lighting would be installed along the maintenance road and within the O&M area. If required by Clark County, street lighting would be installed on poles along the road between the I-15 frontage road and the Proposed Project site. Outside lighting would be installed on pole-mounted lights inside the O&M area. Lighting would be designed to provide the minimum illumination needed to achieve safety and security objectives and would be shielded and oriented to focus illumination on the desired areas. Permanent lighting fixtures would not be installed within the solar field. Occasionally portable or truck-mounted lights would be required for maintenance and security activities within the solar field.

2.5.11 Erosion Control and Stormwater Drainage (Earthen Berms)

The majority of the site would be drained by sheet flow to on- and off-site drainages. The drainage plan would use existing natural washes, by reinforcing their banks, and allow the remaining stormwater flow to pass through the site naturally. The drainage control features would consist of stormwater flow corridor reinforcement, berms within the solar array, and a drainage control berm on the eastern exterior of the solar array (see Figures 2.5-2 and 2.5-3).

Five berms would be constructed to manage stormwater drainage through the solar field. Berms 1, 2, 4, and 5 would be constructed within the solar array. Berm 3 would be constructed outside of the solar array and aligned with the eastern edge of the perimeter fence. Berms would be constructed to a height of 3 to 5 feet above grade with a top width of approximately 15 feet.

The existing stormwater flow corridors would not be disturbed except for at-grade road crossings to permit service vehicle access. Within the stormwater flow corridor washes, no grading would occur and vegetation would be trimmed only where it casts a shadow on the solar panels.

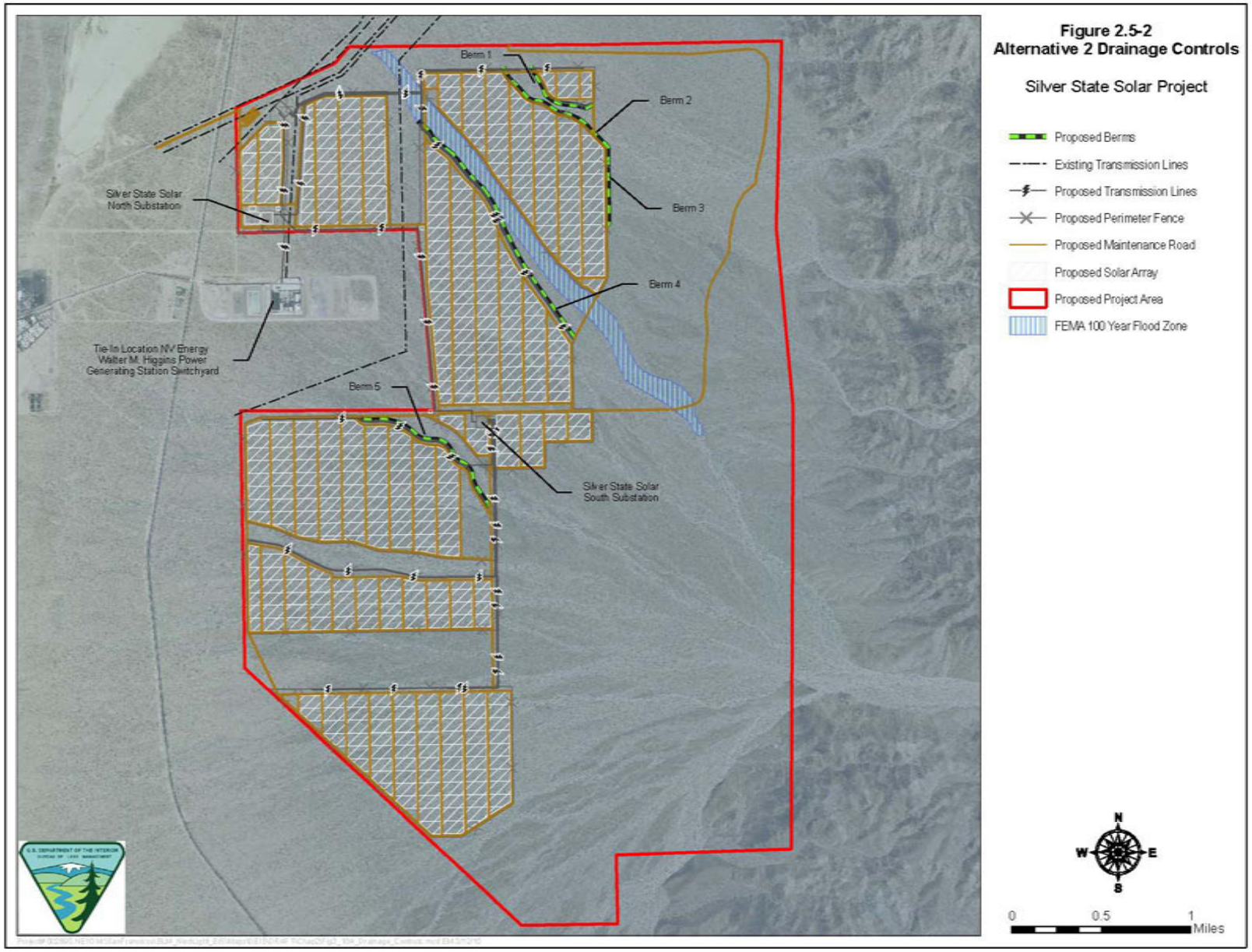


Figure 2.5-2
Alternative 2 Drainage Controls

Silver State Solar Project

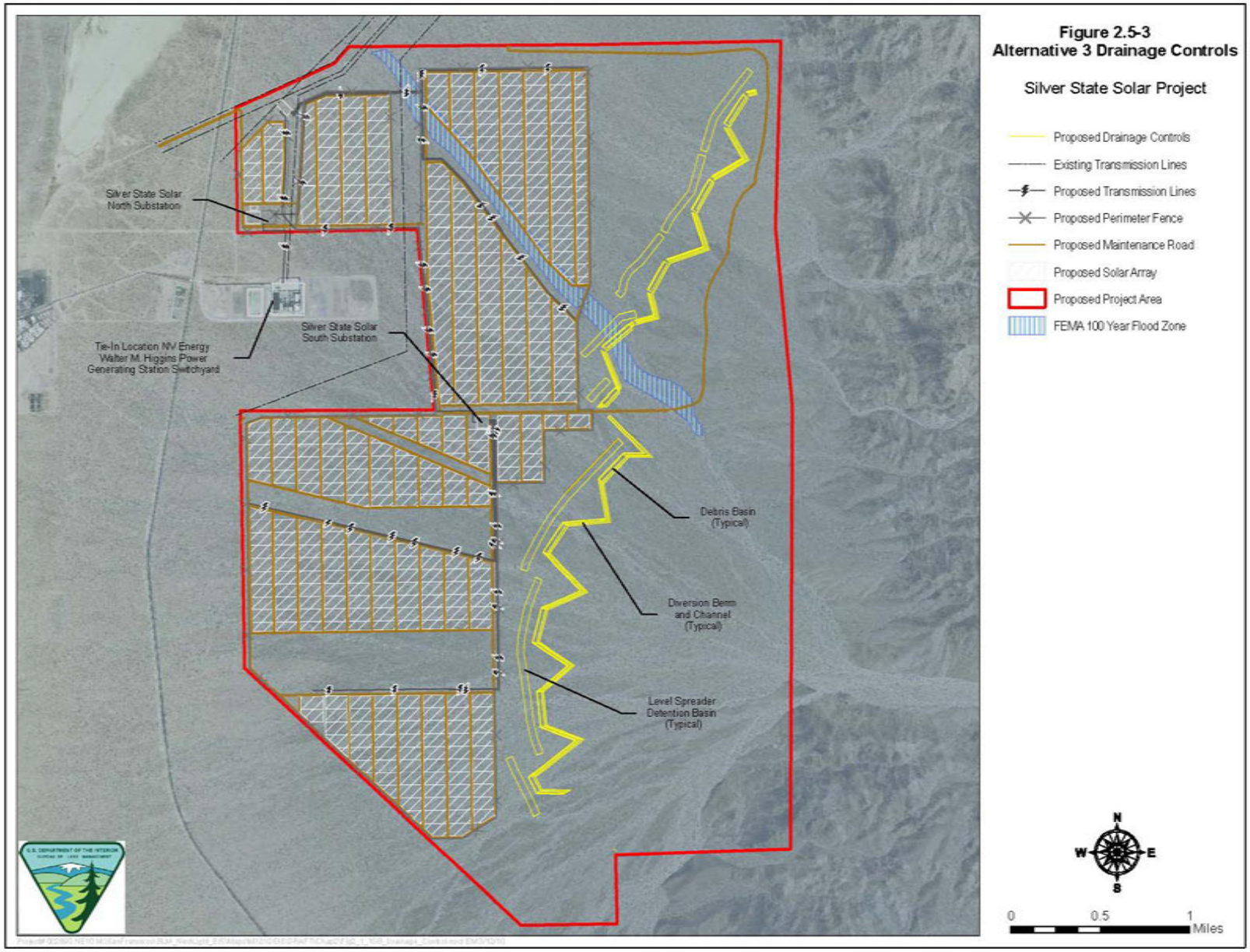


Figure 2.5-3
Alternative 3 Drainage Controls

Silver State Solar Project

2.6 Proposed Project Construction

2.6.1 Project Phasing

The Proposed Project is comprised of three phases and would be constructed in three phases (see Table 2.6-1 and Figure 2.6-1). Phase I would consist of the construction of a 60-MW solar plant and associated facilities. Phase II would include construction of a 140-MW solar plant and associated facilities. Phase III would construct the remaining solar panels to produce 200 MW and infrastructure to complete the Proposed Project. If BLM approves the ROW grant by late 2010, initial delivery of power is scheduled for the second quarter (April-July) of 2011. Construction of the entire Proposed Project, from site preparation and grading to commercial operation, would take place from late 2010 to the fall of 2014.

2.6.2 Site Access and Parking

Most construction staff and workers would come daily to the jobsite from within Clark County. Access to the Proposed Project site would be provided by constructing a paved Project access road on the alignment of the existing road from the I-15 frontage road to the Proposed Project site. This county road makes use of an existing UPRR crossing. Road improvements would be undertaken by Clark County under a separate permitting process. In the event that the County does not improve the road, access to the site would be from Primm Boulevard and would use the existing privately-owned UPRR overpass that provides access to the NV Energy Walter M. Higgins Generating Station.

From the Proposed Project site entrance, a paved interior maintenance road would proceed in a southerly direction to the O&M building. This interior maintenance road would continue east along the southern boundary of T.27S., R.59E., Section 3, then turn due south to run along the western boundary of T.27S., R.59E., Section 11, and then turn east to its termination in T.27S., R.59E., Section 13.

Construction access road beds would typically be 20 feet wide, with 6-foot-wide crushed rock shoulders. A stabilized entrance/exit would be provided to clean vehicle wheels prior to exiting the construction area. The roads described above would be used for delivery of all Proposed Project components and by construction workers traveling to the site. Temporary construction parking construction worker's vehicles would be provided in the northwest corner of the Proposed Project site. Parking areas for construction vehicles and laydown areas for construction materials would be built inside the solar field area.

2.6.3 Construction Workforce

The on-site construction workforce would consist of laborers, craftsmen, supervisory personnel, support personnel, and construction management personnel. The on-site construction workforce is expected to be approximately 230 to 400 employees, depending on the rate of construction.

Construction would occur between 7:00 a.m. and 7:00 p.m., Monday through Friday. Additional hours may be necessary to make up schedule deficiencies, or to complete critical construction activities. For instance, during hot weather, it may be necessary to start work earlier to avoid pouring concrete during high ambient temperatures.

Table 2.6-1. Proposed Project Construction Phases

Task	Quarter # / Description	1 4Q10	2 1Q11	3 2Q11	4 3Q11	5 4Q11	6 1Q12	7 2Q12	8 3Q12	9 4Q12	10 1Q13	11 2Q13	12 3Q13	13 4Q13	14 1Q14	15 2Q14	16 3Q14	17 4Q14
1	Environmental Clearance	1	1	1				2	2	2	2	2 3	2 3	3	3	3		
2	Site Access/Laydown		1	1														
3	Well Field/Pond		1	1														
4	Site Preparation			1	1				2	2	2	2 3	2 3	3	3	3		
5	O&M Area - Building Construction			1	1													
6	Drainage Controls									2	2	2	2	3				
7	Substation/Switchyard			1	1					2	2	2						
8	Overhead pole/line construction			1	1						2	2	2	3	3	3		
9	PV Equipment Installation/Commissioning			1	1	1					2	2	2	2 3	2 3	2 3	3	3
	Initial Power Deliveries				1							2			3			
	Commercial Operation					1										2		3
	Truck Trips To Site (daily maximum)	4	8	36	56	48	1	1	48	56	56	56	56	56	56	56	48	28
	Construction vehicles on-site (daily)	4	39	86	86	62	9	9	86	86	86	86	76	76	62	62	62	62

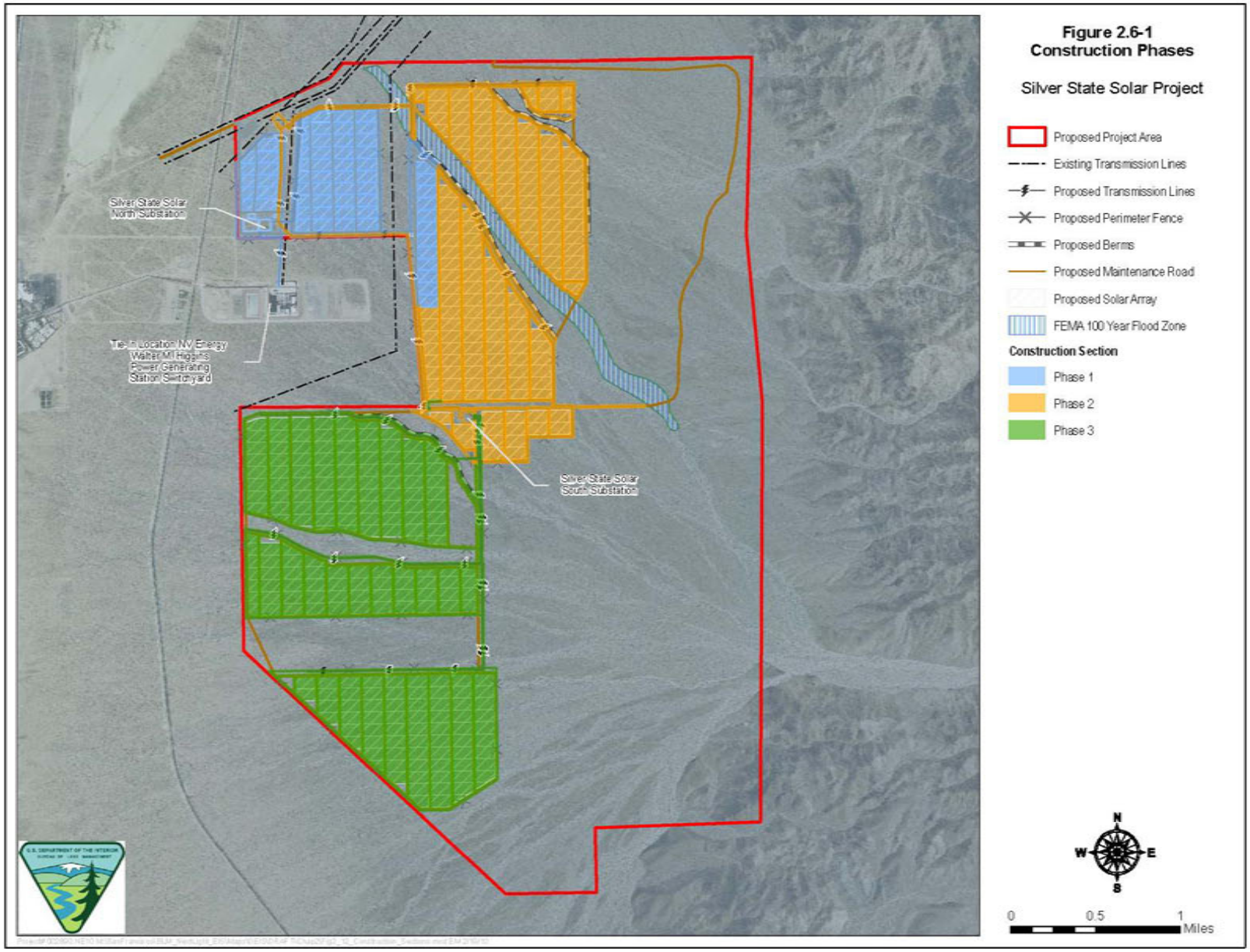


Figure 2.6-1
Construction Phases

Silver State Solar Project

Temporary Tent Structure

A temporary tent structure would be erected to provide a covered work area for storage and assembly of materials. The tent would be used to provide cover from direct sunlight for the construction crew during meeting, pre-assembly, and inventory activities. The tent would be 210 feet by 70 feet, approximately 34 feet high, and would be erected in the laydown area. Following the completion of construction, the tent would be removed and the size of the laydown area would be reduced to the size needed for O&M. All laydown areas must comply with dust regulations of the DAQEM.

2.6.4 Truck Trips and Deliveries

During peak construction, an average of 56 truck trips per day would be required to supply concrete, construction materials, Proposed Project components and equipment to the site. Table 2.6-2 shows the maximum number of daily truck trips during the construction phases. To provide concrete for PV module foundations and other uses, either a concrete batch plant would be located on site or an off-site ready mix plant would be used. In either case, a similar number of trucks would be required to supply either cement or concrete raw materials. Construction materials such as concrete, pipe, PV modules, tracker assemblies, wire and cable, fuels, reinforcing steel, and small tools and consumables would also be delivered to the site by truck.

Table 2.6-2. Truck Trips/Deliveries

Construction Period	Truck Trips to Site (daily max)	Construction Vehicles On-Site (daily max)
Q1	4	4
Q2	8	39
Q3	36	86
Q4	56	62
Q5	48	9
Q6	1	9
Q7	1	86
Q8	48	86
Q9	56	86
Q10	56	86
Q11	56	86
Q12	56	76
Q13	56	76
Q14	56	62
Q15	56	62
Q16	48	62
Q17	28	62
Total	**670**	**1039**

2.6.5 Construction Materials and Equipment

Concrete ballasts, if used, and pads to support the PV panels and tracker units would be pre-cast and delivered to the site or constructed on site. A small amount of concrete would be poured in place for equipment and building foundations, fence footing, and miscellaneous small pads. Aggregate material would be used for the parking lot, substation, switchyard areas, and the perimeter road. An estimated 60,000 tons of aggregate material would be required for construction of the perimeter road and surfacing of the substation and switchyard areas. This aggregate would be procured from off-site locations and trucked to the Proposed Project site. Concrete would be supplied to the site from a commercial source or an on-site batch plant.

Construction materials such as concrete, pipe, PV modules, tracker assemblies, wire and cable, fuels, reinforcing steel, and small tools and consumables would be delivered to the site by truck. Initial grading work would include the use of excavators, graders, dump trucks, and end loaders, in addition to the support pickups, water trucks, and cranes. The large equipment would be on site for the first year of construction for grading. As the Proposed Project moves into the next stages of civil work, equipment for foundations and road construction would be brought in, including paving machines, trenching machines, concrete mixers and pumps, additional excavators for foundation drilling, tractors, and additional support vehicles (see Table 2.6-3).

Table 2.6-3. Construction Equipment

Quantity	Type of Equipment[a]	Horsepower (HP)	Section 1 Total Days	Sec 2/3 Total Days
3	Scraper	135	132	396
3	Motor grader	200	132	396
4	Excavator	195	132	396
3	Dozer	300	132	396
4	Dump truck	275	132	396
3	Pad drum vibratory roller	130	132	396
6	4,000-gallon water truck	220	264	792
6	Concrete truck	250	132	396
2	Backhoe/loader	90	132	396
5	Truck mounted crane	130	198	594
5	Grade-all	100	132	396
5	Flatbed truck	220	198	594
3	Trencher	180	132	396
50	Lightweight truck	150	198	594
2	Drilling Rig for Water Wells	565	20	0
2	Drilling Rig Air Compressor	500	20	0
1	Crawler tractor	84	40	310
2	Traveler equipment	No engine		
1	Jackhammer/ Skid Steer loader	81	40	310
3	Bucket trucks	210	20	160
2	Bullwheel tensioner truck	165	20	160
2	Drum puller truck	460	20	160

Table 2.6-3. Construction Equipment

Quantity	Type of Equipment[a]	Horsepower (HP)	Section 1 Total Days	Sec 2/3 Total Days
1	Pump trucks	350	7	20
2	Auger trucks	200	10	50
1	Welding machines	25	40	310
2	Forklifts	125	40	310
n/a	A truck-mounted pole hole auger	200	10	50
4	Conductor reel and pole trailers	No engine		
n/a	Truck-mounted tensioner and puller	460	20	160

Source: NextLight 2010
Note:
[a] Construction hours would be 7:00 a.m. to 7:00 p.m. Monday thru Friday

The drainage control berms to be constructed to reinforce the stormwater flow corridors would require rock reinforcement. Appropriately sized rock that would be used to minimize erosion would be obtained from on-site grading operations, to the maximum extent possible. By placing a 2-foot-thick layer of rock on the wash side of the berm, approximately 25,000 cubic yards of rock material would be required. It is anticipated that a majority of rock material would be obtained from an off-site rock quarry. Rock material obtained from off-site sources would be of a similar color as the on-site rock material. A BLM-approved material, such as Permeon, may be applied to the rock surface to assist with weathering and blending of the berm's appearance with the surrounding area. Along the interior washes, vegetation would be re-planted on the southern berm of each wash where it would not cause shading of the solar array.

2.6.6 Construction Sequencing

Environmental Clearance

Environmental clearance activities would be performed in each of the three phases of the Proposed Project directly proceeding construction. During each environmental clearance phase, the boundaries of each construction area would be surveyed and marked with flagging. Trained biologists would salvage cactus, survey and relocate desert tortoise, and perform any sensitive species removal and mitigation. Security and tortoise fencing would be installed around the perimeter of each construction area to prevent the reintroduction of sensitive species to the area.

Temporary Construction Fencing

During construction, fencing would consist of portable, stand-alone, chain link fence modules or plastic snow fencing supported by standard metal fence posts. Tortoise fencing would be installed prior to construction along the boundaries of the construction zone to clearly mark this zone, preventing vehicles or personnel from straying onto adjacent off-site habitat. Fencing would also be installed around the North and South substations and the switchyard. Access gates would be provided to allow maintenance vehicle access to the equipment. Substation and switchyard fencing would be similar in design to the perimeter fence.

Site Access and Laydown

Following completion of environmental clearance for site access and the laydown area (which include the Proposed Project access road and O&M area), the site access and laydown area would be prepared for use. The activities described below would only occur during development of construction for Phase 1 of the Proposed Project because the site access and laydown area developed in Phase 1 would also be used for construction of Phase 2 and Phase 3.

The area would be cleared and grubbed of vegetation. Organic matter would be mulched on site and redistributed into the fill (except under equipment foundations, trenches, and roadways) to aid in dust control. The area would also be graded with an approximate 12-inch cut/fill and compacted to establish suitable groundwork for foundations and equipment laydown.

The construction entrance and exit gates would be established. A tire wash area would be established to prevent the removal of soil and maintain a clean access road. Parking and staging areas would be staked for temporary and permanent building erection at a later stage. Temporary equipment storage and laydown areas would be compacted in compliance with dust regulations of the DAQEM and marked with temporary stakes and signage. The maintenance road would then be prepared with an aggregate rock base and paved.

The Proposed Project access road alignment currently serves as an unpaved road. Widening of this road located on public lands would be authorized as a FLPMA right-of-way. This road is a recognized county road and any modifications outside of the recognized existing footprint would require approval by BLM.

A temporary bypass route would be designated by the BLM, if necessary, to enable backcountry access during construction of the Proposed Project access road. Some additional clearing and grubbing would be necessary to widen the existing road to create a suitable prism for an all-weather paved roadway between the I-15 frontage road and the O&M area entrance. Preconstruction activities for the Proposed Project access road would include installation of tortoise fencing, relocation of desert tortoise, and meeting cactus salvage requirements.

Proposed Project Water Supply

The Proposed Project would require 600 acre-feet of water during construction (4 years) and 21 acre-feet per year for O&M. The maximum volume of construction water in any given year is not expected to exceed 200 acre-feet. The primary use of the water would be for dust control during construction and the manufacture of minor amounts of concrete at the Proposed Project site. Water rights to Basin 164-A would be purchased from the Las Vegas Valley Water District (the District) to allow the drilling of two on-site wells.

Water Wells

To provide water during construction, an on-site well and temporary storage pond would be constructed. Based on current groundwater basin information, the water well would be drilled to a depth of approximately 600 feet using a truck-mounted drilling rig. This well would be capped and abandoned in compliance with all federal and state regulations governing well abandonment. In addition, a potable water well would also be drilled to a depth of 600 feet to provide a water source for treated water for use in the O&M building.

Drilling Techniques

During the drilling process, the Applicant would use either a drilling fluid or compressed air technique to stabilize the bore hole. If geologic conditions are determined to be suitable, a drilling fluid, consisting of water mixed with various types of clay (e.g., bentonite) would be used to cool the drill bit and remove materials and cuttings displaced by the advancing drill bit. Drilling fluid would be circulated down the center of the drill stem and allowed to flow back to the surface. It would then be routed to a surface tank where suspended gravel and sand would be allowed to settle out of the drilling fluid. The drilling fluid would then be re-circulated through the drill stem. Supporting equipment would consist of a water truck and surface tanks for drilling fluid management. If geologic conditions do not permit use of a drilling fluid to stabilize the bore hole, compressed air would be used to remove drill bit cuttings and any groundwater encountered during the drilling process.

Following borehole completion, a casing would be set to the bottom of the hole (or top of the bedrock if encountered). If the water bearing layer were sand or gravel, a fine mesh screen of variable length would be attached to the bottom of the well casing. Depending on well conditions, filter gravel, clay seal, and cement grout would be installed between the borehole and casing to complete the well construction.

Following casting completion, the well would be pumped for several hours to remove all sediment within the well casing generated during the installation process. Unless prevented by regulations, the water discharged by the pump test would be discharged to the ground surface. The well would be finalized by installing the well pump and sealing the top of the casing to prevent contamination.

Water Storage Tanks

Two permanent above ground water tanks, each 36 feet in diameter and 32 feet high with a 270,000-gallon capacity, would be located in the O&M area to provide storage for operational water needs as well as water for fire protection. Graded pads for two permanent water storage tanks would be installed at the well field, adjacent to the O&M area.

The Proposed Project's fire protection water system would be supplied from two water storage tanks located near the O&M building, holding a minimum of 3 hours of full flow runtime (approximately 270,000 gallons total) to be accessible through a Clark County-approved fire hydrant. One electric- and one diesel-fueled backup firewater pump would deliver water to the fire protection water-piping network. Fire protection pump flowrates would be in accordance with applicable standards. A smaller electric motor-driven jockey pump would maintain pressure in the piping network. If the jockey pump is unable to maintain a set operating pressure in the piping network, a main fire protection pump would start automatically. All fire protection system pumps must be shut off manually.

Water Storage Pond

An on-site, temporary, 200-foot by 140-foot water storage pond adjacent to the O&M building would be excavated and lined for use during construction. The pond would provide a reliable source of water for dust control during construction. After the construction period, the

construction water storage pond would be re-leveled to grade and the lining would be removed. The site would then be reclaimed in accordance with BLM revegetation standards.

Site Preparation

Vegetation Treatment/Clearing and Grading

Vegetation would not be removed from the Proposed Project site until the onset of construction of a given phase. Except for cactus and yucca species protected by Nevada state law, all cleared vegetation would be mulched or composted and retained on site to assist in erosion control and limit waste disposal. In some areas to be graded outside of the solar field, native vegetation would possibly be harvested for replanting to augment soil stabilization. Otherwise, vegetation would be would be mowed using a conventional ―bush-hog" to a height of 6 to 12 inches within the solar field area and areas identified for structures and transmission lines.

Vegetation would be cleared from roadways, access ways, and where concrete foundations would be used for inverter equipment, substations, and the O&M facilities. Vegetation would be cleared for construction of the drainage controls, including berms. Organic matter would be mulched and redistributed within the construction area (except in trenches and under equipment foundations). Plant root systems would be left in place, except where grading and trenching would be required for placement of solar module foundations, underground electric lines, inverter and transformer pads, road and access ways, and other facilities to provide soil stability.

After environmental clearance and vegetation removal for a given phase, grading equipment would be used to level the site.

Noxious Weed Control

A Noxious Weed Control Plan would be prepared and submitted to the BLM for review and approval before construction began. The Plan would follow the Las Vegas Field Office's Resource Management Plan, Noxious Weed Plan, and the interagency guidance from Partners Against Weeds for an active integrated weed management program using weed control best management practices (BMPs).

Mineral Materials

To the extent possible, the Proposed Project would use mineral materials excavated onsite for the construction of berms, road building material, the parking lot, and other Project components within the ROW area. Any excess mineral materials produced within the ROW area would be stockpiled or, if transported offsite, must sold by the BLM for another project.

Firebreak

A 20-foot-wide and 13.65-mile-long firebreak would be established around the entire fenced perimeter of the Proposed Project. Construction of the firebreak would require removal of shrubs and bushes. It is anticipated that the firebreak would be scraped with a grader or disc periodically to reduce vegetation. A firebreak would not be established along the stormwater flow corridors.

Dust Control

The construction phase of the Proposed Project would temporarily cause fugitive dust related to grading and other construction activities. To comply with Clark County dust control requirements, the Applicant would use water for control dust. Currently, only water is approved for dust control within potential threatened and endangered (T&E) species habitat.

The Proposed Project would implement the following BMPs for fugitive dust and wind erosion control:

- Minimize grading and vegetation removal, and limit surface disturbance during construction to the time just before PV module support structure installation;
- Limit vehicular speeds on non-paved roads (Clark County ordinance speed limit is 25 miles per hour [mph]);
- Apply water to disturbed soil areas of the Proposed Project site to control dust and maintain optimum moisture levels for compaction, as needed. Apply the water using water trucks. Minimize water application rates, as necessary, to prevent runoff and ponding;
- During windy conditions (forecast or actual wind conditions of approximately 25 miles per hour or greater), apply dust control measures to haul roads to adequately control wind erosion. Cover exposed stockpiled material areas;
- Suspend excavation and grading during periods of high winds; and
- Cover all trucks hauling soil and other loose material or maintain at least 2 feet of freeboard.

Operation and Maintenance Building

Grading for O&M Area

O&M area grading would include an area where the O&M building would be constructed. The remaining area would be graded and appropriately surfaced for parking, roads, material storage, and the erection of the temporary tent structure for use during the construction phase of the Proposed Project.

O&M Building Construction

Following environmental clearance and site preparation of the O&M area, construction in the O&M area would commence. The O&M area would also serve as the central construction staging and fabricating area for the Proposed Project. This construction task applies only to construction of Phase 1, as this would serve as a common O&M facility for construction of Phase 2 and Phase 3.

Concrete foundations would be poured to support the permanent O&M building and an area adjacent to the building would be paved for parking. The modular steel building would be erected. A 4-inch aggregate base would be installed on all unpaved areas within the O&M area.

Until the Proposed Project became operational, the O&M building would run on a temporary power source.

Water Supply and Storage

Once the modular steel building is erected, a connection to the two water storage tanks would be established, and the on-site active and reserve septic fields would be established and connected to the O&M buildings waste system. The potable water treatment equipment would be installed in the O&M building and the water pump and line would be connected to the potable water well. The location of the septic fields and water wells would be situated in accordance with BMPs to avoid contamination of potable water supplies and the aquifer.

Substation/Switchyard Construction

After clearing and grading, the substation area(s) would be excavated to a depth of 10 feet. A copper grounding grid would be installed and the foundations for transformers and metal structures would be poured. The area(s) would be backfilled, compacted, and leveled, followed by the application of 6 inches of 10,000 tons of concrete uniformly grade aggregate rock.

Installation of the transformers, breakers, buswork, and metal dead-end structures would follow. A pre-fabricated control house would be installed to house the electronic components required of the substation and switchyard equipment.

Switchyard construction would consist of site grading, concrete equipment foundation forming and pouring, crane-placed electrical and structural equipment, underground and overhead cabling and cable termination, ground grid trenching and termination, control building erection, and installation of all associated systems including, but not limited to heating, ventilation, and air conditioning (HVAC), distribution panels, lighting, communication and control equipment, and lightening protection.

Transmission Line Poles

Two types of overhead transmission line poles would be erected: (1) steel monopole 220kV/230kV poles for interconnection of the high-voltage electrical system; and (2) wooden monopole 34.5kV poles for collection of the medium-voltage electrical system. Stringing areas would be established and the location of each pole would be surveyed and staked.

Pole Installation

Poles would be staged either in a designated laydown/stringing area, or would be delivered and unloaded adjacent to their respective final locations.

Poles would be placed onto their foundations (for wood, placed into their holes) using backhoes or heavy lifter vehicles for the smaller, lighter poles, or a crane for longer poles. The poles would be supported, as necessary, during backfilling or bolting to the foundation to ensure correct pole seating and raking. Taller steel poles, typically those over 45 feet long, would be composed of multiple sections that would be stacked on each other and then ―jacked" together (aligning the boltings on each pole so that they can be properly fastened).

For dead-end wood poles or turning poles, guys and anchors would be installed with auger trucks placing the anchors. Wood pole dead-ends for a double circuit would possibly be two independent poles, two poles lashed together with guys or, more simply, a steel pole on a drilled pier foundation with davit arms designed to hold the tension of a double circuit.

34.5kV Transmission Lines

Wood poles would be embedded into the ground to a depth of at least 10 percent of the pole height plus 2 feet. For the Proposed Project, installation of wood poles is anticipated to require auguring holes approximately 2 feet in diameter and 8 feet deep. Aggregate or high-strength backfill would be used to stabilize the installed poles. One foundation hole is expected for each transmission line structure and directly embedded pole.

The 34.5kv output from each medium-voltage transformer would be ―daisy-chained" together using underground trenched conductors. ―Daisy-chain" refers to the manner in which the transformers are electrically connected together on the 34.5kv side. Transformers for this application would be ordered as loop-feed transformers, meaning that they would have two sets of medium-voltage bushings. Each transformer would connect to the transformers from adjacent blocks (using buried conductors in the trenches), except for the last transformer in each circuit which only connects to one other transformer. Each underground circuit would collect up to 30 MW of transformers in this configuration before transitioning to overhead conductors. At the underground-overhead transition, a pole-mounted visible disconnect switch would be utilized to isolate conductors for service.

Overhead 34.5kv lines would be installed as double circuit lines on wood poles with post insulators (typical of medium-voltage installations in electric distribution systems). Pole height would be 45 feet above grade. Spacing between individual circuits and phases would comply with National Electrical Safety Code requirements, typically 5 feet. A 23-foot ground clearance would be maintained under 34.5kv lines based on the highest expected temperature and loading. A total of 192 wood poles would be installed with 150-foot spacing between poles. Wood poles would be directly embedded to 10 percent of the pole height plus 2 feet, typically 8 feet deep. A ground rod of 8 to 12 feet would be hammered into the ground adjacent to the wood pole.

220kV/230kV Transmission Lines

The Proposed Project would use 220kV/230kV transmission lines for interconnection to the electric power system. Overhead 220kV/230kV transmission lines would be installed on steel monopole structures of approximately 90 feet above grade with 15 foot spacing between conductors and minimum ground clearance of 26 feet per local and national electrical code requirements. A total of 22 steel poles would be installed with 800-foot spacing between poles. Steel poles would be galvanized steel with a dull gray appearance similar to existing steel poles installed adjacent to the Proposed Project. If required by the BLM, the Applicant would color treat the poles.

The 220kV/230kV steel monopoles would be supported by steel-reinforced poured pier concrete foundations suitable for the sandy soils conditions at the site. These foundations would be constructed by auguring a cylindrical hole using a truck-mounted drilling rig. Reinforcing steel and anchor bolt cages would be installed in the hole prior to backfilling with concrete. Steel

monopole foundations would range in size from approximately 4 to 7 feet in diameter, and range in depth from 12 to 30 feet. Larger diameter and deeper foundations used where the transmission line turns at an angle of 30 degrees or greater.

Conductor Stringing

Conductor stringing would likely be done one phase at a time, with all equipment in the same operational place until all phases of that operation are strung. The sequence of conductor stringing operations is summarized below.

- **Finger Lines:** The finger line is used to pull the later pilot line through travelers installed on each davit arm. The finger line is typically a small diameter synthetic rope that can be pulled by hand or with a crawler tractor.
- **Pilot Lines:** The finger line, once in place, is used to pull the pilot line which is a larger synthetic rope or small steel line. This requires a vehicle at each side of the pulling area, a Bullwheel tensioner truck doing the pulling of the pilot line, and a drum puller truck on the other side holding the reel.
- **Conductor:** Using the pilot line, the conductor is pulled through. Other activities may include offset clipping if suspension insulators are not plumb, or splicing together two reels of conductor. Once complete, the traveler equipment would be removed.
- **Tensioning:** After the conductor is completely strung through a section, the section is tensioned to comply with design specifications. Once the conductor has been tensioned or loosened to meet the appropriate sag specification given the ambient temperature, the dead-end clamps would be tightened.

Grounding

Ground rods would be hammered into the earth with a jackhammer device attached to a small excavator (such as a Bobcat®). Typically, the rods come in 8 to 12 foot sections and can be joined if longer rods are needed. For the 34.5kV wood poles, a 3-foot square by 2-foot-deep area would be excavated to expose the ground rod for connection to the plant's grounding grid. The poles would then be connected by laying in ground wire below grade to connect to the ground grid via trenching. Ground rods would be connected to the pole or, in the case of the steel pole, to the anchor bolts. The 220kV/230kV poles could either be connected to the overall plant ground grid or remain independent.

It is expected that an area of approximately 100 feet by 150 feet would be required at each 220kV/230kV pole location for use as temporary laydown or as a staging area for equipment, poles, and hardware. Little to no grading would is expected for these areas.

Typical equipment expected to be used for transmission line construction includes: (1) a backhoe; (2) a truck-mounted pole hole auger; (3) a forklift; (4) a crane; (5) a line truck with an air compressor; (6) various pick-up and flatbed trucks; (7) a conductor reel and pole trailers; (8) bucket trucks; and (9) a truck-mounted tensioner and puller.

Solar Array Assembly and Construction

Solar Field

Pre-assembly of solar field equipment would be conducted in the temporary tent described in Section 2.6.1. The assembled solar equipment would be installed on the pre-cast concrete foundations or embedded piers to form a row of panels. If tracking technology is used, these rows would be attached to an aboveground driveshaft. Specialty trucks would be used to transport the assembled PV modules to the solar field. A small mobile crane would be used for setting the solar modules on their foundations. Trenching machines would be used for base trenching, light skiploaders would be used for backfill, and light rollers would be used for compaction. Final solar field assembly would require small cranes, tractors, welding machines, and forklifts.

PV Equipment Installation

The construction of the solar field would proceed in 1MW blocks. Each block would be approximately 700 feet by 400 feet and would contain solar panels, an inverter, and an SUT. Within each 1MW block, a temporary laydown area would be designated for local deployment of materials and equipment prior to construction of that block.

Support foundations for PV structures would be composed of either concrete foundations (with an embedded galvanized steel pier) that sit at or below grade, or directly driven galvanized steel piers driven to a depth of 8 to 12 feet. The Proposed Project is expected to make use of both concrete foundations and driven steel piers. This selection will be finalized after geotechnical and soils data in each area are obtained and prior to construction.

Embedded piers would be installed by either vibratory pounders or hammer-type pounders that would be mounted to a truck or track hoe. Concrete foundations would be typically laid directly on the ground or poured into a hole augured 18 to 24 inches wide and 6 to 8 feet deep. On steeper portions of the site, creation of small foot pads may be necessary so that changes in vertical elevation between trackers do not exceed 5 percent.

Atop each pier, a galvanized steel ~~"~~table" would be installed to provide a mechanical mounting structure for the PV modules. Fixed tilt structures utilize fixed pier mounting that do not allow rotation of the table. Tracking structures utilize rotating pier caps with bushings between the table and foundations.

For tracking structures, a concrete equipment pad would be poured to support the drive motor. Mechanical linkage would be connected to each tracker unit. The tracker motors/foundations would be located at each row and would be approximately 700 feet apart. Alternatively, depending on specific horizontal tracking technology selected, tracking motors may be mounted directly on the tracker structures. In this configuration, each tracker assembly would have its own drive system and there would be no motor foundation or mechanical linkage from one tracker to the next. PV modules would then mechanically be attached to each table.

The inverter/transformer concrete equipment pad would be poured to provide a mounting surface for the equipment. A pre-fabricated enclosure containing the inverters and communication

equipment would be installed on the equipment pad. A three-phase, medium-voltage transformer would also be installed on the equipment pad.

Once all equipment was physically and electrically inspected, PV modules would be terminated to the inverters and the transformers would be terminated at the underground cabling.

Cable Trenching

Prior to trench excavation, the area to be trenched would be graded and organic matter removed. Organic matter would be mulched and re-deposited within the site fill except under foundations and in trenches. Cable trenches would vary between 2 to 3 feet wide and 2 to 3 feet deep, depending on the number of conductors and voltage of equipment, to comply with electrical code Table 2.6-4 provides a comparison of trenching requirements for the three PV technologies. Underground cable would be installed and "stubbed up" to provide cable access during the electrical terminations step.

Table 2.6-4. Length and Area of Trenching Required for Each PV Technology

Technology	2 ft wide x 3 ft deep (total)	3 ft wide x 3 ft deep (total)	Acres (total)
Tilted Tracker	135,050 ft	138,700 ft	15.8
Horizontal Tracker	256,595 ft	138,700 ft	21.3
Fixed Tilt	153,300 ft	138,700 ft	16.6

After the cable is installed, trenches would be backfilled with 3 to 4 inches of sand to provide suitable bedding for installed conductors, and then 3 to 4 inches of sand would be deposited on top of installed conductors. The remaining backfill would be composed of the native excavated soils and compacted to 50 pounds per cubic foot. During the backfill, underground utility marking tape would be installed 12 inches below grade to indicate the type of conductors installed beneath. Excess soil would be redistributed on site and used to provide level ground for equipment foundations for inverters, transformers and tracker motor foundations (if used). Temporary sheeting or bracing would be used to support trench side-walls in areas where soils are soft or collapsible.

Drainage Control Structures (Earthen Berms)

The activities described below would occur only during development of construction of Phase 2 and Phase 3 because these phases are the only ones that require drainage control (i.e., construction of Phase 1 would not require drainage control facilities because the area is level and is not susceptible to erosion). The drainage control berms would occupy approximately 17.7 acres. Construction is anticipated to disturb an additional estimated 11 acres. Following completion of the drainage structures, areas disturbed during construction would be restored in accordance with an approved restoration plan.

Berm 3, the only exterior berm, would be approximately 3,000 feet long, 5 feet high, and approximately 15 feet wide at the top. Berm 3 would extend south from the existing stormwater flow corridor delineated by Berms 1 and 2 to direct and prevent stormwater flow in the localized area from bypassing the natural wash areas. The berms are illustrated on Figure 2.6-2.

The drainage control berms within the solar array areas (Berms 1, 2, 4, and 5) would be placed along some of the existing primary natural washes to prevent the washes from migrating from their current path. Berms would be omitted from the side of some washes to allow storm water that originates upstream from the Proposed Project site and flows across the solar field to enter the washes. Within the solar field, the berms would be built outside of the existing washes and the Federal Emergency Management Agency (FEMA) flood zone to keep the storm water within the current washes, but still allow the wash to meander within the wash limits defined by the berms. As discussed above, no excavation or vegetation removal would occur inside the washes except for the east and west ends where compacted earth or aggregate roads would be required to cross the washes.

Approximately half of the 58,000 cubic yards of soil material required to construct the berms would be obtained from excess soil material obtained from other excavating activities on site, primarily the berm construction, itself. The remaining soil material would be obtained from an off-site source that has yet to be determined. To reduce visual contrast, the top 4 inches of native soil would be salvaged and placed over the berms to provide a homogenous appearance as well as preserve sensitive soils and seed banks.

To minimize erosion, appropriately sized rock would be obtained from on-site grading operations, and used to strengthen the core of each berm. Each berm would require a 2-foot-thick layer of rock on the wash side of the berm, totaling approximately 25,000 cubic yards of rock. If a sufficient amount of on-site rock cannot be scavenged, additional rock would be obtained from an off-site quarry. Rock material obtained from off-site sources would be of a similar color as the on-site rock material. A BLM-approved material, such as Permeon, may be applied to the rock surface to assist with weathering and for blending the berm's appearance with the surrounding area. Along the interior washes, vegetation would be re-planted on the southern berm of each wash where it would not cause shading of the solar array.

2.6.7 Other Considerations for Construction of the Proposed Project

Erosion and Sediment Control Measures

Erosion Control Measures

The Applicant would employ BMPs to protect the soil surface by covering or binding soil particles using water. As part of the Proposed Project, the Applicant would implement the following erosion control measures:

Year-Round

- Monitor the weather using National Weather Service reports to track conditions and alert crews to the onset of significant rainfall events.
- Preserve existing vegetation and conduct clearing and grading only in areas necessary for Proposed Project activities and equipment traffic. Install temporary fencing prior to construction along the boundaries of the construction zone to clearly mark this zone, preventing vehicles or personnel from straying onto adjacent off-site habitat.

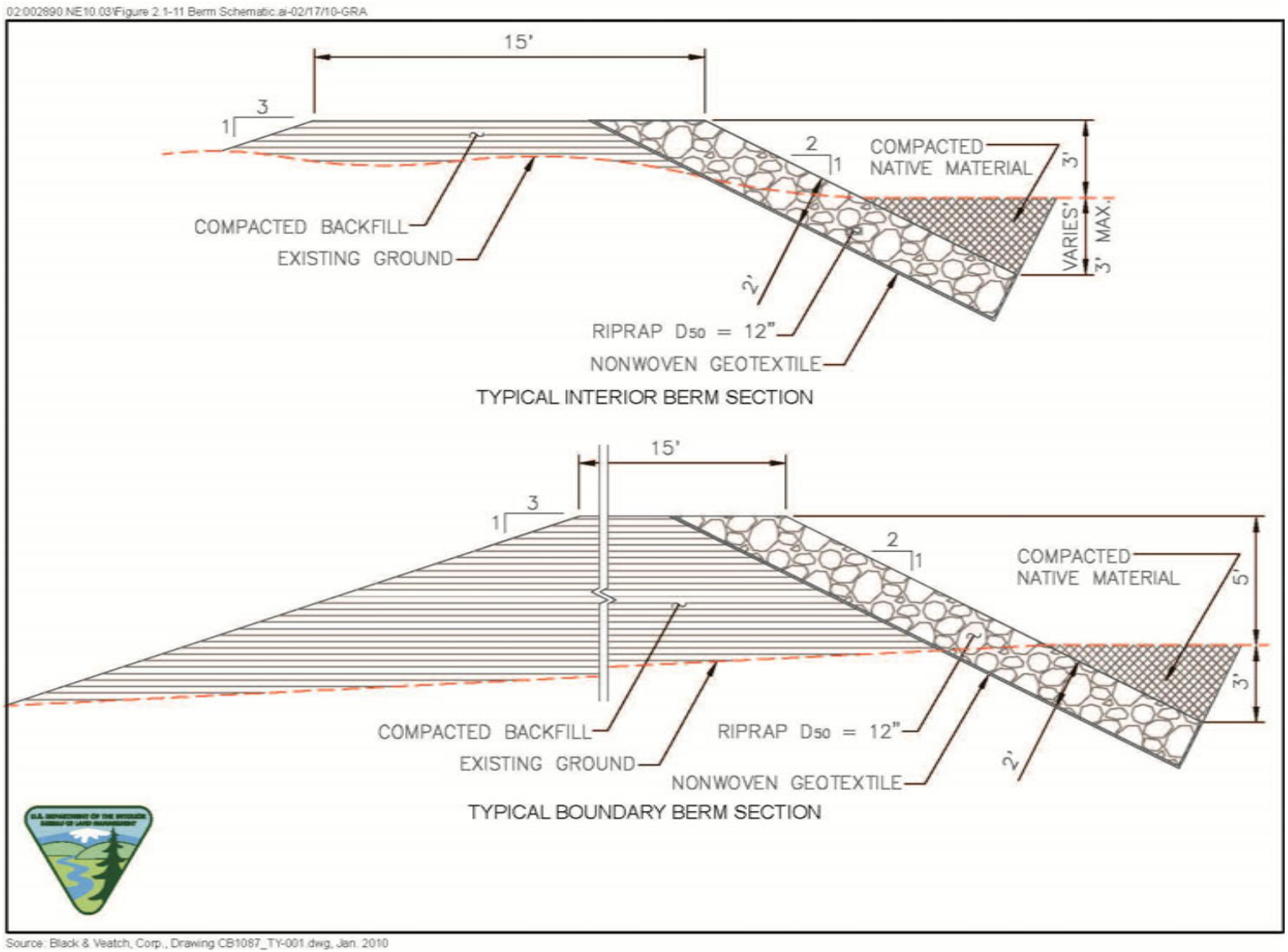


Figure 2.6-2. Conceptual Berm Design
Silver State Solar Project – NextLight Solar Facility

- Sequence construction activities with the installation of erosion control and sediment control measures. Arrange the construction schedule to leave existing vegetation undisturbed until immediately prior to grading.
- Protect slopes susceptible to erosion by installing controls such as hay bales, fiber rolls, and gravel bags.
- Stabilize non-active areas as soon as feasible after construction is complete and no later than 14 days after construction in that portion of the site has temporarily or permanently ceased. Reapply stabilization measures as necessary to maintain effectiveness (currently, there are no BLM-approved dust palliatives in T&E species habitat);
- Place covers over stockpiles prior to forecasted storm events and during windy conditions. Place sediment controls (fiber rolls or gravel bags) around the perimeter of stockpiled materials year-round. Excess sand and gravel will be stockpiled for BLM material sale.
- Maintain sufficient erosion control materials on site to allow implementation in conformance with General Permit requirements and as described in the Stormwater Pollution Prevention Plan (SWPPP). This would include implementation requirements for active areas and non-active areas that require deployment before the onset of rain.
- Promptly repair and reapply erosion controls in areas where failure is evident.

Erosion Control Measures During the Rainy Season

The rainy season in Southern Nevada is late July through early September (monsoon season) and December through March. Erosion control measures to be used during the rainy season would include the following practices:

- Implement temporary erosion control measures such as fiber rolls, straw bales, geotextiles and mats, and gravel bags throughout the defined rainy season and as needed determined by site conditions.
- Inspect and stabilize disturbed areas with erosion control measures before rain events.

Erosion Control Measures During the Non-Rainy Season

The non-rainy season is between April and mid-July and during the early fall. Erosion control measures that would be used during the non-rainy season include the following:

- Conduct construction activities that would have an impact on waters of the United States during the dry season to minimize erosion.

A combination of the following erosion controls may also be used at the site (may also be used during rainy season):

- Scheduling of activities to avoid times of erosion susceptibility;
- Preservation of existing vegetation;
- Mulch and hydraulic mulch;
- Straw mulch;

- Geotextiles and mats;
- Earth dikes and drainage swales;
- Velocity dissipation devices;
- Slope drains; and
- Streambank stabilization.

BMPs will be deployed in a sequence to follow the progress of grading and construction. As the locations of soil disturbance change, erosion controls would be adjusted accordingly to control stormwater runoff at the downgrade perimeter.

Sediment Control Measures

The Applicant would implement the following sediment control practices throughout the year or for specific portions:

Year-Round

- Install detention ponds designed to control sediment transport off site. Sediment would be removed from the ponds and transported off site to a designated fill area.
- Maintain the following temporary sediment control materials on site:
  - Silt fence materials,
  - Gravel bags for linear barriers,
  - Fiber rolls,
  - Gravel filter berms; and
- Install gravel filter berms along the boundaries of delineated sensitive areas, if any, within the boundaries of the Proposed Project site or areas that receive runoff from the Proposed Project site. Native on-site stones/rocks would be used in construction of gravel filter berms or check dams.

Sediment Control Measures During the Rainy Season

The rainy season in Southern Nevada is late July through early September (monsoon season) and December through March. Sediment control measures that would be used during the rainy season would include the following practices:

- Implement temporary sediment controls at the draining perimeter of disturbed soil areas, at the toe of slopes, and at outfall areas; and
- Maintain sufficient quantities of sediment control devices to implement temporary sediment controls in the event of predicted rain, and to respond to failures or emergencies in conformance with General Permit requirements and as described in the SWPPP.

Sediment Controls during the Non-Rainy Season

The non-rainy season is between April and mid-July and October through November. Sediment control measures that would be used during the non-rainy season would include the following practice:

- Implement temporary sediment controls such as hay bales, fiber rolls, or gravel bags at the draining perimeter of disturbed soil areas.

The Proposed Project may implement a combination of the following sediment controls during the non-rainy season:

- Silt fence;
- Sediment basin;
- Sediment trap;
- Check dam;
- Fiber rolls;
- Gravel bag berm; and
- Street sweeping and vacuuming.

BMPs would be deployed in a sequence that follows the progress of grading and construction. As the locations of soil disturbance change, sedimentation controls would be adjusted accordingly to control stormwater runoff at the downgrade perimeter.

Construction Waste

Nonhazardous Solid Waste

The following nonhazardous waste streams would be generated from construction of the Proposed Project:

- **Paper, Wood, Glass, and Plastics.** During construction, approximately 200 tons of paper, wood, glass, and plastics would be generated from packing materials, waste lumber, insulation, and empty nonhazardous chemical containers. These wastes would be recycled to the extent possible. Waste that could not be recycled would be disposed of weekly in a municipal landfill. While on site, the waste would be placed in dumpsters.
- **Metal.** Approximately 2 tons of metal, including steel (from welding and cutting operations, packing materials, and empty nonhazardous chemical containers) and aluminum waste (from packing materials and electrical wiring), would be generated during construction. Waste would be recycled where possible. All wastes that could not be recycled (empty hazardous materials containers, spent welding materials, waste oil) would be deposited in a municipal landfill.

Landfills located nearest the Proposed Project site include the Boulder City Landfill in Boulder City, Nevada (Class I Municipal Solid Waste) and Wells Cargo Landfill in Las Vegas, Nevada (Class III Industrial Waste).

Wastewater

Wastewater generated during construction would include sanitary waste, stormwater runoff, equipment washdown water, and water from excavation dewatering during construction (if required). These wastewaters may be classified as hazardous or nonhazardous, depending on their chemical quality, and would be handled and disposed of in accordance with applicable laws and regulations.

Hazardous Waste

Most of the hazardous waste generated during construction would consist of liquid waste, such as water from excavation dewatering (if it contains contaminants), flushing and cleaning fluids, passivating fluid (to prepare pipes for use), and solvents. Some hazardous solid waste, such as welding materials and dried paint, would also be generated during construction. The quantity of hazardous waste is expected to be minimal, as shown in Table 2.6-5.

Table 2.6-5. Wastes Generated during Construction

Waste	Origin	Composition	Estimated Quantity	Classification	Disposal
Scrap wood, steel, glass, plastic, paper, calcium silicate insulation, mineral wool insulation	Construction activities	Normal refuse	200 tons	Nonhazardous	Recycle and/or dispose of in industrial or municipal landfill
Scrap metals	Construction activities	Parts, containers	<2 tons	Nonhazardous	Recycle and/or dispose of in industrial or municipal landfill
Empty hazardous material containers	Operation and maintenance of plant	Drums, containers, totes[a]	<1 ton	Hazardous and nonhazardous solids	Containers <5 gal would be disposed as normal refuse. Containers >5 gal would be returned to vendors for recycling or reconditioning.
Spent welding materials	Construction activities	Solid	1,500 lb	Hazardous	Disposal at an industrial landfill
Waste oil filters	Construction equipment and vehicles	Solids	500 lb	Nonhazardous	Recycle at a permitted Treatment, Storage, and Disposal Facility (TSDF)
Oily rags, oil sorbent excluding lube oil flushes	Cleanup of small spills	Hydrocarbons	100 cu ft	Hazardous	Recycle or dispose at a permitted TSDF
Solvents, paint, adhesives	Maintenance	Solids and liquids	500 gal	Hazardous	Recycle at a permitted TSDF
Spent lead acid batteries	Construction machinery	Heavy metals	10	Hazardous	Store no more than 10 batteries (up to 1 year); recycle off site.
Spent alkaline batteries	Equipment	Metals	50 lb	Universal waste solids	Recycle or dispose off site at a Universal Waste Destination Facility
Waste oil	Equipment, vehicles	Hydrocarbons	500 gal	Hazardous liquid	Dispose at a permitted TSDF
Sanitary waste	Portable toilet holding tanks	Solids and liquids	200,000 gal	Nonhazardous liquid	Remove by contracted sanitary service

Table 2.6-5. Wastes Generated during Construction

Waste	Origin	Composition	Estimated Quantity	Classification	Disposal
Stormwater	Rainfall	Water	6,870 gal/yr	Nonhazardous liquid	Discharge to stormwater drain

Source: NextLight 2010

Note:
[a]Containers include <5-gallon containers and 55-gallon drums or totes.

A small amount of hazardous waste would be generated during construction, primarily from small petroleum spills resulting from the operation of heavy equipment and filling of transformer and hydraulic equipment reservoirs. These spills would be cleaned up when they occur and the resulting waste material would be properly disposed in accordance with federal and state regulations.

Spill Prevention, Control, and Countermeasures Plan

A Spill Prevention, Control, and Countermeasures (SPCC) Plan would be developed in accordance with federal regulations to reduce environmental impacts resulting from spills of petroleum products. The SPCC would stipulate measures that would be taken to prevent spills, control them if they occurred, and report spills as required to regulatory authorities and the BLM. the Applicant would prepare hazardous materials management plans in accordance with Clark County regulations, including hazardous materials information sheets and flammable/combustive materials storage tank permits.

Emergency Response Plan

An Emergency Response Plan would be prepared for the Proposed Project. The plan would contain a section that presents the results of a comprehensive facility hazard analysis and, for each identified hazard, a response plan. Emergencies may include brush or equipment fires, transformer oil leaks or spills, attempted acts of sabotage, and airplane crashes. The Emergency Response Plan would assign roles and actions for on-site personnel and responders and would designate assembly areas and response actions

Health and Safety Program

The Applicant would require all construction and operation contractors to operate under a health and safety program that is approved by the Applicant and that meets industry standards. All contractors would be required to maintain and carry health and safety materials including the material safety data sheets (MSDS) of hazardous materials used on site.

Table 2.6-6 lists the wastes that may be generated by the Proposed Project, both hazardous and nonhazardous.

Table 2.6-6. Wastes Potentially Generated by the Proposed Project

Waste	Origin	Composition	Estimated Quantity	Classification	Disposal
Lubricating oil	Small leaks and spills from the PV panel tracking lubricating oil system	Hydrocarbons	~55 gallons/yr	Hazardous	Cleaned up using sorbent and rags; disposed of by certified oil recycler
Oily rags	Maintenance, wipe-down of equipment, etc.	Hydrocarbons, cloth	260 lb/yr (~600 rags/yr)	Hazardous	Recycled or disposed of by certified oil recycler
Oil sorbents	Cleanup of small spills	Hydrocarbons	~100 lb/yr	Hazardous	Recycled or disposed of by certified oil recycler

Source: NextLight 2010

Site Restoration/Revegetation Plan

The Proposed Project facilities have an expected life of 50 years after which the Applicant would either upgrade or decommission the facility. In the event that the site is decommissioned, the Applicant would implement the Site Restoration Plan to restore disturbed areas to pre-construction conditions (see Section 2.8, Proposed Project Decommissioning). The Site Restoration Plan would also be used to return temporary disturbance areas to pre-construction conditions. The Site Restoration Plan would cover the following topics:

- Goals and objectives of the plan;
- Methods to be used to achieve site rehabilitation;
- Criteria to be used to determine the success or failure of the rehabilitation;
- Monitoring and maintenance of the site during and periodically after rehabilitation;
- Noxious weed control during rehabilitation;
- Annual reporting procedures; and
- Restoration implementation and monitoring schedule.

This plan would be implemented immediately after temporary disturbance areas are no longer needed.

2.7 Proposed Project Operation and Maintenance

2.7.1 Operations Workforce

The O&M of the solar PV plant would require up to 15 full-time personnel, consisting of plant operators, maintenance technicians, and site security. Staff would be present on site 24-hours per day. Maintenance and administrative staff would typically work 8-hour days, Monday through Friday. During periods when non-routine maintenance or major repairs are in progress, the maintenance force would typically work longer hours. This workforce would be based at the O&M building. Employees would be on site to maintain equipment and provide security.

2.7.2 Operation and Maintenance Activities

There are very few moving parts in a solar PV project and no process water, gas, or fuels are required for the power generation process, and solar PV module replacement rates are anticipated to be less than 0.5 percent per year, on average. This results in a maintenance protocol mainly composed of routine inspections. At this time, it is assumed that periodic routine maintenance would consist of monthly, quarterly, semi-annual, and annual inspections and service. During the first year of operation, the frequency of inspections would be increased to address settling and electrical termination torque (e.g., for year 1, inspections shown as semi-annually are performed quarterly, inspections shown as annual are performed semi-annually).

O&M would require the use of vehicles and equipment including trucks for on-site welding, refueling, lubricating, panel washing, and crane trucks for minor equipment maintenance. Additional maintenance equipment would include forklifts, manlifts, and chemical application equipment for weed abatement and soil stabilizer treatment in the bioremediation area. Flatbed trucks, dump trucks, and pick-up trucks would be in daily use on the site.

At designated intervals, approximately every 10 to 15 years, major equipment maintenance would be performed. On occasion, large heavy-haul transport equipment, including overhead cranes, would be brought on site. No heavy equipment would be used during normal plant operation.

Unscheduled Maintenance

Exposure to the elements and equipment failures would require the following maintenance activities:

- Solar panel replacements; and
- Troubleshooting, repair, and eventual replacement for:
  - Inverters;
  - Switchyard equipments; and
  - Digital control systems.

Maintenance activities would be conducted by a third-party O&M contractor and/or the equipment manufacturers, as necessary.

Water Use

Annual water consumption during the life of the Proposed Project is expected to be approximately 21 acre-feet per year. The Proposed Action would not require process water; however, the administrative area would require domestic potable water service. The majority of water used during operation would be for washing the solar panels, which is scheduled to occur twice per year.

Vegetation Management

Vegetation would be maintained to a height of 6 to 12 inches for fire-risk management using mechanical and BLM-approved chemical controls.

Nonhazardous Solid Waste

The Proposed Action would produce nonhazardous waste during O&M activities. These wastes would include rags, broken and rusted metal and machine parts, defective or broken electrical materials, empty containers, the typical refuse generated by workers and small office operations, and other miscellaneous solid wastes. The quantity of all solid nonhazardous waste generated is estimated to be 50 cubic yards per year (35 tons per year). This waste would be properly disposed at an approved landfill. Landfills located nearest the Proposed Project site include the Boulder City Landfill in Boulder City, Nevada (Class I Municipal Solid Waste) and Wells Cargo Landfill in Las Vegas, Nevada (Class III Industrial Waste).

Nonhazardous Wastewater

Nonhazardous wastewater would be produced during solar panel washing, which is scheduled to occur twice per year. This water would not need to be treated. The wash water would drip to the ground beneath the panels and evaporate. The Proposed Project would also generate on-site domestic water and sanitary sewer waste from the O&M building. A septic tank and drain field system would be used for collection, treatment, and disposal of sanitary sewer waste. It is not known how long the recharge period would be, but the 200,000-gallon tank and drain field would be large enough to process all domestic septic needs for the facility. The sanitary waste system would not receive other wastes or surface runoff from the O&M area. No connection to any existing sanitary sewer system is anticipated and all sanitary waste would be removed by a licensed sanitary sewer service.

Hazardous Materials and Hazardous Waste

The following hazardous materials would be stored on site for O&M:

- Mineral insulating oil;
- Hydraulic fluid;
- Welding gas (acetylene);
- Welding gas (oxygen);
- Welding gas (argon); and
- Herbicide (Roundup® or equivalent).

A SPCC Plan would be developed in accordance with federal regulations to reduce environmental impacts from spills of petroleum products. The SPCC Plan will contain preventative measures, control measures, and reporting protocols as required to regulatory authorities. The Applicant will prepare hazardous materials management plans in accordance with Clark County regulations, including hazardous materials information sheets and flammable/combustive materials storage tank permits.

A SPCC Plan would be developed in accordance with federal regulations to reduce environmental impacts from spills of petroleum products. The SPCC Plan would contain preventative measures, control measures, and reporting protocols as required for regulatory authorities and the BLM. The Applicant would prepare hazardous materials management plans in accordance with Clark County regulations, including hazardous materials information sheets and flammable/combustive materials storage tank permits.

2.8 Proposed Project Decommissioning

In order to ensure that the permanent closure of the facility would not have an adverse effect, a Facility Decommissioning Plan would be developed and approved by the BLM at least 6 months prior to commencement of site closure activities. The Facility Decommissioning Plan would address future land use plans, removal of hazardous materials, impacts and mitigation associated with closure activities, the schedule of closure activities, equipment to remain on the site, and conformance of the plan with applicable regulatory requirements and resource plans. The Facility Decommissioning Plan would be consistent with requirements and goals set forth in the Site Restoration Plan.

The activities involved in the facility closure would depend on the expected future use of the site. Certain facility equipment may be utilized for future uses, such as the O&M building, electrical transmission lines, and roads. Therefore, the extent of site closure activities would be determined at the time of the closure, in accordance with the Facility Decommissioning Plan.

Potential closure activities include:

- Removal of solar panels and supports;
- Removal of foundations;
- Removal of underground facilities to a depth of at least 2 feet below the ground surface;
- Removal of inverters and transformers;
- Removal of the substation;
- Disposal of chemicals and hazardous waste;
- Draining of transformers and disposal of dielectric oils (if transformers cannot be resold);
- Demolition and removal of the operations and maintenance building and removal of building foundations;
- Removal of on-site wooden transmission poles and conductors;
- Removal of 220kV/230kV steel transmission poles and conductors, and removal of foundations to a depth of at least 2 feet below the ground surface;
- Closure and abandonment of water wells and the septic tank;
- Removal of site fencing;
- Regrading and restoration of original site contours; and

- Revegetation of areas disturbed by closure activities in accordance with the Site Restoration Plan.

2.9 Federal, State, and Local Permitting

If the Proposed Project is approved by BLM, the Applicant would be required to obtain permits and other authorizations from federal, state, and local regulatory agencies prior to construction (Table 2.9-1; NextLight 2010).

2.10 Comparison of Alternatives

Impacts were analyzed by resource based on information provided by the Applicant in the initial application and in response to subsequent data requests, field investigations and surveys, public scoping, literature research, and input from federal, state, and local agencies. Environmental effects of constructing, operating, maintaining, and decommissioning the solar facility as proposed (Alternative 2) and as with the modified site layout (Alternative 3) are summarized and compared in Table 2.10-1.

Table 2.9-1. Federal, State, and Local Permits that may be Required for the Proposed Project

Agency	Permit or Authorization	Project Action Requiring Permit	Mandate	Permit Requirement	Status
I. Federal Permits or Authorizations					
U.S. Department of the Interior, Bureau of Land Management	Right-of-Way	Lease of federal lands for the solar collector field, access road, holding tank, transmission line.	BLM Solar Energy Development Policy dated April 4, 2007, stipulates that Applications for commercial solar energy facilities will be processed as ROW authorizations under Title V of the Federal Land Policy and Management Act (FLPMA) 43 U.S.C. 1761-1771 and Title 43, Part 2804 of the Code of Federal Regulations (CFR). Commercial concentrating solar power or photovoltaic electric generating facilities and that the BLM's —…policy is to facilitate environmentally responsible commercial development of solar energy projects on public lands and to use solar energy systems on BLM facilities where feasible."	Applicant prepares a Plan of Development describing the Proposed Action. BLM conducts environmental and other reviews before considering awarding a grant.	NOI issued on June 30, 2009.
U.S. Department of the Interior, Bureau of Land Management	EIS Record of Decision Lease of Federal Lands	NEPA requires environmental review leading to a ROD for major projects on federal lands that may significantly affect the quality of the human environment.	Lead agency (BLM) prepares an EIS that assesses the potential environmental effects of constructing and operating the project leading to the BLM's ROD. 40 CFR 1505.2 and 1021.315		EIS in Progress

Table 2.9-1. Federal, State, and Local Permits that may be Required for the Proposed Project

Agency	Permit or Authorization	Project Action Requiring Permit	Mandate	Permit Requirement	Status
U.S. Department of the Interior, Bureau of Land Management and State Historic Preservation Office/Advisory Council on Historic Preservation	BLM/State Historic Preservation Officer (SHPO) NHPA Section 106 Compliance	Ground disturbance associated with the solar collector field, access road(s), and transmission line could affect eligible historic properties.	NHPA Section 106 requires that federal agencies take into consideration the effects of their undertakings on historic properties, which are properties eligible for listing in the NRHP. 16 U.S.C. 470 and 36 CFR 800.3	The Applicant, on behalf of the federal agency (BLM), conducts an inventory of cultural resources within the Area of Potential Effects (APE), evaluates these to determine which are historic properties (significant properties), and determines potential project effects on these properties. The agency consults with SHPO to resolve any adverse effects to historic properties.	Applicant has prepared a Cultural Resources Report.
U.S. Department of the Interior, Fish and Wildlife Service	Endangered Species Act (ESA) Section 7 Biological Opinion/Incidental Take Permit	Project construction on will be on federal land and would disturb the federally threatened desert tortoise habitat and harm or harass desert tortoises.	Endangered Species Act (16 U.S.C. 1531) requires that federal agencies consult with the U.S. Fish and Wildlife Service (USFWS) regarding any undertaking or action having the potential to cause a take of species listed as threatened or endangered.	Applicant prepares a Biological Assessment that considers a project's potential impacts on species listed under the ESA and proposes measures to mitigate potential take of listed species. USFWS issues a Biological Opinion and, if required, an Incidental Take Permit describing the conditions under which take of a listed species would be allowed.	Applicant has prepared a Biological Assessment to assess desert tortoise density.
U.S. Army Corps of Engineers	Clean Water Act Section 404 Permit	Project construction would alter existing drainage channels that the USACE considers to be Waters of the United States.	CWA Section 404 (33 U.S.C. 1344) requires a permit for dredging or filling waters of the United States.	Applicant prepares a report including a detailed delineation of wetlands and an analysis of whether or not they meet requirements to be considered jurisdictional (i.e. "waters of the United States"). USACE determines whether or not drainage features are jurisdictional.	Applicant report submitted to BLM. USACE has made jurisdictional determination.

Table 2.9-1. Federal, State, and Local Permits that may be Required for the Proposed Project

Agency	Permit or Authorization	Project Action Requiring Permit	Mandate	Permit Requirement	Status
Federal Communications Commission	Radio Station License	Operation of two-way radio communication System.	47 CFR Part 90	FCC review of license application.	Not yet applied for.
II. State of Nevada Permits or Authorizations					
Nevada Bureau of Water Pollution Control	NPDES Temporary Groundwater Discharge Permit		NRS 445A.300-445A.730	Temporary point source discharge to surface water, i.e. natural channel, roadway or storm drain for a duration of less than 6 months. Required for dewatering during construction.	For well testing; not applied for.
Nevada Bureau of Water Pollution Control	Temporary Permit for Working in Waterways (formerly known as ―Rolhg Stock Permit”).		NRS 445A.485	Needed for equipment used and maintained within surface bodies of water (including ephemeral washes).	Not yet applied for.
Nevada Department of Transportation	ROW Encroachment Permit		N.A.C. 408.403; 408.407	NDOT requires this permit for construction activities within the NDOT ROW. Category IV permit required for commercial development.	Clark County Department of Public Works will apply for this permit
Nevada Department of Transportation	Traffic Barricade Plan Approval		N.A.C. 408.413	The NDOT ROW Encroachment Permit requires the Contractor to submit a Traffic Barricade Plan.	Clark County Department of Public Works will submit the Plan.

Table 2.9-1. Federal, State, and Local Permits that may be Required for the Proposed Project

Agency	Permit or Authorization	Project Action Requiring Permit	Mandate	Permit Requirement	Status
Nevada Division of Forestry	Permit to remove fully protected native flora	Project construction may disturb habitat of state-protected plants.	NRS 527.260-300	Department conducts a project review that includes a wildlife and habitat consultation.	Applicant will apply for this permit 3 months before construction begins.
Nevada Division of Forestry	Permit to remove cacti and yucca in commercial quantities	Project construction will result in removal of yucca and cacti.	NRS 527.060-120 and N.A.C. 527	Department issues as permit allowing for removal and transplantation of these species.	Applicant will apply for this permit 3 months before construction begins.
Nevada Department of Wildlife	Permit to capture, kill, or possess protected wildlife or written authorization of Department.	Project construction may disturb habitat of state-protected wildlife	N.A.C. 503.090 and 503.093	Department conducts a project review that includes a wildlife and habitat consultation. Permit or written approval is necessary prior to handling any wildlife as defined by the State of Nevada for the purpose of removing out of harms way. A survey for state-listed species within the Proposed Project area is required. Other information required includes project alignment, area of disturbance, and the state-listed species to be disturbed.	Applicant will apply for this permit prior to construction.

Table 2.9-1. Federal, State, and Local Permits that may be Required for the Proposed Project

Agency	Permit or Authorization	Project Action Requiring Permit	Mandate	Permit Requirement	Status
Nevada Division of Environmental Protection (NDEP)	Stormwater Discharge Permit (NOI)	Construction of the solar collector field and other Project facilities has the potential to discharge sediment in stormwater and will involve disturbance of more than one acre.	National Pollution Discharge Elimination System (NPDES) requires filing an NOI to use the General Stormwater Discharge Permit and the preparation of a Stormwater Pollution Prevention Plan (SWPPP). NRS 445A.228	Project owner prepares the SWPPP and notifies the NDEP of its intention (NOI) to use the General Stormwater Permit. SWPPP must be kept on the construction site and available for inspection.	Applicant will prepare SWPPP and file NOI 3 months before construction begins.
NDEP	CWA Section 401 Water Quality Certification	Project construction will alter drainage in existing drainage channels that may be considered waters of the United States.	CWA Section 401 (33 U.S.C. 1341) requires a water quality certification to accompany the Section 404 permit.	Project owner prepares a permit application that describes any construction-related discharges and the methods proposed to protect water quality.	Applicant will apply for this permit 3 months before construction begins, if needed.
Nevada Public Utilities Commission	Nevada Utility Environmental Protection Act Permit	UEPA permits are required for all utility facilities of 70MW or greater in the State of Nevada.	NRS 704.820 – 704.900	Project owner prepares an engineering project description and environmental impacts analysis. UEPA permit must be obtained prior to commencement of construction.	On August 13, 2009 Applicant submitted the Initial UEPA permit application to the PUCN. A revised application will be submitted when the ROD is issued for the project.

Table 2.9-1. Federal, State, and Local Permits that may be Required for the Proposed Project

Agency	Permit or Authorization	Project Action Requiring Permit	Mandate	Permit Requirement	Status
Nevada Division of Water Resources (State Engineer)	Water Rights Modifications	Water Rights Change of Place of Use and Change of Point of Diversion.	NRS 533.345	Water rights owners must apply for change of place of use and change of point of diversion whenever such changes are desired.	The Las Vegas Valley Water District is holder of the water rights, and will submit the necessary change applications with the State Engineer.
Nevada State Fire Marshall	Hazardous Materials Storage Permit	Project will involve handling of hazardous materials.	NRS 477.045	Project owner applies for permit to store materials above the threshold quantities established by the State Fire Marshall.	Applicant will apply for this permit 3 months before construction begins.
III. Clark County and Regional Permits or Authorizations					
Clark County Department of Air Quality and Environmental Management (DAQEM)	Clark County Multiple Species Habitat Conservation Plan (MSHCP) Compliance	Project will affect at least one federally listed species included in MSHCP.	Clark County Multiple Species Habitat Conservation Plan	Proponent will be required to pay per-acre fee and implement species protection measures.	Not applied for.
DAQEM	Dust Control Permit	Grading the collector field, access road, and transmission access would exceed one quarter acre.	Clark County Air Quality Regulations- Section 94	Project owner submits an assessor's map, owner's designation, and per-acre fee.	Applicant will apply for this permit 3 months before construction begins.

Table 2.9-1. Federal, State, and Local Permits that may be Required for the Proposed Project

Agency	Permit or Authorization	Project Action Requiring Permit	Mandate	Permit Requirement	Status
DAQEM	New Source Permit (Minor Source)		Clark County Air Quality Regulations – Section 14	Needed if there is an emissions source.	Not yet applied for.
Clark County Regional Flood Control District	Land Development Review	Project construction will alter drainage in existing drainage channels.	Any development which is not a subdivision shall be required to meet the requirements for subdivisions as outlined in these Regulations if the Local Administrator determines that the flood hazard so requires. If the proposed development would impact the implementation of the Master Plan, the Local Administrator shall defer to the Chief Engineer for a final determination. Clark County Regional Flood Control District Uniform Regulations for the Control of Drainage.	Development proposals must be submitted to the District for review if the development has regional flood control significance, meaning those facilities, land alterations, portions of the natural drainage system, and regulatory actions that impact the implementation of the Master Plan, or lie within Special Flood Hazard Areas.	Applicant will apply for this review 6 months before construction begins.
Clark County Regional Flood Control District	Floodplain Use Permit	Required if project will be located within an area of special flood hazard.	Clark County Regional Flood Control District Uniform Regulations for the Control of Drainage Section 10.070.	Applications for a Floodplain Use Permit shall include but not be limited to plans in duplicate drawn to scale showing the nature, location, dimensions, and elevations of the area in question; existing or proposed structures, fill, storage of material, drainage facilities; debris control structures; and the location of the foregoing, and if required, a Drainage Plan and Study.	Applicant will apply for this permit 6 months before construction begins.

Table 2.9-1. Federal, State, and Local Permits that may be Required for the Proposed Project

Agency	Permit or Authorization	Project Action Requiring Permit	Mandate	Permit Requirement	Status
Clark County Development Services Department	Permit for Temporary Structures	Required for installation of temporary facilities.	Clark County Code, Title 22.02.120, Unified Development Code	Project owner obtains a third-party plan review/approval and files an application for a temporary building with Fire Prevention Bureau.	Applicant will apply for this permit 3 months before construction begins.
Clark County Development Services Department	Building Permit for Permanent Structures	Required for construction and occupancy of project facilities.	Clark County Code, Title 30.32.030, Unified Development Code	Project owner submits building permit application and plans.	Applicant will apply for this permit 6 months before construction begins.
Clark County Development Services Department	Use Permit and Design Review	The solar collector field and other project facilities will be considered a major construction project.	Clark County Code, Title 30, Unified Development Code	Project owner provides a Title 30 Land Use Application and site plan, elevation, floor plan, etc.	Applicant will apply for this permit 6 months before construction begins.
Clark County Development Services Department	Waiver of Development Standards	Needed only if the facility would need to deviate from the Development Code.	Clark County Code, Title 30, Unified Development Code	Project owner provides a Title 30 Land Use Application.	Applicant will apply for this waiver 6 months before construction begins, if needed.
Clark County Development Services Department	Grading Permit	Grading the solar field, access road, and transmission access.	Clark County Code, Title 30.32.040, Unified Development Code	Project owner submits grading and drainage plans to the County.	Applicant will apply for this permit 6 months before construction begins.

Table 2.9-1. Federal, State, and Local Permits that may be Required for the Proposed Project

Agency	Permit or Authorization	Project Action Requiring Permit	Mandate	Permit Requirement	Status
Clark County Development Services Department	Civil Division Encroachment Permit (contingent)	Would be required only if construction would encounter public right-of-way.	Clark County Code, Title 30.80 and 30.32, Unified Development Code	Project owner submits plans and assessor's parcel maps.	Applicant will apply for this permit 6 months before construction begins.
Clark County Development Services Department	Land Disturbance Permit Report (contingent)	This applies only if the project were to affect non-federal lands (not planned) that are habitat for the desert tortoise.	Clark County Code, Title 30.32.050, Unified Development Code	Project owner must document payment of fees required under the Clark County MSHCP and the County's Section 10(a) Incidental Take Permit.	Unlikely to be needed, as Project will not affect habitat on private land.
Clark County Development Services Department	Right-of-Way Federal Land Policy and Management Act (ROW for RS 2477 roadway conversion; see "Federal Permits or Authorizations")	Clark County undertakes FLPMA ROW process for conversion of RS 2477 roadway to County roadway.	Clark County Code; Title 30.32	Conversion of RS 2477 Roadway to County roadway required when roadway is modified/updated.	Applicant is in consultation with Clark County.
Clark County Development Services Department	Pad Certification for Grading and Earthwork	Shall be submitted and approved prior to any inspection being made.	Clark County Building Administrative Code 22.02.780A and Clark County Code 22.02.460(A).	Certify that construction is in accordance with geotechnical investigation.	Applicant will obtain prior to construction
Clark County Development Services Department	Soils Report Submittal		Clark County Building Administrative Code 20.02.430(7)(10) and Clark County Code 22.02.235.	Soils associated with on-site construction activity (required for Grading Permit.	Applicant will prepare and submit prior to construction
Clark County Development Services Department	Temporary Sign Permit		Clark County Code, Title 30.72.070, Unified Development Code	Construction of on-site and off-site temporary signs.	Applicant will obtain prior to construction

Table 2.9-1. Federal, State, and Local Permits that may be Required for the Proposed Project

Agency	Permit or Authorization	Project Action Requiring Permit	Mandate	Permit Requirement	Status
Clark County Fire Department, Fire Prevention Bureau	Battery Systems Permit		Clark County Fire Code, Article 64, Section 6404.3	At the time of permit application, four (4) sets of plans drawn to an indicated scale and specifications must be submitted for review and approval. A Fire Department permit fee of $75 will be collected upon submittal of plans. Plans may be expedited for an additional fee of $85 per hour of plan review. For expedited submittals, the minimum fee of $85 for the first hour will be collected at the time of submittal. Additional fees may apply and will be collected after review of plans.	Applicant will obtain prior to construction
Clark County Fire Department, Fire Prevention Bureau	Flammable/Combustible Liquid Aboveground Storage Tanks Permit		Clark County Fire Code Article 79	At the time of permit application, three (3) sets of plans, drawn to an indicated scale, must be submitted for review and approval relating to the installation and permitting of flammable/combustible aboveground storage tanks including diesel generators.	Applicant will obtain prior to construction
Clark County Fire Department, Fire Prevention Bureau	Permit Survey Form	Applies to all development projects.	Clark County Fire Code	Project owner fills out Permit Survey Form and submits to Fire Department for the department to determine what hazards exist that warrant a permit. Additionally, Project owner completes/submits *Application for Permit/Plan Review or Other Services* for all permit application submittals.	Applicant will apply for this permit 3 months before construction begins.

Table 2.9-1. Federal, State, and Local Permits that may be Required for the Proposed Project

Agency	Permit or Authorization	Project Action Requiring Permit	Mandate	Permit Requirement	Status
Clark County Fire Department, Fire Prevention Bureau	Hazardous Materials Permit	Storage and use of hazardous materials at the facility.	Clark County Fire Code, Article 80	Project owner prepares and submits site plans and Hazardous Materials Information Sheets for hazardous materials with quantities in excess of permitting thresholds.	Applicant will apply for this permit 3 months before construction begins.
Clark County Public Works Department	Drainage Permit		Clark County Code Title 30.52.050, requiring compliance with the ―Uniform Regulations for the Control of Drainage & Hydrologic Criteria & Drainage Design Manual.”	Site drainage associated with construction of a new facility requiring more than 2 acres within Clark County ROW.	Applicant will obtain prior to construction
Southern Nevada Health District	Small Commercial Septic System Permit		N.A.C. 444.8302	The plans for a commercial system must be submitted for review to the Division of Environmental Protection for the State Department of Conservation & Natural Resources.	Applicant will obtain prior to construction

Table 2.10-1. Comparison of Direct, Indirect, Mitigation Measures, and Cumulative Effects

Alternative 2 Effects (Proposed Action)	Alternative 3 Effects (Modified Site Layout)	Mitigation Measures	Cumulative Effects
Air Quality (Section 4.1.2) • AQ-1:Short-term, adverse effects on air quality conditions resulting from construction and decommissioning. • AQ-2: Long-term effects on air quality conditions resulting from operations. • AQ-3: Potential net benefit to regional air quality. • AQ-4: Short-term, adverse effects on GHG emissions. • AQ 4a: Beneficial impact supporting state renewable energy goals.	Increased short-term air quality impacts associated with additional grading requirements for large detention basins and drainage corridors.	None.	**(Section 4.19.1)** • If the Proposed Action was constructed concurrently with either or both of the projects considered in this analysis, construction would result in a short-term, localized, and unavoidable impact to air quality. • The cumulative nature of other ongoing projects in conjunction with the Proposed Action may contribute to substantial emissions of GHGs.
Noise (Section 4.2.2) • NOI-1: Short-term increase in ambient noise and vibration levels as a result of construction activities. • NOI-2: Long-term increase in ambient noise levels as a result of operational noise.	Larger Proposed Project area could cause noise sources to be located closer to receptors.	• MM NOI-1: Conduct Construction Activities during Daytime Hours. • MM NOI-2: Relocate Stationary Construction Equipment. • MM NOI-3: Turn off Idling Equipment. • MM NOI-4: Notify Adjacent Residences. • MM NOI-5: Install Acoustic Barriers. • MM NOI-6: Proper maintenance and working order of equipment and vehicles. • MM NOI-7: Construction Equipment Muffled. • MM NOI-8 Ensure proper installation of transformer equipment.	**(Section 4.19.2)** Cumulative noise impacts to residents of the Desert Oasis apartment complex would occur only in the event of concurrent construction periods.

Table 2.10-1. Comparison of Direct, Indirect, Mitigation Measures, and Cumulative Effects

Alternative 2 Effects (Proposed Action)	Alternative 3 Effects (Modified Site Layout)	Mitigation Measures	Cumulative Effects
Geology and Topography (Section 4.3.2) • GEO-1: Geologic units would become unstable and would result in on- or off-site landslides, lateral spreading, subsidence, liquefaction, or collapse. • GEO-2: Physical alteration of or damage to geologic features. • GEO-3: Project components damaged by geologic hazards present a threat to public safety.	Effects would be similar to those identified under Alternative 2.	• MM GEO-1: Inspections After Geologic Events. • MM GEO-2: Applicant's Insurance Coverage.	**(Section 4.19.3)** Geologic effects are impacts of the geologic environment on individual projects and would not introduce considerable cumulative impacts.
Soils (Section 4.4.2) • SOIL-1: Increase in soil erosion rates. • SOIL-2: Reduce soil productivity. • SOIL-3: Increase exposure of contaminated soils.	Increased number of disturbed acres would exacerbate the effects to soils described in Alternative 2.	• MM SOILS-1: The Applicant will ensure that imported soils are free from contaminants before use on the site.	**(Section 4.19.4)** There would not be a considerable cumulative impact to erosion in the cumulative effects area due to the requirement to implement SWPPPs to prevent erosion.

Table 2.10-1. Comparison of Direct, Indirect, Mitigation Measures, and Cumulative Effects

Alternative 2 Effects (Proposed Action)	Alternative 3 Effects (Modified Site Layout)	Mitigation Measures	Cumulative Effects
Water Resources (Section 4.5.2) • WATER-1: Decrease groundwater supply or interfere substantially with groundwater recharge. • WATER-2: Degrade the quality of groundwater such that it is no longer suitable for its intended use. • WATER-3: Degrade the quality of surface waters by increasing erosion, increasing sedimentation, or introducing contaminated waters. • WATER-4: Increase the potential for flooding hazards.	• Larger Proposed Project area would increase the amount of water used for dust suppression during construction, resulting in more potential effects to groundwater. • Larger Proposed Project area would result in a greater potential for erosion and sedimentation from mowing and the shading by PV panels. • Drainage channels would experience greater volume and velocity of flow than pre-construction conditions and increased erosion and subsequent sedimentation would occur.	• MM WATER-1: Implement an adaptive management program for erosion and sedimentation to address the uncertainty of the modeling parameters. • MM WATER-2: Flood Risk Control Measures. • MM WATER-3: Stormwater Monitoring and Response Plan.	**(Section 4.19.5)** • The water used for Proposed Project would not alter groundwater volume within the local basins, so it would not contribute to a considerable cumulative impact. • New impervious surfaces of the Proposed Project would not alter groundwater recharge within the local basins, so they would not contribute to a considerable cumulative impact. • With implementation of the SPCC Plan and SWPPP, a release from either the Proposed Project or any foreseeable project would not cause considerable cumulative impacts to water quality. • With appropriate hydrologic modeling to site facilities in areas with the lowest flood risk and with structures designed to accommodate a 100-year, 24-hour flood event, there would not be a significant cumulative impact to flood risks

Table 2.10-1. Comparison of Direct, Indirect, Mitigation Measures, and Cumulative Effects

Alternative 2 Effects (Proposed Action)	Alternative 3 Effects (Modified Site Layout)	Mitigation Measures	Cumulative Effects
Biological Resources (Section 4.6.2) • BIO-1: Vegetation Loss and Habitat Loss, Degradation, and Fragmentation. • RR-1: Loss of forage acreage. • RR-2: Changes in water availability and distribution for recovering riparian areas and protected plant populations within the allotments. • RR-3: Disturbance to enclosure fencing meant to protect plant population and riparian areas from OHV traffic and wildlife grazing. • RR-4: Disturbance to structures designed to enhance rangeland health. • RR-5: The introduction or spread of invasive or noxious weeds.	• Larger Proposed Project area would have similar types of impacts described for Alternative 2, but would result in a net increase in size and magnitude. • Larger Proposed Project area would result in an increase in the undeveloped area confined within the perimeter fencing. • Larger Proposed Project area could result in an increase in the occurrence and spread of noxious weeds. • Larger Proposed Project area would result in an increase in the loss of desert tortoise habitat and would require increased mitigation and compensatory measure outlined in the Biological Opinion.	**(Section 4.6.9)** • MM BIO-1: Preconstruction biological clearance surveys • MM BIO-2: Use Best Management Practices (BMPs) where applicable. • MM BIO-3: Biological monitors would be assigned to the Proposed Project in areas of sensitive biological resources. • MM BIO-4: Worker Environmental Awareness Program (WEAP) • MM BIO-5: Migratory birds and raptors impacts reduction measures. • MM BIO-6: Avian protection. • MM BIO-7: Final location of all Proposed Project facilities would be adjusted to avoid sensitive biological resources to the greatest extent feasible. • MM BIO-8: Western burrowing owl measures. • MM BIO-9: Gila monster and chuckwalla measures. • MM BIO-10: Reduce night lighting. • MM BIO-11: Cover steep-walled trenches or excavations during construction. • MM BIO-12: American badger impacts reduction measures • MM BIO-13: Protocol for the restoration of the natural vegetation community. • MM BIO-14 : Desert bighorn sheep measures. • MM BIO-15: Jurisdictional delineation. • MM BIO-16: Drainage crossings design. • MM BIO-17: Mitigation monitoring plan for affected jurisdictional areas.	**(Section 4.19.6)** • The Proposed Action, in conjunction with other projects, would result in cumulative adverse impacts on native vegetation communities, including cacti and yucca species, and adversely affect special management areas. • The Proposed Action would contribute to unavoidable adverse impacts to biological resources due to vegetation loss and habitat loss, fragmentation, and degradation and could disrupt normal behavior patterns and cause direct injury and/or mortality. • Planned projects in the area, including the Proposed Action, would eliminate up to 106,065 acres of suitable desert tortoise habitat.

Table 2.10-1. Comparison of Direct, Indirect, Mitigation Measures, and Cumulative Effects

Alternative 2 Effects (Proposed Action)	Alternative 3 Effects (Modified Site Layout)	Mitigation Measures	Cumulative Effects
Cultural and Historic Resources (Section 4.7.2) • CULT-1: Adverse effect to cultural resources 26CK1620/8282 and 26CK2632/8280. • CULT-2: Adverse effect to 26CK5180a. • CULT-3: Adverse effect to previously unidentified cultural resources. • CULT-4: Unanticipated discovery of human remains.	Despite the larger footprint and disturbance area, the type, intensity, and duration of effects to cultural resources would be similar to those of Alternative 2.	• MM CULT-1: Avoid adverse effect to 26CK1620/8282 and 26CK2632/8280.	**(Section 4.19.7)** • Cumulative impacts to cultural resources are not analyzed for the Proposed Action because it would result in no impact to cultural resources and, therefore, would not contribute to cumulative impacts to paleontological resources. • Implementation of mitigation measures by all foreseeable projects would prevent cumulative effects on previously undiscovered cultural resources or human remains.
Paleontological Resources (Section 4.8.2) • PALEO-1: Construction activities could destroy or disturb a buried or unknown paleontological resource.	Despite the larger Proposed Project footprint and disturbance area, the type, intensity, and duration of effects to paleontological resources would be similar to those of Alternative 2.	• MM PALEO-1: Paleontological Mitigation and Monitoring Plan.	**(Section 4.19.8)** Cumulative impacts to paleontological resources are not analyzed for the Proposed Action because it would result in no impact to paleontological resources and, therefore, would not contribute to cumulative impacts to paleontological resources.

Table 2.10-1. Comparison of Direct, Indirect, Mitigation Measures, and Cumulative Effects

Alternative 2 Effects (Proposed Action)	Alternative 3 Effects (Modified Site Layout)	Mitigation Measures	Cumulative Effects
Lands and Realty (Section 4.9.2) • The Proposed Project would not result in any impacts to existing or proposed transmission line ROWs that cross the Proposed Project area.	Effects would be similar to those identified under Alternative 2.	None.	**(Section 4.19.9)** Cumulative impacts to land use and realty are not analyzed for the Proposed Action because it would result in no impact to land use and realty and, therefore, would not contribute to cumulative impacts.

Table 2.10-1. Comparison of Direct, Indirect, Mitigation Measures, and Cumulative Effects

Alternative 2 Effects (Proposed Action)	Alternative 3 Effects (Modified Site Layout)	Mitigation Measures	Cumulative Effects
Special Management Areas (Section 4.10.2) • SMA-1: Restrict public access to the Lucy Gray Mountains, and/or restrict access to the public hiking/OHV trails that cross the Jean/Roach Lake SRMA. • SMA-2: Impact desert tortoise and/or desert tortoise habitat found within the Ivanpah DWMA. • SMA-3: Cause changes in air quality or other air clarity evaluations that could occur within SMAs in the area due to construction and operation activities. • SMA-4: Conflict with the Visual Resource Management (VRM) classifications of the SMAs in the area that possess VRM classifications. • SMA-5: Cause changes to the darkness of the night sky dome as viewed from SMAs in the area due to construction and operation activities. • SMA-6: Changes in erosion or sedimentation rates within SMAs in the area.	Although Alternative 3 would disturb a larger area of land than the Proposed Action, Alternative 3 would not result in any additional impacts to any SMAs as compared to those caused by the Proposed Action.	None.	**(Section 4.19.10)** Cumulative impacts to SMAs are not analyzed for the Proposed Action because there are no ACECs, Wilderness Areas, or National Preserves within proximity to the Proposed Action and, therefore, the Proposed Action would not contribute to cumulative impacts.

Table 2.10-1. Comparison of Direct, Indirect, Mitigation Measures, and Cumulative Effects

Alternative 2 Effects (Proposed Action)	Alternative 3 Effects (Modified Site Layout)	Mitigation Measures	Cumulative Effects
Recreation (Section 4.11.2) • REC-1: Conflict with existing federal, state, and local recreation management plans and policies. • REC-2: Changes in access to existing recreation areas or sites. • REC-3: Change in level of use of existing recreation areas or sites. • REC-4: Substantial overcrowding caused by ―spllover" effects to other recreation areas.	Due to a larger Proposed Project site, an increased area would be fenced and would be off limits to members of the public for recreation uses.	None.	**(Section 4.19.11)** A number of renewable energy projects would be constructed during the timeframe the Proposed Action and collectively occupy over 20,000 acres of land if they were all constructed. This acreage would be off limits for the public for recreation.
Visual Resources (Section 4.12.2) • VIS-1: Short-term change to the visual character of the environment. • VIS-2: Long-term change to the visual character of the environment.	• This alternative would result in a slightly smaller scale of visual impacts within the planning area. • The appearance of the facilities would be similar with less overall scale and in some cases facilities that would be located further away from sensitive viewpoints. • Compliance with VRM Class III would be achieved.	None.	**(Section 4.19.12)** Operation of the cumulative projects would permanently alter the existing form, line, color, and texture of the views from the nine viewsheds. The cumulative impact to visual resources in the Ivanpah Valley would be considerable and, when considered in combination, the cumulative projects would not meet the VRM objectives for any of the KOPs.

Table 2.10-1. Comparison of Direct, Indirect, Mitigation Measures, and Cumulative Effects

Alternative 2 Effects (Proposed Action)	Alternative 3 Effects (Modified Site Layout)	Mitigation Measures	Cumulative Effects
Transportation/Motorized Vehicles (Section 4.13.2) • TRAN-1: Short-term effects on traffic volume as a result of construction. • TRAN-2: Short-term effects on access and road conditions as a result of construction. • TRAN-3: Long-term effects on road conditions as a result of construction.	Despite the larger footprint and disturbance area, the type, intensity, and duration of effects to transportation resources would be similar to those of Alternative 2.	• MM TRAN-1: Traffic Management Plan. • MM TRAN-2: Repair Damaged Streets. • MM TRAN-3: None identified.	**(Section 4.19.13)** With concurrent construction of projects in the cumulative analysis, the number of construction vehicles would adversely impact traffic load and LOS on I-15 on Fridays from noon to 10 p.m. and mitigation would be necessary.

Table 2.10-1. Comparison of Direct, Indirect, Mitigation Measures, and Cumulative Effects

Alternative 2 Effects (Proposed Action)	Alternative 3 Effects (Modified Site Layout)	Mitigation Measures	Cumulative Effects
Human Health and Safety (Section 4.14.2) • HAZ-1: Use, store, transport, and disposal of petroleum products and hazardous materials in a manner that results in a release in an amount equal to or greater than the reportable quantity for that material or that creates a substantial risk to human health. • HAZ-2: Expose human or ecological receptors to potentially hazardous levels of chemicals or explosives due to the disturbance or unearthing of contaminated soils or groundwater of hazardous waste into soils. • HAZ-3: Expose workers to contaminated or hazardous materials at levels in excess of those permitted by the Federal Occupational Safety and Health Administration (OSHA) in CFR 29, Part 1910, or expose members of the public to direct or indirect contact with hazardous materials from Proposed Action construction or operations. • HAZ-4: Expose people or structures to a risk of loss, injury, or death involving electrocution or excessive exposure to wildland fires, including where wildlands are adjacent to urbanized areas.	Potential human health and safety effects that would result from the construction, operation and decommissioning of Alternative 3 would be identical to those identified for the Proposed Action. The development of Alternative 3 would likely reduce the potential risk of flooding by incorporating comprehensive systems of berms and ditches that would contribute to an improved drainage at the site.	• MM HAZ-1: Hazardous materials management • MM HAZ-2: Solar PV cell recycling • MM HAZ-3: Characterize potentially contaminated soil/groundwater • MM HAZ-4: Adherence of the health and safety program with 29 CFR, Part 1910.	**(Section 4.19.14)** • Concurrent construction of the foreseeable projects could increase fire risks; however, each project would likely implement its own fire management program to reduce the potential risk of fires. • The NV Energy Walter M. Higgins Generating Station and the Proposed Project would be fenced and any contamination would likely be limited to soil contamination; therefore, the operations of the two facilities are unlikely to increase the potential for human or wildlife exposure to hazardous materials or waste.

Table 2.10-1. Comparison of Direct, Indirect, Mitigation Measures, and Cumulative Effects

Alternative 2 Effects (Proposed Action)	Alternative 3 Effects (Modified Site Layout)	Mitigation Measures	Cumulative Effects
Socioeconomics (Section 4.15.2) • SOCIO-1: Population. • SOCIO 2: Housing. • SOCIO 3: Affected Groups and Attitudes. • SOCIO 3: Economic Base Impacts: Employment, Earnings and Income. • SOCIO 4: Public Services and Utilities.	• Due to its greater land requirement, Alternative 3 would require more water for dust control. • Alternative 3 would absorb a greater amount of habitat and plant and animal species which influence the eco-tourism experience and quality of life defining the desert area.	It is possible that if the Applicant would purchase open land within Clark County for habitat offset or mitigation purposes.	**(Section 4.19.15)** • The concurrent construction of foreseeable projects would result in a beneficial cumulative impact on the local and regional economy and tourism, and could decrease unemployment for the periods of construction. • The cumulative socioeconomic impacts would take place within a setting characterized by tradeoffs between desert habitat/ecological resources and alternative land uses in addition to energy development.
Environmental Justice (Section 4.16.2) There are no environmental justice communities within the study area with respect to income or minority populations; therefore, no environmental justice communities would be affected by the Proposed Action.	Because the Alternative 3 Proposed Project footprint is located within the same census tract, block group, and blocks as Alternative 2, there are no environmental justice communities affected by this alternative.	None.	**(Section 4.19.16)** Cumulative impacts to environmental justice are not analyzed for the Proposed Action because there are no environmental justice communities within the study area for the Proposed Action; therefore, the Proposed Action would not contribute to cumulative impacts under this criterion.

Table 2.10-1. Comparison of Direct, Indirect, Mitigation Measures, and Cumulative Effects

Alternative 2 Effects (Proposed Action)	Alternative 3 Effects (Modified Site Layout)	Mitigation Measures	Cumulative Effects
Energy and Minerals (Section 4.17.2) • EAM-1: Restrict access to or the availability of leasable mineral or energy resources within the Proposed Action area. • EAM-2: Restrict access to or the availability of locatable mineral or energy resources within the Proposed Action area. • EAM-3: Restrict access to or the availability of saleable mineral or energy resources within the Proposed Action area.	Despite the larger footprint of the Proposed Project area, the type, intensity, and duration of effects to energy and minerals for Alternative 3 would be the same as Alternative 2.	None.	**(Section 4.19.17)** Because the Proposed Project would not restrict access to any mining claims outside the proposed project boundary, the cumulative impacts of other projects within the vicinity of, but not in the same immediate area as, the Proposed Action are not analyzed.
Fuels and Fire Management (Section 4.18.2) • FFM-1: The introduction or spread of invasive or noxious weeds. • FFM-2: Allocation of BLM fire resources to the proposed area for fire suppression.	Despite the larger footprint of the Proposed Project area, the type, intensity, and duration of effects to fuels and fire management for Alternative 3 would be the same as Alternative 2.	None.	**(Section 4.19.18)** Because the Proposed Action would not result in an impact to fire management, cumulative impacts for this criterion are not analyzed.

3 Affected Environment

3.1 Air Quality and Climate 3-2

3.1.1 Existing Ambient Air Quality 3-2

3.1.1.1 Air District Significance Thresholds 3-5

3.1.1.2 General Federal Actions 3-5

3.1.1.3 Existing Sources of Air Pollutants (Clark County 2008) 3-7

3.1.2 Climate Change 3-7

3.1.2.1 Potential Effects of Climate Change 3-8

3.1.2.2 Existing Greenhouse Gas Emissions 3-8

3.1.2.3 Federal Greenhouse Gas Guidance 3-10

3.2 Noise 3-10

3.2.1 Environmental Setting 3-10

3.2.2 Regional Setting 3-12

3.2.3 Local Setting 3-12

3.3 Geology, Topography, and Geologic Hazards 3-12

3.3.1 Topography 3-12

3.3.2 Geologic Setting 3-13

3.3.3 Seismicity 3-17

3.3.3.1 Faults 3-17

3.3.3.2 Earthquakes 3-17

3.3.3.3 Seismic Shaking 3-17

3.3.3.4 Landslides 3-19

3.3.3.5 Liquefaction 3-19

3.4 Soils 3-20

3.4.1 Tonopah-Arizo Association 3-20

3.4.2 Haleburu Association 3-20

3.4.3 Nippeno-Nipton Association 3-20

3.4.4 Erosion 3-21

3.5 Water Resources/Hydrology 3-22
3.5.1 Surface Water Resources 3-22
3.5.1.1 Surface Water Quality 3-24
3.5.1.2 Flooding 3-24
3.5.2 Groundwater Resources 3-25
3.5.2.1 Groundwater Quality 3-25
3.5.2.2 Water Use and Discharge 3-26
3.5.3 Jurisdictional Waters, Drainages, and Riparian Areas 3-26

3.6 Biological Resources 3-27
3.6.1 Vegetation 3-27
3.6.2 Wildlife 3-27
3.6.2.1 Survey Methodology 3-27
3.6.2.2 Wildlife Communities 3-28
3.6.3 Special Status Species 3-28
3.6.3.1 Plants 3-32
3.6.3.2 Reptiles 3-34
3.6.3.3 Mammals 3-40
3.6.3.4 Birds 3-42
3.6.4 Invasive Plants 3-45
3.6.5 Rangeland Resources 3-46
3.6.5.1 Regional Setting and Regulatory Framework 3-47
3.6.5.2 Current Conditions and Trends 3-50

3.7 Cultural Resources 3-52
3.7.1 Historic Background 3-52
3.7.2 Known Archaeological Resources 3-53
3.7.3 Tribal Consultation 3-55

3.8 Paleontological Resources 3-55
3.8.1 Existing Paleontological Resources 3-55
3.8.2 Assessment of Paleontological Potential 3-56

3.9 Lands and Realty 3-57
3.9.1 Utility Corridors and Rights-of-Way 3-57
3.9.2 Airports 3-59
3.9.3 Grazing Allotments 3-60
3.9.4 Mining Claims 3-60

3.10 Special Management Areas 3-60
3.10.1 Areas of Critical Environmental Concern 3-60

3.10.2 Desert Wildlife Management Areas 3-62
3.10.3 Special Recreation Management Areas 3-62
3.10.4 National Preserves 3-62
3.10.5 BLM Wilderness Areas 3-62

3.11 Recreation 3-63

3.11.1 Special Recreation Management Areas 3-63
3.11.2 Jean/Roach Lake Special Recreation Management Area 3-63
3.11.3 Special Recreation Permits and Off-Highway Vehicle Racing 3-64
3.11.4 Ivanpah Dry Lake Special Recreation Management Area 3-64

3.12 Visual Resources 3-66

3.12.1 Visual Resources Inventory 3-66
3.12.1.1 Visual Resource Contrast Rating 3-66
3.12.1.2 Distance Zone Mapping 3-67
3.12.1.3 Field Visits, Selection of Observation Points, and Modeling 3-68
3.12.1.4 Visual Contrast Rating 3-69
3.12.2 Existing Conditions 3-69
3.12.2.1 Regional Setting 3-69
3.12.2.2 Visual Resources Management Classes and Visual Sensitivity 3-70
3.12.2.3 Descriptions of KOPs and their Viewsheds 3-71

3.13 Transportation/Motorized Vehicle Access 3-83

3.13.1 Existing Traffic Volumes 3-83
3.13.2 Major Traffic Routes Within or Adjacent to the Proposed Project Site 3-84

3.14 Human Health and Safety/Hazardous Materials 3-86

3.14.1 Potential Hazardous Wastes/Contaminated Soil and Groundwater 3-86
3.14.2 Fire Hazards 3-88

3.15 Social and Economic Conditions 3-89

3.15.1 Social 3-89
3.15.1.1 Community Setting 3-89
3.15.1.2 Demographics and Social Trends 3-90
3.15.2 Economic 3-93
3.15.2.1 Economic Base and Trends: Employment, Earnings, and Income 3-93
3.15.2.2 Public Services and Utilities 3-100

3.16 Environmental Justice 3-102
3.16.1 Study Area 3-103
3.16.2 Minority Populations 3-103
3.16.3 Low-Income Populations 3-105
3.16.4 Surrounding Area 3-105

3.17 Energy and Minerals 3-107
3.17.1 (Fluid) Leasable Minerals 3-107
3.17.2 Locatable Minerals 3-107
3.17.3 Salable Mineral Resources 3-108

3.18 Fuels and Fire Management 3-109
3.18.1 Introduction and Methodology 3-109
3.18.2 Regional Setting and Regulatory Framework 3-109
3.18.2.1 Tortoise – Moderate Density (NV050-01) Fire Management Unit 3-109
3.18.2.2 Proposed Project Area 3-109
3.18.3 Current Conditions and Trends 3-109
3.18.3.1 Tortoise – Moderate Density (NV050-01) Fire Management Unit 3-110
3.18.3.2 Goodsprings-Primm (NV050-18) Fire Management Unit 3-112
3.18.3.3 Silver State Solar Project Area 3-112

3.19 Cumulative Scenario 3-112
3.19.1 Introduction 3-112
3.19.2 Cumulative Projects 3-112
3.19.2.1 Existing Projects 3-113
3.19.2.2 Foreseeable Renewable Projects 3-120
3.19.2.3 Other Foreseeable Projects 3-122

3 Affected Environment

Introduction

This chapter describes the physical, biological, social and economic characteristics of the area that would be affected by implementation of the alternatives. The chapter focuses on current resource conditions as well as environmental trends based on current management. For some resource values, the discussion will address conditions beyond the Proposed Project area to ensure an adequate analysis of off-site and cumulative impacts found in Chapter 4, Environmental Consequences. The information in this chapter is based on existing resource data or the reports the Bureau of Land Management (BLM) specifically required for the Silver State Solar Project.

Geographic Setting

The Proposed Project site is located in the Ivanpah Valley within southwestern Nevada in an unincorporated portion of Clark County, approximately 40 miles south of Las Vegas, 2 miles east of Primm, 2 miles east of Interstate 15 (I-15), and north along the border of California (see Figures 1.1-1 and 1.1-2, presented in Chapter 1, Purpose and Need).

Clark County extends over 8,091 square miles from Lincoln County, Nevada to the north, the Arizona state line to the east, and the Colorado River, including the Hoover Dam and Lake Mead, to the southeast. The California state line forms Clark County‘s southwest border, and Clark County is bounded to the west and northwest by Nye County, Nevada.

Clark County‘s terrain varies from 482 feet above mean sea level (msl) at the Colorado River to 11,918 feet above msl at Mount Charleston, located in the northwest portion of Clark County. Clark County is predominantly terrestrial, (approximately 98 percent/7,911 square miles), with only 2 percent (180 square miles) of the land area covered by water features. The most dominant water feature is Lake Mead. The primary desert habitat within Clark County consists of creosote bush scrub (*Larrea tridentate)*, and the terrain consists of desert valleys, basins, alluvial fans/valleys, and mountain ranges.

The Proposed Project site comprises approximately 7,925 acres of BLM lands. It is bounded to the east by the Lucy Gray Mountains, to the west by the NV Energy Walter M. Higgins Power Generating Station and Union Pacific Railroad (UPRR), and to the southwest by the California state line. A major electric transmission line corridor is located to the north and west of the Proposed Project site.

The Proposed Project site is located on a broad alluvial fan spreading out to the west from the lower slopes of the Lucy Gray Mountains. The alluvial fan drains into both the Ivanpah Dry Lake to the west and south, and to the Roach Dry Lake to the northwest. At its closest point to the Proposed Project site, Ivanpah Dry Lake is located approximately 2 miles away, Roach Dry Lake is approximately 0.5 mile away, and the Proposed Project site is approximately 0.5 mile from the lower western slopes of the Lucy Gray Mountains. The Proposed Project site terrain varies from approximately 2,700 feet above msl in the western portion of the site to 3,700 feet above msl in the southeastern portion of the site (located within the Lucy Gray Mountains).

3.1 Air Quality and Climate

This section identifies existing air quality and climatic conditions within and adjacent to the Proposed Project site. Information in this section is largely based on calculations for mechanized equipment use as well as input received from members of the public during the scoping process.

3.1.1 Existing Ambient Air Quality

The Proposed Project site is located within airshed 164/AB as designated under the Clean Air Act (CAA). Air quality is regulated by federal, state, and local agencies. Pursuant to the CAA, the U.S. Environmental Protection Agency (EPA) has established National Ambient Air Quality Standards (NAAQS) for six criteria air pollutants. The six criteria air pollutants for which NAAQS have been promulgated are: sulfur dioxide (SO_2), nitrogen dioxide (NO_2), particulate matter with a mean aerodynamic diameter of 10 microns or less (PM_{10}) and particulate matter with a mean aerodynamic diameter of 2.5 microns or less ($PM_{2.5}$) (a subset of PM_{10}), carbon monoxide (CO), volatile organics (VOCs), and oxides of nitrogen (NO_X) (precursors to the formation of ozone [O_3]), and lead. Primary standards set limits to protect public health, including the health of "sensitive" populations such as individuals with respiratory diseases, children, and the elderly. Secondary standards set limits to protect the environment, including protection against decreased visibility, damage to animals, crops, vegetation, and buildings (EPA 2008a).

O_3 is not emitted directly from emission sources, but is created at near-ground-level by a chemical reaction between nitrogen oxide (NO_X) and volatile organic compounds (VOCs) in the presence of sunlight. As a result, NO_X and VOCs are often referred to as O_3 precursors and are regulated as a means to prevent ground-level O_3 formation. Criteria air pollutant descriptions and health effects are summarized in Table 3.1-1.

Table 3.1-1. Major Criteria Air Pollutant Descriptions and Health Effects

Pollutant	Description and Health Effects
O_3 (Ozone)	High O_3 levels result from VOC and NO_X emissions from vehicles and industrial sources, in combination with daytime wind flow patterns, mountain barriers, a persistent temperature inversion, and intense sunlight. Health effects include: – Aggravation of respiratory and cardiovascular diseases; – Impairment of cardiopulmonary function; and – Eye irritation.
NO_2 (Nitrogen Dioxide)	NO_2 emissions are primarily generated from the combustion of fuels. Health effects include: – Risk of acute and chronic respiratory disease.
CO (Carbon Monoxide)	CO is a product of incomplete combustion, principally from automobiles and other mobile sources of pollution. Wood-burning stoves and fireplaces can also be measurable contributors. Health effects include: – Impairment of oxygen transport in the bloodstream; – Aggravation of cardiovascular disease; – Impairment of the central nervous system; – Fatigue, headache, confusion, dizziness; and – Death at high levels of exposure.
SO_2 (Sulfur Dioxide)	SO_2 is produced when any sulfur-containing fuel is burned. Natural gas contains trace amounts of sulfur, while fuel oils contain much larger amounts. Health effects include: – Aggravation of respiratory disease; – Reduced lung function; and – Eye irritation.
PM_{10} (Particulate Matter of 10 microns or less in diameter) and $PM_{2.5}$ (Particulate Matter of 2.5 microns or less in diameter)	Particulates in the air are caused by a combination of wind-blown fugitive or road dust, particles that come from fuel combustion in motor vehicles and industrial sources, residential and agricultural burning, and from the reaction of NO_X, sulfur oxides (SO_X), and organics. Health effects include: – Aggravation of respiratory disease; – Reduced lung function; – Cough irritation; and – Lung irritation.
Lead	Lead gasoline additives, non-ferrous smelters, and battery plants were historically significant contributors to atmospheric lead emissions. Legislation has since reduced lead emissions. Health effects include: – Impairment of central nervous system.
VOCs (Volatile Organic Compounds)	A portion of total organic compounds or gases, excluding methane (CH_4), ethane, and acetone (due to low photochemical reactivity). These compounds are regionally important due to their involvement in the photochemical reaction that produces O_3. Health effects include: – Impairment of central nervous system; – Eye, nose, and throat irritation; and – Fatigue, headache, confusion, and dizziness.

Source: CARB 2005

The current State of Nevada and federal ambient air quality standards are identified in Table 3.1-2 below.

Table 3.1-2. State and Federal Ambient Air Quality Standards

Pollutant	Averaging Time	Nevada Standards	Federal Standards (NAAQS) Primary	Federal Standards (NAAQS) Secondary
CO (Carbon Monoxide)	8-hour [a]	9 ppm (10 mg/m^3)	9 ppm (10 mg/m^3)	--
CO (Carbon Monoxide)	1-hour [a]	35 ppm (40 mg/m^3)	35 ppm (40 mg/m^3)	--
Lead	Quarterly Average	1.5 µg/m3	1.5 µg/m^3	Same as primary
Lead	30-Day Average	--	--	Same as primary
NO_2 (Nitrogen Dioxide)	Annual (Arithmetic Mean)	0.053 ppm (100 µg/m^3)	0.053 ppm (100 µg/m^3)	Same as primary
NO_2 (Nitrogen Dioxide)	1-hour	--	1 ppm (100 µg/m^3)	None
PM_{10} (Particulate Matter 10 microns in diameter)	Annual (Geometric Mean) [b]	--	--	Same as primary
PM_{10} (Particulate Matter 10 microns in diameter)	Annual (Arithmetic Mean) [b]	50 µg/m^3	50 µg/m^3	Same as primary
PM_{10} (Particulate Matter 10 microns in diameter)	24-hour [a]	150 µg/m^3-	150 µg/m^3-	Same as primary
$PM_{2.5}$ (Particulate Matter less than 2.5 microns in diameter)	Annual (Arithmetic Mean) [b]	15 µg/m3	15 µg/m^3	Same as primary
$PM_{2.5}$ (Particulate Matter less than 2.5 microns in diameter)	24-hour [c]	65 µg/m3	35 µg/m^3	Same as primary
O_3 (Ozone)	8-hour [a]	0.08 ppm (157 µg/m^3)	0.075 ppm	Same as primary
O_3 (Ozone)	1-hour [a]	0.12 ppm	0.12 ppm	Same as primary
SO_2 (Sulfur Dioxide)	Annual (Arithmetic Mean)	0.03 ppm (80 µg/m^3)	0.03 ppm	--
SO_2 (Sulfur Dioxide)	24-hour [c]	0.14 ppm (365 µg/m^3)	0.14 ppm	--
SO_2 (Sulfur Dioxide)	3-hour	0.50 ppm (1,300 µg/m^3)	--	0.50 ppm (1,300 µg/m^3)
SO_2 (Sulfur Dioxide)	1-hour	--	--	--
Sulfates	24-hour	--	--	--
H_2S (Hydrogen Sulfide)	1-hour	--	--	--

Sources: CARB 2008a; EPA 2008a; Clark County 1994

Notes:

[a] Not to be exceeded more than once per year.

[b] To attain this standard, the 3-year average of the weighted annual mean PM less than 2.5 microns in diameter concentrations from single or multiple community-oriented monitors must not exceed 15.0 µg/m3.

[c] To attain this standard, the 3-year average of the 98th percentile of 24-hour concentrations at each population-oriented monitor within an area must not exceed 35 µg/m3.

Key:

µg = microgram

m^3 = cubic meter

NAAQS = National Ambient Air Quality Standards

ppm = parts per million

3.1.1.1 Air District Significance Thresholds

The local air district uses national ambient air quality standards to determine the potential impact of a Proposed Project. Additional requirements for both construction and operation are in place to manage emissions of fugitive dust (PM_{10}). In addition to particulate matter, Clark County also has attainment plans for management of CO and O_3. Any approved construction or new significant source of stationary (point) air pollution in Clark County would be required by Clark County Department of Air Quality and Environmental Management (DAQEM) to adhere to the prescribed best management practices (BMPs) and control measures in order to minimize dust emissions and control engine exhaust emissions. Table 3.1-3 describes the attainment status of criteria pollutants in Clark County, Nevada (particulate matter 10 and 2.5 microns in size are considered a single criteria air pollutant).

Table 3.1-3. Attainment Status in Clark County, Nevada

Pollutant	State Designation[a]	Federal Designation
Carbon Monoxide (CO)	n/a	A/U
Lead (Pb)	n/a	A/U
Nitrogen Dioxide (NO_2)	n/a	A/U
Ozone (O_3)	n/a	Basic NA
Particulate Matter (PM_{10})	n/a	A/U
Particulate Matter ($PM_{2.5}$)	n/a	A/U
Sulfur Dioxide (SO_2)	n/a	A/U

Source: DAQEM 2008

Note:
[a] Designations are based on exceedances of monitored values above the NAAQS over a period. Nevada does not have state-specific AAQS, but relies on NAAQS. EPA has reported designations for Nevada

Key:
A/U = attainment/unclassifiable area
n/a = not applicable
NA = Nonattainment
$PM_{2.5}$ = particulate matter with a mean aerodynamic diameter of 2.5 microns or less
PM_{10} = particulate matter with a mean aerodynamic diameter of 10 microns or less

3.1.1.2 General Federal Actions

Clark County has been designated as non-attainment for federal ozone standards (Basic). The General Conformity Rule is designed to ensure that federal agencies ensure that Proposed Projects would conform to the applicable state implementation plan (SIP). Modeled as a ―worst-case" scenario, the Proposed Project may be above threshold (or de minimis) levels and could potentially trigger the requirement for a federal conformity analysis. Table 3.1-4 describes regional air quality concentrations for criteria pollutants. Table 3.1-5 shows the exceedances of NAAQS near the Proposed Project

Table 3.1-4. Regional Background Air Quality Concentrations in the Proposed Project Area

Location	PM_{10} (µg/m^3) 24-hour[a]	$PM_{2.5}$ (µg/m^3) Annual	$PM_{2.5}$ (µg/m^3) 24-hour[a]	SO_2 (ppm) Annual	SO_2 (ppm) 24-hour[a]	SO_2 (ppm) 3-hour[a]	CO (ppm) 8-hour[a]	CO (ppm) 1-hour[a]	NO_2 (ppm) Annual	Ozone (ppm) 8-hour[a]	Ozone (ppm) 1-hour[a]
Jean, Clark County, Nevada	50	4.93	12.5	--	--	--	--	--	--	0.074	0.079
Las Vegas, Clark County, Nevada	66	--	--	--	--	--	2.1	2.9	--	0.077	0.091

Source: EPA 2008c

Note:

[a] The average concentrations listed are the fourth-highest daily maximums.

Key:
CO = carbon monoxide
m^3 = cubic meters
NO_2 = nitrogen dioxide
ppm = parts per million
PM_{10} = particulate matter less than or equal to 10 microns in diameter
$PM_{2.5}$ = particulate matter less than 2.5 microns in diameter
SO_2 = sulfur dioxide

Table 3.1-5. Exceedances of Air Quality Standards and Existing Maximum Concentrations near the Proposed Project Area

Year	Ozone (ppm) 2nd Max 1-hr	Ozone (ppm) 2nd Max 8-hr	Ozone (ppm) Days Over Federal	CO (ppm) 2nd Max 1-hr	CO (ppm) 2nd Max 2-hr	Oxides of Nitrogen (ppm) Annual Mean	SO_2 (ppm) 2nd Max 24-hr	SO_2 (ppm) Annual Mean	PM_{10} (ppm) 2nd Max 24-hr	PM_{10} (ppm) Annual Mean	PM_{10} (ppm) Days Over Federal	$PM_{2.5}$ (ppm) 98th percentile	$PM_{2.5}$ (ppm) Annual Mean
2006	.109	.085	4	6.3	5.0	.021	.007	.002	142	35	2	24.3	9.41
2007	.097	.085	12	4.6	3.8	.020	.003	.001	127	39	2	22.6	10.29
2008	.098	.080	12	4.7	3.7	.016	.001	.001	168	33	1	22.5	9.07

Note:
Exceedances of other air criteria pollutants listed on Table 3.1-2 ($PM_{2.5}$, sulfates, lead, hydrogen sulfate, and visibly reducing particles) were not reported by the Mojave Desert Air Quality Management District (MDAQMD) during 2008.

Key:
CO = carbon monoxide
SO_2 = sulfur dioxide
PM_{10} = particulate matter less than or equal to 10 microns in diameter
$PM_{2.5}$ = particulate matter less than 2.5 microns in diameter

3.1.1.3 Existing Sources of Air Pollutants (Clark County 2008)

Area Sources

Area sources are commercial, small-scale, industrial and residential sources with emissions that fall below point source reporting levels and that are too numerous or too small to identify individually. Area sources can be divided into two groups characterized by emission mechanism: hydrocarbon evaporative emission sources and fuel combustion emission sources.

Non-Road Mobile Sources

Non-road mobile sources are a subset of the area source category. They include recreational boats, locomotives, and a broad category of off-highway equipment that covers everything from large earth-moving and construction equipment to lawn mowers.

On-Road Mobile Sources

On-road mobile sources consist of automobiles, trucks, motorcycles, and other motor vehicles traveling on roadways.

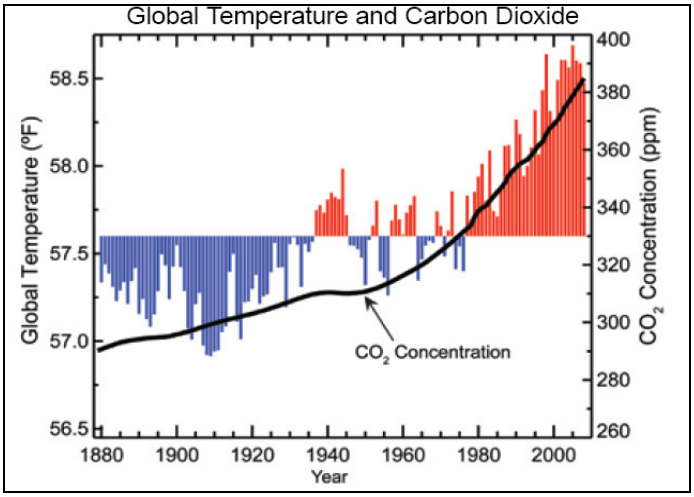
Aircraft Emissions

Annual aircraft emissions are a function of the number of annual aircraft operations, expressed as landing and takeoff cycles; the aircraft fleet mix (i.e., types of aircraft used); and the length of time aircraft spend in each of the four modes of operation (takeoff, climb out, approach, and idle).

3.1.2 Climate Change

Climate change refers to any notable change in measures of climate (temperature, precipitation, or wind) that lasts for an extended period (i.e., decades or longer). Climate change may be affected by a number of factors including natural cycles (e.g., changes in the sun‘s intensity or Earth‘s orbit around the sun); natural processes within the climate system (e.g., changes in ocean circulation); and human activities that change the atmosphere‘s composition (e.g., burning fossil fuels) or land surface (e.g., deforestation, reforestation, urbanization, and desertification).

According to the Intergovernmental Panel on Climate Change (IPCC) Third Assessment Report, increased atmospheric levels of carbon dioxide (CO_2) are correlated with rising temperatures; concentrations of CO_2 have increased by 31 percent above pre-industrial levels since 1750 (Figure 3.1-1) show that temperatures will probably increase by 1.4 degrees Celsius (°C) to 5.8°C between 1990 and 2100. Much of the uncertainty in this increase results from not knowing future CO_2 emissions, but there is also some uncertainty about the accuracy of climate models. The IPCC concluded in a statement released February 2, 2007, that —the widespread warming of the atmosphere and ocean, together with ice-mass loss, support the conclusion that it is extremely unlikely that global climate change of the past 50 years can be explained without external forcing, and very likely that it is not due to known natural causes alone” (IPCC 2007).



Source: IPCC 2007

Figure 3.1-1. Relationship Between Global Temperature and Carbon Dioxide

3.1.2.1 Potential Effects of Climate Change

According to the Nevada Climate Change Advisory Committee (NCCAC) Final Report (NCCAC 2008), the predicted changes in the climate would impact public health through: (1) the direct effects of heat and frequent heat waves; (2) exacerbated air pollution as increased ground level ozone; (3) increases in infectious diseases, such as dengue fever and malaria; and (4) a decrease in general public health due to economic/social changes from climate change.

The Colorado River basin is expected to see less precipitation overall, and a greater percentage will come as rain rather than snow. As the Las Vegas Valley receives over 90 percent of its drinking water from the Colorado River, this will present challenges to maintaining municipal water supply. Additionally, western Nevada receives most of its water from upstream storage in Sierra Nevada rivers which also face the same challenges of decreased precipitation with a greater percentage of that precipitation coming from rain.

3.1.2.2 Existing Greenhouse Gas Emissions

Activities in Nevada accounted for approximately 49.5 MMT of gross CO_2e emissions in 2005, an amount equal to 0.7 percent of total U.S. gross GHG emissions. Nevada‘s gross GHG emissions are rising faster than those of the nation as a whole (gross emissions exclude carbon sinks, such as forests). Nevada‘s gross GHG emissions increased 62 percent from 1990 to 2004, while national emissions rose by only 16 percent during this period. Rapid population growth has been the most important driver in emissions growth in Nevada. Annual population growth from 1990 to 2005 was 4.9 percent.

The principal sources of Nevada‘s GHG emissions are electricity use (which exclude electricity exports to other states) and transportation, accounting for 42 percent and 32 percent of Nevada‘s gross GHG emissions, respectively. The next largest contributor to emissions is the residential, commercial, and industrial fuel use sector, accounting for 13 percent of the total State emissions. Table 3.1-6 describes Nevada GHG emissions from all sources.

Table 3.1-6. Nevada Greenhouse Gas Emissions ($MMTCO_2e$)

(Million Metric Tons CO_2e)	1990	2000	2005	2010	2020	Explanatory Notes for Projections
Energy	**27.4**	**40.2**	**44.0**	**47.4**	**63.8**	
Electricity Production	16.7	24.6	26.1	18.6	22.3	
Coal	15.1	18.0	17.9	7.8	11.0	See electric sector assumptions
Natural Gas	1.3	6.5	8.3	10.8	11.3	in appendix
Oil	0.3	0.06	0.02	0.03	0.03	
Net Imported/Exported Electricity	-3.7	-5.6	-5.3	1.9	5.2	Negative values represent exports
Electricity Consumption Based	**13.0**	**19.0**	**20.8**	**20.5**	**27.4**	
Residential/Commercial/Industrial (RCI) Fuel Use	**4.4**	**5.9**	**6.4**	**7.8**	**10.7**	
Coal	0.4	0.5	0.5	0.6	0.7	Based on US DOE regional projections
Natural Gas	2.2	3.6	4.1	5.0	6.9	Based on US DOE regional projections
Oil	1.9	1.8	1.8	2.2	3.0	Based on US DOE regional projections
Wood (CH_4 and N_2O)	0.02	0.03	0.02	0.03	0.03	Based on US DOE regional projections
Transportation	**9.6**	**14.7**	**16.1**	**18.4**	**24.7**	
Motor Gasoline	5.7	8.3	9.1	10.1	13.1	VMT projections from MPO's
Diesel	1.4	2.6	3.4	4.3	6.6	VMT projections from MPO's
Natural Gas, LPG, other	0.04	0.06	0.08	0.1	0.2	Based on US DOE regional projections
Jet Fuel and Aviation Gasoline	2.5	3.7	3.5	3.9	4.8	Aircraft operations projections from FAA
Fossil Fuel Industry	**0.4**	**0.5**	**0.6**	**0.7**	**0.9**	
Natural Gas Industry	0.4	0.5	0.6	0.7	0.9	Increase based on current trend to 2009, then US DOE to 2020
Oil Industry	0.03	0.01	0.004	0.003	0.001	Increase based on current trend to 2009, then US DOE to 2020
Industrial Processes	**0.2**	**2.1**	**2.5**	**3.1**	**4.6**	
Cement Manufacture (CO_2)	0.000	0.2	0.2	0.3	0.4	Based on NV Nonmetallic Minerals employment projections (2004-2014)
Lime Manufacture (CO_2)	0.000	0.8	0.8	0.9	1.4	Same as above
Limestone & Dolomite Use (CO_2)	0.000	0.04	0.03	0.04	0.06	Same as above
Soda Ash (CO_2)	0.01	0.02	0.02	0.02	0.02	Based on USGS projections
Nitric Acid Production (N_2O)	0.000	0.3	0.3	0.3	0.3	Based on national projections (US State Dept.)
ODS Substitutes (HFC, PFC, and SF_6)	0.002	0.5	1.0	1.5	2.5	EPA 2004 ODS cost study report
Electric Power T & D (SF_6)	0.2	0.1	0.1	0.1	0.1	Based on national projections (US EPA)
Waste Management	**0.8**	**1.4**	**1.4**	**1.5**	**2.2**	
Solid Waste Management	0.7	1.2	1.1	1.2	1.7	Historical waste emplacement rates
Wastewater Management	0.1	0.2	0.3	0.3	0.4	Projections based on population
Agriculture	**1.6**	**1.8**	**1.6**	**1.7**	**1.8**	
Enteric Fermentation	0.7	0.7	0.7	0.7	0.8	Historical emissions for 1990-2002
Manure Management	0.1	0.1	0.2	0.2	0.2	Historical emissions for 1990-2002
Agricultural Soils	0.8	0.9	0.8	0.8	0.8	Historical emissions for 1990-2002, except growth rate for fertilizers based on NV population growth for 1996-2020
Agricultural Residue Burning	0.0001	0.0001	0.0001	0.0001	0.0001	No growth assumed
Total Gross Emissions	**30.1**	**45.4**	**49.5**	**53.7**	**72.3**	
increase relative to 1990		*51%*	*65%*	*79%*	*141%*	
Forestry	**-4.8**	**-4.8**	**-4.8**	**-4.8**	**-4.8**	Historical and projected emissions held at 2004 level.
Agricultural Soils	**-0.2**	**-0.2**	**-0.2**	**-0.2**	**-0.2**	Historical and projected emissions held at 1997 level.
Net Emissions (including sinks)	**25.1**	**40.5**	**44.5**	**48.7**	**67.4**	

[a] Totals may not equal exact sum of subtotals shown in this table due to independent rounding.

Source: NCCAC 2008 – Appendix I

3.1.2.3 Federal Greenhouse Gas Guidance

The Council on Environmental Quality (CEQ) issued draft guidance to federal agencies on February 18, 2010, regarding GHG emissions. The guidance states that in an agency's analysis of direct effects of GHG emissions, it would be appropriate to quantify cumulative emissions over the life of the project; discuss measures to reduce emissions, including consideration of reasonable alternatives; and qualitatively discuss the link between such emissions and climate change. However, the guidance adds, it is not currently useful for the NEPA analysis to attempt to link specific climatological changes to the particular project or emissions; as such, direct linkage is difficult to isolate and to understand.

3.2 Noise

This section identifies existing ambient noise conditions within and adjacent to the Proposed Project site.

3.2.1 Environmental Setting

To describe environmental noise at the regional and local levels, and to assess impacts on areas sensitive to community noise, an understanding of noise fundamentals is necessary. Noise is defined as unwanted sound. Airborne sound is a rapid fluctuation of air pressure above and below atmospheric pressure. There are several ways to measure noise, depending on the source, the receiver, and the reason for the noise measurement. The most common metric is the overall A-weighted sound level measurement that has been adopted by regulatory bodies worldwide. The A-weighted network measures sound similar to how a person perceives sound, thus achieving good correlation with acceptable and unacceptable sound levels.

A-weighted sound levels are typically measured or presented as the equivalent sound pressure level (L_{eq}), which is the average noise energy level for a defined period of time. The L_{eq} is commonly used to measure steady-state sound or noise that is usually dominant. Statistical methods are used to capture the dynamics of a changing acoustical environment. Statistical measurements are typically denoted by L_{xx}, where $_{xx}$ represents the percentage of time the sound level is exceeded. The L_{90} represents the noise level exceeded during 90 percent of the measurement period. Similarly, the L_{10} represents the noise level exceeded for 10 percent of the measurement period. The relative A-weighted noise levels of common sounds measured in the environment and industry for various qualitative sound levels are provided in Table 3.2-1.

Table 3.2-1. Typical Sound Levels Measured in the Environment and Industry

Noise Source at a Given Distance	A-Weighted Sound Level in Decibels	Qualitative Description
Carrier deck jet operation Jet takeoff (200 feet)	140 130 120	Pain threshold
Auto horn (3 feet) Jet takeoff (1,000 feet) Shout (0.5 feet)	110 100	Maximum vocal effort
N.Y. subway station (50 feet) Heavy truck (50 feet)	90	Very annoying; hearing damage (8-hr, continuous exposure)

Table 3.2-1. Typical Sound Levels Measured in the Environment and Industry

Noise Source at a Given Distance	A-Weighted Sound Level in Decibels	Qualitative Description
Pneumatic drill (50 feet) Freight train (50 feet) Freeway traffic (50 feet)	80 70 to 80 70	Annoying Intrusive (telephone use difficult)
Air conditioning unit (20 feet) Light auto traffic (50 feet) Living room/Bedroom	60 50 40	Quiet
Library/Soft whisper (5 feet) Broadcasting/Recording studio	30 20 10	Very quiet Just audible

Source: Adapted from Table E (New York State Department of Environmental Conservation [NYSDEC] 2003).

Another metric used to determine the impact of environmental noise considers the differences in human responses to daytime and nighttime noise levels. During the evening and at night, exterior background noises are generally lower than during the day. However, most household noise also decreases at night and exterior noise becomes more noticeable. Furthermore, most people sleep at night and are, therefore, more sensitive to intrusive noises. To account for human sensitivity to evening and nighttime noise levels, the Daytime-Nighttime Noise Level (DNL, also abbreviated as L_{dn}) and Community Noise Equivalent Level (CNEL) metrics were developed. The DNL accounts for the greater annoyance of noise during the night (10:00 p.m. to 7:00 a.m.). The CNEL accounts for the greater annoyance of noise during the evening (7:00 p.m. to 10:00 p.m.) and nighttime hours.

The effects of noise on people can be listed in three general categories:

- Subjective effects of annoyance, nuisance, dissatisfaction;
- Interference with activities such as speech, sleep, learning; and
- Physiological effects such as startling and hearing loss.

In most cases, environmental noise may produce effects in the first two categories only. No completely satisfactory way exists to measure the subjective effects of noise, or to measure the corresponding reactions of annoyance and dissatisfaction. This lack of a common standard is primarily due to the wide variation in individual thresholds of annoyance and habituation to noise. Thus, an important way of determining a person‘s subjective reaction to a new noise is to compare it to the existing or –ambient” environment to which that person has adapted. In general, the more the level or the tonal (frequency) variations of a noise exceed the previously existing ambient noise level or tonal quality, the less acceptable the new noise will be, as judged by the exposed individual.

The general human response to changes in noise levels that are similar in frequency content (for example, comparing increases in continuous [L_{eq}] traffic noise levels) is summarized as follows:

- A 3-decibel (dB) change in sound level is a barely noticeable difference;
- A 5-dB change in sound level is typically noticeable; and

- A 10-dB change is perceived by the listener as a doubling in loudness.

3.2.2 Regional Setting

The Proposed Project would be located adjacent to the California/Nevada border in an unincorporated portion of Clark County, Nevada, approximately 40 miles south of Las Vegas, and 2 miles east of Primm. The Proposed Project boundary would encompass approximately 2,966 acres of federal BLM-managed lands. A detailed description of the land uses and land use designations for the Proposed Project are discussed in Section 3.9, Lands and Realty.

3.2.3 Local Setting

The Proposed Project site is bounded by the NV Energy Walter M. Higgins Power Generating Station and UPRR to the west. The southwest boundary is the California/Nevada state line. The Lucy Gray Mountains are to the east, and a major electric transmission line corridor is located to the north and west. The proposed North and South substations would be located at the western end of the Proposed Project site, and the solar field (i.e., solar arrays) would occupy a 2,575-acre area that would be enclosed by security fence. The only residences within the Proposed Project area are located in Primm, Nevada, at the Desert Oasis apartment complex, which contains mobile homes as well as apartments. The complex is within 1.4 miles of the Proposed Project site. There are no hospitals, libraries, schools, places of worship, or other facilities in the Proposed Project area. There are no data regarding existing ambient noise levels for the Proposed Project site.

3.3 Geology, Topography, and Geologic Hazards

This section identifies the geology, topography, and geologic hazards within and adjacent to the Proposed Project site and discusses applicable regulations. During the scoping period, meetings were conducted with the public and government agencies to identify concerns. Written comments were also received. With regard to geology, topography, and geologic hazards, a comment about the location of active faults was raised. This comment is addressed in Section 3.3.3, Existing Conditions – Seismicity. Information in this section is largely based on information collected by the U.S. Geological Survey (USGS) and the Nevada Bureau of Mines and Geology (NBMG).

3.3.1 Topography

The Proposed Project site is located on a sloping alluvial fan at the base of the Lucy Gray Mountains in southwestern Nevada. This area is part of the Basin and Range physiographic province. The Basin and Range physiographic province consists of north-south trending linear mountain ranges separated by flat valleys (basins) ranging in width from 12 to 31 miles. The mountain ranges are from 28 to 50 miles long.

The mountain ranges are often asymmetrical in cross section with a steep slope on one face and a gentle slope on the other face. There are a few ranges that are bounded on both sides by faults, thus reasonably symmetrical. This distinct topography of alternating linear mountains and valleys was created through tectonic extension and normal faulting. Over the Basin and Range‘s

geologic history, the basins have filled with sedimentary deposits derived from erosion of the nearby mountain ranges.

The Great Basin section is a distinct area within the larger Basin and Range province. No surface water flows out of the Great Basin due to low precipitation levels, high evaporation rates, and distinct topography. Surface water flows into closed lake or playa-lake basins and evaporates (USGS 2004, Price 2004). Surface water within the vicinity of the Proposed Project site drains in the Ivanpah Dry Lake. More information about water resources can be found in Section 3.5, Water Resources.

3.3.2 Geologic Setting

The surface of the Proposed Project site is primarily comprised of Quaternary alluvium deposits. These deposits comprise approximately 98.4 percent of the site. The term ―Quaternary" indicates that these sediments were deposited in the recent past, specifically within the past 2.6 million years. ―Alluvium" refers to unconsolidated gravels and sand fragments derived from erosion of the surrounding hills. In the immediate Proposed Project site, these sediments are derived from deposition of material from erosion of neighboring mountain ranges, including the Lucy Gray Mountains located on the eastern side of the Proposed Project site.

These deposits form alluvial fans at the base of the Lucy Gray Mountains, as seen in Figure 3.3-1. Alluvial fans are fan-shaped slopes at the base of mountain ranges created through depositions of thousand to millions of years of eroded material (USGS 2001). Most of these are deposits of loose sediments that have not been cemented into rock. Some ancient alluvial fans have been cemented into sedimentary rock.

Due to the loose nature of alluvial fans, they are subject to constant hydrologic reworking. Stream channels migrate over time and continually change the landscape. During heavy precipitation events, alluvial fan deposits can be subject to rapid flow changes, resulting in debris flows, landslides, and flash floods. Extreme rain events can suspend sand, gravel, or even boulders, and transport them downstream, resulting in damage to structures impacted by flood waters (USGS 2001).

A small portion of the southeast region of the Proposed Project site (~1.6 percent) consists of ancient intrusive and metamorphic rocks of the Lucy Gray Mountains. Unlike the unconsolidated materials that comprise the bulk of the site, these are hard rocks formed from the slow cooling of magma and subsequent deformation due to tectonic activity. These rocks date to the Proterozoic period (approximately 2,500 to 542 million years ago).

Table 3.3-1 provides the description and extent of each geologic unit within the Proposed Project site (also see Figure 3.3-2).

Table 3.3-1. Proposed Project Site Surficial Geology, Presented in Descending Age Order

Geologic Label	Name	Description	Acres within Proposed Project Site
Qay	Young alluvium, undivided (Holocene to late Pleistocene)	Coarse grained alluvial fan and wash deposits	298.0
Qay3	Young active alluvium (late Holocene)	Active wash and alluvial fan deposits of poorly to moderately sorted gravel, sand, and minor silt. Obvious and complex flow patterns and broad gravelly areas with few well-defined channels.	3,262.0
Qay2	Young active alluvium and recently abandoned active alluvial surfaces (Holocene)	Intermittently active alluvial fans deposits	646.8
Qay1	Young inactive alluvium (early Holocene to late Pleistocene)	Young, inactive alluvial fans	1,979.3
Qe	Eolian sand (Holocene to late Pleistocene)	Deposits of windblown sand with minor silt components	17.4
Qea	Mixed eolian sand and alluvium (early Holocene to late Pleistocene)	Windblown sand sheet deposits on top of inactive alluvial fans	128.1
Qai	Intermediate alluvium, undivided (late to middle Pleistocene)	Deposits and surfaces of inactive alluvial fans	1,358.9
Qao	Old alluvium (middle to Pleistocene)	Deposits and surfaces of old alluvial fans	25.7
QTa	Old alluvium, undivided (early Pleistocene to late Miocene)	Old, inactive alluvial fan deposits with material from granitic bedrock	24.4
YXg	Ancient intrusive and metamorphic rocks, undivided (Proterozoic)	Hard rocks of the Lucy Gray mountains including granite, granite gneiss, granitic augen gneiss, and quartz monzonite	2.0

Source: NBMG 2006

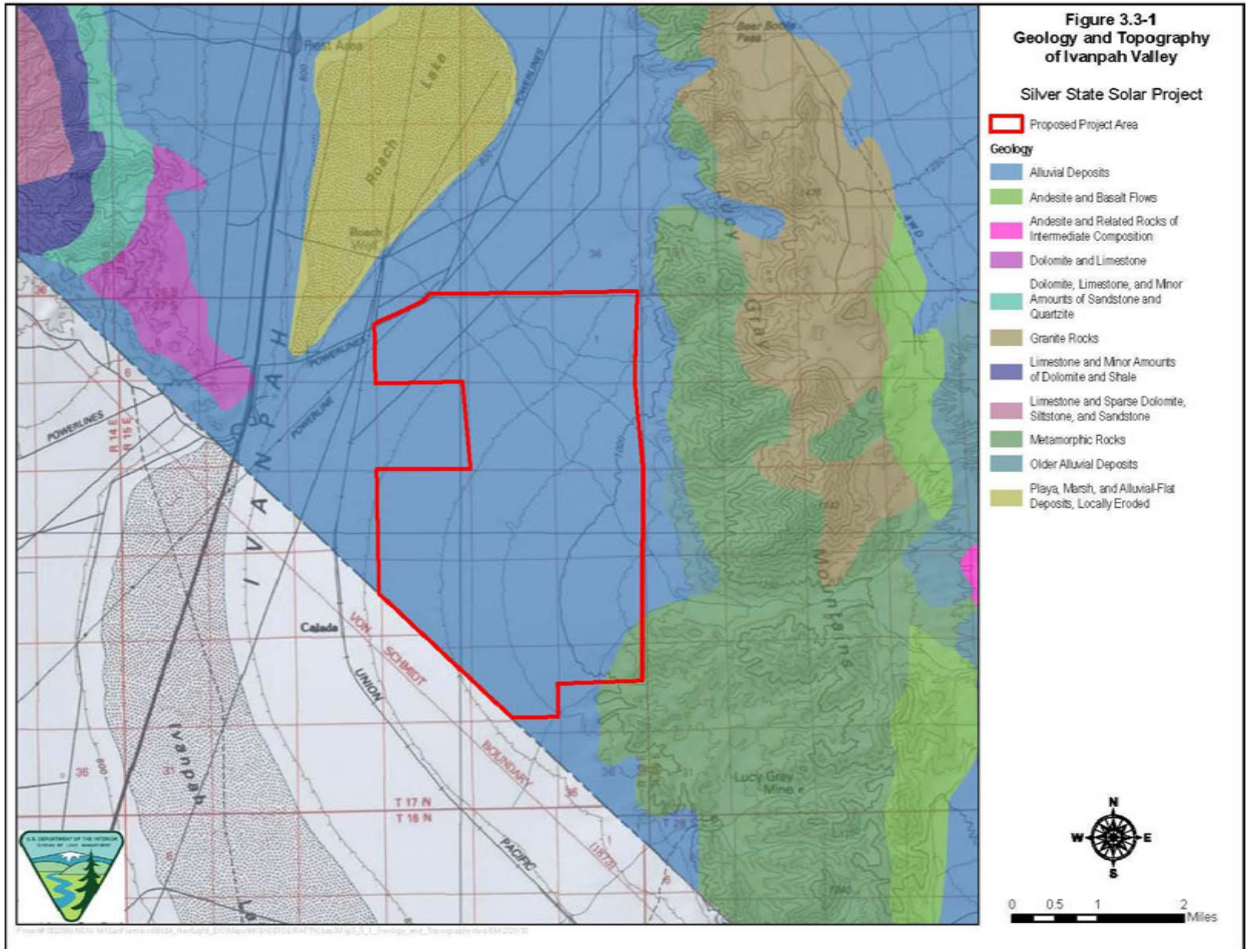


Figure 3.3-1
Geology and Topography of Ivanpah Valley

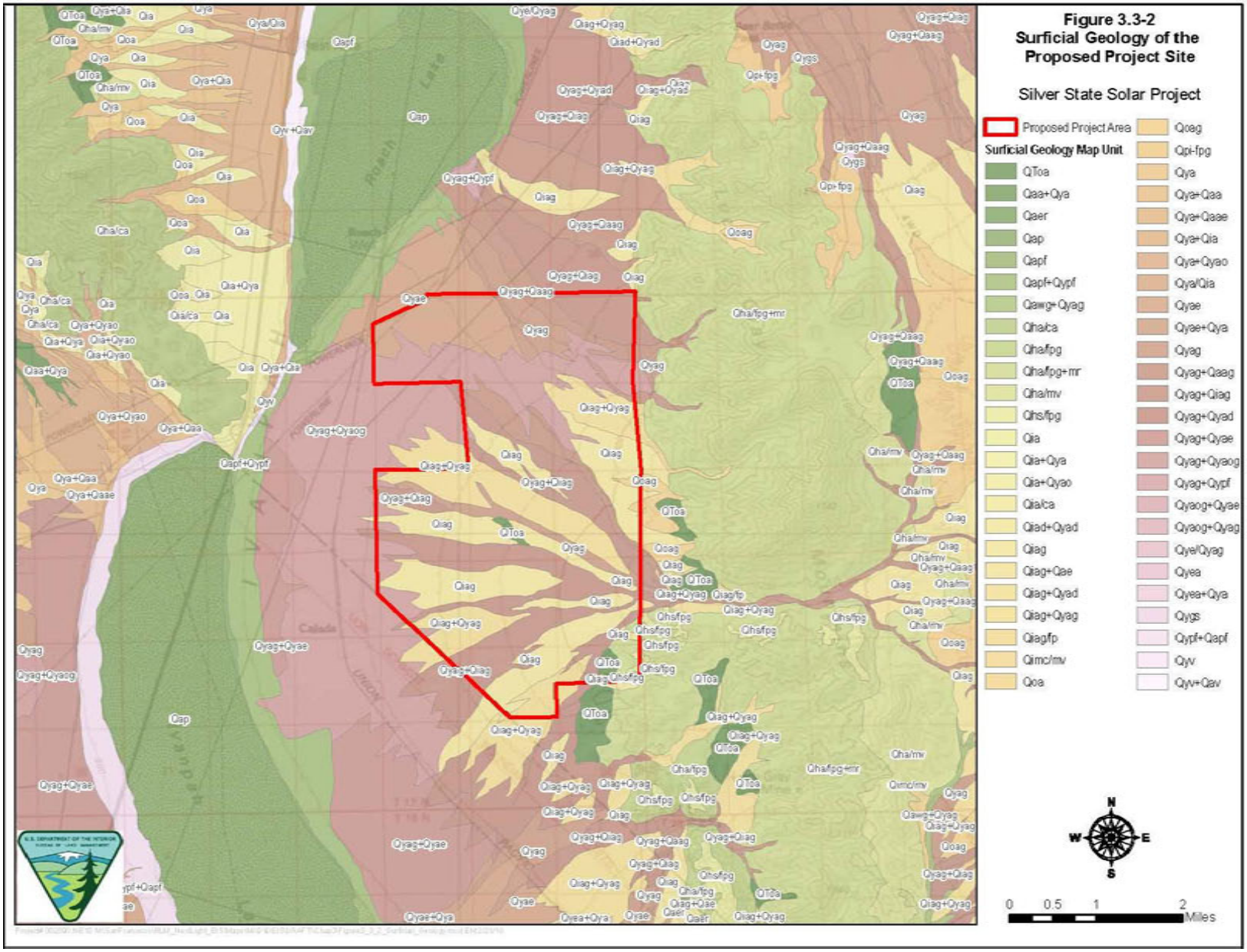


Figure 3.3-2
Surficial Geology of the Proposed Project Site

3.3.3 Seismicity

3.3.3.1 Faults

Faults are breaks in the Earth's crust where there has been movement along a distinct plane called a fault line. These movements produce tremendous amounts of energy and are known as earthquakes. Historic earthquakes near the Proposed Project site are described below. Nevada is considered to be highly active in terms of fault motion. As the Basin and Range province is being pulled apart in an east-west orientation, faults shift to accommodate the tectonic activity (NBMG 2008 – Map 167). There are nearly 150 mapped faults or fault zones within 100 miles of the Proposed Project site (USGS 2009a). There are no mapped faults within the Proposed Project site. The distribution of these faults is displayed on Figure 3.3-3.

The Stateline Fault is located less than 1 mile west of the Proposed Project site. Part of the active Eastern California Shear Zone (ECSZ), the Stateline Fault was previously thought to be inactive with only minor historic movement. Recent studies found that this fault was responsible for substantial movement (30 ± 4 kilometers) over the past 13 million years. These new data indicate that the fault is either in an inactive period or that this movement has transitioned to other faults within the ECSZ to the west (Geological Society of America [GSA] 2007).

3.3.3.2 Earthquakes

Since 1990, there have been 22 earthquakes with a magnitude of 5.0 or higher on the Richter scale that have occurred within 100 miles of the Proposed Project site (USGS 2005). Figure 3.3-3 shows the regional distribution of these data. Earthquakes are caused when movement along a fault line causes shaking. One earthquake above 7.0 magnitude occurred within 100 miles of the Proposed Project site. This earthquake and its associated damage are described below. There have not been any earthquakes with a magnitude of 5.0 or higher on the Richter scale within the Proposed Project site since 1900.

The 7.2 magnitude Hector Mine earthquake occurred in October of 1999 approximately 80 miles southwest of the Proposed Project site in the Pisgah-Bullion Fault Zone (USGS 2005). This earthquake was the result of a fault rupture resulting in 5.2 meters of movement. Very strong shaking and moderate damage were reported immediately surrounding the epicenter. In the Ivanpah Valley, weak shaking, but no damage, was reported (USGS 2009b). Overall, regional damage was minimal due to the remote location of the earthquake (Southern California Earthquake Center [SCEC] 2009). An Amtrak passenger train was derailed due to ground movement. There was one injury associated with the train derailment (Byers 2001).

3.3.3.3 Seismic Shaking

Seismic activity, or earthquakes, may cause hazards that can cause damage to buildings and structures and loss of life. Such hazards include ground shaking, landslides and rock falls, and surface faulting. In general, ground shaking produces the most widespread damage because it can affect large areas. The USGS produces seismic hazard maps of peak horizontal acceleration (ground shaking) and the unit of measure is percent of gravity (%g). Peak acceleration is the largest ground acceleration recorded by a particular station during an earthquake (USGS 2008a).

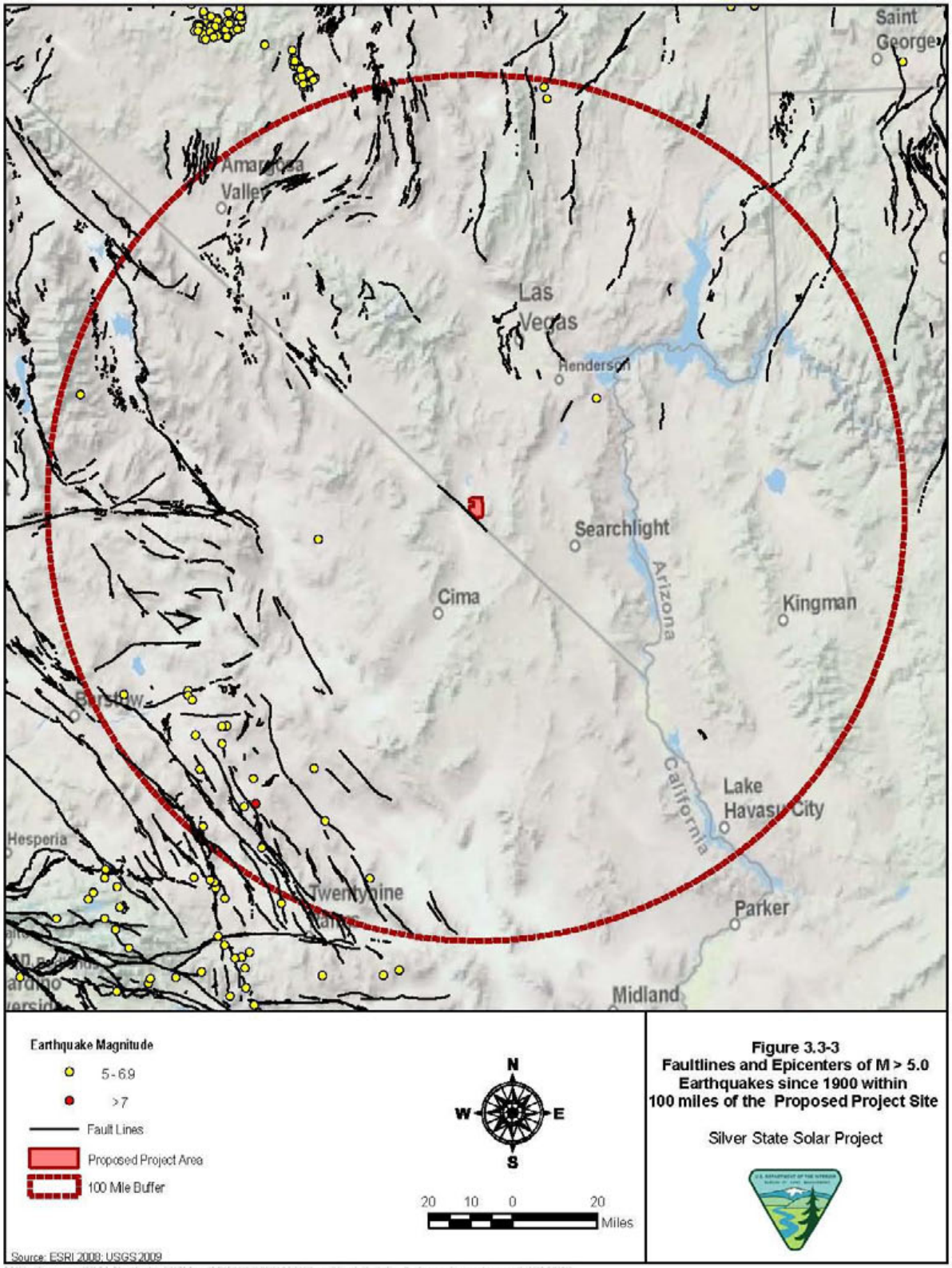


Figure 3.3-3
Faultlines and Epicenters of M > 5.0 Earthquakes since 1900 within 100 miles of the Proposed Project Site

Silver State Solar Project

The Proposed Project site is categorized as having peak ground acceleration (PGA) for a 10 percent probability of exceedance in 50 years in percentage of 9%g (i.e., the acceleration of gravity). This PGA is associated with "moderate" shaking resulting in "very light damage" to structures (USGS 2008b). The data is derived from seismic hazard curves calculated on a grid of sites across the southwestern United States that describe the frequency of exceeding a set of ground motions. The ground motions relate the source characteristics of the earthquake and propagation path of the seismic waves to the ground motion at a site. The predicted ground motion is typically quantified in terms of a median value (a function of magnitude, distance, style of faulting, and other factors) and a probability density function of peak horizontal ground acceleration (USGS 2008b).

3.3.3.4 Landslides

A landslide is the movement of soil, rock, or other earth material downhill in response to gravity (USGS 2004). Several natural events can precipitate landslides, including earthquakes (discussed in Section 3.3.3.2), volcanic eruptions, and most commonly, rainfall. In addition, human activity can also cause landslides.

The USGS National Landslide Hazards Program prepared an overview map of landslide incidence and susceptibility by evaluating the geologic map of the United States and classifying the geologic units according to high, medium, or low landslide incidence (number of landslides) and high, medium, or low susceptibility to landslides. The Proposed Project site is categorized as having low susceptibility to and incidence of landslide (Godt 2001).

Additional landslide hazards associated with alluvial fans must be considered in this desert environment. A specific approach to understanding and assessing flood hazards on alluvial fans has been developed for arid alluvial fans near Laughlin, Nevada. This approach uses geologic mapping to determine active and inactive portions of alluvial fans. Physical features such as stratigraphic relationships, topography, drainage patterns, soil development, and surface morphology are used to determine active and inactive portions of fans (House 2005). Certain portions of alluvial fans can become inactive and remain inactive for thousands of years. Those areas would be relatively safe to build projects. Conversely, very active portions of alluvial fans may need additional hydrological surveys and appropriate engineering controls to assure acceptable impacts to the public and the environment. This approach may improve the accuracy of surface water modeling on alluvial fans and reduce the associated flood hazards.

3.3.3.5 Liquefaction

Liquefaction is a phenomenon in which loose to medium, dense, saturated, granular materials undergo matrix rearrangement, develop high pore water pressure, and lose shear strength because of ground shaking induced by earthquakes. This rearrangement and strength loss is followed by a reduction in bulk volume of the liquefied soils. The secondary effects of liquefaction can include the loss of load bearing capacity below foundations, settlement in level ground, and instability in areas of sloping ground (also known as lateral spreading). Typically, liquefaction occurs over a high water table (within 32 feet of the ground surface) (Dennen *et al.* 1986). Liquefaction hazard is anticipated to be low based on the relatively deep occurrence of groundwater at 550 feet (see Section 3.5.2, Existing Conditions – Groundwater Resources).

3.4 Soils

This section identifies the soil conditions within and adjacent to the Proposed Project site and discusses applicable regulations. Information in this section is largely based on existing data from the U.S. Department of Agriculture (USDA) and the Natural Resources Conservation Service (NRCS) 2006 Soil Survey of Clark County Area, Nevada. Table 3.4-1 summarizes the soil types and limitations within the Proposed Project site.

3.4.1 Tonopah-Arizo Association

The Tonopah-Arizo soil type accounts for 97.8 percent of the total soil type found on the Proposed Project site. The Tonopah-Arizo association is found on fan piedmonts at elevations between 1,210 and 4,360 feet (USDA & NRCS 2006).

Tonopah soil originates from alluvium derived from mixed sources. It exists on fan remnants on slopes between 2 and 8 percent. Tonopah surface rock fragments are about 45 percent gravel. Typical vegetation found on Tonopah soil includes annual forbs, perennial grasses, big galleta, white bursage, range ratany, creosote bush, other shrubs, and other perennial forbs (USDA & NRCS 2006).

Arizo soil originates from alluvium derived from mixed sources. Arizo is found on fan aprons on slopes between 2 and 8 percent. Surface rock fragments are about 10 percent cobbles and 40 percent gravel. Typical vegetation found on Arizo soil includes perennial grasses, big galleta, other annual forbs, other perennial forbs, other shrubs, creosote bush, range ratany, and white bursage (USDA & NRCS 2006).

3.4.2 Haleburu Association

The Haleburu association, composed of Haleburu and Haleburu Dry soils, accounts for 2.1 percent the total soil type found on the Proposed Project site. Haleburu association occurs on hills at elevations between 2,400 and 3,400 feet (USDA & NRCS 2006).

Haleburu soil originates from colluvium and/or residuum weathered from volcanic rock. It typically exists on the back slopes of hills on slopes of between 15 and 50 percent. Haleburu surface rock fragments are about 75 percent gravel, 13 percent cobbles, and 7 percent stones. Typical vegetation found on Haleburu soil includes white bursage, big galleta, other perennial forbs, range ratany, creosote bush, and other shrubs (USDA & NRCS 2006).

Haleburu Dry, like Haleburu, originates from colluvium and/or residuum weathered from volcanic rock. Surface rock fragments of Haleburu Dry are about 75 percent gravel, 7 percent stones, and 13 percent cobbles. Haleburu Dry is found on the backslopes of hills on slopes between 4 and 15 percent. Typical vegetation for Haleburu dry includes white bursage, other annual forbs and shrubs, and creosote bush (USDA & NRCS 2006).

3.4.3 Nippeno-Nipton Association

The Nippeno-Nipton association accounts for 0.01 percent of the total soil type found within the Proposed Project site boundary. The Nippeno-Nipton association is found on mountains at elevations between 2,790 to 5,680 feet (USDA & NRCS 2006).

Nippeno soil originates from colluvium and/or residuum weathered from metamorphic rock and is found on the backslopes of mountains on slopes of between 15 and 50 percent. Surface rock fragments are about 70 percent subangular gravel and 5 percent subangular cobbles. Typical vegetation for Nippeno soil includes blackbrush, other perennial forbs, big galleta, black garama, desert needlegrass, Indian ricegrass, and other shrubs, (USDA & NRCS 2006).

Nipton soil originates from colluvium and/or residuum weathered from metavolcanics and is typically is found on northeast facing summits of mountains on slopes of between 30 and 75 percent. Surface rock fragments are about 3 percent stones, 25 percent cobbles, and 55 percent gravel. Typical vegetation found on Nippeno soil is ephedra, other perennial forbs, desert needlegrass, bush muhly, big galleta, Mojave buckwheat, and other shrubs (USDA & NRCS 2006).

Table 3.4-1. Summary of Soil Types and Limitations by Percent of the Proposed Project Site

% of Total	Acres	Soil Association	Texture Class	Capability Class (Non-Irrigated)[a, b]	Capability Subclass (Non-Irrigated)[c]	Drainage Class	Hydric Class	Slope %
97.8%	7734.78	Tonopah-Arizo Association	Sandy Loam	7	e	Excessively Drained	High	2-8
2.1%	171.87	Haleburu Association	Sandy Loam	7	e	Well Drained	High	15-50
0.01%	1.02	Nippeno-Nipton Association	Gravely Sandy Loam	7	e	Well Drained	Moderately High to High	8-75

Source: USDA & NRCS 2006

Notes:

[a] Irrigated capability-class and subclass data were available but not included in this table because none of the Proposed Project site is classified as prime farmland.

[b] Capability Class 7 definition: Soils have very severe limitations that make them unsuitable for cultivation.

[c] Capability Subclass –e" definition: Limitation due to erosion unless low-growing plant cover is maintained.

3.4.4 Erosion

Wind erodibility of the soil in the area is classified on a scale between 1 and 10, 1 being highly erodible and 10 being minimally erodible. The Haleburu, Nippeno-Nipton, and Tonopah-Arizo associations are all classified as Wind Erodibility 8, the description of which is, –erosion not a problem."

Water erodibility of the soil in the area is classified as slight, moderate, severe, or very severe. A rating of "slight" indicates that erosion is unlikely under ordinary climatic conditions; "moderate" indicates that some erosion is likely and that erosion-control measures may be needed; "severe" indicates that erosion is very likely and that erosion control measures, including revegetation of bare areas, are advised; and "very severe" indicates that significant erosion is expected, loss of soil productivity and off-site damage are likely, and erosion control measures are costly and generally impractical (Peterson 2010).The water erodibility of the Haleburu Association is moderate; Nippeno-Nipton is moderate; and Tonopah-Arizo is slight (Peterson 2010).

3.5 Water Resources/Hydrology

3.5.1 Surface Water Resources

The Proposed Project area lies within the Nevada portion of the Ivanpah Valley within the Mojave Desert. The area has a typical desert climate with extreme fluctuations in daily temperatures. Average temperatures range from 58 to 63 degrees Fahrenheit (°F) in the winter, to summer temperatures exceeding 100°F. According to national climate maps, average annual rainfall in the Proposed Project area can range from 5 to 12 inches (National Oceanic and Atmospheric Administration [NOAA] 2009). The average annual rainfall in the Mojave Desert is 5 inches (CH2M Hill 2009). Average annual snowfall is 0.1 to 3.0 inches in the western portion of the Proposed Project area and 3.1 to 6.0 inches in the eastern portion of the site (NOAA 2009).

The Ivanpah Valley is within a closed basin with no surface water outlet to the ocean. Hydrologically, it is a part of the southwestern hydrographic Great Basin and the Ivanpah-Pahrump Valleys sub-basin (Nevada Department of Conservation and Natural Resources [DCNR] 2009, BLM 2009a). The Proposed Project site and vicinity are on a broad alluvial fan that extends westward from the base of the Lucy Gray Mountains toward Ivanpah Dry Lake and Roach Dry Lake. Ivanpah Dry Lake and Roach Dry Lake are located less than 2 miles southwest and 1 mile northwest, respectively, of the Proposed Project area. The Ivanpah Dry Lake in California is in the valley bottom south of the site. Roach Dry Lake is in Nevada northwest of the site. Numerous ephemeral washes dissect the alluvial fan. Streams, washes, and playas are dry most of the year, with surface water only present following storm events (CH2M Hill 2009). There are no known springs mapped on the USGS Desert or Roach Lake quadrangle in the Proposed Project area, including in the immediate surrounding mountain ranges (USGS 2009). Additionally, the Proposed Project area does not contain mapped hydric soils (NRCS 2009). The Proposed Project area does not contain or drain to a wild and scenic river (Wild & Scenic River Council [WSR] 2009). Figure 3.5-1 describes all hydrologic features within the analysis area.

A field survey of the 2,900-acre Proposed Project footprint conducted by CH2M Hill in August 2009 identified numerous interconnected ephemeral washes ranging in size from small (3 to 10 feet wide) wash features to medium, broad (10 to 20 feet wide) drainages. The active flow channels of the smaller washes are generally devoid of vegetation and typically have a sandy-gravel substrate, although some washes also contained cobble and scattered larger rocks. Most of the larger channels typically contained scattered vegetation (CH2M Hill 2009).

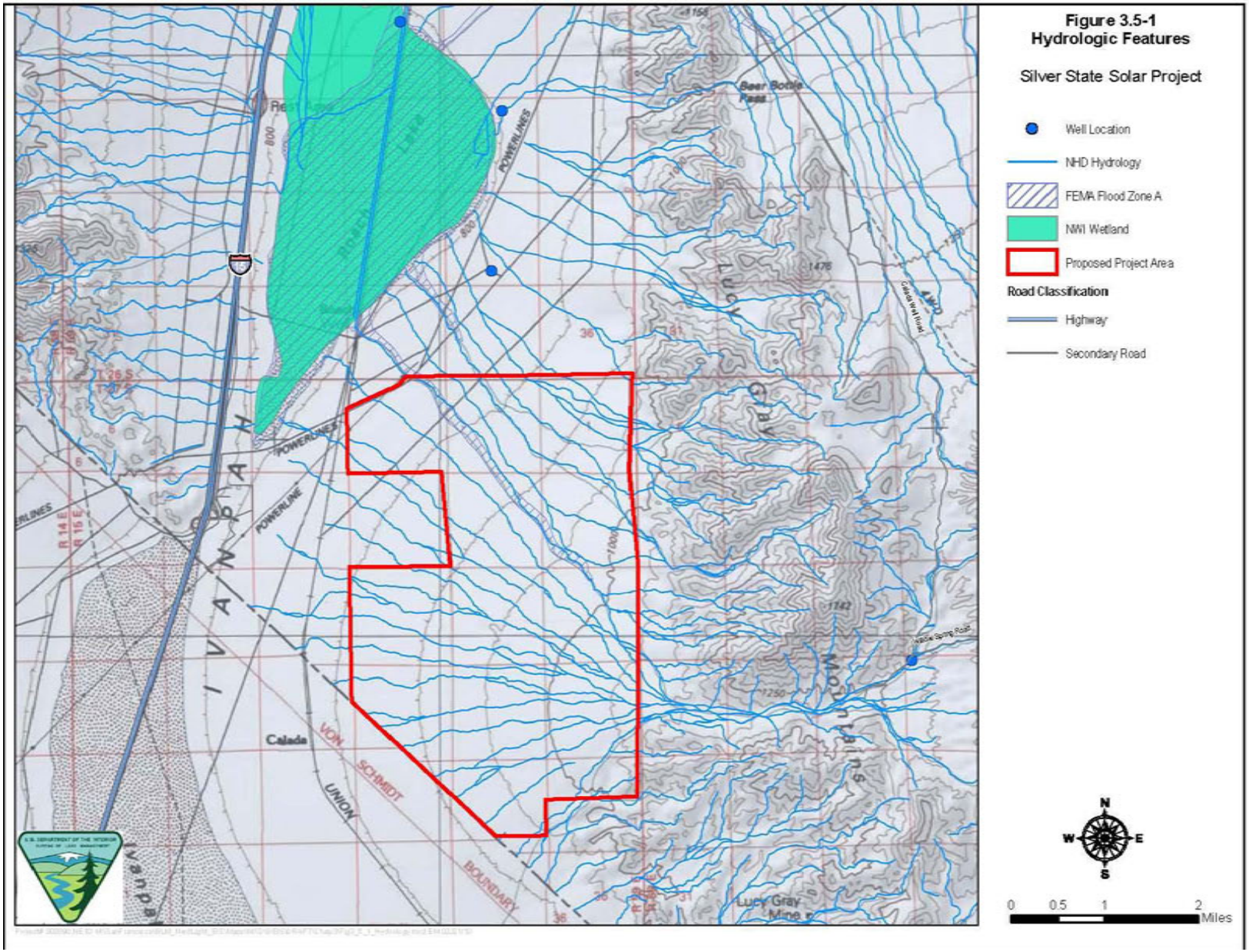


Figure 3.5-1
Hydrologic Features
Silver State Solar Project
Well Location
NHD Hydrology
FEMA Flood Zone A
NWI Wetland
Proposed Project Area
Road Classification
Highway
Secondary Road
N
S
E
W
0
0.5
1
2
Miles
IVANPAH
Lucy Gray Mountains
Lucy Gray Mine
Calada
VON SCHMIDT
UNION
BOUNDARY
POWERLINES
POWERLINE
Bear Bottle Pass
Ivanpah

3.5.1.1 Surface Water Quality

As there are no perennial waterbodies in the Proposed Project area, there is no surface water quality data available for project area washes. The Proposed Project area does not contain, nor is tributary to, any waterbodies which are on Nevada's 303d list for exceeding state water quality standards (Nevada Department of Environmental Protection [NDEP] 2009a).

3.5.1.2 Flooding

Although the Proposed Project area does not contain any mapped floodplains, the relative flood hazard risk classes for the Proposed Project site and surrounding area range from "Very High" to "None" based on local topography (House 2006). In a special report entitled "History of Flooding, Clark County, Nevada 1905-1975," the U.S. Soil Conservation Service documented at least 11 floods in Clark County since 1960. The largest storms typically occur between July and September. During these hot summer months, moist unstable air from the Gulf of Mexico is forced rapidly upward by hot air currents causing severe thunderstorms with intense rainfall on steep mountain slopes and armored desert surfaces (USDA 1977).

There are several Clark County Regional Flood Control District Conveyances (levees, inlet structures, spillways, and a detention basin) approximately 1 mile west of the Proposed Project area and associated with the Primm Wastewater Treatment Plant. However, there are no base flood elevations available for the Proposed Project area and the project area does not lie within a designated Flood Control Watershed (Clark County Regional Flood Control District 2009)

Flood hazard zones are delineated by the Federal Emergency Management Act (FEMA) for the purpose of predicting the extent of the 100-year and 500-year flood hazards for insurance and floodplain management. A FEMA Special Flood Hazard Area (100-year flood zone) is present in Sections 11 and 2 of the Proposed Project site (FEMA 2002). However, it is likely that many washes in the Proposed Project area not yet delineated by FEMA may be subject to flooding based on the frequency of flooding events in the region and the characteristics of flooding on alluvial fans.

Desert washes, which are the typical in the Mojave Desert region, are braided in plan view. These streams flow only intermittently during seasonal precipitation events, are unstable, and can migrate laterally during significant runoff. Water in this area commonly flows into dry lakes (i.e., lakes that receive surface water from desert washes in an internal drainage setting, then evaporate back into the atmosphere and/or contribute to groundwater). It is also possible for water in the dry washes to continue to flow in perennial streams if there is external drainage. For the most part, significant drainage in the area appears to be internal (i.e., dry washes transport water to dry lakes where the water either evaporates or contributes to groundwater). Dry washes can also carry destructive bedloads (boulders and gravels) during rain events.

Geologically, the Proposed Project site is located on a series of alluvial fan lobes that form large, cone-shaped, sedimentary deposits. This is a common depositional environment in this region (Reading 1980). It is likely that most of Proposed Project area is on alluvial fans that have originated from significant amounts of flowing water carrying, and subsequently depositing, sediments across their entire extent during their lifespan. The hydrologic processes that occur on alluvial fans can be random and difficult to model. Sediments, which can range from clay to

large boulders, are transported across alluvial fans by water in desert washes, debris flows, and sheet floods. Flood events on alluvial fans in arid climates are triggered by significant storms. Specific to the Mojave Desert region, these would include the random summer cloud bursts that occur infrequently but can supply a large amount of water to a localized area, or a larger storm such as a tropical storm that occurs on a 100-year time scale. Any of these storms could result in flooding hazards that would cause significant damage across the Proposed Project area and could potentially cause significant localized destruction.

A specific approach to understanding and assessing flood hazards on alluvial fans has been developed for arid alluvial fans near Laughlin, Nevada. This approach uses geologic mapping to determine active and inactive portions of alluvial fans. Physical features such as stratigraphic relationships, topography, drainage patterns, soil development, and surface morphology are used to determine active and inactive portions of fans (House 2005). Certain portions of alluvial fans can become inactive and may remain inactive for thousands of years. Those areas would be relatively safe to build projects. Conversely, very active portions of alluvial fans may need additional hydrological surveys and appropriate engineering controls to assure acceptable impacts to the public and the environment. This approach may improve the accuracy of surface water modeling on alluvial fans and reduce the associated flood hazards.

3.5.2 Groundwater Resources

The Proposed Project area is in the Central Region of Nevada‘s Hydrographic Regions. The Central Region is the largest hydrographic region in Nevada, covering 46,783 square miles, and includes 78 hydrographic areas (Nevada Division of Water Resources [NDWR] 2009c). The Proposed Project is within the Ivanpah Valley Northern Part (164A) and Southern Part (164B) hydrographic basins (NDWR 2009a). The basins consist of alluvial-basin fill groundwater aquifers contained in unconsolidated deposits of suspected Pliocene through Holocene age sand and gravel (BLM 2009b, USGS 2003). The maximum thickness of the alluvium in the basin is at least 825 feet (California Department of Water Resources [CDWR] 2004). These aquifers receive groundwater recharge through infiltration of runoff from the mountain and alluvial fan slopes, and from direct rainfall. The aquifer system includes coarser-grained aquifer units containing the water and finer-grained confining units, retarding vertical and lateral groundwater flow (BLM 2009b).

No specific groundwater data was found for the Proposed Project area; however, the static water level in four water wells drilled within 0.5 mile of the project range in depth from 105 to 312 feet below the surface, with one well yielding 132 gallons per minute (gpm; NDWR 2009d). The Proposed Project area does not lie within a wellhead protection area, source water protection area, or designated sole source aquifer (NDEP 2008, Nevada Rural Water Association 2009, EPA 2009). The nearest completed source water assessment is for Whiskey Pete‘s Hotel and Casino, over three miles from the Proposed Project area along I-15 (NDEP 2009c).

3.5.2.1 Groundwater Quality

Groundwater quality in the hydrologic basins in the Mojave Desert in California and Nevada is generally acceptable for most uses of groundwater; however, since many of the basin-fill aquifers have closed surface drainage and limited inter-basin flow, aquifers may contain poor quality saline waters, elements from natural geothermal activity, and contaminants from mining

or energy operations (BLM 2009b). Groundwater in Ivanpah Valley is generally considered marginal to inferior and is high in calcium, sodium, and fluoride (CDWR 2004). Groundwater in the area of the Primm Wastewater Treatment Plant, approximately 2 miles west of the Proposed Project area, is reported to be poor quality with high levels of total dissolved solids (NDEP 2009b, NDWR 2009d).

3.5.2.2 Water Use and Discharge

There are no known water rights within the Proposed Project boundary. There are four sites with permitted water rights within 0.5 mile of the Proposed Project to the west (NDWR 2009a). One site is sourced by effluent from the Primm Wastewater Treatment Plant and permitted for power and water storage at the adjacent NV Energy Walter M. Higgins Power Generating Station. The re-use of the treated effluent is also authorized for construction purposes and dust suppression (NDWR 2009b, NDEP 2009b). The remaining sites are sourced by wells for quasi-municipal use (NDWR 2009a).

3.5.3 Jurisdictional Waters, Drainages, and Riparian Areas

Based on an August 2009 delineation of the waters of the U.S. within the Proposed Project area conducted by CH2M Hill and the U.S. Army Corps of Engineers (USACE) for the project area, the project could impact potentially jurisdictional waters on the southern portion of the project area (CH2M Hill 2009). The USACE indicated that it would likely assert jurisdiction over all drainages greater than or equal to 3 feet in width that intersect the Nevada-California state line.

Clearing and grubbing activities for Proposed Project infrastructure (i.e., the substation, access roads, maintenance roads, perimeter road, service road, perimeter fence, berms, fire break, parking areas, tower foundations for the transmission lines, collection lines [underground], staging areas, water storage pond, O&M building, and solar arrays) could result in removal of desert wash vegetation and/or filling of jurisdictional areas. Additionally, the removal of vegetation could result in increased erosion and sedimentation, resulting in the degradation of water quality.

During construction and during routine O&M, the use of maintenance and access roads that cross desert washes could result in impacting jurisdictional areas through vegetation loss and increased erosion. The use of vehicles and equipment to cross these washes could also result in the degradation of water quality from the potential introduction of hazardous materials such as fuels and oils.

Though the finding of the August 2009 delineation of waters of the U.S. conducted by CH2M Hill and the USACE indicated that the Proposed Project area does not contain any wetlands and that the southern portion of the project area contained jurisdictional waters of the U.S., a complete assessment of the potential effects to jurisdictional waters, riparian areas, and wetlands caused directly or indirectly by the Proposed Project cannot be completed until Jurisdictional Determination is issued by the USACE.

3.6 Biological Resources

3.6.1 Vegetation

Vegetation in the Proposed Project area is primarily Mojave creosote bush-white bursage (burro-weed) desert scrub with small inclusions of several Mojave wash scrub ephemeral drainages. Species that were observed during the September 2009 site reconnaissance that are typical of Mojave creosote brush-white bursage desert scrub were creosote bush (*Larrea tridentata*), burro-weed (*Ambrosia dumosa*), cholla (*Opuntia* ssp.), prickly-pear cactus (*Opuntia* ssp.), Joshua tree (*Yucca brevifolia*), Mormon tea (*Ephedra* sp.), Spanish bayonet (*Yucca* sp.), big galleta (*Pleuraphis rigida*), Mediterranean grass (*Schismus* sp.), Tiquilia sp., Indian rice grass (*Achnatherum hymenoides*), grama (*Bouteloua* sp.), and *Salsola* sp. (Sycamore Environmental Consultants, Inc. 2009). The composition of the species community associated with the ephemeral washes was similar to the species composition of the Mojave creosote brush-white bursage desert scrub (Sycamore Environmental Consultants, Inc. 2009).

3.6.2 Wildlife

This section identifies biological resources within and adjacent to the Proposed Project site and discusses applicable regulations. This section is based largely on the draft Biological Assessment for the Proposed Project.

3.6.2.1 Survey Methodology

Information for biological resources within the Proposed Project area was gathered through desktop analysis and field surveys. Field surveys for desert tortoise were conducted by Sundance Biology, and field surveys for vegetation are being conducted in the spring of 2010 by Sycamore Environmental Consultants. Desktop analyses were conducted by reviewing current regional literature and accessing agency Internet biological databases and resources, such as the Nevada Natural Heritage Program (NNHP) database, Nevada Department of Wildlife (NDOW 2009) Diversity GIS Data, National Park Service (NPS), U.S. Fish and Wildlife Service (USFWS), and BLM internet resources. Additionally, home ranges of species peripheral to the core Proposed Project area, such as large mammals and birds, were incorporated.

Surveys for desert tortoise were conducted on October 20-31, 2008, and August 26-28, 2009 by experienced, qualified desert tortoise biologists. The protocol-level surveys were based on the 1992 USFWS protocol (USFWS 2009). Surveys were conducted over approximately 15 square miles on the Proposed Project site. A modified TRED methodology was used with three transects per square mile instead of four transects per square kilometer. Additionally, Section 5 is bisected by I-15, which necessitated that the transect shape be modified to fit in the available habitat.

Results of the 2008/2009 desert tortoise surveys are provided in CH2M Hill‘s Presence/Absence Survey for the Desert Tortoise (*Gopherus agassizii*), on the proposed Silver State Solar Project in Ivanpah Valley, Clark County, Nevada Report (2009b).

3.6.2.2 Wildlife Communities

The reptilian fauna is very diverse as there is the potential for 17 species of lizards, 18 snakes, and one tortoise to occur within the Proposed Project area. Historic sightings of reptiles document the following species within the Proposed Project area: western fence lizard (*Sceloporus occidentalis*) and desert iguana (*Dipsosaurus dorsalis*); and the following species within close proximity of the Proposed Project area: desert horned lizards (*Phrynosoma platyrhinos*), yellow-backed spiny lizard (*Sceloporus uniformis*), desert tortoise (*Gopherus agassizii*), and common chuckwalla (*Sauromalus ater*) (NDOW 2009).

The mammalian fauna is dominated by small, mostly nocturnal species of rodents and bats. Larger species that are also likely present include the coyote (*Canis latrans*), gray fox (*Urocyon cinereoargenteus*), and American badger (*Taxidea taxus*). Diurnal mammals are also common and include hares, rabbits, ground squirrels (*Spermophilus tereticaudus*), and ungulates such as mule deer (*Odocoileus hemionus*).

The Proposed Project area potentially hosts a wide variety of avian fauna, including songbirds, raptors (e.g., hawks, eagles, owls, and falcons), woodpeckers, ground fowl, flycatchers, doves, cuckoos, shrikes, and crows and ravens. Many of these birds only winter in the area (e.g., Northern flicker [*Colaptes auratus*], sage thrasher [*Oreoscoptes montanus*], white-crowned sparrow [*Zonotrichia leucophyrs*]), while others (e.g., red-tailed hawk [*Buteo jamaicensis*], common raven [*Corvus corax*], and greater roadrunner [*Goecoccyx californianus*]) are year-round residents.

<u>Migratory Pathways</u>

The Proposed Project is located between the McCullough and Highland Mountains in Nevada and the Spring Mountains and Clark Mountains in California. All of these ranges support suitable desert bighorn sheep (*Ovis canadensis*) habitat in the form of both wintering habitat and crucial habitat. Due to the location of the Proposed Project, desert bighorn sheep may use the Proposed Project area during their migration between these ranges. The closest range to the Proposed Project, the Lucy Gray Mountains, are historically unoccupied by desert bighorn sheep.

The Proposed Project is also located between Mesquite Wilderness Area, Stateline Wilderness Area, Clark Mountain Area of Critical Environmental Concern (ACEC), South McCullough Wilderness Area, Eldorado-Piute ACEC, Ivanpah Desert Wildlife Management Area (DWMA) ACEC, Clark Mountain ACEC, and Mojave Wilderness Area. Many of these DWMAs and Wilderness Areas are also designated desert tortoise critical habitat. Desert wildlife species, including the desert tortoise and other larger reptiles, foraging birds, and large mammals (e.g. wild burros, American badgers), may use the Proposed Project area to migrate between these DWMAs and Wilderness Areas.

3.6.3 Special Status Species

Some species of plants and wildlife are accorded special status by federal and state agencies largely because they are either scarce on a regional level, facing clearly defined threats, or in a position within the regional landscape to potentially become scarce. Special status species are:

- Threatened, endangered, proposed, or candidates for listing under the federal Endangered Species Act (ESA) or state equivalents;
- BLM-designated sensitive species designated by the BLM Nevada State Director;
- Protected by under Title 47, Chapter 527 (Protection and Preservation of Timbered Lands, Trees and Flora) of the Nevada State Code;
- At-risk taxa tracked by the NNHP within the DCNR; and/or
- Designated as sensitive by the Nevada Native Plant Society (NNPS).

The State of Nevada can also fully protect wildlife species through the stipulations of Nevada Revised Statute (NRS) 501. The State of Nevada also protects ―critically endangered" plant species as well as cacti and yuccas under NRS 527. Still other species are tracked by state heritage programs and are assigned different levels of concern based on rarity and perceived level of threat. Some non-government organizations maintain ‗watch lists' that may be considered by natural resources agencies and the public when reviewing environmental documents. Collectively, these species of heightened legal protection or conservation concern are referred to as ―special status species."

Plant and wildlife species with both special status and the greatest probability of occurrence within the Proposed Project area are identified in Table 3.6-1. The species list was derived from an online review of the listing of special status species maintained by the NNHP as well as BLM sensitive species and species covered by the Clark County, Nevada Multiple Species Habitat Conservation Plan (MSHCP). Table 3.6-1 addresses only those species of special concern identified as likely to occur within the Proposed Project area.

The following plant and wildlife species were identified on USFWS, NDOW, BLM, and Clark County MSHCP lists as potentially occurring within Nevada portions of the Proposed Project, but are unlikely to occur on site and, thus, are excluded from Table 3.6-1 due to a lack of suitable habitat, appropriate soils, or suitable elevation: sheep fleabane (*Erigeron ovinus*), Las Vegas buckwheat (*Eriogonum corymbosum* var. *nilesii*), Pinyon mesa buckwheat (*Eriogonum mensicola*), scrub lotus (*Lotus argyraeus* var. *multicaulis*), Clokey buckwheat (*Eriogonum heermannii* var. *clokeyi*), small-footed myotis (*Myotis ciliolabrum*), long-eared myotis (*Myotis evotis*), little brown bat (*Myotis lucifugus*), fringed myotis (*Myotis thysanodes*), cave myotis (*Myotis velifer*), long-legged myotis (*Myotis volans*), spotted bat (*Euderma maculatum*), Nevada admiral (*Limenitis weidemeyerii nevadae*), Carole‗s silver-spot butterfly (*Speyeria zerene carolae*), and Spring Mountains comma skipper (*Hesperia Colorado mojavensis*).

The Mojave creosote bush-white bursage (burro-weed) desert scrub in the Proposed Project area provides habitat for ten special status plant species (see Table 3.6-1). However, there are no NNHP records of special status plants occurring in the Proposed Project area.

Prickly-pear cactus, Joshua tree, and Spanish bayonet are known to occur in the Proposed Project area (Sycamore Environmental Consultants, Inc. 2009). These species are protected and regulated under NRS 527.060.120, Nevada Administrative Code Chapter 527.060–.120 and Nevada Administrative Code Chapter 527.

Table 3.6-1. Special Status Species with Potential to Occur in the Proposed Project Area

Common Name	Scientific Name	Habitat	Status
PLANTS			
White Bear Poppy	*Arctomecon merriamii*	Found on wide variety of dry to sometimes moist basic soils, including alkaline clay and sand, gypsum, calcareous alluvial gravels, and carbonate rock outcrops in chenopod scrub and rocky Mojavean desert scrub from 1,600 to 6,280 ft.	BLM S, NNHP AR, NNPS W
Mojave Milk-Vetch	*Astragalus mohavensis* var. *mohavensis*	Found on dry rocky often limestone substrates in the Mojave desert region from 2,640 to 5,577 ft.	NNHP W
Nye Milk-Vetch	*Astragalus nyensis*	Found in the foothills of desert mountains on calcareous outwash fans and gravelly flats, sometimes in sandy soil from 1,100 to 5,600 ft.	NV D, NNHP AR, NNPS D
Spring Mountains Milk-Vetch	*Astragalus remotus*	Found on rocky, gravelly, and/or sandy calcareous soils in desert shrub or desert wash communities from 3,400 to 7,050 ft.	BLM S, NNHP AR, NNPS W
New York Mountains Catseye	*Cryptantha tumulosa*	Found on granitic/ carbonate gravelly or clay substrates in pinyon and juniper woodland and Mojavean desert scrub from 3,000 to 9,990 ft.	NNHP W, NNPS W
White-Margined Beardtongue	*Penstemon albomarginatus*	Found in Mojavean desert scrub and stabilized desert dunes from 2,100 to 5,890 ft.	BLM S, NNHP AR, NNPS T
Yellow Twotone Beardtongue	*Penstemon bicolor* ssp. *bicolor*	Found on calcareous or carbonate soils in washes, roadsides, rock crevices, outcrops, or similar places receiving enhanced runoff in creosote-bursage, blackbrush, mixed-shrub, and lower juniper communities from 2,500 to 5,480 ft.	BLM S, NNHP AR
Rosy Twotone Beardtongue	*Penstemon bicolor* ssp. *roseus*	Found on rocky calcareous, granitic, or volcanic soils in washes, roadsides, scree at outcrop bases, rock crevices, or similar places receiving enhanced runoff in the creosote-bursage, blackbrush, mixed-shrub, Joshua tree woodland, and Mojavean desert scrub from 1,800 to 4,839 ft.	BLM S, NNHP AR
Aven Nelson Phacelia	*Phacelia anelsonii*	Found in Joshua tree woodland and pinyon and juniper woodland from 3,940 to 5,020 ft.	NNHP W, NNPS M
REPTILES			
Desert Tortoise	*Gopherus agassizii*	Occurs in Mojave desert scrub and Joshua tree woodlands in valleys, on bajadas, and in low hills at elevations up to 4,900 feet. Observed at various points along the Proposed Project alignment.	FT, 501, MSHCP
Gila Monster	*Heloderma suspectum*	Prefers rocky outcrops, canyons, foothills, bajadas, and edges of washes with dense vegetation rather than open scrublands. A Sonoran desert species, peripheral in the Mojave desert.	BLM, 501
Chuckwalla	*Sauromalus ater*	Rocky outcrops with crevices for hiding in Mojave Desert scrub.	BLM
Western Banded Gecko	*Coleonyx variegatus*	Creosote bush scrub, associated with rocks, or sometimes barren dunes. Largely nocturnal.	MSHCP
Desert Iguana	*Dipsosaurus dorsalis*	Creosote bush scrub with loose sand or hardpan areas with rocks.	MSHCP
Black Collared Lizard	*Crotaphytus insularis*	Frequents rocky areas in arroyos and on slopes of hills in creosote bush, saltbush, and Basin sagebrush deserts.	MSHCP

Table 3.6-1. Special Status Species with Potential to Occur in the Proposed Project Area

Common Name	Scientific Name	Habitat	Status
Long-Nosed Leopard Lizard	*Gambelia wislizenii*	Open scrublands such as creosote bush, alkali bush or sagebrush on various substrates.	MSHCP
Western Leaf-Nosed Snake	*Phyllorhynchus decurtatus*	Sandy or gravelly substrates associated with creosote bush scrub.	MSHCP
Glossy Snake	*Arizona elegans*	Variety of habitats from sparse desert scrub, to chaparral, and grasslands, mostly at low elevations.	MSHCP
Common Kingsnake	*Lampropeltis getula*	Found in a wide variety of habitats, including deserts with rock shelters or animal burrow refuges.	MSHCP
Long-Nosed Snake	*Rhinocheilus lecontei*	Occurs in desert or shrubby habitats mostly in valleys and hills.	MSHCP
Lyre Snake	*Trimorphodon biscutatus*	Most often found in areas of massive rock outcrops in creosote bush, desert scrub, or desert grasslands.	MSHCP
Speckled Rattlesnake	*Crotalus mitchellii*	Generally in rocky areas, usually associated with creosote bush. Range includes sagebrush, succulent desert, and piñon-juniper.	MSHCP
Sidewinder	*Crotalus cerastes*	Fine wind-blown sand areas in hummocks also on flats and rocky hillsides. Associated with creosote bush and desert scrublands.	MSHCP
Mojave Rattlesnake	*Crotalus scutulatus*	Most common in upland desert scrublands in creosote bush and also found in mesquite thickets and barren desert.	MSHCP
MAMMALS			
Desert Bighorn Sheep	*Ovis canadensis nelsoni*	Large, relatively contiguous areas of steep, sparsely vegetated mountainous terrain.	BLM
Wild Burro	*Equus asinus*	Mostly low desert environments in scrublands and woodlands.	WHBA
American Badger	*Taxidea taxus*	Mojave desert scrublands on flats and alluvial fans with friable soils where rodents are present.	BLM, S4
California Leaf-Nosed Bat	*Macrotus californicus*	Caves and mines in desert scrub habitat, generally below 3,280 feet in elevation. Requires warm roost sites in winter.	BLM, ART
California Myotis	*Myotis californicus*	Dry, brushy habitats, roosts in cracks and crevices.	BLM, ART
Townsend‘s Big-Eared Bat	*Plecotus townsendii*	Roosts in mines, caves and buildings in Mojave desert scrub.	BLM, ART
Big Free-Tailed Bat	*Nyctinomops macrotis*	Roosts in rugged, rocky areas in desert scrub.	BLM, ART
BIRDS			
Golden Eagle	*Aquila chrysaetos*	Open country in woodland or mountains, nests on cliff ledges or very large trees.	BLM
Burrowing Owl	*Athene cunicularia*	Open, sparsely vegetated land with available animal burrows.	BLM, 501
LeConte‘s Thrasher	*Toxostoma lecontei*	Most common in sparse, open vegetation including creosote bush scrub and salt bush scrub forms	BLM
Peregrine Falcon	*Falco peregrinus*	Nests on cliffs surrounded by large expanses of open space in a variety of habitats.	BLM, 501, MSHCP

Table 3.6-1. Special Status Species with Potential to Occur in the Proposed Project Area

Common Name	Scientific Name	Habitat	Status
Prairie Falcon	*Falco mexicanus*	Nests on cliffs and in deep canyons in a variety of arid and desert habitats.	BLM
Phainopepla	*Phainopepla nitens*	Mostly mesquite thickets along washes, but also desert scrub and woodland habitats.	BLM, 501, MSHCP
Loggerhead Shrike	*Lanius ludovicianus*	Occurs in desert scrub, dense vegetation along washes, and in woodlands.	BLM

Source: Sycamore Environmental Consultants, Inc. 2009

PLANTS Key:
BLM S = Species designated as sensitive by the BLM
C = Candidate for listing under the ESA
NNHP = Nevada Natural Heritage Program
AR = At risk
W = Watch list
NNPS = Nevada Native Plant Society
W = Watch list (potentially vulnerable to becoming threatened or endangered)
D = Delisted (no longer of concern to NNPS)
M = Marginal (rare and/or possibly distinct, and potentially vulnerable, in the Nevada portion of its range, but much more widespread and secure outside Nevada)
T = Threatened (believed to meet the ESA definition of threatened)

WILDLIFE Key:
FT = federally listed as threatened
BLM = BLM sensitive species
ST = listed by the State of Nevada as threatened
ART = Nevada Natural Heritage Program At Risk Taxa
501 = protected under NRS 501
MSHCP = (Clark County) Multiple Species Habitat Conservation Plan

3.6.3.1 Plants

A habitat assessment has been completed for the Proposed Project area, and rare plant surveys will be performed in the spring of 2010. The Final EIS (FEIS) will include the results of these surveys.

White Bear Poppy (*Arctomecon merriamii*) – BLM S, NNHP AR, NNPS W

The white bear poppy (*Arctomecon merriamii*) is an evergreen perennial herb that blooms from April through July. This species is found in Nevada from Clark, Nye, and Lincoln counties on wide variety of dry to sometimes moist basic soils, including alkaline clay and sand, gypsum, calcareous alluvial gravels, and carbonate rock outcrops in chenopod scrub and rocky Mojavean desert scrub from 1,600 to 6,280 feet. The nearest recorded occurrence of the white bear poppy is a California Natural Diversity Database (CNDDB) record from 1989 approximately 6.6 miles west of the Proposed Project area (Sycamore Environmental Consultants, Inc. 2009). The Mojave creosote bush-white bursage (burro-weed) desert scrub in the Proposed Project area provides habitat for this species.

Mojave Milk-Vetch (*Astragalus mohavensis* var. *mohavensis*) – NNHP W

The Mojave milk-vetch (*Astragalus mohavensis* var. *mohavensis*) is an annual or perennial herb that blooms in May. This species is found in Nevada from Clark and Nye counties on dry, rocky, often limestone substrates in the Mojave Desert region from 2,640 to 5,577 feet. The nearest recorded occurrence of the Mojave milk-vetch is a NNHP record from 1999, located approximately 3.2 miles west of the Proposed Project area (Sycamore Environmental

Consultants, Inc. 2009). The Mojave creosote bush-white bursage (burro-weed) desert scrub in the Proposed Project area provides habitat for this species.

Nye Milk-Vetch (*Astragalus nyensis*) – NV D, NNHP AR, NNPS D

The Nye milk-vetch (*Astragalus nyensis*) is an annual herb known that blooms form April through May. This species is found in Nevada from Clark, Nye, and Lincoln counties in the foothills of desert mountains on calcareous outwash fans and gravelly flats, sometimes in sandy soil from 1,100 to 5,600 feet. The nearest recorded occurrence of the Nye milk-vetch is a NNHP record from 1980, located approximately 14.1 miles north-northwest of the Proposed Project area (Sycamore Environmental Consultants, Inc. 2009). The Mojave creosote bush-white bursage (burro-weed) desert scrub in the Proposed Project area provides habitat for this species.

Spring Mountains Milk-Vetch (*Astragalus remotus*) – BLM S, NNHP AR, NNPS W

The Spring Mountains milk-vetch (*Astragalus remotus*) is a perennial herb that blooms from April through May. This species is endemic to the southeastern slopes of the Spring Mountains in Clark County, Nevada and is found on rocky, gravelly, and/or sandy, calcareous soils in desert shrub or desert wash communities from 3,400 to 7,050 feet. The nearest recorded occurrence of the Spring Mountains milk-vetch is a NNHP record from 1905, located approximately 14.5 miles northwest of the Proposed Project area (Sycamore Environmental Consultants, Inc. 2009). The Mojave creosote bush-white bursage (burro-weed) desert scrub in the Proposed Project area provides habitat for this species.

New York Mountains Catseye (*Cryptantha tumulosa*) – NNHP W, NNPS W

The New York Mountains catseye (*Cryptantha tumulosa*) is a perennial herb that blooms from June through Augusts. This species is endemic to Nevada, occurring only from the Sheep and Groom ranges and Mount Irish in Clark County, on granitic/carbonate, gravelly or clay substrates in pinyon and juniper woodland and Mojavean desert scrub from 3,000 to 9,990 feet. The nearest recorded occurrence of the New York Mountains catseye is a NNHP record from 1972, located approximately 7.6 miles east of the Proposed Project area (Sycamore Environmental Consultants, Inc. 2009). The Mojave creosote bush-white bursage (burro-weed) desert scrub in the Proposed Project area provides habitat for this species.

White-Margined Beardtongue (*Penstemon albomarginatus*) – BLM S, NNHP AR, NNPS T

The Proposed Project area is in the middle of habitat mapped as ―medium intensity" and ―high intensity" white-margined beardtongue (*Penstemon albomarginatus*) habitat (BLM 2008). The habitat model uses meteorological, habitat, and sediment/soil conditions to predict occurrence of this species. This perennial herb blooms from March through August. This species is found in Nevada from Clark and Nye counties. Blooms March through August in Mojavean desert scrub and stabilized desert dunes from 2,100 to 5,890 feet. The nearest recorded occurrence is a NNHP record from 1997, located approximately 2 miles north of the Proposed Project area (Sycamore Environmental Consultants, Inc. 2009). The Mojave creosote bush-white bursage (burro-weed) desert scrub in the Proposed Project area provides habitat for this species.

Yellow Twotone Beardtongue (*Penstemon bicolor* ssp. *bicolor*) – BLM S, NNHP AR

The yellow twotone beardtongue (*Penstemon bicolor* ssp. *bicolor*) is a perennial herb that blooms from April through May. This species is found in Clark County, Nevada on calcareous or carbonate soils in washes, roadsides, rock crevices, outcrops, or similar places receiving enhanced runoff in creosote-bursage, blackbrush, mixed-shrub, and lower juniper communities from 2,500 to 5,480 feet. The nearest recorded occurrence of the yellow twotone beardtongue is a NNHP record from 1979, located approximately 8.7 miles northeast of the Proposed Project area (Sycamore Environmental Consultants, Inc. 2009). The Mojave creosote bush-white bursage (burro-weed) desert scrub in the Proposed Project area provides habitat for this species.

Rosy Twotone Beardtongue (*Penstemon bicolor* ssp. *roseus*) – BLM S, NNHP AR

The rosy twotone beardtongue is a perennial herb known in Nevada from Clark and Nye counties. This species is found on rocky, calcareous, granitic, or volcanic soils in washes, roadsides, scree at outcrop bases, rock crevices, or similar places receiving enhanced runoff in the creosote-bursage, blackbrush, mixed-shrub, Joshua tree woodland, and Mojavean desert scrub from 1,800 to 4,839 feet. The nearest recorded occurrence of the rosy twotone beardtongue is a NNHP record from 1969, located approximately 8 miles northeast of the Proposed Project area (Sycamore Environmental Consultants, Inc. 2009). The Mojave creosote bush-white bursage (burro-weed) desert scrub in the Proposed Project area provides habitat for this species.

Aven Nelson Phacelia (*Phacelia anelsonii*) – NNHP W, NNPS M

The Aven Nelson phacelia (*Phacelia anelsonii*) is an annual herb that blooms from April through May. This species is found in Nevada from Clark, Nye, and Lincoln counties in Joshua tree woodland and pinyon and juniper woodland from 3,940 to 5,020 feet. The nearest recorded occurrence of the Aven Nelson phacelia is a NNHP record from 1998, located approximately 9.4 miles southeast of the Proposed Project area (Sycamore Environmental Consultants, Inc. 2009). The Mojave creosote bush-white bursage (burro-weed) desert scrub in the Proposed Project area provides habitat for this species. This species is typically found in Joshua tree woodland and pinyon and juniper woodland which do not occur in the Proposed Project area. However, the Southwest Environmental Information Network (SEINet) has herbarium records of this species occurring in non-Joshua tree woodland and pinyon and juniper woodland habitats.

3.6.3.2 Reptiles

Desert Tortoise (*Gopherus Agassizii*) – FT, NRS 501, MSHCP

The Mojave population of the desert tortoise is listed as threatened under the ESA (Federal Register 1990) and is also a BLM sensitive species and a State of Nevada protected species. The *Recovery Plan for the Mojave Population of the Desert Tortoise* (USFWS 1994) and the *Draft Revised Recovery Plan for the Mojave Population of the Desert Tortoise* (USFWS 2008) define critical habitat areas for the desert tortoise and establish DWMAs that the BLM manages as ACECs. The entire Proposed Project site is located in habitat for the desert tortoise; however, the project is not located within the boundaries of any critical habitat area or DWMA/ACEC (USFWS 2008). These habitats also are likely to provide the preferred food sources for tortoises, such as perennial grasses, woody perennials, and cacti, as well as non-native species such as red brome (*Bromus rubens*) and redstem filaree (*Erodium cicutarium*) (USFWS 2008b). The

Proposed Project is located approximately 1 mile north of the Ivanpah Critical Habitat Unit in California, and over 10 miles west of the Piute-Eldorado Critical Habitat Unit in Nevada. The Ivanpah DWMA/ACEC is located immediately southwest of the Proposed Project area, over the state line; however, any relocated tortoises could not be moved to California. The Piute-Eldorado Valley DWMA/ACEC is located several miles to the southeast of the Proposed Project in Nevada. The entire western side of the Proposed Project site is within the congressionally-defined Airport Environs Overlay District and may not be available for tortoise relocation.

In the Mojave Desert, tortoises most commonly occur on gently sloping terrain with sandy gravel soils and where there is sparse cover of low-growing shrubs, which allows establishment of herbaceous plants. Soils must be friable enough for digging of burrows and must have enough structural integrity to prevent collapse of the burrows. Typical habitat for the desert tortoise in the Mojave Desert has been characterized as creosote bush (*Larrea tridentata*) scrub, often mixed with cacti, yucca, and other drought resistant shrubs, such as saltbush (*Atriplex spp.*). These habitats tend to have a relatively high diversity of perennial plants, and average annual precipitation ranges from 2 to 8 inches (USFWS 2008c). All areas of the Proposed Project fall into this habitat type and, thus, all areas of the project are considered desert tortoise habitat. Desert tortoises generally occur at elevations from below msl in Death Valley, California, to 5,000 feet at Yucca Mountain, Nevada; however, presence at elevations up to 7,300 feet has been reported (USFWS 2008c). The Proposed Project area ranges in elevation from 2,600 feet to 3,500 feet.

The Proposed Project area contains good to excellent quality desert tortoise habitat due to its location within the Ivanpah Valley. Desert tortoise is distributed throughout the Ivanpah Valley with the exception of the dry lakes and developed areas. The non-lakebed portion of the Ivanpah Valley area is excellent quality tortoise habitat with some of the highest population densities in the East Mojave, while the North Ivanpah Valley area is quantified as good quality tortoise habitat (BLM 2002). The Proposed Project area is within the Northeastern Mohave Recovery Unit, one of six designated evolutionarily significant units within the range of the tortoise (USFWS 1994). When the 1994 Recovery Plan was being issued, some of the highest known tortoise densities were in southern Ivanpah Valley, with 200 to 250 adults per square mile (USFWS 1994).

The USFWS and the BLM were consulted prior to initiating desert tortoise surveys in October 2008. A team of two experienced, qualified desert tortoise biologists (Sundance Biology, Inc.) conducted modified TRED sampling configurations to survey transects 1.5 miles in length and 30 feet in width (Boland and Vaughn 2009). The use of a TRED sampling methodology was determined to be used because the timing of the surveys occurred within the transition period between the 1992 and 2009 survey protocols. In total, 39 transects were surveyed over 17 different sections (1 mile x 1 mile blocks) located within or adjacent to the Proposed Project area. Desert tortoise calibration surveys were not required for the surveyors because calibration plots are unavailable in the state of Nevada. Thirteen sections were surveyed in October 2008 and the remaining five were surveyed in August 2009. In general, all areas of the Proposed Project were surveyed with nearby transects. The survey methodology utilized in 2009 is not consistent with 2009 USFWS guidance for desert tortoise surveys; however, because the initial surveys were conducted in 2008, and in an effort to maintain consistency between survey years, these survey techniques were approved and recommended by both the USFWS and the BLM.

Desert tortoises were present within the Proposed Project area and this species has a high potential to be present in all areas of the project. Secondary evidence of desert tortoise presence (e.g., burrows, excrement, tracks, shell remains, etc.) was observed in all surveyed sections except for T.27S., R.59E., Section 12 towards the northeast portion of the Proposed Project area. Four live tortoises were detected during surveys; one in a wash bank burrow in T.27S., R.59E., Section 11, approximately 1 mile east of the existing power station, and three were found in a burrow (one tortoise) and rock (caliche) cave (two tortoises) in T.27S., R.59E., Section 25, towards the far southeast portion of the Proposed Project area. The burrow located in T.27S., R.59E., Section 11 lies within the proposed solar array footprint, while the burrow and caliche cave located in Section 25 likely lies within the storm water facility footprint. The nature and amount of secondary evidence of desert tortoise presence that was detected across all areas of the Proposed Project indicate that tortoises are likely present in all areas of the Proposed Project. Although no desert tortoises or desert tortoise signs of any kind were detected in T.27S., R.59E., Section 12, the presence of a live tortoise, as well as burrows, shell remains, and excrement in adjacent sections indicates that presence should be anticipated in this section, as well. The desert tortoise survey report uses calibration values from past projects to estimate tortoise densities of less than or equal to 20 per square mile in 12 sections within the Proposed Project area, and tortoise densities of 20 to 50 per square mile for six sections within the project area.

Using these results, the estimated number of desert tortoises to be displaced within the fenced solar array area was calculated. These calculations yield an estimate of 88 tortoises using the midrange of the density estimates. Using the low and high range of density estimates, tortoise numbers could range from 42 individuals on the low end to 123 individuals on the high end. It is reasonable to assume, on average, the mid-range estimates are sufficiently accurate for planning and permitting purposes. The midrange calculations used 10 tortoises per square mile for the areas in which there were zero to 20 tortoises estimated, and 35 tortoises per square mile for the areas in which there were 20 to 50 tortoises estimated. As a whole, tortoise densities within the Proposed Project area are described as moderate.

Gila Monster (*Heloderma suspectum)* – BLM, S4, NRS 501

The Gila monster (*Heloderma suspectum)* occurs from southern Nevada and extreme southwestern Utah, west to southern California, through Arizona, to northern Sinaloa, Mexico (Beck 2005, Stebbins 2003). Gila monsters occur in the Sonoran and Mojave Deserts. In the United States, the Gila monster generally occurs as a peripheral species in California, Nevada, Utah, and New Mexico, with the bulk of its range in Arizona. Gila monster populations in California are not currently faced with any immediate threat, but their numbers are very low, with only 26 credible records from four counties in the past 153 years (Beaman and Lovich 2007). In Nevada, the species occurs in Clark, Lincoln, and Nye counties (NNHP 2004).

Gila monsters prefer undulating rocky foothills, bajadas, and canyons, and tend to avoid open sandy plains (Beck 2005). Brown and Carmony (1991) indicate that rough, rocky country is an important component of Gila monster habitat. Habitat of this type provides many opportunities for crevices under rocks and similar structures that can be used for winter hibernacula and/or summer dens. Trees and shrubbery are an important part of Gila monster habitat in providing shade and cover, but also in supporting larger populations of prey species.

Gila monsters utilize dry washes and their edges, as well as mesquite thickets for foraging. Gila monsters use a ―search and dig" strategy to forage for nests, and have a varied diet that includes newborn rodents and rabbits, lizards, ground-nesting birds, carrion, and eggs from birds and reptiles (Beck 2005, Ivanyi *et al.* 2000, Lowe *et al.* 1986). The daily timing of Gila monster activities varies according to season and locality, and generally shows a bimodal pattern (Beck 2005). Estimates for the amount of surface activity are low, and in some locations they may spend up to 98 percent of their time in burrows (Brown and Carmony 1991, Ivanyi *et al.* 2000). However, recent telemetry studies indicate that Gila monsters move much more than expected when they are active (Beck 2005). Home range estimates vary from an average of 86 acres in Utah to 159 acres in Nevada (Beck 2005).

With respect to the Proposed Project area, the closest suitable Gila monster habitat occurs in the rougher terrains on mountain slopes, and rocky canyons and ravines associated with the McCullough and Clark Mountains. Though the Proposed Project area lacks the preferred habitat of the Gila monster, there is the potential for the rare occurrence of this species due to the proximity of the project to the McCullough Mountains.

Chuckwalla (*Sauromalus ater*) – BLM

The chuckwalla is restricted to rocky areas in desert flats, hillsides, and mountains where crevices are available for shelter (Brennan and Holycross 2006). Creosote bush is common throughout this lizard‘s range (Stebbins 2003). Chuckwallas are primarily herbivorous, eating a variety of desert annuals and perennials, but they occasionally eat insects (Brennan and Holycross 2006, Sherburn 1972, Stebbins 2003). The common chuckwalla is widely distributed across western Arizona, southern Nevada, southeastern California, Baja California, and northwestern Sonora.

The chuckwalla is likely to occur anywhere in the Proposed Project area where suitable rocky habitat is present and there is historical sighting of this species in close proximity to the project area in 2000 (NDOW 2009).

Western Banded Gecko (*Coleonyx variegatus*) – MSHCP

With its soft, pliable skin, the western banded gecko (*Coleonyx variegatus*) would seem poorly suited to life in extremely arid situations, but its nocturnal and subterranean habits allow it to thrive in arid environments such as creosote bush desert and desert scrub habitats (Stebbins 2003). This gecko feeds on a variety of arthropods, primarily insects (Degenhardt *et al.* 1996, Stebbins 2003). The western banded gecko is very likely present within the Proposed Project area, and because of its habitat flexibility regarding acceptable soil types and elevation, it could be present anywhere (Degenhardt *et al.* 1996).

Desert Iguana (*Dipsosaurus dorsalis*) – MSHCP

The desert iguana is primarily an inhabitant of creosote bush habitat, where it is often active in the heat of the day. Creosote bush provides shelter from heat and predators, and its flowers are a staple in the diet of the desert iguana. The desert iguana is primarily herbivorous and often accesses food materials by climbing up into creosote bushes or other vegetation. This iguana will also eat insects and carrion (Ivanyi *et al.* 2000, Stebbins 2003). The desert iguana is likely to be present within the Proposed Project area, particularly in creosote bush habitat. The species

was documented within the Proposed Project area and in close proximity to the Proposed Project's boundary.

Black Collared Lizard (*Crotaphytus insularis*) – MSHCP

The black collared lizard (*Crotaphytus insularis*) tends to prefer rocky habitat with generally sparse vegetation, but has been recorded in less rocky areas. This lizard primarily eats insects, but will take other lizard species and some plant materials (Stebbins 2003). Even though the Proposed Project area lacks this species' preferred habitat, there is the potential for the rare occurrence of this species due to the proximity of the project to the McCullough Mountains.

Long-Nosed Leopard Lizard (*Gambelia wislizenii*) – MSHCP

The long-nosed leopard lizard (*Gambelia wislizenii*) is a rather large lizard (3.25 to 5.75 inches) that can be quite variable in coloration. This lizard prefers mostly open country, and will occur on a variety of substrates and in many vegetation communities such as creosote bush, sagebrush (*Artemisia* spp.), or other low scattered plant groupings (Stebbins 2003). It may occur in rocky areas, but the presence of rocks is not a requirement for the species (Degenhardt *et al.* 1996). The long-nosed leopard lizard consumes some plant materials but also eats a variety of prey including insects, lizards, and snakes. Because of its large size, it is even capable of taking small rodents (Degenhardt *et al.* 1996, Stebbins 2003). The long-nosed leopard lizard is likely to be present almost anywhere within the Proposed Project area.

Western Leaf-Nosed Snake (*Phyllorhynchus decurtatus*) – MSHCP

The western leaf-nosed snake (*Phyllorhynchus decurtatus*) is common in creosote bush desert, but is not often observed. These snakes seldom exceed 20 inches in length, and have an enlarged rostrum that aids in digging. The western leaf-nosed snake occurs in desert scrub habitat, and is typically associated with areas where creosote bush is dominant. Their principal foods are various species of lizards including the western banded gecko (Stebbins 2003). The western leaf-nosed snake is likely to be present within Proposed Project area where creosote bush is the dominant plant.

Glossy Snake (*Arizona elegans*) – MSHCP

The glossy snake (*Arizona elegans*) is found in sparsely vegetated or barren desert, grasslands, or chaparral-covered slopes where it is primarily active at night (Degenhardt *et al.* 1996, Stebbins 2003). While it is an efficient burrower, it readily utilizes burrows of other species or spaces beneath rocks for shelter. The glossy snake is more common at lower elevations, and is often found associated with Western (*Crotalus viridis*) and diamondback (*C. atrox*) rattlesnakes (Degenhardt *et al.* 1996). Glossy snakes primarily eat lizards, but snakes, small mammals and birds are also taken (Degenhardt *et al.* 1996, Stebbins 2003). The glossy snake may be present anywhere within the Proposed Project area.

Common Kingsnake (*Lampropeltis getula*) – MSHCP

The common kingsnake (*Lampropeltis getula*) is present through a wide range of habitats and elevations from sea level to near 7,000 feet (Degenhardt *et al.* 1996, Stebbins 2003). In desert habitats, it uses rock shelters, animal burrows, or manmade structures to escape high temperatures and low humidity (Degenhardt *et al.* 1996). Common kingsnake primarily feed on

other snake species, but also consume lizards, frogs, birds, and eggs of reptiles and birds (Degenhardt *et al.* 1996, Stebbins 2003). The common kingsnake may occur within the Proposed Project area, but their numbers are expected to be low.

Long-Nosed Snake (*Rhinocheilus lecontei*) – MSHCP

The long-nosed snake (*Rhinocheilus lecontei*) is typically a snake of valleys or low rolling hills where grasses or thick vegetation and little rock are present (Degenhardt *et al.* 1996). The primary prey of the long-nosed snake include lizards and small mammals, but they will also take snakes, reptile eggs, insects, and occasionally birds (Degenhardt *et al.* 1996, Stebbins 2003). The long-nosed snake may occur within the Proposed Project area, but their numbers are expected to be low.

Lyre Snake (*Trimorphodon biscutatus*) – MSHCP

The range of the lyre snake (*Trimorphodon biscutatus*) barely extends into southern Nevada. It tends to prefer the steeper slopes and rocky terrain of canyons and arroyos, but may occasionally be encountered on valley floors (Degenhardt *et al.* 1996, Stebbins 2003). The lyre snake may occur in a variety of vegetation types from sea level to almost 8,000 feet elevation (Stebbins 2003), and primarily prey on lizards but also snakes, birds, and small mammals, including bats, which it seeks out in their roosts (Degenhardt *et al.* 1996, Stebbins 2003). The lyre snake may occur within the Proposed Project area, but their numbers are expected to be low.

Speckled Rattlesnake (*Crotalus mitchellii*) – MSHCP

The speckled rattlesnake (*Crotalus mitchellii*) prefers rocky habitats, but may also occur in areas of non-cohesive soils and sandy habitats. The speckled rattlesnake is present in creosote bush, succulent desert, thornscrub, and up into piñon-juniper woodland. This rattlesnake primarily preys on small mammals, birds, and lizards (Stebbins 2003). The speckled rattlesnake is likely to be present anywhere within the Proposed Project area, and is not likely to be restricted to any specific habitat type.

Sidewinder (*Crotalus cerastes*) – MSHCP

The sidewinder (*Crotalus cerastes*) is not a large snake (usually less than 3 feet in length) and is typically found in areas of aeolian sands where plants such as creosote bush or mesquite have developed mounds that support the burrowing rodents that are its main prey. The sidewinder is not restricted to sandy areas, and may occur on hardpan or even rocky hillsides (MacMahon 1985, Stebbins 2003). The "stepped" tracks it leaves in sand are characteristic of its method of locomotion. The principle prey species of the sidewinder are rodents and lizards, but birds may also be taken (Stebbins 2003). The sidewinder is likely to occur in the Proposed Project area where areas of loose sands are present.

Mojave Rattlesnake (*Crotalus scutulatus*) – MSHCP

The Mojave rattlesnake (*Crotalus scutulatus*) is more commonly found in upland desert and the foothills of the mountains in areas with mostly scattered vegetation, often in creosote bush or mesquite habitat, and usually not in very rocky habitat (Degenhardt *et al.* 1996, Stebbins 2003). The Mojave rattlesnake eats mostly small mammals, lizards, snakes, and birds (Stebbins 2003).

The Mojave rattlesnake is likely to be present anywhere within the Proposed Project area except in areas of where loose, sandy soils are prevalent.

3.6.3.3 Mammals

Desert Bighorn Sheep (*Ovis canadensis nelson*) – BLM, S3

Desert bighorn are creatures of rugged, open, mountainous terrain where adequate forage, water, and escape terrain are available. Steep slopes and cliffs are used to escape from predators. The subspecies of desert bighorn sheep that occurs in the Southwest desert regions of the United States is Nelson's bighorn sheep. The Nelson subspecies has become well-adapted to the desert mountain environment; they are typically found in small bands with little or no permanent water, although they do require access to surface water (e.g., guzzlers [man-made water source]) (Wehausen 2006). Their diet consists of grasses, forbs, and sedges. Mating may take place at anytime in the desert if climatic conditions are suitable. The gestation period is about 180 days. Decline of the species can be contributed to degradation of their habitat due to development, road-building, water-management practices, and recreational activities. The bighorns are also highly susceptible to various diseases, sometimes passed on to them by domestic sheep, and are often preyed upon by mountain lions, coyotes, and less likely by domestic dogs, as their occurrence in the Proposed Project area would be extremely rare. Predation by mountain lion has been documented to be high in the Clark Mountains (Wehausen 2006). Drought-induced mortality can also occur if edible food sources decline or if there is competition for surface water with humans and other large mammals (e.g., cattle or burros). The sheep is classified by NDOW as a Big Game mammal, and annual hunting seasons allow for a very limited take.

The Proposed Project area does not contain the preferred habitat of the desert bighorn sheep. The closest preferred habitat is the McCullough and Highland Mountains in Nevada and the Spring Mountains and Clark Mountains in California. Within the McCullough range are bighorn special use areas (i.e., lambing areas and summer grounds) that are of concern to wildlife and land managers. The closest range to the Proposed Project, the Lucy Gray Mountain Range, is historically unoccupied by desert bighorn sheep (BLM GIS). Due to the location of the Proposed Project, desert bighorn sheep may use the Proposed Project site during their migration between these ranges; however, occurrence is expected to be rare.

Wild Burros (*Equus asinus*) – WHBA

The wild burro (*Equus asinus*) receives protection under the 1971 federal Wild Free-Roaming Horses and Burros Act. The act protects wild horses and burros within designated lands administered by the United States Forest Service (USFS) and the BLM. The rationale is to maintain populations of these animals in ecological balance within the designated areas. The species is not listed as threatened or endangered by the USFWS (ESA) or the State of Nevada. The genus Equus evolved in North America contemporaneously with grassland habitats and only later expanded to South America and Europe. Current wild horse and burro populations are descendants of domestic animals that were used during the ranching, mining, and settlement periods. Wild burros are found in the Red Rock Herd Management Area northwest of the Proposed Project area but, due to geographic barriers and the distance, it is unlikely that the animals would travel between the Red Rock Herd Management Area and Project area. There is

the potential for the occurrence of wild burro within the Proposed Project area, but their occurrence is expected to be rare.

American Badger (*Taxidea taxus*) – BLM, S4

The American badger is frequently found on the flats and alluvial fans next to desert mountains (Hoffmeister 1986). American badgers occupy a diversity of habitats, particularly with the following elements: sufficient food (e.g., small mammals and burrowing rodents), friable soils, and relatively open uncultivated land. This species will also eat mice, woodrats (*Neotoma* spp.), reptiles, birds and their eggs, and bees and other insects (California Department of Fish and Game [CDFG] 1986). Badgers are likely to occur within the Proposed Project area, especially in areas characterized by a greater plant species diversity and cover that provide habitat for prey species.

California Leaf-Nosed Bat (*Macrotus californicus*) – BLM, ART

The California leaf-nosed bat (*Macrotus californicus*) is primarily a resident of caves and mines in desert scrub habitat, generally below 3,280 feet in elevation (Hoffmeister 1986, Western Bat Working Group [WBWG] 2005). These bats utilize a variety of night roosts, such as open buildings, porches, bridges, rock shelters, and mines (Harvey *et al.* 1999). The California leaf-nosed bat feeds on large night-flying and terrestrial insects, and sometimes fruit, including those of cacti (Hoffmeister 1986). There is evidence that the California leaf-nosed bat may utilize the same roost throughout its life (Brown *et al.* 1993). These bats do not forage far from their roosts. Approximately 20 maternity colonies, and fewer than 20 winter roost sites, all located in mines, are known in California, mostly in mountains bordering the Colorado River Basin (Brown *et al.* 1993). Threats to this species include mine closures, vegetation removal, vandalism at roosts, and prolonged exposure to low temperatures (Brown *et al.* 1993).

The Proposed Project is within the generally accepted range of the California leaf-nosed bat (Barbour and Davis 1969, Bat Conservation International [BCI] 2008, Harvey *et al.* 1999, National Museum of Natural History [NMNH] 2008), and the species could occur in the vicinity where suitable mine or cave roost habitat is present. There is very little evidence of historic mining on Clark Mountain, Sheep Mountain, in the Lucy Gray Mountains, or in the north McCullough Pass area. Mine adits or shafts suitable for bat roosts are unlikely to be present in these areas. Large solution pockets or small caves on Sheep Mountain and eroded pockets in igneous strata in the Lucy Gray and McCullough Mountains could support small numbers of roosting bats if the voids are of adequate depth to maintain the proper roost temperature range required. This bat species would be most likely to occur within the Proposed Project limits during nocturnal foraging activity.

California Myotis(*Myotis californicus*) – BLM, ART

The California myotis (*Myotis californicus*) roosts in a variety of habitats including rock crevices, under loose bark and within holes in trees, in buildings, and occasionally in caves or mines (Harvey *et al.* 1999, Hoffmeister 1986). They are primarily residents of desert scrub habitats, but do go as high as the lower edge of conifer zones, though rarely above 6,000 feet. In all situations in the southwestern deserts, they usually occur near a water source, often in rocky riparian canyons (Barbour and Davis 1969, Hoffmeister 1986).

Though the Proposed Project area lacks the preferred roosting habitat of the California myotis, there is the potential for the rare occurrence of this species due to the proximity of the Proposed Project to suitable roosting sites within the general area. This species would be most likely to occur within the Proposed Project limits during nocturnal foraging activity.

Townsend's Big-Eared Bat (*Plecotus townsendii*) – BLM, ART

Townsend's big-eared bat (*Plecotus townsendii*) occurs throughout the western United States west of the Great Plains, north into British Columbia, and south to Oaxaca in Mexico (BCI 2008, Harvey *et al.* 1999). The pale Townsend's Big-eared Bat (*P. t. pallescens*) is restricted to the desert southwest (Barbour and Davis 1969) and is the subspecies that would occur within the Proposed Project vicinity. Pale Townsend's big-eared bats normally roost in mines or caves, and they typically return to the same roosts each year (Harvey *et al.* 1999). It is probably the bat species most frequently encountered in caves and mines in the western United States (Barbour and Davis 1969). The pale Townsend's big-eared bat is found from low desert up into coniferous forest (Hoffmeister 1986). The pale Townsend's big-eared bat prefers moths to other prey (WBWG 2005).

Townsend's big-eared bat would be likely to use similar habitats that the California leaf-nosed bat would find attractive, and would be most likely to occur within the Proposed Project limits during nocturnal foraging activity.

Big Free-Tailed Bat (*Nyctinomops macrotis*) – BLM, ART

The big free-tailed bat (*Nyctinomops macrotis*) is found from the southwestern United States, as far north as central Utah and Colorado, south to northern South America, and east to the Caribbean (Harvey *et al.* 1999, Hoffmeister 1986). The big free-tailed bat is probably at the northern limit of its normal range in the southwestern United States (Harvey *et al.* 1999). The big free-tailed bat is apparently uncommon within its range in the United States in general, but may be locally common, and records for this species are often of individual bats from widespread locations (Barbour and Davis 1969). Maternity colonies are known in the United States from Arizona, New Mexico, and from Big Bend National Park on the Rio Grande River, in Texas (Hoffmeister 1986, Schmidly 1991). The big free-tailed bat roosts among rocky, usually high cliffs in crevices, rock shelters, under slabs of rock, and occasionally in buildings (Harvey *et al.* 1999, Hoffmeister 1986).

The big free-tailed bat could use natural bedrock cavities or fractures in cliffs in the north McCullough Pass area, or in the Lucy Gray Mountains, or on Sheep Mountain. Their presence within the Proposed Project area would likely be limited to nocturnal foraging activities.

3.6.3.4 Birds

The Proposed Project area provides foraging and nesting habitat for bird species, including raptors. Bird nesting could occur within vegetation (particularly shrubby plants and cacti species), in ground burrows, in cliffs and crevices associated with surrounding mountain ranges, and potentially on Proposed Project facilities (e.g. existing poles and towers). In the Proposed Project vicinity, the avian nesting season for most species is from late February to early July. There is a general lack of natural potential roosting and nesting habitat for raptors along most of the Proposed Project area. There is some potential nesting habitat in the Clark Mountains near

the Mountain Pass Substation where there are rocky cliffs and a few piñon pine, and potential nesting habitat in the north McCullough Pass area where there is rocky terrain that might support cliff nesting species. Electrical transmission line lattice towers probably provide most of the potential raptor nesting habitat in the area.

Golden Eagle (*Aquila chrysaetos*) – BLM, FPS

The golden eagle is relatively common in the western United States and can be found in a variety of habitats, but prefers open ground or low hills where visibility is good for hunting (Ehrlich *et al.* 1988, Glinski 1998). They nest on cliffs, large or small trees, and sometimes telephone poles (Glinski 1998). The golden eagle primarily feeds on mammals, preferring rabbits (*Lepus* spp.) and ground squirrels, but also will feed on snakes, birds, and large insects when mammals are unavailable (Ehrlich *et al.* 1988, Glinski 1998, Terres 1980).

Suitable nesting habitat for the golden eagle is present in the Clark Mountains (to the west of the Proposed Project), but primarily in rockier areas at higher elevations, and not within the Proposed Project area. There is also potential for golden eagles nesting in the upper elevations of the McCullough Mountains, and there is a probable nesting record for the Highland Mountains (Floyd *et al.* 2007). The Proposed Project, as a whole, is quite open, and provides suitable hunting habitat for the golden eagle.

Burrowing Owl (*Athene cunicularia*) – BLM, NRS 501

Burrowing owls (*Athene cunicularia*) use a variety of habitat types, including shortgrass prairie, open scrublands of mesquite (*Prosopis* spp.), creosote bush, or rabbit brush (*Chrysothamnus* spp.), agricultural fields, airports, and golf courses (Terres 1980, Ehrlich *et al.* 1988, Dechant *et al.* 1999). In desert areas, habitat is typically treeless, open, and relatively level. Burrowing owls often select burrows where surrounding vegetation is kept short by grazing, dry conditions, or burning (Hjertaas *et al.* 1995, Dechant *et al.* 1999). The burrowing owl is unique among North American owls, as this species nest in burrows in the ground. They are semi-colonial and usually occupy burrows excavated by small mammals, often at the edges of active colonies of ground squirrels. In areas that lack colonial burrowing mammals, burrowing owls will use excavations made by other animals such as badgers, skunks, foxes, armadillos, coyotes, and tortoises. They may also use natural cavities in rocks and openings in man-made structures. In addition to the nest burrow, they may also use several satellite burrows as protection from predators and parasites (Dechant *et al.* 1999). Burrowing owls in the western United States do not dig their own burrows and, thus, the presence of burrowing animals is a critical element of their habitat.

Burrowing owls are opportunistic feeders, preying on a variety of arthropods and small vertebrates (Dechant *et al.* 1999, Hjertaas *et al.* 1995). They may forage during the day or night, but tend to forage closer to the nest during the day. Foraging habitat requirements are variable, depending on prey availability and abundance.

The burrowing owl is likely to occur within the Proposed Project area as there is suitable habitat is present, particularly where animal burrows, especially those of desert tortoise, are present.

LeConte's Thrasher (*Toxostoma lecontei*) – BLM

LeConte's thrasher (*Toxostoma lecontei*) is very sparsely distributed in southern California, western Arizona, southern Nevada, and extreme southwestern Utah (Schram 1998). It is generally restricted to the lowest, hottest, and most barren desert plains, particularly in saltbush and creosote bush habitats (Terres 1980). LeConte's thrashers primarily feed on large insects and other terrestrial invertebrates, and they occasionally eat lizards, other vertebrates, seeds, or fruit (Dobkin and Granholm 2005, Ehrlich *et al.* 1988). Populations of this species are very sparse, with densities in optimum habitat of five pairs or fewer per square mile (Remsen 1978). This species is very secretive and sensitive to human disturbance. Specific threats include off-highway vehicle (OHV) activity and clearing of shrubs for agriculture or other development.

Within the Proposed Project area, LeConte's thrashers are likely to occur in areas where vegetation is sparse and where chollas provide suitable nesting sites.

Peregrine Falcon (*Falco peregrinus*) – BLM, NRS 501, MSHCP

Peregrine falcons (*Falco peregrinus*) inhabit open wetlands near cliffs and they can also be found living in cities with tall buildings or bridges (National Geographic Society [NGS] 2002). General breeding habitat for this species includes open areas from tundra, savanna, and seacoasts, to high mountains, as well as open forest and tall buildings (Ehrlich *et al.* 1988). Their diet is solely comprised of birds, which they catch in mid-air (Phillips *et al.* 1964). They primarily eat doves and pigeons, but also waterfowl, shorebirds, and passerines (Ehrlich *et al.* 1992).

The Peregrine falcon is known to occur in the McCullough Mountains, and it is possible that the species breeds there (Floyd *et al.* 2007). The Proposed Project, as a whole, is quite open, and provides suitable hunting habitat for the peregrine falcon.

Prairie Falcon (*Falco mexicanus*) – BLM

The prairie falcon (*Falco mexicanus*) is typically found in very open habitats in perennial grasslands, rangeland, and light agricultural areas, but is present in the southeast deserts in California as well (Dawson 1998, Wheeler 2003). The prairie falcon is known to nest almost exclusively on sheltered cliffs. The nests are usually on a rock ledge that is overhung, or in a crack, and the nest always faces open habitat (Ehrlich *et al.* 1988, Steenhof 1998, Wheeler 2003). However, there are a few records of these birds nesting in earthen embankments (Ehrlich *et al.* 1988). While they may nest near riparian areas, they do not require the presence of water (Wheeler 2003). They do not construct their own nest, but utilize an old avian nest or scrape together soil, rocks, and sticks to construct their eyrie (Dawson 1998, Wheeler 2003). The eyries may be reused annually for many years (Wheeler 2003).

The Prairie Falcon is suspected to occur in the vicinity of the McCullough Mountains, but there are no records of the species breeding in the range (Floyd *et al.* 2007). Similar to the peregrine falcon, the prairie falcon may use the Proposed Project area as hunting habitat.

Phainopepla (*Phainopepla nitens*) – BLM, NRS 501, MSHCP

The phainopepla (*Phainopepla nitens*) is a member of the silky-flycatcher family, Ptilogonatidae, a primarily tropical family of birds. The phainopepla feeds on a variety of berries and insects. In desert scrub habitats, mesquite mistletoe (*Phoradendron californicum*) berries are an important food source, and are an attractant to the species. In other areas, they feed on juniper (*Juniperus* spp.), elderberry (*Sambucus* spp.), grape (*Vitis* spp.), buckthorn (*Rhamnus* spp.), Russian olive (*Elaeagnus angustifolia* L.), and other berries. They forage for insects in typical flycatcher fashion, repeatedly launching out from a high perch to retrieve an insect and returning to the perch (Chu and Walsberg 1999, NatureServe 2008).

The phainopepla typically nests twice a year, but occasionally three broods are produced (NatureServe 2008). The first nest of the year is produced in low desert scrub or mesquite (*Prosopis* spp.) habitat. As the warmer weather approaches, the phainopepla moves to higher elevations into piñon-juniper or oak (*Quercus* spp.) forest where it will nest a second time. Nests are constructed mostly by the male and are usually in a tree or occasionally in a shrub (Chu and Walsberg 1999, NatureServe 2008). The phainopepla is a confirmed breeding species in the McCullough Mountains (Floyd *et al.* 2007). The phainopepla may occur within the Proposed Project area, especially during the early spring, but their numbers are expected to be low.

Loggerhead Shrike (*Lanius ludovicianus*) – BLM

The loggerhead shrike (*Lanius ludovicianus*) is widely distributed across the United States. It is found in a variety of habitats which generally include open country, thinly wooded or shrubby areas with clearings, meadows, pastures, old orchards, and thickets along roadsides (Terres 1980). Loggerhead shrikes primarily feed on large insects, but they frequently eat small birds, mice, lizards, amphibians, carrion, and other invertebrates (Ehrlich *et al.* 1988). Populations of this species appear to be declining almost everywhere throughout its range, with the probable causes being habitat loss and pesticides (Ehrlich *et al.* 1988). The loggerhead shrike is relatively common in the lower elevations of southern California, including deserts, foothills, the Salton Sea, and the Colorado River (Schram 1998). The loggerhead shrike is a resident throughout the state of Nevada (Floyd *et al.* 2007) and likely to occur within the Proposed Project area.

3.6.4 Invasive Plants

Invasive plants and noxious weeds are managed on public lands by the BLM under the direction of the National Invasive Species Council (NISC) established in 1999 (Executive Order [EO] 13112). This statute defines invasive species as — …an alien (non-native) species whose introduction does, or is likely to cause, economic or environmental harm or harm to human health" (NISC 2008). In addition, much of the management of invasive plants and the listing of noxious weeds is regulated by the USDA under the Federal Noxious Weed Act (7 U.S.C. 2801 et seq. 1974). Invasive weeds are defined for this report as species of non-native plants that are included on the USDA weed lists for Nevada (USDA 2009), as well as those plant species identified by the BLM in their Las Vegas Field Office Noxious Weed Plan (BLM 2006).

Invasive plant species have been introduced into an environment similar to their native environment, but often without their natural predators or inter-species competition that would limit their reproduction and distribution. As such, these species often out-compete native plants and/or simply replace native plant species after disturbance. Invasive species can reduce the

productivity of rangelands, forest lands, riparian areas, and wetlands. Eradication of these species is intensive, time-consuming, and costly.

Invasive exotic plant species are known to occur within the Proposed Project area. The special status plant species reconnaissance survey for the Proposed Project did identify three exotic invasives: Russian thistle (*Salsola tragus*), red brome (*Bromus madritensis* ssp. *Rubens*), and Mediterranean grass (*Schismus* sp.) (Sycamore Environmental Consultants, Inc. 2009). In addition, a regional study produced cooperatively between the BLM, USFS, and NPS surveyed BLM lands in southern Clark County and found a wide range of invasive exotic plant species present within the vicinity of the Proposed Project site (Clark County 2009). This study included the Proposed Project area, but did not provide specific location data for each species. However, a total of 25 invasive exotic species were detected on BLM lands during the survey, including 10 grasses and 15 forbes (Clark County 2009):

Invasive Exotic Grasses	**Invasive Exotic Forbes**
Creeping bentgrass (*Agrostis stolonifera*)	Sahara mustard (*Brassica tournefortii*)
Ripgut brome (*Bromus diandrus*)	Blue mustard (*Chorispora tenella*)
Red brome (*Bromus madritensis* ssp. *rubens*)	Red-stem filaree (*Erodium cicutarium*)
Downy brome (B. tectorum)	Jersey cudweed (*Gnaphalium luteoalbum*)
Hare barley (*Hordeum murinum*)	African mustard (*Malcolmia Africana*)
Perennial ryegrass (*Lolium perenne*)	White sweet clover (*Melilotus alba*)
Dallis grass (*Paspalum dilatatum*)	Yellow sweet clover (*Melilotus officinalis*)
Green fountain grass (*Pennisetum setaceum*)	Burr buttercup (*Ranunculus testiculatus*)
Pennisetum grass (*Pennisetum. monspeliensis*)	Russian thistle (*Salsola tragus*)
Common wheat (*Triticum aestivum*)	Tumble mustard (*Sisymbrium altissimum*)
	London rocket (*S. irio*)
	Oriental hedge mustard (*S. orientale*)
	Salt cedar (*Tamarix ramosissima*)
	Common dandelion (*Taraxacum officinale*)

The BLM Las Vegas Resource Management Plan (LVRMP) also identifies the weeds of highest concern in the general area (BLM 1998) including: saltcedar, Sahara mustard, red brome, and filaree (*Erodium* sp.).

The Weed Program of the BLM Southern Nevada District Office expressed concern from threats of new weed introductions (Caplette 2009).

3.6.5 Rangeland Resources

This section identifies existing land use goals, objectives, and policies within and adjacent to the Proposed Project site and discusses applicable regulations.

BLM lands within the Las Vegas Field Office planning area are available for livestock grazing and are divided into 53 grazing allotments (2,867,508 acres) and non-allotted land (689,852 acres) (LVRMP 1998). A grazing allotment is a parcel of BLM public land that a permittee leases from BLM. The permittee develops an agreement with the BLM, called the grazing Allotment Management Plan (AMP), to ensure that land use planning decisions are correctly applied on a site-specific basis. The allotments are located in the Mojave Desert with low precipitation levels, hot summers, and cool winters. Annual precipitation varies from 4 inches to greater than 15 inches depending on elevation (Jean Lake AMP 1998).

The Proposed Project area crosses two grazing allotments within the BLM Las Vegas Field Office planning area—the Jean Lake allotment and the Roach Lake allotment. The Jean Lake allotment has an AMP (1998); the Roach Lake allotment does not. Thus, there is more information available about the existing environment for the Jean Lake allotment than for the Roach Lake allotment.

The season of use on the Jean Lake and the Roach Lake allotments is _ephemeral' and is tied to forage production and the overall ecological health of each allotment. Currently, both allotments are closed to grazing (Johnson 2010). Although neither allotment is within critical habitat for the Mojave desert tortoise (a federally listed threatened species), the closed allotments allow for forage recovery that will benefit livestock, desert tortoises and other wildlife, and that will improve overall ecological health.

3.6.5.1 Regional Setting and Regulatory Framework

Unless otherwise cited, the information in the following section is taken from the LVRMP (1998):

BLM lands in the LVFO planning area are grazed under permitted grazing allotments originally delineated in 1934. In 1969, all grazing allotments in Clark County were designated as ephemeral in response to the Ephemeral Range Rule of 1968. This rule provides a description of rangelands characterized as ephemeral or annual in nature, as well as special rules for administering those ephemeral rangelands (the Ephemeral Range Rule text is in Appendix E of the LVRMP [1998]).

On ephemeral allotments, season of use is contingent on the availability of ephemeral forage—which can vary from year to year. Range inspections are made before grazing is authorized—to determine if adequate forage is available, to see if the potential to produce forage exists, and to measure soil moisture. Permittees must submit applications to graze at regular intervals throughout the year. Permits are granted based on what inspection results reveal about forage availability and rangeland health. In 1997, the Secretary of Interior gave final approval of regulations under 43 Code of Federal Regulations (CFR) 4180, which categorized grazing allotments into three types according to their potential to respond to management. (43 CFR 4100 Standards and Guidelines for Rangeland Health are in Appendix L of the LVRMP [1998]). Type "I" for improve, Type "M" for maintain, and Type "C" for custodial. Type "I" allotments have the highest need and priority for intensive management. Type "M" allotments have satisfactory conditions and management. Type "C" allotments, for a variety of reasons, have low management priority.

Monitoring and evaluation of the effects of livestock grazing occurred on 18 allotments. Only the allotments placed in the "improve" or "maintain" categories, such as Jean Lake, had intensive monitoring studies initiated. Other allotments, including Roach Lake, had minimal to no studies initiated (Jean Lake AMP 1998).

Jean Lake Allotment

Located approximately 30 miles south of Las Vegas, the Jean Lake allotment is east and contiguous to the towns of Jean and Primm, Nevada. It is bounded on the west by I-15. There are two valleys and portions of several mountain ranges in the allotment. On the west side is Roach Lake Valley (the NE end of the Ivanpah Valley) and on the east side, the Jean Lake Valley. The Sheep Mountain and Lucy Gray ranges border the east side of Roach Lake Valley and the west side of Jean Lake Valley. The McCullough Mountain Range is the east border of the allotment and the Jean Lake Valley. The slopes in the valleys vary from level to 30 percent with a majority of the valleys at about 5 to 9 percent slopes. The mountains are oriented in a north/south direction with variable slopes and aspects.

The primary vegetation communities for valleys below 4,000 feet are the white bursage-creosote desert shrub community, the white bursage-big galleta-Indian ricegrass community, the white bursage-winterfat-spiny menodora-big galleta community, the big galleta-bush muhly-Indian ricegrass community, the big galleta-creosote community, and the big galleta-white bursage-spiny menodora community (Jean Lake AMP 1998).

The primary vegetation communities for valleys above 4,000 feet are the blackbrush-Nevada ephedra-Spanish dagger-black grama-big and little galleta community, the blackbrush-Spanish dagger-big and little galleta-black grama community, and the blackbrush-Spanish dagger-black grama-desert needlegrass-big galleta community (Jean Lake AMP 1998).

The vegetation communities in the Sheep, Lucy Gray, and McCullough mountains are variable but best represented by the blackbrush-Nevada ephedra-Spanish dagger-black grama-big and little galleta community, the blackbrush-big and little galleta-black grama community, the blackbrush-buckhorn cholla-Nevada ephedra-black grama-desert needlegrass-big galleta-bush muhly community, the desert needlegrass, big galleta, shadscale white bursage community, the desert needlegrass, big galleta, blackbrush, shadscale, white bursage community, the Utah juniper, blue grama community, the Utah Juniper and Singleleaf Pinyon Woodland community, and the Mexican cliffrose, Utah juniper, blue grama community (Jean Lake AMP 1998).

Prior to the passage of the Federal Land Policy and Management Act (FLPMA) in October 1976 and through March 1, 1992, the season of use on Jean Lake was yearlong with cattle having unlimited access to every part of the allotment for all or during any part of the 12 months of the year. Once designated as ephemeral, the Jean Lake allotment was divided into four historical use areas or pastures (Pastures 1-4) on which to rotate the cattle. Pasture 1 is the area around the Jean Lake playa and well. Pasture 2 is the area around the Black Rock water haul and McClanahan Spring. Pasture 3 was the Roach Lake playa and well. Pasture 4 was the Calada well, the Jean Lake water haul, and all the springs located on the west and south side of the McCullough Mountains. Partial barriers, lack of interior fencing, and a scarcity of water within the four pastures resulted in uneven livestock distribution and areas with heavy to severe use levels and subsequent localized degraded ecological conditions (Jean Lake AMP 1998).

The grazing system set forth in the Jean Lake AMP maintains the historic livestock pasture use areas but introduces:

- Interior pasture fences to delineate pastures;
- Water hauls to more easily distribute and control livestock use;
- A southern boundary fence to keep cattle in the allotment and out of desert tortoise critical habitat;
- An enclosure (approximately 80 acres in size) around a high-density population of white margin penstemon (*Penstemon albomarginatus*) in Pasture 1 to monitor changes to the Nevada BLM state-listed special status species over time;
- Fences around riparian areas to protect them from livestock and OHV use; and
- The AMP identifies:
  - specific utilization levels,
  - and vegetation objectives.

The key species for the Jean Lake allotment include galleta grass (*Hilaria jamesii*), big galleta (*H. rigida*), bush muhly (*Muhlenbergia porteri*), sand dropseed (*Sporobolus cryptandrus*), dropseed species (*Sporobolus* spp.), Indian rice grass (*Oryzopsis hymenoides*), black grama (*Bouteloua eripoda*), desert needlegrass (*Stipa speciosa*), range ratany (*Krameria parvifolia*), ephedra (*Ephedra* spp.), white burrobrush (*Hymenoclea salsola*), white bursage (*Ambrosia dumosa*), and winterfat (*Eurotia lanata*).

As a result of the development of Clark County's Short-Term Habitat Conservation Plan for the Desert Tortoise (1991), six (then active) grazing allotments including Jean Lake, were purchased in cooperation with The Nature Conservancy (TNC) (BLM 1998). The Jean Lake allotment was determined to be in low density tortoise habitat. With the exception of scattered microsites in the Jean Lake allotment, the soils are considered too gravelly, too sandy, too clayey, and subject to occasional flooding—all poor characteristics for tortoise burrowing.

Historic cow camps once used to monitor and manage the livestock operation are located at McClanahan Spring, Willow Spring, and Calada Well. There is an existing cabin at Willow Spring, corrals at Calada Well, and buildings with corrals at McClanahan Spring.

Other resources and uses in the Jean Lake allotment (1998) include:

- The South McCullough Mountains Wilderness Study Area (WSA), comprising approximately 70 percent of Pasture 4. Any action associated with livestock grazing would only be allowed in the WSA if actions were in line with the BLM's Interim Management Policy and Guidelines for Lands Under Wilderness Review and if accompanied by an environmental assessment.
- The designated Clark County Special Recreation Management Area (SRMA)—an area for OHV use is within the allotment. Existing cattle trails in the McCullough Mountains follow the land contour and are often the easiest routes and lead to spring water sources.

Casual use by OHVs and mountain bikes has been documented to negatively impact riparian habitat.

- A major power line corridor crossing through Pastures 2 and 3 with associated maintenance access roads may now also include a pipeline, a fiber-optic right-of-way (ROW), and a high-speed MAG-LEV raised rail transport to Las Vegas located along the valley floor, parallel to the I-15 corridor.
- There are six mineral material sale sites for sand and gravel with numerous inactive filings that can become active. Two existing mill sites and one under construction east of the I-15 frontage road.
- The State of Nevada's Jean Prison is in the northern tip of Pasture 3.
- The grazing permittee on record through 1991 regularly coordinated with the BLM, OHV groups, and mineral site representatives. As a result, they were able to keep the impacts to roads, fences, and developments to a minimum.

Roach Lake Allotment

The Roach Lake allotment was closed in 2000 when Clark County acquired the grazing rights from permittees (Johnson 2010). The Roach Lake AMP either does not exist or is unavailable. It is likely that because the Roach Lake allotment was given low management priority under regulation 43 CFR 4100 that it does not have an AMP with management objectives or associated ecological health monitoring study data like those available in the Jean Lake AMP.

3.6.5.2 Current Conditions and Trends

The largest potential influences of the Proposed Project on the Jean Lake and Roach Lake allotments are forage loss, changes in water availability and distribution for recovering riparian areas, and an delay overall rangeland health recovery. Based on 1998 sources, a status table showing information pertaining to the Jean Lake and Roach Lake allotments is presented as Table 3.6-2.

Table 3.6-2. Status of Allotments Crossed by the Proposed Project Area

Allotment Name/Number	Jean Lake - 15416	Roach Lake - 15421
2010 Status	Closed	Closed
Class (43 CFR 4100)[a]	Improve (I)	Custodial (C)
Operator	TNC/Clark County	Whipple, Davis
Acreage	119,777 (excludes the 21,305 acre desert tortoise management area in the south)[b]	20,752[b]
Elevation Range (feet)[b]	2,624 – 7,026 ft.	
Annual Precipitation (inches)	4 – 15+ in.	

Sources:
[a] LVRMP 1998
[b] Jean Lake AMP 1998

Jean Lake Allotment

The allotment was last grazed in 1995 (Jean Lake AMP 1998). An ecological status survey, used to compare the existing vegetation community air dry weights with the potential natural community for the respective ecological site, was conducted in 1996. The survey found that the approximately 5,500 acres in poor to fair condition are due to historical uneven livestock distribution and associated zones of heavy to severe use. These acreages fall primarily within the valley bottoms, washes, and riparian areas.

A riparian inventory, used to assess each site for proper functioning condition, was conducted in 1996 and 1997. The inventory gave ratings of PFC for proper functioning condition, FAR for functioning at risk, and N/A for riparian rating not applicable.

Although the Jean Lake allotment is not within critical desert tortoise habitat, low density populations of Mojave desert tortoise are present. The white margin penstemon has populations in Pastures 1, 2, and 3.

Bighorn sheep populations exist in the McCullough, Lucy Gray, and Sheep mountain ranges within the allotment. Other wildlife such as mule deer, mountain lion, small mammals, reptiles, various birds, and numerous non-game species also use the springs and other vegetation and water resources.

The major influences of the Proposed Project on the Jean Lake grazing allotment pertain to delayed rehabilitation and re-opening of the allotment. Disturbances such as new infrastructure (buildings and roads) could result in forage loss for cattle, desert tortoises, and other wildlife, and it could result in weed introductions.

Roach Lake Allotment

Management of grazing on the non-AMP allotments (when they are open to grazing) generally occurs through an informal system whereby permittees use the location and availability of water to control the movement of livestock within the allotment. Range improvements such as fences, spring developments, wells, pipelines, and troughs can be owned either by the permittee or the BLM. In many cases, the BLM furnishes materials and the permittee provides labor for construction of projects under a cooperative management agreement. Because the Roach Lake allotment is closed and because it is classified as Type “C,” little to no management or monitoring is occurring. Should the BLM consider re-opening the Roach Lake allotment to grazing, an AMP would need to be developed and would need to include rangeland health assessment data (LVRMP 1998).

3.7 Cultural Resources

This section identifies the cultural resources within the Area of Potential Effect (APE) for cultural resources and discusses applicable regulations. During the scoping period, meetings were conducted with the public and government agencies to identify their concerns. Written comments were also received.

The Proposed Project site and APE are located on an alluvial fan at the base of western slopes of the Lucy Gray Mountains in the Basin and Range physiographic province in southwestern Nevada. The Proposed Project site overlooks the Ivanpah Valley and Ivanpah Dry Lake in California. The sediments contained within the Proposed Project site are noted as Quaternary alluvium deposits that formed as a result of the erosion of the Lucy Gray Mountains. Alluvial fans can be subjected to sediment re-working resulting from periods of intense rainfall. New stream channels are often cut while old channels become filled in and can represent an ever changing landscape.

Alluvial fans can be associated with buried cultural resources deposits. Geologic studies have provided approximate dates for the major depositional episodes of sediment on the fan. Generally speaking, any sediment deposited in the last 14,000 years (end of the Pleistocene and throughout the Holocene geologic periods) may have potentially covered over cultural resources. According to Section 3.3, Geology, Topography, and Geologic Hazards, the alluvial and hydrologic activity on this fan has resulted in continued re-working of the sediments; therefore, the likelihood of sites being found intact below the surface of the fan is low.

The APE is formally within Southern Paiute territory. The Southern Paiute are subdivided into the Chemehuevi, Las Vegas, Moapa, Pahranagat, Gunlock, Saint George, Shivwits, Uinkaret, Cedar, Beaver, Panguitch, Kaibab, Kaiparowits, Antarianunts and the San Juan. The Ivanpah Valley is reported as being important to the Chemehuevi whose range included the eastern Mojave Desert between Baker and the Colorado River, and south to the Parker, Arizona vicinity (White and Lerch 2009). Historic documentation also shows of use of the Proposed Project area by the Mohave. Other adjacent tribes are also known to have passed through the Proposed Project vicinity which has always been used as a north-south travel corridor and is still in use today by I-15 travelers.

3.7.1 Historic Background

Historic activities that had an influence on this Proposed Project area are few. The San Pedro, Los Angeles, and Salt Lake Railroad Company (SP, LA&SL) constructed a railway line from San Pedro, California, to Salt Lake City, Utah, in 1905. This began one of the larger influxes of people into Las Vegas Valley to the north of the Proposed Project area. Smaller communities developed in Nelson, Sandy, Goodsprings, and Searchlight with small, stable, and transient populations involved in mining discoveries. The line was purchased by Union Pacific in 1921 and is still operated by that company (Sander *et al.* 2009). This line crosses the current Proposed Project area along the main proposed access road.

The mountains in the Proposed Project area offer mineral resources that were desirable for early miners. Gold, copper, silver, and lead were available in the region. The first mine in the area was

established in 1869 in the Clark Mountains. Ivanpah Spring became the supply center to service the mine and mills built at Ivanpah by the mid-1870s. In 1898, the Copper World Mine was developed at Rosalie Wells. The mine was in operation until World War I. Mountain Pass was the site of gold and silver finds in 1879. The Mescal Mine was developed in 1882 and was active until 1887. Gold was discovered near Vanderbilt Spring in the New York Mountains in 1891. By 1892, major development began on the Gold, Bronze, and Boomerang mines (Fergusson 2007).

The Lucy Gray Mine is the closest mine to the Proposed Project site. It is located immediately southeast of the Proposed Project area. The mine was opened in 1905 by T.C. Bright and J.W. Seiders to extract what was thought to be a rich gold ore. The mine was active until 1918 with ore from the mine was hauled 3 miles downslope to the Lyons railroad siding. Associated with the mine was a shop, an assay office, and a camp that housed 25 men (White and Lerch 2009).

The construction of Boulder (Hoover) Dam brought more people into southern Nevada and electricity was required. Eighteen transmission lines were constructed in the 1930s, of which three pass through the Proposed Project area. These lines cross 226 miles to San Bernardino, California. The original Hoover Dam transmission line was constructed in 1930 - 1931 over a period of eight months. Once the dam was constructed, the flow of electricity was reversed to provide hydro-electric power to the Los Angeles area. The line is still in use and is currently owned by Southern California Edison (SCE; Sander *et al.* 2009). The two other lines were upgraded in the 1980s. A telegraph line was also constructed by SCE in the 1940s through the Proposed Project area from southern California to Boulder Dam to facilitate communication.

The 1930s saw the legalization of gambling in the state of Nevada. This move helped shape the state‘s economy and increase the population along with the military establishing Nellis Air Force Bas (AFB), Fallon Naval Air Station, and an army base at Tonopah. During Prohibition (1920-1933) a man local to the Proposed Project area, Pete McIntyre (Whiskey Pete), began a lucrative bootlegging operation and owned a local gas station. Pete‘s property was purchased in the 1950s by Ernie Primm. The Primm family was instrumental in the development of the area by the construction and operation of three casinos in the 1970s (White and Lerch 1910). Many off-road motorcycle races have crossed the Proposed Project area from the Primm resort area.

3.7.2 Known Archaeological Resources

A background records search was conducted by Statistical Research, Inc. (SRI) for the Applicant in August 2009. A total of 32 cultural resource sites were documented prior to their field inventory that included the Proposed Project area and a 1-mile buffer around the project. Only five of these sites were within the APE for this Proposed Project to be addressed. The systematic, complete, Class III inventory prepared for this undertaking included 7,967 acres in the APE. Twenty-three new sites were recorded and the five previously known sites were revisited in 2009.

Because the proposed undertaking is located on federally administered lands, the Proposed Project is subject to Section 106 of the National Historic Preservation Act (NHPA), as amended, and its implementing regulations, 36 CFR 800. This body of law requires that identified cultural resources be evaluated for eligibility for inclusion in the National Register of Historic Places (NRHP). According to National Register Bulletin 15 (NPS 1991), to be eligible for listing in the

NRHP, identified cultural resources must have integrity and meet at least one of the four evaluation criteria defined by 36 CFR 60 which reads in part:

> —The quality of significance in American history, architecture, archaeology, engineering, and culture is present in districts, sites, building, structures, and objects that possess integrity of location, design, setting, materials, workmanship, feeling, and association; and
>
> - that are associated with events that have made a significant contribution to the broad patterns of our history; or
> - that are associated with the lives of persons significant in out past; or
> - that embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or
> - that have yielded, or may be likely to yield, information important in prehistory or history."

Fourteen prehistoric lithic scatters and one trail segment (26CK8734 to 26CK8740, 26CK8743 to 26CK8748, 26CK8754, and 26CK8773) have been determined not eligible to the NRHP. Seven historic refuse scatters (26CK8741, 26CK8742, and 26CK8749 to 26CK8753) associated with the construction of either the SP, LA & SL/UP Railroad or the power transmission lines, and one decommissioned telegraph line (26CK8755) have also been determined not eligible to the NRHP.

Two previously recorded and evaluated sites, a short, modified section of the SP, LA &SL/UP railroad (26CK5685), and a short, disturbed section of County Road/Arrowhead Trail (26CK7218) are also not considered eligible.

The three Boulder transmission lines (26CK5180a, b, and c) are not considered part of the Proposed Project APE, as they occupy their own ROWs and would not be affected by the implementation of this project.

Line 26CK5180a has been previously determined eligible and is currently part of a separate project to upgrade the line known as the Eldorado to Ivanpah Transmission Project (EITP) in a separate Environmental Impact Statement (EIS). Removal and upgrade of this line has been determined an adverse effect and will be mitigated by completely documenting the line in the Historic American Engineering Record (HAER).

Only two prehistoric sites (26CK1620/8282 and 26CK2632/8280) in the APE for the access road are considered eligible, as they may be likely to yield information important in prehistory in southern Nevada.

3.7.3 Tribal Consultation

Consultation letters were sent out to six tribes that included the Chemehuevi Tribe, the Colorado River Indian Tribes, Fort Mojave Indian Tribe, Las Vegas Paiute Tribe, Moapa Band of Paiutes, and the Pahrump Paiute Tribe, to inform them of the Proposed Project; and additional correspondence was sent informing them of the public scoping meetings they could attend. The letters and ensuing conversations between the BLM and the tribes resulted in a field meeting to look over some of the previously recorded prehistoric sites within the Proposed Project site. This meeting took place on October 13, 2009, and included members of both the Chemehuevi Indian Tribe and the Moapa Band of Paiutes, BLM staff, and Statistical Research, Inc. representatives that archaeologically inventoried the Proposed Project area.

3.8 Paleontological Resources

This section describes potential impacts on paleontological resources within and adjacent to the Proposed Project site. Additionally, this section discusses applicable regulations governing paleontological resources.

For the purposes of this analysis paleontological resources can be defined as the remains of prehistoric life preserved in the geologic record. These resources include fossilized plant and animal remains, casts or impressions of such remains, and unmineralized remains. Paleontological resources are classified as nonrenewable scientific resources and are protected by several federal and state statutes which are described below.

3.8.1 Existing Paleontological Resources

The following discussion of the existing paleontological resources at the Proposed Project site (which includes the Silver State Solar Project Site, 220 kilovolt [kV] and 230kV transmission lines, proposed access roads, substations, switchyards, and operations and maintenance building) is summarized from the results of the paleontology literature and records review provided by the Applicant (CH2M Hill 2009c). The review includes geological references from the NBMG, including Assessments, Surficial Geologic Maps (Ivanpah Valley Area) and Geology and Mineral Resources (Clark County, Nevada); paleontology literature and records review provided by the San Bernardino County Museum online utilities and the University of California at Berkeley Museum of Paleontology; and other published and unpublished reports containing pertinent information about the geology and paleontological resources regionally, locally, and specifically within the Proposed Project location.

A detailed description and overview of the geology of the Proposed Project site is provided in Section 3.3.2, Existing Conditions – Geologic Setting. The results of the paleontological assessment were measured against the Potential Fossil Yield Classifications (PFYC) system to determine the potential for paleontological resources known to occur in the Proposed Project area. The majority of the Proposed Project site is underlain by Quaternary alluvium which dates from the early Holocene to late Pleistocene geological periods. Quaternary alluvium is classified under the PYFC as having low paleontological potential. Section 3 of the Proposed Project site, near Roach Dry Lake, is underlain by Eolian and playa fringe, classified under the PYFC as having unknown paleontological potential. However, the paleontological assessment (CH2M

Hill 2009) suggests that, although fossil material would not be expected at the surface or up to 10 feet below the surface of Eolian and playa fringe, surviving fossils that may exist at subsurface depths of more than 10 feet would be affected by trenching and excavation from heavy equipment.

3.8.2 Assessment of Paleontological Potential

The PFYC system is used to determine the potential impacts to paleontological resources on BLM administered lands (BLM 2009). It provides the ability to review the geology and attribute a general assumption as to the potential for this type of geology (at the surface) to provide for paleontological resources.

There are five classes, with Class 1 being Very Low Potential and Class 5 being Very High Potential. These are defined by BLM as follows;

- A Class 1 paleo-resource area provides a very low potential for significant paleontological resources.
- A Class 2 paleo-resource area indicates a low potential for significant paleontological resources.
- A Class 3 paleo-resource area is defined as a moderate (3a), or unknown (3b) potential for significant paleontological resources (i.e., [a] the geology is known to have sporadic occurrences of fossils, or [b] there is not adequate information to determine the potential for paleontological resources). Work in both Class 3a and 3b areas may require pre-construction surveys.
- A Class 4 paleo-resource area has a moderate to high potential for significant paleontological resources, but has a varying potential for human or environmental degradation due to the presence or absence of protective covering such as soil or vegetation. Work in Class 4 areas requires pre-construction surveys.

Based on literature reviews and record searches conducted by CH2M Hill in 2009, the Proposed Project area is composed of geology that results in a PFYC of Class 2 and Class 3b. As described above, a paleo-resource area classified as Class 2 is considered to be of low potential for paleontological resources. The Class 2 areas for the Proposed Project site are designated as Quaternary alluvium and this indicates that there is rapid movement of sediment from flowing water, which would likely have carried away any potential paleontological resources. Also, the sediments may be too young to yield fossils of scientific significance.

T.27S., R.59E., Section 3, located in the southern extremity of Roach Dry Lake, is classified as a Class 3b paleo-resource area and is the only area of the Proposed Project that has been identified as having some potential for containing paleontological resources. Based on conclusions from the literature and records review for the Proposed Project no paleontological resources have previously been identified on the surface in this area; however, it is possible that paleontological material could occur at a depth of more than 10 feet.

3.9 Lands and Realty

This section identifies existing land use goals, objectives, and policies within and adjacent to the Proposed Project site and discusses applicable regulations.

The Proposed Project would be located in the northeastern Mojave Desert of southern Nevada approximately 2 miles east of Primm and 40 miles south of Las Vegas, entirely on BLM-administered lands. The land use type throughout the Proposed Project site includes undeveloped desert alluvial valleys, and transmission lines are located in the western portion of the project area. The surrounding land uses to the west include the Walter M. Higgins Power Generating Station, UPRR, and hotels and casinos within Primm, Nevada. The Lucy Gray Mountains are located within the far eastern portion of the Proposed Project site and the California boundary line borders the southern boundary. The Proposed Project site encompasses approximately 7,925 acres and is located in T.27S., R.59E., and Sections 1-3, 11-15, 22-24, N 1/2 Sec. 25, and Secs. 26, and 27 within the Mount Diablo Base and Meridian (USGS State Pass, Roach and Desert 7.5-minute quadrangle).

The Proposed Project would be located near, or cross through, a variety of land use types including a proposed airport, grazing allotments, mining claims, and utility corridors and ROWs for a major natural gas pipeline, a railroad, and an interstate highway. The Proposed Project site is currently open for ROW applications, and the discussion below provides further details about these existing land uses.

3.9.1 Utility Corridors and Rights-of-Way

The Proposed Project site is located next to a utility corridor containing several electrical transmission lines, a major natural gas pipeline, a railroad, and an interstate highway. The Proposed Project would interconnect to both NV Energy‘s Bighorn Substation and SCE‘s proposed EITP, a proposed upgrade to 220 kV of the existing 115-kV transmission line. The interconnections would allow both Nevada and California utilities to purchase renewable energy generated by the Proposed Project. The Applicant is actively marketing the Proposed Project‘s output to utilities in both Nevada and California and will have Power Purchase Agreements (PPAs) in place for the output before it is constructed. Interconnection of the Project to the NV Energy system at the Bighorn Substation and to the California Independent System Operator (CAISO) grid on the EITP transmission line will require entering into an interconnection agreement with each utility (in February 2010, NextLight Renewable Power, LLC signed a power purchase agreement with NV Energy to sell 50 MW of electrical power from the Silver State Solar Project) Interconnection requests have been filed with both NV Energy and CAISO (NextLight 2009).

The majority of BLM ROW grants are authorized by Title V of the FLPMA (43 U.S.C. 1761-1771), and the Mineral Leasing Act (Section 28 of the Mineral Leasing Act of 1920, as amended, 43 U.S.C. 185). A BLM ROW grant authorizes rights and privileges for a specific use of a project on public lands for a specific period of time. Typical ROW uses include roads, pipelines, transmission lines, and communication sites. BLM ROWs are usually granted for a term appropriate for the life of the project (BLM 2009a). Table 3.9-1 includes the existing BLM ROW grants that have been issued within the Proposed Project site.

Table 3.9-1. Existing Rights-of-Way within the Proposed Project Site

Case Number	Township/Range	ROW Type	Status	Expiration
NVCC 018367	T27S, R59E Section 3 (S2NW)	McCullough-Victorville 500 kV Transmission Line	Authorized	Indefinite
NVCC 020824	T27S, R59E Section 3 (4)	Transmission Line	Authorized	Indefinite
NVN 039980	T27S, R59E Section 2 (4)	McCullough-Victorville 500 kV Transmission Line	Authorized	Indefinite
NVN 039980	T27S, R59E Section 3 (SWNE, SW)	McCullough-Victorville 500 kV Transmission Line	Authorized	Indefinite
NVN 039980	T27S, R59E Section 3 (1,2)	McCullough-Victorville 500 kV Transmission Line	Authorized	Indefinite
NVN 074211	T27S, R59E Section 3 (E2W2)	Transmission Line	Authorized	Indefinite
NVN 074211	T27S, R59E Section 3 (1,2)	Transmission Line	Authorized	Indefinite
NVN 074654	T27S, R59E Section 3 (E2W2)	Transmission Line	Authorized	11/14/11
NVN 074654	T27S, R59E Section 3 (1,2)	Transmission Line	Authorized	11/14/11
NVN 082824	T27S, R59E Section 3 (NWNE, SWNE, SENW, SESW, NESW)	Bighorn- Eldorado Interconnection 500 kV Transmission Line	Pending	
NVN 082824	T27S, R59E Section 3 (2)	Bighorn- Eldorado Interconnection 500 kV Transmission Line	Pending	
NVN 082825	T27S, R59E Section 3 (NWNE, SWNE, SENW, NESW, SESW)	Bighorn- Eldorado Interconnection 500 kV Transmission Line	Pending	
NVN 082825	T27S, R59E Section 3 (2)	Bighorn- Eldorado Optical Ground Wire Line	Pending	
NVN 085603	T27S, R59E Section 13 (All)	Solar Thermal Energy Facility Transmission Line	Pending	
NVN 085603	T27S, R59E Section 14 (All)	Solar Thermal Energy Facility Transmission Line	Pending	
NVN 085603	T27S, R59E Section 15 (All)	Solar Thermal Energy Facility Transmission Line	Pending	
NVN 085603	T27S, R59E Section 22 (N2, SE1/4, NE1/4 of SW1/4)	Solar Thermal Energy Facility Transmission Line	Pending	
NVN 085603	T27S, R59E Section 23 (All)	Solar Thermal Energy Facility Transmission Line	Pending	
NVN 085603	T27S, R59E Section 24 (All)	Solar Thermal Energy Facility Transmission Line	Pending	
NVN 085603	T27S, R59E Section 25 (N2)	Solar Thermal Energy Facility Transmission Line	Pending	
NVN 085603	T27S, R59E Section 26 (N2, NE1/4 of SW1/4, N2 of SE1/4, N2 of S2 of SE1/4)	Solar Thermal Energy Facility Transmission Line	Pending	
NVN 085603	T27S, R59E Section 27 (NE1/4 of NE1/4)	Solar Thermal Energy Facility Transmission Line	Pending	

Table 3.9-1. Existing Rights-of-Way within the Proposed Project Site

Case Number	Township/Range	ROW Type	Status	Expiration
NVN 04326501	T27S, R59E Section 2 (SWNW)	Mead Eldorado Transmission and Telephone Lines	Authorized	Indefinite
NVN 04326501	T27S, R59E Section 2 (3,4)	Mead Eldorado Transmission and Telephone Lines	Authorized	Indefinite
NVN 04326501	T27S, R59E Section 3 (SENE, N2SE, SWSE, SESW)	Mead Eldorado Transmission and Telephone Lines	Authorized	Indefinite
NVN 08282401	T27S, R59E Section 3 (NWNE, SWNE, SENW, SESW, NESW)	500 kV Transmission Interconnection	Pending	
NVN 08282401	T27S, R59E Section 3 (2)	500 kV Transmission Interconnection	Pending	
NVN 08282501	T27S, R59E Section 3 (NWNE, SWNE, SENW, NESW, SESW)	Optical Ground Wire Transmission Line	Pending	
NVN 08282501	T27S, R59E Section 3 (2)	Optical Ground Wire Transmission Line	Pending	
NVN 088003	T27S, R59E Section 3 (S2, NE1/4, S2 of NW1/4, S2 of NE1/4 of NW1/4)	Ivanpah Supplemental Airport Withdrawal and Transfer for a Noise Compatibility Area on map titled, ―Clark County Conservation of Public Land and Natural Resources Act of 2002”	Authorized	Indefinite

Source: BLM 2009b

3.9.2 Airports

The Clark County Department of Aviation (CCDOA) has proposed to construct a new commercial service airport in the Ivanpah Valley of southern Nevada. The new Southern Nevada Supplemental Airport (SNSA) would provide additional capacity to serve the Las Vegas metropolitan area. In 2004, pursuant to the Ivanpah Valley Airport Lands Transfer Act (Pub. L. 106-362), BLM patented a 6,000-acre Airport Site to Clark County for this purpose. FAA and the BLM, as joint lead agencies, are currently preparing an EIS for the SNSA. If approved, Clark County would have the right, pursuant to Title V of the 2002 Clark County Conservation of Public Land and Natural Resources Act (Pub. L. 107-282), to request title to an additional 17,000 acres designated by Congress as the Airport Environs Overlay District. A portion of the Proposed Project site (T.27S., R.59E., Section 3) would be located within the Airport Environs Overlay District. The proposed Southern Nevada Regional Heliport is located over 5 miles to the northeast, south of Sloan, Nevada.

3.9.3 Grazing Allotments

The BLM administers and manages the grazing allotments on public lands in the vicinity of the Proposed Project area. The Proposed Project would cross through the Jean Lake (Allotment Number 15416) and Roach Lake (Allotment Number 15421) grazing allotments, which are closed. For further discussion and analysis of impacts to grazing within the Proposed Project area, refer to Section 3.6.5, Range.

3.9.4 Mining Claims

Mineral mining in southern Clark County is present on BLM land. Currently, there are no mining claims managed under the 1872 Mining Act located within the Proposed Project site. For further discussion and analysis of impacts to mining within the Proposed Project area refer to Section 3.17, Energy and Minerals.

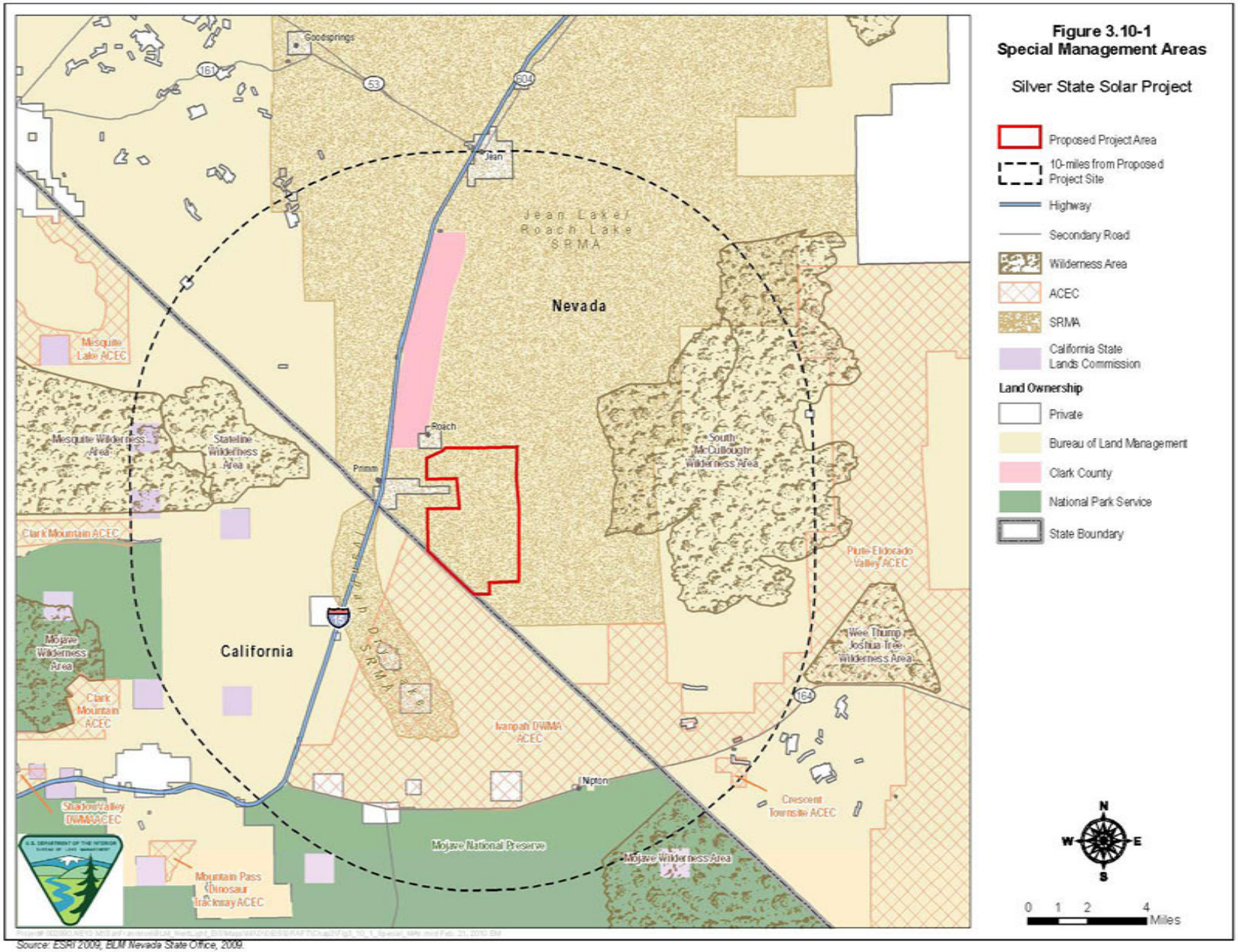
3.10 Special Management Areas

This section identifies Special Management Areas (SMAs) within and adjacent to the Proposed Project site (Figure 3.10-1) and identifies applicable regulations pertaining to these areas. The BLM manages federal lands that possess unique and important historical, anthropological, ecological, biological, geological, and paleontological features as SMAs. SMAs include designated Wilderness and Wilderness Study Areas (WSAs), rare or unique habitats or those occupied by species listed as threatened or endangered, natural environments, open spaces, scenic landscapes, special recreation management areas, historic locations, cultural landmarks, and fossil-bearing regions. SMAs are either designated by an Act of Congress or Presidential Proclamation or created under BLM administrative procedures.

3.10.1 Areas of Critical Environmental Concern

The Proposed Project would not cross any designate ACECs. The nearest ACEC to the Proposed Project is the Piute-Eldorado ACEC, located approximately 4.5 miles from the project site. The Piute-Eldorado ACEC is a desert tortoise critical habitat area that is managed to help sustain and increase the Mojave population of desert tortoise. For a discussion of potential impacts to desert tortoise see Section 3.6.3, Special Status Species.

The BLM uses the ACEC designation to highlight public land where special management attention is necessary to protect and prevent irreparable damage to important historical, cultural, and scenic values; fish or wildlife resources; or other natural systems or processes. The ACEC designation may also be used to protect human life and safety from natural hazards. The BLM identifies, evaluates, and designates ACECs through its resource management planning process. Allowable management practices and uses, mitigation, and use limitations, if any, are described in the planning document and the concurrent or subsequent ACEC Management Plan. The Proposed Project is not located within an ACEC; however, the southern boundary of the project site abuts the Ivanpah DWMA, which is an ACEC.



Source: ESRI 2009, BLM Nevada State Office, 2009.

3.10.2 Desert Wildlife Management Areas

DWMAs were developed to provide ―reserve level" protection for tortoise (USFWS 1994). Critical habitat was designated to identify areas containing key biological and physical attributes that are essential to the desert tortoise's survival and conservation, such as space, food, water, nutrition, cover, shelter, and reproductive sites. As part of the actions needed to accomplish the recovery of this species, land management goals within all DWMAs include the restriction of human activities that adversely affect desert tortoises (USFWS 1994).

The Proposed Project would not cross any designate DWMAs. The nearest DWMA is the Ivanpah DWMA ACEC located immediately south of the Proposed Project boundary on the California side of the border. The area is managed by the California BLM Needles Field Office to help sustain and increase the Mojave population of desert tortoise. For a discussion of potential impacts to desert tortoise, see Section 3.6.3, Special Status Species.

3.10.3 Special Recreation Management Areas

An SRMA is an area of land that is under BLM management, is typically 1,000 acres or more, and has been identified as having the potential for high public use and/or cultural/natural resources management.

The Proposed Project would be constructed entirely within the Jean/Roach Lake SRMA. For further discussion of the Jean/Roach Lake SRMA, refer to Section 3.11, Recreation.

3.10.4 National Preserves

In 1970, Congress elaborated on the 1916 National Park Service Organic Act, declaring that all units of the system have equal legal standing in a national system. National Preserves are defined as areas having characteristics associated with national parks, but in which Congress has permitted continued public hunting, trapping, and oil/gas exploration and extraction (NPS 2000).

The Proposed Project would not cross any National Preserves. The nearest National Preserve to the Proposed Project is the Mojave National Preserve, located immediately south of the project boundary in California.

3.10.5 BLM Wilderness Areas

The Wilderness Act of 1964 gives Congress the sole power to designate Wilderness Areas. The Act defines wilderness as an area of land that ―(1) generally appears to have been affected primarily by the forces of nature, with the imprint of man's work substantially unnoticeable; (2) has outstanding opportunities for solitude or a primitive and unconfined type of recreation; (3) has at least 5,000 acres of land or is of sufficient size as to make practicable it preservation and use in an unimpaired condition; and (4) may also contain ecological, geological, or other features of scientific, educational, scenic, or historical value." Except in emergencies or necessary administration of an area, vehicular travel is prohibited in Wilderness Areas. The BLM is responsible for managing 222 Wilderness Areas with 8.6 million acres in the Western United States (BLM 2009).

The Proposed Project would not cross any Wilderness Areas. The nearest Wilderness Areas to the Proposed Project are the Wee Thump Joshua Tree Wilderness Area, 11 miles to the east, the Stateline Wilderness, 6 miles to the northwest in California, and the South McCullough Wilderness Area, 2.9 miles to the east.

3.11 Recreation

This section discusses recreation resources within 5 miles of the Proposed Project boundary. A 5-mile buffer has been chosen because it may include direct, on-site impacts to recreation, as well as reasonably foreseeable off-site impacts to recreational areas and dispersed recreational activities.

The Proposed Project would be constructed entirely on lands administered by the BLM-Las Vegas Field Office within the Jean/Roach Lake SRMA, and within 5 miles of the Ivanpah Dry Lake SRMA in California. The Proposed Project would not be constructed within 5 miles of any local, county, or state recreational facilities, as shown in Table 3.11-1.

Table 3.11-1. Recreation Areas in the Vicinity of the Proposed Project

Name	Distance	Use
Jean/Roach Lake SRMA	Project would occur within the SRMA boundary	Competitive OHV racing and dispersed recreational use and commercial activities.
Ivanpah Dry Lake SRMA	Project would occur within 3 miles of the SRMA	Kite buggying, land sailing, and archery.

3.11.1 Special Recreation Management Areas

An SRMA is an area of land that is under BLM management, is typically 1,000 acres or more, and has been identified as having the potential for high public use and/or cultural/natural resources management. The SRMA designation is used for internal BLM administrative and budgetary considerations (BLM, n.d.).

3.11.2 Jean/Roach Lake Special Recreation Management Area

The Proposed Project would be located within the boundary of the Jean/Roach Lake SRMA (Figure 3.11-1). The Proposed Project site is managed by the BLM Las Vegas Field Office —for intensive recreation opportunities, including competitive off-road vehicle (in accordance with the U.S. Fish and Wildlife Service Biological Opinion) and other recreational events, as well as dispersed recreational use and commercial activities" (BLM 1998).

Additional uses of the SRMA include recreational model rocket launching, movie, commercial, and music video filming, big game hunting, horseback riding events, hiking, music festivals, and land sailing on the Jean and Roach dry lakes (Dieli 2009).

3.11.3 Special Recreation Permits and Off-Highway Vehicle Racing

Special recreation permits are required for specific recreational uses of BLM managed public lands and waters and are issued to protect natural and cultural resources and accommodate commercial recreational uses.

Within the Proposed Project site, OHV races occur during the spring and fall months and occasionally during the summer time. A special recreation permit is required for OHV racing and these permits are typically applied for six months before OHV races.

There are four annual races that take place in the Jean/Roach Lake SRMA. These races include the Battle at Primm, the SNORE 250, the SCORE Terrible‘s Primm 300, and the Henderson Fabtech Desert Classic.

The Battle at Primm race occurs annually during the month of February. The vehicles that are used for this race fall under the category of truck and buggie. The race uses trails within the Jean/Roach Lake SRMA and typically has around 270 racers and attracts over 6,000 people (Cox 2009).

The SNORE 250 race, at Primm, Nevada, typically takes place annually in the fall during October. Vehicle racing types are truck and buggie. The race uses trails in the Jean/Roach Lake SRMA. The race has between 90 and 120 racers and attracts around 4,000 people (Cox 2009).

The SCORE Terrible‘s Primm 300 race occurs annually during the first weekend after Labor Day during the month of September. The vehicles that are used for this race fall under the category of truck and buggies. This 276-mile race uses trails within the Jean/Roach Lake SRMA. The race typically has about 150 racers and attracts over 10,000 people to the area for the event (Fish 2009).

3.11.4 Ivanpah Dry Lake Special Recreation Management Area

The Ivanpah Dry Lake SRMA is located in the Mojave Desert in San Bernardino County, California, on I-15 at the California-Nevada state line. The area is managed by the BLM Needles Field Office and is used by many recreationists for non-motorized recreational activities including archery, kite buggying, and land sailing (BLM 2009). The Proposed Project would be constructed 3 miles from the Ivanpah Dry Lake SRMA, California.

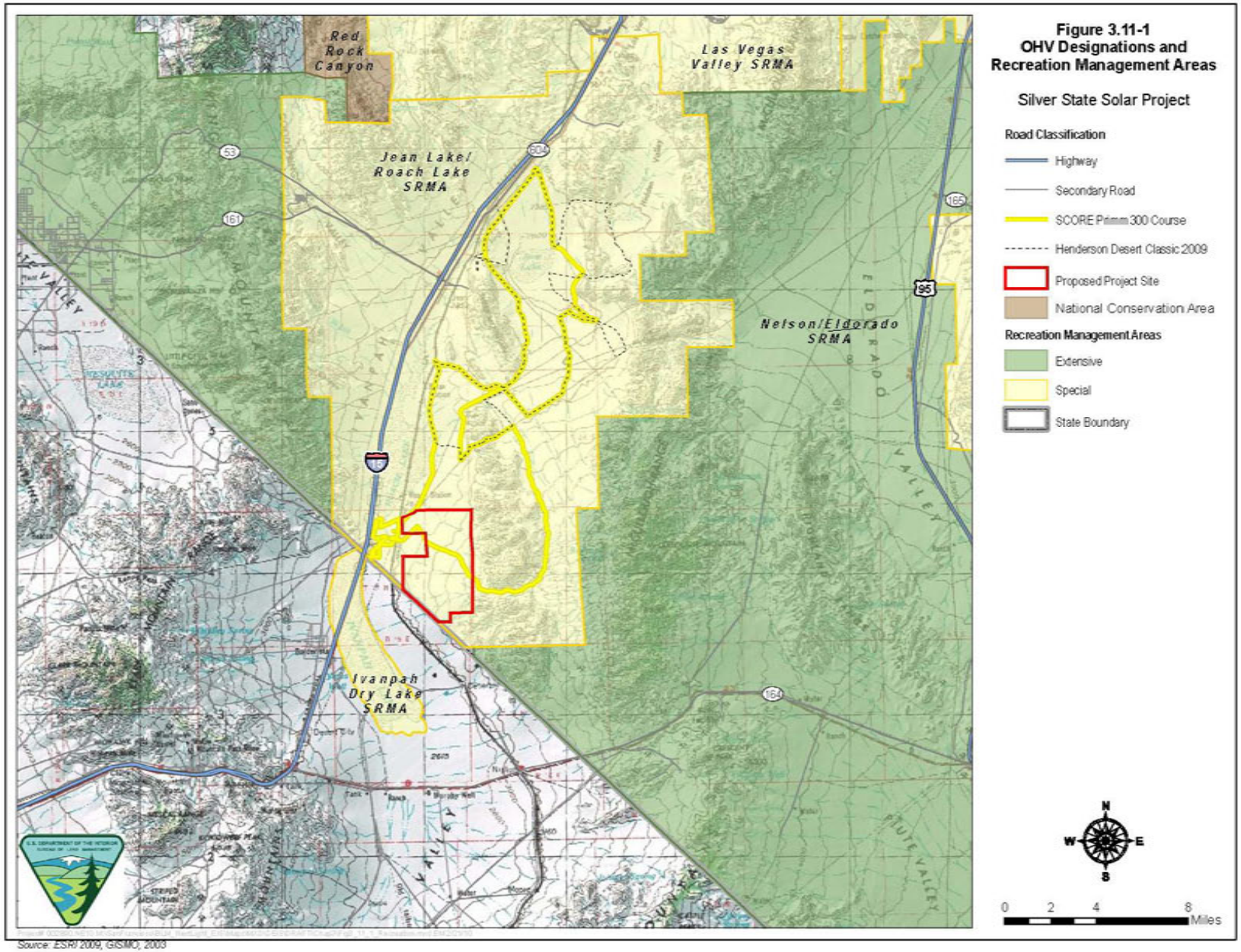


Figure 3.11-1
OHV Designations and Recreation Management Areas

Silver State Solar Project

Source: ESRI 2009, GISMO, 2003

3.12 Visual Resources

This section identifies existing aesthetic quality and visual resources within and adjacent to the Proposed Project site and discusses applicable regulations. Information in this section is largely based on evaluating the area generated from the BLM's guidelines for establishing visual resource management (VRM) classes as well as input received from members of the public during the scoping process.

3.12.1 Visual Resources Inventory

The BLM's visual resource inventory process, as outlined in the BLM's Handbook H 8410 1, Visual Resource Inventory (BLM 1986a), determines visual values and classifies BLM land according to those values. The inventory consists of a scenic quality evaluation, viewer sensitivity level analysis, and a delineation of distance zones. Considering these three factors, BLM-administered lands are placed into one of four visual resource inventory classes that represent the value of the visual resources. Lands placed in Class I and Class II are the most valued, lands in Class III are of moderate value, and lands in Class IV are of least value for visual resource protection. BLM Resource Management Plans establish VRM objectives for each of these classes that are used to guide BLM's management of visual resources (BLM 1986a):

- **Class I Objective.** The objective of this class is to preserve the existing character of the landscape. This class provides for natural ecological changes and very limited management activity. The level of change to the landscape should be very low and must not attract attention.
- **Class II Objective.** The objective of this class is to retain the existing character of the landscape. The level of change to the landscape should be low and must not attract attention. Management activities may be noticeable, but must not attract the attention of the casual observer. Any changes must repeat the basic elements of form, line, color, and texture found within the predominant natural features of the characteristic landscape.
- **Class III Objective.** The objective of this class is to partially retain the existing character of the landscape. The level of change to the landscape should be moderate. Management activities may attract attention, but should not dominate the view of the casual observer. Any changes must repeat the basic elements of form, line, color, and texture found within the predominant natural features of the characteristic landscape.
- **Class IV Objective.** The objective of this class is to provide for major management activities that require major modification of the existing character of the landscape. The level of change to the characteristic landscape can be high. Management activities may dominate the view and be the major focus of viewer attention. However, every attempt should be made to minimize the impacts of these activities through careful location, minimal disturbance, and repeating the basic elements.

3.12.1.1 Visual Resource Contrast Rating

Visual resource contrast rating is used to analyze potential visual impacts of a Proposed Project and determine if the impacts would be consistent with the BLM's management objectives. The

extent to which a management activity affects the visual quality of the landscape is contingent on the visual contrast of the Proposed Project and the existing landscape. According to the BLM's Handbook H-8431-1, Visual Resource Contrast Rating (BLM 1986b), the contrast rating process includes identifying key observation points (KOPs) at locations where most viewers would view a project most of the time. Because it is not possible to depict every view toward the Proposed Project features, representative views have been selected to represent types of views that are available to the public. For this analysis, three viewing distances were used: foreground-middleground (between 0 and 5 miles of the viewers), background (between 5 miles and 15 miles), and seldom seen (beyond 15 miles). Impact assessments were conducted for each KOP using a visual resource contrast rating worksheet that documents the comparison of the existing landscape with the way the landscape would appear following construction of a Proposed Project. The worksheets for each KOP include descriptive text and photographs documenting the existing landscape at the KOP and a photo simulation of the Proposed Project. The difference between the two landscapes is described by the extent of contrast: strong, moderate, weak, or none. A Proposed Project meets the VRM objective if all of the contrasts for all KOPs are equal to or less than the highest contrast allowed for that objective. Table 3.12-1 lists the degrees of contrast and the criteria to meet that contrast category.

Table 3.12-1. VRM Degrees of Contrast and Criteria

Degree of Contrast	Criteria
None	The element contrast is not visible or perceived.
Weak	The element contrast can be seen but does not attract attention.
Moderate	The element contrast begins to attract attention and begins to dominate the characteristic landscape.
Strong	The element contrast demands attention, will not be overlooked, and is dominant in the landscape.

Source: BLM Handbook H-8431-1, Visual Resource Contrast Rating (BLM 1986b)

Visual resource contrast is assessed by considering form, line, color, and texture; and visual impacts are expressed in terms of degree of contrast: high, moderate, weak, or none. The highest degree of contrast allowed for each VRM classification is as follows:

- VRM Class I – none;
- VRM Class II – weak;
- VRM Class III – moderate; and
- VRM Class IV – strong.

3.12.1.2 Distance Zone Mapping

Prior to conducting field work, the Proposed Project features were plotted on topographic maps using Arc Info GIS. These maps were overlain with the locations of communities, travel routes, preservation areas, historic landmarks, and recreation areas (for example, parks, golf courses, and OHV trails). A viewshed analysis was then conducted to determine the areas from which Proposed Project features could be visible. The analysis extended 15 miles north and south of the Proposed Project site to analyze potential visibility from Goodsprings in the north to the

Mojave National Preserve in the south. This represents a conservative approach to capture all sensitive viewpoints from which the Proposed Project would be visible. On the basis of the extensive distance used to define the Proposed Project viewshed, some views of the project would include only minimal visibility of project features, such as the tip of the transmission poles. In addition, although this analysis considers the extent to which topography would block views of the Proposed Project, it does not take into account the extent to which buildings and vegetation would also block views. Analysis of these sites relative to the Proposed Project area allowed a preliminary assessment of visual impacts associated with the project.

The BLM's Las Vegas Field Office reviewed and approved the viewshed analysis prior to any field inventory or contrast analysis. Using the viewshed analysis, typical, sensitive, close-up, and distant views were identified that had views of the Proposed Project site.

3.12.1.3 Field Visits, Selection of Key Observation Points, and Modeling

From August 24 through 26, 2009, CH2M Hill's visual resource specialists conducted site visits to the potentially sensitive locations and documented these locales via photographs and recorded global positioning system (GPS) points. All photographs were taken with a digital camera with the lens set at a focal length that created images equivalent to images taken with a 35-millimeter (mm) camera with a 50-mm focal length. The selection of KOPs was based on the guidance found in BLM VRM Handbook 8341.2(C), which outlines the factors that should be used in determining KOPs, including commonly traveled routes or at other likely observation points, angle of observation, number of viewers, length of time the project is in view, relative project size, season of use, and light conditions.

On August 25, 2009, the BLM accompanied CH2M Hill to visit less accessible potential KOP sites, including the Lucy Gray OHV trail, and Ivanpah and Roach dry lakebeds. Based on the viewshed analysis, observations made during the field visit, and direction from the BLM, nine KOPs were selected to represent a range of views toward the Proposed Project site from or near communities in the region, recreational use areas, and major travel corridors.

A visual simulation was prepared for each KOP using computer modeling techniques to depict the view as it would appear with the Proposed Project completed. A combination of computer-aided drafting, GIS, and rendering programs were used to produce the images of the project facilities that are superimposed on photographs. To produce the simulations, a digital site model was created using topographic and site data. Next, three-dimensional (3-D) models of project features were prepared using Proposed Project plans, and these were superimposed on the digital site model. For each KOP, viewer location was digitized from topographic maps, using 1.5 meters (5 feet) as the assumed eye level. Computer ―wire frame" perspective plots were overlaid on the photographs of the KOPs from the simulation viewpoints to verify scale and viewpoint location. Digital visual simulation images were produced based on renderings of the 3-D model combined with the high-resolution digital base photographs.

Preliminary simulation work indicated that visual impacts from all three design options under consideration appeared to be similar at each KOP. Therefore, simulations for only one design option, the tilted-tracker, were analyzed. The tilted tracker option was chosen because the key visual differentiator among the three design options is height and the tilted-tracker is the tallest technology (the tilter-tracker's 15-foot height is twice that of the next tallest technology, the

horizontal tracker). In addition, the tilted-tracker configuration would also include electrical equipment housing that would be up to 12 feet high. This greater height would, therefore, represent the most conservative (worst-case) scenario for potential visual impacts to occur at the site.

Using the conservative assessment approach accomplishes several objectives:

- First, it facilitates comprehensive analysis in a streamlined way by considering the greatest level of impact that could occur, thus also encompassing all lesser impacts that could occur with the use of other design options;
- Second, using a single worst-case scenario avoids separate assessment of the three technologies when the differences among them are minimal relative to visual impacts;
- Third, it presents the reader and reviewer with focused visual simulations of multiple KOPs that consider the worst-case visual scenario; and
- Fourth, it facilitates consistency with the EIS process by preparing a report and analysis consistent with EIS methodologies commonly used in analysis conducted under NEPA.

3.12.1.4 Visual Contrast Rating

To assess the existing visual quality of the views from the KOPs and to establish the degree to which the Proposed Project would alter visual quality levels, the images were rated using BLM‘s methodology. BLM Visual Contrast Rating Worksheet Form 8400-4 was completed for each KOP (Appendix C). Sections A, B, and C were completed to document the existing environment and the changes to the existing environment resulting from the implementation of the Proposed Project.

3.12.2 Existing Conditions

3.12.2.1 Regional Setting

The Proposed Project is located in the Ivanpah Valley of southern Nevada, which is characterized by an expansive arid landscape and long distance views, the Ivanpah and Roach dry lakebeds, and rugged mountains. The Ivanpah Valley is a broad, north-south trending valley bounded by the Clark Mountains and the Spring Mountains to the west, the McCullough Mountains and the Lucy Gray Mountains to the east, and the New York Mountains and the Ivanpah Mountains to the south. Vegetation is typical of the Mojave Desert province and is characterized by bursage, creosote bush, Mojave yucca, cats claw acacia, Joshua tree, and cactus.

In the Proposed Project vicinity, the landscape has been significantly altered by human use. Because of its strategic location between Los Angeles and Las Vegas, this portion of the Ivanpah Valley has historically been used as a major transportation and utility corridor. Built features near the Proposed Project site include I-15, the resort town of Primm, a railroad track, several high-voltage transmission lines that converge in this area, and the NV Energy Higgins Power Plant, a natural gas power plant with highly visible heat recovery steam generators, switchyard, stacks, and air-cooled condenser. Primm is approximately 2 miles west of the Proposed Project site. Three large casinos (Buffalo Bill‘s Resort and Casino, Primm Valley Resort and Casino,

and Whiskey Pete's Hotel and Casino), an outlet mall, and the Desert Oasis apartment complex (for casino employees) are all located in Primm.

Recreational areas in the Proposed Project vicinity include the Ivanpah and Roach dry lakebeds, several OHV trails, the Primm Valley Golf Club, and the Mojave National Preserve. The Ivanpah dry lakebed is approximately 2 miles west of the Proposed Project site. It covers approximately 35 square miles and is a popular place for kite buggying, land sailing, long-distance archery, and kite demonstrations. The lake area is open to non-motorized vehicle access and to motorized vehicles with a permit. Approximately 1 mile northwest of the Proposed Project site is the southern edge of the Roach dry lakebed, which is used for camping and OHV riding. At least four professional OHV races per year occur on trails in the Proposed Project vicinity, one of which (the Lucy Gray Trail) crosses the project site. The 500-acre Primm Valley Golf Club is approximately 3.5 miles southwest of the Proposed Project site. The northern boundary of the Mojave National Preserve is located approximately 8 miles south of the Proposed Project site.

In addition to Primm, other small communities in the Ivanpah Valley include Jean, approximately 10 miles north of the Proposed Project site; Goodsprings, approximately 14 miles to the north; and Nipton, California, approximately 8 miles to the south.

No designated scenic vistas or state-designated scenic highways are within or within view of the Proposed Project area.

3.12.2.2 Visual Resources Management Classes and Visual Sensitivity

The Proposed Project is located on BLM-administered land designated VRM Class III. For purposes of this evaluation, the BLM's VRM classification for the lands potentially affected by the Proposed Project is applied to adjacent non-BLM-managed lands to standardize the analysis.

These four groups comprise the viewer types analyzed for the Proposed Project:

- **Communities:** Primm, Jean, Goodsprings, and Nipton;
- **Recreation Areas:** Ivanpah Dry Lakebed, Roach Dry Lakebed, Lucy Gray OHV Trail;
- **Parks:** Mojave National Preserve; and
- **Travel Corridors:** I-15.

The following are general discussions on the viewer types and their sensitivities based on the general characteristics found in the planning area. Specifics of each are discussed in Section 3.12.2.3, below. The communities listed have high visual sensitivity due to the long duration of view, high expectation for scenic views, and moderate use volume compared other small desert communities. The recreation areas considered also have high visual sensitivity due to moderate duration of view, high expectation for scenic views, and high use volume compared to other expanses of public land in the planning area. The Mojave National Preserve has high visual sensitivity due to the moderate duration of view, high expectation for scenic views, and low use volume compared to other viewpoints in the planning area. The I-15 highway has low visual

sensitivity due to the moderate to short duration of view, low expectation of scenic views, and high use volume.

3.12.2.3 Descriptions of KOPs and their Viewsheds

Based on the viewshed analysis, observations made during the field visit, and direction from the BLM, nine KOPs were selected for analysis. These nine KOPs represent a broad range of views toward the site from or near communities in the region, recreational use areas, and major travel corridors. A summary of the KOPs by location is provided in Table 3.12-2. A map showing the locations of the KOPs in relation to the project facilities is shown on Figure 3.12-1. The images of each KOP are presented on Figures 3.12-2 through 3.12-10.

Table 3.12-2. Key Observation Points

KOP #	Description	VRM Class
KOP 1	View from Goodsprings Road	
KOP 2	View from I-15 near Jean	
KOP 3	View from Roach Dry Lake Bed	
KOP 4	View from Desert Oasis Apartment Complex	
KOP 5	View from Primm Valley Resort and Casino	
KOP 6	View from Lucy Gray OHV Trail	
KOP 7	View from Ivanpah Dry Lake Bed	
KOP 8	View from I-15 at Nipton Road Overpass	
KOP 9	View from Entrance to Mojave National Preserve	

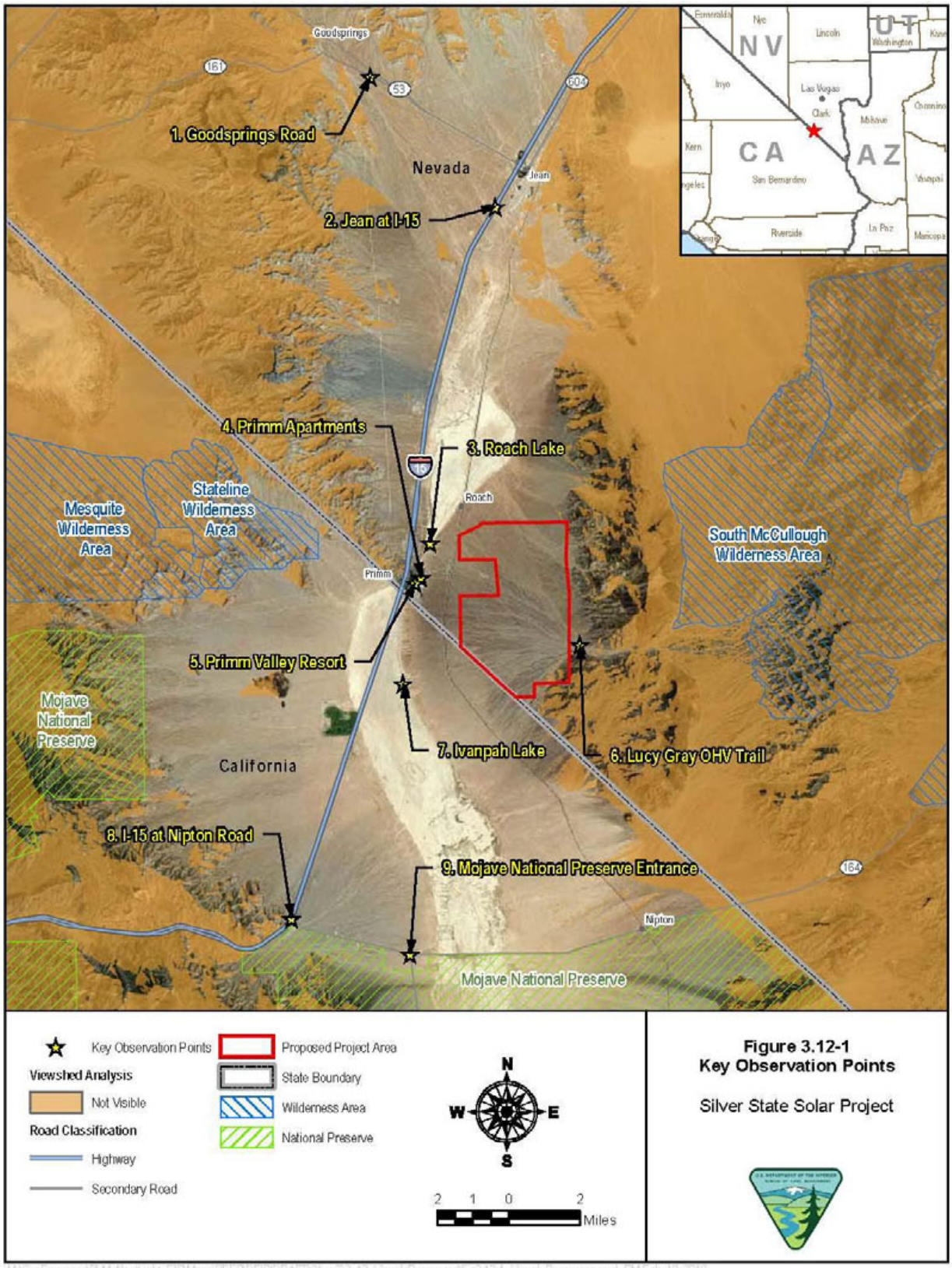


Figure 3.12-1
Key Observation Points

Silver State Solar Project

KOP 1 – View from Goodsprings Road

KOP 1 (Figure 3.12-2) is a view from Goodsprings Road, approximately 14 miles from the Proposed Project site. This view represents the closest easily accessible point to the town of Goodsprings from which the Proposed Project site would be fully visible. KOP 1 is located in a BLM VRM Class II area, though the middleground and background of the image, including the Proposed Project site, are in VRM Class III areas.

Figure 3.12-2. KOP 1 – View from Goodsprings Road

KOP 1 represents the view of resident motorists traveling east from the unincorporated communities of Goodsprings and Sandy Valley looking toward the Proposed Project site. The length of the view would be of moderate duration representing a motorist‘s view from a point just east of Goodsprings up to Jean. The view, however, would be an oblique view (not a forward view), and thus would not be within the primary cone of vision of travelers who have left Goodsprings and are driving toward Jean and I-15. The majority of KOP 1 viewers is likely to be local residents or daily commuters to Goodsprings or Jean and is likely to be sensitive to the view.

KOP 1 presents a long range view across the Ivanpah Valley. The broad valley floor inclines gently toward mountain ranges on all three sides. A hill rises in the foreground on the right side of the view and the southern end of the Lucy Gray Mountains rise in the middleground on the left. The New York Mountains are visible in the background as an undulating ridgeline on the horizon. The foreground land ranges in color from light to dark brown, as well as including grays and blacks. Roach Dry Lake is visible as the white patch in the middleground. The mountains in the background are grayish brown. Vegetation is distinguishable only in the

foreground and consists of sparsely growing Joshua trees and other shrubs. Vegetation color ranges from light to dark green.

Structures are barely visible in this view. A line of existing transmission poles is marginally visible in the middleground against the backdrop of Roach Dry Lake. Buildings marking the town of Primm are barely detectable beyond the base of the hill in the foreground. The power plant east of Primm is almost indistinguishable from the dark substrate that surrounds it. A faint white line marks the road leading to the power plant.

KOP 2 – View from I-15 near Jean

KOP 2 (Figure 3.12-3), approximately 10 miles from the Proposed Project site, is a view looking south from the westbound lanes of I-15 near the town of Jean. Jean is a resort town and commercial center consisting of the Gold Strike Hotel and Gambling Hall, the Jean Sport Aviation Center, a Nevada Department of Corrections prison facility, and a Nevada Highway Patrol substation. The photograph of KOP 2 was taken from BLM Class III land and features BLM Class III land in its view.

Figure 3.12-3. KOP 2 – View from I-15 near Jean

This photograph was taken from I-15 just south of Jean because there are no unobstructed views of the Proposed Project site in the publicly accessible, central parts of Jean due to the presence of buildings and other structures. In particular, the Jean airport, which extends south of town parallel to the east side of I-15, blocks most views toward the Proposed Project site from Jean.

The view from KOP 2 is the view that can be seen looking to the southeast from vehicles traveling southwest from Jean along I-15. The length of the view would be of moderate duration representing a motorist's view from a point just south of Jean to Primm. This view would be primarily an oblique view with a short duration as a forward view. The majority of KOP 2 viewers would likely be motorists traveling long distances from Las Vegas to points in southern California or, to a lesser extent, motorists traveling from Las Vegas to Primm. They would be, at most, moderately sensitive to the view from KOP 2, which would likely represent a view that is a part of a much longer drive.

Landforms in the view from KOP 2 are typical of the Ivanpah Valley. The foreground is an expansive valley floor with the Roach dry lakebed visible as the white area in the middleground. The Lucy Gray and the Clark mountains rise gradually from the valley floor on the east and west sides of the valley. The New York Mountains and Ivanpah Mountains form the undulating line of the horizon. Vegetation is distinguishable only in the foreground as mounded shrubs.

The foreground of KOP 2 is dominated by structures including I-15, the highway barrier wall and signs, and a steel-pole transmission line. These existing structures create strong horizontal and vertical lines in the landscape composition. Structures in the background of the view are barely visible and include Primm and the power plant. Primm blends into the color of the dark underlying substrate and the mountains that form its backdrop. The power plant is slightly more visible as small structures in silhouette against a lighter backdrop.

KOP 3 – View from the Roach Dry Lakebed

KOP 3 (Figure 3.12-4) is a view from Roach dry lakebed looking east, approximately 0.9 mile from the Proposed Project site. This image is a panorama composed of two 50-mm images. The panorama was necessary because Proposed Project facilities would not all be visible in a single image based on the proximity of KOP 3 to the Proposed Project site relative to the project size. The photograph of KOP 3 was taken from BLM Class III land and features BLM Class III land in its view.

Figure 3.12-4. KOP 3 – View from the Roach Dry Lakebed

Roach dry lakebed is a destination site/area for campers and OHV enthusiasts and is part of the BLM Jean/Roach Lake Special Management Recreation Area (SMRA). This view is representative of what a recreationalist on Roach dry lakebed would see. The view from KOP 3 would be one of short to moderate duration by OHV users, but of long duration by campers.

Visitors to Roach dry lakebed would likely be at least moderately sensitive to views toward the Project site and recreationalists who are exclusively OHV users, somewhat less so.

Roach dry lakebed forms the foreground of the view from KOP 3 and is visible as white playa substrate. The edge of the lakebed is marked by the emergence of mounded vegetation. The shrubby vegetation extends into the middleground, forming a brown line after which it becomes indistinct. The Lucy Gray Mountains rise sharply in the background.

The view from KOP 3 is dominated by structural elements in the foreground and landforms in the background. Two rows of lattice steel transmission lines extend from the foreground to the background. At least two other rows of transmission lines are faintly visible in the middleground against the mountains. The transmission towers are blocky and characterized by horizontal, vertical, and diagonal lines. The power plant is visible as a dark building in the middleground. The plant is surrounded by an artificial berm which is a lighter color than the surrounding area. The Lucy Gray Mountains dominate this view from Roach Dry Lake and form a jagged line along the horizon.

KOP 4 – View from Desert Oasis Apartment Complex

KOP 4 (Figure 3.12-5) is a view from the Desert Oasis apartment complex in Primm, Nevada, 1.3 miles from the Proposed Project site. The apartment complex houses workers employed by the Primm hotels and casinos. This KOP panoramic image was prepared to display the Proposed Project features visible from this viewpoint. A single image would not depict all Proposed Project features because of the proximity of KOP 4 to the project site relative to the project size. KOP 4 is not located on BLM-managed land, but includes views of the BLM VRM Class III area, which includes the Proposed Project area.

Figure 3.12-5. KOP 4 – View from Desert Oasis Apartment Complex

This photograph was taken looking east toward the power plant. The photograph was taken from the center of the parking lot because this location provides the best view of the Proposed Project area from the apartment complex. Similar views can be seen from east-facing windows on the east side of the apartment complex. A slightly diminished version of this view can be seen from the pool area. The view from KOP 4 would be a frequent view of short duration for residents accessing their cars in the parking lot or of long duration from apartment windows on the east side of the complex. Residents would likely be at least moderately sensitive to the view from KOP 4, which would likely represent a daily view.

KOP 4 has foreground views of the apartment complex parking lot surrounded by a perimeter wall. The foreground is dominated by structures and consists mostly of a flat asphalt surface alternating with bare patches of ground covered in reddish gravel. The parking lot is mostly empty containing just two cars and two trailers. It also contains utility boxes, light posts, and is surrounded by a white perimeter wall. Beyond the wall, the power plant and associated facilities and a transmission line with a tall tower are also visible. The only visible vegetation in the foreground is a few ornamental trees in the parking lot and weeds in the bare patches and along the perimeter wall.

Due to the perimeter wall, the middleground is not very visible. It consists of relatively flat ground extending east toward the Lucy Gray Mountains. On the right side of the image, the ground slopes toward the mountain range along an alluvial fan. Middleground vegetation consists of a relatively unbroken stretch of desert scrub vegetation of undistinguishable texture and greenish-brownish color. Beyond the perimeter wall, at least three transmission lines are visible at varying distances.

The background of KOP 4 consists of the western face of the Lucy Gray Mountains and their jagged ridgeline along the horizon. The range is relatively rugged and its colors alternate from browns to beiges, pinks, and whites.

KOP 5 – View from Primm Valley Resort and Casino

KOP 5 (Figure 3.12-6) is a view from the Primm Valley Resort and Casino in Primm, Nevada, 1.4 miles west of the Proposed Project site. The Primm Valley Resort and Casino is one of three major hotel/casinos in Primm, Nevada and hosts visitors for gambling, concerts, professional OHV event attendance, and casual local OHV use. KOP 5 is not located on BLM-managed land, but includes views of the BLM VRM Class III area, which includes the Proposed Project area.

This photograph was taken looking east toward the Proposed Project site from the balcony of the fourth floor, of the Primm Valley Resort to capture a view from the hotel. KOP 5 represents the perspective of hotel guests from east-facing windows of Primm Valley Resort and of nearby Buffalo Bill‘s Resort and Casino. The view would potentially be frequent but of short duration for hotel guests and workers looking out of east-facing windows. Hotel guests and casino workers are oriented toward activities inside the casinos and outlet mall and are not sensitive to the surrounding landscape.

KOP 5 is dominated by the flood-control features in the proximate foreground and the Lucy Gray Mountains in the background. The proximate foreground has been graded, stripped of vegetation, and converted to a detention basin with relatively steep side slopes. The basin contains structures such as a paved roadway lined with light poles in the foreground, chain-link fencing, and a dirt road in the middleground. The focal point of the detention basin is a rock-filled area in the center of the image.

Figure 3.12-6. KOP 5 – View from Primm Valley Resort and Casino

The middleground is an expanse of mostly flat valley alluvial plain that slopes upward toward the Lucy Gray Mountains in the background. It is crossed by a transmission line with lattice steel towers that have strong horizontal, vertical, and diagonal lines. Middleground vegetation is scattered, round, desert shrubs that blend into an indistinguishable green-brown mass in the distance. The background of KOP 5 consists of the western face and ridgeline of the Lucy Gray Mountains. The range is relatively rugged and its colors alternate from browns to beiges, pinks, and whites.

KOP 6 – View from Lucy Gray OHV Trail

KOP 6 (Figure 3.12-7) is a view from the Lucy Gray OHV trail looking west, 2 miles from the Proposed Project site. This image is a panorama composed of two 50-mm images that were stitched together. The panorama was necessary because Proposed Project facilities would not all be visible in a single image due to the proximity of KOP 6 to the project site relative to the project size. KOP 6 is located within and includes views of BLM VRM Class III areas.

The Lucy Gray OHV trail is used at least four times per year for professional races and is also used throughout the year by nonprofessional OHV enthusiasts. This view is representative of what OHV recreationalists see upon entering the Ivanpah Valley from the east along the Lucy Gray OHV trail. The view is likely to be of short duration given the speeds at which OHVs travel in this area and the driver‘s focus on the trail.

Figure 3.12-7. KOP 6 – View from Lucy Gray OHV Trail

KOP 6 presents an expansive view of the Ivanpah Valley with the Clark and Spring mountains in the background. The foreground contains the irregular, rocky surface of the alluvial fan which slopes from the Lucy Gray Mountains toward the valley. The image was taken from the edge of the OHV trail which curves to the right. The vegetation is sparse and shrubby and includes species such as cacti, Mojave yucca, bursage, and creosote and varies in color from yellow to green. Visible soil is rocky and whitish to tan in color.

The middleground is a broad valley in which Primm, the power plant, Roach and Ivanpah dry lakebeds are visible. Except for the dry lakebeds, which have a whitish playa surface, vegetation covers the valley floor, forming a greenish-brown surface of undistinguishable texture. Views of Primm and the power plant are partially obstructed by vegetation in the foreground. From the vantage point of KOP 6, Primm blends fairly well with the hills in the background due to its distance and the light coloring of most of its buildings, which are similar to the colors of Ivanpah dry lake bed and the mountains in the background. The power plant stands out more as a dark, blocky structure that contrasts with the colors of the hills behind it.

The background of KOP 6 consists of the eastern face of the Clark and Spring mountains and their jagged ridgeline. The ranges are relatively rugged and the colors alternate from browns to beiges, pinks, and whites.

KOP 7 – View from Ivanpah Dry Lakebed

KOP 7 (Figure 3.12-8) is a view from the eastern edge of Ivanpah dry lakebed 2 miles from the Proposed Project site looking east toward the Lucy Gray Mountains. This image is a panorama composed of two 50-mm images that were stitched together. The panorama was necessary because Proposed Project facilities would not all be visible in a single image due to the proximity of KOP 7 to the project site relative to project size. KOP 7 is located within and includes views of BLM VRM Class III areas.

Ivanpah dry lakebed is a well-known spot for racing, archery, kite buggying, and land sailing. This view is representative of what a person recreating on the lakebed would see. The length of the view would be of short to medium duration, with the viewer tending to focus on recreational activities. Recreationalists are likely to be moderately sensitive to views toward the Proposed Project site as it would affect their overall experience on the lakebed.

Figure 3.12-8. KOP 7 – View from Ivanpah Dry Lakebed

KOP 7 shows the nearly flat Ivanpah dry lakebed in the foreground, an expanse of the Ivanpah Valley behind it, sloping up toward the Lucy Gray Mountains in the background. The foreground contains the flat, cracked surface of the Ivanpah dry lakebed, which is devoid of vegetation. The edge of the lakebed is visible where coarse vegetation, typical of the Mojave Desert, starts.

The middleground is characterized by relatively flat land that slopes slightly upward toward the Lucy Gray Mountains. It is covered with vegetation of a dark green to brownish color and slightly lumpy texture that becomes indistinct with distance. The power plant and at least one transmission lines are visible in the distance. The northern segment of the transmission line is very visible against the skyline north of the Lucy Gray Mountains. Where transmission lines occur against the backdrop of the Lucy Gray Mountains, they blend into the background. Though the power plant is visible with its blocky form and dark color, it is relatively inconspicuous against the backdrop of the Lucy Gray Mountains.

The background of KOP 7 consists of the western face of the Lucy Gray Mountains and their jagged ridgeline. The range is relatively rugged and its colors alternate from browns to beiges, pinks, and whites.

KOP 8 – View from I-15 at Nipton Road Overpass

KOP 8 (Figure 3.12-9) is a view from the Nipton Road overpass on I-15 looking northwest toward the Ivanpah Valley and Primm, approximately 9 miles from the Proposed Project site. The photograph was taken from an overpass above the freeway and, therefore, captures an elevated view of what a motorist along northbound I-15 would see upon entering the Ivanpah Valley from California.

The length of the view represented by KOP 8 would be of short to moderate duration due the speed at which a motorist would be traveling. The motorist would have a view of the Proposed Project for approximately 6 minutes from KOP 8 to a point directly west of the Proposed Project site along I-15. This portion of I-15 is part of a highly traveled corridor between Los Angeles and Las Vegas. The majority of KOP 8 viewers are likely to be motorists traveling long distances for business or recreational purposes between southern California and Las Vegas. They would, at most, be moderately sensitive to the view from KOP 8, which would represent a short-term view that is part of a much longer drive.

Figure 3.12-9. KOP 8 – View from I-15 at Nipton Road Overpass

KOP 8 is a view of the Ivanpah Valley with the Clark Mountains, the Spring Mountains, and the Lucy Gray Mountains visible in the background. The foreground slopes downhill into the Ivanpah Valley and is dominated by structures including I-15 and associated dividers and signs. A 115kV transmission line flanks the east side of I-15. Foreground vegetation consists of intermittently spaced shrubs that range from green to brownish in color.

The middleground contains the flat expanse of the Ivanpah Valley including Ivanpah dry lakebed. Most of the valley floor is covered with vegetation giving it a greenish-brown color. The Ivanpah dry lakebed is the strikingly white area dominating the middleground. The lakebed contains a little water due to a brief rainstorm a few days before the photograph was taken. The water surface has a grayish-silver hue that reflects the sky. Middleground structures include dirt roads criss-crossing the valley floor and buildings associated with a former roadside service station.

The background contains Primm, the power plant, and the Clark, Spring, and Lucy Gray mountain ranges. Primm and the power plant are not very visible from this vantage point. Their form is somewhat blocky and contrasts with the smooth lines of the Ivanpah Valley but their colors are indistinguishable from those of their surroundings. Primm consists of whites and tans and its form appears to be almost an extension of the Clark Mountain Range. The power plant is a brownish gray, which blends into the backdrop of the Lucy Gray Mountains.

KOP 9 – View from Entrance to Mojave National Preserve

KOP 9 (Figure 3.12-10) is a view from Ivanpah Road at Nipton Road, California, approximately 0.3 mile north of the entrance to the Mojave National Preserve and 8 miles from the Proposed Project site. KOP 9 represents the view that Mojave National Preserve visitors would see as they exit the preserve on Ivanpah Road. The duration of the view would be short and would only be a forward view along Ivanpah Road. After a driver turned right or left onto Nipton Road, the view toward the Proposed Project site would be the view looking from the side and would not be within the driver‘s primary cone of vision.

Figure 3.12-10. KOP 9 – View from Entrance to Mojave National Preserve

In KOP 9, the Ivanpah Valley stretches into the distance. The foreground is covered by coarse vegetation interspersed with bare patches with colors ranging from green to brown. The foreground also contains the Ivanpah Road and Nipton Road intersection and associated signs.

Most of the middleground is not visible due to the curvature of the valley floor and vegetation in the foreground. Parts of Ivanpah dry lakebed are visible as the whitish-tan strip devoid of vegetation across the right half of the image. Behind it, an alluvial fan extends from the Ivanpah Valley toward the Lucy Gray Mountains. Vegetation on the alluvial fan gives it a dark hue. Due to the dark color of the substrate and the distance, the power plant color blends into that of the alluvial fan and is only visible in profile as a dark blocky structure against lighter mountains in the distance. Primm is not visible in this image. The Lucy Gray, Clark, and Spring Mountain ranges form a backdrop to the image.

3.13 Transportation/Motorized Vehicle Access

This section identifies existing transportation and motorized vehicle access conditions in the Proposed Project site.

3.13.1 Existing Traffic Volumes

Annual Average Daily Traffic (AADT) is defined as the total volume of traffic passing a point or a segment of a highway facility in both directions for one year divided by the number of days in the year (Traffic Research Board 2005). AADT figures are calculated by the Nevada Department of Transportation (NDOT) to assist in the determination of average traffic volumes at particular points along state roads throughout Clark County and the State of Nevada. The closest points to the Proposed Project site (that have AADT figures published by NDOT) are on the northbound and southbound off-ramps from I-15 at the Primm Interchange (Exit 1), and volumes were reported as 4,400 and 8,900, respectively (see Table 3.13-3). As of September 2009, the year-to-date average daily auto traffic on I-15 at the California-Nevada border was calculated at 38,687 vehicles (Las Vegas Convention and Visitors Authority 2009).

Level of Service (LOS) is defined as a quality measure describing operational conditions within a traffic stream, generally in terms of such service measures as speed and travel time, freedom to maneuver, traffic interruptions, and comfort and convenience (Traffic Research Board 2005). LOS indicators for the highway and roadway system are based on specific characteristics of traffic flow on designated sections of roadway during a typical day. For mainline freeway and roadway segments, these include overall traffic volume, speed, and density. Several physical and operational characteristics of the roadway, such as lane configuration, free-flow speed (typical speed between intersections), and number of intersections per mile, are used to determine the vehicular capacity of the roadway segment. When these two sets of data are compared, a volume to capacity (V/C) ratio is calculated. These factors are then converted to a letter classification identifying best to worst operating conditions, expressed as a LOS A through F and defined in Table 3.13-1.

Table 3.13-1. Level of Service Classifications and Definitions

LOS Class	Definition
A	Free flow of traffic. Individual users are virtually unaffected by others in the traffic stream. Level of comfort and convenience is excellent.
B	Within the range of stable traffic flow, with the presence of others in the traffic stream beginning to be noticeable. Level of comfort and convenience is below LOS A, as the presence of others in the traffic stream begins to affect individual behavior.
C	Within the range of stable traffic flow, but marks the point at which the operation of individual users is significantly affected by others in the traffic stream. Level of comfort and convenience declines noticeably.
D	High-density, but stable traffic flow. Speed and freedom to maneuver are severely restricted and the level of comfort and convenience is generally poor. At this level, small additions of traffic are likely to cause operation problems.
E	Operating conditions at or near the capacity level with all speeds being reduced to a low, but uniform value. Freedom to maneuver with the traffic stream is extremely difficult and comfort and convenience are extremely poor, leading to high driver frustration.

Table 3.13-1. Level of Service Classifications and Definitions

LOS Class	Definition
F	Forced or breakdown traffic flow. Exists wherever the amount of traffic approaching a point exceeds the amount which can traverse the point.

Source: Martin & Martin 2001

3.13.2 Major Traffic Routes Within or Adjacent to the Proposed Project Site

The Proposed Project site is located in a largely undeveloped area and, therefore, major transportation routes are limited. Traffic routes within the Proposed Project site are limited to unpaved OHV roads, trails, and dry washes. I-15 would provide indirect access to the Proposed Project from the urban centers of Southern California, such as San Diego and the greater Los Angeles area from the south, and Salt Lake City and Las Vegas from the north. East Primm Boulevard provides east-west direct access from I-15, South Las Vegas Boulevard/Nevada State Route (SR) 604, and Desert Arena Drive, as shown in Table 3.13-2. Additionally, several competitive OHV races traverse the roads, trails, and washes of the Proposed Project site, including the Terrible's Primm 300 off-road vehicle race (see Section 3.11, Recreation, for further discussion).

Table 3.13-2. Routes Providing Direct or Indirect Access to the Proposed Project Site

Route	Direction	Type	Lanes	Description
I-15	north-south	Paved Interstate Freeway	3-4 (Each direction)	Provides a connection between San Diego, Victorville, and Barstow, California and Las Vegas, Nevada and points north. Provides direct access to Proposed Project site via East Primm Boulevard.
East Primm Boulevard	east-west	Paved Arterial (public portion)/ Local street (private portion)	1-2 (Each direction)	Provides public access east from both I-15 and South Las Vegas Boulevard to Desert Arena Drive. Becomes a private road east of Desert Arena Drive and leads to the Proposed Project site and NV Energy Walter M. Higgins Generating Station.
South Las Vegas Boulevard/ Nevada SR 604	north-south	Paved Arterial/ State Route	1-2 (Each direction)	Runs parallel, at various distances, to I-15 from the California/Nevada state line to north of Las Vegas. Provides direct access to the Proposed Project site via East Primm Boulevard.
McIntyre Boulevard	east-west	Unpaved Road	1-2	Runs parallel to the east side of SR 604 until reaching off-road race course immediately north of Buffalo Bill's Casino, where it makes a 90-degree turn and connects with Desert Arena Drive. Provides direct access to the Proposed Project site via Desert Arena Drive and East Primm Boulevard.
Desert Arena Drive	north-south	Unpaved Road	1-2	Runs parallel to the eastern perimeter of Buffalo Bill's Casino between McIntyre Boulevard and East Primm Boulevard. Provides direct access to the Proposed Project site via East Primm Boulevard.

Table 3.13-2. Routes Providing Direct or Indirect Access to the Proposed Project Site

Route	Direction	Type	Lanes	Description
Union Pacific Railroad	north-south	Railroad	1 track	Provides connection between Salt Lake City and Los Angeles. Private access portion of East Primm Boulevard passes over the railroad grade less than 1 mile west of the Proposed Project site.

Sources: Clark County 2008

For intersections, LOS can be determined by using either the methodology described above or by using the average control delay (the amount of time a vehicle is delayed by the operations of the traffic signal) calculated at an individual intersection (Traffic Research Board 2005). Peak Hour Volume is defined as the volume of vehicle traffic during the maximum-volume hour of the day (there is typically an A.M. and P.M. Peak Hour Volume on most roadways) (Traffic Research Board 2005).

Available LOS and Peak Hour Volume data for local roads servicing the Proposed Project site are presented in Table 3.13-3.

Table 3.13-3. Existing Traffic Volumes and Levels of Service

Route	Segment	Peak Hour Volume[a]	Annual Average Daily Traffic[b]	Level of Service
I-15	Northbound off-ramp of the Primm Interchange (Exit 1)	149 – 519 (A.M.)[4] 248 – 821 (P.M.)[4]	4,400[2]	D (A.M. Peak)[5] E (P.M. Peak)[5]
I-15	Southbound off-ramp of the Primm Interchange (Exit 1)	No Data Available	8,900[2]	D (A.M and P.M. Peak)[5]
I-15	California/Nevada State Line	1,207 – 2,651 (South)[3] 1,129 – 2,185 (North)[3]	38,000[2]	No Data Available
East Primm Boulevard	Eastbound at intersection with NB I-15 off-ramp	207 (A.M.)[5] 221 (P.M.)[5]	No Data Available	A (A.M and P.M. Peak)[5]
East Primm Boulevard	Westbound at intersection with NB I-15 off-ramp	159 (A.M.)[5] 132 (P.M.)[5]	No Data Available	C (A.M. and P.M. Peak)[5]
South Las Vegas Boulevard/Nevada SR 604	Primm to Las Vegas	No Data Available	No Data Available	No Data Available

Sources: [1] Clark County 2008a, [2] NDOT 2009b, [3] NDOT 2009c, [4] NDOT 2009d, [5] Martin & Martin 2001

Notes:
[a] Volume of vehicle traffic during the maximum-volume hour of the day.
[b] Total volume of vehicle traffic for a year divided by 365 days. From NDOT 2009b Annual Traffic Report.

3.14 Human Health and Safety/Hazardous Materials

This section defines existing conditions relative to human health and safety/hazardous materials to establish a baseline against which potential impacts may be measured. The Proposed Project is located on undeveloped lands administered by the BLM and would be potentially affected by existing hazards in the project area, including fire, earthquakes, flooding, and existing soil or groundwater contamination. Hazards associated with seismic conditions are addressed in Section 3.3, Geology, Topography, and Geologic Hazards. Flood-related hazards are addressed in Section 3.5, Water Resources. Other potential natural hazards, hazards related to existing infrastructure, and hazards associated with uses of the site and its vicinity are considered herein.

3.14.1 Potential Hazardous Wastes/Contaminated Soil and Groundwater

Exposure to hazardous materials or wastes can occur due to both the existing conditions at the site and the Proposed Project activities. The potential for encountering hazards and hazardous material sites in the Proposed Project area during construction and operation would exist if existing and past land use activities possess indicators of hazardous material storage and use. Examples of past and current land uses that could have resulted in unknown contamination include the following:

- Rural residences and farms that commonly have old or inactive underground storage tanks (USTs);
- Pesticide-polluted runoff from agricultural properties; and
- Commercial and industrial sites (historic and current) that could have soil or groundwater contamination from unreported hazardous substance spills.

The primary reason to define potentially hazardous sites is to protect worker health and safety and to minimize public exposure to hazardous materials during construction and waste handling. If encountered, contaminated soil may qualify as hazardous waste, thus requiring handling and disposal according to local, state, and federal regulations.

Existing and past land use activities with potential for encountering hazards and hazardous materials within the Proposed Project site could be related to industrial and mining activities. The closest industrial facility located in the vicinity of the Proposed Project is the 598MW NV Energy Walter M. Higgins Generating Station, located 0.45 mile from the proposed north substation. There is no evidence of previous agricultural development at the site. However, four closed mining claims are located within the Proposed Project site (Table 3.14-1), and two active and 38 closed claims located within a 1-mile radius of the site boundaries (BLM 2010).

There is no reported evidence of previous agricultural or commercial activity in the site; however, no Phase I Environmental Site Assessments have been previously conducted on the site.

A review of the NDEP Bureau of Corrective Actions, NDEP Bureau of Waste Management, and EPA online databases indicates that there are two active UST sites located within 2 miles of the Proposed Project site boundaries, as shown in Table 3.14-2. No brownfields, active remediation sites, or waste management facilities have been identified within a 1-mile radius from the

Proposed Project. Also, there is no evidence of illegal dumping sites near the Proposed Project area.

Table 3.14.1. Mining Claims Located within the Proposed Project Area

Claim Name	Status
COPPER HILL # 9	Closed
JAMES 23	Closed
D & M # 10	Closed
D & M # 7	Closed

Source: BLM 2010

Table 3.14.2. Potentially Contaminated Sites in the Vicinity of the Proposed Project Area

Site Name	Address	City	Site/Facility Type	Cleanup Status	Distance from Proposed Project Site
Whiskey Pete's Chevron Truckstop	115 West Primm Blvd.	Primm	Federally Regulated Underground Storage Tank (UST)	Active Permit	1.79 miles
Primm Valley Texaco	31960 South Las Vegas Blvd.	Primm	Federally Regulated Underground Storage Tank (UST)	Active Permit	1.57 miles

Sources: NDEP 2009, NDEP 2009, EPA 2009

Additional potential sources of hazards or hazardous materials within the Proposed Project site are pipeline and other utilities crossings. There are three major petroleum pipelines located in Clark County, Nevada, including the Kern River high pressure natural gas line, Southwest Gas that supplies natural gas to southern Las Vegas Valley, and the Kinder Morgan Calnev pipeline that supplies fuel to the McCarran International Airport and Las Vegas Terminal (Clark County Local Emergency Planning Committee [LEPC] 2008). However, none of these pipelines would cross or be located within 1 mile of the Proposed Project site (BLM 2010).

Regarding other utilities related to existing conditions and potential exposure to hazards or hazardous materials, the northwestern boundary of the Proposed Project site would be located immediately adjacent to a UPRR main line ROW which runs through southern Nevada and connects Los Angeles-Long Beach with Salt Lake City. Major commodities handled by the railroad include coal, chemicals, aggregates, lumber, and consumer goods (Clark County LEPC 2008).

3.14.2 Fire Hazards

The Nevada Fire Safe Council commissioned the Clark County Community Wildfire Risk/Hazard Assessment Project which was published in 2005. This assessment included communities at risk within the vicinity of federal lands that are most vulnerable to the threat of wildfire, and was based on five primary factors that affect potential fire hazard:

1. Community design;
2. Construction materials;
3. Defensible space,
4. Availability of fire suppression resources; and
5. Physical conditions such as the vegetative fuel load and topography (Resource Concepts, Inc. [RCI] 2005).

The list of Clark County communities assessed by the Nevada Fire Safe Council included Primm, located 2 miles west of the Proposed Project site. The vegetative fuel density in the Primm area is generally light dominated by widely spaced creosote bush, Joshua trees, and yucca (RCI 2005). The area surrounding Primm is a Wildland-Urban Interface (WUI), with a clear demarcation between building structures and wildland fuels (RCI 2005).

The Community Hazard Assessment conducted for the Clark County Multi-Jurisdictional Hazard Mitigation Plan (2005) classifies Primm as ―Low Fire Hazard" due to its low wildfire ignition risk potential. The rating was primarily attributed to sparse vegetation and sufficient defensible space. The assessment determined that there is no significant wildfire history in the area surrounding the community, and the recorded history of lightning strikes and other ignitions shows only one incident. According to this assessment, the worst-case fire hazard scenario would occur on an August afternoon with an ignition along I-15 south of town. Strong wind could push a fire through sparse vegetation. There is low fire danger with very low probability of structure loss if minimum defensible space is maintained topography (RCI 2005).

An additional potential fire hazard sources related to the Proposed Project would be related to the existing UPRR ROW and electric transmission lines within the area. The northwestern boundary of the Proposed Project site would be located immediately adjacent to the UPPR, as well as to power lines owned and operated by the Los Angeles Department of Water and Power (LADWP), SCE and NV Energy. A portion of these transmission lines would be located within the Proposed Project site boundary, as shown in Table 3.14-3. The Clark County 2005 Hazard Mitigation Plan has recommended maintaining vegetation fuels along railway corridor 15 feet from tracks in order to reduce fire risk and hazards related to the railroad operations (Clark County 2005; RCI 2005).

Regarding fire response and abatement resources, there is no fire department in Primm. The closest resources to respond to a wildland fire threatening the community would come from Clark County Fire Department (CCFD) Station 78 in Goodsprings, approximately 30 miles to the north. Water available for fire suppression in Primm includes fire hydrants with a minimum flow capacity of 500 gpm within 500 feet of structures, community wells that operate on electric pumps (with emergency back-up), and a one-million-gallon storage tank (RCI 2005).

Table 3.14-3 Utility Crossings within the Proposed Project Boundary

Right-of-Way Holder	Right-of-Way Type
Los Angeles Dept. of Water and Power	Transmission line (2 crossings)
Southern California Edison	Transmission line (1 crossing)
NV Energy	Transmission line (1 crossing)

Source: BLM 2009

Additionally, coordinated resources could be requested from the USFS, the NPS, and the BLM through the Las Vegas Interagency Communications Center. The Nevada Division of Forestry also provides mutual aid dispatched from the Sierra Front Interagency Dispatch Center in Minden, Nevada, which locates the nearest available fire suppression resource according to incident command and computer aided dispatch protocols (Clark County 2005).

3.15 Social and Economic Conditions

3.15.1 Social

This section describes the existing demographic and social conditions in the most immediate area in closest proximity to the Proposed Project as well as the broader host region, Clark County, Nevada.

The social profile functions as the baseline and existing environment setting against and focuses on the demographic and social trends, and groups and their attitudes that comprise the host environment or region of influence. Clark County is profiled since the Proposed Project assets will be incorporated into the physical energy infrastructure serving Clark County and will potentially provide electrical power to the region. The Proposed Project will also use resources (land, labor and materials) and pay taxes to the county.

3.15.1.1 Community Setting

The Proposed Project area falls within the South County Planning Area that is a special planning sub-region for Clark County. The South County Planning Area includes the unincorporated communities of Jean and Primm and these areas fall within census tract 57.03 and zip code tabulation area 89019. The Proposed Project is located in the Ivanpah Valley, characterized by expansive arid landscapes, broad valleys, the Ivanpah and Roach Dry lakes, and rugged mountains. The South County Plan embodies some of the social concerns of area residents and, consequently, key goals of the Plan are profiled in the existing conditions section.

3.15.1.2 Demographics and Social Trends

Population

Primm is the closest population center to the Proposed Project and had an estimated population level of 1,060 in 2008 (Clark County Department of Comprehensive Planning [CCDCP] 2008). Primm's population level reflects a community that is primarily comprised of workers and their families who support the resorts and hotels serving the casinos (i.e., Buffalo Bill's, Primm Valley Resort, and Whiskey Pete's). Primm's three resort hotels provide community housing for the workers. Jean, Nevada, hosts two correctional facilities (the currently closed Southern Nevada Correctional Center), a medium custody facility for male inmates, and Jean Conservation Camp, a minimum custody facility for female inmates). These facilities are operated by the Nevada Department of Corrections (South County Land Use Plan [SCLUP] 2008).

Over the last 10-year period (excluding the most recent recession), the region has grown rapidly in line with the growth experienced by the metropolitan Las Vegas area. Average annual population growth rates have exceeded 2 percent per annum over the last several years and demographers expect this pace will resume and continue in the medium- and long-term planning horizon. The immediate region of influence near Primm is sparsely populated, as evidenced by the Zip Code Tabulation Area 89019 and census tract 57.03 low population densities. Nevada demographers expect that Clark County's population will increase to 2.7 million by 2020 and rise to 3 million persons by 2028 (Nevada State Demographer's Office [NVSDO] 2008). The racial composition of Zip Code Tabulation Area 89019 is predominantly White (82.2 percent) with Blacks and Asians each comprising about 3.5 percent of the total population, respectively. Native Americans are under 1 percent of the total population of this area, while Hispanics comprise 11.9 percent of total population. Hispanics can be of any race (USCB 2000). Table 3.15-1 presents a summary of population levels and growth trends in the Clark County, Nevada area.

Table 3.15-1. Population Levels, Growth Rates, and Density

Area	Population Levels 2000	Population Levels 2008 est.	Population Growth Rates 2000-2008	Population Growth Rates Average Annual Growth	Population Density Persons/ mile^2 (2000)	Population Density Person/ mile^2 (2008 est.)	Population Density Land Area (mile^2)
Nevada	1,998,257	2,738,733	37.1%	4.0%	18.2	24.9	109,826
Clark County	1,424,956	1,986,146	39.4%	4.2%	180.1	251.1	7,910
Las Vegas, City	478,434	593,528	24.1%	2.7%	4222.5	5,238.3	113.3
Primm	261	1,060	306.1%	19.1%	2.5	10.1	105.0
Jean	600	216	-64.0%	-12.0%	30.0	10.8	20.0
Zip Code Tabulation Area: 89019	2,478	3,205	29.3%	3.3%	11.8	15.2	210.4
Census Tract: 57:03	2,702	n.a.	n.a.	n.a.	1.9	n.a.	1,405.5

Sources: CCDCP 2008, NVSDO 2008, USCB 2000

Key:
n.a. = not available

Housing

The permanent housing stock in closest proximity to the Proposed Project area reflects the nature of the institutions that are supporting these communities. Approximately 75 percent of Primm's population is housed in apartments while the remaining 25 percent reside in Mobile homes. Housing within the unincorporated area of Jean reflects the institutional population comprised of the two correctional facilities housing male and female inmates (CCDCP 2008). Table 3.15-2 shows the distribution of housing units by type of housing for the immediate area and broader region. The dominant housing type for the communities within the western half of the South County Planning Area (including Goodsprings, Jean, and Primm) are manufactured homes (SCLUP 2008).

Table 3.15-2. Housing Stock (2008 Number of Units by Housing Type)

Housing Type	Clark County	Las Vegas Valley Urban Area	Primm
Single Family	463,812	451,205	0
Duplex 3/4 Plex	19,229	18,880	0
Mobile Home	29,463	24,204	135
Apartments	155,200	152,603	436
Town Homes	37,496	34,735	0
Condominiums	79,488	76,037	0
Total Units:	**784,688**	**757,664**	**571**

Source: CCDCP 2008b

Clark County has a substantial number of vacant housing units, and the median home value has fallen significantly since the survey data reflected in Table 3.15-3. According to the Southern Nevada Home Builder's Association (SNHBA), the median price of a new home fell by -12.5%, from $280,000 to $245,000, between 2007 and 2008 (SNHBA 2009). The median price of an existing home in Clark County was $125,000 in October of 2009, down 31 per cent from 2008 (University of Nevada Las Vegas [UNLV] 2009).

Table 3.15-3 Housing Stock Characteristics (2006 to 2008)[a]

Area	Total Housing Units	Homeowner Vacancy Rate	Rental Vacancy Rate	Median Value (dollars)
Nevada	1,098,307	13.8%	10.2%	$296,200
Clark County	784,892	13.8%	10.4%	$299,200

Source: American Community Survey (ACS), n.d.
Note:
[a] American Community Survey estimates are based on data collected over a 3-year time period. The estimates represent the average characteristics of population and housing between January 2006 and December 2008 and do not represent a single point in time.

Clark County had a hotel/motel room inventory of 141,190 in September of 2009. The September 2009 hotel occupancy rate was 83.2 percent, down from 84.3 percent in September of 2008 (UNLV 2009).

Affected Groups and Attitudes

This section discusses some of the groups who potentially may be impacted by the Proposed Project. Classifying stakeholders into groups does not imply that other stakeholders who do not fit into a particular group are being overlooked or are outside of the social and environmental review process. Discussion of the affected groups is simply a means to highlight and facilitate issue framing related to the social concerns of some stakeholders who may have a particular local or regional relationship to the host landscape (the Proposed Project footprint) that may potentially be developed to exploit solar energy. Social concerns were heard during the scoping process.

Public Land Recreational Users / Off-Highway Vehicle Users / Organizations and Supporting Industries

OHV enthusiasts and racers have a unique historic relationship to the land. These recreationists depend on having physical connectivity to trails and courses that are unimpeded by any structures. Social concerns for this group relate to the potential loss of recreational resources and mitigation measures. Moving beyond the immediate OHV users, social concerns relate to the social and economic well being of supporting industries that depend on OHV demand (events and usage patterns) for their livelihoods and form an important part of the regional economy.

Environmental Groups and Stewards

Environmental groups and stewards have concerns about the potential loss of habitat and desert environment that supports numerous species, some of which are threatened and endangered. This group is also concerned with mitigation measures and proposed strategies, and the potential cumulative impacts to the host environment as it relates to biodiversity vis a vis renewable energy development on a large utility scale. Some environmental groups are also concerned with the loss of desert open space areas and the potential impacts to the carbon sequestration function of the unimpeded desert soils and the potential loss of vegetation and drainage impacts. The social aspect relates to the feelings of unease in how the groups‘ historic stewardship role may be compromised by developments that may be perceived to be outside of their control.

Project Construction Workers and Suppliers to the Renewable Energy Industry

A group of stakeholders in the region are unemployed or underemployed. These stakeholders view the clean energy economy transition and projects such as renewable energy as potential future economic opportunities that will also improve their social welfare. Since the area is in the midst of a recession, social attitudes towards future employment opportunities and cross training are favorable and hopeful. Suppliers to the renewable energy industry are firms and establishments that can provide goods or services necessary to build, operate, and decommission the Proposed Project or other renewable projects in the area. These firms can potentially be local, regional, or national in origin and have a vested interest in participating in renewable energy development. The livelihood of this group depends on economic opportunities for exploiting renewable energy in the region.

Utility Off-Taker and End-Use Energy Consumers

The processors, distributors, and ultimate consumers of potential electricity to be generated by the Proposed Project are a social group that will be considered in the socioeconomic impact

evaluation. The Proposed Project's energy output will be delivered to a grid system for use by final retail consumers. These consumers have various social attitudes towards renewable energy that relates to its reliability, cost, and the environmental sustainability of this resource. These attitudes also include concerns for the resources consumed (e.g., water) and the tradeoffs necessary to achieve emission free solar power generation. The average consumer is concerned with how their local energy bill or electricity rates may potentially change with the introduction of solar energy assets.

Local Private Land Owners / Residents / Large Lot Owners

Local private land owners with properties that are in the vicinity of the Proposed Project have various attitudes towards renewable energy development. The attitudes range from being pro renewable energy development, to being against a change to the desert environment, to being indifferent to the proposed development. Local land owners are also concerned about effective permanent changes to the natural high desert environment (given the 50-year lease aspect of the ROW grant), wildlife, and potential impacts to property values.

3.15.2 Economic

The immediate vicinity landscape corridor near the Proposed Project has been significantly altered by human use. Because of its strategic location between Los Angeles and Las Vegas, this portion of the Ivanpah Valley has historically been used as a major transportation thoroughfare and utility corridor. Modern and built-environmental features of the landscape include an interstate highway (I-15 corridor); a mainline railroad track; the resort town of Primm with its casinos; a mall (the Fashion Outlets of Las Vegas) and roller coaster; several high-voltage transmission lines that converge in this area; and the NV Energy Walter M. Higgins Generating Station, a large combined-cycle generating station that employs highly visible heat recovery steam generators, switchyard, stacks, and air-cooled condenser (NextLight 2009). The immediate Proposed Project area (near Primm) is also a gateway and overflow tourist area that can accommodate the greater Las Vegas region during periods of peak tourist and convention event demand. The economy of Primm is based on its three casinos that cater to gaming tourists traveling between Nevada and California.

3.15.2.1 Economic Base and Trends: Employment, Earnings, and Income

The economic base describes the industries, jobs, earnings, and wealth that collectively define the economy of the region. Since the most comprehensive economic indicators are compiled at the county level, county-level data have been used to describe the regional economy. Key industries and economic trends that are relatively more important to the character of the region are highlighted in more detail.

Employment

The City of Las Vegas accounts for approximately 29.5 percent of the labor force and current employment level for Clark County. Clark County had a labor force of 994,000 persons as of October of 2009, with almost 130,000 unemployed persons. The greater Las Vegas economy has been severely impacted by the recession. Unemployment started to rise substantially towards the end of 2008 and only declined slightly in October. Regional unemployment rates are

equivalent to the Nevada state average of 13 percent (Bureau of Labor and Statistics [BLS] 2009). Table 3.15-4 presents data related to employment in the Proposed Project area.

Table 3.15-4. Labor Force, Employment, and Unemployment

	Nevada	Clark County	City of Las Vegas	City of Las Vegas/ Clark County
2008				
Labor Force	1,373,462	987,998	291,799	29.5%
Employed	1,282,012	922,878	272,182	29.5%
Unemployed	91,450	65,120	19,617	30.1%
Unemployment Rate	6.7%	6.6%	6.7%	102.0%
2009 October				
Labor Force	1,386,167	994,934	294,317	29.6%
Employed	1,210,821	865,222	255,178	29.5%
Unemployed	175,346	129,712	39,139	30.2%
Unemployment Rate	12.6%	13.0%	13.3%	102.0%

Source: BLS 2009

Figure 3.15-1 shows the trends in unemployment rates since 1999 for the region. Area unemployment rates have increased by eight percentage points (on average) from their December 2007 levels. These job losses have been devastating to the region.

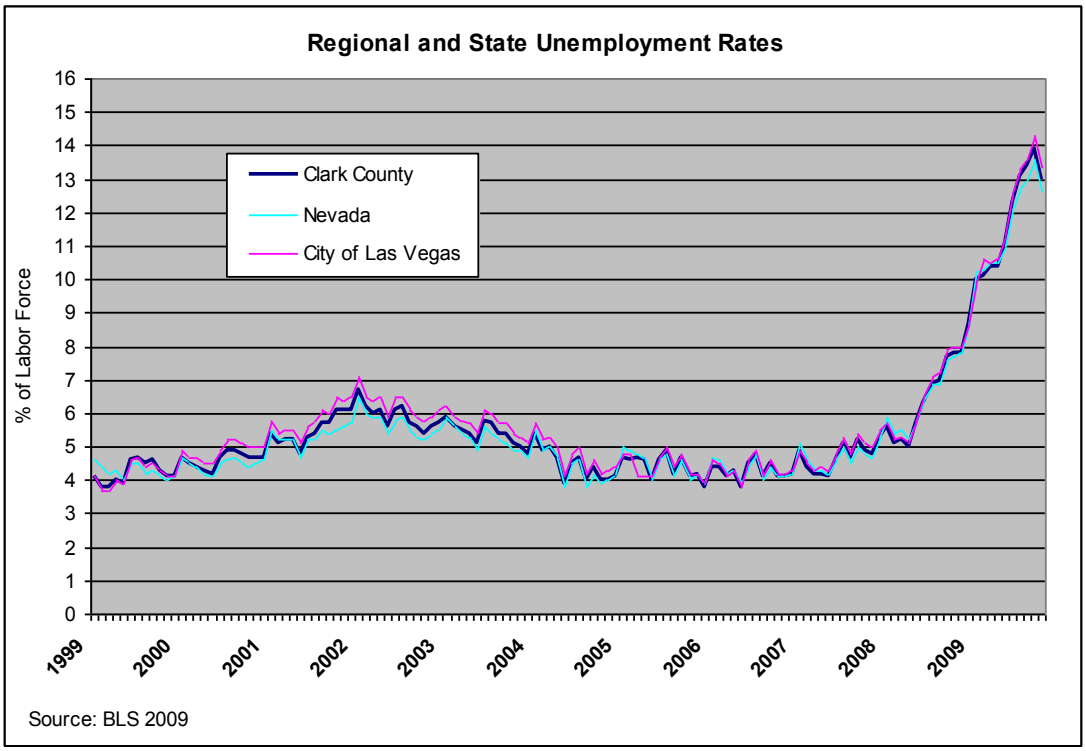


Figure 3.15-1. Regional and State Unemployment Rates

Employment Composition

Clark County, home of the Las Vegas strip casinos and resorts, is both a domestic and international tourist destination. The economy is heavily dependent on the leisure and hospitality sector, as well as closely linked supporting sectors in arts, entertainment, and retail trade establishments. In addition, hotel and resort renovation, development, and expansion within Las Vegas have traditionally been a mainstay of the Clark County economy. The recession has had a major negative impact on construction employment and has also affected most industries within the county. Table 3.15-5 shows the distribution of employment by industry within Clark County, comparing 2008 and the first quarter of 2009. Annual total wages and average weekly wages across industries are also profiled.

Table 3.15-5 shows that total employment levels in Clark County declined by over 70,000 jobs between 2008 and March of 2009. Virtually all industry sectors have been negatively impacted by the recession, with the exception of Education and Health Services and a few other unclassified sectors. Particularly hard hit was the construction sector that shed over 20,000 jobs (29 percent of the total job losses) over this period. The construction industry used to employ 10 percent of all workers in the economy, but now employs approximately 8.6 percent. The leisure and hospitality sector has shed almost 18,000 jobs since 2008. This backbone industry accounts for approximately 30 percent of the employment base of Clark County.

Annual total wages paid in Q1 of 2009 were $35.6 billion. The loss in employment has removed over $3.4 billion in annual total wages from the Clark County economy since 2008. Average weekly wages have declined by 1.8 percent for all industries combined. The most recent available data show that the construction industry has yet to stabilize. Figure 3.15-2 shows the Clark County construction employment level trends since 2002 and the annual growth rate in construction jobs. The industry peaked in July of 2006, and employed over 111,000 construction workers at that time. Since the peak of activity, construction employment has declined by 40,000 workers. According to area researchers, the economic contraction reflects the national recession, the overbuilt housing stock and commercial real estate, and excess hotel room inventory/supply (UNLV 2009).

Table 3.15-5. Clark County Employment by Industry, Annual Total Wages, and Average Weekly Wage

Industry	Employment by Industry 2008	Employment by Industry 2008 %	Employment by Industry Mar-2009	Employment by Industry 2009 %	Employment by Industry Absolute Ch. 2008 - 2009	Annual Total Wages 2008	Annual Total Wages Q1 2009 Annualized	Annual Total Wages Absolute Ch. 2008 - 2009	Average Weekly Wage 2008	Average Weekly Wage 2009 Q1	Average Weekly Wage % Ch. 2008 - 2009
Total All Industries	905,267	100.0%	834,217	100.0%	(71,050)	$39,035,219	$35,609,868	$(3,425,351)	$829	$814	-1.8%
Natural Resources and Mining	501	0.1%	394	0.0%	(107)	$22,149	$17,208	$(4,941)	$850	$835	-1.8%
Construction	92,364	10.2%	71,849	8.6%	(20,515)	$5,528,238	$4,403,244	$(1,124,994)	$1,151	$1,143	-0.7%
Manufacturing	25,363	2.8%	21,934	2.6%	(3,429)	$1,227,105	$1,046,860	$(180,245)	$930	$901	-3.1%
Trade, Transportation, and Utilities	160,591	17.7%	148,604	17.8%	(11,987)	$5,750,286	$5,332,824	$(417,462)	$689	$683	-0.9%
Information	11,014	1.2%	9,951	1.2%	(1,063)	$604,341	$548,800	$(55,541)	$1,055	$1,070	1.4%
Financial Activities	47,396	5.2%	43,463	5.2%	(3,933)	$2,332,776	$2,193,128	$(139,648)	$947	$964	1.8%
Professional and Business Services	111,625	12.3%	101,066	12.1%	(10,559)	$5,950,505	$5,380,892	$(569,613)	$1,025	$1,003	-2.1%
Education and Health Services	66,213	7.3%	66,713	8.0%	500	$3,173,334	$3,095,700	$(77,634)	$922	$895	-2.9%
Leisure and Hospitality	269,518	29.8%	251,817	30.2%	(17,701)	$8,584,925	$7,746,100	$(838,825)	$613	$589	-3.9%
Other services	20,738	2.3%	19,018	2.3%	(1,720)	$644,955	$580,392	$(64,563)	$598	$588	-1.7%
Public Administration	39,451	4.4%	n.a.	n.a.	n.a.	$2,448,832	n.a.	n.a.	$1,185	n.a.	n.a.
Unclassified	855	0.1%	1,117	0.1%	262	$51,701	$64,596	$12,895	$1,163	$1,243	6.9%

Source: BLS 2009b

Key:
n.a. = not available

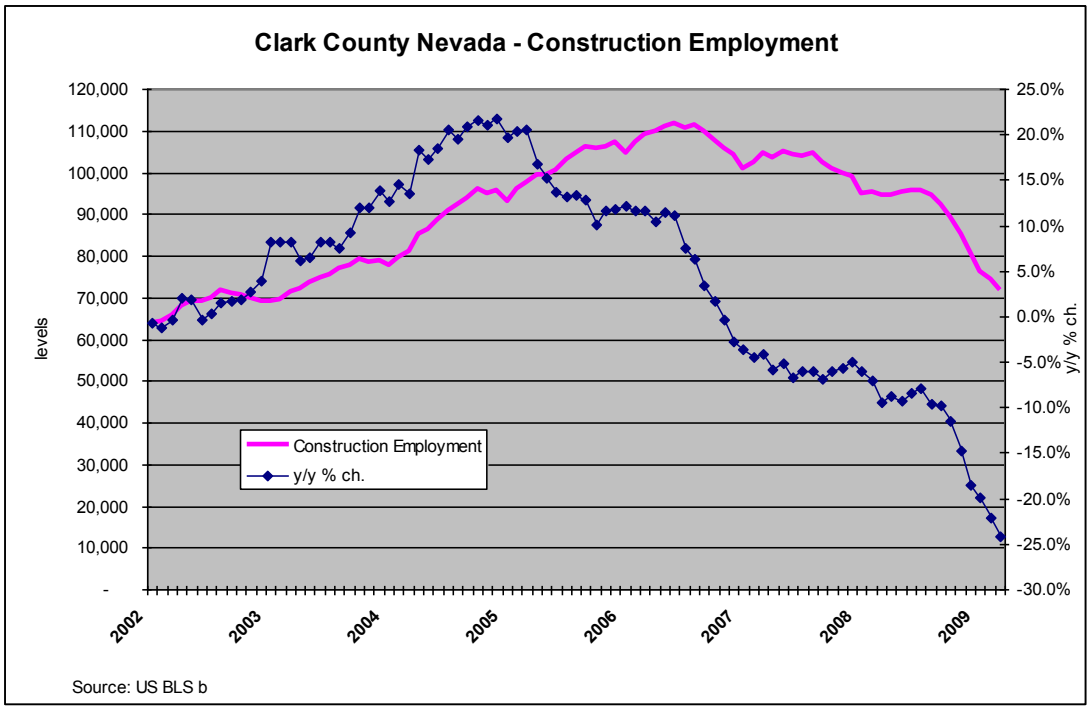


Figure 3.15-2. Clark County Nevada – Construction Employment

Tourism

Tourism provides the driving economic force for a significant part of the Clark County economy. Researchers at UNLV compile and track several indicators of tourist activity that serves as a barometer of economic conditions supporting Las Vegas. Table 3.15-6 shows that key indicators such as taxable sales, gaming revenue, airline passengers and hotel occupancy are beneath prior year levels and have not yet returned to their pre-recession normal annual growth rates (UNLV 2009).

Table 3.15-6. Clark County Tourism Indicators

Indicator	Date	Latest Period	Previous Period	Year Ago	% Δ from prior month	% Δ from prior year
Taxable Sales	Aug-09	$2,239,397,937	$2,226,329,436	$3,028,823,555	0.6%	-26.1%
Clark County Taxable Gasoline Sales (Gallons)	Aug-09	65,471,464	66,982,145	67,652,574	-2.3%	-3.2%
McCarran Total Airline Passengers	Sep-09	3,336,007	3,495,522	3,377,238	-4.6%	-1.2%
Gaming Revenue	Sep-09	$774,055,720	$708,130,123	$853,511,000	9.3%	-9.3%
Visitor Volume (all of Clark County)	Sep-09	3,350,862	3,402,171	3,230,992	-1.5%	3.7%
Room Inventory (Las Vegas Metro)	Sep-09	141,190	141,420	137,690	-0.2%	2.5%
Convention Attendance (Las Vegas Metro)	Sep-09	401,319	235,841	357,525	70.2%	12.2%

Table 3.15-6. Clark County Tourism Indicators

Indicator	Date	Latest Period	Previous Period	Year Ago	% Δ from prior month	% Δ from prior year
Hotel/Motel Occupancy (Las Vegas Metro)	Sep-09	83.2%	81.4%	84.3%	2.2%	-1.3%

Source: UNLV 2009

Income

Clark County median and per capita incomes exceed the U.S. average, although 10.5 percent of the individuals within the county have incomes that are below the poverty level threshold. Total personal income shows that the county accounts for 70 percent of the total wealth of the state (see Table 3.15-7), using personal income as a proxy measure for total wealth or the total value of Gross Domestic Product (GDP).[1]

Table 3.15-7. Measures of Income and Wealth (2008, except where noted)

	Nevada	Clark County	U.S.
Median Household Income (2008)	$56,348	$56,954	$52,175
Per capita income	$28,049	$28,138	$27,466
Families below poverty level	7.6%	7.6%	9.6%
Individuals below poverty level	10.8%	10.5%	13.2%
Personal Income, 2007, Bils.$[a]	$101.8	$71.6	$11,634

Sources: USCB, n.d.(a), Bureau of Economic Analysis (BEA) 2007

Note:

[a] Personal income is the income received by all persons from all sources. Personal income is the sum of net earnings by place of residence, rental income of persons, personal dividend income, personal interest income, and personal current transfer receipts.

Figure 3.15-3 plots the growth in per capita income, measured as an index value, where 1990 is equal to 100. The most recent plot points for 2007 show that per capita incomes have grown by 95 to 96 percent compared to the 1990 base reference level. The annual data does not reflect the impact of the most recent recession, as the most recent annual data from the Bureau of Economic Analysis (BEA) was only available for 2007. Historically, Clark County and Nevada per capita incomes have kept pace with national trends. Since 1990, Nevada‘s growth has slightly outpaced the United States, with the exception of a few years at the beginning of the decade.

[1] GDP is not measured at the county level.

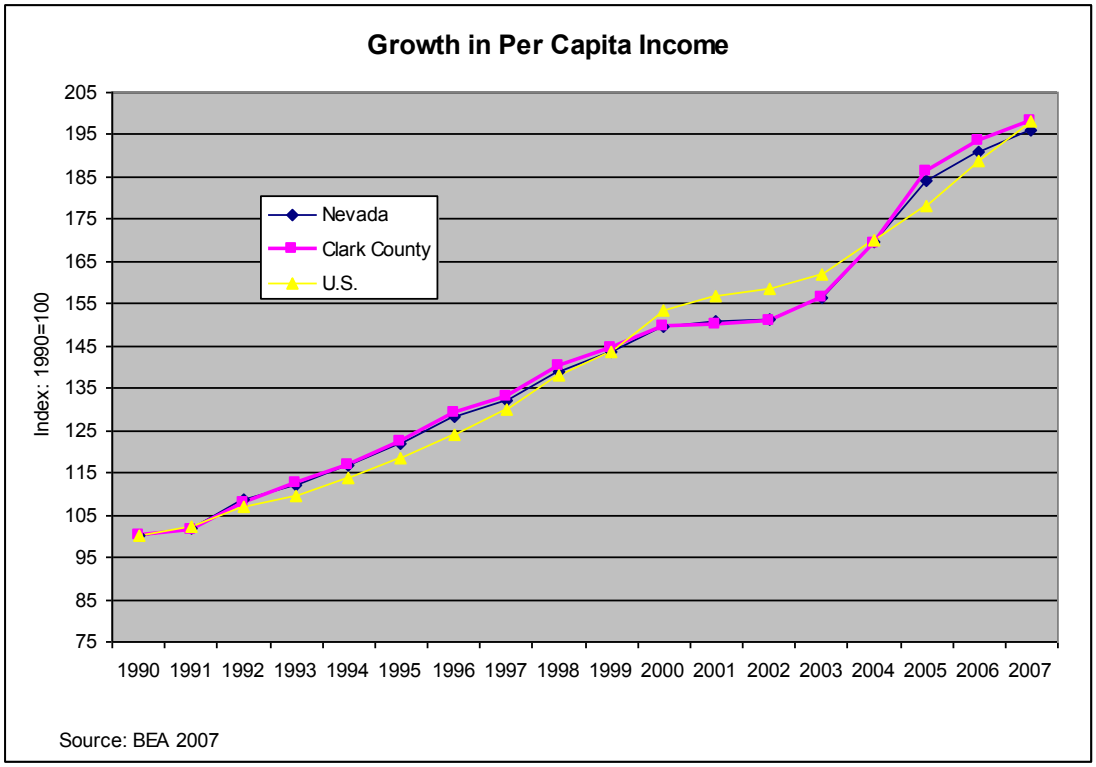


Figure 3.15-3. Growth in Per Capita Income – 1990 to 2007

Public Revenues

Clark County funds numerous public services. These services include traditional governmental activities such as those of the County Recorder, Clerk, Assessor, Treasurer, Airports, Hospital, Family Services, Social Services, and criminal justice system including Courts, District Attorney, Public Defender, and Juvenile Justice Services. For the large portion of the County's population residing in its unincorporated areas, the County provides a full range of local services such as fire and police protection, road maintenance and construction, animal control, parks and recreation, building inspection, and water and sewage systems. Table 3.15-8 shows the breakdown in revenues for 2008. County revenues totaled $5.1 billion in 2008. Ad valorem (combined real and personal property tax revenues) totaled $799 million or 16 percent of total Clark County revenues (Comprehensive Annual Financial Report [CAFR] 2008).

Table 3.15-8. Clark County Revenues 2008 (in millions of $)

Revenue Source	Clark County, Nevada	Total
Charges for Services	$2,068	40.4%
Operating Grants and Contributions	$445	8.7%
Capital Grants and Contributions	$386	7.5%
General Revenues	$2,217	43.3%
Ad Valorem Taxes	$799	15.6%
Consolidated Tax	$490	9.6%

Table 3.15-8. Clark County Revenues 2008 (in millions of $)

Revenue Source	Clark County, Nevada	Total
Sales and Use Tax	$281	5.5%
Other	$647	12.6%
Total Revenues	**$5,117**	**100.0%**

Source: CAFR 2008

The gaming and resort and entertainment companies are the largest taxpayers in Clark County. These companies include MGM Mirage, Harrah's Las Vegas, Wynn Las Vegas, Las Vegas Sands and Boyd Gaming. The Nevada Power Company was the fourth largest taxpayer for 2009-2010 (Clark County Assessor's Office [CCAO] 2009).

3.15.2.2 Public Services and Utilities

Clark County has a vast network of public services, facilities, and infrastructure that serves a large population dispersed over a wide geographic area. The following public services and facilities profiled are those that primarily provide services within the South County Planning Area or the outlying and rural areas closest to the state border. Figure 3.15-4 shows the location of these facilities vis a vis the Proposed Project location.

Water and Wastewater

Potable water for the South County communities is extracted from groundwater that is collected in a series of hydrographic basins. These basins fall under the jurisdiction of the State Engineer. Currently, all the basins within the South County have been over allocated, causing the State Engineer to "designate" them. When hydrographic basins become "designated," the Nevada State Engineer can declare preferred uses in those basins. There are a total of eight groundwater basins in the South County Planning Area and the basin corresponding to the Proposed Project area would be the Ivanpah Valley South Basin that includes the communities of Goodsprings, Jean, and Primm (SCLUP 2008). The Las Vegas Valley Water District (LVVWD) owns, operates, maintains, and administers the Jean water supply system. The Jean service area is supplied by three groundwater wells in the Ivanpah Valley and the groundwater is sourced from the Ivanpah Valley aquifer. This aquifer is recharged from the southern end of the Spring Mountains and the New York Mountains. Water from the three wells is blended before entry into the distribution system (LVVWD 2009). There are two package wastewater treatment facilities also located in Jean, Nevada serving the discharge from the prison and resort. Primm also has a package wastewater treatment plant that processes the wastewater discharge from its resort hotels (SCLUP 2008). Established neighborhoods within the South County Planning Area rely on septic systems. These systems are regulated by the Southern Nevada Health District (SNHD) (SCLUP 2008).

Fire and Emergency Medical Services

The CCFD provides fire protection and emergency medical response to South County (see Figure 3.15-4). The CCFD currently has one full-time emergency medical station, Fire Station 87, located in Jean, with four volunteer stations that provide service to the area (see Table

3.15-9). Fire Station 87 is the only full-time emergency station in South County. It is staffed with two personnel and functions as a paramedic/Advanced Life Support (ALS) unit and currently has no fire fighting capabilities. It is located at 20400 South Las Vegas Boulevard on the northern most portion of the Jean Sport Aviation Center (SCLUP 2008).

Table 3.15-9. Fire Stations and Facilities in South County Planning Area

Fire Stations/Address	Fire District/ Agency	Area Served	Equipment/ Apparatus
Sandy Valley Station (Station 77) Volunteer 650 W. Quartz Ave. Sandy Valley, NV 89019 (702) 455-7311	CCFD	South County	1 Engine (750 gal) 1 Water tender (4,000 gal) 1 Squad (250 gal) 1 Rescue
Goodsprings Station (Station 78) Volunteer 375 N. Beacon St. Goodsprings, NV 89019 (702) 455-7311	CCFD	South County	1 Engine (1,000 gal) 1 Squad (250 gal)
Fire Station 87 Paid (2 full-time) 20400 S. Las Vegas Blvd. Clark County, NV 89019 (702) 455-7311	CCFD	South County	1 Rescue

Source: CCFD 2009

Police

The Las Vegas Metropolitan Police Department (LVMPD) is the agency responsible for providing police protection in the South County Planning Area. The LVMPD was formed by the Legislature in 1973 by merging the Clark County Sheriff's Office and the Las Vegas Police Department. Both Clark County and the City of Las Vegas are responsible for funding the LVMPD. South County is currently served by the LVMPD's Resident Officer Program (SCLUP 2008). At year-end 2008, the LVMPD had 2,815 police officers and 1,416 civilian employees serving an area of 7,900 square miles. Police coverage or officers per 1,000 residents increased from 1.82 to 1.95 between 2007 and 2008 (LVMPD 2008). The Nevada Highway Patrol operates a substation in Primm, Nevada (SCLUP 2008).

Hospitals

The University Medical Center (UMC) provides medical services to Southern Clark County (SCLUP 2008). The UMC is the state-designated Level I Trauma Center for Southern Nevada, and also houses the state's only burn care facility—the Lions Burn Care Center—and operates a comprehensive free-standing unit devoted solely to physical medicine and rehabilitation. The hospital is affiliated with University of Nevada School of Medicine and serves as the state's major clinical campus (UMC 2009).

Public Schools

The Clark County School District (CCSD) provides public educational services to the entire county, covering an 8,060-square-mile area. The CCSD is a separate governmental entity from Clark County, and for administrative purposes, the county is divided into five regions. The school district is funded by local sales taxes, property taxes, state funding, and other sources. For the 2006-2007 school year, there were 302,763 students enrolled in 328 schools in Clark County. Schools in the South County Planning Area, in closest proximity the Proposed Project, are listed in Table 3.15-10. Also refer to Figure 3.15-4 for the locations of all public facilities near the Proposed Project.

Table 3.15-10. Public Service Locations in the Vicinity of the Project

Facility Type	Facility Name	Address	Town	State
Police Stations	Southern Command – Nevada Highway Patrol – Jean Substation	Sergeant Dan Solow (702) 874-1284 Fax: (702) 874-1285	Jean	NV
Hospitals	University Medical Center (UMC)	1800 West Charleston Blvd.	Las Vegas	NV
Hospitals	University Medical Center (UMC)	23120 S Las Vegas Blvd. (702) 383-2210	Jean	NV
Public Schools	Sandy Valley Elementary School (K-5)	1420 E. Pearl Ave.	Sandy Valley	NV
Public Schools	Sandy Valley Middle High School (6-12)	1420 E. Pearl Ave.	Sandy Valley	NV
Public Schools	Goodsprings Elementary School (K-5)	385 W. San Pedro Ave.	Goodsprings	NV

Sources: CCSD 2009, Nevada Highway Patrol 2009, UMC 2009

Solid Waste

Residents in the communities within the South County Planning Area have curbside pick-up provided by an independent hauler operating under a contract with Clark County. The solid waste is taken to the APEX Regional Waste Management Center located in the Northeast Planning Area of the county (SCLUP 2008).

3.16 Environmental Justice

This section presents descriptive information about communities in the Proposed Project area and their racial compositions. Data was obtained from the 2000 Census for the analysis of existing conditions pertaining to environmental justice. Data from 2000 have been used in this analysis because the block-group-level and block-level data are not available for years after 2000.

Minority populations are considered to be anywhere not classified as ―white alone" in the 2000 Census. For defining minority populations, the SF-1 detailed tables were obtained from the U.S. Census (USCB, n.d.[a]).

Poverty status in the specified geographic areas was also calculated using the U.S. 2000 Census. The U.S. Census Bureau follows the Office of Management and Budget‘s Statistical Policy Directive 14, whereby a set of money income thresholds that vary by family size and

composition are used to determine who is in poverty. If a family's total income is less than the family's threshold, then that family—and each member of the family—is considered in poverty (USCB, n.d.[b]). Data for defining poverty status and median household income was obtained from the SF-3 detailed tables from the U.S. Census (USCB, n.d.[b]). The poverty and median household income tables only go to the block-group-level and, therefore, blocks are not included in the analysis.

3.16.1 Study Area

For the purposes of evaluating existing conditions with respect to environmental justice, the study area is the Census geographies (census tract, block groups, and blocks) encompassing all potential project construction and operation activities. The identified census tract, block groups, and associated blocks are partially or fully incorporated into the study area.

Tables 3.16-1 and 3.16-2 provide demographic characteristics for the United States, State of Nevada, Clark County, and the study area geographies. These are the communities in which there could be disproportionately high or adverse impacts from the Proposed Action if an environmental justice community were to exist.

3.16.2 Minority Populations

As shown in Table 3.16-1, the percent minority population of the United States, State of Nevada, and Clark County is 24.9 percent, 24.8 percent, and 28.4 percent, respectively. The percent Hispanic or Latino of total population of the United States, Nevada, and Clark County is 12.5 percent, 19.7 percent, and 22.0 percent, respectively. Of the minority population in the United States, Nevada, and Clark County, the percent of the minority population that is American Indian or Alaska Native alone is 3.5 percent, 5.3 percent, and 2.8 percent, respectively.

The study area is completely within Census Tract 57.03 in Clark County, and there is only one Block Group (57.03.01) within that Census Tract. In 2000, 31.6 percent of the total population was considered to be a minority, and 14.4 percent of the total population was considered to be Hispanic or Latino in both the Census Tract and Block Group 57.03.01. For both Census Tract 57.03 and Block Group 57.03.01, 2.3 percent of the minority population is considered to be American Indian or Alaska Native alone.

There are 557 blocks within Block Group 57.03.01. Of these, four blocks are either fully contained or partially contained within the study area. There are no minority communities within the study area, as there is zero population in these blocks. As such, the study area is not considered an environmental justice community with respect to minority populations.

Table 3.16-1 Racial Composition and Percent Minority for the Study Area

Geographic Area	Total Population	White, alone	Black or African American, alone	American Indian and Alaska Native, alone	Asian, alone	Native Hawaiian and other Pacific Islander, alone	Some other race, alone	Two or More races	Minority [a] Aggregation	Percent of Total Population which is Minority	Hispanic or Latino (any race)	Percent of Total Population which is Hispanic or Latino (any race)	Percent of Minority which is Native American
United States	281,421,906	211,460,626	34,658,190	2,475,956	10,242,998	398,835	15,359,073	6,826,228	69,961,280	24.9%	35,305,818	12.5%	3.5%
State of Nevada	1,998,257	1,501,886	135,477	26,420	90,266	8,426	159,354	76,428	496,371	24.8%	393,970	19.7%	5.3%
Clark County	1,375,765	984,796	124,885	10,895	72,547	6,412	118,465	57,765	390,969	28.4%	302,143	22.0%	2.8%
Tract 57.03	2,702	1,847	367	20	137	5	81	245	855	31.6%	388	14.4%	2.3%
Block Group 1	2,702	1,847	367	20	137	5	81	245	855	31.6%	388	14.4%	2.3%
Block 1083	0	0	0	0	0	0	0	0	0	0	0	0	0
Block 1525	0	0	0	0	0	0	0	0	0	0	0	0	0
Block 1526	0	0	0	0	0	0	0	0	0	0	0	0	0
Block 1538	0	0	0	0	0	0	0	0	0	0	0	0	0

Source: USCB, n.d.(b)

Note:
[a] Minority aggregation includes the sum of Black or African American alone; Asian alone; American Indian and Alaskan Native alone; Hawaiian and other Pacific Islander alone; some other race alone; and two or more races

3.16.3 Low-Income Populations

Table 3.16-2 shows the median household income and percentage of the population living in poverty according to the U.S. 2000 Census for the geographic comparison areas. In 1999, the median household incomes for the United States, Nevada, and Clark County were similar at $41,994, $44,581, and $44,616, respectively.

Clark County had 10.8 percent living below poverty level, and the State of Nevada had a 10.5 percent poverty rate. These are both lower than the national poverty status of 12.4 percent. As there is zero population living within the boundaries of the study area, there are no low-income communities in the study area; thus, the study area is not considered an environmental justice community with respect to income.

Table 3.16-2. Poverty Status for Geographic Comparison Areas

Geographic Area	Median Household Income in 1999 dollars	Total Population[a]	Number with Income in 1999 below poverty level	Percent of Total Population[a] below the 1999 poverty level
United States	$ 41,994	273,882,232	33,899,812	12.4%
State of Nevada	$ 44,581	1,962,948	205,685	10.5%
Clark County, Nevada	$ 44,616	1,355,075	145,855	10.8%
Tract 57.03	$ 35,531	2,091	209	10.0%

Source: USCB, n.d.(a)

Note:
[a] Total Population is the population for which poverty status was determined in the U.S. Census 2000.

3.16.4 Surrounding Area

The state of Nevada has a higher proportion of Native American residents than the United States, at 5.3 percent of the minority population as compared to 3.5 percent of total minority population (see Table 3.16-1). While Clark County and the study area have a lower percentage of Native American minorities, additional research was conducted to analyze where higher concentrations of Native American populations reside in the vicinity of the study area. Populated census tracts, block groups, and blocks were analyzed by first finding the total minority population. The percentage of the total minority population whom responded to the U.S. Census in 2000 as being American Indian and/or Alaska Native either alone, or among other races, was determined and is shown in Table 3.16-3.

Table 3.16-3. Percentage of American Indian and/or Alaska Native Populations near the Study Area

Geographic Area	Total Population	Minority Aggregation [a]	Percent Minority	American Indian and/or Alaska Native Aggregation [b]	Percent of Minority which is American Indian and/or Alaska Native	Direction and Distance from the center of the Study Area (miles)
United States	281,421,906	6,9961,280	24.9%	411,930	5.9%	--
State of Nevada	1,998,257	496,371	54.8%	42,222	8.5%	--
Clark County	1,375,765	390,969	28.4%	20,728	5.3%	--
Tract 55.01	4,365	198	4.5%	53	26.8%	--
Block Group 1	3,030	129	4.3%	34	26.4%	37.70 NE
Block Group 2	1,335	69	5.2%	19	27.5%	34.59 NE
Tract 55.02	4,091	227	5.5%	67	29.5%	--
Block Group 1	3,646	186	5.1%	59	31.7%	38.99 NE
Tract 56.13	4,165	318	7.6%	48	15.1%	--
Block Group 1	2,244	235	10.5%	29	12.3%	66.75 NE
Tract 57.05	1,177	74	6.3%	12	16.2%	--
Block Group 1	1,177	74	6.3%	12	16.2%	48.31 SE
Tract 57.10	2,774	240	8.7%	26	10.8%	--
Block Group 1	2,774	240	8.7%	26	10.8%	23.14 NE
Tract 58.16	3,877	288	7.4%	55	19.1%	--
Block Group 1	3,877	288	7.4%	55	19.1%	20.65 NW

Source: USCB, n.d.(a)

Notes:
[a] Minority aggregation includes the sum of Black or African American alone; Asian alone; American Indian, and Alaskan Native alone; Hawaiian and other Pacific Islander alone; some other race alone; and two or more races.
[b] American Indian and/or Alaska Native Aggregation includes the sum of all categories, including race alone, two or more races, three or more races, four or more races, five or more races, and six or more races that include an American Indian and/or Alaska Native category.

As noted in Table 3.16-3, the area surrounding Census Tract 57.03 (the tract that includes the study area) includes six Census Tracts and their associated block groups. These areas have a greater percentage of American Indian and Native Alaska populations than the United States, State of Nevada, Clark County, or the study area. The closest census tract to the study area is 20 miles northwest from the center of the study area.

3.17 Energy and Minerals

This section identifies energy and mineral resources that would be impacted from construction, operation and maintenance, and decommissioning of the Proposed Project. Additionally, this section discusses applicable regulations. Information in this section is largely based on data from the USGS, NBMG, and California Data Exchange Center (CDEC).

The Proposed Project site lies on undeveloped lands administered by BLM in Clark County, Nevada. Identified mineral resources within the Proposed Project site are described below.

The BLM defines three types of mineral resources: leasable, locatable, and salable:

- Leasable minerals include, but are not limited to, oil and gas and geothermal resources that are extracted through a competitive leasing program under 43 CFR 3100.
- Locatable minerals include metallic minerals such as gold, silver, and copper that are developed within a defined geographic area and must be located on a mining claim and are managed under 43 CFR 3800.
- Salable minerals include sand, gravel, and other aggregates that are sold at fair market value under 43 CFR 3600.

3.17.1 (Fluid) Leasable Minerals

Oil and gas resources in the region were identified using data produced by the NBMG and the California Department of Conservation (2009). There are no oil or gas producers or seeps within 5 miles of the Proposed Project site.

3.17.2 Locatable Minerals

Locatable mineral resources available within the Proposed Project site were identified by compiling data from BLM's LR2000 land records system (BLM 2010). Four mining claims were active in the past (VS #17, Kodiak and Copper Hill #8 and 9), but these were closed between 1989 and 2008 (BLM 2010). Thirty-eight other claims were mined in the past in the surrounding area; however, all were closed in the late 1980s.

Distance from the Proposed Project site perimeter, site name, commodity, operation type, and development status are included in Table 3.17-1.

Table 3.17-1. Locatable Mineral Resources Within 5 Miles of the Proposed Project Site

County, State	Distance (Miles)	Site Name	Commodity	Operation Type	Development Status
Clark, Nevada	1.0	Roach Lake Nos. 137-152	Unknown	Unknown	Closed
Clark, Nevada	1.0	D & M Nos. 5-10	Unknown	Unknown	Closed
Clark, Nevada	1.2	Prospect No. 5	Copper	Underground	Prospect
Clark, Nevada	1.9	Unnamed Mine	Gold	Underground	Prospect
Clark, Nevada	2.4	Lucy Gray Mine	Gold, Copper, Lead, Silver, Zinc	Underground	Past Producer
Clark, Nevada	3.1	Copper Hill Claims	Copper, Malachite	Unknown	Occurrence
San Bernardino, California	4.2	White Hat	Gold	Unknown	Prospect
San Bernardino, California	4.4	Jack Claim	Tungsten, Mercury, Cinnabar, Scheelite, Wolframite	Unknown	Occurrence
Clark, Nevada	4.4	Yellow Jacket Group	Uranium	Surface	Prospect

The BLM requires a mining claim be properly located although its precise location cannot be mapped easily. A claim has specific dimensions equaling approximately 20 acres, unless it is an association claim, and can be located in any orientation on the ground and, due to its size, is not defined by traditional legal land descriptions, except down to quarter-section resolution.

3.17.3 Salable Mineral Resources

There are no BLM mineral material sites located in or around the Proposed Project site. There is a private pit located near Primm, over one mile away from the Proposed Project, and NDOT has gravel pits for use on I-15 at Primm and along I-15. The latter sites, however, are not public mineral sites.

3.18 Fuels and Fire Management

3.18.1 Introduction and Methodology

Information provided in this section is based on three existing publications including the BLM Las Vegas Field Office's Fire Management Plan for the Southern Nevada Fire Planning Unit (BLM 2004), the Silver State Solar Draft POD Amendment prepared by the Applicant for the BLM (NextLight 2009), and the Interagency Fire Regime Condition Class (FRCC) Guidebook, Version 1.3.0 (Hann *et al.* 2008).

The proposed 7,925-acre Proposed Project site would be located on federally-managed BLM lands within two Fire Management Units (FMUs), the Tortoise – Moderate Density (NV050-01) FMU and the Goodsprings-Primm (NV050-018) FMU (NextLight 2009). Wildland fire protection on all BLM public lands within these two FMUs is provided by the BLM Las Vegas Field Office. Structural fire protection on private lands within this FMU is provided by the CCFD and/or the City of Mesquite Fire Department (BLM 2004).

3.18.2 Regional Setting and Regulatory Framework

3.18.2.1 Tortoise – Moderate Density (NV050-01) Fire Management Unit

Major topographical features within the Tortoise – Moderate Density FMU include California Wash, Eldorado Mountains, Hiko Wash, Ivanpah Valley, Morman Mesa, Muddy Mountains, New York Mountains, Newberry Mountains, and the Pahrump Valley. Elevations range between 1,397 and 5,396 feet. Slopes are generally less than 10 percent but range from 10 to 30 percent in some places. Aspects are various (BLM 2004). Resource use within this FMU consists of hunting, disbursed recreation, special use permit activities, commercial reptile collecting, mining, utility line corridors and ROWs, and open grazing allotments.

From 1980 to 2003, 340 fires burned a total of 13,402.4 acres of the Tortoise – Moderate Density FMU, with an average fire size of 39.4 acres (BLM 2004). The number and size of fires in this region vary and are largely driven by weather including lightning, strong winds, warm temperatures, and live fuel moisture percentages. Between 1980 and 2003, lightning caused 116 (34 percent) fires and human or other causes were responsible for 224 (66 percent) fires (BLM 2004).

Much of this FMU is without roads. Primary access routes include I-15 North (Mormon Mesa); I-15 South (Ivanpah Valley), and SR 160 (Pahrump Valley). Other access within the FMU includes the Bitter Springs Back Country Byway (Muddy Mountains), SR 161 (Goodsprings), SR 164 (New York Mountains), and numerous unpaved roads. Wildfire suppression response times by ground forces usually exceeds one or more hours.

3.18.2.2 Proposed Project Area

Between 1989 and 2009, there were no wildland fires reported in the Proposed Project area.

3.18.3 Current Conditions and Trends

Current fuel and fire management direction for the Tortoise – Moderate Density FMU and the Goodsprings-Primm FMU is given in the BLM Las Vegas Field Office's Fire Management Plan

for the Southern Nevada Planning Unit (BLM 2004). If land is in a designated Wilderness Area, suppression action and other resource objectives will be identified in Wilderness Plans (BLM 2004). However, until these plans are complete, suppression actions in the Wilderness/ Wilderness Study Area (WSA)/Instant Study Area (ISA) portions of this FMU will comply with the 2003 Las Vegas Field Office Interim Wilderness Management Plan (BLM 2004).

3.18.3.1 Tortoise – Moderate Density (NV050-01) Fire Management Unit

The Tortoise – Moderate Density FMU is a High Value Habitat FMU type. Further, it is classified as Fire Regime 5 and Condition Class 2 (BLM 2004). Fire regimes describe periodicity and pattern of naturally occurring fires in a particular area or vegetative type. Land in Fire Regime 5 burns every 200 plus years, ranging from stand-replacement severity (most typical) to any severity from low, to mixed, to replacement severity (Hann *et al.* 2008). Fire Regime Condition Class is a classification system that describes departure from the natural (historic) state of an area or landscape to present condition. Areas classified as Condition Class 2 have fire regimes that have a moderate departure from the historical range of variability. Fire behavior, effects, and other associated disturbances are moderately departed (33 to 66 percent) with composition and structure of vegetation somewhat altered. The risk of losing key ecosystem components from the occurrence of fire is moderate in Condition Class 2 (Hann *et al.* 2008).

Ninety-eight percent of the fuels in the Tortoise – Moderate Density FMU consist of low elevation desert shrub communities including creosote, bursage, blackbrush, saltbush, and Mojave scrub, and more (BLM 2004). Generally, in their undisturbed condition, these desert shrub communities did not historically support spreading or intense wildfire activity. Today, wildfire in these desert plant communities occurs with greater frequency, size, and intensity than in the past. This shift is primarily due to human impacts on vegetation during the past century or more. Lighting and human-caused wildfires, which are typically exacerbated by wind, are now also frequently intensified by the buildup of introduced annual grasses such as red brome (*Bromus rubens*) (BLM 2004). Due to its threatened and endangered species habitat value for the desert tortoise, these portions of the FMU are a high suppression priority for the BLM Las Vegas Field Office. Two percent of fuels in this FMU comprise widely spaced riparian habitat and/or mesquite/acacia habitat, mountain shrub communities such as chaparral, and pockets of pinyon-juniper woodland (BLM 2004). The majority of this portion of the FMU is located within designated wilderness areas, the Mount Stirling WSA, or the Sunrise Mountain ISA (BLM 2004). Today, wildfire in these higher elevation plant communities is more intense and spreads more easily due to tamarisk (*Tamarix* spp.) infestations. These areas have secondary suppression priority because, in some instances, allowing small individual wildfires (less than 15 acres in size) to burn can improve habitat quality for mule deer and bighorn sheep (BLM 2004).

Specific suppression priorities in the Tortoise – Moderate Density FMU are as follows (BLM 2004):

- Moderate density desert tortoise habitat: Mormon Mesa; Moapa Valley/California Wash; Pahrump Valley; Ivanpah Valley north of I-15.
- Moderate and low density desert tortoise range (threatened and endangered species).
- All riparian and mesquite/acacia habitats, especially Hiko Wash.

- All wildfires occurring within the air quality non-attainment airshed basins in this FMU: north and south of Apex, along U.S. Hwy 93; between Las Vegas Valley and Jean, Nevada, primarily north of I-15.
- Wilderness Areas (6): Arrow Canyon; Muddy Mountains; Eldorado; Ireteba Peaks; South McCullough; Mount Charleston.
- Mount Stirling WSA.
- Sunrise Mountain ISA.
- Rainbow Gardens ACEC (sensitive plant species habitat).
- Cultural resource ACECs (3): Arrow Canyon; Hidden Valley; Crescent Townsite.
- Sensitive species habitats and populations mainly concentrated in areas of either gypsum soils; deep sand swales; gravelly washes; riparian areas; or mesquite/acacia stands.
- Wild horse and burro Herd Management Areas (HMAs) (4): Muddy Mountains HMA; Eldorado HMA; Red Rock HMA; Johnnie HMA.

Fine fuels from invasive annual grasses are the dominant characteristic affecting wildland fire behavior in this FMU. These grasses dry out throughout the growing season as temperatures increase, thus lowering their fuel moisture content and increasing their ability to carry ground fires.

At live fuel moisture levels of 181 percent and above, fires typically exhibit very low fire behavior characteristics; between 151 and 180 percent, low fire behavior characteristics; between 126 and 150 percent, moderate fire behavior characteristics; between 101 and 125 percent, high fire behavior characteristics; between 75 and 100 percent, extreme fire behavior characteristics; at 75 percent and below, advanced fire behavior characteristics.

Table 3.18-1. Live Fuel Moisture Averages for the Tortoise – Moderate Fire Management Unit (NV050-01)

LFM Site	May	June	July	Aug	Sept	Oct
N5G	167%	121%	96%	98%	88%	75%

Source: BLM 2004

Wet lightning is common throughout the region surrounding this FMU. Fires typically remain small when starts occur under these common conditions. Dry lightning is also possible in the region, but less common. Larger fires can result from the associated dry and windy conditions. Human-caused ignitions during warm summer temperatures and lower fuel moisture content can result in large fires. Extreme fire behavior is a potential when fire reaches riparian areas heavily infested with tamarisk (BLM 2004).

3.18.3.2 Goodsprings-Primm (NV050-18) Fire Management Unit

The Goodsprings-Primm FMU is classified as a Wildland Urban Interface (WUI) FMU type. Further, it is classified as Fire Regimes 4 and 5 and Condition Class 3 (BLM 2004). Land in Fire Regime 4 burns every 35 to 200 years, typically with stand replacement, high severity fires. Land in Fire Regime 5 burns every 200 plus years ranging from stand-replacement severity (most typical) to any severity from low, to mixed, to replacement severity (Hann *et al.* 2008). Areas classified as Condition Class 3 have fire regimes that have a high departure from the historical range of variability. Fire behavior, effects, and other associated disturbances are highly departed (greater than 66 percent), with composition and structure of vegetation greatly altered. The risk of losing key ecosystem components from the occurrence of fire is high in Condition Class 3 (Hann *et al.* 2008).

This discontinuous FMU takes in the rural towns of Goodsprings, Primm, Sandy Valley, Jean, and the Jean Lake disposal area. This FMU includes five public land disposal areas: Goodsprings (915 acres), Primm (1,181 acres), Sandy Valley (6,268 acres), Jean (2,445 acres), and Jean Lake (7,326 acres). The Jean Lake disposal area WUI zone is included in anticipation of near future build-out around the proposed SNSA at Jean, Nevada.

3.18.3.3 Silver State Solar Project Area

Currently, there is no Fuels Management Plan specifically for the Proposed Project area and there are no fuels treatments anticipated. Should fuels treatments be organized, creating fuel breaks by applying herbicide to non-native annual grasses is a possibility. Because wildfire incidence is so low in the Proposed Project area, herbicide fuel breaks are unlikely (Oliver 2009).

3.19 Cumulative Impacts Scenario

3.19.1 Introduction

In accordance with NEPA, this Draft Environmental Impact Statement (DEIS) analyzes cumulative impacts of the Proposed Project in conjunction with other developments that affect or could affect the area. Under NEPA, a cumulative impact is the impact on the environment that results from the incremental impact of the project when added to other past, present, and reasonably foreseeable future actions (40 CFR Section 1508.7). In order to facilitate the cumulative analysis, a cumulative scenario has been developed that identifies and evaluates projects that are reasonably foreseeable and that are already existing within the Proposed Project area or would be constructed or commence operation during the timeframe of activity associated with the project. The cumulative scenario is presented in this section; the cumulative analysis for each resource area is presented in Chapter 4.19, Cumulative Impacts.

3.19.2 Cumulative Projects

The cumulative scenario includes projects within the same geographic and temporal scope as the Proposed Project. The geographic scope varies for each resource area depending on the nature of the resource. For example, the geographic scope for cumulative impacts to air quality may include the natural basin formed by the mountains that surround the Ivanpah Valley in which the Proposed Project would be located; whereas, the geographic scope for cumulative impacts to

transportation and traffic would be limited to the roads that would be used during construction and operation of the Proposed Project. Generally, the cumulative analysis is limited to the Ivanpah Valley as enclosed by the Clark, Spring, Lucy Gray, and New York mountains; the specific geographic scope for each resource area is defined at the beginning of each cumulative analysis in Chapter 4, Environmental Consequences.

As with the geographic scope of the cumulative analyses, the temporal scope of each analysis varies by resource area. Impacts of the Proposed Project may be limited to a particular phase of the project, such as during construction, or may only occur under certain circumstances, such as in the event of an accidental spill; the temporal constraints of the cumulative impact analysis for each resource area are described in Chapter 4.19, Cumulative Impacts.

The cumulative scenario comprises all projects that are considered for any resource area. These include renewable energy projects, transportation projects, infrastructure improvement projects, pipeline projects, and other projects that meet these criteria:

- Projects that are closely related completed past projects;
- Projects approved and under construction;
- Projects approved but not yet under construction; or
- Projects that have been proposed but not approved.

Projects are included in this cumulative analysis if information on the project was available in the BLM's GeoCommunicator mapping system, identified during agency scoping, provided in consultation with the BLM, or in another published cumulative analyses as of January 15, 2010. Table 3.19-1 lists all the projects considered in the cumulative impact analysis, separated into three categories: planned projects, foreseeable projects, and foreseeable renewable projects. Table 3.19-1 also lists the location of the cumulative projects, the project developer/owner, a description of the project, project permitting status, and a list of impacted or potentially impacted resources that could contribute to cumulative impacts. These projects are depicted in relation to the Proposed Project in Figure 3.19-1.

3.19.2.1 Existing Projects

The Ivanpah Valley is a relatively undeveloped region. Existing development in the area includes commercial, residential and industrial development in and around Primm, Nevada; transportation infrastructure; electrical transmission infrastructure; and mining operations or associated mining infrastructure. These projects are listed in Table 3.19-1, and are included in the description of the existing setting for the resource areas described in this chapter, as appropriate. Past projects are included in the cumulative impacts discussions only where their impacts are similar to those of the Proposed Project.

Label	Status*	Name	Acreage**
1	E	Bighorn Electric Generating Station	86.9
2	E	Primm Casinos	127.8
3	E	Primm Valley Golf Course	531.3
4	E	Primm Outlet Mall	38.7
5	E	Ivanpah Dry Lake SRMA	12855.3
6	E	Molycorp Mine	2271.9
7	E	Colosseum Mine	289.9
8	E	Desert Oasis Apartment Complex	13.5
9	E	Molycorp Evaporation Pond	355.5
10	E	AT&T Fiber Optic Cable	NA***
11	E / P	Southern California Edison Eldorado-Ivanpah 230-kV Transmission Line and Ivanpah Substation	NA***
12	E	Molycorp Wastewater Pipeline	NA***
A	P	First Solar Photovoltaic Project	5433.4
B	P	Southern NV Supplemental Airport	3734.5
D	P	Joint Port of Entry	324.7
F	E	Caltrans Temporary Batch Plant	32.4
H	P	Iberdrola Wind Project	1872.6
I	P	BrightSource ISEGS Project	7262.9
K	P	Fast Food Restaurant	3.6
L	E	I-15 Mountain Pass Truck Lane	NA***
N	P	Table Mountain Wind Project	13655.4
P	P	Desert Xpress Project	4060.1
R	P	Calnev Pipeline Expansion Project	NA***

* E=Existing, P=Pending, A=Approved

** Cumulative project areas are approximated reflecting the project right-of-way and not necessarily the actual or final project boundary footprint

*** Linear projects not included when calculating overall disturbance

SOURCE: See source list for Table 3.19-1

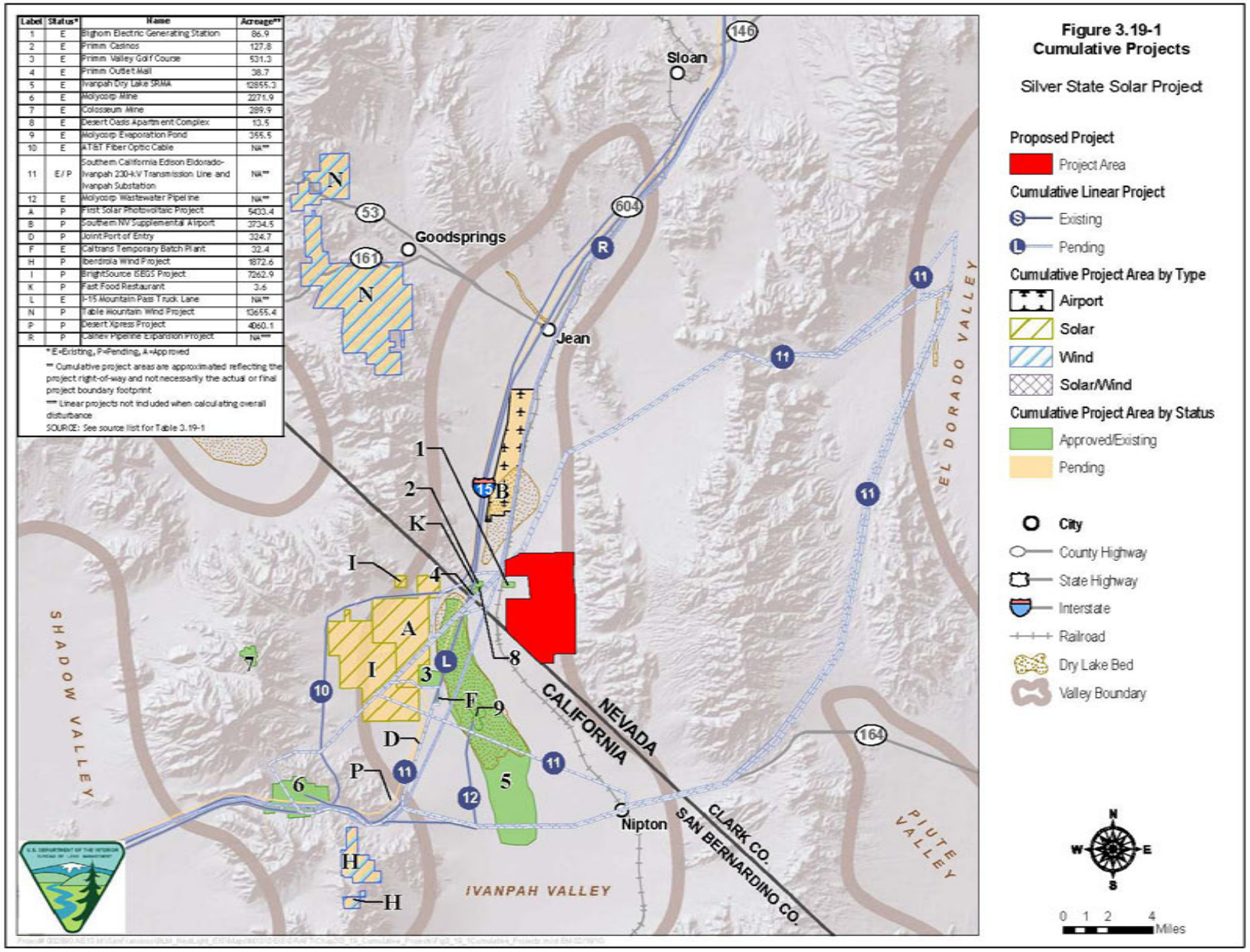


Figure 3.19-1
Cumulative Projects

Silver State Solar Project

Table 3.19-1. List of Projects Considered Within or Near the Ivanpah Valley

Map ID Letter or #, Project Name[3], and Application Number (if applicable)	Location	Owner	Project Description	Project Type	Status	Cumulatively Affected Resources
Existing Projects						
1 –Walter M. Higgins Power Generating Station	Primm, Nevada	NV Energy	Operating 570-MW natural gas power plant, uses dry cooling system	Power Plant	Existing	Aesthetics, Air, Noise
2 –Primm Casinos	I-15 at the California/ Nevada state line	Terrible's Primm Valley Casino Resorts (MGM Mirage)	Two existing Resort and Casinos and one existing hotel and casino	Casino/Resort	Existing	Aesthetics, Socioeconomics, Traffic
3 – Primm Valley Golf Course[1]	Primm, Nevada 32100 Las Vegas Blvd. S. Primm, NV	Terrible's Primm Valley Casino Resorts (MGM Mirage)	An approximately 22-acre golf course located south of the California/Nevada border along I-15 that opened in 1997	Recreation	Existing	Aesthetics; Hazards; Hydrology; Noise; Recreation
4 – Primm Valley Outlet Mall	Primm, Nevada 32100 Las Vegas Blvd. S. Primm, NV	Fashion Outlets (MGM Mirage)	Existing shopping outlet with over 100 stores. Connected to the Primm Casinos by monorail, approximately 359,000 square feet of leasable area and 1,600 parking spaces. More than one million vehicles pass the Fashion Outlets per month.	Shopping Mall	Existing	Aesthetics, Socioeconomics, Traffic
5 – Ivanpah Dry Lake Special Recreation Management Area (SRMA)[1]	Ivanpah Dry Lake, CA	BLM	The area is managed by the BLM Needles Field Office and used by recreationists for non-motorized recreational activities including, archery, kite buggying, and land sailing (BLM 2009)	Recreation	Approximately 200 casual use permits are issued for various non-motorized recreational activities.	Recreation
6 – Molycorp[4] Mine[1]	Mountain Pass, Sulphide Queen Property, CA	Molycorp[4]	Open pit rare-earths mining operation.	Mine	Ongoing, expected to continue until mid-2020	Aesthetics, Air Quality; Geology (Soils); Hazards; Noise; Recreation
7 – Colosseum Mine[1]	12 miles west of Primm, Nevada	Lac Minerals	Mining facilities occupy 284 acres on a 3,316 acre private parcel. Located within the East Mojave National Scenic Area and Clark Mountain ACEC. The area was mined for gold in an open pit.	Mine	Inactive – as of early 1990s. Remedial action conducted.	None

Table 3.19-1. List of Projects Considered Within or Near the Ivanpah Valley

Map ID Letter or #, Project Name[3], and Application Number (if applicable)	Location	Owner	Project Description	Project Type	Status	Cumulatively Affected Resources
8 – Desert Oasis Apartment	Primm, NV	MGM Mirage	Gated community comprised of 52 buildings to house 650 Primm casino/resort employees. Includes laundry facilities, a 10,000-square-foot market, clubhouse, swimming pool, fitness facilities and basketball court.	Residential Units	Existing	Aesthetics, Socioeconomic, Traffic
9 – Molycorp[4] Evaporation Pond[1]	Southeast of the Ivanpah Dry Lake, CA	Molycorp[4]	Evaporation Pond for wastewater generated at the Molycorp[2,4] rare-earths mining facility.	Evaporation Pond	Active, undergoing improvements	Aesthetics; Hazards; Hydrology
12 –Molycorp[4] Wastewater Pipeline[1]	Runs from Molycorp[2,4] south of I-15, through the Mojave National Desert Preserve to the Evaporation pond	Molycorp[4]	13-mile long wastewater pipeline that runs between the Molycorp[2] mine and the evaporation pond.	Wastewater Pipeline	Active	None
L – I-15 Mountain Pass Truck Lane (4393U)[1]	San Bernardino County, CA near Wheaton Springs	Caltrans	Northbound Truck Descending Lane and Pavement rehabilitation.	Highway Bypass	Construction began in 2008, and is expected to continue until 2010.	Aesthetics;, Air Quality; Biology; Cultural; Hazards; Land Use; Noise; Traffic
Foreseeable Projects						
10 AT&T Fiber Optic Cable Replacement[1]	Along the west side of the Ivanpah Dry Lake and of I-15	AT&T	Existing direct buried fiber-optic cable will be replaced from Nevada border to the Halloran Summit, including a segment adjacent to the ISEGS project to the west of the Ivanpah Dry Lake. To use existing 10 foot ROW with some temporary larger ROW for where existing cable must be replaced.	Buried Fiber Optic Cable		– **Construction Impact:** Aesthetics ; Air Quality; Biology; Cultural; Hazards; Hydrology; Land Use; Noise; Socioeconomics; Traffic – **Operational Impact:** None anticipated
11 Southern California Edison Eldorado-Ivanpah 230-kV Transmission Line and Ivanpah Substation	Nipton, CA to Eldorado Substation, NV	Southern California Edison		Transmission Line and Substation	Draft EIR/EIS is in progress. Construction expected to begin in 2010.	

Table 3.19-1. List of Projects Considered Within or Near the Ivanpah Valley

Map ID Letter or #, Project Name[3], and Application Number (if applicable)	Location	Owner	Project Description	Project Type	Status	Cumulatively Affected Resources
B Southern Nevada Supplemental Airport (SNSA)[1]	30 miles south of the McCarran International Airport	Clark County	International Airport to supplement the McCarran International Airport in Las Vegas 5,934 acre site 17,000 acre Congressionally-designated Airport Environs Overlay District	Airport	Draft EIS in progress. Construction expected to begin 2013-14	– **Construction Impact** Aesthetics; Air Quality; Biology; Cultural; ; Hydrology; Noise; Traffic – **Operational Impact:** Aesthetics; Air Quality; Biology; ; Noise; Traffic
P – Desert Xpress	Along the I-15 between Victorville and Las Vegas	DesertXpress Enterprises	Installation of 180 miles of train tracks for a commercial high-speed electric train that would operate between Victorville California and Las Vegas, Nevada. Construction Commencement Date TBD.	High Speed Train	Draft EIS was published in March 2009. Construction start date unknown.	– **Construction Impact:** Aesthetics; Air Quality; Biology; Cultural; Hazards; Hydrology; Land Use; Noise; Socioeconomics; Traffic – **Operational Impact:** Aesthetics, Air, Biology, Cultural, Hazards, Noise, Traffic
D – Joint Port of Entry (CA-690-EA06-01)[1]	Between Yates Well Road and Nipton Road, San Bernardino County.	Caltrans, California Dept Food and Agriculture	The Joint Port of Entry would include an Agricultural Inspection Facility and a Commercial Vehicle Enforcement Facility located on the north side of Interstate 15 between Nipton Road and Yates Well Road	Inspection Facility	Caltrans is reconsidering proposal as a phased project based on funding availability. Temporary Use Permit for Geotechnical Testing and soil sampling is in process. Caltrans submitted a Recreation and Public Purposes Act Lease application to the BLM for the JPOE facility.	– **Construction Impact: Aesthetics;** Air Quality; Cultural; Geology; Noise; Traffic. – **Operational Impact:** Aesthetics; Traffic
F – Caltrans Temporary Batch plant[1]	Located at Yates Well Rd. intersection within Interstate 15 ROW	Caltrans	Temporary asphalt batch plant.	Asphalt Plant	Active	– **Construction Impact:** Aesthetics; Air Quality; Biology; Cultural; Hazards; Hydrology; Land Use; Noise; Socioeconomics; Traffic – **Operational Impact:** Aesthetics, Air Quality; Biology; Cultural; Hazards; Hydrology; Land Use; Noise; Socioeconomics; Traffic

Table 3.19-1. List of Projects Considered Within or Near the Ivanpah Valley

Map ID Letter or #, Project Name[3], and Application Number (if applicable)	Location	Owner	Project Description	Project Type	Status	Cumulatively Affected Resources
K– New fast food restaurant[1]	Primm, NV	Unknown	Fast food restaurant to be built adjacent to the Primm Outlet Mall 32100 S. Las Vegas Blvd.)	Restaurant	In permitting process, application received by the Clark County permitting office 2/7/08.	– **Construction Impact:** Aesthetics; Air Quality; Biology; Cultural; Hazards; Hydrology; Noise; Socioeconomics; Traffic – **Operational Impact:** Aesthetics; Socioeconomics; Traffic
Q– Calnev Pipeline Expansion Project	Parallel and adjacent to UPRR in this area	Kinder Morgan	Expansion of the current pipelines owned and operated by Kinder Morgan that run between Colton, CA and Las Vegas, NV.	Petroleum Product Pipeline	Currently in NEPA preparation process (Draft EIS due 2010).	– **Construction Impact:** Aesthetics; Air Quality; Biology; Cultural; Hazards; Hydrology; Geology (Soils);, Noise; Socioeconomics; Traffic – **Operational Impact:** Air Quality; Hazards; Hydrology; Geology (Soils); Traffic
Foreseeable Renewable Energy Projects						
A – First Solar Photovoltaic Project (BLM ROW CACA 48669)[2]		First Solar Development	300MW Photovoltaic 4,160 acres land requested	Solar Photovoltaic Plant		– **Construction Impact:** Aesthetics; Air Quality; Biology; Cultural; Hazards; Hydrology; Noise; Recreation; Socioeconomic; Traffic – **Operational Impact:** Aesthetics; Biology; Land Use; Hydrology; Recreation
H – Iberdrola Wind Project (BLM ROW CACA 44988)[2]		Iberdrola Renewables	75MW wind energy project 2,330 acres	Wind	ROW issued for 3 MET towers expires 12/31/09	– **Construction Impact:** Aesthetics, Air, Biology, Cultural, Hazards, Hydrology, Land Use, Noise, Recreation Socioeconomic, Traffic – **Operational Impact:** Aesthetics; Biology; Cultural; Hydrology

Table 3.19-1. List of Projects Considered Within or Near the Ivanpah Valley

Map ID Letter or #, Project Name[3], and Application Number (if applicable)	Location	Owner	Project Description	Project Type	Status	Cumulatively Affected Resources
I – BrightSource ISEGS Project (BLM ROW 048668, 049502, 049503, 049504, and 049508)[2]	Ivanpah Valley, CA	Solar Partners I LLC	Ivanpah 2 Project (ISEGS); increased acreage 12/14/06; related files 049502, 049503, 049504	Solar	ROW Pending	– **Construction Impact:** Aesthetics; Air Quality; Biology; Cultural; Hazards; Hydrology; Noise; Recreation; Socioeconomic; Traffic – **Operational Impact:** Aesthetics; Biology; Land Use; Hydrology; Recreation
N –Table Mountain Wind Project (BLM ROW NVN-083041 and NVN-073726)[4]	Approximately 3 miles east of Sandy Valley, NV	Table Mountain Wind Co LLC	Installation and operation of 10 meteorological towers on 11,570 acres to gather data for a potential wind generation site through 12/31/2010. Total project footprint approximately 30 acres.	Wind	ROW issued for 10 MET towers through 12/31/2010	– **Construction Impact:** Aesthetics, Air, Biology, Cultural, Hazards, Hydrology, Land Use, Noise, Recreation Socioeconomic, Traffic – **Operational Impact:** Aesthetics; Biology; Cultural; Hydrology

Sources:
[1] BLM and CEC 2009. Final Staff Assessment and Draft Environmental Impact Statement and Draft California Desert Conservation Area Plan Amendment Ivanpah Solar Electric Generating System Application For Certification (07-AFC-5) San Bernardino County. October 2009.
[2] BLM 2009b. BLM GeoCommunicator Interactive Mapping Tool, Web site accessed on multiple dates in 2009 and 2010.

Notes:
[3] In the absence of a known project name, projects are named according to the owner/developer and the type of facility or structure proposed.
[4] Molycorp is a subsidiary of Chevron-Texaco Corporation.

3.19.2.2 Foreseeable Renewable Projects

Table 3.19-1 lists 10 renewable projects planned for the Ivanpah Valley region including a number of projects with multiple applications combined into under a single project name. It is not anticipated that all of these projects will be approved or constructed; however, given the number of projects proposed and political focus on permitting, approving, and constructing renewable energy generation, it is reasonable to assume that some of the renewable projects will be constructed. Typical impacts from wind and solar projects are described below, as a supplement to the information included in Table 3.19-1.

Typical Impacts from Solar Projects

Solar projects included in the cumulative scenario are the First Solar Photovoltaic Project (A) and the BrightSource ISEGS Project (I).

PV and concentrating solar power (CSP) are the two dominant solar energy technologies on the market. PV technology creates electricity directly from sunlight through solar cells. Solar cells have traditionally been made of monocrystalline silicon, but other material technologies exist. PV solar cells produce alternating current electricity, which is converted to direct current electricity with an inverter and then integrated directly into the power grid (rooftop applications) or transferred along distribution lines (utility-scale applications).

CSP technology, or –solar thermal" technology, concentrates sunlight to heat a liquid that produces steam that turns a simple turbine to create electricity. Parabolic troughs, solar power towers, and solar dishes are all forms of CSP technology that focus mirrors on a single point to generate steam. Generally, CSP technologies have been developed for utility-scale applications.

Both PV and solar thermal projects are proposed in the Ivanpah and Eldorado valleys. Some of these projects do not have detailed project descriptions available or have not undergone formal impact assessment. Both CSP and PV solar technologies have similar impacts, although CSP usually has a significant requirement for water for cleaning and cooling. Typically, both types of construction projects cause a:

- Temporary increase in air pollutants and dust emissions;
- Temporary increase in noise;
- Temporary or permanent disruption of wildlife patterns from construction activities;
- Possible loss of cultural or historic resources; and
- Temporary disruption of local traffic patterns and road use.

Most of the construction impacts can be mitigated through site-specific BMPs and other mitigation measures. Because solar projects may result in a single use for the land, several permanent impacts could occur as a result of operations, including:

- Permanent loss of wildlife habitat;
- Impact to existing recreational activities;

- Increase in impermeable surfaces that could lead to increased magnitude or frequency of flooding events; and
- Permanent alteration of visual or aesthetic characteristics.

Typical Impacts from Wind Projects

Wind projects included in the cumulative scenario are the Iberdrola Wind Project (H) and the Table Mountain Wind Project (N).

Wind generation facilities typically comprise multiple wind turbines that are connected to a substation through a network of underground and overhead lines. In addition to erecting the wind turbines, installing a wind generation system typically requires constructing access roads, substations, and a switchyard as well as connecting the substation to a transmission line. The equipment for all the structures is stored at a staging area prior to construction.

Many of the impacts associated with wind generation facilities result from their large footprint. Installation of these types of facilities may:

- Disturb wetlands or water bodies;
- Remove or alter vegetation and potential wildlife habitat;
- Temporarily displace wildlife; and
- Disturb cultural resources.

Other construction-related impacts are those typical of construction projects in general, such as generation of noise and dust from construction activities and a temporary increase in traffic from the movement of construction and equipment vehicles on local streets.

Operating wind generation facilities typically:

- Alter the visual landscape;
- Cause the death or injury of birds and bats;
- Permanently displace wildlife; and
- Influence migration patterns.

Construction of a wind generation facility temporarily increases local employment. Non-local workers require housing. However, wind power generation facilities typically permanently employ only approximately 30 people and, therefore, do not have a significant impact on local economies.

Typical Impacts from Meteorological Towers

As a first step to determine the viability of a location for a wind power generation project, meteorological towers (METs) are installed to collect relevant meteorological data. The four wind projects considered in the cumulative scenario are currently in the MET stage of development. METs are typically 60 meters in height and ground is disturbed for a 60-meter

radius surrounding the tower. A ROW grant for METs is usually valid for three years; therefore, three years is the typical duration of operation. Construction impacts of METs may include:

- Vegetation trimming or removal;
- Dust from vehicles;
- Impacts to listed species; and
- Impacts to cultural resources.

Impacts that typically occur during operation include alteration of the visual landscape and injury or mortality of migratory birds and bats; the duration of operation, as stated above, is typically three years.

3.19.2.3 Other Foreseeable Projects

Non-renewable planned development in the area includes an AT&T Fiber Optic cable replacement project (see Figure 3.19-1, 10), the Eldorado-Ivanpah Transmission Project (11), the SNSA (B), the DesertXpress (P), the Joint Port of Entry (D), a Caltrans temporary batch plant (F), a new fast food restaurant (K), and the Calnev Pipeline Expansion Project (Q). These projects are in various stages of development, as noted in Table 3.19-1; information to supplement the cumulative scenario table is provided, as available, below.

Eldorado-Ivanpah Transmission Project

SCE proposes to construct the EITP, which comprises a transmission upgrade from a single-circuit 115kV line to a double-circuit 230kV line between the existing Eldorado Substation in Nevada and the proposed Ivanpah Substation in California. The EITP would also include installation of a redundant telecommunications system, which would be installed on existing transmission lines, undergrounded along Nipton Road, and transmitted via microwave with a new microwave tower near Nipton, California. The BLM and the California Public Utility Commission (CPUC) released a scoping summary report in October, 2009, and are currently completing a Draft Environmental Impact Report (EIR)/DEIS, which is anticipated to be published in April, 2010. Construction is scheduled to commence in the first quarter of 2011. This transmission project may contribute to cumulative impacts to air quality (short term), hydrology, and transportation and traffic.

Southern Nevada Supplemental Airport

The Clark County Department of Aviation (CCDOA) has proposed to construct a new commercial service airport in the Ivanpah Valley of southern Nevada. The new SNSA would provide additional capacity to serve the Las Vegas metropolitan area. In 2004, pursuant to the Ivanpah Valley Airport Lands Transfer Act (Pub. L. 106-362), BLM patented a 6,000-acre Airport Site to Clark County for this purpose. FAA and the BLM, as joint lead agencies, are currently preparing an EIS for the SNSA. If approved, Clark County would have the right, pursuant to Title V of the 2002 Clark County Conservation of Public Land and Natural Resources Act (Pub. L. 107-282), to request title to an additional 17,000 acres designated by Congress as the Airport Environs Overlay District. A portion of the Proposed Project site (T.27S., R.59E., Section 3) would be located within the Airport Environs Overlay District.

In the Draft Alternatives Working Paper, a number of project alternatives were considered to meet the purpose and need of the project, including using other modes of transportation and placing the project at another site nearer to Las Vegas (Federal Aviation Administration [FAA] 2008). The DEIS for the project is expected to be released for public review in the 4th Quarter of 2012. Project construction is not anticipated to begin until 2014 and is expected to be completed in 2020 (FAA 2009, 2006). The proposed airport site would be located approximately 1 mile from the EITP at MP 24. The EITP intersects the 17,000-acre noise compatibility area for the airport between MPs 24 and 28. Potential impacts of the SNSA that may contribute to cumulative impacts include noise during construction and operation, air quality impacts to the Ivanpah Valley, and traffic impacts along the I-15 corridor.

Southern Nevada Regional Heliport

The proposed Southern Nevada Regional Heliport was not included in this analysis because it was judged to be too far away from the Proposed Project site (more than 5 miles northeast).

DesertXpress Project

DesertXpress Enterprises, LLC proposes to construct a high speed rail line along an approximate 200-mile corridor between Southern California (Victorville) and Las Vegas, Nevada. The Draft EIS was prepared by the Federal Railroad Administration (FRA) in cooperation with the BLM, Surface Transportation Board (STB), Federal Highway Administration (FHWA), and the NPS, with the added participation of the California Department of Transportation (Caltrans) and NDOT. Public scoping meetings to invite public and agency comments regarding the project were held in July, 2006. The DEIS was published on March 18, 2009, and public meetings were held in April 2009. Construction was scheduled to commence in early 2010, with a projected completion date of 2013; however, the Final EIS for this project has not been released. This railroad project may contribute to cumulative impacts to aesthetics and visual resources, air quality (short-term), biology, geology, and noise.

Joint Port of Entry Project

The State of California, acting through the Caltrans, filed an application for the Joint Port of Entry (JPOE) project on 133 acres of public lands. The proposed JPOE inspection facility would be comprised of a commercial vehicle enforcement facility and an agricultural inspection facility between Nipton Road and Yates Well Road on the southbound I-15. Upon completion of the project, all traffic entering California on the southbound I-15 would be diverted through the JPOE. A Notice of Realty Action for the JPOE project was published on February 10, 2010 and the scoping period for the project closes on March 29, 2010. This project may contribute to cumulative impacts to aesthetics and visual resources, air quality (short-term), cultural, geology, noise, and transportation and traffic.

Calnev Pipeline Expansion Project

Calnev Pipe Line, LLC (Calnev), an operating partnership for Kinder Morgan Energy Partners, L.P., proposes to replace and expand its refined petroleum products pipeline on the existing Calnev system. The project would run between the existing North Colton Terminal in the city of Colton, San Bernardino County, California, to Bracken Junction, located about 1.5 miles west of McCarran International Airport in the city of Las Vegas, Clark County, Nevada. In addition to

the main underground pipelines, the existing Calnev system includes laterals to the Southern California Logistics Airport (formerly George Air Force Base), Edwards and Nellis Air Force bases, the Burlington Northern and Santa Fe (BNSF) rail yard at Barstow, California, and the McCarran International Airport. Existing above-grade facilities include terminals, pump stations, and junctions at various locations along the alignment.

The project would involve construction, operation, and maintenance of approximately 234 miles of new 16-inch-diameter, subsurface pipeline from Colton to Las Vegas. In addition to pipeline construction, the project would require construction of tie-ins, laterals, a new pump station, a new junction, an electric substation, and upgrades to components of the existing Calnev system. Project construction is anticipated to be carried out within a 100-foot-wide ROW. Pipeline startup had been previously projected for late 2009 or early 2010, but the project currently remains in the Draft EIR/EIS stage of environmental analysis. The pipeline project would intersect the EITP near MP 27. This pipeline project may contribute to cumulative impacts to air quality, hydrology, soils, and traffic during the construction phase and impact hazards in the case of rupture and/or explosion during the operation phase.

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4 Environmental Consequences

4.1 Air Quality and Climate Impacts 4-3

4.1.1 Indicators 4-4
4.1.2 Direct and Indirect Effects by Alternative 4-4
4.1.3 Residual Effects 4-7

4.2 Noise Impacts 4-7

4.2.1 Indicators 4-7
4.2.2 Direct and Indirect Effects by Alternative 4-7
4.2.3 Residual Effects 4-15

4.3 Geology, Topography, and Geologic Hazards Impacts 4-15

4.3.1 Indicators 4-15
4.3.2 Direct and Indirect Effects by Alternative 4-15
4.3.3 Residual Effects 4-17

4.4 Soils Impacts 4-18

4.4.1 Indicators 4-18
4.4.2 Direct and Indirect Effects by Alternative 4-18
4.4.3 Residual Effects 4-20

4.5 Water Resources/Hydrology Impacts 4-20

4.5.1 Indicators 4-20
4.5.2 Direct and Indirect Effects by Alternative 4-20
4.5.3 Residual Effects 4-30

4.6 Biological Resources Impacts 4-31

4.6.1 Indicators – Biological Resources 4-35
4.6.2 Direct and Indirect Effects by Alternative – Vegetation 4-36
4.6.3 Residual Effects – Vegetation 4-40
4.6.4 Residual Effects – Sensitive Plant Species 4-42
4.6.5 Residual Effects – Wildlife 4-44
4.6.6 Residual Effects – Sensitive Wildlife Species 4-52

4.6.7 Indicators – Range 4-54
4.6.8 Direct and Indirect Effects by Alternative – Range 4-54
4.6.9 Mitigation Measures – Biological Resources 4-58

4.7 Cultural Resources Impacts 4-62

4.7.1 Indicators 4-62
4.7.2 Direct and Indirect Effects by Alternative 4-62
4.7.3 Residual Effects 4-64

4.8 Paleontological Resources Impacts 4-64

4.8.1 Indicators 4-64
4.8.2 Direct and Indirect Effects by Alternative 4-65
4.8.3 Residual Effects 4-66

4.9 Lands and Realty Impacts 4-66

4.9.1 Indicators 4-66
4.9.2 Direct and Indirect Effects by Alternative 4-67
4.9.3 Residual Effects 4-67

4.10 Special Management Areas Impacts 4-68

4.10.1 Indicators 4-68
4.10.2 Direct and Indirect Effects by Alternative 4-68
4.10.3 Residual Effects 4-70

4.11 Recreation Impacts 4-70

4.11.1 Indicators 4-70
4.11.2 Direct and Indirect Effects by Alternative 4-70
4.11.3 Residual Effects 4-73

4.12 Visual Resources Impacts 4-73

4.12.1 Indicators 4-73
4.12.2 Direct and Indirect Effects by Alternative 4-73
4.12.3 Residual Effects 4-83

4.13 Transportation/Motorized Vehicle Impacts 4-84

4.13.1 Indicators 4-84
4.13.2 Direct and Indirect Effects by Alternative 4-84
4.13.3 Residual Effects 4-87

4.14 Human Health and Safety/Hazardous Materials Impacts 4-87

4.14.1 Indicators 4-87
4.14.2 Direct and Indirect Effects by Alternative 4-88

4.14.3 Residual Effects 4-100

4.15 Social and Economic Impacts 4-100

4.15.1 Indicators 4-100
4.15.2 Direct and Indirect Effects by Alternative 4-101
4.15.3 Residual Effects 4-117

4.16 Environmental Justice Impacts 4-117

4.16.1 Indicators 4-117
4.16.2 Direct and Indirect Effects by Alternative 4-118
4.16.3 Residual Effects 4-121

4.17 Energy and Minerals Resources Impacts 4-121

4.17.1 Indicators 4-121
4.17.2 Direct and Indirect Effects by Alternative 4-121
4.17.3 Residual Effects 4-122

4.18 Fuels and Fire Management Impacts 4-123

4.18.1 Indicators 4-123
4.18.2 Direct and Indirect Effects by Alternative 4-124
4.18.3 Residual Effects 4-126

4.19 Cumulative Impacts 4-126

4.19.1 Air Quality and Climate 4-126
4.19.2 Noise 4-129
4.19.3 Geology, Topography, and Geologic Hazards 4-131
4.19.4 Soils 4-131
4.19.5 Water Resources/Hydrology 4-133
4.19.6 Biological Resources 4-137
4.19.7 Cultural Resources 4-142
4.19.8 Paleontology 4-142
4.19.9 Lands and Realty 4-143
4.19.10 Special Management Areas 4-143
4.19.11 Recreation 4-143
4.19.12 Visual Resources 4-145
4.19.13 Transportation/Motorized Vehicle Access 4-150
4.19.14 Human Health and Safety/Hazardous Materials 4-152
4.19.15 Socioeconomics 4-155
4.19.16 Environmental Justice 4-157
4.19.17 Energy and Minerals 4-158
4.19.18 Fuels and Fire Management 4-158

4.20 Other NEPA Requirements 4-158

4.20.1 Unavoidable Adverse Impacts and Irreversible and Irretrievable Commitments of Resources 4-158

4.20.1.1 Air Quality and Climate 4-159

4.20.1.2 Noise 4-159

4.20.1.3 Geology, Topography, and Geologic Hazards 4-159

4.20.1.4 Soils 4-159

4.20.1.5 Water Resources/Hydrology 4-160

4.20.1.6 Biological Resources 4-160

4.20.1.7 Cultural Resources 4-160

4.20.1.8 Paleontological Resources 4-160

4.20.1.9 Lands and Realty 4-161

4.20.1.10 Special Management Areas/Special Designations 4-161

4.20.1.11 Recreation 4-161

4.20.1.12 Visual Resources 4-161

4.20.1.13 Transportation and Traffic 4-161

4.20.1.14 Human Health and Safety/Hazardous Materials 4-162

4.20.1.15 Social and Economic Conditions 4-162

4.20.1.16 Environmental Justice 4-162

4.20.1.17 Energy and Minerals 4-162

4.20.1.18 Fuels and Fire Management 4-162

4.20.2 Relationship Between Short-Term Uses and Long-Term Productivity of the Environment 4-162

4 Environmental Consequences

Introduction

The Proposed Action and alternatives outlined in Chapter 2, Description of the Proposed Action and Alternatives, may cause, directly or indirectly, changes in the human and physical/natural environment. This Environmental Impact Statement (EIS) assesses and analyzes these potential changes and discloses the impacts to decision makers and the public. This process of disclosure is one of the fundamental aims of the National Environmental Policy Act (NEPA).

The following sections define and clarify the concepts and terms used in this EIS when discussing the impacts assessment.

Impacts

Impacts may refer to ecological, aesthetic, historical, cultural, economic, social, or health-related phenomena that may be caused by the Proposed Action or alternatives. Impacts may be direct, indirect, or cumulative.

Direct Impacts

A direct effect occurs at the same time and place as the action. Direct and indirect impacts are discussed in combination under each affected resource.

Indirect Impacts

Indirect impacts are reasonably foreseeable impacts that occur later in time or are separated by some distance from the action. Direct and indirect impacts are discussed in combination under each affected resource.

Cumulative Impacts

Impacts on a resource are cumulative when added to the impacts (or anticipated impacts) from other past, present, or future projects in the cumulative impacts area for the Proposed Project. The cumulative impacts area may be larger than the direct impacts area.

Residual Impacts

Impacts are considered residual when the effect from the Proposed Project cannot be completely avoided or minimized and remains after or despite mitigation.

Significance

―Significant" has a very particular meaning when used in a NEPA document. Significance is defined by the Council on Environmental Quality (CEQ) (40 Code of Federal Regulations (CFR) 1508.27) as a measure of the *intensity* and *context* of the impacts of a major federal action on, or the importance of that action to, the human environment. Significance is a function of the beneficial and adverse impacts of an action on the environment.

Intensity refers to the severity or level of magnitude of impact. Public health and safety, proximity to sensitive areas, level of controversy, unique risks, or potentially precedent-setting effects are all factors to be considered in determining the intensity of the effect.

Context means that the effect(s) of an action must be analyzed within a framework or within physical or conceptual limits. Resource disciplines, location, type, or size of area affected (e.g., local, regional, national), and affected interests are all elements of context that ultimately determine significance. Both long- and short-term impacts are relevant.

Impact Indicators

Use of the term ―significant" when referring to impacts indicates that some threshold was exceeded for a particular impact indicator. Impact indicators are the consistent currency used to determine quality, intensity, and duration of change in a resource. Working from an established existing condition (i.e., the baseline conditions described in Chapter 3), this indicator would be used to predict or detect change in a resource related to causal impacts of proposed actions.

Mitigation

Where applicable, mitigation measures are proposed in this document. Mitigation measures are solutions to environmental impacts that are applied in the impact analysis to reduce intensity or eliminate the impacts. To be adequate and effective, CEQ regulations (40 CFR 1508.20) require that mitigation measures fit into one of five categories:

1. Avoiding the impact altogether by not taking a certain action or parts of an action;
2. Minimizing impacts by limiting the degree or magnitude of the action and its implementation;
3. Rectifying the impact by repairing, rehabilitating, or restoring the affected environment;
4. Reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action; or
5. Compensating for the impact by replacing or providing substitute resources or environments.

4.1 Air Quality and Climate Impacts

This section discusses effects on existing air quality and climate that may occur with implementation of the Proposed Action or alternatives.

It is anticipated that there will be long-term and short-term impacts to air quality due to emissions associated with project construction and operation. Air emissions associated with the Proposed Action are primarily short-term and chiefly associated with engine exhaust due to combustion of fossil fuel in construction equipment and fugitive dust during construction. Relatively less significant contributions to air emissions would be generated due to on-road travel of vehicles for worker commutes and delivery of materials and equipment to the Proposed Project‘s construction site. It is expected that a similar scale of air emissions would occur during the Proposed Project‘s decommissioning.

Construction of the Proposed Project would take approximately four years to complete and would generate emissions of carbon monoxide (CO), nitrogen oxides (NO_X), volatile organic compounds (VOCs), sulfur dioxide (SO_2), particulate matter with a mean aerodynamic diameter of 10 microns or less (PM_{10}), and particulate matter with a mean aerodynamic diameter of 2.5 microns or less ($PM_{2.5}$). Ozone (O_3) is not emitted directly from emission sources, but is created in the atmosphere via a chemical reaction between NO_X and other gases in the presence of sunlight; these compounds are referred to as ozone precursors. Table 4.1-1 presents estimates of total emissions during construction, both as a yearly average as well as total emissions from all construction activities. Actual emissions can be reasonably expected to be lower than the emissions listed in this table.

Table 4.1.1. Summary of Yearly Construction Emissions Estimates

Year	Emissions (tons/year)						GHG Total Emissions (metric tons/year)		
	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	CO_2e
2011	11.78	64	71	0.17	3.3	3.2	10,631	2	10,673
2012	10.18	59	56.5	0.16	2.7	2.6	9,337	0.83	9,354
2013	10.18	59	56.5	0.16	2.7	2.6	9,337	0.83	9,354
2014	10.18	59	56.5	0.16	2.7	2.6	9,337	0.83	9,354
Project Total	**42**	**241**	**241**	**0.65**	**11.4**	**11**	**38,642**	**4.5**	**38,735**

There would be no large combustion sources on site. Operational emissions would occur from the vehicles used by an estimated 15 workers commuting daily to the site, some on-site vehicles (such as pick-up trucks and flat bed —stake” trucks), and small-scale comfort heating and cooling needs for the operations and maintenance (O&M) building.

4.1.1 Indicators

Air Quality

The Proposed Action would affect air quality if it would:

- Conflict with or obstruct implementation of an applicable air quality plan;
- Violate any air quality standard or contribute substantially to an existing or projected air quality violation;
- Result in a cumulatively considerable net increase of any criteria pollutant for which the Project region is in non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors); or
- Expose sensitive receptors to substantial pollutant concentrations.

Climate Change / Greenhouse Gases

The environmental analysis and documents produced in the NEPA process should provide the decision maker with relevant and timely information about the environmental effects of the decision and reasonable alternatives to mitigate these impacts. In this context, climate change issues arise in relation to the consideration of: (1) the greenhouse gas (GHG) emissions‘ effects from a Proposed Action and alternative actions; and (2) the relationship of climate change effects to a Proposed Action or alternatives, including the relationship to proposal design, environmental impacts, mitigation, and adaptation measures. Effects of GHG emissions of the Proposed Action and each alternative are presented in the analysis in Section 4.1.2; however, the effects of climate change on the Proposed Action are discussed in Section 3.1.2, Climate Change.

Greenhouse gas impacts from the Proposed Action would affect the environment if they would:

- Help or hinder attainment of the state‘s goals of reducing GHG emissions (Nevada Climate Change Advisory Committee [NCCAC] 2008);
- Increase the consumption of energy resources, especially fossil fuels;
- Generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment; or
- Conflict with any applicable plan, policy, or regulation of an agency adopted for the purpose of reducing the emissions of GHGs.

4.1.2 Direct and Indirect Effects by Alternative

Alternative 1: No Action

Under NEPA, the Bureau of Land Management (BLM) must consider an alternative that assesses effects that would occur if the Proposed Action were not approved and the application rejected. The No Action Alternative assumes that the right-of-way (ROW) application is denied. Under this alternative, there would be no construction or operational emissions and the Proposed Project site would not be disturbed; thus, there would be no direct or indirect effects on air quality or emissions of GHGs. Some indirect, adverse effects to air quality may occur under this

alternative if the 400 megawatts (MW) of proposed renewable energy generation associated with the Proposed Action do not occur elsewhere and the energy is generated instead by fossil fuels.

Alternative 2: Proposed Action

Effect AQ-1: Short-term, adverse effects on air quality conditions resulting from construction and decommissioning.

Exhaust and fugitive dust emissions generated from construction equipment and vehicles would increase ambient concentrations of air pollutants, but are not expected to contribute to regional exceedances of criteria air pollutant National Ambient Air Quality Standards (NAAQS) for which the areas has been designated as non-attainment by the United States Environmental Protection Agency (EPA) for NO_X (while portions of Clark County are within a non-attainment airshed, such as the Las Vegas Valley, the 164/AB airshed is designated is not designated as non-attainment). The temporary air quality impacts associated with construction would end immediately after construction. Control measure requirements for both construction and operation would be in place to manage emissions of fugitive dust.

The yearly construction and operation emissions totals for NO_X, CO, and PM_{10} would be less than the de minimis thresholds as specified under the Federal General Conformity Rule (40 CFR 93); thus, Project-related emissions are assumed to conform to the SIP and the regional air quality plans.

Any approved construction or new significant source of stationary (point) air pollution in Clark County would be required by the Clark County Department of Air Quality and Environmental Management (DAQEM) to adhere to the prescribed best management practices (BMPs) and control measures in order to minimize dust emissions and control engine exhaust emissions.

It is expected that, during decommissioning, a similar scale of effort and resultant emissions would occur and, therefore, there would not be a significant impact to air quality during decommissioning.

Effect AQ-2: Long-term effects on air quality conditions resulting from operations.

Ongoing emissions associated with operation of the Proposed Project would be associated with mobile combustion emissions from worker commutes and delivery trips, as well as limited fugitive dust from inspection and maintenance vehicles traveling on unpaved roads.

The Proposed Project would require an operational workforce of up to 15 full-time equivalent (FTE) positions. This workforce would include administrative and management personnel, operators, and security and maintenance personnel. O&M would require the use of vehicles and equipment including trucks for on-site welding, re-fueling, lubricating, and panel washing, and crane trucks for minor equipment maintenance. Additional maintenance equipment would include forklifts, manlifts, and chemical application equipment for weed abatement and soil stabilizer treatment in the bioremediation area. Flatbed trucks, dump trucks, and pick-up trucks would be in daily use on the Proposed Project site.

Long-term, ongoing emissions associated with operation of the proposed facility would be relatively minor. There would be no large combustion sources on site and, other than the mobile

equipment listed above, the only sources of long-term emissions would be some limited space heating and cooling. Fugitive dust emissions would continue from O&M vehicles traveling on the gravel roads.

Effect AQ-3: Potential net benefit to regional air quality.

Although not quantified due to the speculative nature of emissions benefits, it should also be noted that long-term generation of renewable electricity would have ongoing, long-term air quality benefits, including potential avoidance of emissions associated with avoided electric production from petroleum resources.

Climate change theories and air pollution are linked by the use of fossil fuels, including coal, petroleum, and natural gas. In the United States, fossil fuel combustion accounts for 98 percent of anthropogenic emissions of carbon dioxide (CO_2), the predominant GHG by volume (NCCAC 2008). Because the burning of fossil fuels is linked to both human-induced climate change and air pollution, reducing the use of fossil fuels as an energy source will play an important role in reducing emissions of GHGs as well as criteria air pollutants.

Effect AQ-4: Short-term, adverse effects on GHG emissions.

During construction, it is estimated that as much as 20,000 metric tons of GHGs would be emitted from construction equipment and worker commute vehicles. Although the relative scale of these emissions would be extremely small when compared to state or national GHG emissions levels, the cumulative nature of other ongoing projects in conjunction with the Proposed Action could contribute to and increase in emissions of GHGs. This impact is addressed further in the cumulative impact analysis (Section 4.19). Ongoing operational emissions of GHGs would be much lower than during construction and are, thus, considered to not adversely affect emission levels of GHG, or hinder federal or state attempts to reduce GHG emissions levels.

The CEQ issued draft guidance on February 18th, 2010, which states that ―fia Proposed Action would be reasonably anticipated to cause direct emissions of 25,000 metric tons or more of CO_2-equivalent GHG emissions on an annual basis, agencies should consider this an indicator that a quantitative and qualitative assessment may be meaningful to decision makers and the public" (CEQ 2010). CEQ does not propose this as an indicator of a threshold of significant effects, but rather as an indicator of a minimum level of GHG emissions that may warrant some description in the appropriate NEPA analysis for agency actions involving direct emissions of GHGs.

Effect AQ 4a: Beneficial impact supporting state renewable energy goals.

The operation of the Proposed Action would contribute to the State of Nevada‘s declared goal of increasing the renewable energy content of in-state energy generation.

Alternative 3: Modified Site Layout

As compared to the Proposed Action, Alternative 3 would require additional grading requirements for earth-moving and grading in order to create large detention basins and drainage corridors. However, impacts to air quality and GHGs would be similar to the Proposed Action in that daily emissions would be approximately the same and changes in project construction duration would be relatively minor.

4.1.3 Residual Effects

All air quality and GHG impacts were assessed with consideration of all Applicant Proposed Measures (APMs), BMPs, and other design features of the alternatives have been applied. Therefore, there is no difference between residual effects and project impacts, as discussed above.

4.2 Noise Impacts

This section discusses the effects on the ambient noise and vibration levels that may occur with implementation of the Proposed Action or alternatives. First, the indicators used to identify and analyze effects are presented; second, potential effects are discussed, and agency recommended mitigation measures are presented; third, a discussion of residual impacts is provided.

4.2.1 Indicators

The primary indicator of noise levels for this analysis is the A-weighted average noise level measured in decibels (L_{eq}). The one-hour average noise level (dBA L_{eq} [1-hour]) is often used to characterize ongoing operations or long-term effects. The maximum dBA level (dBA L_{max}) is used to document the highest intensity, short-term noise level. Another commonly used measure of noise effects is L_{dn}. The L_{dn} value matches the L_{eq} value for noise generated from 7:00 a.m. to 10:00 p.m. but accounts for increased public sensitivity to noise at night by the A-weighted equivalent sound level for a 24-hour period with an additional 10 dB imposed on the equivalent sound levels for nighttime hours of 10:00 p.m. to 7:00 a.m.

Clark County does not have regulations quantitatively limiting noise generation or effects from the Proposed Action during the construction phase. The Clark County has regulations regarding noise generation from operations, as discussed in Section 3.2, Noise.

The Proposed Action would affect ambient noise and vibration levels if it would:

- Result in the generation of noise levels or exposure of persons and sensitive species to noise levels in excess of standards established in applicable federal, state, and local general plans or noise ordinances at nearby noise-sensitive areas; or
- Result in generation of, or exposure of persons to, groundborne vibration or groundborne noise levels in excess of 75 vibration decibels (VdB) (generally considered intrusive for residential uses) unless allowed by federal, state, or local codes or ordinances.

4.2.2 Direct and Indirect Effects by Alternative

This section describes the effects under each alternative using the respective methodology prescribed under NEPA. To compare effects, this analysis defines the temporal scale (time), spatial extent (area), and intensity of effects for each alternative. All effects discussed in this section are direct. No indirect effects were identified for this resource.

Effects on the existing ambient noise and vibration levels may arise from Proposed Action construction, operation and maintenance, and decommissioning equipment and vehicles as well

as from the introduction of construction or O&M-related traffic on local roads near the Proposed Action.

Alternative 1: No Action

Under this alternative, there would be no construction and the Proposed Project site would not be disturbed; thus, there would be no noise effects to sensitive receptors.

Alternative 2: Proposed Action

The Proposed Project would authorize the Applicant to construct, operate, maintain, and decommission a 400 MW solar PV power plant on BLM land. The footprint of the Proposed Project and related facilities would be 2,966 acres. The Proposed Project would be located in Clark County, Nevada, 2 miles east of Primm, along the California/Nevada state line. Effects that could result from the implementation of Alternative 2 during construction, O&M, or decommissioning activities are analyzed in the discussion below.

Effect NOI-1: Short-term increase in ambient noise and vibration levels as a result of construction activities.

The construction phase of the Proposed Project is expected to last 48 months, spanning a period from the fourth quarter of 2010 to the fourth quarter of 2014. During peak construction activity, the Proposed Project would require approximately 230 to 400 workers. Across the entire construction phase, the average workforce is expected to number approximately 230 workers.

Construction. To evaluate potential noise impacts due to project construction, reference noise levels were obtained from the Roadway Construction Noise Model User's Guide (Federal Highway Administration [FHWA] 2006) which provides a comprehensive assessment of noise levels from construction equipment. Based on the reference values in the guide and the list of construction equipment to be used on the Project, presented in Table 4.2-1, the loudest equipment would generally emit noise in the range of 80 to 90dBA at 50 feet, with usage factors of 40 to 50 percent that account for the fraction of time that the equipment would be in use over the specified time period. Noise at any specific receptor is typically dominated by the closest and loudest equipment. The type of construction equipment and the number of equipment pieces near any specific receptor location would vary over time. To provide a reasonable and conservative estimate for construction noise, the following scenario was modeled:

- One piece of equipment generating a reference noise level of 85 dBA (at 50 feet distance with a 40 percent usage factor), located on the transmission line route or the substation property line.
- Two pieces of equipment generating reference 85-dBA noise levels, located 50 feet farther away on the transmission line route or the substation property line.
- Two additional pieces of equipment generating reference 85-dBA noise levels, located 100 feet farther away on the transmission line route or the substation property line.

Equipment Noise. Individual pieces of equipment would generate noise levels in a range from 55 to 90 dBA at 50 feet from the source (see Table 4.2-1). In addition, a temporary increase in

traffic noise on Interstate 15 (I-15) and local roads would occur as a result of equipment delivery and workers commuting to the site.

Table 4.2-1. Construction Equipment Noise Levels for the Proposed Action (Alternative 2)

Type of Equipment[a]	Phase I Total Days	Phase II/III Total Days	Equivalent Federal Transit Administration Classification	Typical Sound Pressure Level (dBA) at 50 feet from source
Scraper	135	132	Scraper	89
Motor grader	200	132	Grader	85
Excavator	195	132	Backhoe	80
Dozer	300	132	Dozer	85
Dump truck	132	396	Truck	88
Pad drum vibratory roller	132	396	NA	85
4,000-gallon water truck	264	792	Truck	88
Concrete truck	132	396	NA	85
Backhoe/loader	132	396	Loader	85
Truck mounted crane	198	594	NA	83
Vibratory pile driver			NA	95
Grade-all	132	396	Grader	85
Flatbed truck	198	594	Truck	88
Trencher	132	396	NA	55
Lightweight truck	198	594	Truck	88
Drilling rig for water wells	20	0	NA	84
Drilling rig air compressor	20	0	NA	80
Crawler tractor	40	310	Dozer	85
Jackhammer/ Skid steer loader	40	310	NA	90
Bucket trucks	20	160	NA	85
Bullwheel tensioner truck	20	160	NA	78
Drum puller truck (also a truck-mounted tensioner and puller)	20	160	NA	78
Pump trucks	7	20	NA	85
Auger trucks (also a truck-mounted pole hole auger)	10	50	NA	85
Welding machines	40	310	NA	
Forklifts	40	310	Crane, mobile	83
Conductor reel and pole trailers	No engine		NA	NA
Traveler equipment	No engine		NA	NA

Sources: Federal Transit Administration (FTA) 2006; FHWA 2006.

Note:
[a] Construction hours would be 7:00 a.m. to 7:00 p.m. Monday through Friday.

Construction equipment noise levels at various distances, based on this scenario, are presented in Table 4.2-2.

Table 4.2-2. Construction Equipment Noise Levels versus Distance

Distance from Route or Substation Property Line (feet)	L_{eq} Noise Level (dBA)
50	83
100	79
200	74
400	69
800	63
1,600	58
3,200	52
6,400	46

Although real composite noise levels from construction activities would depend on the duration of each task and the exact number and usage factor of each piece of equipment and vehicle, it is estimated that construction activities would produce a short-term, adverse increase over the existing ambient noise levels at the site boundary of the Proposed Action (50 feet from the source). In addition, the use of percussive or vibratory equipment during the installation of the solar arrays may produce a short-term ground-borne vibration (above 75 VdB) and groundborne noise levels. Due to the location of the closest residence (approximately 1.4 miles from the site), these noise and vibration levels would be attenuated over distance and reduced to background levels at the closest sensitive receptor. Implementation of MM NOI-1 through MM NOI-6 would mitigate construction noise impacts during the construction phases.

- MM NOI-1: Conduct Construction Activities during Daytime Hours. The Applicant will conduct construction activity only during daytime hours while in the vicinity of the Desert Oasis apartment complex. Construction activities (including truck deliveries, pile driving, and vibration equipment use) shall be restricted to the least noise-sensitive times of day—weekday daytime hours between 7:00 a.m. and 10:00 p.m., near residential or recreational areas;
- MM NOI-2: Turn off Idling Equipment. The Applicant will turn off idling equipment when not in use.
- MM NOI-3: Notify Adjacent Residences. The Applicant shall notify adjacent residents in advance of construction work through public mailings and signs directed toward residents, landowners, and recreational users within one mile of the site prior to construction. The notice will state specifically where and when construction activities will occur in the area. The Applicant will also provide a communication line or procedures to enable individuals to contact the contractor in the event that construction noise levels affect them.
- MM NOI-4: Install Acoustic Barriers. The Applicant shall install acoustic barriers around stationary construction noise sources.
- MM NOI-5: Proper maintenance and working order of equipment and vehicles. Construction equipment shall be maintained per manufacturers‘ recommendations. The

Applicant will ensure that all equipment is adequately muffled and maintained, to include:

- Use of noise controls on standard construction equipment and shielding on impact tools;
- Use of broadband noise backup alarms on mobile equipment;
- Installation of mufflers on exhaust stacks of all diesel and gas-driven engines; and

- MM NOI-6: Construction Equipment Muffled. The Applicant shall provide adequately muffled construction equipment.

Other sensitive land uses, such as recreation and special management areas, may be affected by a short-term increase of noise levels. Effects on recreational users may be detectable along off-highway vehicle (OHV) routes but would be short-term and unlikely to impair the recreational resource. The Proposed Project would not cross any designated Areas of Critical Environmental Concern (ACECs). The closest Special Management Areas (SMAs) to the Proposed Project site are the South McCullough Wilderness Area, located 1.9 miles east of the Project in Nevada, and the Stateline Wilderness Area, located 2.5 miles to the west in California. Therefore, no measurable change would be detected from current conditions, resulting in no effect from construction on sensitive land uses other than residential.

Transmission Line Corona Noise. Corona is the noise generated from the strong electric field at the surface of a high-voltage power line conductor ionizing the nearby air, resulting in an audible, continuous, low-level noise or _buzz.‘

Transmission Lines. Construction of the transmission line would produce noise which would affect residences located at the Desert Oasis apartment complex due to the operation of construction equipment. The Federal Transit Administration (FTA) provides guidelines for reasonable criteria for assessment of construction noise (FTA 2006) indicating that construction noise that exceeds a 1-hour L_{eq} of 90 dBA or an 8-hour L_{eq} of 80 dBA during the day would provoke adverse community reaction. The apartments are located 1.4 miles from the Proposed Project site, which would result in noise levels that would not be discernable above background noise in the area during construction. Construction activities would be limited to daytime hours, and Clark County regulations provide an exemption for noise generated during daytime construction activities.

Substations. The North and South substations would be located in Primm in Clark County, where temporary construction noise is exempt from exterior noise level limits. The nearest noise receptor is the Desert Oasis apartment complex, located 1.4 miles away. No hospitals, libraries, schools, places of worship, or other facilities are within the Proposed Project area. The setting is rural and undeveloped.

Noise levels from common construction equipment at various distances can be estimated conservatively by assuming that the only sound-reducing mechanism is the divergence of the sound waves in open air. Propagation of groundborne vibration from equipment and vehicles is also assumed to be mitigated with greater distance. Construction noise and vibration levels related to the Proposed Action would vary during the construction period, depending on the construction phase and number and location of operating construction equipment. The site

preparation phase would involve noise-generating activities such as clearing and grubbing, earthwork, and rough site grading; while the installation of solar panel arrays would involve the installation of steel beams using percussive or vibration equipment in a manner similar to installing freeway guardrails.

Effect NOI-2: Long-term increase in ambient noise levels as a result of operational noise.

Operations and Maintenance. During the operational phase, the Proposed Project is expected to employ up to 15 permanent workers to operate and maintain the facility and to provide plant security.

The Proposed Project operations would be totally automated. The various power components would be turned on and off automatically in the morning and evening, respectively. Electrical power components that would be operated include solar field direct current (DC) electrical collector systems, DC to alternating current (AC) inverters and step-up transformers, two new substations, expansion of the existing Bighorn Substation, and 34.5-kilovolt (kV), 220kV and 230kV transmission tie-in lines.

Permanent staff would include 15 people, including the nightly security officer. Maintenance needs would include panel washing (twice per year), array visual and infrared inspection, vegetation control (as needed), and inverter and switchyard maintenance. The equipment would also include all-terrain vehicles to go inside the array for physical inspection and parts replacement.

The potential sources of long-term operational noise would stem from the operation of electrical equipment including the transformers for the solar arrays, corona noise from the 33kV, 220kV, and 230kV transmission tie-in lines, the North and South substations, the existing NV Energy Walter M. Higgins Generating Station and noise from vehicle operations during routine O&M. There would be an increase in local traffic noise resulting from workers traveling to and from the site during construction (up to 700 daily trips by workers, plus up to 112 trips for construction vehicles) and approximately 1,039 construction vehicles would be in use the at work site each day over the 48-month construction period.

Noise from electrical equipment, such as transformers, is characterized as a discrete low-frequency hum (Bell and Bell 1994). Among this type of equipment, transformers would be expected to contribute the most to the composite noise at the site. The noise from transformers is produced by alternating current flux in the core that causes it to vibrate (an effect also known as magnetostriction). In addition, transformer cooling fans produce noise when they operate. This noise is produced at a frequency (Hertz [Hz]) of twice the reference line (i.e., 2 x 60 Hz = 120 Hz), which can propagate with favorable weather conditions over long distances with little potential for reduction and create disturbances for residential receptors located at distances of 3,000 to 10,000 feet (Elliot *et al.* 1998).

The relative loudness of transformers depends on the construction design and techniques, as well as the ambient noise levels at a site (Jefferson Electric 2010). The Phase 1 equipment would include a total of 400 transformers (1 MW of power generation) to be enclosed within each photovoltaic power block. The National Electrical Manufacturers Association (NEMA) standard

sound levels for 2,000kVA commercial transformers (e.g., vent-dry type) at a distance of one foot from the source are 66 dBA for self-cooled and 71 dBA for fan-cooled units (General Electric 1999). The composite noise level from identical sources—which can be predicted based on the final design, location, and technical specifications—would add three dB per identical transformer. However, the transformers would be housed in enclosures which would reduce the noise levels by means of transmission loss and the transformers locations are spread widely over the site which would reduce the composite noise level at a receptor. The closest distance from a transformer to a receptor is over 1.4 miles. Even with the composite noise of 400 transformers during operations, the sound level at the closest receptor would not exceed 55 decibels (dB). This would result in a long-term increase in ambient noise levels and would be audible at the nearest receptor.

The corona effect is the ionization of the air that occurs at the surface of the energized conductor and suspension hardware due to very high electric field strength at the surface of the metal during certain conditions. Corona generates audible noise during operation of transmission lines and substation equipment. The noise is generally characterized as a crackling, hissing, or humming noise. The amount of corona produced by a transmission line is a function of the voltage of the line, the diameter of the conductor, the elevation of the line above sea level, the condition of the conductor and hardware, and the local weather conditions. The interconnection transmission line would not be audible at the closest sensitive receptor, which is over one mile away.

Other maintenance activities, such as visual inspections, vegetation mowing, and parts replacement, would be expected to be long-term over the life of the Proposed Action. Potential effects from these activities on the existing ambient noise levels may be detectable for a short duration at the site and on local roads (minor increase in traffic), but given the relative location of the site with respect to sensitive receptors, any potential increases in the noise levels on site are unlikely to be detectable or of concern to the general public. Therefore, there would be no long-term effects on existing ambient noise and vibration levels from O&M of the Proposed Action. No additional mitigation has been identified.

Maintenance activities associated with the transmission line, substations, and the transformers and the solar arrays would typically result in noise levels below those associated with construction-related activities, and are anticipated to involve fewer pieces of heavy equipment, occur less frequently, and be of shorter duration than construction activities. Maintenance activities are primarily inspection-related (for example, annual inspection of the transmission line from vehicles). Other maintenance activities, including washing of insulators to ensure proper function, would be conducted on an as-needed basis, but are anticipated to occur less than once per year. As with construction noise, the Applicant would use noise reduction measures to be compatible with local plans and zoning to the extent practicable. Implementation of MM NOI-7 would mitigate noise impacts during the O&M phase of the Proposed Project.

- <u>MM NOI-7: Ensure proper installation of transformer equipment.</u> The Applicant shall ensure proper installation of transformer equipment by:
    - Installing transformers within enclosures;

- Using sound-dampening pads between each transformer and the mounting surface;
- Using flexible conduit couplings between each transformer and the associated wiring system; and
- Mounting the transformers on surfaces with a large mass to avoid amplifying the sound.

Decommissioning. The expected life of the Proposed Project is 50 years (NextLight 2010.) According to the Applicant, in the event that the site should be removed from power generation service, it would be made suitable for reclamation. All equipment, buildings, concrete foundations, and driven piles would be removed from the site, generating a temporary and localized increase in ambient noise levels during decommissioning. The Applicant would develop a decommissioning plan consistent with BLM requirements in a manner that protects public health and safety and is environmentally acceptable. With the implementation of MM NOI-1 through MM NOI-7, adverse effects during decommissioning would be localized and short-term.

Alternative 3: Modified Site Layout

Alternative 3 would be constructed and operated similar to as Alternative 2 (the Proposed Action) for every project component, with the exception of the drainage plan and a larger project footprint. Alternative 3 would include several diversion berms (each 10 feet high), debris basins, and level spreader detention basins. Most of the Project components, construction techniques and design features of this alternative are the same as Alternative 2, with the exception of how the Proposed Project would address erosion controls and stormwater management. Because of the erosion controls, the footprint of Alternative 3 and related facilities would be larger than the Proposed Action and would encompass approximately 4,818 acres. Noise sources may be located closer to the receptors by expanding the Proposed Project area, but not to a degree where it would significantly change the noise level at the receptor.

Construction. The noise impacts for Alternative 3 would be similar to Alternative 2 (the Proposed Action) since the Proposed Project site is located 1.4 miles from the closest sensitive receptor (i.e., Desert Oasis apartment complex) for both alternatives. Alternative 3 would include a larger project footprint; however, the number of components would be the same under both alternatives. The construction duration of 48 months and the equipment that would be used during construction would be similar.

Construction noise mitigation measures MM-NOI 1 through MM- NOI 6 would be required for Alternative 3.

Operations and Maintenance. The O&M noise impacts for Alternative 3 would be similar to the Alternative 2 (the Proposed Action) and mitigation measure MM-NOI 7 would be required for Alternative 3.

4.2.3 Residual Effects

There would be no residual effects from construction, O&M, and decommissioning of the alternatives after mitigation.

4.3 Geology, Topography, and Geologic Hazards Impacts

This section discusses effects on existing geology, topography, and from geologic hazards that may occur with implementation of the Proposed Action or alternatives.

4.3.1 Indicators

The Proposed Action would affect geologic resources or be affected by geologic hazards if it would:

- Be located on a geologic unit that is unstable or would become unstable as a result of the Proposed Action and result in on- or off-site landslides, lateral spreading, subsidence, liquefaction, or collapse;
- Result in physical alteration of or damage to geologic features; or
- Present a significant threat to public safety due to damage to project components by geologic hazards.

4.3.2 Direct and Indirect Effects by Alternative

This section describes the effects under each alternative using the respective methodology prescribed under NEPA. To compare effects, this analysis defines the temporal scale (time), spatial extent (area), and intensity of effects for each alternative. All effects discussed in this section are direct. No indirect effects were identified for this resource.

Alternative 1: No Action

Under this alternative, there would be no construction and the Proposed Project site would not be disturbed; thus, there would be no effect on geology or topography.

Alternative 2: Proposed Action

This alternative would approve the ROW application and the Proposed Action would be carried forward. Effects that could result from the implementation of Alternative 2 during construction, O&M, or decommissioning activities are analyzed in this section.

<u>Effect GEO-1: Geologic units would become unstable and would result in on- or off-site landslides, lateral spreading, subsidence, liquefaction, or collapse.</u>

The Proposed Project site is located on a moderately sloping alluvial fan that is composed of loose sediments that have not been cemented into rock. Due to the loose nature of alluvial material, the sediments of alluvial fans can move and shift, particularly during heavy precipitation events, such as flash floods (see Section 3.3.3, Seismicity). Extreme rain events can result in the suspension and transportation of sand, gravel, or even boulders, which can cause structural damage. Additionally, earthquakes and human activities can result in landslides (see

Section 3.3.3); however, as discussed in Section 3.3.3, the site is categorized as having low susceptibility to and incidence of landslides (Godt 2001). Risks associated with earthquakes are discussed below in Effect GEO-3.

No construction or operational activity would alter the character of the underlying alluvial fan to make it less stable. Maintenance of the natural terrain and its existing drainage system would facilitate natural drainage through the site. Although the site is located on an alluvial fan where sediments have the potential for movement during large precipitation events, the Proposed Project would be constructed to minimize that potential movement by utilizing the natural on-site drainage. Therefore, it is not likely that the geologic unit would become unstable as a result of the Proposed Project. In addition, all excavations associated with the Proposed Action would be filled with soil or foundation material.

The presence of subterranean void spaces can contribute to subsidence, landslides, and/or collapse. Therefore, the Proposed Project would not increase the geologic instability of the area and would not increase the risk of on- or off-site landslides, lateral spreading, subsidence, liquefaction, or collapse.

Effect GEO-2: Physical alteration of or damage to geologic features.

To provide water for construction and operation of the Proposed Project, two on-site wells would be drilled to a depth of approximately 600 feet using a truck-mounted drilling rig (see Section 2.6.2, Construction Tasks for the Proposed Project, for a discussion of drilling techniques). Any effects on subsurface geologic features resulting from drilling would be localized to the drilling sites. No unique geologic features were identified at the site; therefore no effect on a unique geologic feature would occur.

Effect GEO-3: Project components damaged by geologic hazards present a threat to public safety.

Given that there have been over 22 earthquakes with a magnitude (M) of 5.0 or higher on the Richter scale, with one above 7.0 M, that have occurred within 100 miles of the Proposed Project site since 1990, there is the potential for damage to project components due to fault rupture, earthquakes, or seismic shaking (U.S. Geological Survey [USGS] 2005b). An earthquake could cause structural damage on site; however, all project structures would have to comply with applicable earthquake building codes. Therefore, earthquake-related damage to structural components of the Proposed Project would be minimal and confined to the site. Furthermore, there have not been any earthquakes with a magnitude of 5.0 or higher on the Richter scale within the Proposed Project site since 1900. Because most of the site would be fenced and in a remote area, very few, if any, members of the public would be exposed to potential earthquake damage at the facility; however, workers and wildlife could be exposed to earthquake damage at the facility.

As discussed in Effect GEO-1, flash flooding can result in debris flow in desert environments. The alluvium at and surrounding the site could be transported during flash floods and damage on-site structures, such as solar panels, fencing, etc. The fence surrounding the facility would impede some or all of the debris flow during a flash flood event. The Applicant would perform maintenance after major storm events to remove any debris that may have accumulated against

the fencing and to repair any damage to the fencing; however, flash flood events could result in on-site damage that could represent a hazard to on-site workers or wildlife. The size, frequency, and intensity of flash flood events and associated damage has not been documented in this area. It is possible that a major flash flood could result in damage downslope of the site.

Compliance with earthquake building codes and maintaining the natural drainage would minimize potential risk associated with the most likely geologic hazards in the area; however, once these events occur, they can strain or stress the existing infrastructure. With the implementation of mitigation measures MM GEO-1 and MM GEO-2, potential short- or long-term adverse effects related to the recurrence of these types of events would be reduced and any damage addressed, such that they would be short-term and localized.

- MM GEO-1: Inspections After Geologic Events. To minimize or avoid potential hazards from earthquakes and other geologic events, the Applicant will have inspections performed by a BLM-approved appropriate professional (e.g., geologist, geophysicist, geologic engineer, or structural engineer) following geologic events in the vicinity of the Proposed Project site. The appropriate professional will perform the appropriate inspection and make recommendations to ensure that hazards are minimized for the next comparable or larger event. The Applicant will implement the recommended corrective actions.
- MM GEO-2: Applicant's Insurance Coverage. The Applicant shall acquire the appropriate insurance coverage to address potential off-site damage to structures or injury to people by facility structures that are moved off-site by a geologic event such as an earthquake or flash flood event.

Alternative 3: Modified Site Layout

Effects under Alternative 3 would be the similar to those identified under Alternative 2 (the Proposed Action). The difference in the temporarily disturbed area (1,150 acres) and permanently disturbed area (250 acres) for construction would be increased under Alternative 3, but the type, intensity, and duration of the effects would be similar to the Proposed Action. The same mitigation used for the Proposed Action would be applicable for Alternative 3.

4.3.3 Residual Effects

Given that there will be no direct or indirect impacts to impacts to geology, topography or geologic hazards, there will be no residual impacts from the Proposed Project.

4.4 Soils Impacts

This section discusses the effects on soil resources that may occur with implementation of the Proposed Action or alternatives. The indicators used to identify and analyze effects are presented and potential effects and agency recommended mitigation measures are discussed.

4.4.1 Indicators

The Proposed Action would affect soil resources if it would:

- Increase erosion rates.
- Reduce soil productivity by compaction or soil mixing to a level that would prevent successful rehabilitation and eventual reestablishment of vegetative cover to the recommended or preconstruction composition and density.
- Increase exposure of human or ecological receptors to potentially hazardous levels of chemicals or explosives due to the disturbance of contaminated soils or to the discharge or disposal of hazardous materials into soils.

4.4.2 Direct and Indirect Effects by Alternative

This section describes the effects under each alternative using the respective methodology prescribed under NEPA. To compare effects, this analysis defines the temporal scale (time), spatial extent (area), and intensity of effects for each alternative. All effects discussed in this section are direct. No indirect effects were identified for this resource area.

Alternative 1: No Action

The No Action Alternative assumes that the ROW application is denied, there would be no construction, and the Proposed Project site would not be disturbed; thus, there would be no effect on soil resources.

Alternative 2: Proposed Action

The implementation of Alternative 2, the Proposed Action, could result in several effects on soils. Effects are detailed below, along with corresponding mitigation measures that would reduce effects on soils.

Effect SOIL-1: Increase in soil erosion rates.

Several factors affect the potential for soil to be eroded by water or wind, including soil texture, the length and percent of slope, vegetative cover, and intensity of rainfall or wind. Construction and O&M of Alternative 2 would disturb 2,966 acres of land through clearing and grading, as well as construction of impermeable surfaces throughout the Project site over a four-year period (2010-2014). As discussed in section 3.4, Soils, the Haleburu, Nippeno-Nipton, and Tonopah-Arizo associations are all classified as Wind Erodibility 8, the description of which is, –erosion not a problem," and would, therefore, not affect undisturbed soils within the Proposed Project site. During construction, the Applicant would clear and grade 2,966 acres within the Proposed Project area. This removal of the vegetation and soil crusts and grading would expose soil and increase the potential for wind- and water-driven erosion. The Proposed Project site is relatively flat, but it has the potential for high winds and infrequent strong rains. The use of vehicles and

equipment on these areas would further increase the potential for both wind- and water-driven erosion. Therefore, there would be a strong potential for wind and water erosion within the Proposed Project site.

To reduce the potential for water-driven erosion, the Applicant has designed an erosion control and stormwater detention system. As part of this system, the majority of the Proposed Project site would be drained by sheet flow to on- and off-site drainages. The drainage plan would use existing natural washes, by reinforcing their banks, and allow the remaining stormwater flow to pass through the site naturally. The drainage control features would consist of stormwater flow corridor reinforcement, berms within the solar array, and a drainage control berm on the eastern exterior of the solar array.

Construction of the erosion control system would reduce water erosion susceptibility of the Proposed Project site and down gradient parcels. To further ensure that effects related to soil erosion are minimized, the Applicant has incorporated a series of BMPs into their Proposed Project (see Chapter 2, Description of the Proposed Action and Alternatives, for more detail). Implementation of these BMPs would reduce localized soil impacts resulting from wind and water erosion; however they would not eliminate all soil loss within the Proposed Project site.

Wind erosion would be exacerbated due to the removal and maintenance of vegetation within the Proposed Project site, likely resulting in a localized loss of topsoil. Also, placement of impervious surfaces (solar panels) may alter the drainage characteristics of the Proposed Project site, limiting the effectiveness of the Applicant-designed stormwater detention system during monsoonal precipitation events.

Effect SOIL-2: Reduce soil productivity.

The soft alluvial soils that compose the Proposed Project site provide habitat to desert vegetation. Impacts to local flora are discussed in Section 4.6, Biological Resources Impacts. To reduce effects on soil production, the Applicant proposes to salvage the top 4 inches of native soil where flood control berms are built. After construction of the berms, salvaged soil would be replaced to provide a homogenous appearance as well as preserve sensitive soils and seed banks. Salvaged soil will be held on site until it is used for restoration.

Effect SOIL-3: Increase exposure of contaminated soils.

The Proposed Project site does not contain any contaminated or hazardous soils (NDEP 2009e, EPA, n.d.). The Proposed Project would employ a balanced cut-to-fill ratio for construction of project elements with the exception of the earthen berms. About half of the 58,000 cubic yards of soil material required to construct the berms would be obtained from excess soil material obtained from other excavating activities on site, primarily the berm construction, itself. The remaining soil material (29,000 cubic yards) would be obtained from an off-site source with the same soil type that has yet to be determined.

- MM SOILS-1 Ensure soils are free from contaminants. The Applicant will ensure that imported soils are free from contaminants before use on the site. At the request of the BLM, soils will be tested to ensure that hazardous materials are not present within the imported fill.

Alternative 3: Modified Site Layout

Alternative 3 would produce similar effects on soils as describe in Alternative 2 (the Proposed Action), with the exception of the flood control system. Alternative 3 would involve several diversion berms (each 10 feet high), debris basins, and level spreader detention basins, and would temporarily disturb an area of 1,150 acres and permanently disturb an additional 250 acres. Because of the site drainage plan, the footprint of Alternative 3 and related facilities would encompass 3,669 acres. This increase in the number of disturbed acres would exacerbate the effects to soils described in Alternative 2.

Because the flood control system in Alternative 3 would not make use of the Proposed Project site‘s existing channels for flood control, the mitigation described in Alternative 2 would not reduce these potential effects to the same level. Construction of Alternative 3 would likely result in residual effects related to increased rates of wind and water-driven erosion resulting from construction and operation of the Proposed Project.

4.4.3 Residual Effects

Construction, operation, and decommissioning of the Proposed Project would increase the potential for localized flooding and downgrade soil loss through wind and water erosion. Although the Applicant has designed an extensive water erosion control system and committed to a series of BMPs, localized soil erosion can be expected. These residual impacts would be most prevalent on dry, windy days, when wind erosion underneath the panels would be greatest, and during monsoon events when water volume may exceed that capacity of the flood control system. Either residual impact would be localized to the Proposed Project site and only occur during unique climatic conditions.

4.5 Water Resources/Hydrology Impacts

This section discusses effects on water resources/hydrology that may occur with implementation of the Proposed Action or alternatives.

4.5.1 Indicators

The Proposed Action would affect water/hydrology resources if it would:

- Decrease groundwater supply or interfere substantially with groundwater recharge;
- Degrade the quality of groundwater such that it is no longer suitable for its intended use;
- Degrade the quality of surface water by increasing erosion, increasing sedimentation, or introducing contaminated waters; or
- Increase the potential for flood hazards.

4.5.2 Direct and Indirect Effects by Alternative

This section describes the effects under each alternative using the respective methodology prescribed under NEPA. To compare effects, this analysis defines the temporal scale (time), spatial extent (area), and intensity of effects for each alternative.

Alternative 1: No Action

Under this alternative, there would be no construction and the Proposed Project site would not be disturbed; thus, there would be no adverse effect on water resources or hydrology.

Alternative 2: Proposed Action

The proposed action would authorize the Applicant to construct, operate, maintain, and decommission a 400MW solar PV power plant on BLM land. The footprint of the Proposed Project and related facilities would be 2,966 acres.

Effect WATER-1: Decrease groundwater supply or interfere substantially with groundwater recharge.

As described in Chapter 2, Description of the Proposed Action and Alternatives, the proposed project would require 600 acre-feet of water over the four-year construction period and 21 acre-feet per annum (AFA) for O&M activities. No more than 200 acre-feet would be allowed in any single year. The construction phase water estimates include dust suppression water. O&M phase water use, estimated at 21 AFA, would be used for biannual panel washing and for domestic potable water supply in the administrative area.

Water would be supplied from two wells would be drilled on the Project site, immediately adjacent to the O&M building. The larger well would be drilled to a depth of approximately 600 feet with a truck-mounted drilling rig. Its primary purpose would be to provide water for dust suppression during construction and fire suppression and cleaning water during operations. A temporary water storage pond would be set up near the larger well to supply construction phase water. The temporary storage pond would be excavated and lined. It would be 200 feet by 140 feet. The dry season is generally windy; therefore, greater amounts of water would likely be needed for dust suppression than on calm days. The Applicant analyzed 23 wells in the immediate vicinity of the Proposed Project to determine the required well depth and assess water supply and draw down effects. Drawdown is the drop in the level of the groundwater in the well when water is being pumped (NRWA 1989). The well analysis concluded that water consumption for the Project would not adversely affect water supply or cause draw down, with the use of the temporary storage pond. The temporary storage pond would be filled to use the well water efficiently. Following construction, the lining of the storage pond would be removed and the area would be regraded. In addition, two aboveground water tanks would be located adjacent to the O&M building. Each tank would have a capacity of 220,000 gallons. These tanks would provide operational-phase water and water for fire protection. The smaller well would be drilled near the O&M building and would be used to supply potable water. Equipment for water treatment would be installed in the O&M building.

Groundwater rights in the area are held by the Las Vegas Valley Water District (LVVWD). As described in Section 3.5.2, Groundwater Resources, the Ivanpah Valley consists of alluvial-basin fill groundwater aquifers receiving recharge through infiltration of runoff from the mountain and alluvial fan slopes, and from direct rainfall. The drilling of the two wells described above would be contingent on approval from the LVVWD. As stated in Section 3.5.2, the Proposed Project area would be within the Ivanpah Valley Northern Part and Southern Part hydrographic basins (Nevada Division of Water Resources [NDWR] 2009a). In the Plan of Development (POD), the Applicant stated that the LVVWD possess sufficient rights in Basin 164-A (Ivanpah Valley

Northern Part) to meet the construction and operational water requirements of the Proposed Project. A water service agreement with LVVWD was scheduled for LVVWD Board approval in February 2010. The findings of this approval were not yet available at the time of this document.

LVVWD provides average daily water usage for each type of development. The average daily water consumption rate for industrial development is 1.1 gallons per minute (GPM) per acre. This equates to approximately 4,717 AFA when converted and applied to the proposed disturbance area for the Proposed Project. Construction phase water use (600 acre-feet over four years) is 3 percent of 4,717 AFA. Operational water use (21 AFA) is less than 1 percent of 4,717 AFA. The Proposed Project water usage would be between 1 and 3 percent of the maximum allowed for the LVVWD. Effects to drawdown would only be a concern during peak water usage for dust suppression. With the temporary storage pond system described above, effects to groundwater down draw would be localized and short-term.

Aquifers are recharged by infiltration of precipitation to the subsurface. Increasing the amount of impervious surfaces in an area can adversely affect groundwater recharge by decreasing the amount of water that infiltrates to the subsurface. As stated in Section 3.5.2, groundwater recharge in the Ivanpah Valley occurs via infiltration of runoff from the mountain and alluvial fan slopes, and from direct rainfall. The Proposed Project would include new impervious areas at the O&M building, substations, and roadways. This accounts for 196.1 acres (0.3 square miles), or 6.6 percent of the Project site. The Ivanpah Valley groundwater basin covers 637 square miles in Nevada and California (NDWR 2009c, California Department of Water Resources [CDWR] 2004). Effects to groundwater recharge due to construction and operation of the Proposed Project would result from the impervious area of the Proposed Project, but this area would only cover 0.05 percent of the entire Ivanpah Valley groundwater basin, most of which is undeveloped.

Effect WATER-2: Degrade the quality of groundwater such that it is no longer suitable for its intended use.

Spills of chemicals and petroleum products can degrade groundwater quality such that it is no longer suitable for its intended use. The Proposed Project would use small amounts of hazardous materials during construction and operation (see Section 3.14, Human Health and Safety/Hazardous Materials, for more information about quantities of hazardous materials). Petroleum spills would be possible while refueling equipment during construction and operation of the Proposed Project.

During operations, a transformer would be used and would be located throughout the solar array field and at each of the two substations. Transformers would require mineral insulating oil with approximately 160,800 gallons stored on site during operation and would be installed with secondary containment. Approximately 400 transformers, each containing 315 gallons of mineral insulating oil, would be located throughout the solar array field. The two substations would each house two transformers containing approximately 8,700 gallons of mineral insulating oil.

As described in Section 3.5.2, Groundwater Resources, groundwater is located around 550 feet below ground surface. The Applicant has stated that a Spill Prevention, Control, and

Countermeasures (SPCC) Plan would be developed and observed to protect the environment from petroleum product spills during operation. The Applicant has also stated that an emergency response plan would be developed to address emergencies including leaks and spills during construction. Successful implementation of the SPCC and emergency response plans would minimize the potential for a spill and detail the measures to cleanup any spills that occur. In addition, groundwater is located over 100 feet below the ground surface; therefore, it is unlikely that any surface spill would infiltrate to groundwater.

Other sources of liquid waste with the potential for contamination would come from sanitary waste and flushing and cleaning of pipes. Construction-phase sanitary waste would be removed by a contracted sanitary service. A septic tank and drain field system would be constructed near the O&M building to accommodate operation phase sanitary waste. The septic system would be constructed and maintained in accordance with Southern Nevada Health District‘s Small Commercial Septic System Permit. Adherence to this permit would prevent impacts to groundwater quality from the septic system.

Effect WATER-3: Degrade the quality of surface waters by increasing erosion, increasing sedimentation, or introducing contaminated waters.

Surface water quality can be degraded by increasing rates of erosion and sedimentation, introducing contaminants, violating water quality standards, or otherwise changing the character of surface waters. As described in Section 3.5.1, Surface Water Resources, the Proposed Project area would be within the Ivanpah Valley area of the Mojave Desert where there is very little precipitation. There are no perennial water bodies within the Proposed Project area. Therefore, there is no surface water quality data available to measure potential impacts against.

As described in the groundwater discussion, small amounts of chemicals solvents, herbicides, and petroleum products would be used during construction and operation of the Proposed Project. Additionally, large volumes of mineral oil would be utilized and stored at the transformers. The greatest potential for contamination of surface water from these materials would be from petroleum products at the transformer and vehicle refueling stations. The Applicant‘s emergency response plan (construction phase) and SPCC plan (operation phase) would provide for hazardous material spill prevention and clean-up measures, were a spill to occur.

There would be potential for increased erosion or siltation on site or off site due to project construction and O&M activities. There are no perennial waterbodies within the Proposed Project site. However, there are drainages in the Proposed Project site area both in the form of dry washes and sheet floods that are characteristic of alluvial fans where surface water flows during and after heavy rains. Water from these drainages flows into Roach and Ivanpah Dry Lakes, which have water on a seasonal basis and no external drainage. While no surface water quality data are available for these temporary water bodies, it is expected that bed loads and suspended loads are quite high during significant storm events.

The Applicant has proposed to incorporate the construction-phase erosion and sediment control measures listed in Section 2.6.7, Other Considerations for Construction of the Proposed Project. These measures are consistent with regional BMPs and federal, state, and local regulations

including the Project's General Permit and Stormwater Pollution Prevention Plan (SWPPP). These measures would control erosion and sediment transport during construction.

There would likely be effects that last beyond the construction period and terms of the General Permit and SWPPP. Although the Applicant proposes to maintain existing drainage patterns throughout the solar field, construction and operation of the Proposed Project activities would likely change natural runoff patterns, thereby affecting erosion and deposition. Little research regarding effects to sedimentation of surface waters associated with development on alluvial fans in the Mojave Desert has been conducted. Construction activities causing ground disturbance, such as grading and devegetation, and installation and operation of the Proposed Project components would likely have long-term effects, increasing the amount of soil erosion in and downstream of the Project area. These are not completely understood at this time as the amount of revegetation that will occur is in a development phase.

The Applicant proposes to construct berms to prevent lateral migration of the four major drainages in the Proposed Project site. Across the remainder of the site, drainage occurs via sheet flow and in smaller washes that feed into the four large drainages. Under the proposed drainage plan, this character of drainage would be maintained. There would be breaks in the berms to allow upslope flow to enter into the larger drainages. The Applicant's hydrologic modeling concluded that installation of the berms would ―have an insignificant effect on the flow depths and velocities in the washes" (Louis Berger 2010). According to the modeling, flow would be consistent with pre-construction conditions and the berms would be rip rapped to prevent scour. Therefore, post-construction erosion and sedimentation rates within the four main drainage channels would be consistent with pre-construction conditions. While this indicates that effects to surface water quality due to erosion and sedimentation within the four main channels would be negligible, this assumption is contingent on the accuracy of surface water modeling. Mitigation measure MM WATER-1, described below, would address the uncertainty of the modeling parameters by implementing an adaptive management program for erosion and sedimentation.

During site preparation, the Applicant would prepare the surface by cutting vegetation to a height of 12 inches. Desert vegetation performs several vital functions including soil stabilization and slowing of stormwater flows. As described in Section 4.6.2, Direct and Indirect Effects by Alternative, there would likely be loss in vegetative cover due to mowing of the site and subsequent shading by the PV panels. Therefore, the vegetation would not be performing its functions of slowing stormwater and stabilizing the soil and may result in increased erosion and sedimentation, both on and off site.

During pre-development rain events, precipitation is evenly distributed across the ground. With construction of the Proposed Project, precipitation would flow off of the panels and would be concentrated at the lower ends of the panels, which may create localized gullies that will alter surface water flow. This would potentially result in increased erosion throughout the solar array panel field and the potential for increased sedimentation both on- and off-site. As part of mitigation measure MM WATER-1, the Applicant would conduct biannual and post-storm monitoring of erosion and sedimentation. If localized gullies were to result in increased rates of erosion and sedimentation, the Applicant would be required to revise erosion and sedimentation control measures, in consultation with the BLM.

Changes to the site surface, including devegetation and gullying, would likely result in increased erosion and sedimentation both on- and off-site for the life of the Project. Installation of berms could result in increased erosion and sedimentation. In order to reduce impacts, the Applicant would adhere to MM WATER-1.

- MM WATER-1: Operational phase erosion and sedimentation control measures. The Applicant will develop and implement erosion and sedimentation control measures to be used to minimize impacts during the life of the Project. At a minimum, this plan will include:
  - Soil stabilization measures to offset loss in vegetation;
  - Biannual and post-storm monitoring of erosion and sedimentation;
  - Annual monitoring of the surface of Ivanpah Dry Lake and Roach Dry Lake to assess effects of sedimentation;
  - Monitoring at Roach Dry Lake will be conducted in a manner that will not interfere with the Southern Nevada Supplemental Airport (SNSA); and
  - Adaptive management of actions if erosion and sedimentation control measures are found to be insufficient to control surface water at the site. Any changes must be approved by the BLM.

This plan must be approved by the BLM three months prior to the beginning of project construction.

Effect WATER-4: Increase the potential for flooding hazards.

Development could result in an increase in flooding hazard if it were to:

- Impede or redirect flood flows;
- Cause inundation or additional risk associated with a debris flow; or
- Otherwise increase the rate or amount of surface water leaving the site.

Flood hazards can increase due to multiple factors, including alteration of the natural drainage of an area to prevent adequate water flow, reducing the area within which precipitation and runoff infiltrate, and increasing the impervious surface area in a region.

The Applicant performed hydrologic and hydraulic modeling to assess existing site drainage and develop a project site drainage plan (Louis Berger 2010). The models and subsequent drainage plan were designed to quantify and accommodate a 100-year flood flow from the Lucy Gray Mountains. There are four major drainages that transect the Proposed Project site. In order to prevent lateral channel migration over the life of the Proposed Project, the Applicant would construct berms to reinforce the drainage banks. The berms would be 3 to 5 feet above grade with a top width of approximately 15 feet.

Across the remainder of the Proposed Project site, drainage occurs via sheet flow and in smaller washes that feed into the four large drainages. Under the proposed drainage plan, this style of drainage would be maintained. There would be breaks in the berms to allow upslope flow to

enter into the larger drainages. The Applicant's hydrologic modeling concluded that installation of the berms would "have an insignificant effect on the flow depths and velocities in the washes" (Louis Berger 2010). Because flow would be consistent with pre-construction conditions and the berms would be rip rapped to prevent scour, post-construction flooding risks within the four main drainage channels would be consistent with pre-construction conditions.

Little research regarding flooding risks associated with development on alluvial fans in the Mojave Desert has been conducted. However, a specific approach to understanding and assessing flood hazards on alluvial fans has been developed for arid alluvial fans near Laughlin, Nevada. This approach uses geologic mapping to determine active and inactive portions of alluvial fans. Physical features such as stratigraphic relationships, topography, drainage patterns, soil development, and surface morphology are used to determine active and inactive portions of fans (House 2005). Certain portions of alluvial fans can become inactive and may remain inactive for thousands of years. Those areas would be considered suitable for building. Conversely, very active portions of alluvial fans may need additional hydrological surveys and appropriate engineering controls to assure that any impacts to the public and the environment would be within acceptable constraints.

An additional hydrologic study predicting flood hazards was completed in 2006 for the Ivanpah Valley (House 2006). This study, which includes the Proposed Project area, depicts five flood zones ranging from no flood risk to very high flood risks. The Proposed Project area and the predicted flood zones are presented as Figure 4.5-1. Flood zones in the southern portion of the site are classified primarily low to none. However, several areas in the northern portion of the site would be built in areas of the alluvial fan where the flood risk is very high. This information suggests that the northern portion of the site may be unstable during flood events. Flooding would cause scour to occur at the footings for PV panels (Louis Berger 2010). Flooding could also cause channels to migrate laterally and destroy or significantly damage portions of the Proposed Project.

As noted in Chapter 3, drainage within the Proposed Project site occurs via sheet flow to migrating channels, which is typical of an alluvial fan. Due to the loose nature of alluvial fans, they naturally change during a process known as hydrologic reworking. Extreme rain events can suspend sand, gravel, or even boulders, and transport them downstream or downslope, resulting in damage to structures impacted by flood waters (USGS 2001). If a flood event were to occur it could result in flooding that could cause significant damage across the Proposed Project area and could cause significant localized destruction.

If scour were to cause PV panels to collapse, the panels and footings could be transported downstream with flood flows, resulting in damage to project components on and off site. A perimeter fence would likely contain large debris. This fence would help contain small amounts of debris from flood damage within the fence line. In areas subject to flood flows, the fence would be constructed using materials that would break up if large amounts of debris were to build up. This would prevent large piecing of fence material being transported downstream in a flood flow. After flood events or on a regular maintenance schedule, debris will be removed.

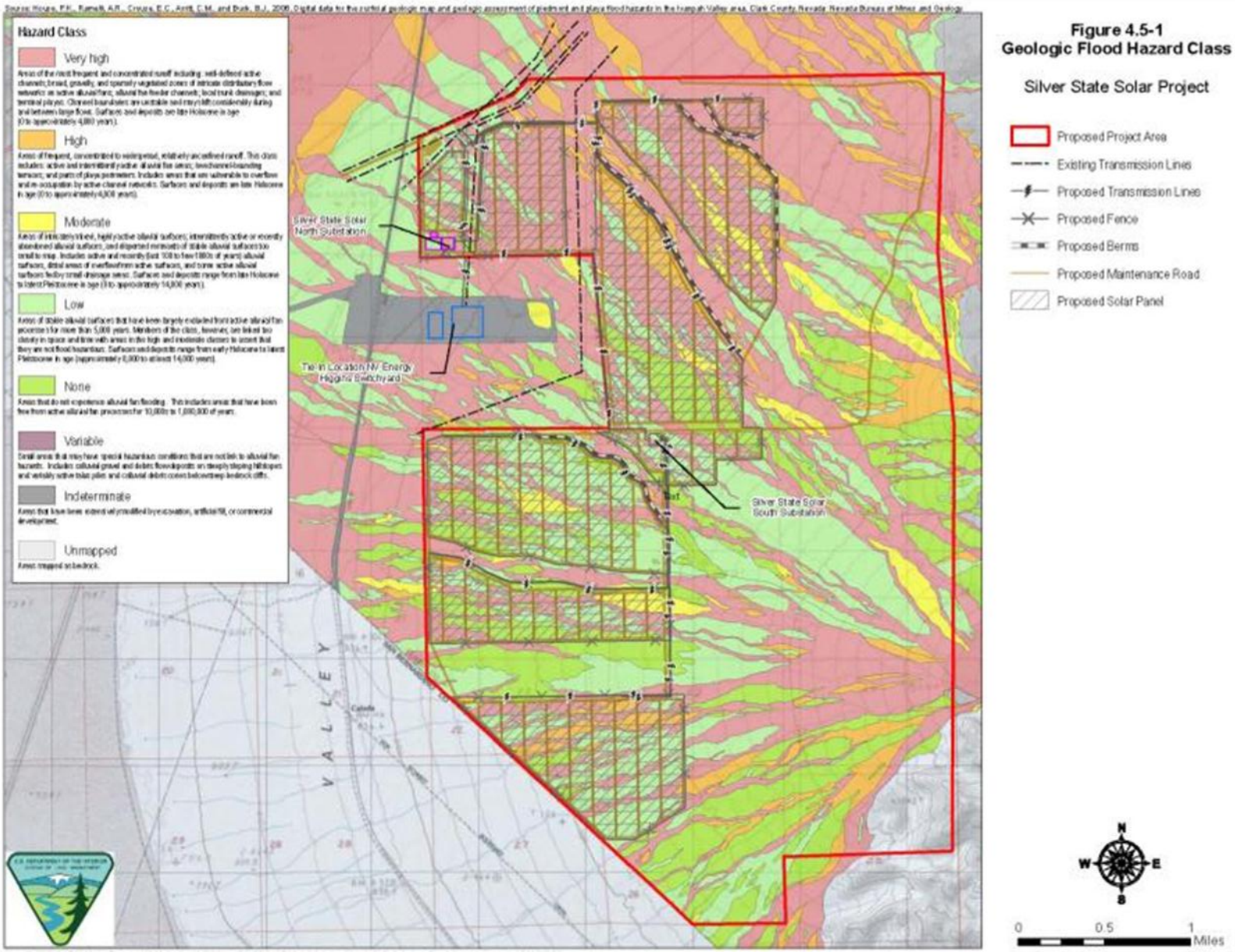

Figure 4.5-1
Geologic Flood Hazard Class

Silver State Solar Project

Flooding is a known potential hazard at the Proposed Project site, as described above. In order to appropriately mitigate against risk to the public and environment, the Applicant would adhere to mitigation measures MM WATER-2 and MM WATER-3. With proper implementation of these mitigation measures, including adaptive management of practices, effects related to flooding would be reduced to negligible levels.

- MM WATER-2: Flood risk control measures. The Applicant will develop and implement flood risk control measures to be used to minimize impacts during the life of the Project. These measures include adhering to the recommendations presented in the Applicant's Initial Site Drainage Plan (Louis Berger 2010). At a minimum, this plan will include:
    - PV panels designed to be at least 3 feet above the ground to accommodate the 0.5 foot to 2.5 feet of flooding calculated in the Louis Berger report;
    - Concrete ballasts would not be used on areas rated at moderate or higher risk flood zone after House (2006). Steel post foundations would be used in these flood-prone areas. Steel post foundations (8 to 12 feet in depth) in flood-prone areas would be designed to withstand a minimum of 4 feet of scour; and
    - Adaptive management of actions if erosion and sedimentation control measures are found to be insufficient or excessive or if flooding proves to be destructive. Any changes must be approved by the BLM.

The flood control plan must be approved by the BLM three months prior to the beginning of project construction.

- MM WATER-3: Stormwater monitoring and response plan. The Applicant will develop and implement a stormwater monitoring and response plan to be used to minimize impacts from flood damage during the life of the Project. At a minimum, this plan will include:
    - Visual surveys of all structures for scour following major storm events;
    - Visual surveys of fencing to check for damage;
    - Cleanup of broken equipment if failures do occur;
    - Inspection and cleanup of downstream areas, including the surface of Ivanpah Dry Lake if debris is transported off site;
    - Adaptive management of flood protection and erosion actions if the monitoring plan reveals routine damage to project structures due to flooding. Any changes must be approved by the BLM.

The stormwater monitoring and response plan must be approved by the BLM three months prior to the beginning of project construction.

Alternative 3: Modified Site Layout

Alternative 3 would be constructed and operated similar to Alternative 2 (the Proposed Action) in every project component, with the exception of the site drainage plan. Alternative 3 would involve several diversion berms (each 10 feet high), debris basins, and level spreader detention basins, temporarily disturbing an area of 1,150 acres, and permanently disturbing 250 acres. Because of the site drainage plan, the footprint of Alternative 3 and related facilities would encompass approximately 3,669 acres.

The detention drainage basin system in Alternative 3 would capture stormwater from the Lucy Gray Mountains in a series of detention basins on the eastern (uphill) border of the Proposed Project. Stormwater would be collected and released as sheet flow onto the Proposed Project site at a controlled rate. This runoff would be released at a rate consistent with runoff from a 10- or 25-year, 24-hour rain storm. In the event of a major precipitation event (exceeding the 100-year storm), the detention basins would drain into a series of peripheral drainage channels via emergency spillways. This would divert heavy rain flow away from the Alternative 3 project site. The peripheral drainage channels would discharge at the western extend of the Alternative 3 project site near existing culverts at a railroad track. These drainage channel outflows would coincide with existing ephemeral stream channels.

Not only would the site drainage plan of Alternative 2 disturb less acreage as a result of construction stormwater berms, it would reduce the overall size of the solar field because its site drainage plan would allow solar panels in areas not feasible under the Alternative 3 site drainage plan. Alternative 2 would reduce the amount of water needed for dust control because less acreage would be disturbed.

Effect WATER-1: Decrease groundwater supply or interfere substantially with groundwater recharge.

The Project description for Alternative 3 states that water usage would be the same as that described above for Alternative 2. Since Alternative 3 water usage is between 1 and 3 percent of the maximum allowed for the LVVWD, effects to groundwater supply within the Ivanpah Valley due to water use for the Proposed Project would be negligible. However, Alternative 3 would disturb more acreage than Alternative 2 for the flood control structures during construction (an additional 1,150 acres). Therefore, the final amount of water used for dust suppression during construction would likely be far greater for Alternative 3, resulting in more potential effects to groundwater.

Effect WATER-2: Degrade the quality of groundwater such that it is no longer suitable for its intended use.

The potential for adverse effects to the quality of groundwater for Alternative 3 is consistent with the conclusions above for Alternative 2 since all hazardous materials and their handling would be the same.

Effect WATER-3: Degrade the quality of surface waters by increasing erosion, increasing sedimentation, or introducing contaminated waters.

Alternative 3 would disturb more land area during construction; specifically, 1,150 acres associated with construction of the drainage control system would be temporarily disturbed. Alternative 2 would only cause 11 acres of temporary disturbance for construction of its drainage control system. This increased acreage would result in a greater potential for adverse effects associated with erosion and sedimentation.

In the detention pond system included in Alternative 3, runoff water from upstream areas on the alluvial fan would be collected in detention ponds. This would result in a slowing of water at the ponds and release of sediment load. However, the drainage control system for Alternative 3 includes diverting heavy flow events around the Proposed Project site by confining the flow to drainage channels. These channels would experience greater volume and velocity of flow than pre-construction conditions. Therefore, increased erosion and subsequent sedimentation would occur. Similar to the discussion for Alternative 2 above, Alternative 3 would experience increased erosion and sedimentation associated with vegetation loss due to mowing during site preparation and subsequent shading of much of the site by PV panels. This would result in adverse effects related to erosion and sedimentation.

Effect WATER-4: Increase the potential for flooding hazards.

Alternative 3 would call for the creation of detention ponds with an emergency spillway to a diversion channel for heavy flow events. Additionally, drainage ditches within the Proposed Project site would direct flow to the off-site diversion channels to drain flood waters from the site. As described above, alluvial fan deposits are subject to significant reworking by flood events. The drainage plan in Alternative 2 identifies, reinforces, and maintains the existing major channels within the Proposed Project site. Effectively, Alternative 2 has identified the pre-construction drainage system and would maintain that system.

The drainage plan in Alternative 3 would rely on modeling that incorporates multiple assumptions about drainage patterns on alluvial fans. Since flooding risks associated with development on alluvial fans in the Mojave Desert have not been extensively studied, the conservative approach in Alternative 2 would be more effective at reducing flooding risks.

4.5.3 Residual Effects

No residual effects on water resources or hydrology would result from implementation of the Proposed Action or alternatives.

4.6 Biological Resources Impacts

This section discusses effects on biological resources that may occur with implementation of the Proposed Action or alternatives. This section is divided into several subsections by resource: vegetation, sensitive plant species, wildlife, and sensitive wildlife species, and rangeland resources.

Methodology

Impact analysis for biological resources was conducted by: (1) using information from numerous sources in addition to the data provided by the Applicant; and (2) evaluating temporal and spatial impacts to habitats and organisms potentially present within the Proposed Project area and within a regional geographic context.

The Applicant has not conducted formal botanical surveys, as these surveys are scheduled for the spring of 2010. The Applicant has conducted a botanical reconnaissance and desktop evaluation for the Proposed Project area.

The Applicant did conduct an on-the-ground survey of the presence of desert tortoise (*Gopherus agassizii*), which has been used in this analysis to estimate the potential number of individual desert tortoises within the Proposed Project area. No additional wildlife surveys were completed.

Mapping resources were consulted to determine the extent of impact from the Proposed Project on SMAs, including the Clark County Multiple Species Habitat Conservation Plan (MSHCP).

Potential impacts and appropriate minimization and mitigation measures were discussed in-depth with resource agencies, specifically the U.S. Fish and Wildlife Service (USFWS) and Nevada Department of Wildlife (NDOW).

Additionally, other relevant environmental documents for projects occurring in the same vicinity as the Eldorado to Ivanpah Transmission Project (EITP) were reviewed to assure consistency with impact analyses and proposed mitigation, including the Ivanpah Solar Electric Generating System (ISEGS) Final Staff Assessment(FSA)/DEIS prepared by the California Energy Commission (CEC), and the joint BLM and California Public Utilities Commission Draft Environmental Impact Report (DEIR)/DEIS for the EITP.

When analyzing impacts from project alternatives, the discussions were confined to impacts specifically generated from differences between the footprint of the Proposed Project and that of the alternative.

Applicant Proposed Measures

The Applicant has included the following APMs related to biological resources:

- APM-1 Erosion Control; and
- APM-3 Air/Dust Control.

The Applicant would use water to control dust to comply with Clark County dust control requirements. Where water is insufficient to control dust, soil stabilizers approved by the BLM and USFWS would be used within the fenced solar field to control dust to Clark County standards.

The Proposed Project would implement the following practices for fugitive dust and wind erosion control:

- Minimize grading and vegetation removal, and limit surface disturbance during construction to the time just before PV module support structure installation;
- Limit vehicular speeds on non-paved roads;
- Apply water to disturbed soil areas of the Proposed Project site to control dust and maintain optimum moisture levels for compaction, as needed. Apply the water using water trucks. Minimize water application rates as necessary to prevent runoff and ponding;
- Apply dust control suppressants approved by the BLM and USFWS;
- During windy conditions (forecast or actual wind conditions of approximately 25 miles per hour or greater), apply dust control to haul roads to adequately control wind erosion. Cover exposed, stockpiled, material areas;
- Suspend excavation and grading during periods of high winds; and
- Cover all trucks hauling soil and other loose material or maintain at least 2 feet of freeboard.

The Applicant would prepare a Waste Management Plan (APM-8) that would describe the storage, transportation, and handling of wastes and would emphasize the recycling of wastes, where possible, and would identify the specific landfills that would receive wastes that could not be recycled. The Applicant would also develop a SPCC Plan and a SWPPP.

A Noxious Weed Control Plan (APM-9) would be prepared and submitted to the BLM for review and approval before construction begins.

The following are project-specific measures that the Applicant would implement to control noxious weeds:

- **Noxious Weed Risk Assessment Form.** This form provides information about the types of weed surveys to be conducted and weed treatment and prevention method schedules appropriate for the types of noxious weeds likely to be present. This form identifies and evaluates the level of noxious weed management necessary.
- **Herbicide Use Proposal.** The Applicant shall prepare, submit, obtain, and maintain a herbicide use proposal for the Proposed Action. The Applicant would coordinate weed control activities with the BLM Weed Coordinator, particularly regarding proposed herbicide treatments.
- **Weed Management Plan.** Before ground-disturbing activities begin, the Applicant would prepare a weed management plan. The plan would identify potential weed

infestations at the Proposed Project site and along the Project-associated linear facilities and would prescribe treatment.

- **Weed Infestation Prevention.** The Applicant would limit ground disturbance to the minimum necessary to safely construct and operate the Proposed Project. The Applicant would avoid creating soil conditions that promote weed germination and establishment.
- **Equipment Cleaning Sites.** The Applicant would establish equipment cleaning sites to remove weed seeds, plant parts, or mud and dirt from vehicles. Project-related equipment and machinery would be cleaned using compressed air or water to remove mud, dirt, and plant parts before moving into and from relatively weed-free areas. Seeds and plant parts would be collected, bagged, and deposited in dumpsters destined for local landfills, when practical.

The following measures would be implemented to prevent infestations of noxious weeds at the Proposed Project site and to control any potential infestations that may occur during project construction and operation:

- Project construction workers would inspect, remove, and dispose of weed seed and plant parts found on their clothing and personal equipment, bag the product, and dispose of in a dumpster for deposit in a local landfill;
- Certified weed-free hay bales would be used for erosion control and to contain vehicle station wash water;
- Periodic monitoring of the construction site would be conducted to check for noxious weed infestations; and
- Areas subject to construction, such as the transmission ROW, would be rehabilitated and revegetated in accordance with the Rehabilitation Plan (see Section 2.6.7, Other Considerations for Construction of the Proposed Project).

In order to ensure that the permanent closure of the facility does not have an adverse effect, a Facility Decommissioning Plan (APM-10) would be developed at least 6 months prior to commencement of site closure activities. The Facility Decommissioning Plan would be developed in coordination with the BLM, with input from other agencies as appropriate. The Facility Decommissioning Plan would address future land use plans, removal of hazardous materials, impacts and mitigation associated with closure activities, schedule of closure activities, equipment to remain on the site, and conformance of the plan with applicable regulatory requirements and resource plans. The Facility Decommissioning Plan would be consistent with requirements and goals set in the Site Rehabilitation Plan.

The activities involved in the facility closure would depend on the expected future use of the site. Certain facility equipment may be utilized for future uses of the site, such the O&M building, electrical transmission lines, and roads. Therefore, the extent of site closure activities would be determined at the time of the closure, in accordance with the Facility Decommissioning Plan.

Closure activities may include:

- Removal of solar panels and supports;

- Removal of foundations;
- Removal of underground facilities to a depth of at least 2 feet below the ground surface;
- Removal of inverters and transformers;
- Removal of the substation;
- Disposal of chemicals and hazardous waste;
- Draining of transformers and disposal of dielectric oils (if transformers cannot be resold);
- Demolition and removal of the O&M building and removal of building foundations;
- Removal of on-site wooden transmission poles and conductors;
- Removal of 220kv/230kv steel transmission poles and conductors, and removal of foundations to a depth of at least 2 feet below the ground surface;
- Closure and abandonment of water wells and the septic tank;
- Removal of site fencing;
- Regrading and restoration of original site contours; and
- Revegetation of areas disturbed by closure activities in accordance with the Site Rehabilitation Plan.

Initial site mobilization activities in each construction section would include environmental clearance (APM-14) in which site activities are reviewed and approved for compliance with resource protection plans and approved construction-compliance documents. Environmental clearance activities would:

- Be performed in each of the Proposed Project construction sections as they are constructed;
- First be obtained for the site access roads, well field, construction water storage pond and O&M area. Subsequent clearances would be obtained for each of the remaining major tasks;
- Delineate and mark the boundaries of each construction area during each phase of environmental clearance;
- Would use professional biologists to meet cactus salvage requirements, survey and relocate desert tortoise, and perform other sensitive species removal and mitigation;
- Install security and tortoise fencing around the perimeter of each construction area to prevent the reintroduction of sensitive species to the area; and
- Occur only during weather conditions permitted for the activity.
- The schedule provided in Chapter 2, Description of the Proposed Action and Alternatives, provides for multiple environmental clearance windows for each Proposed Project construction section.

The Proposed Project would establish a plant nursery on site during clearing (APM-16) as necessary in order to store salvage plants, including cactus and yucca that are protected under Nevada state law (Nevada Revised Statutes [NRS] 527.060-120 and Nevada Administrative

Code [NAC] 527). As determined necessary, before clearing, field crews would salvage cacti and yucca to meet requirements established by the State. As determined by the BLM, plants would be made available for commercial and public use.

The Applicant would implement a comprehensive set of mitigation measures to minimize impacts to the desert tortoise during construction (APM-17). These measures would include proper handling and translocation, worker training, proper fencing design, and other protective measures.

4.6.1 Indicators – Biological Resources

The Proposed Action would affect biological resources if it would:

- Substantially alter the structure, function, and persistence of sensitive upland, riparian, or aquatic vegetative communities;
- Change the diversity or substantially alter the numbers of a local population of any wildlife or plant species, or interfere with the survival, growth, or reproduction of affected wildlife and plant populations;
- Substantially interfere with the seasonal or daily movement, migration corridors, or range of migratory birds and other wildlife;
- Result in a substantial long-term habitat loss, degradation, fragmentation, or substantial increase in the edge-to-volume ratio of key habitat for special status species;
- Result in direct or indirect impacts on candidate or special status species populations or habitat that would contribute to or result in the federal or state listing of the species (e.g., substantially reducing species numbers, or resulting in the permanent loss of habitat essential for the continued existence of a species);
- Introduce and/or increase the potential for introduction of invasive, non-native plants or noxious weeds to an area or potential increase to existing populations of these plants;
- Introduce physical structures or involve production, use, or disposal of materials that pose a health hazard to special status species.
- Result in changes in the environment that increase opportunities for predators of special status species.
- Result in water use, water developments, or water controls that impact native vegetation, special status plant species, or habitat for special status plant species.

Vegetation

Vegetation in the Proposed Project area is primarily Mojave creosote bush-white bursage (burroweed) scrub, with some segments of Mojave wash scrub. Mojave yucca are scattered throughout the landscape on slopes or alluvial fans and constitute the largest and tallest plants in the landscape. A variety of cacti including cholla, prickly pear, and barrel cactus are also common. A wide variety of perennial and annual forbs occupy the understory, intermingling with invasive weed species in some locations. Desert wash portions of the Proposed Project area support taller and more vigorous specimens of species found throughout the site, sometimes supplemented by mesquite. The implementation of the Proposed Project would affect all forms

of vegetation on and surrounding the site. Direct and indirect effects, cumulative effects, mitigations, and residual effects to vegetation resources are discussed below.

4.6.2 Direct and Indirect Effects by Alternative – Vegetation

This section describes the effects under each alternative using the respective methodology prescribed under NEPA. To compare effects, this analysis defines the temporal scale (time), spatial extent (area), and intensity of effects for each alternative. Effects on vegetation that could result from the implementation of the alternatives during construction, O&M, or decommissioning activities associated with Alternatives 2 or 3 are analyzed in this section.

Alternative 1: No Action

Under this alternative, there would be no construction and the Proposed Project site would not be disturbed, thus there would be no project-related effects on vegetation resources.

Alternative 2: Proposed Action

Clearing and grubbing activities for the Proposed Project‘s infrastructure (i.e., the substation, access roads, maintenance roads, perimeter road, service road, perimeter fence, berms, fire break, parking areas, tower foundations for the transmission lines, collection lines [underground], staging areas, water storage pond, O&M building, and solar arrays) would cause the direct loss of vegetation within the Project area. The vegetation community that would be affected is primarily Mojave creosote bush-white bursage scrub, with some segments of Mojave wash scrub. Some disturbance would be temporary, such as for the installation of temporary construction facilities, parking areas, staging areas, trenching of underground cables, berms, and the free space within the solar arrays would also be considered temporary. Impacts to vegetation in these areas would be temporary, as communities would likely re-colonize these areas over time.

Other Proposed Project infrastructure would be permanent and, thus, vegetation would be permanently impacted for those project areas (substation, access roads, solar array pads, and fire break). The exact amount of permanent impact versus temporary impact cannot be calculated at the present time because the exact design of the solar array has not been determined. For the purpose of this analysis, the tilted tracker PV design was selected because this design would be the most conservative (greatest permanent impact) in terms of the amount of permanent impacts that would result due to its construction.

The total area that would be disturbed by the Proposed Project‘s construction would be 2,966.8 acres. If the Applicant selects tilted trackers, construction of the Proposed Project would result in 336.7 acres of permanent disturbance to vegetation and 2,629.6 acres of temporary impacts to vegetation. Temporary impacts would occur within the 93.8 acres of undeveloped area which was defined as the area within perimeter fence not occupied by equipment, but assumed to be disturbed, and the portion of the solar field not occupied by tracker foundations and the drive mower foundations. Table 4.6-1 provides the calculations for the acreage for the permanent impacts within the solar field. Temporary impacted areas are those areas that the Applicant would commit to the restoration of the vegetation.

Table 4.6-1. Estimate of Permanent Impacts within the Solar Array

Tracker Foundation		
Total number of foundations	Size of individual foundation	Total acres of coverage by foundation
257,800	10 ft x 2 ft	236.7 acres
Drive Motor Foundation		
Total number of foundations	Size of individual foundation	Total acres of coverage by foundation
3,200	7 ft x 12 ft	6.2
Total Permanent Impact		**243.0 acres**

For portions of the Proposed Project area where clearing and grubbing activities are not required for the construction of permanent project facilities, the Applicant has proposed to mow the natural vegetation. The mowing would occur during the construction phase as well as during the O&M of the Project. The natural vegetation would be mowed to a height of less than 12 inches, with no minimum mowing height indicated. Mowing would result in the loss of a percentage of each plant‘s biomass and the nutrient and carbohydrate stores contained within the lost biomass. Mowing would result in the direct mortality of some plant species, while the surviving plants would respond to the mowing by using energy stored in root systems to replace the lost stems. The continual mowing activities during the operation of the Project could lead to the direct mortality of the remaining plant individuals, as each period of attempted stem replacement by these plants following mowing would deplete energy stores within the plant and increase metabolic stress. Mowing could also result in the direct mortality or injury of existing plants, as the discarded biomass created by the mowing could damage, smother and/or shade the remaining vegetation. Mowing would also expose plant cut stems to infection from bacteria and fungal disease which could result in morality.

During the operation of the Proposed Project, the continual use of mowing during the operation of the Project to manage the local vegetation would cause a shift within the current composition of the local plant community. During the lifetime of the Proposed Project, the composition of the plant community would shift to favor those species that are more tolerant of continual disturbance from mowing. The selective pressure on plants from mowing during the operation phase of the Proposed Project would cause some plant species to decline and, perhaps, die out, while other species would tolerate the mowing and may even thrive under new conditions. This shift would likely favor the propagation of noxious/invasive weed species, while existing native plants would be least likely to tolerate this treatment and would be out-competed by the growth strategy of most noxious/invasive weed species.

Clearing, grubbing, and mowing activities would disturb soil within the Proposed Project area, thus creating opportunities for non-native invasive weed species to colonize the disturbed work areas. Invasive weed species could out-compete native plants for resources such as water and space. Additionally, soil disturbance could reduce the native seed bank associated with the site. Dust generated during construction could adversely affect on-site and off-site native vegetation communities by reducing photosynthetic activity. Reduction of native plant species would leave denuded areas at risk for the potential spread of non-native invasive weed species and increase the potential for increased erosion. The spread of non-native invasive weeds would also occur during O&M activities that continuously denude and disturb the existing habitat. Typical O&M

activities include additional vehicle traffic due to monthly, quarterly, semi-annual, and annual inspections and service, the proposed biannual washing of the PV panels, and road maintenance. The treatment of noxious/invasive weeds (i.e., herbicide treatments, plant removal) could result in the inadvertent mortality and/or injury of the native plant species. Additional vehicles and crews could inadvertently track in clinging seeds and/or parts of noxious weeds. Spread of noxious weeds within the Proposed Project area would also have the potential to impact the adjacent SMA, the Ivanpah Desert Wildlife Management Area (DWMA) ACEC.

The Proposed Project would introduce added water to the site for a variety of reasons including dust control, soil compaction and stabilization, PV solar panel washing, and miscellaneous other maintenance uses. The Applicant estimates that 600 acre-feet of water would be used on site during the construction phase of the Proposed Project with an additional estimated 21 AFA used thereafter. The majority of this 21 AFA use would be used for PV panel washing, with the remainder for dust control on roads. The Applicant estimates two PV panel washings would be required each year, but would wash PV panels as frequently as needed. This sudden introduction of additional water inputs could directly impact the composition of the local plant community by providing a competitive advantage to those plant species that thrive in wetter conditions. The additional water source would also provide moisture for the germination of existing seeds. Noxious/invasive weed species could also benefit from the additional moisture, potentially out-competing the native vegetation which thrives under xeric conditions.

During construction, hazardous waste (solid and liquid) would be generated, all of which would be generated at the Proposed Project site. Most of the hazardous waste generated during construction would consist of liquid waste, such as water from excavation dewatering (if it contains contaminants), fluids used for flushing, cleaning and passivating (to prepare pipes for use), solvent use, and potential small petroleum spills resulting from the operation of heavy equipment and the filling of transformer and hydraulic equipment reservoirs. Exposure to hazardous waste could result in the direct mortality of individuals from the natural vegetation community. O&M activities could also result in production of similar hazardous waste, as during the construction phase of the Proposed Project, and would result in the same types of impacts.

Project implementation would change the quantity, frequency, and location of sunlight reaching the ground beneath the solar arrays. Artificial shading caused by the PV solar panels could result in a decrease in photosynthesis and reduced soil and plant temperatures. These changes to the microhabitat underneath PV solar panels would result in a change to the composition of the natural plant community, as species that are better adapted to the new condition would have a competitive advantage over those species that are not as well-adapted to the new conditions. The changes to the microhabitat under the PV panels could create a more suitable habitat for the propagation of noxious/invasive species.

During operation of the Proposed Project, the drainage berms would transform physical topography and surface hydrology within project area. Surface hydrology and water inputs are controlling forces in the distribution of both native vegetation and special status plants. Under natural conditions, major precipitation events would produce flow dispersed among a network of small and large channels across the alluvial fans on site. Drainage control berms would alter the distribution and quantity of surface water flows and the patterns of sediment deposition by surface water within the Proposed Project area. Changes to the current hydrological regime

would result in a change to the composition of the natural plant community, as species that are better adapted to the new conditions would have a competitive advantage over those species that are not as well as adapted to the new conditions.

The Proposed Project facilities have an expected life of 50 years or more. The Applicant would develop a Site Rehabilitation Plan for the revegetation and rehabilitation of areas disturbed by the Proposed Project. This plan would be implemented immediately after construction for the areas that are temporarily disturbed, such as portions of the transmission line route that involve disturbance. At the present time, the future use of the site has not been determined; therefore, the Applicant has not determined the extent of site closure activities. Because the Facility Decommissioning Plan has not been developed at the time of this assessment, the identification of and assessment of the potential impacts cannot be completed at this time. However, activities related to the decommissioning of the Project would most likely be similar in nature to those activities occurring during the construction phase of the Project. If this is true, then decommission activities would result in similar type of impacts to local vegetation species as is described for the construction phase of the Project.

The Applicant has incorporated the following measures to minimize impacts to help avoid or reduce impacts on vegetation communities:

- APM-1 Erosion Control;
- APM-3 Air/Dust Control;
- APM-9 Noxious Weed Control Plan;
- APM-10 Site Rehabilitation Plan and Facility Decommissioning Plan;
- APM-14 Environmental Clearance; and
- APM-16 Establish a Plant Nursery during Clearing of the Project Site.

Implementation of the Proposed Project as designed, including these APMs, would result in adverse impacts on vegetation communities and individuals of special status plants species. These impacts would be both short- and long-term (depending on whether the required ground disturbances were permanent or temporary) and localized to the footprint of the Proposed Project. Impacts also could be extensive due to the potential spread of introduced noxious and invasive plant species outside of the boundaries of the Proposed Project. To avoid and minimize the impacts, the following mitigation measures are recommended (see Section 4.6.9, Mitigation Measures – Biological Resources, for further specific details on the proposed mitigation measures):

- Preconstruction Survey (MM BIO-1);
- Best Management Practices (MM BIO-2);
- Biological Monitors (MM BIO-3);
- Worker Environmental Awareness Program (MM BIO-4);
- Facility Siting (MM BIO-7); and
- Restoration Plan (MM BIO-13).

Alternative 3: Modified Site Layout

Alternative 3 would be constructed and operated similar to Alternative 2 (the Proposed Action), with the exception of the site drainage plan. Alternative 3 would involve several diversion berms (each 10 feet high), debris basins, and level spreader detention basins. When compared to the Alternative 2, the Alternative 3 drainage plan would result in an increase in temporary disturbance (1,150 acres) and an increase in permanent disturbance (250 acres). Alternative 3 would also result in a larger solar field (an increase of 173 acres) and an increase in the undeveloped area that would be confined within the perimeter fencing (an increase of 358 acres). Due to the increase in both temporary and permanent impacts, Alternative 3 would result in similar types of impacts to vegetation communities as is described for Alternative 2, but would result in a net increase in size and magnitude of the direct and indirect impacts associated with construction of the drainage plan and the increase in size of the solar field. Alternative 3 would result in adverse impacts to vegetation communities. These impacts would be both short- and long-term and would be localized to the Proposed Project footprint. The potential for extensive impacts would still be applicable as Alternative 3 could also increase the occurrence and spread of noxious weeds. These impacts are the same as described for Alternative 2.

4.6.3 Residual Effects – Vegetation

Subsequent to implementation of all APMs and mitigation measures, it is possible that noxious/invasive weeds could be introduced in the area after construction and during operations phases. The combination of the continual mowing, and the introduction of both artificial shading and additional water sources could result in conditions that would favor the propagation of noxious weeds. At this time, the site-specific noxious weed plan has not been developed, so the specific measures that the Applicant would implement to control noxious/invasive species cannot be reviewed. There is also the potential for residual adverse effects to the native plant community. Mitigation measure MM BIO-13 would be implemented to restore the vegetation within the temporary impacted areas; however, the native vegetation within the portions of the Proposed Project area requiring periodic mowing may not be able to sustain itself.

The continual disturbance caused by the mowing activities could result in the slow demise that would eventually result in the mortality of many of the individual plants. Each mowing occurrence could result in the weakening/injury of individuals and lead to direct mortality of individuals. The proposed mowing regime may also reduce the ability of the individual plants to propagate. Depending on the timing and frequency of mowing activities, native plants may not be able to produce flowers and/or seeds. At this time, the Applicant has not estimated the expected frequency of mowing events; therefore, a complete assessment of the residual impacts due to mowing cannot be fully determined.

Sensitive Plant Species

There is the potential for ten special status plant species to occur within the Proposed Project area (Sycamore Environmental Consultants 2009). To date, there have been no protocol-level botanical surveys conducted within the Proposed Project area. At present, only a desktop review and reconnaissance survey has been conducted. Formal botanical surveys are scheduled for the spring of 2010. The ten special status plant species that have the potential to occur are white bear poppy, Mojave milk-vetch, Nye milk-vetch, Spring Mountain milk-vetch, New York Mountains

catseye, clokey buckwheat, white-margined beardtongue, yellow twotone beardtongue, rosy twotone beardtongue, and Aven Nelson phaceila. If present, these species would be susceptible to the same direct and indirect impacts as for the natural vegetation community described above.

In particular, white-margined beardtongue would be impacted by changing patterns of wind dispersed sand and sediment by the construction of the Project‘s facilities and PV arrays. This species is found only in deep deposits of sand transported by wind from valley floors to lower slopes of adjacent hills and ridges. The Project‘s facilities and PV arrays could disrupt the sand and sediment transport process that naturally occurs within the Proposed Project area, which could result in the indirect decrease in the propagation of new individuals of this species.

The Applicant has incorporated the following measures to minimize impacts to help avoid or reduce impacts on special status plant species:

- APM-1 Erosion Control;
- APM-3 Air/Dust Control;
- APM-9 Noxious Weed Control Plan;
- APM-10 Site Rehabilitation Plan and Facility Decommissioning Plans;
- APM-14 Environmental Clearance; and
- APM-16 Establish a Plant Nursery during Clearing of the Project Site.

Implementation of the Proposed Project as designed, including these APMs, would result in adverse impacts on individuals of special status plants species. These impacts would be both short- and long-term (depending on whether the required ground disturbance). The spatial extent of the impact could range from local to extensive, depending on the species of special status plants that are impacted. At the time of this report, there have been no formal botanical surveys conducted. The Applicant is scheduled to conduct botanical surveys during the spring of 2010. The results of these surveys will provide a clearer picture of the abundance and diversity of special status species that are present within the Proposed Project area. To avoid and minimize the impacts, the following mitigation measures are recommended:

- Preconstruction Survey (MM BIO-1);
- Best Management Practices (MM BIO-2);
- Biological Monitors (MM BIO-3);
- Worker Environmental Awareness Program (MM BIO-4);
- Facility Siting (MM BIO-7); and
- Restoration Plan (MM BIO-13).

4.6.4 Residual Effects – Sensitive Plant Species

The residual effects cannot be evaluated at this time because the density and diversity of special status species occurring within the Proposed Project area has not been determined. The Applicant has not conducted botanical surveys at this point, as these surveys are scheduled for the spring of 2010. Until the identification of the type and density of special status species has been identified, the cumulative and residual impacts cannot be determined.

Wildlife

Alternative 1: No Action

Similar to impacts on vegetation, no impacts to wildlife would occur if the application is denied and the Proposed Project is not built and operated.

Alternative 2: Proposed Action

Clearing and grubbing activities for project infrastructure (i.e., the substation, access roads, maintenance roads, perimeter road, service road, perimeter fence, berms, fire break, parking areas, tower foundations for the transmission lines, and collection lines [underground], staging areas, water storage pond, O&M building, and solar arrays) are potential sources of direct mortality to wildlife. Collisions with equipment and vehicles can occur for slower-moving species, species that have subsurface burrows, or ground-nesting birds. Nesting birds, large mammals, and reptiles are very susceptible to visual and noise disturbances caused by the presence of humans and construction equipment, and the generation of dust. Such disturbances could cause wildlife to alter foraging and breeding behavior, and avoid suitable habitat (e.g., nesting birds may abandon nests due to these disturbances). Loss of burrows due to Proposed Project construction, ground vibration, or avoidance behavior would cause wildlife to search for and/or dig new burrows.

Wildlife would also be indirectly impacted. As previously discussed, clearing and grubbing activities and/or mowing would remove and/or modify natural vegetation communities. These vegetation communities provide forage, shelter, and nesting opportunities to non-listed wildlife and multiple special status wildlife. Loss and degradation of habitat would cause wildlife to rely more heavily on habitat in surrounding areas. The loss of these vegetation communities would result in an indirect adverse impact.

The permanent fencing of 2,865 acres would greatly reduce access to the native habitat within the fenced areas, and would cause wildlife to rely more heavily on habitat within the surrounding area. The loss of access would result in the loss of foraging areas, shelter, and nesting opportunities to non-listed wildlife and multiple special status wildlife species.

Construction activities and O&M activities would have the potential to impact wildlife within the Ivanpah DWMA ACEC. Construction and operation of the Project could directly and adversely impact wildlife within the Ivanpah DWMA ACEC by causing wildlife to alter foraging and breeding behavior in the Ivanpah DWMA. For example, increased noise as a result of construction, could result in wildlife avoiding the general area surrounding the Proposed Project. Additionally, wildlife that could not access food resources within the fenced portions of the Proposed Project area could add pressure on the food resources within the Ivanpah DWMA

ACEC. The clearing and grubbing activities and mowing could impact the Ivanpah DWMA ACEC through the spread of noxious/invasive weeds, which could potentially out-compete existing annual vegetation which would indirectly and adversely affect the quality of wildlife habitat.

The presence of Proposed Project infrastructure may also indirectly cause mortality to wildlife by increasing the risk of predation on certain species by native predators such as ravens and raptor species. The addition of transmission towers could provide additional perching resources to ravens and raptor species, which could result in increased foraging activity of these species within the Proposed Project area. Construction and O&M of the Proposed Project would result in trash and debris that may attract predators such as ravens and coyotes.

The compaction of soils and the introduction of exotic plant species due to mowing, grading, and removal of vegetation during construction and O&M activities could result in direct adverse habitat loss over time. Introduced noxious and invasive plant species would potentially out-compete existing annual vegetation.

During construction, hazardous waste (solid and liquid) would be generated at the plant site. Most of the hazardous waste generated during construction would consist of liquid waste, such as water from excavation dewatering (if it contains contaminants), fluids used for flushing, cleaning, and passivating (to prepare pipes for use), solvent use, and potential small petroleum spills resulting from the operation of heavy equipment and the filling of transformer and hydraulic equipment reservoirs. Exposure to hazardous waste could be a direct source of wildlife mortality and/or injury through the poisoning of individuals. Spills of hazardous waste could also indirectly adverse impact wildlife if the spill of the hazardous waste results in the loss of natural vegetation community. The loss of the natural vegetation communities would result in the loss of foraging areas, shelter, and nesting opportunities to non-listed wildlife and multiple special status wildlife. O&M activities could also result in production of similar hazardous waste, as during the construction phase of the Proposed Project, and would result in the same type of impacts.

The Proposed Project facilities have an expected life of 50 years or more. The Applicant would develop a Site Rehabilitation Plan for the revegetation and rehabilitation of areas disturbed by the Proposed Project. This plan would be implemented immediately after construction for the areas that are temporarily disturbed, such as portions of the transmission line route that involve disturbance. At the present time, the future use of the site has not been determined; therefore, the Applicant has not determined the extent of site closure activities. Because the Facility Decommission Plan has not been developed at the time of this assessment, the identification and assessment of the potential impacts cannot be completed at this time. However, activities related to the decommissioning of the Project would most likely be similar in nature to those activities occurring during the construction phase of the Project; therefore, decommissioning activities would result in similar impacts to local population of wildlife species as those described for the construction phase of the Project.

The Applicant has incorporated the following measures to minimize impacts to help avoid or reduce impacts on wildlife species:

- APM-3 Air/Dust Control;

- APM-4 SWPP;
- APM-5 SPCC Plan;
- APM-8 Waste Management Plan;
- APM-9 Noxious Weed Control Plan;
- APM-10 Site Rehabilitation Plan and Facility Decommissioning Plan; and
- APM-14 Environmental Clearance.

Implementation of the Proposed Project as designed, including these APMs, would result in adverse impacts on wildlife species. These impacts would be both short- and long-term and would be localized to the Proposed Project footprint. To further avoid and reduce impacts, the following mitigation measures are recommended:

- Preconstruction Survey (MM BIO-1);
- Best Management Practices (MM BIO-2);
- Biological Monitors (MM BIO-3);
- Worker Environmental Awareness Program (MM BIO-4);
- Facility Siting (MM BIO-7);
- Reduced Night Lighting (MM BIO-10); and
- Restoration Plan (MM BIO-13).

Alternative 3: Modified Site Layout

Alternative 3 would be constructed and operated similar to Alternative 2 (the Proposed Action), with the exception of the site drainage plan. Alternative 3 would involve several diversion berms (each 10 feet high), debris basins, and level spreader detention basins. When compared to Alternative 2, the Alternative 3 drainage plan would result in an increase in temporary disturbance (1,150 acres) and an increase in permanent disturbance (250 acres). Alternative 3 would also result in a larger solar field (an increase of 173 acres) and an increase in the undeveloped area that would be confined within the perimeter fencing (an increase of 358 acres). Due to the increase in both temporary and permanent impacts, Alternative 3 would result in similar impacts to local populations of wildlife as is described for Alternative 2, but would result in a net increase in size and magnitude of the direct and indirect impacts associated with construction of the drainage plan and the increase in size of the solar field. Alternative 3 would result in adverse impacts to local wildlife populations. These impacts would be both short- and long-term and would be localized to the Proposed Project footprint. These impacts would be the same as those described for Alternative 2.

4.6.5 Residual Effects – Wildlife

There would be long-term residual effects to wildlife due to the construction of the Proposed Project. None of the recommended mitigation measures would reduce the loss of wildlife habitat lost due to construction of the perimeter fence. The perimeter fence would surround 2,865 acres of wildlife habitat and would severely reduce the ability of wildlife to access the Proposed Project area. Only wildlife small enough to fit through the fence holes or able to climb or fly

over the fence would have access to the resources within the fenced portions of the Proposed Project area. The loss of wildlife habitat due to the construction of the perimeter fence would result in the affected wildlife to rely more heavily on habitat within the surrounding area.

The proposed mowing regime for the management of the vegetation would have a residual effect on wildlife. The continual mowing of the natural vegetation within the Proposed Project area could result in a change in the species composition of the vegetation community, as species that are more tolerant of frequent mowing events would out-compete species which are not tolerant of frequent mowing. This change in the species composition of the vegetation community could result in a loss/increase of shelter, nesting habitat, and foraging sources for wildlife species.

Sensitive Wildlife Species

The previously discussed impacts due to construction, O&M, and decommission are all sources of potential adverse impacts to listed or sensitive wildlife species. The mechanisms of potential impact as described above for non-listed species apply to special status species, and include direct and indirect impacts. A discussion on potential impacts and avoidance and minimization measures for grouped sensitive species are discussed in detail below.

Reptiles

There is the potential for the occurrence of 16 special status reptile species within the Proposed Project area. To date, there have been no formal surveys for the detection of reptiles, except for the desert tortoise surveys conducted during August 2008 and October 2009. The special status reptiles potentially present within the Proposed Project area would all be subject to similar types of impacts. Ground-disturbing activities could result in injury and mortality to slower-moving reptiles or reptiles occupying subsurface burrows. Increased vehicle use on site during O&M could also increase the potential for collisions and mortality. The Proposed Project would result in the potential for reptiles to be excluded from the 2,865 acres of habitat located within the fenced perimeter of the Project area. The loss of access to the habitat within the fenced portions of the Proposed Project area would be small relative to the available habitat within the area (except for desert tortoise habitat, which would be considered a moderate loss). The compaction of soils and the introduction of exotic plant species due to grading and removal of vegetation during construction, operation, and maintenance activities could result in direct adverse habitat loss over time.

Desert Tortoise

All desert tortoises found within the fenced area of the Project would be translocated in accordance with BLM and USFWS protocols. During the life of the Proposed Project, 2,966 acres of the desert habitat would be disturbed. Of this, 2,950 acres of desert tortoise habitat would be lost due to the construction of the perimeter fence. Desert tortoises could be harmed during clearing and grubbing activities. Project activities could result in direct mortality, injury, or harassment of individuals as a result of encounters with vehicles or heavy equipment, whether in the Proposed Project area or from vehicles straying from designated access or designated areas into adjacent habitat. Individual tortoises could be crushed or entombed in their burrows; disruption of tortoise behavior during construction or operation of facilities could occur due to noise or vibration from the heavy equipment; injury or mortality could occur from encounters with workers‘ or visitors‘ pets; and trash may attract tortoise predators such as ravens and

coyotes. Desert tortoises may also be attracted to the construction area by application of water to control dust, placing them at higher risk of injury or mortality. Additionally, tortoises may take shelter under parked vehicles and take may occur when the vehicle is moved. Desert tortoises could be harmed by inadvertent hazardous materials spills, including equipment fuel and hydraulic fluid leaks.

Installation of the exclusionary fencing of the solar fields could result in take of desert tortoises due to equipment operation, potential removal of tortoise burrows, and subsequent tortoise relocation. The fencing would preclude desert tortoises from re-entering, resulting in fragmentation of habitat and individual home ranges. Removal of habitat within a tortoise‘s home range or segregating individuals from their home range with a fence would likely result in displacement stress that could result in loss of health, exposure, increased risk of predation, increased intra-specific competition, and death. Capturing, handling, and relocating desert tortoises from the Proposed Project site after the installation of the fencing would result in harassment and may also result in death or injury. This is particularly true if relocation methods are performed improperly, such as during extreme temperatures, or if tortoises void their bladders due to handling stress, leaving them susceptible to severe dehydration.

During construction, breaches in the solar field exclusionary fencing may occur; tortoises could pass through the barrier and be affected by project-related activities. If breaches occur, materials and equipment left behind following construction and maintenance activities may entrap or entangle tortoises, attract desert tortoise predators such as common ravens and coyotes, or provide shelter for tortoises which, when removed, may result in displacement or injury of the tortoise. During operation, surface water flows could also undercut and compromise the tortoise fences and allow short-term access to desert tortoise and their predators until such time as repairs are made.

The Applicant has incorporated the following measures to help avoid or reduce impacts on the desert tortoise:

- APM-4 SWPP;
- APM-5 SPCC Plan;
- APM-8 Waste Management Plan;
- APM-9 Noxious Weed Control Plan;
- APM-10 Site Rehabilitation Plan and Facility Decommissioning Plan;
- APM-14 Environmental Clearance; and
- APM-17 Desert Tortoise Measures.

Adverse impacts on desert tortoise would occur with the implementation of the Proposed Project and the proposed APMs. These impacts would be both short- and long-term and would be localized, extensive, and area-wide to the Proposed Project footprint. Impacts would be localized as a result of the removal of all desert tortoises from the Proposed Project area and the loss of suitable desert tortoise habitat due to the construction of exclusionary fencing. Impacts would be extensive, as well, because the translocated individuals would most likely impact the fitness of

the desert tortoises that occupy the translocation site, and the operation of the Proposed Project would remove 2,966.8 acres of suitable desert tortoise habitat from the Ivanpah Valley.

Gila Monster and Chuckwalla

Gila monster and chuckwalla would be susceptible to the same impacts as were generally discussed for special status reptiles. Both lizards prefer habitat characterized by rocky terrain that provides adequate crevices for winter hibernacula and summer dens.

The Applicant has incorporated the following measures to avoid and minimize impacts on the Gila monster and the chuckwalla:

- APM-4 SWPP;
- APM-5 SPCC Plan;
- APM-8 Waste Management Plan;
- APM-9 Noxious Weed Control Plan;
- APM-10 Site Rehabilitation Plan and Facility Decommissioning Plan; and
- APM-14 Environmental Clearance.

Adverse impacts to Gila monster and chuckwalla would occur with the implementation of the Proposed Project and the proposed APMs. These impacts would be both short- and long-term and would be localized. To further avoid and reduce impacts, the following mitigation measures are recommended:

- Preconstruction Survey (MM BIO-1);
- Best Management Practices (MM BIO-2);
- Biological Monitors (MM BIO-3);
- Worker Environmental Awareness Program (MM BIO-4);
- Facility Siting (MM BIO-7);
- Gila Monster and Chuckwalla Measures (MM BIO-9);
- Reduce Night Lighting (MM BIO-10);
- Cover Steep-Walled Trenches or Excavations during Construction (MM BIO-11); and
- Restoration Plan (MM BIO-13).

Mammals

There is the potential for seven protected mammal species to occur within the Proposed Project area. No formal surveys targeting the detection of protected mammal species have been conducted to-date; surveys are scheduled for the spring of 2010. There were no incidental observations recorded of any protected mammal species during the desert tortoise surveys (Sundance Biology 2009) and the special status plant species reconnaissance survey (Sycamore Environmental Consultants 2009).

Bats

The four protected bat species, California-leafed nose bat, California myotis, Townsend's big-eared bat, and big free-tailed bat, are only expected to be present within the Proposed Project area during nocturnal foraging events. Artificial lighting and the presence of the temporary storage water pond could alter the foraging behavior of bat species. The loss of the natural vegetation could decrease the prey availability (i.e., insects) within the Proposed Project area for nocturnally feeding bats. The additional light sources during the operation could result in a concentrated foraging location as the artificial lighting could congregate insects. However, the foraging area of the Proposed Project area is relatively small compared to the amount of foraging habitat in the region and the storage water pond would be a temporary feature.

Desert Bighorn Sheep

The closest preferred habitat for the desert bighorn sheep is the McCullough and Highland mountains in Nevada and the Spring and Clark mountains in California. Within the McCullough Range, there are bighorn special use areas (i.e., lambing areas and summer grounds). The closest range to the Proposed Project, the Lucy Gray Mountains, are historically unoccupied by desert bighorn sheep and, therefore, it is assumed that desert bighorn sheep are absent from the Lucy Gray Mountains. This species would be susceptible to visual and noise disturbance during construction activities and O&M, potentially resulting in alteration of their seasonal movement behavior between the Spring and Clark mountains and the McCullough and Highland mountains. This would cause avoidance of suitable migratory routes and energetic costs to locate other suitable migratory pathways.

The Applicant has incorporated the following measures to help avoid or reduce impacts on desert bighorn sheep:

- APM-10 Site Rehabilitation Plan and Facility Decommissioning Plan; and
- APM-14 Environmental Clearance.

As currently designed, the Proposed Project would have localized, adverse, short- and long-term impacts on individuals of these species. The following mitigation measures are recommended to further reduce the potential for impacts to desert bighorn sheep:

- Preconstruction Survey (MM BIO-1);
- Best Management Practices (MM BIO-2);
- Biological Monitors (MM BIO-3);
- Worker Environmental Awareness Program (MM BIO-4);
- Reduce Night Lighting (MM BIO-10); and
- Desert Bighorn Sheep Measures (MM-BIO-14).

Wild Burro

The wild burro would be susceptible to visual and noise disturbance during construction activities and O&M, potentially resulting in alteration of their behaviors to avoid the site. This would cause avoidance of suitable habitat and energetic costs to locate other suitable habitat in

the area around the Proposed Project. This would result in adverse, short- and long-term loss of food and suitable habitat used by the wild burro.

The Applicant has incorporated the following measures to avoid or minimize impacts on the wild burro:

- APM-10 Site Rehabilitation Plan and Facility Decommissioning Plan; and
- APM-14 Environmental Clearance.

As currently designed, the Proposed Project would have localized adverse impacts on individuals of these species.

American Badger

If American badgers are present on the Proposed Project site during construction, there is the potential for mortality due to the collapse of occupied burrows during clearing and grubbing. Visual and noise disturbances could trigger habitat avoidance behavior that could alter successful foraging and breeding for individuals in the immediate area. Loss of forage and burrow habitat by Proposed Project construction would reduce available suitable habitat within the badger‘s range. However, the amount of habitat that the badger would not be able to access due to the construction of the site (2,865 acres) is relatively small as compared to the badger‘s full range in this area.

The Applicant has incorporated the following measures to help avoid or reduce impacts on the American badger:

- APM-4 SWPP;
- APM-5 SPCC Plan;
- APM-8 Waste Management Plan;
- APM-9 Noxious Weed Control Plan;
- APM-10 Site Rehabilitation Plan and Facility Decommissioning Plan; and
- APM-14 Environmental Clearance.

As currently designed, the Proposed Project would have adverse, short- and long-term, and localized impacts on individuals of this species. The following mitigation measures are recommended to reduce the potential for impacts to the American badger:

- Preconstruction Survey (MM BIO-1);
- Best Management Practices (MM BIO-2);
- Biological Monitors (MM BIO-3);
- Worker Environmental Awareness Program (MM BIO-4);
- Facility Siting (MM BIO-7);
- Reduce Night Lighting (MM BIO-10);
- American Badger Impacts Reduction Measures (MM BIO-12); and

- Restoration Plan (MM BIO-13).

Birds

Construction of the Proposed Project could potentially cause adverse impacts on avian species, including nesting raptors and birds protected by the Migratory Bird Treaty Act (MBTA). Impacts on these bird species would typically result from activities that would cause nest abandonment or take of chicks or eggs in active nests, mortality of adults due to collision, or reduction of potential forage and nesting habitat. For most species, the Proposed Project impacts would be confined to Proposed Project areas and areas immediately adjacent to the Project. For other species such as raptors, project-related impacts would have the potential to extend up to one mile or more beyond project boundaries, depending on the nature of the surrounding area (e.g., urban or rural), and topography.

Active bird nests in shrubs or near the ground would be susceptible to being crushed during clearing and grubbing operations, and during any activities where vegetation would be crushed. Noise and visual disturbance caused by construction and project-related traffic, including construction at work sites and traffic along project access roads would have the potential to cause nest abandonment or habitat avoidance by birds nesting on or off site in adjacent areas. Nest abandonment would result in mortality to chicks and eggs. Alternately, construction may cause birds to avoid suitable habitat by opting to nest or forage in less suitable habitat. Such impacts would cause potential energetic costs to these birds and could indirectly contribute to stress and eventual mortality. Decreased foraging success could decrease the survivorship of chicks in nests near the Proposed Project. The construction of new collection line poles would potentially increase the risk of mortality of adult raptors and larger non-raptor species by collision.

The Applicant has incorporated the following measures to avoid or minimize impacts on bird species:

- APM-4 SWPP;
- APM-5 SPCC Plan;
- APM-8 Waste Management Plan;
- APM-9 Noxious Weed Control Plan;
- APM-10 Site Rehabilitation Plan and Facility Decommissioning Plan; and
- APM-14 Environmental Clearance.

Adverse impacts on MBTA protected species would occur with the implementation of the Proposed Project and the proposed APMs. These impacts would be both short- and long-term and would be localized. To further avoid and reduce impacts, the following mitigation measures are recommended:

- Preconstruction Survey (MM BIO-1);
- Best Management Practices (MM BIO-2);
- Biological Monitors (MM BIO-3);
- Worker Environmental Awareness Program (MM BIO-4);

- Migratory Birds and Raptors Impacts Reduction Measures (MM BIO-5);
- Avian Protection (MM BIO-6);
- Facility Siting (MM BIO-7); and
- Restoration Plan (MM BIO-13).

Special Status Birds

There is the potential for seven special status bird species to occur within the Proposed Project, the golden eagle, peregrine falcon, prairie falcon, western burrowing owl, loggerhead shrike, LeConte‘s thrasher, and phainopepla. Western burrowing owl, loggerhead shrike, LeConte‘s thrasher, and phainopepla would use the area for forage and nesting. These birds would be susceptible to visual and noise disturbance as described above, potentially resulting in alteration of foraging behaviors to avoid the site and nest abandonment. Additionally, these species are at risk from construction if they were using on-site vegetation to nest in, as clearing of vegetation could result in the direct loss of nests and would also remove potential forage habitat. Golden eagle, prairie falcon, and peregrine falcon would use the Project area for foraging. These birds would be susceptible to visual and noise disturbance as described above, potentially resulting in alteration of foraging behaviors to avoid the site, leading to a potential decrease in fitness.

The Applicant has incorporated the following measures to help avoid or reduce impacts to special status bird species.

- APM-4 SWPP;
- APM-5 SPCC Plan;
- APM-8 Waste Management Plan;
- APM-9 Noxious Weed Control Plan;
- APM-10 Site Rehabilitation Plan and Facility Decommissioning Plan; and
- APM-14 Environmental Clearance.

The Proposed Project would result in direct, short- and long-term loss of food and shelter for special status birds. These adverse impacts would be localized in spatial extent. The following mitigation measures are recommended:

- Preconstruction Survey (MM BIO-1);
- Best Management Practices (MM BIO-2);
- Biological Monitors (MM BIO-3);
- Worker Environmental Awareness Program (MM BIO-4);
- Migratory Birds and Raptors Impacts Reduction Measures (MM BIO-5);
- Avian Protection (MM BIO-6);
- Facility Siting (MM BIO-7); and
- Restoration Plan (MM BIO-13).

Alternative 3: Modified Site Layout

Alternative 3 would be constructed and operated similar to Alternative 2 (the Proposed Action), with the exception of the site drainage plan. Alternative 3 would involve several diversion berms (each 10 feet high), debris basins, and level spreader detention basins. When compared to Alternative 2, the Alternative 3 drainage plan would result in an increase in temporary disturbance (1,150 acres) and an increase in permanent disturbance (250 acres). Alternative 3 would also result in a larger solar field (an increase of 173 acres) and an increase of 358 acres in the undeveloped area that would be confined within the perimeter fencing. Due to the increase in both temporary and permanent impacts, Alternative 3 would result in similar impacts to special status wildlife species and habitats as is described for Alternative 2, but would result in a net increase in the size and magnitude of the direct and indirect impacts associated with construction of the drainage plan and the increase in size of the solar field. However, the increase in the size of the Proposed Project area would not change the intensity or spatial extent of the impacts to special status species as described for Alternative 2.

The intensity of the impact to desert tortoise would not change for Alternative 3, as compared to Alternative 2. Additionally, the increase in loss of desert tortoise habitat would require increased mitigation and compensatory measures that would be outlined in the Biological Opinion.

4.6.6 Residual Effects – Sensitive Wildlife Species

Construction and operation of the Proposed Project would result in similar residual effects to special status species similar to those described in the previous wildlife section. The construction of the perimeter fence would severely reduce the ability of these species to access the fenced portions of the Proposed Project area. The loss of access would not be mitigated by any of the recommended mitigation measures and would continue to affect special status species throughout the lifetime of the Project. This loss of habitat would result in the affected special status species to rely more heavily on habitat within the surrounding area, therefore increasing the pressure on these resources.

The proposed mowing regime for the management of vegetation would also have a residual effect on special status species. The continual mowing of the natural vegetation within the Proposed Project area could result in a change in the species composition of the vegetation community.

The translocation of desert tortoise would result in detectable residual effects. Even with the Applicant successfully implementing the recommended mitigation measures, the translocation process would still have the potential to adversely impact both the tortoises being translocated and those existing tortoises occupying the translocation area. The translocation could result in adverse impacts from increased competition for resources (i.e., food, shelter, mates) within the translocation site, introduction of disease, and increased stress among the tortoises. At this time, the Biological Opinion has not been developed; therefore, the specifics (e.g., location, timing, and number of tortoise to be relocated) of the translocation plan have not been outlined. As such, a complete assessment of the residual effects cannot be determined.

Range

This section discusses the effects on rangeland resources that may occur with implementation of the Proposed Action or alternatives.

Goals for rangeland resources in the Jean Lake and Roach Lake allotments are to manage resources to be consistent with the Las Vegas Resource Management Plan (BLM 1998a), the Jean Lake AMP (BLM 1998b), and all regulations and policies cited within these two documents including the Ephemeral Range Rule of 1968 (BLM 1998a, Appendix E) and Rangeland Health Standards and Guidelines for the Mojave-Southern Great Basin Area (BLM 1998a, Appendix L). Rangeland Health Standards and Guidelines apply to all land uses, not just livestock grazing. Variance from one or more of the standards indicates that rangeland health may be compromised and corrective actions for livestock grazing may be required.

The Las Vegas Resource Management Plan (LVRMP) requires achievement of the health standards presented in the Standards and Guidelines for the Jean Lake and Roach Lake allotments. Under the Rangeland Health Standards and Guidelines, the Jean Lake allotment is categorized as Type I for ―improve." It has been identified as the type that has the highest need and priority for intensive management. The Jean Lake AMP provides direction for implementation as well as rangeland health assessment data. The Roach Lake allotment has been identified as Type C for ―custodial," the type with the lowest management priority. The Roach Lake allotment does not have an AMP and rangeland health assessments have not been carried out on this allotment.

Assumptions used to analyze impacts to rangeland resources include the following:

- Federal lands within the boundary of the Las Vegas Field Office's Jean Lake and Roach Lake allotments were used as the impact analysis area for direct, indirect, and cumulative impacts;
- The Jean Lake and Roach Lake allotments are currently closed to livestock grazing;
- BLM rangeland health assessments have not been completed on the Jean Lake allotment since 1996 and 1997; and
- BLM rangeland health assessments have never been completed on the Roach Lake allotment.

The following APMs outlined in the Section 4.6, Biological Impacts – Vegetation, would also apply to rangeland resources:

- APM-1 Erosion Control;
- APM-4 SWPPP;
- APM-9 Noxious Weed Control Plan;
- APM-10 Site Rehabilitation Plan and Facility Decommissioning Plan; and
- APM-17 Desert Tortoise Measures.

4.6.7 Indicators – Range

In general, the Proposed Action would affect rates of recovery for rangeland resources by decreasing available acreage for forage recovery, by introducing and spreading weed populations, and by slowing rates of recovery in riparian areas. Adverse effects on rangeland resources would occur if the Proposed Action would:

- Result in a substantial long-term loss of rangeland habitat;
- Interfere substantially with the recovery of riparian habitat;
- Result in physical alteration to structures in place for future grazing operations and habitat protection such as:
  - interior pasture fences,
  - water haul stations,
  - cow camp areas,
  - cattle guards used to keep livestock out of critical desert tortoise habitat in the southern portion of the Jean Lake allotment,
  - enclosures around a high-density population of white margin penstemon (*Penstemon albomarginatus*) in Jean Lake allotment, Pasture 1, and
  - fencing used to protect riparian areas from OHV use and livestock grazing; or
- Introduce or spread invasive or noxious weed populations.

4.6.8 Direct and Indirect Effects by Alternative – Range

This section describes the effects under each alternative using the framework prescribed under NEPA. To compare effects, this analysis defines the temporal scale (time), spatial extent (area), and intensity of effects for each alternative. Effects on rangeland resources that could result from the implementation of the alternatives during construction, O&M, or decommissioning activities associated with Alternative 2 (the Proposed Action) and Alternative 3 are analyzed in this section. The specific management action of leaving the allotments closed to grazing for forage recovery is common to all alternatives. Direct and indirect effects are directly proportional to the amount of permanent disturbance associated with Alternatives 2 and 3.

Alternative 1: No Action

Alternative 1, the No Action Alternative, assumes the application for the Proposed Action is denied and current management goals for rangeland resource recovery on the Jean Lake and Roach Lake allotments would continue. Under Alternative 1, there would be no construction and the Proposed Project area would not be disturbed, thus rangeland resources would be unaffected. Continuing current management for grazing resources (i.e., allotments closed to improve rangeland health) is expected to have positive impacts on rangeland health.

Alternative 2: Proposed Action

Alternative 2, the Proposed Action, would authorize the Applicant to construct, operate, maintain, and decommission a 400MW solar PV power plant on 2,966 acres of BLM-managed lands. The Proposed Project would generate power as soon as the Proposed Project substation is

completed. Direct and indirect effects on rangeland resources for Alternative 2 are discussed in detail below.

Effect RR-1: Loss of forage acreage.

Direct effects to the existing forage ground cover for livestock and wildlife would occur from grading and surface disturbance for Proposed Project infrastructure (i.e., the substation, access roads, maintenance roads, the perimeter road, service roads, the perimeter fence, fire breaks, parking areas, tower foundations for the transmission lines, underground collection lines, staging areas, the water storage pond, the O&M building, and the solar arrays). Infrastructure would lead to the direct loss of forage acreage within the Proposed Project area. The majority of the Proposed Project footprint is in the Jean Lake allotment. The portion of the Jean Lake allotment that would be affected is primarily in the southwest corner along the Nevada state line (to the south) and the boundary between the Jean and Roach Lake allotments (to the west). The portion of the Roach Lake allotment that would be affected is the southeast corner of the allotment along the Nevada state line (to the south) and the boundary between the allotments (to the east).

Some surface disturbance would be short-term. These include the installation of temporary construction facilities, parking areas, staging areas, and berms; trenching of underground cables; and the free space within the solar arrays. Impacts to rangeland vegetation in these areas would be short-term because a rehabilitation plan and decommissioning plan (APM-10), as well as a noxious weed control plan (APM-9), would be implemented immediately following short-term construction activities. Other project infrastructure would be long-term (equal to or greater than 50 years) and rangeland forage acreage would be permanently impacted. These project areas include the substation, access roads, solar array pads, acreage directly under the solar arrays, and the fire break. The amount of short-term compared to long-term disturbance cannot be calculated until the exact design of the solar array has been decided. Direct effects would be proportional to the amount of long-term disturbance.

Effect RR-2: Changes in water availability and distribution for recovering riparian areas and protected plant populations within the allotments.

Implementation of the Proposed Project would change the physical topography and surface hydrology of the Proposed Project area. Natural flow from major precipitation events would be altered, causing long-term indirect impacts to riparian areas within the allotments. The Applicant would need to incorporate the erosion control plan (APM-1), the SWPPP (APM-4), and the Site Rehabilitation Plan and Facility Decommissioning Plan (APM-10) in order to minimize long-term effects and to help avoid or reduce impacts to enclosed riparian areas.

Effect RR-3: Disturbance to enclosure fencing meant to protect plant populations and riparian areas from OHV traffic and wildlife grazing.

Installation of some project infrastructure might disturb enclosure fencing within the Jean Lake allotment designed to protect sensitive plant populations in Pastures 1, 2, and 3, as well as riparian habitat from OHV traffic and wildlife grazing. Disturbing enclosure fencing could create opportunities for the plant populations or riparian areas to be disturbed or damaged by construction activities, OHV use, or wildlife grazing. The Applicant would keep direct effects to the short-term and minimize damage to structures and any enclosed habitat or plant species by using ecological construction monitors to oversee these areas during construction and

decommissioning as outlined in the Site Rehabilitation Plan and Facility Decommissioning Plan (APM-10).

Effect RR-4: Disturbance to structures designed to enhance rangeland health.

Installation of some Proposed Project infrastructure might disturb interior pasture fencing, cattle guards, or water haul areas. Pasture fencing, cattle guards, and water haul areas improve livestock distribution throughout an allotment when it is open to grazing. Water haul areas are used by wildlife as well as livestock. Cattle guards keep cattle and some wildlife out of the critical desert tortoise habitat in the south central portion of the Jean Lake allotment. The Applicant would keep direct effects to the short-term and minimize damage to structures by using desert tortoise measures (APM-17) and ecological construction monitors to oversee these areas during construction and decommissioning. Should the Applicant need to temporarily remove a structure during construction, they would immediately replace the structure in the same or better working order as outlined in the Site Rehabilitation Plan and Facility Decommissioning Plan (APM-10).

Effect RR-5: The introduction or spread of invasive or noxious weeds.

Grading and surface disturbance activities during construction and decommissioning would disturb soil within the Project area and create areas of bare ground. This disturbance would unearth dormant weed seeds in the seedbed and create opportunities for noxious and invasive weed species to colonize these areas. Increased vehicle traffic during all phases of the Project (construction, O&M, and decommissioning) also carries the potential to introduce weeds.

Vehicles are effective at disbursing weed seed to uninfected areas, where the plants may then become established. Noxious and invasive weeds directly and indirectly impact rangeland resources. Weeds can diminish the value of range sites by displacing quality forage plants. Weeds effectively compete with forage species for sunlight, soil, water, nutrients, and space, thereby reducing native forage productivity. If the allotments are re-opened to grazing, some weeds may cause toxic physical reactions in livestock. In order to minimize long-term impacts, the Applicant would implement a noxious weed control plan (APM-9).

Adverse impacts to rangeland resources for Alternative 2 would have observable and temporary short-term changes to baseline conditions in a relatively small area, but these conditions would not alter baseline conditions in the long-term.

Alternative 3: Modified Site Layout

Alternative 3 would be constructed and operated similar to Alternative 2 (the Proposed Action), with the exception of the site drainage plan. Alternative 3 would involve several diversion berms (each 10 feet high), debris basins, and level spreader detention basins. Alternative 3 would temporarily disturb and area of 1,150 acres and permanently disturb an additional 250 acres. Because of the site drainage plan, the footprint of Alternative 3 and related facilities would encompass 3,669 acres. Alternative 3 would impact rangeland resources if it would result in any of the effects listed under Alternative 2.

Jurisdictional Waters, Drainages, and Riparian Areas

Based on a delineation of the waters of the U.S. within the Proposed Project area conducted by CH2M Hill and the U.S. Army Corps of Engineers (USACE) during August 2009, the Project could impact potential jurisdictional waters on the southern portion of the Project area (CH2M Hill 2009). The USACE indicated that the USACE would likely assert jurisdiction over all drainages greater than or equal to 3 feet in width that intersect the Nevada/California state line.

Clearing and grubbing activities for project infrastructure (i.e., the substation, access roads, maintenance roads, perimeter road, service road, perimeter fence, berms, fire break, parking areas, tower foundations for the transmission lines, collection lines [underground], staging areas, water storage pond, O&M building, and solar arrays) could result in removal of desert wash vegetation and/or filling of jurisdictional areas. Additionally, the removal of vegetation could result in increased erosion and sedimentation, resulting in the degradation of water quality. During construction and during routine O&M, the use of maintenance and access roads that cross desert washes could result in impacting jurisdictional areas through vegetation loss and increased erosion. The use of vehicles and equipment to cross these washes could also result in the degradation of water quality from the potential introduction of hazardous materials such as fuels and oils.

Though the finding of the August 2009 delineation of waters of the U.S. conducted by CH2M Hill and the USACE indicated that the Proposed Project area does not contain any wetlands and that the southern portion of the Project area contained jurisdictional waters of the United States, a complete assessment of the potential effects to jurisdictional waters, riparian areas, and wetlands caused directly or indirectly by the Proposed Project cannot be completed until Jurisdictional Determination is issued by the USACE.

The following measures would reduce impacts to potential jurisdictional waters:

- APM-1 Erosion Control; and
- APM-3 Air/Dust Control.

If the pending Jurisdictional Determination supports the finding of the delineation of the waters of the U.S. within the Proposed Project area and these cannot be avoided, then the adverse impacts are likely to be both short- and long-term in duration. The following mitigation measures are recommended to reduce the adverse impacts on drainages and jurisdictional areas on a localized scale:

- Best Management Practices (MM BIO-2);
- Facility Siting (MM BIO-7);
- Jurisdictional Delineation (MM BIO-15);
- Drainage Crossing Design (MM BIO-16); and
- Mitigation Monitoring Plan for Affected Jurisdictional Areas (MM BIO-17).

4.6.9 Mitigation Measures – Biological Resources

The following measures are recommended to minimize, reduce, and mitigate impacts to biological resources with implementation of the Proposed Project. These would be implemented in addition to any Applicant proposed measures:

- MM BIO-1: Preconstruction Surveys. Preconstruction surveys will be conducted by qualified biologists according to the most current USFWS protocols, where available, by species. These surveys will include surveying mowing areas, brush clearing areas, and ground disturbance areas within habitat deemed suitable for sensitive species by a qualified biologist. These surveys will be conducted for the presence of special status plants, the presence of noxious weeds, and the presence of general and special status wildlife species, to prevent direct loss of vegetation and wildlife and to prevent the spread of noxious plant species.
- MM BIO-2: Best Management Practices. Crews would be directed to use BMPs where applicable. These measures would be identified prior to construction and incorporated into the construction operations.
- MM BIO-3: Biological Monitors. Biological monitors would be assigned to the Project in areas of sensitive biological resources. The monitors would be responsible for ensuring that impacts on special status species, native vegetation, wildlife habitat, or unique resources would be avoided to the fullest extent possible. Where appropriate, monitors would flag the boundaries of areas where activities would need to be restricted in order to protect native plants and wildlife or special status species. Those restricted areas would be monitored to ensure their protection during construction.
- MM BIO-4: Worker Environmental Awareness Program. A Worker Environmental Awareness Program (WEAP) would be prepared. All construction crews and contractors would be required to participate in WEAP training prior to starting work on the Project. The WEAP training would include a review of the special status species and other sensitive resources that could exist in the Project area, the locations of sensitive biological resources and their legal status and protections, and measures to be implemented for avoidance of these sensitive resources. A record of all trained personnel would be maintained.
- MM BIO-5: Migratory Birds and Raptors Impacts Reduction Measures. To reduce impacts on migratory birds and raptors, the following will be done:
    - Biological monitors will monitor and enforce disturbance buffers around all active bird nests (for raptors and species protected by the MBTA) found in project areas during construction. The general bird breeding season for this area is late February to early July. For raptors specifically, the Applicant will use the USFWS Utah Field Office Guidelines for Raptor Protection from Human and Land Use Disturbances (1999) to determine appropriate survey areas and disturbance buffers for active nests. For all non-raptor bird species, biologists will survey within project areas. Because there are no standardized disturbance buffers for active non-raptor bird nests, the Applicant will consult with the appropriate agencies (BLM, USFWS, and NDOW) on a case-by-case basis when active nests are found in project areas, unless directed to do otherwise by these same agencies.

- Active bird nests will not be move during breeding season, unless the Project is expressly permitted to do so by the USFWS, BLM, and NDOW.
- All active nests and disturbance or harm to active nests will be reported within 24 hours to the USFWS, BLM, and NDOW upon detection. The biological monitor will halt work if it is determined that active nests are being disturbed by construction activities, until further direction or approval to work is obtained from the appropriate agencies.

- MM BIO-6: Avian Protection. All transmission and subtransmission towers and poles would be designed to be avian-safe in accordance with the Suggested Practices for Avian Protection on Power Lines: the State of the Art in 2006 (APLIC 2006).
- MM BIO-7: Facility Siting. Final tower and spur road locations would be adjusted to avoid sensitive biological resources to the greatest extent feasible.
- MM BIO-8: Western Burrowing Owl Measures. To reduce impacts on the western burrowing owl, the following will be done:
  - A qualified biologist will conduct preconstruction surveys within 30 days prior to construction for western burrowing owl within suitable habitat prior to breeding season (February 1 through August 31). All areas within 50 meters (approximately 150 feet) of the Project area will be surveyed.
  - If an active nest is identified, there will be no construction activities within 50 meters (approximately 150 feet) of the nest location to prevent disturbance until the chicks have fledged, as determined by a qualified biologist.
  - The occurrence and location of any western burrowing owl will be documented by biological monitors in daily reports and submitted to the authorized biologist on a daily basis. The authorized biologist will report all incidents of disturbance or harm to burrowing owls within 24 hours to the appropriate resource agencies (USFWS, BLM, NDOW).

- MM BIO-9: Gila Monster and Chuckwalla Measures. The following measures are the current NDOW construction site protocols for the Gila monster (NDOW 2005). These protocols are applicable for the Gila monster in both the Nevada and California sections of the Project, and applicable for the chuckwalla in the Nevada section of the Project. Through the WEAP, workers and other project personnel should (at a minimum) know how to: (1) identify Gila monsters and be able to distinguish them from other lizards such as chuckwallas and banded geckos; (2) report any observations of Gila monsters (in Nevada) to the biological monitor for notification of the NDOW; (3) be alerted to the consequences of a bite resulting from carelessness or unnecessary harassment; and (4) be aware of protective measures provided under state law.
  - Live Gila monsters found in harm‘s way on the construction site will be captured and then detained in a cool, shaded environment (<85 degrees Fahrenheit) by the Project biologist or equivalent personnel until a NDOW biologist can arrive for documentation purposes. Despite the fact that a Gila monster is venomous and can deliver a serious bite, its relatively slow gait allows for it to be easily coaxed

or lifted into an open bucket or box, carefully using a long handled instrument such as a shovel or snake hook (note: it is not the intent of NDOW to request unreasonable action to facilitate captures; additional coordination with NDOW will clarify logistical points). A clean 5-gallon plastic bucket with a secure, vented lid; an 18-inch x 18-inch x 4-inch plastic sweater box with a secure, vented lid; or a tape-sealed cardboard box of similar dimension may be used for safe containment. Additionally, written information identifying the mapped capture location (e.g., GPS record), date, time, and circumstances (e.g., biological survey or construction) and habitat description (e.g., vegetation, slope, aspect, and substrate) will also be provided to NDOW.

- Injuries to Gila monsters may occur during excavation, blasting, road grading, or other construction activities. In the event a Gila monster is injured, it should be transferred to a veterinarian proficient in reptile medicine for evaluation of appropriate treatment. Rehabilitation or euthanasia expenses would not be covered by NDOW. However, NDOW immediately will be notified during normal business hours. If an animal is killed or found dead, the carcass immediately will be frozen and transferred to NDOW with a complete written description of the discovery and circumstances, habitat, and mapped location.
- Should NDOW‘s assistance be delayed, biological or equivalent acting personnel on site may be requested to remove and release the Gila monster out of harm‘s way. Should NDOW not be immediately available to respond for photo-documentation, a 35-mm camera or equivalent (5 megapixel digital minimum preferred) will be used to take good quality images of the Gila monster in situ at the location of live encounter or dead salvage. The pictures, preferably on slide film (.tif or .jpg digital format) will be provided to NDOW. Pictures will include the following information: (1) encounter location (landscape with Gila monster in clear view); (2) a clear overhead shot of the entire body with a ruler next to it for scale (Gila monster should fill camera's field of view and be in sharp focus); and (3) a clear, overhead close-up of the head (head should fill camera's field of view and be in sharp focus).

- MM BIO-10: Reduce Night Lighting. Reduce night lighting in all natural areas to avoid unnecessary visual disturbance to wildlife. Night lighting during construction, operations, and maintenance will be reduced in natural areas using directed lighting, shielding methods, and/or reduced lumen intensity. The Applicant will indicate anticipated measures to resource agencies for approval prior to construction.
- MM BIO-11: Cover Steep-Walled Trenches or Excavations during Construction. To prevent entrapment of wildlife, all steep-walled trenches, auger holes, or other excavations will be covered at the end of each day. Fencing will be maintained around the covered excavations at night. For open trenches, earthen escape ramps will be maintained at intervals of no greater than 0.25 mile. A biological monitor will inspect all trenches, auger holes, or other excavations a minimum of twice per day, and also immediately prior to back-filling. Any species found will be safely removed and relocated out of harm‘s way, using a pool net when applicable. For safety reasons, biological monitors will, under no circumstance, enter open excavations.

- MM BIO-12: American Badger Impacts Reduction Measures. To reduce impacts to American badger, the following will be done:
  - Qualified biologists will be notified if badgers are observed within the Project area during construction activities. Work will immediately be stopped in the area if the biologists find occupied burrows within 100 feet of construction activities during preconstruction surveys.
  - Qualified biologists will ensure passive relocation of the occupied burrow by installing one-way trap doors on the burrow. The burrow will be collapsed after the badger vacates.
  - Work will be allowed to resume once the burrow has relocated outside the 100-foot zone.
- MM BIO-13: Site Restoration Plan: The Applicant will develop a Site Restoration Plan that describes measures to mitigate and compensate for special status plants such as transplanting/re-seeding and/or compensation in consultation with appropriate agencies (USFWS, BLM, NDOW). The plan will also outline the protocol for the revegetation of the portions of the Project area that are classified as temporary impacted. The plan will provide a matrix showing how the Applicant will address each species considered sensitive in terms of mitigation type (e.g., seed collection, salvage, fencing certain populations). This will include clearly describing how cacti and yucca species will be salvaged, stored, and re-established. The plan will also define success criteria in accordance with agency guidance and outline mitigation measures to be implemented if the success criteria are not met. The plan will be provided to these agencies for review and approval prior to work authorization.
- MM BIO-14: Desert Bighorn Sheep Measures: The Applicant will consult with the BLM, USFWS, and NDOW regarding conservation measures to avoid impacts on desert bighorn sheep during construction. Avoidance and minimization measures could include such elements as preconstruction surveys, biological monitoring, and timing construction activities to avoid bighorn sheep active seasons.
- MM BIO-15: Jurisdictional Delineation. The Applicant will conduct a formal jurisdictional delineation within the boundaries of the Project area once final engineering for the location of project-specific features is complete. This will be conducted prior to construction and is required in order to apply for permits, if needed, with USACE.

- MM BIO-16: Drainage Crossings Design. If drainages cannot be avoided by infrastructure placement, then the Applicant will design drainage crossings to accommodate estimated peak flows and ensure that natural volume capacity can be maintained throughout construction and upon post-construction restoration. This measure is necessary to minimize the amount of erosion and degradation to which drainages are subject.
- MM BIO-17: Mitigation Monitoring Plan for Affected Jurisdictional Areas. The Applicant will develop a Mitigation Monitoring Plan for affected jurisdictional areas with established riparian areas, as needed, for submittal to the USACE for review and approval. The plan will outline measures to accomplish restoration, provide criteria for restoration success, and/or provide compensation ratios. This measure is needed to compensate for loss of wetlands and waters that provide suitable habitat for special-status and sensitive species, and provide important hydrological and water quality functions in the desert environment.

4.7 Cultural Resources Impacts

This section discusses effects on cultural resources that may occur with implementation of the Proposed Action or alternatives.

4.7.1 Indicators

In general, the Proposed Action could affect cultural resources by either directly or indirectly altering the characteristics of a historic property that is eligible for inclusion or listed in the National Register of Historic Places (NRHP) per 36 CFR, Part 800.5. The Proposed Action would adversely affect historic properties if it would:

- Disturb any human remains, including those interred outside of formal cemeteries. No quantitative threshold exists;
- Cause physical destruction or damage to all or part of the property;
- Change the character of the property's use or physical features within a property's setting that contribute to its historic significance (for example, by isolating the property from its setting); or
- Introduce visual, atmospheric, or audible elements that diminish the integrity of the property's significant historic features.

4.7.2 Direct and Indirect Effects by Alternative

This section describes the effects under each alternative using the respective methodology prescribed under NEPA. All effects discussed in this section are direct. No indirect effects were identified for this resource.

Alternative 1: No Action

Under Alternative 1, there would be no construction and the Proposed Project area would not be disturbed; therefore, Alternative 1 would have no effect on cultural resources.

Alternative 2: Proposed Action

Under Alternative 2, the ROW application would be approved and the Proposed Action would be carried forward. The area of potential effect (APE) for the Proposed Action encompasses approximately 7,967 acres of disturbed and undisturbed land. This area includes approximately 7,925 acres associated with the Project area, 35 acres associated with an existing 1.55-mile-long maintenance and access road following power transmission lines, and 7 acres related to a 0.3-mile-long alternative access road connecting with an existing power generation facility. The APE for each access road corridor was defined as 60 meters (200 feet) on each side of the road centerline. The APE includes two 2.8-acre substations that would provide renewable energy to recipients via Nevada Energy‘s Bighorn Substation and Southern California Edison (SCE)‘s proposed 220kV Eldorado to Ivanpah Transmission Project (EITP) upgrade to the existing 115kV line.

The Class III inventory for the Proposed Project resulted in the identification of 23 new cultural resource sites and five previously identified and documented sites located within the APE. Three NRHP-eligible properties are within the APE. Two are prehistoric sites and one is an historic transmission line (Boulder Line 26CK5180a). The two prehistoric sites are along the access road into the Proposed Project area. These sites would not be affected by improvements made to the access road for the Proposed Project.

The three transmission lines (26CK5180a, b, and c) that were constructed from Boulder/Hoover Dam to Los Angeles, California in the 1930s are not considered to be part of the Project APE because they occupy their own rights-of way and will not be affected by this Proposed Project. They have not been formally evaluated for NRHP eligibility for this project, although they have been determined eligible in other locations. The Boulder Line (26CK5180a) will be removed and replaced with upgraded lines as part of the EITP project between California and Nevada. That undertaking, proposed by SCE, is the subject of the EITP Environmental Impact Report (EIR)/EIS with the CPUC as the lead CEQA agency with the BLM in California as the lead agency. Removal and upgrade of the Boulder Line by the EITP has been determined to be an adverse effect which will be resolved by documenting the resource for the national Historic American Engineering Record. This line will not be discussed further in this section.

Three NRHP-eligible properties are within the APE. Two are prehistoric sites (26CK1620/8282 and 26CK2632/8280) and one is an historic transmission line (Boulder Line 26CK5180a).

Effect CULT-1: Effect to cultural resources 26CK1620/8282 and 26CK2632/8280.

Sites 26CK1620/8282 and 26CK2632/8280 are located within the 120-meter-wide corridor surveyed for the main access road. Improvements along the access road to this project would not affect either site; however, if any construction activities occur outside the immediate road prism, impacts might be inadvertently caused. Implementation of PDF-13 and mitigation measure MM CULT-1 would ensure effects to 26CK1620/8282 and 26CK2632/8280 would not occur during implementation of this project.

- MM CULT-1: Avoid adverse effect to 26CK1620/8282 and 26CK2632/8280. In order to avoid any inadvertent effects to 26CK1620/8282 and 26CK2632/8280 during road construction activities, an archaeological monitor will be present during land disturbing activities along the proposed main access road within 100 feet of 26CK1620/8282 and 26CK2632/8280in the northwest corner of the Proposed Project area. Further, should any deep excavations be conducted in this sand dune area, a qualified geoarchaeologist or geologist will be present to analyze the excavation(s) to determine the presence or absence of the former Pleistocene Ivanpah Lake bottom and the amount of associated post lake deposition.

Effect CULT-2: Unanticipated discovery of cultural resources or human remains

Construction of the Proposed Project would involve ground disturbance, resulting in potential effects on inadvertent surface and subsurface cultural resources. . The sand dune area in the extreme northwest corner of the Proposed Project area and the proposed main east-west access for the Project falls within an archeological sensitivity zone. Implementation of PDF-13 and MM CULT-1 would ensure effects to inadvertent discoveries of cultural resources would be avoided. Although unlikely, any human remains discovered during Proposed Project activities would be protected by following the protocols set forth in the October 26, 2009, State Protocol Agreement between the BLM and the Nevada State Historic Preservation Office.

Alternative 3: Modified Site Layout

Alternative 3 would be constructed and operated similarly to Alternative 2 on every project component, with the exception of the drainage plan. The footprint for Alternative 3 would be larger and would encompass approximately 3,669 acres, as compared to 2,966 acres for Alternative 2. The construction disturbance area and permanent construction disturbance area would be increased with Alternative 3; however, the type, intensity, and duration of effects to cultural resources would be similar to that of Alternative 2. The Project design features and mitigation prescribed for Alternative 2 would be applicable for Alternative 3

4.7.3 Residual Effects

There would be no residual effects to any NRHP-eligible cultural resources in the Project area or along the access roads.

4.8 Paleontological Resources Impacts

This section discusses effects on paleontological resources that may occur with implementation of the Proposed Action or alternatives.

4.8.1 Indicators

NEPA requires that important natural attributes of our national heritage are considered when assessing the environmental consequences of any Proposed Action. NEPA does not refer to paleontological resources specifically; however, NEPA Section 101(b)(4) states that it is the responsibility of the federal government to —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." NEPA does not provide impact indicators

specifically for paleontological resources. However, it is the policy of the BLM that potential effects on scientifically significant paleontological resources be identified and proper mitigation is implemented (BLM 2008). Pursuant to BLM policy, the Proposed Action would adversely affect paleontological resources if it would:

- Damage or destroy known paleontological resources; or
- Cause the loss of valuable scientific information by disturbing the geology in which fossils are found.

4.8.2 Direct and Indirect Effects by Alternative

This section describes the effects under each alternative using the respective methodology prescribed under NEPA.

Alternative 1: No Action

Under Alternative 1, there would be no construction and the Proposed Project area would not be disturbed; therefore, Alternative 1 would have no effect on paleontological resources.

Alternative 2: Proposed Action

Under Alternative 2 (the Proposed Action), the ROW application would be approved and the Proposed Action would be carried forward. The APE for the Proposed Action encompasses approximately 7,967 acres of disturbed and undisturbed land. This area includes approximately 7,925 acres associated with the Project area, 35 acres associated with an existing 1.55-mile-long maintenance and access road following power transmission lines, and 7 acres related to a 0.3-mile-long alternative access road connecting with an existing power generation facility. As discussed in Section 3.8.1, Existing Paleontological Resources, the results of the assessment concluded that no paleontological sites with the potential to be scientifically significant have been located within one mile of the Proposed Project site (CH2M Hill 2009c) or within the Project area within the top 10 feet of soil.

Construction. As discussed in Chapter 3, fossils may exist at subsurface depths of more than 10 feet in areas of the Proposed Project site underlain by Eolian and playa fringe. These fossils, if they exist, would be affected by trenching and excavation activities that would involve subsurface ground disturbance of more than 10 feet. Any possible paleontological resources obtained by project-related drilling and auguring would not be scientifically significant on the basis of the nature of extraction and therefore are not subject to any paleontological monitoring.

Effect PALEO-1: Construction activities could affect a buried or unknown paleontological resource.

The results of the paleontology literature and records review for the Proposed Action indicate that the majority of the Proposed Project site has a low potential to affect significant nonrenewable fossil resources because the formation in the Project area has a low potential to contain fossils.

- MM PALEO-1: Paleontological Mitigation. Results of the data inventory and impact assessment confirm that the sediments present within the boundaries of the Proposed Project area have a low potential to contain significant paleontological resources. Mitigation measures should be implemented if significant subsurface paleontological resources are identified during construction. The BLM requires the following stipulation:

  The Proponent shall immediately notify the BLM authorized officer of any paleontological resources discovered as a result of operations under this authorization. The Proponent shall suspend all activities in the vicinity of such discovery until notified to proceed by the authorized officer, and shall protect the locality from damage or looting. The authorized officer will evaluate, or will have evaluated, such discoveries as soon as possible, but not later than 5 working days after being notified. Appropriate measures to mitigate adverse effects to significant paleontological resources will be determined by the authorized officer after consulting with the Proponent. The Proponent is responsible for the cost of any investigation necessary for the evaluation and for any mitigation measures, including museum curation. The Proponent may not be required to suspend operations if activities can avoid further impacts to a discovered locality or be continued elsewhere.

Alternative 3: Modified Site Layout

Alternative 3 would be constructed and operated similarly to Alternative 2 (the Proposed Action) on every project component, with the exception of the drainage plan. The construction disturbance area and permanent construction disturbance area would be increased with Alternative 3; however, the type, intensity, and duration of effects to paleontological resources would be similar to that of Proposed Action. The Project design feature and mitigation prescribed for the Proposed Action would be applicable for Alternative 3.

4.8.3 Residual Effects

No residual effects on paleontological resources would result from implementation of the Proposed Action or alternatives.

4.9 Lands and Realty Impacts

This section discusses effects on lands and realty that may occur with implementation of the Proposed Action or alternatives.

4.9.1 Indicators

The Proposed Action would affect land use and realty if it would:

- Conflict with existing federal, state, or local land use plans or policies;
- Conflict with existing BLM land use authorizations;
- Change public land disposition; or
- Restrict land tenure adjustments.

4.9.2 Direct and Indirect Effects by Alternative

Alternative 1: No Action

Under NEPA, the BLM must consider an alternative that assesses effects that would occur if the Proposed Action were not approved. The No Action Alternative assumes that the ROW application is denied. Under this alternative there would be no construction and the Proposed Project site would not be disturbed; thus, there would be no effect on land use and realty.

Alternative 2: Proposed Action

The Proposed Action would be constructed entirely on BLM-managed lands designated as Open Public Lands. The Proposed Project would be constructed in an area that is crossed by three transmission lines.

EFFECT LANDS-1: Limit uses within the Congressionally-Designated Airport Environs Overlay District. A portion Proposed Project (T.27S., R.59E., Section 3; connections to the Walter M. Higgins Generating Station; and access routes) would be constructed within the Airport Environs Overlay District designated by Congress in Public Law 107-282. With implementation of mitigation measure MM LANDS-1, the Proposed Action would not result in adverse effects to lands and realty.

- MM LANDS-1: Ensure compatibility with airport projects. The Applicant will work closely with the Clark County Department of Aviation (CCDOA) to ensure that all planning, construction, and operation remains compatible with airport projects and future airport operations.

The Proposed Project would not result in any impacts to existing or proposed transmission line ROWs that cross the Proposed Project area, as the Applicant has designed the Proposed Project around the existing transmission line ROWs and would allow continued access to the existing transmission lines by their owners. For further analysis of impacts to mineral resources, refer to Section 4.17, Energy and Minerals Impacts.

No additional impacts to any federal, state, or local land use plans or policies, existing BLM land use authorizations, public land disposition, or land tenure adjustments would occur as a result of the Proposed Action.

Alternative 3: Modified Site Layout

Alternative 3 would not result in any additional impacts to any federal, state, or local land use plans or policies, existing BLM land use authorizations, public land disposition, or land tenure adjustments as compared to those of the Proposed Action.

4.9.3 Residual Effects

The Proposed Project would not have any residual impacts to land use relative to the criterion outlined in this section.

4.10 Special Management Areas Impacts

This section discusses effects to Special Management Areas (SMAs) that may occur with implementation of the Proposed Action or alternatives.

4.10.1 Indicators

The Proposed Action and alternatives would affect SMAs if the Proposed Project would:

- Restrict public access to the Lucy Gray Mountains, and/or restrict access to the public hiking/OHV trails that cross the Jean/Roach Lake Special Recreation Management Area (SRMA);
- Impact desert tortoise and/or desert tortoise habitat found within the Ivanpah DWMA;
- Cause changes in air quality or other air clarity evaluations that could occur within SMAs in the area due to construction and operation activities;
- Conflict with the visual resource management (VRM) classifications of the SMAs in the area with VRM classifications;
- Cause changes to the darkness of the night sky dome as viewed from SMAs in the area due to construction and operation activities; or
- Cause changes in erosion or sedimentation rates within SMAs in the area.

4.10.2 Direct and Indirect Effects by Alternative

This section describes the effects under each alternative using the respective methodology prescribed under NEPA. To compare effects, this analysis defines the temporal scale (time), spatial extent (area), and intensity of effects for each alternative.

Alternative 1: No Action

Under this alternative, there would be no construction and the Proposed Project site would not be disturbed; thus, there would be no effect on SMAs.

Alternative 2: Proposed Action

The Proposed Action would be located approximately 2 miles east of Primm, Nevada, along the California/Nevada border.

<u>Effect SMA-1: Restrict public access to the Lucy Gray Mountains, and/or restrict access to the public hiking/OHV trails that cross the Jean/Roach Lake SRMA.</u>

The Proposed Project would be constructed within the boundaries of the Jean/Roach Lake SRMA. The Proposed Project would be constructed on several trails used for hiking and recreational and professional OHV use. The Proposed Action would continue to provide OHV users and other recreationists access to the backcountry by means of a new OHV route, and racing would still be allowed near the Proposed Project site. Additionally, the Proposed Action would provide public access to the Lucy Gray Mountains by allowing the public use of the Proposed Project‘s perimeter road.

The Proposed Action would permanently restrict access to the trails within the Project boundary resulting in an adverse effect to the Jean/Roach Lake SRMA. For more discussion of project-related effects to the Jean/Roach Lake SRMA, see Section 4.11, Recreation Impacts. See also Section 4.12 for discussion of visual resource impacts to SMAs.

Effect SMA-2: Impact desert tortoise and/or desert tortoise habitat found within the Ivanpah DWMA.

The Proposed Project would be constructed adjacent to the Ivanpah DWMA, which is positioned immediately south of the Proposed Project along the California/Nevada border. As the Proposed Action is immediately adjacent to the Ivanpah DWMA, the Proposed Project could inadvertently introduce noxious weeds into the DWMA from construction equipment unintentionally transporting the seeds of these undesirable plant species. To prevent the spread of noxious weeds, the Applicant would implement a BLM-approved noxious weed plan to reduce adverse effects to the Ivanpah DWMA.

Effect SMA-3: Cause changes in air quality or other air clarity evaluations that could occur within SMAs in the area due to construction and operation activities.

The nearest SMAs to the Proposed Project site are the South McCullough Wilderness Area located 1.9 miles east of the Project in Nevada, and the Stateline Wilderness Area located 2.5 miles to the west in California. Construction of the Proposed Project would not result in air quality or air clarity changes within these wilderness areas, as the Applicant would use water during construction for dust suppression and these wilderness areas are located far enough from the Proposed Project that project-related dust would not change their air quality or air clarity; therefore, there would be no impact.

Effect SMA-4: Conflict with the VRM classifications of the SMAs in the area that possess VRM classifications.

Key Observation Points (KOPs) for VRM impacts were assessed for the Mojave National Preserve (KOP 9), South McCullough Wilderness (KOP 6), the Ivanpah Dry Lake SRMA (KOP 7), and the Jean/Roach Lake SRMA (KOP 6). KOP 6 is used for both the Jean/Roach Lake SRMA and the South McCullough Wilderness Area, as this KOP represents the view of the Jean/Roach Lake SRMA and generally represents the view for the South McCullough Wilderness Area. The Proposed Action would be visible from all of the above listed KOPs and would meet the VRM Class objectives assigned to each KOP; therefore, there would be no impact. For greater discussion of VRM impacts, see section 4.12 Visual Resources Impacts.

Effect SMA-5: Cause changes to the darkness of the night sky dome as viewed from SMAs in the area due to construction and operation activities.

Night construction is not anticipated, as the Applicant has stated that project construction activities would occur during the day between the hours of 7:00 a.m. and 7:00 p.m.; therefore construction of the Proposed Project would not alter the darkness of the night sky dome as viewed from SMAs.

For O&M, the Proposed Project would employ the use of security lighting around the O&M building and along the paved access road between the Proposed Project site perimeter and the O&M building. The lighting would be directed at a downward angle at the road and the O&M building. As the Proposed Project site would be located more than 2 miles from the nearest wilderness area, O&M would not change the darkness of the night sky dome as viewed from SMAs; therefore, there would be no impact.

Effect SMA-6: Changes in erosion or sedimentation rates within SMAs in the area.

The Proposed Action may result in increased erosion and sedimentation in the Ivanpah DWMA. The magnitude of this impact is currently unknown. For a more in-depth discussion of erosion and sedimentation rates, see Section 4.5, Water Resources/Hydrology Impacts.

Alternative 3: Modified Site Layout

Alternative 3 would be constructed within the same boundaries, and have a similar site design as Alternative 2 (the Proposed Action); however, the site drainage plan of Alternative 3 would have a greater construction and operational disturbance of land than the Proposed Action. Although Alternative 3 would disturb a much greater area of land than the Proposed Action, Alternative 3 would not result in any additional impacts to any SMAs as compared to those caused by the Proposed Action.

4.10.3 Residual Effects

There would be no residual effects to SMAs as a result of the Proposed Action and alternatives.

4.11 Recreation Impacts

This section discusses effects on recreation that may occur with implementation of the Proposed Action or alternatives.

4.11.1 Indicators

The Proposed Action would affect recreation if it would:

- Conflict with existing federal, state, and local recreation management plans and policies;
- Change access to existing recreation areas or sites;
- Change levels of use for existing recreation areas or sites; or
- Create substantial overcrowding to other recreation areas caused by “spill over.”

4.11.2 Direct and Indirect Effects by Alternative

This section describes the effects under each alternative using the respective methodology prescribed under NEPA.

Alternative 1: No Action

Under the No Action Alternative, the Proposed Project would not be constructed, and there would be no impacts to recreational uses or resources.

Alternative 2: Proposed Action

This alternative would approve the ROW application and the Proposed Action would be carried forward. Effects that could result from the implementation of Alternative 2 during construction, O&M, or decommissioning activities are analyzed in this section.

The footprint of the Proposed Project and related facilities would be 2,967 acres. The Proposed Project would be located within the boundary of the Jean Dry Lake/Roach Dry Lake SRMA. Additional uses of the SRMA include recreational model rocket launching, movie, commercial, and music video filming, big game hunting, horseback riding events, hiking, music festivals, and land sailing on the Jean and Roach dry lakes (Dieli 2009).

Construction. Construction of the Project would include the erection of an 8-foot-high chain link perimeter fence with barbed-wire security strands at the top around 2,865 acres of the Proposed Project site. Once the perimeter fence is erected, access would be off limits to the public. A temporary bypass route would be designated by BLM to enable backcountry access during construction of the county road.

Effect REC-1: Conflict with existing federal, state, and local recreation management plans and policies.

The Project site is managed by the BLM Las Vegas Field Office —forntensive recreation opportunities, including competitive off-road vehicle (in accordance with the U.S. Fish and Wildlife Service Biological Opinion) and other recreational events, as well as dispersed recreational use and commercial activities (BLM 1998a)." Given the mitigation of rerouting the access to the competitive off road vehicle race area, construction of Alternative 2 would not cause a conflict with existing federal, state, and local recreation management plans and policies.

Effect REC-2: Changes in access to existing recreation areas or sites.

Construction of Alternative 2 would result in the Project site being fenced; thus, the entire project site would be off limits to the public. This portion of the Jean Dry Lake/Roach Dry Lake SRMA would no longer be accessible to members of the public engaged in OHV use; recreational model rocket launching; movie, commercial, and music video filming; big game hunting; horseback riding events; hiking; and music festivals.

Access to the Proposed Project site would be via the project access road, a new 1.55-mile-long, 40-foot-wide road constructed and maintained (including necessary lights and crossing gates at the Union Pacific Railroad [UPRR] crossing) by Clark County as a public road. A temporary bypass route would be designated by BLM to enable backcountry access during construction of the county road. An unimproved, four-wheel–drive, OHV route would be constructed to allow casual OHV uses to continue in the vicinity of the Proposed Project area. This OHV route would extend along the northern boundary of the Proposed Project site across Section 1, and then south along the eastern project boundary within Sections 1 and 12. At this point, it would connect to the existing OHV road that provides access to the Lucy Gray Mountains. The final alignment of the route would be determined by BLM and the road would be operated by BLM. The Primm 300 race would be rerouted outside the Proposed Project site; however, it would still go through the same general part of the Jean Dry Lake/Roach Dry Lake SRMA.

Effect REC-3: Change in level of use of existing recreation areas or sites.

Construction of Alternative 2 would result in an increase in the level of use of other parts of the Jean Dry Lake/Roach Dry Lake SRMA by members of the public engaged in OHV use; recreational model rocket launching; movie, commercial, and music video filming; big game hunting; horseback riding events; hiking; and music festivals since this portion of the SRMA would no longer be open to the public.

Effect REC-4: Substantial overcrowding caused by "spill over" effects to other recreation areas.

Construction of this alternative would not prevent OHV users from being able to access the backcountry. The OHV route currently used to access the backcountry would be realigned and would remain open during construction. The Primm 300 race would be rerouted outside the Proposed Project site; however, it would still go through the same general part of the Jean Dry Lake/Roach Dry Lake SRMA. Although some recreational users in the Jean Dry Lake/Roach Dry Lake SRMA would not longer have access to Proposed Project site, it would not cause substantial overcrowding by having a "spill over" effect to other recreation areas.

Operations and Maintenance. O&M for Alternative 2 would result in the same effects as construction. During O&M, the Proposed Project site would remain fenced and would be off limits to members of the public. OHV users and other recreationists would continue to have access to the backcountry by means of a new OHV route and the Primm 300 would still be held near the Proposed Project site; however, members of the public engaged in recreational model rocket launching, movie, commercial, and music video filming, big game hunting, horseback riding events, hiking, and music festivals would not have access to the Proposed Project site, itself.

Decommissioning. After decommissioning, there would be no effects to recreation as the land that had been off limits to members of the public would be available again for use for recreational activities.

Alternative 3: Modified Site Layout

Alternative 3 would be constructed and operated similar to Alternative 2 on every project component, with the exception of the site drainage plan. Alternative 3 would involve several diversion berms (each 10 feet high), debris basins, and level spreader detention basins, temporarily disturbing an area of 1,150 acres, and permanently disturbing 250 acres. Because of the site drainage plan, the footprint of Alternative 3 and related facilities would encompass approximately 4,818 acres.

Construction. Construction of Alternative 3 would have similar impacts to recreation as Alternative 2, except the amount of land directly affected would be 4,818 acres versus to 2,865 under Alternative 2.

Effect REC-2: Changes in access to existing recreation areas or sites.

This effect would be increased as compared to Alternative 2 since the Proposed Project site would be larger, 4,818 acres versus 2,968 acres. A larger area (2,865 acres) would be fenced and would be off limits to the public.

Effect REC-3: Change in level of use of existing recreation areas or sites.

This effect would be increased since a larger portion of the Jean Dry Lake/Roach Lake SRMA would be off limits to members of the public and recreational users would have to move their activities to other parts of the Jean Dry Lake/Roach Lake SRMA.

Operations and Maintenance. Operation of Alternative 3 would have same effects for recreation as Alternative 2 except effects would be greater since a larger amount of land would be fenced (3,365 acres) as compared to Alternative 2 (2,865 acres) and would not be available for use by the public.

Decommissioning. Effects under Alternative 3 for recreation would be the same as for Alternative 2.

4.11.3 Residual Effects

Under Alternatives 2 and 3, there would be a change in existing access to the Jean Lake/Roach Lake SRMA since a portion of this SRMA would no longer be open to the public. In addition, both alternatives would result in an increase in the level of use of other parts of the Jean Lake/Roach Lake SRMA by members of the public engaged in recreational model rocket launching, movie, commercial, and music video filming, big game hunting, horseback riding events, hiking, and music festivals since a portion of the SRMA would no longer be available to the public.

4.12 Visual Resources Impacts

This section discusses effects on visual resources that may occur with implementation of the Proposed Action or alternatives.

4.12.1 Indicators

Adverse effects on visual resources would occur if the Proposed Action would:

- Cause a use to be constructed in an area that is not compatible with the existing VRM class.

None of the impacts discussed in the following sections would result in a use constructed in an area that is not compatible with the existing VRM class.

4.12.2 Direct and Indirect Effects by Alternative

This section describes the effects on visual resources under each alternative using the framework prescribed under NEPA.

Alternative 1: No Action

Under the No Action Alternative, the ROW application would be rejected and the Silver State Solar Project would not be built. Visual resource impacts would not occur from the Proposed Project.

Alternative 2: Proposed Action

Effect VIS-1: Short-term change to the visual character of the environment.

The short-term change to the visual character of the environment would include the construction activities. Views of construction machinery and grading and drainage activities would be seen first. Dust suppression activities would be present on site, but emissions of fugitive dust would still occur and potentially be visible to the viewpoints identified in Effect VIS-2. Following the grading and drainage activities, the installation of the solar PV equipment, power collection system and huts, electrical switchyards, and transmission lines would be visible. These would be short-term activities that would be visible up to the operation phase of the Proposed Project.

The most notable effect due to the short-term change would be the exposed soils created during construction. These exposed soils would contrast strongly with the colors and textures found adjacent to the site. Since the Applicant has agreed to re-vegetate the site, these visual contrasts would be short-term.

Effect VIS-2: Long-term change to the visual character of the environment.

This section analyzes the visual resources impacts of the Proposed Project in accordance with the methods outlined in Section 3.12.1.3, Field Visits, Selection of Key Observation Points, and Modeling). The KOPs described in Section 3.12.2.3, Descriptions of KOPs and their Viewsheds, and Figures 4.12-2 through 4.12-10 provide simulations of each view as it would appear during the Proposed Project‘s operational phase.

KOP 1 – View from Goodsprings Road

Figure 4.12-1 represents a simulated view that motorists traveling east from Goodsprings would see looking toward the Proposed Project. The length of the view would be of moderate duration representing a motorist‘s view from a point just east of Goodsprings en route to Jean. The view would be an oblique view, not a forward view and, therefore, would be less evident to the motorist whose line of vision would be focused on the road directly ahead. The majority of KOP 1 viewers would likely be local residents or daily commuters to Goodsprings or Jean who are likely to be sensitive to the view.

The Proposed Project‘s solar collector fields would be visible as flat, geometric forms on the alluvial fan. The angular forms and straight lines would create a moderate level of contrast with the more natural shapes of the surrounding environment. The collector fields appear to be darker than the alluvial fans on which the Proposed Project would be located and contrast moderately with the surrounding environment. Further, the collector fields appear to have a relatively smooth texture, contrasting weakly with the surrounding environment.

When the Proposed Project is in place, project features would attract attention, but would not dominate the view of the casual observer. As such, the Proposed Project would meet the VRM Class III objectives from this KOP.

Figure 4.12-1. KOP 1 – View from Goodsprings Road

KOP 2 – View from I-15 near Jean

Figure 4.12-2 represents a simulated view that motorists traveling south from Jean along I-15. The length of the view would be of moderate duration representing a motorist's view from a point just south of Jean to Primm. This would not, however, be a forward view but an oblique view, and would be at the outer edge of the primary cone of vision of drivers traveling westbound on I-15. The majority of KOP 2 viewers are likely to be motorists traveling long distances from Las Vegas to points in southern California or, to a lesser extent, motorists traveling from Las Vegas to Primm. They would be moderately sensitive to the view from KOP 2, which would likely represent a view that is a part of a much longer drive.

Project solar collector fields would be visible as flat, geometric forms on the alluvial fan on which the Proposed Project would be located, creating a moderate level of contrast with the more natural forms of the surrounding environment. The existing surrounding environment already includes prominently visible lines created by structural elements in the foreground and middleground of the view. The existing foreground of KOP 2 is dominated by structures including I-15, the highway barrier wall and signs, and a steel-pole transmission line. These existing structures create strong horizontal and vertical lines in the existing view.

The geometric forms created by the Proposed Project's collector fields would be defined by straight lines that would be visible from this vantage point and create a moderate level of contrast with the surrounding environment, although this contrast would be diminished by the existing structures (for example, transmission lines). The collector fields appear to be darker than the alluvial fields on which the Proposed Project would be located and to contrast moderately with the surrounding greenish-brown color of the alluvial fan. Further, the collector fields appear to have a medium texture, contrasting weakly with the surrounding environment. When the Proposed Project is in place, project features would attract attention, but would not dominate the view of the casual observer. As such, the Proposed Project would meet the VRM Class III objectives from this KOP.

Figure 4.12-2. KOP 2 – View from I-15 near Jean

KOP 3 – View from Roach Dry Lakebed

The Roach dry lakebed is a destination for camping and OHV use and is part of the BLM Jean/Roach Lake SMRA. Figure 4.12-3 represents a simulated view that recreationalists would see from Roach dry lakebed. The view from KOP 3 would be one of short to moderate duration by OHV users, but of long duration by campers. During OHV activity, the view would probably not be the primary focus of interest since the recreationalists would be traveling off-road which focuses their attention to the irregular trails and obstacles ahead. Campers at Roach dry lakebed are likely to be at least moderately sensitive to views toward the Proposed Project site and recreationalists who are exclusively OHV users somewhat less so.

The solar collector fields would appear as mostly flat, horizontal forms in the middleground at the base of the Lucy Gray Mountains that contrast weakly with the surrounding environment. The rectangular forms of the O&M building and the thin, tubular forms of the new transmission

lines would also be visible, but less dominant. The Proposed Project would create a line that is visible against the line dividing the valley floor from the mountains and create a moderate level of contrast with this line. The collector fields appear to be white to gray and lighter than the brownish green to gray of the alluvial fan on which they are located. This color contrast level would be moderate. Further, the collector fields appear to have a medium texture and the O&M building appears to have a smooth texture, which contrast weakly with the surrounding environment.

Proposed Project features would attract attention but would not dominate the view of the casual observer, particularly in consideration of existing structures—two rows of lattice steel transmission lines extending from the foreground to the background, at least two other rows of transmission lines faintly visible in the middleground against the mountains, and the power plant in the middleground. As such, the Proposed Project would meet the VRM Class III objectives from this KOP.

Figure 4.12-3. KOP 3 – View from Roach Dry Lakebed

KOP 4 – View from Desert Oasis Apartment Complex

Figure 4.12-4 represents a simulated view of short duration for residents accessing their cars in the parking lot or of long duration from apartment windows on the east side of the complex. Residents would likely be at least moderately sensitive to the view from KOP 4, which would likely represent a daily view.

Proposed Project features from KOP 4 would be visible in the middleground between the parking lot perimeter wall and the mountains in the distance. From this distance, the Proposed Project solar collector fields would be visible as flat, geometric forms and the inverter boxes as three-dimensional rectangular forms that create a weak level of contrast with the surrounding environment. The Proposed Project features would create straight lines along the alluvial fan, which would contrast weakly with the more gentle lines of the surrounding environment. The collector fields appear to be white to black in color and are mostly lighter than the brownish green to gray surrounding environment. The color contrast level is moderate. Further, the Proposed Project features appear to have a medium to coarse texture, which contrasts weakly with the surrounding environment.

In this KOP, existing foreground views are of an apartment complex parking lot surrounded by a perimeter wall. The perimeter wall limits the view of the middleground. The Proposed Project

features would attract attention, but would not dominate the view of the casual observer. As such, the Proposed Project would meet the VRM Class III objectives from this KOP.

Figure 4.12-4. KOP 4 – View from Desert Oasis Apartment Complex

KOP 5 – View from Primm Valley Resort and Casino

Figure 4.12-5 represents a potentially frequent but short duration view for Primm Valley Resort and Casino hotel guests and workers viewing the Proposed Project area from east-facing windows. Hotel guests and workers are not likely to be highly sensitive to the view from KOP 5 because their main purpose at the hotel is focused on activities within the on-site casinos and outlet shopping mall.

The existing view of KOP 5 is dominated by the flood-control features in the foreground and the Lucy Gray Mountains in the background. The foreground has been graded, stripped of vegetation, and converted to a detention basin with relatively steep sides. The basin contains structures such as a paved roadway lined with light poles in the foreground, chain-link fencing, and a dirt road in the middleground.

Proposed Project features would be visible as flat, geometric forms on the alluvial fan in the middleground and would create a weak level of contrast with the surrounding environment. The Proposed Project features would create straight lines along the valley floor, which would contrast moderately with the more organic lines of the surrounding environment. The collector fields appear to be white to gray in color and are mostly lighter than the brownish green to gray of the alluvial fan on which they are located. The color contrast level is moderate. Further, the Proposed Project features appear to have a medium to coarse texture, which would contrast moderately with the surrounding environment.

Proposed Project features would attract attention, but would not dominate the view of the casual observer. As such, the Proposed Project would meet the VRM Class III objectives from this KOP.

Figure 4.12-5. KOP 5 – View from Primm Valley Resort and Casino

KOP 6 – View from Lucy Gray OHV Trail

The Lucy Gray OHV trail is used at least four times per year for professional races and is also used throughout the year by nonprofessional OHV enthusiasts. Figure 4.12-6 is a representative view that OHV recreationalists would see upon entering the Ivanpah Valley from the east along the Lucy Gray OHV trail. The view is likely to be limited and of short duration given the driver‘s focus on the trail, the partial screening of views by vegetation adjacent to the trail, and the speeds at which some OHVs can travel during a race event.

Proposed Project solar collector fields would be visible as flat, geometric forms and the inverter boxes as three-dimensional rectangular forms in the middleground east of Roach dry lakebed that would create a weak level of contrast with the surrounding environment. The Proposed Project features would create straight lines along the valley floor, which would also contrast weakly with the surrounding environment. Proposed Project features would vary in color from light and reflective to dark and nonreflective. The light, reflective surfaces would contrast moderately with the surrounding environment. Further, the Proposed Project features would appear to have a coarse, dotted/modeled texture which would contrast weakly with the surrounding environment.

Proposed Project features would attract attention, but would not dominate the view of the casual observer. As such, the Proposed Project would meet the VRM Class III objectives from this KOP.

Figure 4.12-6. KOP 6 – View from Lucy Gray OHV Trail

KOP 7 – View from Ivanpah Dry Lakebed

Ivanpah dry lakebed is a well-known spot for OHV racing, archery, kite buggying, and land sailing. Figure 4.12-7 is representative of what a person recreating would see from Ivanpah Dry Lake. The length of the view would be of short to medium duration, with the viewer tending to focus on recreational activities. Recreationalists are likely to be moderately sensitive to views toward the Proposed Project site as it may affect their overall experience on the lakebed.

Proposed Project features would be visible as low, geometric forms in the middleground that would create a weak level of contrast compared to the natural forms prevalent within the surrounding environment. The Proposed Project lines would be well defined due to the differences in color of the solar field and the alluvial fan on which it is located. Proposed Project features would appear grayish to silver in color and would contrast moderately with the greenish-brown shades of the surrounding alluvial fan. Further, the Proposed Project features would appear to be of medium texture, which would contrast weakly with the surrounding environment.

Proposed Project features would attract attention, but would not dominate the view of the casual observer. As such, the Proposed Project would meet the VRM Class III objectives from this KOP.

Figure 4.12-7. KOP 7 – View from Ivanpah Dry Lakebed

KOP 8 – View from I-15 at Nipton Road Overpass

The existing foreground of KOP 8 is dominated by existing structures, including I-15 and associated dividers and signs. A 115kV transmission line visibly parallels the east side of I-15.

The majority of KOP 8 viewers are likely to be motorists traveling long distances between southern California and Las Vegas for business or recreational purposes, as this portion of I-15 is part of a highly traveled corridor between Los Angeles and Las Vegas. Motorists would be moderately sensitive to the view from KOP 8, which would represent a view that was a part of a much longer drive. The length of the view represented by KOP 8 would be of short to moderate duration due the speed at which a motorist would be traveling. Figure 4.12-8 is representative of what a motorist would have momentary periods to view the Proposed Project for approximately 6 minutes from KOP 8 to a point directly west of the Project site along I-15. While the Proposed Project would be in direct view for the northbound travel lanes, the view would not always include the Proposed Project, assuming the driver is focused on the traffic conditions ahead of them.

Proposed Project features would be visible as flat, geometric forms in the background east of Ivanpah dry lakebed and would create a moderate level of visual contrast with the alluvial fan on which it would be located. Proposed Project features would create straight lines along the valley floor, which would contrast moderately with the more gentle lines of the surrounding environment. Within the Proposed Project footprint, rows of solar collectors and inverter boxes would create the impression of a repeated series of lines. Proposed Project features have a gray to silver appearance that would contrast moderately with the greenish-brown of the alluvial fan on which it would be located. The closest Proposed Project features would appear to be dotted and of medium texture and those further away would appear to be of smooth texture. The texture would contrast weakly with the surrounding environment. Proposed Project features would attract attention, but would not dominate the view of the casual observer. As such, the Proposed Project would meet the VRM Class III objectives from this KOP.

Figure 4.12-8. KOP 8 – View from I-15 at Nipton Road Overpass

KOP 9 – View from Entrance to Mojave National Preserve

Figure 4.12-9 is representative of what the views that visitors to the Mojave National Preserve would see as they exit the Preserve on Ivanpah. The duration of the view would be short and would only be frontal along Ivanpah Road. After a driver turned right or left onto Nipton Road, the view from KOP 9 would be from the side of their vehicle.

Proposed Project features would be visible as low, angular forms on the alluvial fan on the right side of the image and would create a weak level of contrast with the surrounding environment. The Proposed Project features would create straight lines along the valley floor, which would contrast moderately with the surrounding environment. Proposed Project features would have a gray matte appearance, which would contrast moderately with the greenish-brown of the alluvial fan on which it is located. Proposed Project features would appear to be of smooth texture at this distance and would contrast weakly with the surrounding environment.

Proposed Project features would attract attention, but would not dominate the view of the casual observer. As such, the Proposed Project would meet the VRM Class III objectives from this KOP.

Figure 4.12-9. KOP 9 – View from Entrance to Mojave National Preserve

Alternative 3: Modified Site Layout

Instead of the large berms proposed under Alternative 2 (the Proposed Action), Alternative three would store stormwater on site. The exposed soils that were anticipated for the berming would, instead, be used for the detention basins as excavations, berming, and water conveyance systems

would be installed over the existing grades. The impacts on exposed soils that would result from Alternative 2 or 3 would be similar.

Of note are the short-term impacts of the water detention basins. Standing water on site would appear visible from the viewpoints presented in Alternative 2. Until the water would infiltrate the arid soils or evaporate, it would remain standing in the detention basins, similar to the dry lakes in the region. Visibility of this standing water would be impaired by surface drainage features installed to both route and collect water into these detention basins. The appearance of this standing water would be similar to the dry lakes in the region. This would not be an introduced feature that would contrast strongly with the surrounding natural appearing terrain.

This alternative would result in a slightly smaller scale of visual impacts within the planning area. The appearance of the facilities would be similar with less overall scale and, in some cases, facilities that would be located further away from sensitive viewpoints. Compliance with VRM Class III would be achieved.

4.12.3 Residual Effects

As the impact analysis in Section 4.12.2 indicates, the Proposed Project would be consistent with the VRM Class III objectives that the BLM has established for the lands included within the Proposed Project area. Because the BLM has requested that the visual changes associated with the Proposed Project be minimized, the following mitigation measures have been recommended by the BLM of which the Applicant has voluntarily agreed to include within their Proposed Project construction plans.

- During the construction period, dust suppression measures will be used to minimize the creation of dust clouds potentially associated with the use of the access roads.
- Sites selected for use as storage yards and laydown areas will be located within the solar field to minimize the total amount of land disturbance required to construct the Project.
- A plan will be prepared to revegetate areas disturbed by construction of flood control berms and channel improvements. Berms and channel improvements will be blended into the natural landscape to the extent practical.
- Solar field access ways will be offset at appropriate intervals to minimize the appearance of straight lines within the solar field. The exterior of the inverter boxes and the exterior of the O&M building should be factory treated with a dull finish and a BLM standard environmental color, such as Yuma Green or Covert Green, that will reduce their visual contrast with the surrounding environment.

After the voluntary mitigation measures are implemented for the Proposed Project, the lasting effect of the facility would remain visible on the landscape. However, implementing the voluntarily agreed-upon measures would reduce and minimize impacts to the lands managed as VRM Class III.

4.13 Transportation/Motorized Vehicle Impacts

This section discusses effects on transportation that may occur with implementation of the Proposed Action or alternatives.

4.13.1 Indicators

The Proposed Action would affect transportation levels if it would:

- Cause an increase traffic which is substantial in relation to the existing traffic load and capacity of the street system;
- Produce an exceedance, either individually or cumulatively, of a level of service (LOS) standard established by the local county congestion management agency;
- Degrade existing road conditions as a result of construction;
- Prevent adequate emergency access;
- Cause loss of access to private land parcels; and
- Cause loss of access to historically important recreation access points or staging areas.

4.13.2 Direct and Indirect Effects by Alternative

This section describes the effects under each alternative using the respective methodology prescribed under the NEPA. To compare effects, this analysis defines the temporal scale (time), spatial extent (area), and intensity of effects for each alternative. All effects discussed in this section are direct. No indirect effects were identified for this resource area.

Effects may arise from physical changes to roads, such as closures and reroutes, construction activity, introduction of construction- or O&M-related traffic on local roads, or changes in daily or peak-hour traffic volumes created by either direct or indirect workforce changes in the area.

Alternative 1: No Action

Under this alternative, there would be no construction and the Proposed Project site would not be disturbed, thus there would be no effect on transportation or motorized vehicle access.

Alternative 2: Proposed Action

Alternative 2, the Proposed Action, would result in the approval of the ROW application and construction of the Proposed Project. With implementation of the mitigation measures described below, the Proposed Action would result in short- and long-term effects to traffic volumes, short-term adverse effects to the LOS, long-term effects to access, and long-term beneficial effects to road conditions.

<u>Effect TRAN-1: Short-term effects on traffic volume as a result of construction.</u>

Construction of the Proposed Action would require activities and equipment movement near and within public roadway ROWs, resulting in short-term increases in the use of I-15 and local arterial roadways. Existing conditions of potentially affected road segments can be found in

Table 3.13-3 in Section 3.13, Transportation/Motorized Vehicle Access. Heavy equipment would be transported to the site and would likely remain for the duration of construction.

Construction of the Proposed Project would result in a short-term increase in traffic volume of a maximum of 700 trips per day (using a maximum number of workers on-site during the height of construction activities for 350 morning trips and 350 evening trips) due to the construction labor force (assuming they all drive separately). Additionally, construction of the Proposed Project would result in short-term increases in traffic volume of a maximum of 112 trips per day (56 trips to the site and 56 trips leaving the site) due to delivery of construction equipment and supplies to the site. These combined would result in 812 vehicle trips per day during construction.

The Applicant is proposing to access the Project site using one of two proposed routes described in Chapter 2, Description of the Proposed Action and Alternatives. Use of either route would result in similar effects to transportation and traffic. Affects to local traffic patterns are discussed by road type.

Interstate 15

Workers and deliveries would both use I-15 as the primary access route to the Proposed Project site. Assuming that the new project access road is constructed along the alignment of an existing county road, an increase in traffic volume would occur on I-15, East Primm Boulevard, and South Las Vegas Boulevard/Nevada SR604, as these are the predominant roads that would be used to access the site. A maximum of 812 additional vehicle trips per day is likely to temporarily degrade the LOS at the intersection of I-15 and East Primm Boulevard, as the LOS values at both the northbound and southbound off-ramps of I-15 at the Primm Interchange are currently poor.[1] The addition of a maximum of 812 trips entering and exiting the site during peak commute times would further degrade traffic flow on I-15 and associated on-ramps which are currently operating at LOS D and E (see Table 3.13-3, in Section 3.13.2, Major Traffic Routes Within or Adjacent to the Proposed Project Site). This effect would be greatest on Friday afternoons when the maximum number of vehicle trips (812 per day) would be added to an already congested interstate. Effects to I-15 would be reduced through implementation of mitigation measure MM TRAN-1.

Local Arterial Roadways

After exiting I-15, vehicles would access the site using local arterial roadways as described in Chapter 2, Description of the Proposed Action and Alternatives. Although the LOS of local intersections is currently not impacted, ranging from A to C, the addition of a maximum of 812 vehicle trips would likely result in a substantial effect on LOS for the segment of East Primm Boulevard between I-15 and South Las Vegas Boulevard/Nevada SR 604. The Proposed Action would result in short-term effects on traffic volume and would adversely affect traffic flow on local roadways during peak construction. The intensity of these effects would be lessened with the implementation of MM TRAN-1.

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[1] The LOS values for the A.M. and P.M peak on the northbound off-ramp of I-15 at the Primm Interchange are D and E, respectively (Martin & Martin 2001). The LOS value for both the A.M. and P.M. peak on the southbound off-ramp of I-15 at the Primm Interchange is D (Martin & Martin 2001).

- MM TRAN-1: Traffic Management Plan. The Applicant will produce a Traffic Management Plan that identifies BMPs to minimize construction-related traffic impacts. Specifically, the BMPs would ensure an adequate flow of traffic in both directions by providing sufficient signage to alert drivers of construction zones, notifying emergency responders prior to construction, conducting community outreach, and control traffic around impacted intersections. The Traffic Management Plan will include the following:
  - Deliveries of materials will be scheduled for off-peak hours to reduce effects during periods of peak traffic;
  - Truck traffic will be phased throughout construction;
  - Truck traffic will use designated truck routes when arriving to and departing from the proposed work sites;
  - The Applicant will require 50 percent of the construction workforce to carpool or vanpool; and
  - Signs and public notices regarding construction work will be distributed before disruptions occur, identifying detours to maintain access, the use of flagmen or escort vehicles to control and direct traffic flow, and scheduling roadway work during periods of minimum traffic flow.

Effect TRAN-2: Short-term effects on access and road conditions as a result of construction.

Given the high numbers of vehicle trips per day (maximum of 812) along with the movement of heavy construction equipment, it is reasonable to anticipate that construction of the Proposed Project could damage public roads through increased use. Impacts to local streets would likely occur during the construction phase of the Proposed Action, as only minor vehicle use is anticipated during O&M and decommissioning. The Proposed Project site is in a relatively undeveloped area, and it is anticipated that construction of the Proposed Project would not result in any short-term effects to access or road conditions; however, any unanticipated short-term effects on access and/or road conditions would be reduced by implementing mitigation measures MM TRAN-1 and MM TRAN-2.

- MM TRAN-2: Repair Damaged Streets. Before construction, the Applicant, a BLM representative, and a local representative will document the condition of the access route, noting any pre-construction damage. After construction, any damage to public roads will be repaired to its pre-construction condition as determined by the local representative.

Effect TRAN-3: Long-term effects on road conditions as a result of construction.

Construction of the Proposed Project would result in a beneficial effect on road conditions, as construction of the Project would result in the creation of a new paved county road.

Operation and Maintenance. O&M of both phases of the Proposed Action may result in a long-term increase in traffic volume of up to 30 trips per day (for a staff of 15, including morning and evening trips). There would be additional irregular increases in traffic volume due to scheduled and unscheduled maintenance. The additional traffic volume generated during O&M would be a long-term increase in traffic volumes and would not decrease or disrupt existing primary access on public roads through the area, nor would it affect the LOS.

Decommissioning. Typical activities during decommissioning would include facility removal, breaking concrete pads and foundations, removal of access roads that are not maintained for other uses, and revegetation of the site. Short-term increases in the use of local roadways would occur during the decommissioning period from the transport of heavy equipment and labor force. Heavy equipment would remain at the site until reclamation is completed, and the labor force would be expected to add no more than 24 trips per day to local roads (assuming 12 people driving to and from the site). Overweight and oversized loads could cause short-term disruptions to local traffic.

Alternative 3: Modified Site Layout

Effects under Alternative 3 would be the similar as those identified under Alternative 2 (the Proposed Action). The difference in the construction disturbed area (1,150 acres) and permanent construction disturbance area (250 acres) would be increased, but the type, intensity, and duration of the effects would be similar. The same mitigation would be applicable.

4.13.3 Residual Effects

Under all action alternatives, there would be short-term and long-term increases in traffic volume that could not be eliminated completely through mitigation. Short-term increases would be large and would affect the LOS of roads in the Proposed Project area, particularly during peak traffic times. Long-term increases would be very small and are not likely to affect the LOS at any intersection in the area.

4.14 Human Health and Safety/Hazardous Materials Impacts

This section discusses effects on human health and safety due to exposure to or creation of hazards that may occur with implementation of the Proposed Action or alternatives. The criteria used to identify and analyze effects are presented, potential effects are discussed and agency recommended mitigation measures are presented, and a discussion of residual effects is provided.

It is the BLM‘s policy to reduce threats to public health and safety, and property. In addition, in accordance with the FLPMA, the BLM is required to comply with State standards for public health and safety. During the EIS scoping period, meetings were conducted with the public and government agencies to identify concerns. Written comments were also received. Comments and concerns related to hazards and hazardous materials during the scoping period suggested the need for a product life cycle approach and recycling of solar PV panels in order to reduce potential exposure of workers or public to hazardous waste during handling or disposal of decommissioned panels.

4.14.1 Indicators

Under NEPA, significant effects to health and safety would occur if the Proposed Action would:

- Use, store, or dispose of petroleum products and/or hazardous materials in a manner that results in a release to the aquatic or terrestrial environment in an amount equal to or greater than the reportable quantity for that material or creates a substantial risk to human health;

- Mobilize contaminants currently existing in the soil or groundwater, creating potential pathways of exposure to humans or wildlife that would result in exposure to contaminants at levels that would be expected to be harmful;
- Expose workers to contaminated or hazardous materials at levels in excess of those permitted by the Federal Occupational Safety and Health Administration (OSHA) in 29 CFR §1910, or expose members of the public to direct or indirect contact with hazardous materials from the Proposed Action‘s construction or operations; or
- Expose people residing or working in the Proposed Action vicinity or structures to safety hazards and/or a significant risk of loss, injury, or death.

4.14.2 Direct and Indirect Effects by Alternative

This section describes the effects under each alternative using the respective methodology prescribed under NEPA. To compare effects, this analysis defines temporal scale (time), spatial extent (area), and intensity of effects for each alternative. The analysis of direct and indirect effects focuses on the potential effects on public safety due to the exposure to hazards and hazardous materials on the general public, workers, and the environment.

The primary mechanisms for potential exposure to human health and safety hazards considered for this analysis include: improper handling or transport of hazardous materials; reasonably foreseeable but inadvertent spills or releases of hazardous materials; soil and groundwater disturbance on sites with known and unknown contamination; and electrical and fire hazard.

Alternative 1: No Action

Under this alternative, the Proposed Action would not be constructed, and there would be no project-related effects on human health and the environment.

Alternative 2: Proposed Action

The following discussion identifies potential direct and indirect effects from construction, O&M, and decommissioning of the Proposed Action. Construction and operation activities of the Proposed Action would take place on previously undeveloped BLM land. Potential safety risks associated with the Proposed Action phases range from accidental spills or releases of hazardous substances, mobilization of existing contamination, handling and disposal of hazardous materials, and potential exposure to electrical, flood, fire, and aircraft operation hazards.

The Applicant is required by regulation to develop a SWPPP to mitigate potential soil erosion and assist with the management and protection of water resources throughout construction and the operational life of the Proposed Action.

The Applicant is required by federal regulations to develop a SPCC Plan to reduce the risk of releases of oil and hazardous substances to the environment during operations. Specifically, the Applicant would be required to have a SPCC Plan because the Proposed Project would store over 1,320 gallons of mineral oil in the transformers. In addition, the Applicant has proposed to develop and implement a SPCC Plan for construction to protect the environment from spills of petroleum products.

General Design and Construction Standards

The Applicant would design the Proposed Action in accordance with federal and industrial standards including the American Society of Mechanical Engineers (ASME), National Electric Code (NEC), International Energy Conservation (IECC) Code, International Building (IBC) Code, Uniform Plumbing (UPC) Code, Uniform Mechanical (UMC) Code, the National Fire Protection Association (NFPA) standards, and OSHA regulations.

For construction activities, the Applicant would also comply with the federal regulations and industrial standards mentioned above, as well as with applicable state and local codes. Local Clark County codes to be considered by the Applicant would include Title 13 – Fire and Fire Prevention, Title 22 – Buildings and Construction, Title 24 – Water, Sewage, and Other Utilities, and Title 25 – Plumbing and Electrical Regulations.

Health and Safety Program

The Applicant would require all employees and contractors to adhere to appropriate health and safety plans and emergency response plans. In addition, all construction and operation contractors would be required to operate under a health and safety program that meets industry standards. All contractors would be required to maintain and carry health and safety materials including the Material Safety Data Sheets (MSDS) of hazardous materials used on site.

Emergency Response Plan

The Applicant would prepare an Emergency Response Plan based on the results of a comprehensive facility hazard analysis. In addition, specific response plans would be prepared for each identified hazard. Emergencies might include brush or equipment fires, transformer oil leaks or spills, attempted acts of sabotage, and airplane crashes. The Emergency Response Plan would assign roles and actions for on-site personnel and responders and would designate assembly areas and response actions

Waste Management Plan

The Applicant would prepare a Waste Management Plan that would describe the storage, transportation, and handling of wastes and emphasize the recycling of construction wastes where possible. The plan would also identify the specific landfills that would receive construction wastes that could not be recycled. The Applicant would manage construction wastes in accordance with the Resource Conservation and Recovery Act (RCRA) (42 U.S.C. 6901, et seq. and RCRA‘s implementing regulations at 40 CFR 260, et seq.) and other applicable state and local regulations.

Noxious Weed Control Plan

The Applicant would prepare and submit for BLM approval a Noxious Weed Control Plan. The plan would follow the Las Vegas Resource Management Plan (BLM 1998a), Noxious Weed Plan (BLM 2006), and the interagency guidance Partners Against Weeds (BLM 2007) for an active integrated weed management program using weed control BMPs. This plan would include a herbicide use proposal for the Proposed Action, which would establish the coordination responsibilities for weed control activities, particularly regarding proposed herbicide treatments.

Effect HAZ-1: Use, store, transport, and disposal of petroleum products and hazardous materials in a manner that results in a release in an amount equal to or greater than the reportable quantity for that material or that creates a substantial risk to human health.

Construction. The Proposed Action's construction would involve a sequence of activities inside and outside fenced areas and would have associated potential human health and safety effects due to the use, transport, and disposal of petroleum products and hazardous materials. These construction activities include: fencing environmental clearance areas for protecting sensitive species; establishing site access and laydown areas; constructing two water wells and a temporary water storage pond; preparing the site by clearing and removing vegetation, clearing, grading and excavating the solar field, substations and O&M area; constructing drainage control berms; constructing two substations and associated switchyards; installing two overhead transmission lines; installing solar PV equipment in the proposed solar field, and installing a fire protection system.

Hazardous materials that would be used during the construction activities include substances such as gasoline, diesel fuel, motor oil, hydraulic fluids and lubricants, paints, solvents, adhesives, batteries, welding materials, and mineral oil for transformers. Construction materials would be delivered to the site by truck and temporarily stored in designated staging areas.

During construction activities, localized spills and leaks of hazardous materials from equipment, storage sites and/or vehicles could occur as a result of improper handling or inadvertent spills, which could result in exposure of the public or wildlife to contaminants. Potential sources of spills and leaks would include the operation of heavy equipment and filling of transformer and hydraulic equipment reservoirs. In the event of any accidental spill, the Applicant would clean up and restore the spill site (as part of the Emergency Response Plan and the Spill Prevention and Containment Plan for construction) and the resultant waste would be properly disposed in accordance with federal and state regulations. In addition, the Applicant would require all contractors and employees to comply with a Health and Safety Program during construction.

Although the Applicant has proposed an Emergency Response Plan, it has not been specified the development of a proactive plan to manage hazardous material and minimize or prevent the potential for spills. Because of the size of the Proposed Project, the Applicant is required to prepare and implement a SWPPP which can include BMPs for hazardous materials management. However, to date, detailed information about the SWPPP has not been available. The Applicant has stated that they would develop a Spill Prevention and Containment Plan for construction to protect the environment from spills of petroleum products. However, it is not clear what this plan would contain and the Applicant has not mentioned hazardous materials. Therefore, there is the potential for an adverse effect from the handling of hazardous materials. To ensure that potential health and safety effects due to handling of hazardous materials during construction would be minimized to the lowest feasible levels, the Applicant would implement mitigation measure MM HAZ-1:

- MM HAZ-1: Hazardous Materials Management. The Applicant will implement a Hazardous Materials Handling Management Program or incorporate within their other program the item outlined below. Hazardous materials used and stored onsite for the

Proposed Action activities will be managed according to the specifications outlined below as follows:

- **Hazardous Materials Handling Program.** A project-specific hazardous materials management program will be developed prior to initiation of the Proposed Action construction. The program will outline proper hazardous materials use, storage, and disposal requirements. The program will identify types of hazardous materials to be used during construction activities. All personnel will be provided with project-specific training. This program will be developed to ensure that all hazardous materials are handled in a safe and environmentally sound manner. Employees will receive hazardous materials training and will be trained in: hazardous waste procedures; spill contingencies; waste minimization procedures; and treatment, storage, and disposal facility (TSDF) training in accordance with OSHA Hazard Communication.
- **Transport of Hazardous Materials.** Hazardous materials that will be transported by truck include fuel (diesel fuel and gasoline), and oils and lubricants for equipment. Containers used to store hazardous materials will be properly labeled and kept in good condition. Written procedures for the transport of hazardous materials used will be established in accordance with U.S. Department of Transportation (USDOT), and Nevada Department of Transportation (NDOT) regulations. A qualified transporter will be selected to comply with federal and state transportation regulations.
- **Fueling and Maintenance of Construction Equipment:** Written procedures for fueling and maintenance of construction equipment will be prepared prior to construction. Vehicles and equipment will be refueled on site or by tanker trucks. Procedures will include the use of drop cloths made of plastic, drip pans, and trays to be placed under refilling areas to ensure that chemicals do not come into contact with the ground. Refueling stations will be located in designated areas where absorbent pads and trays will be available. The fuel tanks will also contain a lined area to ensure that accidental spills do not occur. Drip pans or other collection devices will be placed under the equipment at night to capture drips or spills. Equipment will be inspected daily for potential leakage or failures. Hazardous materials such as paints, adhesives and solvents, will be kept in an approved locker or storage cabinet.

Hazardous waste that would be generated as a result of the Proposed Action‘s construction would consist of water from excavation dewatering and water well drilling (if contamination is encountered), water pipe flushing and cleaning fluids, passivating fluids (fluids used to prepare water pipes for use), solvents, dried paints, empty hazardous material containers (<1 ton), spent welding materials (1,500 lbs), oil filters, waste hydraulic oil, discarded batteries (10 spent lead acid and 50 lbs of spent alkaline batteries), and waste oil (500 gallons). The Applicant has committed to prepare and implement a Waste Management Plan in order to control the storage, transportation, and handling of construction wastes in accordance with the RCRA.

During construction, vehicle fuel, oils, and other fluids for vehicle maintenance would be used and stored in construction vehicles. Solid waste generated during construction would be recycled

or disposed of at either an industrial or municipal landfill. Sanitary waste would be removed by a sanitary service contractor.

Since there are no on-site, permanent, surface water bodies and groundwater is greater than 550 feet below the surface, any accidental releases of petroleum products or hazardous substances during construction would likely result in only localized soil contamination. Although wells are being drilled, hazardous materials would not be used in the drilling of the boreholes; therefore, contamination of groundwater would be unlikely. Adherence to federal, state, and local regulations, as well as proper implementation and monitoring of the Applicant‘s SWPPP, Spill Prevention and Containment Plan for construction, Emergency Response Plan, Health and Safety Program, and MM HAZ-1 would reduce the likelihood of a release. The construction site would be located approximately 1.4 miles from the closest residential receptor (Desert Oasis apartment complex); therefore, potential populations that could be directly exposed to hazardous materials would be limited to workers and occasional recreational users of the Jean/Roach Lake SRMA.

With the proper implementation of the Applicant‘s plans and adherence to regulations, any release that occurred would likely be below the reportable quantity for hazardous materials and would be cleaned up in a manner that complies with federal, state, and local regulations; thus, limiting or preventing any potential exposure to any people or wildlife. Therefore, the potential impact of an accidental release of hazardous materials during construction would be short-term and localized.

Operation and Maintenance. The O&M of the proposed project would involve the periodic and routine transport, use and disposal of hazardous materials, hydraulic fluid, welding gases (acetylene, oxygen, and argon), and herbicide (Roundup® or equivalent). In addition, there would be one diesel-fueled backup firewater pump that would be located near the O&M building. The volume of diesel to be stored on site is currently unknown. The hazardous substances to be used during operations have low and moderate (acetylene only) toxicity materials under the NFPA health rating.[2] The Applicant would have to comply with the standards of the required hazardous material permits to be issued by the Nevada State Fire Marshall and the Clark County Fire Department for the proper storage of these hazardous materials on-site. In their permit application, the Applicant would be required to include a Hazardous Material Management Plan (HMMP) that includes a Facility Site Plan designating storage and use areas, maximum amount of materials to be stored, container sizes and types, location of emergency isolation and mitigation valves, and the proposed storage arrangement.

Localized spills or releases of these hazardous materials could occur due to improper handling, storage, or maintenance. Also, small leaks of lubricant oil might result from operation of the PV panel tracking system. These leaks or spills could result in soil contamination. No surface water is present on site and groundwater is located 600 feet below ground surface; therefore, contamination of a water body is unlikely. Through the proper implementation of the Applicant‘s

[2] The NFPA health ratings scale designates the following levels of toxicity for hazardous substances: 0 or 1 for low toxicity; 2 for moderate toxicity; 3 for high toxicity; and 4 for extreme toxicity.

SPCC Plan and Emergency Response Plan, any spills would be cleaned up and the resultant waste disposed of according to state and federal standards.

Hazardous wastes that would be generated during operations include waste lubricating oil (approximately 55 gallons per year), oily rags used during maintenance (260 pounds per year), and waste oil sorbents used for cleanup of small spills (approximately 100 pounds per year). All of these hazardous wastes would be recycled or disposed by a certified oil recycler according to the Applicant‘s Waste Management Plan.

At the proposed substations, carbon steel transformers would contain approximately 8,700 gallons of dielectric fluid (mineral oil), and would be located on a concrete pad surrounded by a 6-inch earthen or concrete containment berm or curb. Mineral oil is not considered a hazardous material. Within the proposed solar field there would also be 400 three-phase pad mounted transformers that convert the output of each inverter to 34.5 kV. Each transformer would contain approximately 315 gallons of dielectric (mineral) oil. The total on-site inventory of mineral dielectric or insulating oil would be 160,800 gallons. During operation, leaks or spills of mineral insulating oil could occur in cases of damage to the transformers due to a seismic event, fire, or other unforeseen incident. The Applicant would be required to implement a SPCC plan to prevent spills associated with these transformers.

The Applicant proposes to construct a concrete containment berm or curb at secondary containment at each substation to contain any potential leaks or spills of mineral insulating oil from transformers. The containment area would be lined with an impermeable membrane covered with gravel, and would drain to an underground storage tank. Any stormwater or fluid drained to the tank would be inspected for sheen prior to disposal. If sheen were observed, the Applicant would remove the tank contents by vacuum truck and dispose of the contents at an approved disposal site. The Applicant would design the above containment/storage tank/holding pond system to accommodate the volume of the insulating oil contained in the transformer plus an allowance for precipitation.

Replacement of PV panels during unscheduled or routine maintenance could result in a release of hazardous materials. Hazardous materials are used in the manufacture and assembly of PV system equipment. The circuitry and inverters of PV panels may contain hazardous materials, and emerging thin-film and nanotechnology cells could pose unknown health and environmental dangers. Although these panels would be sealed under normal operating conditions, materials within the panels could be released if they were damaged or improperly disposed of. At a minimum, the Applicant would have to dispose of the panels in compliance with federal RCRA, state, and local regulations. To address the public‘s concerns about an increased risk to human health or the environment, the Applicant would develop a recycling option, as detailed in mitigation measure MM HAZ-2:

- MM HAZ-2: Solar PV Cell Recycling. The Applicant will either return solar panel products to the original manufacturer or send them to a certified recycling facility after the solar PV cells are decommissioned. Solar panel material recycling and end-of-life disposal will be done in compliance with the federal, state, and local regulations.

The proposed project would be located approximately 1.4 miles from the closest residential receptor (Desert Oasis apartment complex); therefore, potential populations that could be directly

exposed to accidental releases of hazardous materials would be workers and occasional recreational users of the Jean/Roach Lake SRMA. In the event of an accidental release, potential effects would be temporary and localized, and the related intensity would depend on the proper implementation of preventive and contingency measures.

Compliance with federal, state, and local regulations addressing hazardous and non-hazardous materials, along with the proper implementation and monitoring of MM HAZ-1, MM HAZ-2 and the Applicant's proposed SPCC, Waste Management and Emergency Response plans would result in a reduced likelihood of a release as well as a reduction of potential volume of a release that could occur during operations, thus reducing the risk for that exposure to be harmful to human health and the environment. Therefore, the potential impact of an accidental release of hazardous materials during operations would be short-term and localized.

Decommissioning. Decommissioning of the Proposed Action components would occur upon cessation of the ROW grant and/or the end of operation and eventual removal of equipment. The Proposed Action facilities have an expected life of 50 years or more. The Applicant would develop a Site Rehabilitation Plan for temporarily disturbed areas after construction and a Facility Decommissioning Plan for site closure activities.

In the Facility Decommissioning Plan, the Applicant would address the removal of hazardous materials, impacts and mitigation associated with closure activities, the schedule of closure activities, equipment to remain on site, and conformance of the plan with applicable regulatory requirements and resource plans.

Closure activities that would pose human health and safety risk associated with use, handling, transport or disposal of petroleum products and hazardous materials during decommissioning would include: the removal of solar panels and supporting foundations; removal of underground facilities to a depth of at least 2 feet below the ground surface; removal of inverters and transformers; removal of the substations; disposal of chemicals and hazardous waste; draining of transformers and disposal of dielectric oils (if transformers cannot be resold); demolition and removal of the O&M building; removal of transmission poles and conductors; and closure and abandonment of water wells and the septic tank.

The above-described activities could result in localized spills of hazardous materials. However, proper implementation and monitoring of the Applicant's Facility Decommissioning Plan, MM HAZ-1, and MM HAZ-2, and compliance with federal, state, and local regulations addressing hazardous materials would minimize the potential of a spill and the risk of soil contamination or exposure of hazardous substances to humans or wildlife to levels that would not be expected to be harmful, and resulting in short-term and localized effects.

Effect HAZ-2: Expose human or ecological receptors to potentially hazardous levels of chemicals or explosives due to the disturbance or unearthing of contaminated soils or groundwater of hazardous waste into soils.

Construction. The Proposed Project site is currently undeveloped and vacant and there is no evidence of previous commercial or agricultural activity. The closest residential area is the Desert Oasis apartment complex, located approximately 1.4 miles from the site. A review of federal and state databases indicates that the Proposed Project area is not located on or within a

1-mile radius of a hazardous materials site (NDEP 2009e, EPA, n.d.). In addition, according to the USGS National Land Cover Database (NLCD), there is no evidence of previous agricultural sites within the Project area or within a 1-mile radius from the site boundaries since 2001; thus, agricultural pesticides and herbicides have not likely been previously used on site. However, there is evidence of previous mining activity at the Proposed Project boundaries, while a total of four now closed claims and an additional 38 mining claims within a 1-mile radius of the proposed site (BLM 2010), which are also now closed. If the mining claims were worked, there could be residual soil contamination.

Construction activities would involve disturbance of soils and exposure of groundwater as a result of excavation, drilling, or surface disturbance, including: site preparation (clearing and grading), water wells and water storage pond construction, O&M building construction, substation below grade equipment installation, and foundations for the transmission line structures and the solar tracking system foundations. Explosives would not be used during construction activities.

To provide water for the Proposed Project construction and operations, the Applicant would construct two water wells (one for construction and a second for potable water to be used during both construction and operation), both to be drilled to a depth of approximately 600 feet. In addition, a temporary water storage pond (200 feet by 140 feet) would be constructed to supply water needs during project construction. The Applicant would use either compressed air or non-hazardous water based drilling fluids.

Currently, there is no evidence to suggest that on-site soils or groundwater are contaminated, but these resources have not been sampled and characterized, and mining activity has been reported within the site boundaries. Therefore, there is the possibility that small amounts of contaminated soils are present on site. Construction activities could unearth this contamination and construction, workers or wildlife could be exposed. To reduce the potential exposure of the public and ecological receptors to contaminated soils or groundwater due to the Proposed Action construction, the Applicant would implement mitigation measure MM HAZ-3 in addition with the proposed Health and Safety Program, Waste Management Plan, and Emergency Response Plan:

- MM HAZ-3: Characterize Potentially Contaminated Soil/Groundwater. To ensure that workers, the public, and wildlife are not exposed to potential contaminants, it is recommended that if soil is unearthed that is discolored or has an odor, work will be stopped in that area. The soil should then be sampled and characterized prior to further site excavation activities in the area with discolored or odorous soils. If the soil is found to be contaminated based on federal or state regulations, then the Applicant should implement the appropriate and relevant procedures to properly characterize, contain, and dispose of the contaminated material. If groundwater is encountered that has an odor or is discolored, it should be sampled, characterized, addressed, and disposed of according to state and federal regulations.

Compliance with applicable federal, state, and local regulations along with the effective implementation and monitoring of MM HAZ-1 and MM HAZ-3 and the incorporation of these proposed contingency planning actions within the Applicant‘s Health and Safety Program would

limit or prevent exposure of people or wildlife to existing contaminants in the soil or groundwater. In addition, any contamination that was discovered would be disposed of according to state and federal regulations.

Operation and Maintenance. The Proposed Project operations and routine maintenance would involve limited disturbance or unearthing of contaminated soils or groundwater of hazardous materials compared to construction activities. Unscheduled maintenance could involve the potential repair and eventual replacement of solar panels, inverters, switchyard equipment, and Digital Control Systems, requiring a minor level of soil disturbance. Any excavation, grading, trenching or drilling activity required as a result of routine and unscheduled maintenance would require the implementation and monitoring of MM HAZ-1 and MM HAZ-3. In addition, the Applicant‘s Health and Safety Program and Waste Management Plan would be required to include special preventive and contingency measures to avoid the workers‘ exposure to contaminated soils or groundwater. Therefore, the exposure to contaminants due to disturbance or unearthing of contaminated soil or groundwater during maintenance repairs is unlikely.

Decommissioning. The potential effects on human and ecological receptors due to decommissioning of the proposed project would be similar to those described in the construction section. Closure activities that would disturb soil and groundwater include: the removal of solar panels and supporting foundations; removal of underground facilities to a depth of at least 2 feet below the ground surface; demolition and removal of the O&M building; removal of transmission poles and conductors; and closure and abandonment of water wells and the septic tank. If a spill of hazardous materials occurs, residual contamination could be unearthed.

Proper implementation of the Facility Decommissioning Plan proposed by the Applicant and incorporation of the preventive and contingency measures provided in MM HAZ-1 and MM HAZ-3 would reduce the likelihood of disturbing or unearthing contaminated soil/groundwater during closure activities and would address any contamination that would be encountered, such that it would be disposed of according to state and federal regulations.

Effect HAZ-3: Expose workers to contaminated or hazardous materials at levels in excess of those permitted by the Federal Occupational Safety and Health Administration (OSHA) in 29 CFR, Part 1910, or expose members of the public to direct or indirect contact with hazardous materials from Proposed Action construction or operations.

Construction, O&M, and decommissioning activities could temporarily expose workers to direct or indirect contact with hazardous materials. Workers who work with hazardous materials are required under OSHA regulations to have a certain level of training in order to properly handle hazardous materials. However, due to improper handling of hazardous materials, workers could be exposed in excess of permitted levels. To address workers potential exposure to contaminated or hazardous materials, the Applicant would develop and implement a Health and Safety Program that would require all employees and contractors to adhere to appropriate health and safety plans and emergency response plans that meet industry standards. However, detailed content of this plan is not currently available. In order to ensure adherence to OSHA in 29 CFR, Part 1910 and other federal, state, and local regulations, the Applicant would be required to implement MM HAZ-4, as well as and the proper implementation and monitoring of MM HAZ-1, MM HAZ-2, MM HAZ-3, and the Applicant‘s Emergency Response Plan:

- MM HAZ-4: Adherence of the Health and Safety Program with 29 CFR, Part 1910. The Applicant will ensure that the all health and safety and emergency plans to be required for employees and contractors during construction, operations, and decommissioning of the Proposed Action will comply with the Occupational Safety and Health Standards provided in federal regulation 29 CFR, Part 1910, as well as with applicable state and local occupational health and safety regulations.

Proper adherence of the Applicant‘s Health and Safety Program to applicable occupational health and safety federal, state, and local regulations as provided in MM HAZ-4 along with MM HAZ-1, MM HAZ-2, MM HAZ-3, and the Applicant‘s Spill Prevention and Containment and Emergency Response plans for construction and operations, would reduce the potential risk of direct or indirect contact of workers or members of the public to hazardous levels at levels in excess of those permitted by OSHA in 29 CFR, Part 1910.

Effect HAZ-4: Expose people or structures to a risk of loss, injury, or death involving electrocution or excessive exposure to wildland fires, including where wildlands are adjacent to urbanized areas.

Construction. During construction, the proposed project activities and related equipment could expose people or structures to an increased risk of loss, injury, or death as a result of electrocution or exposure to wildland fires, including those wildlands adjacent to urbanized areas in Primm (Desert Oasis apartment complex and commercial and tourism areas) and occasional recreational visitors of the Jean/Roach Lake SRMA.

The Community Hazard Assessment conducted for the Clark County Multi-Jurisdictional Hazard Mitigation Plan (2005) classifies Primm as ―Low Fire Hazard” due to its low wildfire ignition risk potential. However, the proposed project would pose two major potential ignition sources during construction: brushing and welding. Organic matter removed during vegetation clearing and grubbing would be mulched on site and redistributed into the fill (except under equipment foundations, trenches, and roadways), increasing the risk of wildland fires within the construction areas. Solar array construction would also involve welding for PV panel assembly.

Existing facilities located in the proximity of the Proposed Project site are the NV Energy Walter M. Higgins Generating Station and the tracks of the UPRR Southern Nevada line. The Clark County Multi-Jurisdictional Hazard Mitigation Plan (Clark County 2005) has included a recommended measure for reducing the fire risk from the UPRR operations by maintaining fuel sources 15 feet away from the railway corridor

The Applicant‘s Emergency Response Plan would contain a facility hazard analysis and a response plan for each identified hazard. Among emergencies addressed, brush and equipment fires would be included. The Emergency Response Plan would assign roles and actions for on-site personnel and responders and would designate assembly areas and response actions. However, in order to ensure that potential fuel and ignition sources are properly controlled during construction activities, the Applicant would be required to implement mitigation measure MM HAZ-5 in conjunction with the Emergency Response Plan:

- MM HAZ-5: Construction Fire Prevention Measures. The following fire prevention measures will be implemented by the Applicant or its contractor during proposed project construction:
  - Maintain a list of all relevant fire fighting authorities near the Proposed Project site. The closest resources to respond to a wildland fire threatening the community of Primm would come from Clark County Fire Department Station 78 in Goodsprings;
  - Have and maintain available fire suppression equipment in all construction areas, including but not limited to: water trucks, potable water pumps, and chemical fire extinguishers. Ensure an adequate supply of fire extinguishers for welding and brushing crews;
  - Include mechanisms for fire suppression in all heavy equipment, including fire extinguishers and spark arresters or turbo-charging (which eliminates sparks in exhaust);
  - Remove any flammable wastes generated during construction, including organic matter from vegetation clearing, on a regular basis;
  - Store all flammable materials used at the construction site;
  - Allow smoking only in designated smoking areas; and
  - Require all work crews to park vehicles away from flammable vegetation, such as dry grass and brush. At the end of each workday, heavy equipment should be parked over mineral soil, asphalt, or concrete, where available, to reduce the chance of fire.

To further decrease the fire hazard, the Applicant would be required to construct the Proposed Action in accordance with state and local standards and submit designs to the Nevada State Fire Marshall and the Clark County Fire Department for review and consultation with regards to fire risks and hazards, among other considerations. The Applicant also would have to implement fire safety measures in accordance with OSHA Safety and Health Regulations for Construction.

Construction of the proposed project would also expose workers to potential electrocution hazards. However, the Applicant has committed to designing the proposed electric systems and components in compliance with the NEC, additional industrial safety standards, and federal, state, and local codes. Additionally, in order to ensure compliance with OSHA in 29 CFR, Part 1910, the Applicant would implement MM HAZ-4 during construction activities, including but not limited to Subpart S and Sections 1910.331-1910.335 related to protective measures and equipment for employees whose occupations require them to work directly with electricity.

Implementation of MM HAZ-5 along with the Applicant‘s Emergency Response Plan would reduce the risk of wildland fires by providing prevention and response measures to potential fire hazards. In addition, implementation of MM HAZ-4 would ensure that construction employees and those working with electrical equipment would be required to follow electrical safety-related work practices required by OSHA regulations.

Operation and Maintenance. The O&M of the proposed solar PV facility would increase the potential for additional incidents related to fire and fire safety. Hydraulic oil and other petroleum products would be the main flammable substances to be used during project operations and construction which, combined with electrical arcing and sparking from exposed wiring between solar panels or substations, would result in a fire hazard. The 598MW NV Energy Walter M. Higgins Generating Station and the UPRR Southern Nevada line tracks are located within 0.5 mile of the Proposed Project site. Both facilities could be exposed to a risk of loss in the event of fires.

To reduce fire risk, the Applicant would construct a 20-foot-wide firebreak on the exterior of the perimeter fence. Shrubs and other large vegetation would be removed from the firebreak. The firebreak would be maintained by grading or discing. Additionally, the Applicant would use a fire protection water system. This system would be supplied from two water storage tanks located near the O&M building, holding a minimum of 3 hours of full flow runtime to be accessible through a Clark County-approved fire hydrant.

The electrical equipment enclosures that would house the inverters and transformers would be either metal or concrete structures. Any fire that could potentially occur would be contained within the structures which are designed to meet NEMA standards for electrical enclosures.

O&M of the proposed project would also expose workers to potential electrocution hazards from the electrically energized equipment. However, the Applicant has committed to designing the proposed electric systems and components in compliance with the NEC and other applicable federal and industrial standards. Implementation of MM HAZ-4 would ensure adherence to OSHA 29 CFR, Part 1910, in particular the protective measures and equipment for employees whose occupations require them to work directly with electricity.

The Applicant has committed to comply with federal and industrial safety standards as part of the proposed project design. In addition, implementation of MM HAZ-4 would ensure that health and safety and emergency plans required for employees and contractors during construction, operations, and decommissioning of the Proposed Action would comply with the OSHA standards provided in the federal regulation 29 CFR 1910 to reduce the potential of fire and electrocution incidents during Proposed Project operations. Therefore, the risk of exposure of people or structures to loss, injury, or death involving electrocution or excessive exposure to wildland fires would be reduced and result in potential localized short-term effects.

Decommissioning. Decommissioning of the proposed project would involve similar fire and electrocution risks as those described for the construction activities. Demolition of structures and decommissioning of electrical equipment would pose a fire risk that could be controlled by proper implementation and monitoring of MM HAZ-4 and MM HAZ-5 in conjunction with the Applicants' Facility Decommissioning Plan. Adherence to these preventive measures along with applicable federal, state, and local requirements would reduce the potential risk of loss, injury, or death involving electrocution or excessive exposure to wildland fires, resulting in potential localized short-term effects.

Alternative 3: Modified Site Layout

The Applicant would implement soil stabilization, erosion control, and sediment control measures to protect the soil surface and water bodies.

Potential human health and safety effects that would result from the construction, operation and decommissioning of Alternative 3 would be identical to those identified for Alternative 2 (the Proposed Action). The components of the Proposed Action would be located at the same sites and expected construction techniques and timeframes would be similar, with the exception of the erosion control and drainage measures. The development of Alternative 3 would likely reduce the potential risk of flooding by incorporating comprehensive systems of berms and ditches that would contribute to improved drainage at the site.

Proper implementation and monitoring of MM HAZ-1, MM HAZ-2, MM HAZ-3, MM HAZ-4, and MM HAZ-5, along with the Applicant provisions during construction, operations, and decommissioning, would ensure the reduction of potential human health and safety risk and result in localized and short-term effects.

4.14.3 Residual Effects

With proper implementation of the Applicant's design features and plans, and the mitigation measures provided for additional prevention, management, and response of human health and safety hazards during construction, operation, and decommissioning of Alternatives 2 or 3, residual effects due to exposure of human or ecological receptors to hazards and hazardous materials are not anticipated.

4.15 Social and Economic Impacts

This section discusses effects on social and economic resources that may occur with implementation of the Proposed Action or alternatives. First, the indicators used to identify and analyze effects are presented, and second, potential effects are discussed. This discussion format is organized separately for both social and economic conditions.

4.15.1 Indicators

NEPA provides no specific thresholds of significance for socioeconomic impact assessment. Significance varies based on the setting of the Proposed Action (40 CFR 1508.27[a]), but 40 CFR 1508.8 states that indirect effects may include those that are growth inducing and others related to induced changes in the pattern of land use, population density, or growth rates. In

addition, the regulations state that "Effects include….cultural, economic, social, or health, whether direct, indirect, or cumulative. Effects may also include those resulting from actions which may have both beneficial and detrimental effects, even if on balance the agency believes that the effect would be beneficial" (40 CFR 1508.8).

For the purposes of this analysis, the Proposed Action would affect social and economic conditions if it would:

- Result in a permanent or temporary population increase larger than local services, infrastructure, or population can accommodate; or
- Result in a tax burden to local residents not offset by the Proposed Action's generation of new public revenues.

4.15.2 Direct and Indirect Effects by Alternative

This section describes the effects under each alternative using the respective methodology prescribed under NEPA.

Alternative 1: No Action

Under NEPA, the BLM must consider an alternative that assesses impacts that would occur if the Proposed Project were not approved and the application rejected. The No Action Alternative assumes that the ROW application is denied and the Proposed Project is not built. Under this alternative, the purpose and need for the Proposed Project would be provided by other means.

In terms of socioeconomic impacts, the no action would mean that 400 MW of renewable electric generating capacity would have to be provided from other renewable energy projects or energy sources. Under the No Action Alternative, the impacts described within the sections below (for the Alternative 2) would not occur. Under the No Action Alternative, the land that would have been occupied by the Proposed Project would continue to be used in the manner designated by the BLM. Without the Proposed Project, the land would continue to remain undeveloped in the future. Under the No Action Alternative, it is likely that the land would continue to serve as a rural undeveloped desert area providing habitat for species and land resources for traditional socioeconomic uses associated with this desert location (e.g., OHV use, hiking, horseback riding, natural resource appreciation low impact uses, ecotourism, etc.). Under the No Action Alternative, there would be no adverse impacts to socioeconomic resources requiring mitigation that would be associated with the Proposed Action's construction, O&M, and decommissioning activities of the proposed 400MW plant.

Alternative 2: Proposed Action

The socioeconomic impacts associated with Alternative 2 are discussed in detail below under each resource section.

Alternative 3: Modified Site Layout

Alternative 3 would be constructed and operated similar to Alternative 2, with the exception of the site drainage plan. Alternative 3 would involve several diversion berms (each 10 feet high), debris basins, and level spreader detention basins, and would temporarily disturb an area of

1,150 acres and permanently disturb an additional 250 acres. Because of the site drainage plan, the footprint of Alternative 3 and related facilities would encompass 3,669 acres, a larger overall footprint compared to the Alternative 2.

Socioeconomic resource impacts that are a function of the greater land requirement and overall project footprint size (required under Alternative 3) would be impacted to a greater negative extent under Alternative 3 compared to Alternative 2. For example, Alternative 3 would require more water for dust suppression because more acreage would be disturbed. Additionally, Alternative 3 would absorb a greater amount of desert tortoise habitat, Joshua trees, yuccas, and other plant and animal species in the area than would Alternative 2. These ecological resources influence the low impact eco-tourism experience and quality of life defining the desert area that would be impacted to a greater extent under Alternative 3 compared to Alternative 2.

Social

This section discusses potential effects to the social well-being of groups representing the concerns of area stakeholders. Effects to the social welfare of these groups may potentially occur during implementation of the Proposed Action or alternatives. Potential social effects described in terms of effects to social well-being relate to how a particular social group, individual, or stakeholder interprets how the Proposed Action or alternatives may affect their environment and how such an effect relates to the integrity, quality, use, and enjoyment of socioeconomic resources.

Stakeholder comments received and evaluated during the scoping process were reviewed to determine the values and quality of life concerns of stakeholder groups. These concerns form the backdrop against which project phases are evaluated for how each element could potentially influence the social well-being of the groups. Resources are broadly defined and can include, for example, historically used open spaces and quality habitat supporting recreation and wildlife appreciation and other resources necessary to maintain the historic quality of life that influences the social well-being of these stakeholders. Social well-being can potentially be affected by each phase of the Proposed Project (construction, O&M, and decommissioning). Social well-being can also be influenced by the level of participation and perceived degree of control that stakeholders have over their environment, its resources, and the government institutions that have stewardship obligations to manage these resources in a sustainable manner.

Demographics and Social Trends

Population

Construction. The construction phase is expected to have a short-term, beneficial impact on the Clark County population level. The impact would not cause a temporary population increase that would necessitate additional local public services or investment in infrastructure capacities that could not be provided from existing resources.

During the peak quarters of construction, (Q2 2012 to Q4 2013), the workforce could reach 350 workers. However, it expected that 280 workers (80% of the total) would be local (i.e., permanent residents) of Clark County. The peak non-local workforce could reach 70 persons (=350-280). Assuming, for conservative population impact purposes, that each worker moved to the region and had a household size of three persons, approximately 210 persons could be

temporarily migrating to the area during the peak of the construction phase. This temporary population influx could be easily accommodated by Clark County where infrastructure is designed for peak seasonal demands and fluctuations from global tourism.

Operations and Maintenance. The operational phase of the Proposed Project is expected to have a long-term, beneficial impact on the area's population level. Assuming all three phases are completed and the Proposed Project is commissioned, up to 15 permanent staff would be required to operate and maintain the facility and provide plant security.

Housing

Construction. The construction phase is expected to have a short-term, beneficial impact on the Clark County permanent and temporary housing stock. The impact would not cause a temporary strain that would necessitate additional local public services or investment in public infrastructure capacities that could not be provided from existing resources. Assuming, as a worst-case scenario, that 70 workers and their dependents temporarily relocate to the Primm Valley or Greater Las Vegas area during the peak quarters (Q2 2012 to Q4 2013) of construction activity, up to 210 persons could be looking for temporary accommodations. The permanent housing stock information compiled in Section 3.15, Social and Economic Conditions, showed a high vacancy rate for rental units, and a large hotel/motel room inventory characterized by declining occupancy rates given the breadth and persistence of the Great Recession. Therefore sufficient temporary housing should be available within the Greater Las Vegas/Clark County area to accommodate non-local workers and their families/dependents during the length of their construction phase tenures. The small incremental demand from these workers will be beneficial to the housing and lodging sectors that have been negatively impacted by the recession.

Operations and Maintenance. The operational phase of the Proposed Project is anticipated to have a long-term, beneficial effect on the area's housing stock. The Proposed Project would permanently employ up to 15 full-time workers. It is likely that most of these workers would be from the region and already be permanent residents. Therefore, the housing impact would be negligible; however, any incremental long-term stimulus provided from net migration to the housing sector would be beneficial for the economy. Some permanent workers could relocate to the Clark County area and would be expected to either purchase or lease homes during their long-term work tenures.

Affected Groups and Attitudes

Public Land Recreational Users / Off-Highway Vehicle Users / Organizations and Supporting Industries

Under Alternatives 2 and 3, recreational users would have less open space available to them to pursue historic activities such as competitive OHV racing and recreational use, hunting, horseback riding and events, hiking, flora and fauna viewing and wildlife appreciation, and entertainment filming. The resources attracting these users would be impacted by the Proposed Project footprint (to a larger extent under Alternative 3). Under Alternative 1, the underlying resources affecting socioeconomic uses in the Proposed Project area would still be available in their original, unfettered condition. There would, therefore, be no negative impacts to the social well-being of this group under Alternative 1. Under Alternatives 2 and 3, the Proposed Project footprint would change the historic relationships that these users have with the public land, but

would not necessarily alter it in a detrimental manner. There is a possibility that some positive aspects of social well-being associated with the use and enjoyment of select acreage of habitat or OHV range that is absorbed or altered by the Proposed Project footprint could be compromised on both a short-term and long-term basis. However, mitigation measures can reduce these potential negative social well-being effects (see Section 4.11, Recreation Impacts). For example, it is possible that the social well-being of some OHV users would be negatively impacted if connectivity or abridgement of historic roads and trails is not mitigated. Alternatives 2 and 3 could have similar effects, although Alternative 3's larger consumption of open land (and use of scarce resources such as water) would likely have a relatively larger adverse effect on social well-being.

Environmental Groups and Stewards

For the No Action Alternative, the environmental groups and stewards (e.g., Amargosa Conservancy, Red Rock Audubon Society, etc.) would likely experience a positive sense of social well-being because the designated Proposed Project lands would continue to provide their historic services and functions in an unfettered form. Under the No Action Alternative, the land would retain its rural desert qualities and the habitats supporting ecosystems and species would not be altered from project-related encroachments. Under Alternatives 2 and 3, the Proposed Project footprint would change the historic relationship that this stakeholder has with the land, but would not necessarily alter it in a negative manner. It is likely that Alternative 3 would generate larger social concerns within this group due to the size of the footprint and greater resource demands compared to Alternative 2 (Proposed Action). There is the possibility that, if not properly handled, select mitigation measures and strategies proposed could lead to social unrest or unease within this group. This sense of social unease could be mitigated by having full, open, transparent vetting of the management measures and strategies suggested by the Applicant and by engaging the environmental groups and stewards throughout all phases of the EIS process.

Project Construction Workers and Suppliers to the Renewable Energy Industry

Under Alternatives 2 and 3, construction workers and suppliers to the utility scale solar installation industry have a vested interest in seeing the Proposed Project through to completion. Under Alternatives 2 and 3, the social well-being of this group would be enhanced as the construction phase mobilization of manpower, materials, equipment, and supplies would provide a much needed stimulus to this sector of the regional economy. The sense of positive social well-being would arise from the participation of this group in the industry's development and the experience of having worked on a utility scale project. Positive social well-being also comes with developing experience and knowledge of utility scale installation (and best construction practices) of solar assets that can potentially lead to future contracts in this growing industry. Under the No Action Alternative, the social well-being of this group would not be favorably affected since the Proposed Project would not be built and operated within the Primm Valley.

Utility Off-Taker and End-Use Energy Consumers

Under the No Action Alternative, the utility or wholesale bulk power purchaser and/or distributor would not have access to the energy supply that would have been produced by the Proposed Project from within the Primm Valley. Alternative renewable energy generation projects would have to be developed elsewhere in order to provide a positive sense of social well-being to this

stakeholder associated with processing and delivering the electricity output to final users. Likewise, under the No Action Alternative, final end-use retail consumers would not experience any positive sense of social well-being as this alternative would not involve construction and operation of the solar plant and delivery of emission-free power. Under Alternatives 2 and 3, the utility and/or wholesale processor would experience a positive sense of social well-being and satisfaction by knowing that they are contributing towards meeting Nevada‘s renewable energy generation portfolio targets for electricity generation and earning profits. Under Alternatives 2 and 3, final end-use customers would realize the renewable benefits of the solar plant‘s output and would experience a sense of social well-being that may come from knowing that a portion of their total regional power demand is being met from emission-free generated electricity production.

Local Private Land Owners/Residents/Large Lot Owners

The social attitudes within this group are diverse, and the likely social welfare effects that arise under each alternative would be varied, as well. Under Alternatives 2 and 3, the social well-being of area and adjacent residents who embrace solar energy development within the Primm Valley (and Mojave Desert) would be enhanced. Under the No Action Alternative, some residents who support the full-scale development of renewable energy potential on public lands would feel discouraged and disappointed. Other residents who oppose solar development would feel vindicated under the No Action Alternative.

Economic

Economic Base Impacts: Employment, Earnings & Income

The construction phase mobilization of resources (i.e., manpower, materials, supplies, and equipment) would be beneficial to the region‘s economy that has been mired in recession. Project construction spending would provide a non-recurrent demand stimulus that would invigorate other inter-dependent sectors, industries, and households within Clark County over a four-year period. During operations, the Proposed Project‘s permanent direct employment, payroll, and O&M-related spending would provide a long-term positive recurring stimulus to the region‘s economy.

To measure the total economic effect to the Clark County region during both construction and operations, the Impact Analysis for Planning, Inc. (IMPLAN; see text box below) regional economic input-output model was applied. Total economic impacts include both direct and indirect effects associated with the linked supply chain and spending from household wages.

Direct effects represent the impacts from direct expenditures from construction activity such as spending from Proposed Project payroll and locally procured supplies and equipment to support the Proposed Project‘s installation. As the initial spending is received and subsequently re-spent by suppliers and vendors, indirect impacts would be created from these successive rounds of spending. The full multiplier effect captures the spending between suppliers and their suppliers, and so on. Induced effects capture the impacts from wages spent by workers/households that are directly and indirectly impacted.

What is IMPLAN (Impact Analysis for Planning)?

IMPLAN is an analytical software tool used to estimate socioeconomic impacts originally developed by researchers at the U.S. Forest Service. The model is now owned and administered by the Minnesota IMPLAN Group, Inc. (Minnesota IMPLAN Group [MIG], Inc.) The IMPLAN software is an input-output based model that describes the inter-industry relationships between industries and commodity purchases within a local economy. The model relies on county and state-level data sets that are continually updated by the U.S. government and by MIG, Inc. IMPLAN is used to measure the multiplier impacts or total economic impacts associated with a given project's spending relationships or linkages to a region's vendors, suppliers, households, and government entities. A multiplier describes the response of the regional economy to a stimulus (e.g., construction period spending associated with a project's local capital expenditures and payroll) that is a change in final demand. The multiplier process represents the predictive part of the model. The model supplements the traditional input-output framework with a social accounting matrix that takes into account non-industrial transactions such as the payment of taxes by businesses and households. The model can, therefore, also be used to conduct a fiscal impact analysis (IMPLAN 2004).

Employment

Construction. The construction phase of the Project is expected to have a short-term, beneficial impact on Clark County's employment levels. Section 3.15, Social and Economic Conditions, documented that the Clark County construction sector has been hard hit by the Great Recession. The Proposed Project would provide a short-term boost to this sector, especially as up to 80 percent of the construction workers are expected to be hired locally from the region.

The construction phase of the Proposed Project is expected to last four years and three months (seventeen quarters), spanning a period from the fourth quarter of 2010 to the fourth quarter of 2014. Figure 4.15-1 shows the construction phase ramp-up schedule and the average workforce by quarter.

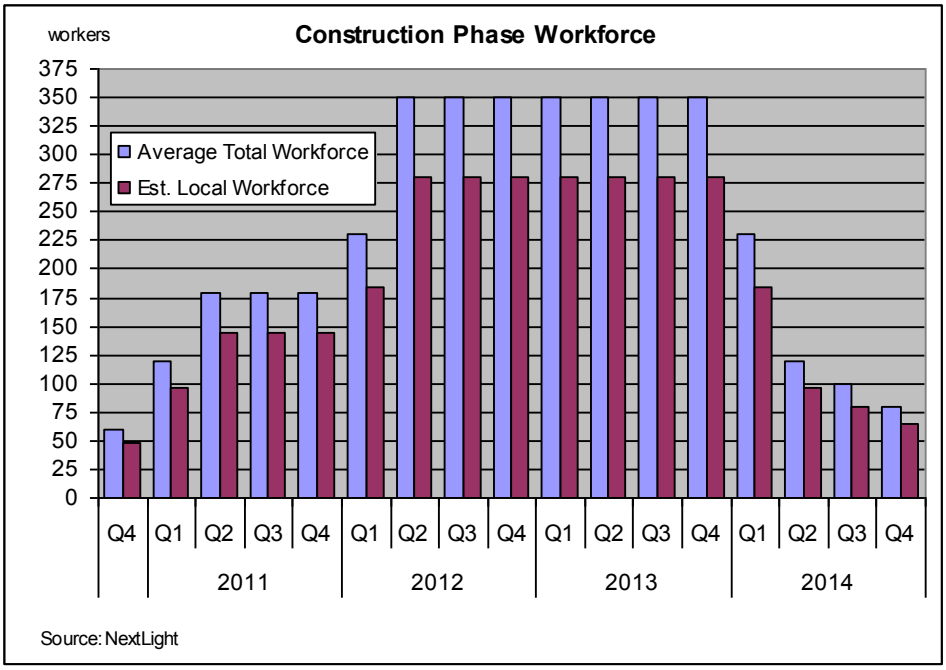

Figure 4.15-1. Total Construction Labor Force by Quarter

During peak construction activity, the Proposed Project would use approximately 350 workers. Across the entire construction phase, the average workforce is expected to number approximately 230 workers. These figures are estimates and can potentially fluctuate based on weather conditions and schedule. It is expected that approximately 80 percent of the workforce could be sourced locally from within the Clark County/Greater Las Vegas region. Therefore, at the height of construction activity (Q1 2012 – Q4 2013), at least 275 workers would be contributing to the Proposed Project from the local workforce.

It is likely that the local workforce would commute from the Clark County/Greater Las Vegas region and most of their earnings would be recycled back into the Clark County regional economy through spending of disposable income. In addition, non-local workers would provide a temporary stimulus to the local economy as they spend per diem money on hotels, meals, and consumables. However, unlike local workers who permanently reside in Clark County, non-local workers would be expected to spend most of their earnings outside of the region. Some direct spending generated from local workers would also be expected to leak out of the region as the total regional demand for goods and services could not be entirely satisfied from local (i.e., Clark County) production.

The types of jobs (i.e., the composition of the labor force) are expected to be relatively high paying and would be related to completing tasks such as environmental clearance and permitting, site access/laydown, well field/pond and site preparation, and O&M building construction. Workers with skills necessary for drainage controls, substation/switchyard erection, overhead pole and line construction, and PV equipment installation and commissioning would be mobilized. These jobs have been targeted as clean energy/renewable energy opportunities that are expected to grow at above-average rates and pay above-average wages. The Proposed Project would, therefore, help diversify the labor force of the Clark County economy and add capacity and valuable utility scale solar installation experience to the local solar construction specialty labor pool.

The direct spending from Proposed Project payroll and direct expenditures on locally procured materials, equipment, and supplies would also create jobs. These indirect and induced jobs could lead to total job growth of 160 percent over the four-year construction period. Therefore, assuming that 275 local direct jobs are created by the Proposed Project during 2012-2013, total employment to Clark County could reach 440 jobs (for each quarter in this time period), with 165 indirect and induced jobs created by the initial direct expenditures from payroll. These employment estimates do not include jobs generated from spending on local materials, equipment, and supplies that would also boost the total jobs generated over the four-year construction period. The jobs created are important in helping the Clark County region resume a normal, steady-state growth path and economic recovery. This is particularly the case as the economy is currently operating below capacity with large numbers of construction workers either unemployed or working in part-time, underemployed positions that do not fully utilize their skills and experience.

<u>Operations and Maintenance.</u> During the operational phase, the Proposed Project is expected to employ up to 15 permanent workers to operate and maintain the facility and to provide plant security.

Earnings

The Proposed Project is expected to have a positive, short-term effect on employee earnings and personal income in Clark County generated from the spending associated with employee payroll and direct spending on materials, equipment, and supplies. It is estimated that the total construction period payroll (cumulative across all four years of the construction phase) will total between $240 and $340 million. At the height of construction activity (2012-2013) the quarterly payroll is estimated to average $17 million, as shown on Figure 4.15-2.

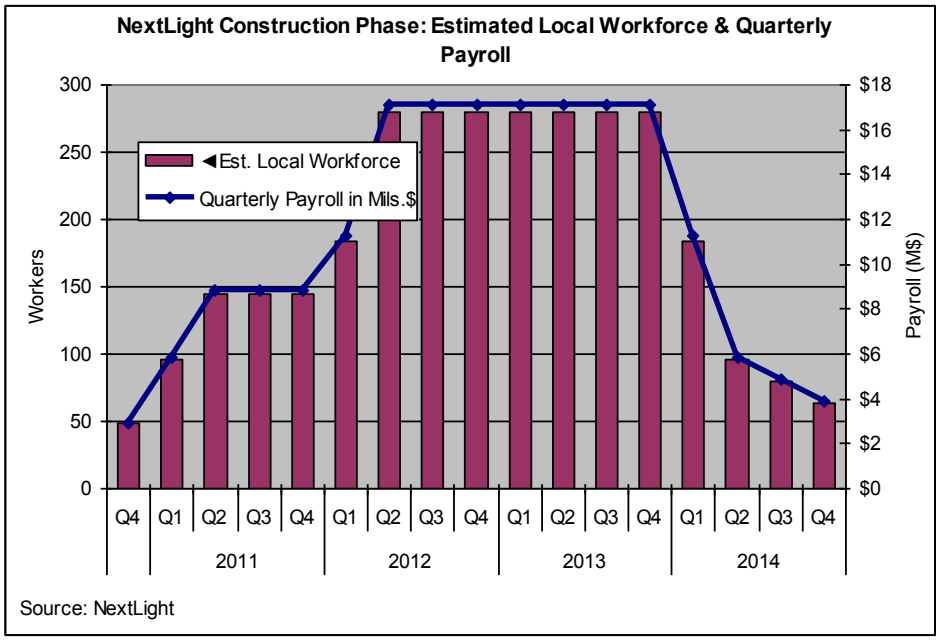

Figure 4.15-2. Local Construction Labor Force and Payroll by Quarter

Tourism

Given the remote, sparsely populated area where construction will take place it is unlikely that tourism will be negatively impacted by construction activity in any material or noticeable manner. As Section 3.15, Social and Economic Conditions, demonstrated, there is a sufficiently large stock of available housing and motel/hotel room inventory (an oversupply) in the region that can accommodate both tourists and additional non-local workers who require temporary lodging. Motel/hotel capacity and room utilization have been below capacity during the recession and temporary worker room demand would be positive for occupancy levels and the economy. This temporary demand would not be large enough to displace or interfere with regular tourist demand associated with gaming, entertainment, and typical Las Vegas visitor patronage. For example, during the height of construction activity, expected to occur over 2012 to 2013, up to 70 workers (on average per quarter) would be non-local. Assuming that some of these workers relocated with dependents or significant others, this demand would not be enough to interfere with tourism or available motel/hotel capacities. It is possible that some forms of tourism involving the natural appreciation of the desert and OHV use of this open space area would be impacted, but mitigation can address this potential small effect (see Section 4.11, Recreation Impacts).

Income

Construction. Construction of the Proposed Project is expected to have a positive, short-term (i.e., 4 years + 1 quarter) impact on the regional income and economy of Clark County. The total value of goods and services (including emission free electricity output from operations) generated by the Proposed Project would be particularly beneficial to the economy, especially as resources are not fully employed or utilized given the persistence of the Great Recession. The economic impacts during the construction phase were measured from direct expenditures associated with Proposed Project payroll and spending on supplies, materials, and equipment to support all tasks during the construction phase.

The IMPLAN model was used to estimate a low-high range of total industrial output that would accrue to the Clark County economy. Total industrial output is equivalent to business sales. It is estimated that out of the $960 million to $1.3 billion required in direct spending on materials, supplies, and equipment, between 10 to 15 percent of this total would be procured and spent locally from within Clark County. To simplify and consolidate the analysis, the total impact estimates use a range midpoint of 12.5 percent that translates to a direct expenditures range of between $120 million and $162.5 million in direct, locally procured goods and services over the entire four-year construction phase. Table 4.15-1 shows the total economic impact to Clark County over the entire four-year and three-month construction period.

Table 4.15-1. Construction Phase Economic Impacts to Clark County, Nevada (In millions of Dollars of Industrial Output)

Industrial Output	Sum of Q4 2010 – Q4 2014 Construction Phase Spending		
	Project Payroll	Equipment, Materials, and Supplies	Total
Low Estimate			
Direct	$192.1	$120.0	$312.1
Indirect	$26.5	$29.9	$56.4
Induced	$27.4	$40.7	$68.0
Total	$246.0	$190.6	$436.5
High Estimate			
Direct	$272.0	$162.5	$434.5
Indirect	$37.5	$40.5	$78.0
Induced	$38.8	$55.1	$93.8
Total	**$348.3**	**$258.1**	**$606.4**

Note: Indirect and induced impacts estimated using IMPLAN input-output model for Clark County, Nevada.

Table 4.15-1 shows the cumulative total output that would be generated during construction of the Proposed Project. The annual economic impacts would be generated according to the following construction phase-in schedule shown on Figure 4.15-3. Figure 4.15-3 includes all three consecutive phases of construction required to install 400 MW of solar capacity. The schedule follows the expected workforce schedule and phase-in of direct capital expenditures (all three construction phases) and is an estimate subject to change based on weather and other conditions.

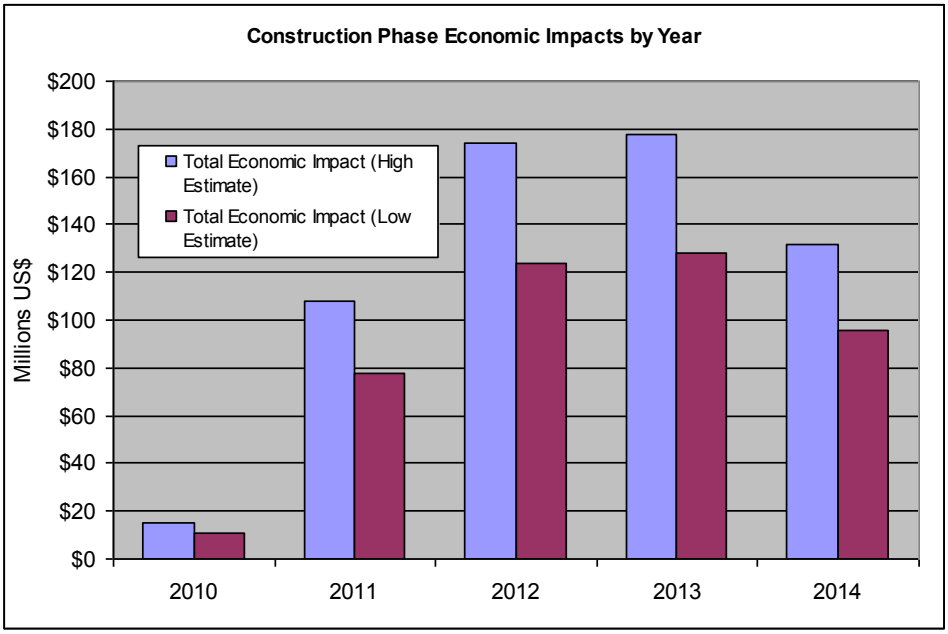

Figure 4.15-3. Construction Phase Total Economic Impacts by Year

Operations and Maintenance. The O&M phase of the Proposed Project is expected to have a long-term, beneficial impact to the regional economy and area personal income. Annual O&M spending would have a small, positive, annually recurring impact on the Clark County regional economy. During commercial operations, the estimated annual direct O&M spending is expected to total $6.5 million per year. Annual O&M spending on permanent employee payroll, third-party labor, and contractual services is expected to total $3.9 million. Approximately $2.3 million per year is anticipated to be spent on supplies and materials, and $0.3 million is expected to flow to utilities for water and telecommunications services.

The annual spending would last for the 30-year life of the assets and would also generate an additional multiplicative impact demand stimulus to Clark County as permanent workers would spend disposable incomes and vendors would spend earnings and replenish inventories. Table 4.15-2 shows the estimated annual economic impacts expected during the Proposed Project's commissioning by category of direct expenditure. Estimated impacts were measured in terms of total industrial output to Clark County.

Table 4.15-2. Annual Economic Impact Estimates to Clark County, Nevada during Project Operations (in millions of US$)

Direct O&M Spending Area	Direct Industrial Output	Indirect Industrial Output	Induced Industrial Output	Total Industrial Output
Operational payroll, third-party labor, and contractual services	$3.90	$0.54	$0.56	$4.99
Equipment, supplies, and materials	$2.30	$0.39	$0.98	$3.68
Utilities (water & telecommunications)	$0.30	$0.07	$0.10	$0.46
Total	**$6.50**	**$1.00**	**$1.64**	**$9.14**

Source: Direct O&M expenditures from the Applicant. Indirect and induced economic impacts estimated with IMPLAN input-output model for Clark County, Nevada.

During project operations, the combined $6.5 million in annual O&M necessary to sustain the 400MW solar plant would generate an annually recurring $9.1 million in total economic activity to Clark County, including the economic output from indirect and induced effects.

Public Revenues

Construction. During construction, the Proposed Project would generate a short-term (i.e., 4-year and 1-quarter), positive, non-recurring contribution to public revenues. Comparatively speaking, these public revenue contributions during construction would be minor, as Clark County total public revenues were $5.2 billion in 2008. However, the revenue contributions during construction would be more than sufficient to offset any public service demands arising during this phase.

During the construction phase, the local workforce would earn payroll and pay taxes on employee compensation that would flow to federal, state, and local jurisdiction coiffures. In addition, since tax revenues would also be generated from the indirect and induced economic activity stimulated by the initial direct construction expenditures, tax revenues would be generated from household expenditures and indirect business taxation. In addition, sales taxes would be generated from direct spending on materials, equipment, and supplies. However, it is assumed that sales tax exemptions associated with spending on renewable energy infrastructure would apply for the Proposed Project. The Applicant has assumed that 63 percent of total construction costs would be eligible for sales tax abatements. The following public revenue estimates during the construction phase take these assumptions into account.

Table 4.15-3. Summary of Estimated Range of Tax Revenues Generated during Construction[a] (in millions of US$)

Revenue Source:	Cumulative (2010−2014): Low	Cumulative (2010−2014): High	Annual Average: Low	Annual Average: High
Project Payroll				
Federal	$4.9	$6.96	$0.98	$1.39
State/Local	$4.2	$5.90	$0.83	$1.18
Total:	$9.1	$12.9	$1.8	$2.6
Spending on Equipment, Materials, and Supplies				
Federal	$6.1	$8.27	$1.22	$1.65
State/Local	$2.0	$2.70	$0.40	$0.54
Total:	$8.1	$11.0	$1.6	$2.2
Total				
Federal	$11.0	$15.2	$2.2	$3.0
State/Local	$6.2	$8.6	$1.2	$1.7
Total:	$17.2	$23.8	$3.4	$4.8

Note:
[a] Estimated tax revenues generated from total economic activity (i.e., direct, indirect, and induced output generated during construction). Estimates assumes that 63 percent of construction costs will be eligible for tax abatement.

Operations and Maintenance. Over the 30-year operating life of the Proposed Project, the estimated annual property tax is expected to average $1.2 million per year. This estimate assumes that the Proposed Project is eligible to use Nevada's Renewable Energy Property Tax Abatement, AB522, and the Nevada Commission on Economic Development's "Short Life Schedule" for property tax calculations. In addition, the annually recurring O&M expenditures would generate tax revenues to Clark County Nevada during the 30-year operating life of the solar plant. It has been estimated that the annual $6.5 million in O&M spending would generate approximately $1 million in combined taxes to federal and state/local government ($0.7M federal, $0.37M state/local). This estimate does not include payment of corporate income taxes or payments to the BLM under land lease royalty arrangements.

Fiscal Impact Analysis to Clark County

Using the construction phase tax revenue projections, a fiscal impact analysis that examined the incremental local government expenditures to Clark County, in relation to the incremental local government revenues arising during this period, was completed. The analysis was conducted using a worst-case scenario of population net migration during the construction phase. As a worst-case scenario, it was assumed that a total of 210 persons would migrate to Clark County during the construction period. The estimate assumes 70 non-local workers and a household size of three persons. Actual public expenditures for Clark County (for FY 2008) were expressed on a per capita basis and compared to annual revenues projected during construction. The public expenditure categories reflect Clark County spending on all municipal services and public schools.[3] The analysis supports the finding that the Proposed Project would not result in an incremental tax burden to local residents that is not offset by the Proposed Action's generation of new public revenues. The annual average state and local low-high tax revenues shown in Table 4.15-3 were compared to an estimate of the annual public expenditures (including both county and school district expenses) that would be generated by the net influx of non-local employees and their dependents migrating to Clark County. The annual net surplus of tax revenues in excess of public expenditures varied between a range of $162,273 and $650,128.

During annual operations, at least $1.6 million has been identified in annual tax revenues that would flow to the local government. This estimate does not include other flows that may be of a proprietary or confidential nature. Of the identified visible amounts, $1.2 million would come from annual property taxes and $0.4 million would be generated from annual economic activity initially stimulated by direct O&M expenditures. These amounts would be compared to the annual incremental public expenditures arising during operations that are expected to be low, given the small number of personnel who would man the facility and budgeted amounts from O&M that would pay for purchased public utilities.

Mitigation Impacts and County Revenue Effects

It is possible that if the Applicant purchases open land within Clark County for habitat offset or mitigation purposes, then Clark County may experience a change in public revenues arising from the change in land status. At this time, it has not been determined where any proposed private

[3] Municipal expenses include general government, judicial, public safety, public works, health, welfare, culture and recreation, community services, water, airport, sewer, interest on long-term debt, and other (CAFR 2008).

mitigation acres would be located. The fiscal impact to Clark County would depend on what land uses and potential development would have occurred (but for the Proposed Action's land mitigation requirements) on these lands in the future. If the potential ad valorem revenues arising from these acres (under a "without project" slated path of development) were greater than the revenue streams associated with the "with project" land uses, then Clark County would have a negative fiscal impact. However, if the designated lands (slated for acquisition under a mitigation plan) were intended to be used for low impact, conservation, and combined recreational purposes, it is not clear that the revenue impacts to Clark County would be that large, as no fixed assets would have been built to raise the future assessed value of these lands. The resolution of the scale of this potential impact is based on what the "opportunity costs" of the targeted mitigation lands would be. Therefore, the next best use of the acres would have been in the absence of their targeted use as mitigation plan acres.

Public Services and Utilities

The incremental demand from the Proposed Project on public services during construction, operations, and decommissioning is not anticipated to result in extraordinary stresses placed on service capacities or infrastructure that could not be met by existing and projected public resources (i.e., projected county operating budgets and capital expenditures already planned for to meet population growth). As explained below in more detail, adequate resources exist within Clark County and the Primm Valley/Jean area that can accommodate the Proposed Project's installation demands during construction. Furthermore, operations would not result in a noticeable population increase to Clark County. In addition, over the long-term life of the facility, the solar plant assets would generate annual property taxes (estimated at $1.2 million per year) that would be sufficient to offset any new demands on public resources arising during operations.

Water and Wastewater

Construction. During the construction phase of the Proposed Project, water would be used for dust control. During construction, a lined water storage pond would be built for temporary storage of water. The pond would allow for well draw down during peak water usage periods without adversely impacting peak demand usage periods. At the completion of construction, the storage pond would be re-leveled to grade and the lining would be removed.

Wastewater generated during construction would include sanitary waste, stormwater runoff, equipment washdown water, and water from excavation dewatering during construction (if dewatering is required). The wastewater load during construction could potentially be classified as hazardous or nonhazardous, depending on the chemical constituents, and would be processed and disposed of in accordance with the applicable laws governing these effluents.

Operations and Maintenance. During operations, the Proposed Project would require water for panel washing and domestic use for on-site personnel, estimated at approximately 15 individuals. It is estimated that these requirements would amount to 21 acre-feet per year, equivalent to approximately 6.8 million gallons. Panel washing is scheduled to occur twice each year. The plant does not require process water for cooling purposes, and it is noted that PV water consumption during operations is between 95 percent and 99 percent less than that of concentrating solar power (CSP) projects. The Applicant has budgeted funds within their annual

O&M budgets to pay for water. Water would be obtained from the Las Vegas Valley Water District and would be supplied to the Proposed Project by on-site wells. Two permanent above ground water tanks would be located in the O&M area to provide storage for operational water needs and water for fire protection.

The wastewater generated from panel washing would be non-hazardous and would drip to the ground and either evaporate or infiltrate into the ground. The O&M building would also generate on-site domestic water and sanitary sewer waste that would be treated and disposed of through a septic tank and drain field system. It is not expected that the O&M building would connect to any existing sanitary sewer system. Given the small number of permanent staff operating the facility, these wastewater loads would be small.

Fire and Emergency Medical Services

Construction. During a large-scale construction project, there is the potential for emergencies and accidents. However, in addition to the Proposed Project's design features Clark County also has resources near the Proposed Project site. Fire stations are located in both Jean and Goodsprings (refer to Map Figure 3.15-4 in Section 3.15, Social and Economic Conditions).

The Proposed Project would be built with features that could be used to quickly douse fires and reduce the potential for the spread of fire. A 20-foot-wide fire break would be constructed around the exterior of the perimeter fence. Two permanent above ground water tanks would be located in the O&M area to provide storage for operational water needs and water for fire protection. The pumping systems for the firewater pumps also have redundant features to allow uninterrupted, continuous flow, if required. In addition, the electrical equipment enclosures that house the inverters and transformers would be built with either metal or concrete structures. Any fire that could potentially occur would be contained within the structures, which are designed to meet NEMA 1 or NEMA 3R IP44 standards for electrical enclosures (heavy duty sealed design to withstand harsh outdoor environmental conditions).

Operations. During the operational phase, the on-site fire protection water system would be supplied from the above mentioned two water storage tanks located near the O&M building. These tanks can hold a minimum of two hours of full flow runtime (approximately 200,000 gallons). The capacities and equipment of the three local Clark County fire stations are also provided in Table 3.15-9 in Section 3.15, Social and Economic Conditions. Resources from these stations could also be mobilized in the event of an emergency.

Police

Construction. The Proposed Project's built-in security features would function to place minimal demands on County police resources. Security at the Proposed Project site would be achieved by a combination of fencing, lighting, and security patrols. The Applicant would provide 24-hour security during plant construction.

Operations. During operations, the Proposed Project site would be staffed 24 hours per day, seven days per week. The staff would include full time security, and regular security patrols would be conducted throughout the site. Lighting would also be provided at the O&M building

and the main plant access road entrance. In addition, a perimeter security system may also be installed as necessary.

Hospitals

Construction. It is possible that accidents requiring ambulance services and hospital treatment may occur during the construction phase. To minimize this possibility, the Applicant would require all construction contractors to operate under an approved health and safety program that meets industry standards. In addition, all contractors would be required to maintain and carry health and safety materials including the MSDS showing the physical and chemical properties and health hazard information of hazardous materials used on site. It should be noted that the UMC is located at 231120 S. Las Vegas Boulevard in Jean. In addition, the full service UMC is located at 1800 West Charleston Boulevard in Las Vegas (see Table 3.15-10 in Section 3.15, Social and Economic Conditions).

Operations and Maintenance. It is possible that accidents may occur during project operations. Given the small number of permanent staff manning the facility and the safety plan and protocols to be followed, the probability of occurrence of any accidents and their annual frequency is low. Therefore the regional hospitals and emergency medical service facilities are expected to be able to fully accommodate any accidents requiring medical treatment and ambulance services within their current levels of staffing and resource deployment.

Public Schools

Construction. The Proposed Project‘s construction phase is expected to last four years and three months. During that time, it is possible that some of the non-local workers may relocate to the area with school-aged children. The schools in closest proximity to the Proposed Project site (see Table 3.15-10 in Section 3.15, Social and Economic Conditions) all have class sizes and student teacher ratios that are below the school district averages for the South region. These ratios suggest that additional students could enroll in regional schools without altering the educational demands placed on the system, or changing the quality of the educational experience for existing pupils. Some workers may, in fact, commute from a greater distance radius within the Las Vegas Metro area and their children may possibly be enrolled as students in city schools. Together with other schools within the Clark County School District, it is likely that any additional students could be accommodated without placing any incremental resource demands on the public school system.

Operations and Maintenance. The Proposed Project would not be expected to have any noticeable effect on public school services or capacities during the operational period, as the estimated addition of 15 permanent workers is relatively small.

Solid Waste

Construction. The construction phase of the Proposed Project is expected to generate solid wastes that can be easily accommodated by regional public facility capacities, waste management processing, and recycling centers. During construction, the main type of waste created would be nonhazardous solid waste. However, some nonhazardous liquid waste and hazardous waste (solid and liquid) would also be generated. All of the hazardous wastes would be generated at the plant site. The types of waste and their estimated quantities would likely

consist of paper, wood, glass, and plastics (approximately 200 tons), and metal (approximately 2 tons of metal including steel).

As a priority, and where feasible, wastes would be recycled and non-recyclables would be disposed of on a weekly basis at a permitted landfill. Landfills located nearest the Proposed Project site include the Boulder City Landfill in Boulder City (Class I Municipal Solid Waste) and Wells Cargo Landfill in Las Vegas (Class III Industrial Waste). The Applicant would prepare a Waste Management Plan describing the storage, transportation, and handling of wastes, emphasizing the recycling of construction wastes where possible, and identifying the specific landfills that would receive construction wastes that cannot be recycled. Construction wastes would be managed in accordance with RCRA 42 United States Code (U.S.C.) 6901, et seq., RCRA‘s implementing regulations at 40 CFR 260, et seq., and other applicable state and local regulations.

Operations and Maintenance. During operations, the facility would likely generate solid wastes consisting of rags, broken and rusted metal and machine parts, defective or broken electrical materials, empty containers, discards and office waste, and other miscellaneous solid wastes. The quantity of all solid annual nonhazardous waste generated is estimated to be approximately 50 cubic yards (or 35 tons) per year. This level of solid waste generation could be easily handled by the existing capacities of local waste management facilities, transfer stations, and area landfills. The design capacity of the APEX Regional Landfill is approximately 784 million cubic yards and a service life of 85 years. The APEX Regional Landfill accepts municipal solid waste, treated sewage sludge, and treated medical waste (CCCP 2010).

Decommissioning. The potential effects on socioeconomic resources from decommissioning options are expected to be beneficial and alternatively either short-term or long-term in duration, based on the particular option chosen.

It is possible that the Proposed Action may be upgraded with a new technology (to continue to exploit the area‘s strong solar radiation potential) at the end of its estimated 30-year life. If this option is chosen, the plant would continue to provide zero emission electricity to the regional grid and make lasting contributions to meeting the region‘s projected load growth. In addition there would be short-term construction-related benefits to incomes, employment, and output (from the upgrade project option). Over the long-term, the public land lease would most likely be renewed and taxes would continue to be paid on this possessory interest, and the new upgraded plant would employ both permanent workers and sporadic O&M worker teams.

It is also possible that the solar plant could be dismantled and the land made suitable for reclamation. Dismantling and reclamation/restoration activities would also provide a short-term stimulus to the local economy as special teams would be needed to safely disassemble the plant assets and restore the site to its original pristine condition. In addition, the underlying land would be freed up for other potential uses, including the historic, traditional desert uses for the property under BLM stewardship.

4.15.3 Residual Effects

During construction phases of the Proposed Action, there would be short-term, beneficial residual effects on population and housing, the regional economy, and personal income and employment levels, public services, and tax revenues. During O&M phases, there would be long-term beneficial residual effects on population and housing, the regional economy, and personal income and employment levels, public services, and tax revenues. Effects on social and economic conditions from decommissioning are also expected to be beneficial.

4.16 Environmental Justice Impacts

This section discusses effects on environmental justice that may occur with implementation of the Proposed Action or alternatives. Data utilized for the environmental justice analysis was obtained from the 2000 Census and is presented in detail in Section 3.16, Environmental Justice. As discussed in Section 3.16.2, Minority Populations, and Section 3.16.3, Low Income Populations, the Proposed Project area is not considered an environmental justice community, with respect to minority populations (including Native American communities) or income. As such, any project-related impacts that would occur within the boundaries of the Proposed Project area would not have any disproportionately adverse human health or environmental effect on minority, Native American, or low-income populations.

4.16.1 Indicators

Consistent with Executive Order (EO) 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations* (February 11, 1994), this environmental justice analysis identifies and addresses any disproportionately high and adverse human health or environmental effects of its actions on minority and low-income populations. The CEQ (1997) has issued guidance to federal agencies on the definition of disproportionately high and adverse effects as used in EO 12898, as follows:

- **Disproportionately High and Adverse Human Health Effects.** When determining whether human health effects are disproportionately high and adverse, agencies are to consider the following three factors to the extent practicable:
  1. Whether the health effects, which may be measured in risks and rates, are significant (as employed by NEPA), or above generally accepted norms;
  2. Whether the risk or rate of hazard exposure to a minority population, low-income population, or Indian tribe to an environmental hazard is significant (as employed by NEPA) and appreciably exceeds or is likely to appreciably exceed the risk or rate to the general population or other appropriate comparison group; and
  3. Whether health effects occur in a minority population, low-income population, or Indian tribe affected by cumulative or multiple adverse exposure to environmental hazards.
- **Disproportionately High and Adverse Environmental Effects.** When determining whether environmental effects are disproportionately high and adverse, agencies are to consider the following three factors to the extent practicable:

1. Whether there is or will be an impact on the natural or physical environment that significantly (as employed by NEPA) and adversely affects a minority population, low-income population, or Indian tribe. Such effects may include ecological, cultural, human health, economic, or social impacts on minority communities, low-income communities, or Indian tribes when those impacts are interrelated to impacts on the natural or physical environment;
2. Whether environmental effects are significant (as employed by NEPA) and are or may be having an adverse impact on minority populations, low-income populations, or Indian tribes that appreciably exceed or are likely to appreciably exceed those on the general population or other appropriate comparison group; and
3. Whether the environmental effects occur or would occur in a minority population, low-income population, or Indian tribe affected by cumulative or multiple adverse exposures from environmental hazards.

In addition, the BLM Land Use Planning Handbook defines BLM's environmental justice principles and considers ―aggregate, cumulative, and synergistic effects, including results of actions taken by other parties" (BLM 2005).

4.16.2 Direct and Indirect Effects by Alternative

This section discusses the potential direct and indirect effects on environmental justice under each alternative. Analysis for this section was completed by assessing potential temporary (i.e., construction) and permanent impacts due to the implementation of each alternative and comparing these impacts to the census tracts, block groups, and blocks within and in the vicinity of the Proposed Project area.

Alternative 1: No Action

The No Action Alternative assumes the ROW application is denied and that the Proposed Project is not built. Under the No Action Alternative, the purpose and need for the Proposed Project would be provided by other means. The land that would have been occupied by the Proposed Project would continue to be used in the manner designated by the BLM. Without the Proposed Project, the land would continue to remain undeveloped in the future. Under the No Action Alternative, it is likely that the land would continue to serve as a rural, undeveloped, desert area providing habitat for species and land resources for the traditional uses (i.e., OHV use, hiking, horseback riding, and natural resource appreciation low impact uses, ecotourism, etc.) associated with this desert location. Under the No Action Alternative, there would be no temporary or permanent impacts and, thus, there would be no impact to any potential minority, low-income, or Native American communities either within or in the vicinity of the study area.

Alternative 2: Proposed Action

The footprint of Alternative 2, aside from 1,550 feet of proposed transmission line that would connect to an existing switch yard, is fully contained within the boundary of the Proposed Project area. There are no environmental justice communities within the Proposed Project area with respect to income or minority populations (including Native American communities). The 1,550 feet of proposed transmission line that would not be contained within the study area boundary would still be located within Census Tract 57.03, which was evaluated in the environmental

justice analysis. The transmission line component which would fall outside the study area boundary would be contained either partially or fully within Block Group 1 (Blocks 1083, 1525, and 1526) of Census Tract 57.03.

Table 4.3.16-1 shows the racial composition of the identified census tract, blocks, and block groups for the transmission line area located outside of the study area. As shown in the table, in 2000, Blocks 1083, 1525, and 1526 had zero population. Thus, the transmission line area outside of the study area would not impact an environmental justice community. As there is zero population living within the identified blocks, there would be no low-income communities impacted by the Proposed Action.

The Proposed Action does not disproportionately affect minority and/or low-income populations, as there is no environmental justice community within the Proposed Project footprint.

The State of Nevada has a higher Native American population than the United States. Populated census tracts, block groups, and blocks were analyzed in the vicinity of the study area to further evaluate Proposed Project impacts on Native American populations in the vicinity of the Project area. As shown in Table 3.16-3, presented in Section 3.16.4, Surrounding Area, there are six populated census tracts and seven populated block groups near the Proposed Project area. The closest census tract to the study area with a significantly higher percentage of the minority population being Native American or Alaska Native is located 20 miles northwest of the center of the Proposed Project area. Due to the distance of the Native American population from the Proposed Project site, and the majority of impacts being located within the boundary of the Project area, the Proposed Action is not expected to disproportionately effect the Native American population.

Alternative 3: Modified Site Layout

Because the Alternative 3 project footprint is located within the same census tract, block group, and blocks as Alternative 2 (the Proposed Action), the environmental justice impacts of Alternative 3 would be identical to those described under Alternative 2. The footprint of Alternative 3, aside from 1,550 feet of proposed transmission line connecting to an existing switch yard, would be fully contained within the boundary of the Proposed Project area. Alternative 3 does not disproportionately affect minority and/or low-income populations, as there is no population or environmental justice community within the proposed footprint of Alternative 3.

Table 4.16-1. Racial Composition and Percent Minority for the Footprint of Alternative 2 and Alternative 3 Outside of the Study Area

Geographic Area	Total Population	White, alone	Black or African American, alone	American Indian and Alaska Native, alone	Asian, alone	Native Hawaiian and other Pacific Islander, alone	Some other race, alone	Two or more races	Minority [a] aggregation	Percent of Total Population which is Minority	Hispanic or Latino (any race)	Percent of Total Population which is Hispanic or Latino (any race)	Percent of Minority which is Native American
Tract 57.03	2,702	1,847	367	20	137	5	81	245	855	31.6%	388	14.4%	2.3%
Block Group 1	2,702	1,847	367	20	137	5	81	245	855	31.6%	388	14.4%	2.3%
Block 1083	0	0	0	0	0	0	0	0	0	0	0	0	0
Block 1525	0	0	0	0	0	0	0	0	0	0	0	0	0
Block 1526	0	0	0	0	0	0	0	0	0	0	0	0	0

Source: USCB, n.d.(a)

Note:
[a] Minority aggregation includes the sum of Black or African American alone; Asian alone; American Indian and Alaskan Native alone; Hawaiian and other Pacific Islander alone; some other race alone; and two or more races

4.16.3 Residual Effects

The Proposed Project would have no environmental justice impacts as there are no environmental justice communities within the Project area; therefore the Proposed Project would not have any residual effects under this criterion.

4.17 Energy and Minerals Resources Impacts

This section discusses effects on energy and minerals resources that may occur with implementation of the Proposed Action or alternatives.

4.17.1 Indicators

Adverse effects on energy and minerals resources would occur if the Proposed Action would:

- Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state;
- Result in the loss or availability of a locally important mineral resource recovery site delineated on a local general plan, specific plan, or other land use plan; or
- Restrict access to or the availability of mineral or energy resources.

4.17.2 Direct and Indirect Effects by Alternative

This section describes the effects under each alternative using the respective methodology prescribed under NEPA. To compare effects, this analysis defines the temporal scale (time), spatial extent (area), and intensity of effects for each alternative. All effects discussed in this section are direct. No indirect effects were identified for this resource.

Alternative 1: No Action

Under this alternative, there would be no construction and the Proposed Project site would not be disturbed, thus there would be no effect on energy or mineral resources.

Alternative 2: Proposed Action

Alternative 2 (the Proposed Action) would approve the ROW application and the Proposed Action would be carried forward. Effects that could result from the implementation of Alternative 2 during construction, O&M, or decommissioning activities are analyzed in this section.

Access to some prospected or production sites for mineral or energy resources could be inhibited during construction, O&M, or decommissioning of the Proposed Action.

Effects EAM-1, EAM-2, and EAM-3 discuss the potential for the Proposed Action to inhibit access to leasable, locatable, and salable energy and mineral resources, respectively.

Effect EAM-1: Restrict access to or the availability of fluid leasable mineral or energy resources within the Proposed Project area.

Oil and gas resources in the region were identified using data produced by the Nevada Bureau of Mines and Geology (NBMG) and the California Department of Conservation (2009). There are no oil or gas producers or seeps within 5 miles of the Proposed Project site. Therefore, the Proposed Action would have no effect on leasable mineral resources.

Effect EAM-2: Restrict access to or the availability of locatable mineral or energy resources within the Proposed Project area.

Locatable resources available near the Proposed Project site were identified by compiling data from USGS (2005a). However, there are no existing claims within the Proposed Project area.

Effect EAM-3: Restrict access to or the availability of saleable mineral or energy resources within the Proposed Project area.

Salable resources available near the Proposed Project site were identified by compiling data from the USGS (2005a). Sand, gravel, and stone have been extracted or processed at three locations within 5 miles of the Proposed Project site. Of these three locations, two are currently in operation and one has not yet been evaluated for commercial use. However, because none of these locations fall within the Proposed Project site, the Project would have no effect on saleable mineral or energy resources.

Alternative 3: Modified Site Layout

Short-term and long-term effects during construction under Alternative 3 would be greater than those identified under Alternative 2 (the Proposed Action). Both Alternative 2 and 3 have identical construction durations, but the difference between the total areas graded and developed is 604 acres greater for Alternative 3 compared to Alternative 2 after construction reclamation. In addition, the proposed energy generation for both alternatives would be the same, at 400MW. The effect to energy and minerals for Alternative 3 would be the same as Alternative 2.

4.17.3 Residual Effects

The Proposed Project components would preclude excavation of mineral resources in the future.

4.18 Fuels and Fire Management Impacts

This section discusses effects on fuels and fire management that may occur with implementation of the Proposed Action or alternatives.

Goals for fuels and fire management are to manage resources to be consistent with all fuels and fire management-related guidance throughout the LVRMP (BLM 1998a) including the BLM Las Vegas Field Office‘s Fire Management Plan (LVFMP) for the Southern Nevada Fire Planning Unit (BLM 2004) and the Las Vegas Field Office Interim Wilderness Management Plan (BLM 2003). APM goals are from the POD Amendment prepared by the Applicant (NextLight 2010).

The LVFMP addresses fire suppression, prescribed fire, non-fire fuel treatments, community assistance, and education on every acre of burnable vegetation under BLM administrative jurisdiction within the BLM Las Vegas Field Office. As stated in the LVFMP, management goals adhere to FLPMA which states that the BLM will manage public lands on the basis of multiple use and sustained yield and that the quality of scientific, scenic, historical, ecological, environmental, air and atmospheric, water resources, and archeological values be protected.

Wilderness areas within the BLM Las Vegas Field Office fire management units (FMUs) will follow specific Wilderness Plans addressing suppression tactics. Until these Wilderness Plans are complete, the BLM Las Vegas Field Office will adhere to suppression guidance given in the Las Vegas Field Office Interim Wilderness Management Plan (2003).

Assumptions used to analyze impacts to fuels and fire management resources include the following:

- Lands specifically within the boundary of the BLM Las Vegas Field Office Tortoise-Moderate Density (NV-050-01) FMU and Goodsprings-Primm (NV-050-18) FMU were used as the impact analysis area for direct, indirect, and cumulative impacts;
- Specific Wilderness Plans for wilderness areas within the Tortoise-Moderate Density FMU and the Goodsprings-Primm FMU are not complete at this time;
- The following APMs outlined in the Section 4.6, Biological Resources Impacts, would also apply to rangeland resources:
  - APM-9 Noxious Weed Control Plan; and
  - APM-10 Site Rehabilitation Plan and Facility Decommissioning Plan.

4.18.1 Indicators

In general, the Proposed Action would affect fuels and fire management resources because prescribed burning would not occur within the Proposed Project area and maintaining ecological health by creating a patchy mosaic of fuels would have to be achieved by other means than fire or grazing (since the Proposed Project area is closed to grazing). Adverse effects on fuels resources would occur if the Proposed Action would fail to:

- Maintain an adequate fuel break around the Proposed Project perimeter during construction, O&M, and decommission of the Proposed Project;

- Adhere to mowing BMPs with the goals of minimizing natural or human-caused fire starts or spread and maximizing ecological health in and around the Proposed Project area; or
- Regularly monitor for and treat weed infestations to eliminate colonization and minimize spread of weed species as outlined in the Noxious Weed Control Plan (APM-9).

4.18.2 Direct and Indirect Effects by Alternative

This section describes the effects under each alternative using the framework prescribed under NEPA. To compare effects, this analysis defines the temporal scale (time), spatial extent (area), and intensity of effects for each alternative. Effects on fuels and fire management that could result from the implementation of the alternatives during construction, O&M, or decommissioning activities are analyzed in this section.

Alternative 1: No Action

Alternative 1, the No Action Alternative, assumes the application for the Proposed Action is denied and current fire management goals for fuels and fire management within the vicinity of the Proposed Action would continue. Under Alternative 1, there would be no construction and the Proposed Project area would not be disturbed; thus, fuels and fire management would be unaffected.

Adverse impacts to fuels and fire management resources for Alternative 1 would be negligible (i.e., effects may or may not cause observable changes to baseline conditions; regardless, they do not alter the baseline conditions). Positive impacts could be moderate (i.e., effects cause observable and short-term change to baseline conditions, and/or they alter baseline conditions) depending on if the BLM implemented prescribed fire (in place of mowing) in the Proposed Project area as a tool to restore ecological health to areas with historic disturbance including fire suppression and overgrazing.

Alternative 2: Proposed Action

Alternative 2, the Proposed Action, would authorize the Applicant to construct, operate, maintain, and decommission a 400MW solar PV power plant on 2,966 acres of BLM-managed lands. The Proposed Project would generate power as soon as the substation is complete. Alternative 2 would cause the following direct and indirect effects to fuels and fire management resources:

<u>Effect FFM-1: The introduction or spread of invasive or noxious weeds.</u>

Fire starts, whether triggered by natural causes such as dry lightning, or human causes such as prescribed burns or accidental starts from recreation or mining activities occurring in areas surrounding the Proposed Project area, can have beneficial effects on plant community health. However, even when fires do not burn too hot through herbaceous and shrub communities like those around the Proposed Project area, burned over areas need to be monitored in the months and years following fire.

Burned over conditions allow invasive weeds such as red brome (*Bromus rubens*) in upland areas and tamarisk (*Tamarix* sp.) in riparian areas to establish quickly and thrive. Cheatgrass, tamarisk,

and many other invasive species can establish dense stands providing high amounts of flammable biomass. If more fire occurs or it if humans continually disturb an area through construction and O&M activities, further weed establishment can occur. Unless monitored, fire and weeds can create a positive feedback cycle that can degrade the ecological health of an area allowing future fires to spread more rapidly and burn more intensely.

Effect FFM-2: Allocation of BLM fire resources to the proposed area for fire suppression.

Although prescribed burning would not occur in the Proposed Project vicinity and although any wildlife starts will be suppressed, the naturally dry and windy conditions associated with desert shrub communities of the Mojave Desert, especially during peak fire season with warm temperatures and proportionally low fuel moisture content, can spread large fires from other areas into the Proposed Project area.

The BLM would not conduct prescribed burns in the Proposed Project vicinity or suppress any wildfire starts. Should a fire occur during any phase of the Proposed Project, adverse impacts to fuel and fire resources for Alternative 2 would be observable and temporary, and short-term changes to baseline conditions would occur in a relatively small area, but would not alter baseline conditions in the long-term.

In order to reduce short-term impacts, the Applicant would maintain a 20-foot-wide fire break around the solar array perimeter fence year-round and keep vegetation within the Proposed Project vicinity mowed to between 6 and 12 inches in height during the construction and O&M phases of the Proposed Project.

Mowing BMPs and a mowing schedule are provided in a maintenance and monitoring plan. Mowing practices would meet both fuels and fire management resource standards (i.e., to mimic the beneficial effects of prescribed fire and a healthy grazing regime and to control fuel and debris build-up) as well as vegetation resource goals for long-term vegetation community health. Should a wildfire threaten any infrastructure associated with the Proposed Project area and allocation of BLM fire resources is required, access roads as well as a 3.85-mile-long paved interior maintenance road would allow fire crews and their vehicles safe ingress and egress, and safe access to structures.

In order to minimize long-term impacts, the Applicant would implement the noxious weed control plan (APM-9), the Site Rehabilitation Plan and Facility Decommissioning Plan (APM-10) (which includes standards for reclaiming the fire break and roads), and a maintenance and monitoring plan.

Alternative 3: Modified Site Layout

Alternative 3 would be constructed and operated similar to Alternative 2 (the Proposed Action), with the exception of the site drainage plan. Alternative 3 would involve several diversion berms (each 10 feet high), debris basins, and level spreader detention basins. Alternative 3 would temporarily disturb an area of 1,150 acres and permanently disturb an additional 250 acres. Because of the site drainage plan, the footprint of Alternative 3 and related facilities would encompass 3,669 acres. Alternative 3 would impact fuels and fire management resources if it would result in Effect FFM-1 or Effect FFM-2 listed under Alternative 2.

With the implementation APM 9 and APM 10, adverse impacts to fuels and fire management resources for Alternative 3 would be observable and temporary and have short-term effects on baseline conditions in a relatively small area.

4.18.3 Residual Effects

Given that there would be no adverse effects to fire resources, there would be no residual impacts.

4.19 Cumulative Impacts

Introduction and Methodology

In accordance with NEPA, this DEIS analyzes cumulative impacts of the Proposed Project in conjunction with other developments that affect or could affect the area. The cumulative scenario that serves as the basis of the cumulative impacts analysis is outlined in Section 3.19. The cumulative effects analysis enumerates the environmental effects of the related projects identified in Section 3.19, Cumulative Impacts Scenario, and considers the interaction of these multiple projects. The analysis then considers the aggregate effect of the past, present, and future foreseeable projects in conjunction with the effects of the Proposed Action.

For resource sections where the analysis in Chapter 4, Environmental Consequences, determined that there was no impact or that there was no impact after mitigation, the cumulative effect of the Proposed Action is not analyzed because the Proposed Action would not contribute to cumulative impacts to that resource. Similarly, for each resource area, the No Action Alternative would result in no impacts and, therefore, would not contribute to cumulative impacts to any resource analyzed in this document. For this reason, the No Action Alternative is not discussed further in this section.

Cumulative Impact Analysis by Resource

4.19.1 Air Quality and Climate

Geographic Extent

Air quality impacts resulting from the Proposed Action would occur within the natural basin within the Ivanpah Valley as formed by the Spring, Clark, Lucy Gray, and New York Mountains. Since the Proposed Action has negligible direct operating emissions, the cumulative impact discussion focuses on construction impacts. Construction impacts would be localized and of short duration. Therefore, only projects within one mile of the Proposed Project are considered

projects that could, with the Proposed Project, contribute to cumulative impacts. These include the Bighorn Electric Generating System, the existing railroad, the Eldorado to Ivanpah Transmission Project (EITP), and the Calnev Pipeline Expansion Project. Additionally, only projects that are scheduled concurrently in the same area as the Proposed Project are considered as possible contributors to cumulative impacts.

All contributions to climate change associated with the emission of GHGs are inherently cumulative in nature. The emissions levels for the Proposed Action are relatively negligible and support long-term delivery of essentially emissions-free electricity. Additionally, the majority of GHG emissions would be associated with construction activities. Due to the low level of GHG emissions and the fact that the Proposed Action is a renewable energy project, cumulative impacts are not analyzed.

Existing Cumulative Conditions

As discussed previously, the Proposed Action construction would take place in desert, rural areas where population is sparse, with the exception of Primm, Nevada. The Proposed Project would be located within the Mojave Desert Air Basin, with local air quality management administered by the Clark County DAQEM. The portion of Clark County in which construction activities would occur is designated as non-attainment for ozone with respect to NAAQS. Current ambient air quality conditions represent cumulative contributions of both past and present projects including the Bighorn Electrical Generating Station and the existing railroad. Ambient air quality for the Proposed Project area is described in detail in Section 3.1, Air Quality and Climate. Since the Proposed Action would be located in an area designated as non-attainment, any significant increase in emissions of non-attainment pollutants (or precursors) would have the potential to impact air quality adversely.

Reasonably Foreseeable Future Projects and Changes

Only the Projects within 1 mile of the Proposed Action that would be emitting contaminants concurrent with construction of the Proposed Action are considered potential contributors to cumulative impacts. These include the EITP and the Calnev Pipeline Expansion Project and have the potential to temporally overlap emissions with construction of the Proposed Project because they are located within 1 mile of the Proposed Project. However, the construction schedules of these projects are uncertain and may not coincide with the Proposed Project.

Cumulative Impact Analysis

The potential for air quality impacts of the Proposed Action to combine with the effects of other projects within the geographic extent of the cumulative analysis is described below. The relevant effects of the Proposed Action is Effect AQ-1. As discussed above, Effect AQ-2 is not analyzed for its contribution to cumulative impacts to air quality because the Proposed Action‘s long-term emissions associated with operation of the Proposed Action would be negligible. Additionally, as discussed above, Effect AQ-3 is not analyzed for its contribution to cumulative impacts to climate because climate change, by nature, is cumulative; therefore, this has already been addressed in Section 4.1, Air Quality and Climate.

Cumulative Impact AIR-1: Short-term, adverse effect on air quality conditions resulting from construction.

This section discusses the combined effects on air quality during construction of the Proposed Project and other past, present, and reasonably foreseeable projects. Construction of the Phase 1 of the Proposed Action would take approximately 12 months and would generate emissions of CO, NO_X, VOCs or ROGs, SO_2, PM_{10}, $PM_{2.5}$. Ozone is not emitted directly from emission sources but is created in the atmosphere via a chemical reaction between NO_X and VOCs or ROGs in the presence of sunlight; these compounds are referred to as ozone precursors.

This threshold would not necessarily be exceeded daily, but it could be if all components of the Proposed Project were to be constructed simultaneously.[4] The emissions would be localized to those locations under construction. Facilities such as the Walter M. Higgins Power Generating Station and the existing railroad are currently generating emissions, which are reflected in current ambient air conditions.

Construction of the foreseeable projects within the same airshed as the Proposed Project would generate similar types of emissions and could contribute cumulatively to impacts to air quality. Individually, the foreseeable projects could exceed the daily construction emission thresholds for the same or different criteria pollutants as the Proposed Project. Table 4.19-1 provides the estimated daily emissions of the Proposed Project and the other projects planned in the area for which data are available.

Table 4.19-1. Estimated Maximum Daily Construction Emissions of Criteria Pollutants for the Proposed Action and Other Foreseeable Projects

Criteria Pollutant	Maximum Daily Emissions (lb/day)					Attainment Status in Clark County, Nevada[4]
	EITP CA[2]	EITP NV[3]	Proposed Action[5] NV[1]	Calnev CA[2]	Calnev NV[3]	
CO	893	728	14,655.1	2,118	1,358	Attainment
NO_X	1,791	1,381	17,339.9	4,720	2,654	Attainment/Unclassified
VOC/ROG	209	159	2,151.5	515	325	N/A
SO_2	8	11	22.6	5	3	Attainment/Unclassified
PM_{10}	1,748	1,240	654.9	7,336	533	Attainment

Notes:
[1]Construction for this project would only take place in Nevada
[2]Construction in the Mojave Desert Air Basin
[3]Construction in Clark County
[4] Source: DAQEM 2008
[5] These calculations reflect Phase 1 of development and include Diesel non-road equipment, daily exhaust emissions for on-road vehicles, and emissions from worker commutes.

[4] As indicated in Section 4.19.1, above, the maximum daily construction emission rates are based on the assumption that all construction activities would occur concurrently and that all equipment for each activity is operating on the same day. This assumption is expected to produce a very conservative estimate of the Proposed Project‘s maximum daily emissions during construction.

The EITP and the Calnev Pipeline Project would both result in daily emissions of CO and PM_{10}; however, the instant airshed is not out of compliance for those criteria pollutants. The EITP and the Calnev Pipeline Project would generate VOC emissions in an area that is in non-attainment for ozone. Together, these projects would result in a cumulative impact to air quality. The Proposed Action would also result in daily emissions of CO, PM_{10}, NO_X and VOCs. If the Proposed Action was constructed concurrently with either or both of the Projects considered in this analysis, construction would result in a short-term, localized, and unavoidable impact to air quality.

Alternatives

Alternative 3 would cause an increase in short-term air quality impacts to a greater degree than the Proposed Action. Most of the additional short-term emissions would be associated with additional grading requirements for earth-moving and grading in order to create large detention basins and drainage corridors. Similar to the Proposed Action, although to a greater extent, Alternative 3 would result in a short-term, localized, and unavoidable impact to air quality.

4.19.2 Noise

Geographic Extent

Noise impacts are limited to where there are receptors to hear noise. There is only one noise receptor that would be potentially impacted by construction or operation noise, the Desert Oasis apartment complex in Primm, Nevada. Development within 2 miles of this receptor could contribute to increases in ambient noise levels to this receptor. Therefore, the geographic area analyzed for cumulative noise impacts is a 2-mile radius around the Desert Oasis apartment complex.

The Proposed Action has no adverse operational impacts from noise; therefore, only projects that could have concurrent construction periods are considered in this analysis.

Existing Cumulative Conditions

The Desert Oasis apartment complex in Primm, Nevada, is in the urbanized area closest to the proposed site. Existing development in and around Primm includes the Primm casinos, the Primm Valley Outlet Mall, and the Bighorn Electric Generating Station. Population growth and additional future development projects that are approved in Primm would also lead to increased ambient noise levels.

Past, Present, and Reasonably Foreseeable Projects and Changes

Noise levels in the Ivanpah Valley region reflect an increasing number of sources of noise due to increased highway traffic, air traffic, construction projects, and expanded development. Approved, pending, and reasonably foreseeable projects would add to the future expected noise levels throughout the geographic area. However, various noise levels will continue to be experienced in the area regardless of projects, depending on the proximity to human activity. Open space and rural communities would remain the quietest.

Anticipated development near the Desert Oasis apartment complex includes more urbanization, but also includes the Calnev Pipeline Expansion, the EITP, and the DesertXpress project. The

potential of foreseeable projects to contribute to cumulative noise effects would depend on their distance from the noise receptors as well as the potential for overlapping construction schedules. Approved, pending, and reasonably foreseeable projects would not increase the number of noise-sensitive uses to the area.

Cumulative Impact Analysis

The potential for noise impacts of the Proposed Action to combine with the effects of other projects within the geographic extent of the cumulative analysis is described below.

The existing and foreseeable projects listed in Table 4.19-2 would result in noise impacts primarily due to construction activity. Therefore, cumulative noise impacts to residents of the Desert Oasis apartment complex would occur only in the event of concurrent construction periods. While the table lists sources of existing noise sources, such as the Primm Outlet Mall, Primm Casino, and Bighorn Electric Generating Station, the largest contributors to noise at the apartment complex is traffic noise on I-15 and at the nearby truck stop.

Table 4.19-2. Existing and Foreseeable Projects within 2 Miles of Noise Receptors

Existing or Foreseeable Projects Near Desert Oasis Apartment Complex	Distance from Noise Receptor (miles)
NextLight Silver State Solar Project (Proposed Action)	1.4
EITP	0.01
New fast food restaurant	0.4
Calnev Pipeline	0.5
Primm Outlet Mall	0.9
BLM-sanctioned recreational activities	1.0
Primm Casino	1.7
Bighorn Electric Generating Station	1.7

Construction of the Calnev Pipeline Expansion Project is estimated to occur at a rate of about two miles per day in the vicinity of Primm; therefore, its potential noise impact to the Desert Oasis apartment complex would be for one or two days. Calnev would implement site-specific noise mitigation measures (BLM 2009c, BLM 2008). It is not known when or how long the construction of the planned fast food restaurant would be and what the noise levels would be at the apartment complex. Construction of the EITP would produce noise that would impact residents of the Desert Oasis apartment complex. The apartments are located between 50 and 100 feet from the EITP, which would result in noise levels between 83 and 79 dBA, respectively, during construction. The apartment complex is separated from potential construction activities by an 8-foot solid concrete block wall. Typically, such a wall provides a minimum 5 to 10 dBA noise level reduction, provided it blocks the line of sight between the noise source and receiver. This would result in estimated construction noise levels between 69 and 78 dBA. Concurrent construction of these projects could result in a cumulative noise impact to residents of the Desert Oasis apartment complex.

Noise generated by construction of the Proposed Action would not contribute to cumulative noise impacts at the Desert Oasis apartment complex due to the distance between that receptor and the proposed site relative to the distance between the apartment complex and the cumulative projects. Noise and vibration levels from the Proposed Action would be attenuated over distance and reduced to background levels at the closest sensitive receptor. Implementation of MM NOI-1 through MM NOI-7 would mitigate construction noise impacts for receptors at the Desert Oasis apartment complex. Additionally, noise at any specific receptor is typically dominated by the closest and loudest equipment. If construction of the cumulative projects were concurrent with construction of the Proposed Action, the noise levels generated by the cumulative projects would exceed and drown out noise produced by construction of the Proposed Action.

Alternatives

Noise impacts are a function of the greater land construction area and overall larger project footprint size; the larger project footprint and construction area required by Alternative 3 would result in a greater adverse noise impact than Alternative 2. However, the location of Alternative 3 relative to the cumulative projects and the distance between Alternative 3 and the Desert Oasis apartment complex would be the same; therefore, the cumulative analysis for Alternative 3 would be the same as that of the Proposed Action.

4.19.3 Geology, Topography, and Geologic Hazards

Cumulative impacts to geology are not analyzed for the Proposed Action because the Proposed Action would result in no impact to geologic units or topography and, therefore, would not contribute to cumulative impacts to geology and topography.

Geologic hazards (such as ground shaking, earthquake-induced ground failure, and fault rupture) from the local and regional faults are impacts of the geologic environment on individual projects and would not introduce cumulatively considerable impacts.

The effects on geologic resources from Alternative 3 would be similar to that of the Proposed Action because the effects would also be located in the same proximity to regional faults and on the same geologic unit and Alternative 3 would be similarly designed to avoid impacts to existing transmission infrastructure; therefore, cumulative impacts to geology, topography, and geologic hazards for Alternative 3 are not analyzed.

4.19.4 Soils

Geographic Extent

Impacts to soils caused by the Proposed Action would be limited to projects in the Ivanpah Valley. The other proposed renewable energy projects located on alluvial fan formations and that would require grading for installation of project components would cause effects to soil resources similar to those expected under the Proposed Action. Soil loss would be mitigated by BMPs.

Existing Cumulative Conditions

The local lands in the Ivanpah Valley generally share the same desert soil characteristics as the Proposed Project site. The adjacent lands are primarily rural, open spaces.

Past, Present, and Reasonably Foreseeable Projects and Changes

Ongoing and foreseeable development throughout the cumulative effects area for soils is dominated by proposed renewable energy projects. As shown in Figure 3.19-1 and described in Table 3.19-1 (see Section 3.19, Cumulative Impacts Scenario), additional renewable energy development is expected in the area. Other projects within the Ivanpah Valley that could contribute to cumulative effects include the EITP, the SNSA, the Calnev Pipeline Expansion, and the DesertXpress rail line. The airport is still in the planning phase and, if built, would not be completed until 2020; therefore, it could only contribute to impacts during Project operations. The other projects could have overlapping construction schedules; therefore, they could contribute to cumulative impacts during Project construction, as well as during operations.

Cumulative Impact Analysis

Construction of the Proposed Action would involve grading certain areas of the Project site. Erosion could occur in these areas due to the removal of vegetation and soil exposure. The Applicant would implement a SWPPP to minimize the amount of any soil erosion during construction.

Due to the potential for water-driven erosion at the Proposed Project site, which is on an alluvial fan formation, the Applicant has designed an erosion control and stormwater detention system. Erosion would occur during flash flood events but the potential adverse effects of erosion would be addressed and minimized by the erosion control design as described in Chapter 2, Description of the Proposed Action and Alternatives. As part of this system, the majority of the site would be drained by sheet flow to on- and off-site drainages. The drainage plan would use existing natural washes, by reinforcing their banks, and allow the remaining stormwater flow to pass through the site naturally. Construction of the erosion control and stormwater detention system would reduce water erosion susceptibility of the Proposed Project site and down gradient parcels.

To further ensure that effects related to soil erosion are minimized, the Applicant has incorporated a series of BMPs into their Proposed Project (See Chapter 2). Implementation of these BMPs will reduce localized soil impacts resulting from wind and water erosion; however they will not eliminate all soil loss within the Project site. Wind erosion will be exacerbated due to the removal and maintenance of vegetation within the Project site, likely resulting in a localized loss of topsoil. Also, placement of impervious surfaces (solar panels) may alter the drainage characteristics of the site, limiting the effectiveness of the Applicant designed stormwater detention system during monsoonal precipitation events.

As with construction, there would be the potential for erosion and topsoil loss during decommissioning, the legally required erosion control measures would be implemented. Therefore, the Proposed Action would not contribute to substantial soil erosion or loss of topsoil in the area.

All other foreseeable construction projects in the cumulative effects area for soils would also be required by law to implement SWPPPs to prevent erosion. However, the acreage affected by the other foreseeable projects would contribute to an overall cumulative impact to soil resources over the life of the Project.

To reduce effects on soil production, the Applicant proposes to salvage the top four inches of native soil where flood control berms are built. After construction of the berms, salvaged soil would be replaced to provide a homogenous appearance as well as preserve sensitive soils and seed banks. Implementation of MM SOILS-2 reduces the potential for exposure to contaminated soils. The implementation of these types of measures is expected for the other projects in the cumulative effects area for soils. On a local scale the cumulative effects could be large given the amount of vegetation clearing and grading; however on a broader regional basis, the cumulative impact would not be considerable, amounting to an effective loss of up to 55,917.8 acres, of which about 2,967.47 acres would be the result of the Silver State project.

Alternatives

Alternative 3 would produce similar effects on soils as describe in Alternative 2, with the exception of the flood control system. Alternative 3 would involve several diversion berms (each 10 feet high), debris basins, and level spreader detention basins, and would temporarily disturb an area of 1,150 acres and permanently disturb an additional 250 acres. Because of the site drainage plan, the footprint of Alternative 3 and related facilities would encompass 3,669 acres. This increase in the number of disturbed acres would exacerbate the effects to soils described in Alternative 2, thus increasing the cumulative impacts to soils.

Because the flood control system in Alternative 3 does not make use of the site‘s existing channels for flood control, the mitigation described in Alternative 2 would not reduce these potential effects to the same level

4.19.5 Water Resources/Hydrology

Geographic Extent

In general, impacts to hydrology and water quality are contained within watersheds. Water quality regulations, such as TMDLs, are generally implemented at the watershed level. Therefore, this cumulative effects analysis for hydrology and water quality considers the watersheds and subwatersheds of the valley.

Existing Cumulative Conditions

Although there is some development in the area considered for cumulative effects to hydrology and water quality, the area is largely undeveloped. The development within Primm, Nevada, at the Primm Valley Golf Course, and at the Molycorp Mine has altered the natural hydrology of these areas and, therefore, has contributed to the condition of the hydrology and water quality.

Past, Present, and Reasonably Foreseeable Projects and Changes

Ongoing and foreseeable development throughout the cumulative effects area for hydrology and water quality is dominated by proposed renewable energy projects. As shown in Figure 3.19-1 and described in Table 3.19-1 (see Section 3.19, Cumulative Impacts Scenario), additional renewable energy development is expected in the area. Other projects within the watersheds that could contribute to cumulative effects include the EITP, the SNSA, the Calnev Pipeline Expansion, and the DesertXpress rail line. The airport is still in the planning phase and, if built, would not be completed until 2020. Only operational impacts from the SNSA would contribute to cumulative hydrologic impacts. The other projects could have overlapping construction

schedules; therefore, they could contribute to cumulative impacts during Project construction. These projects may include the DesertXpress, EITP and the other solar projects listed on Table 3.19-1.

Cumulative Impact Analysis

The potential for hydrology and water quality impacts of the Proposed Project to combine with the effects of other projects within the geographic extent of the cumulative analysis is described below.

Cumulative Impact WATER-1: Decrease groundwater supply or interfere substantially with groundwater recharge.

This section addresses the combined effects of decreasing groundwater supply or interfering substantially with groundwater recharge by the Proposed Project and past, present, and reasonably foreseeable projects. The relevant impact of the Proposed Project is Effect WATER-1.

The Proposed Project would use up to 600 acre-feet of water during the four-year construction period, with no more than 200 acre-feet used in any one year. The source of this water would be from two wells drilled on the Proposed Project site. The foreseeable solar projects within the Ivanpah Valley are shown in Figure 3.19-1 (see Section 3.19, Cumulative Impacts Scenario). Within the cumulative analysis area, the foreseeable solar projects would occupy over 12,696 acres, with an additional 2,967 acres of disturbance from the Proposed Project. The ISEGS is the only project within the Ivanpah Valley that has completed an environmental analysis. ISEGS, an almost 4,100-acre facility, has estimated that it would use 626.8 acre-feet of water during its four-year construction period (or approximately 157 AFA) and 119.2 AFA during operations. ISEGS would draw its water from two wells located close to its site (BLM and CEC 2009). Assuming a comparable annual water usage per acre during construction of the foreseeable solar projects, these projects would need at least 464 AFA during construction.[5] At this time, it is not known what the source of water would be for the First Solar project.

The capacity of the local aquifer is not currently known. However, as described above, the Proposed Project would use 1 to 3 percent of the amount allowed by the LVVWD for its size and type of development. Without knowing the water sources for many of the foreseeable projects, it is not possible to assess the magnitude of the impacts; however, if all the water needed to support the foreseeable projects were drawn from the same water table, this would cause a cumulative impact. However, the water used for the Proposed Project would be small in comparison to the withdrawal parameters from the LVVWD and would not alter groundwater volume within the local basins; therefore, it would not contribute to a considerable cumulative impact under this criterion.

The Proposed Project would result in about 196 acres (0.3 square mile) of impervious surfaces. The Proposed Project would be in the Ivanpah Valley groundwater basin which covers 637 square miles, which is largely undeveloped. The area covered by the impervious surfaces of the

[5] These figures assume 157 acre-feet per 4,000-acre facility, using the ISEGS project as a model.

Proposed Project would be 0.05% of these basins. There could be as many as 28,224 acres of new renewable energy facilities in the Ivanpah and Eldorado valleys, not including the 2,967 acres that would be disturbed by the Proposed Project, all built on previously undisturbed land. The other foreseeable projects could result in the construction of hundreds to thousands of acres of impervious or semi-impervious surfaces. This could result in significant cumulative alteration of groundwater recharge locally. However, the area of new impervious surfaces of the Proposed Project would be small in reference to the size of the recharge area that it would not alter groundwater recharge within the local basins, so it would not contribute considerably to the cumulative impact.

The Proposed Project would use 21 AFA during O&M. If other foreseeable projects were using a similar level of water use for O&M, together they would cause an impact, although at a much reduced level than during construction.

Cumulative Impact WATER-2: Degrade the quality of groundwater such that it is no longer suitable for its intended use.

This section addresses the combined effects of the Proposed Project on degrading groundwater quality such that it is no longer suitable for its intended use and the similar impacts of past, present, and reasonably foreseeable projects. The relevant impact of the Proposed Project is Effect WATER-2.

Although hazardous material spills can occur on any construction site, the Applicant would implement many programs and measures to reduce the potential for a spill and to address spills that occur. These include emergency release response procedures to address any potential release of hazardous materials. Since the Proposed Project would store quantities of mineral insulating oil at the transformers, SPCC plans would be required.

All foreseeable construction projects would also be required by law to implement a SWPPP and would likely have the same type of hazardous materials management programs as the Applicant. All other foreseeable projects that would have aboveground oil storage capacity greater than 1,320 U.S. gallons, or completely buried oil storage capacity greater than 42,000 U.S. gallons, would be required by law to implement a SPCC plan.

With successful implementation of the spill prevention measures, any release from either the Proposed Project or any foreseeable project would have short-term and localized effects. Given the depth to groundwater in the area, considerable cumulative impacts to water quality would not be likely. Therefore, it is unlikely that there would be a significant cumulative impact to water quality that would result in degradation of groundwater quality.

Cumulative Impact WATER-3: Degrade the quality of surface waters by increasing erosion, increasing sedimentation, or introducing contaminated waters.

This section addresses the combined effects of the Proposed Project on potential degradation of the quality of surface waters by increasing erosion, increasing sedimentation, or introducing contaminated waters and the similar impacts of past, present, and reasonably foreseeable projects. The relevant impact of the Proposed Project is Effect WATER-3.

The estimated total land disturbance from the Proposed Project would be 2,967.47 acres. During construction of the Proposed Project, the Applicant would implement the required SWPPP and BMPs required by the General Permit. This would help ensure all the appropriate erosion control measures were used during construction to prevent on-site or off-site siltation or erosion. All other foreseeable construction projects would also be required by law to implement a SWPPP to prevent erosion. Therefore, there would not be a considerable cumulative impact to erosion in the cumulative effects area.

Cumulative Impact WATER-4: Increase the potential for flooding hazards.

This section discusses the combined effects on increasing the potential for flooding hazards of the Proposed Project and past, present, and reasonably foreseeable projects. The relevant impact of the Proposed Project is Effect WATER-4.

As described above, drainage within the Proposed Project site occurs via sheet flow to migrating channels, which is typical of an alluvial fan. During heavy precipitation, alluvial fan deposits can be subject to rapid flow changes, resulting in debris flows, landslides, and flash floods. Extreme rain events can suspend sand, gravel, or even boulders, and transport them downstream or downslope, resulting in damage to structures impacted by flood waters (USGS 2001). Flood events on alluvial fans in arid climates are triggered by significant storms. In the Mojave Desert region, these would include the random summer cloudbursts that occur infrequently but can supply a large amount of water to a small area, as well as larger storms such as tropical storms that occur on a 100-year time scale. Any of these storms could result in flooding that could cause significant damage across the Proposed Project area and could cause significant localized destruction.

The Applicant conducted hydrologic modeling for the Proposed Project site. As part of MM WATER-2, the Applicant would design project facilities to mitigate against flood risk. MM WATER-2 also calls for an adaptive management approach whereby flood risks would be reassessed throughout the life of the Project. If the established flood risk mitigation measures were found to be insufficient or excessive, these practices could be amended, with consultation from the BLM.

The other foreseeable projects would be constructed on alluvial fans and alluvium on the valley floors. The analysis of the ISEGS project indicated that the ISEGS project area is subject to flash floods and mass erosion. The results of hydrological modeling indicated that a 100-year flood event would inundate most of the proposed ISEGS project area through canalized and sheet flows, and would be primarily erosive rather than depositional. Scour analysis was used to ensure that the Project design could withstand flash flood flows with minimal damage to site structures and heliostats (BLM and CEC 2009). The Calnev Pipeline Expansion and the DesertXpress rail line (Segment 4B) would cross Ivanpah Dry Lake. DesertXpress would implement mitigation to restore areas to preconstruction conditions to allow for revegetation and would give special attention to erosion control near ephemeral drainages and within playas (USDOT 2009). No specific restoration requirements are included in the Calnev document. The DesertXpress drainage facilities and culverts would be sized to handle the flow of a 100-year, 24-hour storm event (USDOT 2009). The other foreseeable projects would be required to take similar measures to reduce the potential adverse effects of flood events; therefore, the potential cumulative risks

would be reduced. As long as the foreseeable projects did the appropriate hydrologic modeling to site their facilities in the areas with lowest flood risk and their structures were designed to accommodate a 100-year, 24-hour flood event, there would not be a significant cumulative impact to flood risks.

Alternatives

As described in the alternatives analysis above, Alternative 3 would result in slightly more impacts than the Proposed Project due to the larger footprint of Alternative 3. The increased acreage of disturbance would result in more construction-phase water usage for dust suppression.

The potential for adverse effects to the quality of groundwater for Alternative 3 is consistent with the conclusions above for Alternative 2 since all hazardous materials and their handling would be the same.

Alternative 3 would disturb more land area during construction, specifically 1,150 acres of temporary disturbance associated with construction of the drainage control system. This increased acreage would result in a greater potential for adverse effects associated with erosion and sedimentation. Since Alternative 3 would have to comply with a SWPPP and the General Permit, Alternative 3 would not contribute to cumulative impacts related to surface water quality. All other foreseeable projects would have to comply with the same permits. Therefore, cumulative effects related to degradation of surface water would not be expected.

Alternative 3 would use a flood control plan more reliant on modeling than the natural scenario used in the Proposed Project. Since flooding risks associated with development on alluvial fans in the Mojave Desert have not been extensively studied, the cumulative effects associated with this hazard are not fully understood. However, if elaborate stormwater management programs were implemented at all of the foreseeable project sites, there could be adverse cumulative impacts.

4.19.6 Biological Resources

Geographic Extent

Environmental analysis for biological resources is confined by the natural geographic boundaries of the region in which the Proposed Project is sited. Therefore, cumulative biological impacts associated with the Proposed Project will be evaluated within the Ivanpah Valley region as confined by the Spring Mountains, Clark Mountains, Lucy Gray Mountains, and New York Mountains.

The cumulative impacts area reflects natural watershed boundaries (similar to the boundary used for the cumulative impact to water resources) and encompasses the local ranges of species that may be affected by the Proposed Project and other projects. The area is an expansion of the area that was used to assess the potential biological impacts of the Proposed Project; expansion of the geographic boundaries used to assess the environmental impacts of the Proposed Project facilitates an evaluation of cumulative effects on a regional, landscape-level scale. Analysis of cumulative impacts will assess regional impacts on wildlife corridors and species impacts resulting from cumulative habitat fragmentation and loss.

Existing Cumulative Conditions

The Proposed Action would be constructed in an area that supports a broad variety of biological resources. Details of these resources within the cumulative study area are summarized here and provided more fully in Section 3.6, Biological Resources. The Proposed Project would be located within the Mojave Desert biome, which is comprised of a diverse range of habitat types typical of those found in the Mojave Desert. These habitat types include desert scrub, desert wash, and scattered desert woodlands. The cumulative impacts area also includes the Ivanpah and Jean/Roach Lake dry lake beds, numerous drainages, and areas relatively devoid of native vegetation including developed areas, paved roads, highways, access roads, and other disturbed areas associated with on-going mining operations. Invasive and noxious weed species have been identified throughout the cumulative impacts area as described in Section 3.6.4, Invasive Plants.

Vegetation communities are described in Section 3.6.1, Vegetation, and wildlife communities are discussed in Section 3.6.2, Wildlife. The area supports habitat for, and populations of, numerous special status flora and fauna as described in Section 3.6.3, Special Status Species, and listed in Table 3.6-1.

Past, Present, and Reasonably Foreseeable Projects and Changes

Land in the cumulative analysis area has been historically altered by human activities, resulting in conversion of undeveloped land and habitat loss, fragmentation, and degradation. Reasonably foreseeable future projects that could impact biological resources in the cumulative impacts area characterize overall development trends in the Ivanpah Valley. These projects are shown in Figure 3.19-1 and described in Table 3.19-1 (see Section 3.19, Cumulative Impacts Scenario). Ongoing development in the area is dominated by renewable energy development. Major renewable projects require extensive access roads and new transmission lines to tie into the existing electrical grid system and would require upgrades to the existing electrical grid system, such as the EITP.

Other projects in the cumulative study area include several large-scale transportation infrastructure projects, including DesertXpress, the California High-Speed Rail Project, and the proposed SNSA. Additional ongoing regional trends that have led to degradation of biological resources in the area include population growth and the subsequent demand for new housing and infrastructure, grazing, and recreational activities.

In addition to one-time construction impacts, the Proposed Action would have ongoing operational impacts on biological resources. Therefore, all projects that might contribute impacts over time in the cumulative area are considered for this analysis. This would include transportation, transmission, wind power, and solar power projects.

Cumulative Impact Analysis

The potential for biological resource impacts of the Proposed Project to combine with the effects of other projects within the geographic extent of the cumulative analysis is described below. As described in Section 4.6, Biological Resources Impacts, the EITP would have adverse impacts on biological resources during construction and operation of the Proposed Action.

Cumulative impacts to biological resources can be additive, that is, directly proportional in severity to the quantity of the resource affected (such as vegetation loss or wetland fill), or exponential. For exponential impacts, increasing levels become disproportionately more substantial if they affect biological features that are critical to the survival of a species. An example of an exponential impact is habitat fragmentation, where the result of the construction of multiple projects in a particular area results in fragmentation of areas that formerly provided contiguous habitat into separate areas too small to support dependent species.

Additionally, cumulative impacts on biological resources could be exacerbated as a result of project schedules. Construction of multiple projects within the same time period can result in greater impacts from emissions, noise, construction equipment, and vehicle traffic, and overall habitat degradation and loss. If projects were to be constructed consecutively, project impacts would be reduced in intensity but prolonged in duration, resulting in adverse impacts on the life cycles of species and/or resulting in prolonged or permanent displacement of wildlife from critical habitats. Given the number of projects planned in the Ivanpah Valley region, it is likely that concurrent construction would occur.

Cumulative Impact BIO-1: Vegetation Loss and Habitat Loss, Degradation, and Fragmentation.

This section discusses the combined effects of habitat fragmentation, degradation, and loss and vegetation loss resulting from the Proposed Action and past, present, and reasonably foreseeable projects.

Given the scale and number of projects proposed within the Ivanpah Valley region, these impacts could be significant on a regional level. The development of numerous large-scale projects, such as ISEGS, other wind and solar generation facilities, the EITP, DesertXpress, the California High-Speed Rail Project, and the SNSA, would result in a substantial permanent conversion of desert habitat to industrial/commercial uses. This could have significant effects on a variety of species through direct habitat loss and/or habitat fragmentation. Table 4.19-3 below lists the acreages that would be potentially disturbed by construction and/or operation of the cumulative projects.

Table 4.19-3. Summary of Land Disturbance by Project Type[1,2]

NextLight Silver State Solar Project	Acreage of Disturbance: 7,937.2 acres	**Existing Cumulative Projects**	Acreage of Disturbance: 16,603.2 acres	**Future Foreseeable Projects**	Acreage of Disturbance: 36,347.2 acres

Notes:
[1] Project areas are approximated based on the Proposed Project ROW and do not necessarily reflect the actual or planned Project footprint.
[2] Linear projects are not included when calculating overall acreage of disturbance.

The Proposed Action, in conjunction with other projects, would result in cumulative impacts on native vegetation communities, including cacti and yucca species, and adversely affect SMAs due to temporary and permanent habitat loss from ground disturbance and inadvertent distribution of noxious weeds as described in Section 4.6, Biological Resources Impacts. Vegetation would be cleared for construction activities and, while vegetation would be allowed to repopulate areas where there would not be permanent project features, the area would be

maintained via regular mowing. Additionally, washing of the solar panels would introduce new sources of water and the solar panels would introduce new areas of shading, which would adversely affect native vegetation. Drainage and berms would also alter the topography of the Proposed Project site, which could impact native vegetation. It is anticipated that planned renewable projects in the Ivanpah Valley region would have similar impacts to vegetation and existing habitat to the Proposed Action.

As outlined in Section 4.6, Biological Resources Impacts, mitigation measures would lessen the impact of the Proposed Action on vegetation communities and existing habitats. MM BIO-1 would require pre-construction surveys to identify special status plant and wildlife species on site. MM BIO-2 would require BMPs to minimize impacts to biological resources. MM BIO-3 would require biological monitors to ensure that impacts on special status species, native vegetation, wildlife habitat, or unique resources would be avoided to the fullest extent possible. MM BIO-4 recommends that a WEAP would be prepared to increase worker awareness of ways to avoid or minimize impacts to biological resources. MM BIO-7 would require the final locations of all project facilities, solar panels, and roads be adjusted to avoid sensitive biological resources to the greatest extent feasible. MM BIO-13 would outline the protocol for the restoration of the natural vegetation community following BLM guidelines.

These measures would minimize impacts to vegetation and existing habitat; however, as shown in Table 4.19-3, up to 36,347.2 acres are planned for development in the Ivanpah Valley area (not including planned linear projects) as compared to 16,603.2 acres currently developed in the region. Cumulatively, these projects would result in a long-term adverse impact due to vegetation loss and habitat loss, fragmentation, and degradation. Even with the implementation of mitigation, the Proposed Action would contribute to unavoidable adverse impacts to biological resources due to vegetation loss and habitat loss, fragmentation, and degradation.

Cumulative Impact Bio-2: Wildlife and Special Status Species.

This section discusses the combined effects on wildlife, including special status species, from the Proposed Action and past, present, and reasonably foreseeable projects.

As discussed in Section 4.6, the Proposed Action would result in impacts on special status species that could result in cumulative impacts in conjunction with similar impacts from other projects. Impacts would include noise and visual disturbances and increased human/vehicle presence during construction, operations, and maintenance, all of which could disrupt normal behavior patterns and cause direct injury and/or mortality. Species potentially affected would include special status plants and several special status wildlife species (reptiles, mammals, and birds) with potential for significant impacts to desert tortoise, desert bighorn sheep, American badger, and burrowing owl.

Construction activities could result in the disturbance, injury, or take of wildlife, including special status species. Additionally, as described above, the construction and operation of the Proposed Action would result in vegetation losses and loss, degradation of, and fragmentation of habitat, which would indirectly affect local wildlife populations. Additionally, the permanent fencing of 2,865 acres would greatly reduce access to the native habitat within the fenced areas, and would cause wildlife to rely more heavily on habitat within the surrounding area. Further, the presence of infrastructure associated with the Proposed Action may also indirectly cause

mortality to wildlife by increasing the risk of predation on certain species by native predators such as ravens and raptor species.

As described in Section 4.6, Biological Resources Impacts, proposed mitigation measures would reduce potential impacts to wildlife, including special status species, with the exception of desert tortoise. MM BIO-1 would require pre-construction surveys to identify special status wildlife species on site. MM BIO-2 would require BMPs to minimize impacts to biological resources. MM BIO-3 would require biological monitors to ensure that impacts on special-status species, native vegetation, wildlife habitat, or unique resources would be avoided to the fullest extent possible. MM BIO-4 recommends that a WEAP be prepared to increase worker awareness of ways to avoid or minimize impacts to biological resources. MM BIO-7 would require final location of all project facilities, solar panels, and roads be adjusted to avoid sensitive biological resources to the greatest extent feasible. MM BIO-10 would require the Applicant to minimize nighttime lighting to avoid disturbing local wildlife populations. MM BIO-13 would outline the protocol for the restoration of the natural vegetation community following BLM guidelines. With the implementation of these mitigation measures, the Proposed Action would minimize impacts to special status species, with the exception of desert tortoise; however, even with the implementation of the mitigation described above, the Proposed Action could still contribute to cumulative impacts to these species when considered in combination with the Projects listed in Table 3.19-1 and shown on Figure 3.19-1 (see Section 3.19, Cumulative Impacts Scenario).

Data is not available at this time to analyze the cumulative impacts of all projects considered in this analysis for each sensitive species. Instead, impacts on desert tortoise are quantified here as an example of the extent of impacts that could occur. The range of the desert tortoise encompasses virtually all of the cumulative impacts area, incorporates most of the habitat types that would be used by other potentially impacted species, and includes the locations of the majority of the past, present, and future cumulative projects evaluated in this analysis.

One potential effect from future projects, including the Proposed Action, could be habitat loss over a large area. Coupled with historical losses, this extensive habitat loss would result in significant cumulative impacts. Planned projects in the area, including the Proposed Action, would eliminate up to 61,323.4 acres of suitable desert tortoise habitat. The Proposed Action would comprise 8.63 percent of the overall habitat loss and would contribute to cumulative impacts to wildlife and sensitive species (see Table 4.19-4).

Table 4.19-4. Impacts on Desert Tortoise Habitat from EITP and Other Proposed Projects

	Proposed Action (acres)[1]	Other Projects (acres)	Total Impacts (the Proposed Action + Other Proposed Projects)	Contribution of the Proposed Actions to Cumulative Impacts (%)
Desert Tortoise Habitat	8,373	52,950.4[2]	61,323.4[2]	8.63%

Notes:
[1] This acreage represents the total ROW and not the actual footprint of the Proposed Action. This acreage does not include disturbance associated with linear projects.

Table 4.19-4. Impacts on Desert Tortoise Habitat from EITP and Other Proposed Projects

	Proposed Action (acres)[1]	Other Projects (acres)	Total Impacts (the Proposed Action + Other Proposed Projects)	Contribution of the Proposed Actions to Cumulative Impacts (%)

[2] This acreage figure includes 3,463 acres of critical desert tortoise habitat.

Using the desert tortoise as an indicator species to impacts to sensitive species in the region as a whole, the Proposed Action would contribute to cumulative impacts to special status species discussed in Section 4.6, Biological Resources Impacts. Specific to the desert tortoise, tortoise populations have been eliminated or reduced in large parts of their ranges in California and in areas near Las Vegas as a result of human activities and disease (USFWS 2008b). This historical decline, coupled with potential effects from future projects, makes any future impacts potentially significant. Adverse impacts on desert tortoise would occur with the implementation of the Proposed Action, which would contribute to cumulative impacts to the desert tortoise population in the region.

The white margin penstemon may be particularly affected by renewable and other development in Nevada. For example, five of seven white margin penstemon populations are threatened by solar development and concentration of OHV activity resulting from exclusion from adjacent sites by development (Edwards 2010). The Proposed Project site would remove habitat, although until the spring 2010 surveys are completed it unknown precisely how many acres would be affected. Depending on the amount of habitat that is found during the surveys, the Applicant may be required to implement mitigation beyond that which is currently envisioned.

Alternatives

Alternative 3 would have a greater impact on biological resources due to the increased project footprint; however, despite the increased area of disturbance, and because the location and construction activities and operational conditions would be similar to the Proposed Action, Alternative 3‘s contribution to cumulative impacts to biological resources would be the same as those discussed above for the Proposed Action.

4.19.7 Cultural Resources

There would be no cumulative impacts to cultural resources as a result of the Proposed Action because there would be no impacts. As described in Section 4.7, Cultural Resources Impacts, there are two prehistoric sites (26CK1620/8282 and 26CK2632/8280) located within the corridor for the main access road for the Proposed Action; however, MM CULT-1 would ensure that the Applicant would avoid any inadvertent impacts to these resources during construction, operation, and decommissioning of the Proposed Action. Cultural resource 26CK5180a is located in the northwestern portion of the proposed project; however, it would not be affected by the Proposed Project. Because all impacts to cultural resources could be avoided and/or fully mitigated, the Proposed Action would not contribute to cumulative impacts to cultural resources.

The effects on cultural resources from Alternative 3 would be the same as those from the Proposed Action.

4.19.8 Paleontological Resources

Since the Proposed Action would result in no impact to paleontological resources, there would be no cumulative impacts.

The effects on paleontological resources from Alternative 3 would be the same as the Proposed Action in that there would be no cumulative impacts.

4.19.9 Lands and Realty

Cumulative impacts to land use are not analyzed for the Proposed Action because the Proposed Action would result in no impact to land use and, therefore, would not contribute to cumulative impacts to land use. As discussed in Section 4.9, Lands and Realty Impacts, the Proposed Project site is designated by the BLM as Open Public Land and is currently crossed by three transmission lines. The Proposed Action has been designed so as not to interfere with the existing transmission lines and does not conflict with any land use designations for the area. Therefore, the Proposed Action would have no impact to land use.

The effects on land use from Alternative 3 would be similar to those of the Proposed Action because Alternative 3 would also be located on land designated Open Public Land and would be similarly designed to avoid impacts to existing transmission infrastructure; therefore, cumulative impacts to land use for this alternative are not analyzed.

The CCDOA has proposed a new commercial service airport in the Ivanpah Valley of southern Nevada. The SNSA would provide additional capacity to serve the Las Vegas metropolitan area. In 2004, pursuant to the Ivanpah Valley Airport Lands Transfer Act (Pub. L. 106-362), the BLM patented a 6,000-acre Airport Site to Clark County for this purpose. The Federal Aviation Administration (FAA) and the BLM, as joint lead agencies, are currently preparing an EIS for the SNSA. If approved, Clark County would have the right, pursuant to Title V of the 2002 Clark County Conservation of Public Land and Natural Resources Act (Pub. L. 107-282), to request title to an additional 17,000 acres designated by Congress as the Airport Environs Overlay District. A portion of the Proposed Project site (T.27S., R.59E., Section 3) would be located within the Airport Environs Overlay District.

4.19.10 Special Management Areas

Cumulative impacts to SMAs are not analyzed for the Proposed Action because there are no ACECs, Wilderness Areas, or National Preserves within proximity to the Proposed Action. Cumulative impacts to SRMAs are discussed in Section 4.19.11 Recreation, below. Cumulative impacts to the Ivanpah DWMA are discussed in Section 4.19.6, Biological Resources, above.

The effects on SMAs from Alternative 3 would be similar to those of the Proposed Action due to the similarities in location and size of this alternative; therefore, cumulative impacts to SMAs are not analyzed.

4.19.11 Recreation

Geographic Extent

The Proposed Project would be constructed entirely on lands administered by the BLM Las Vegas Field Office within the Jean/Roach Lake SMRA, and within 5 miles of the Ivanpah Lake SRMA. The Proposed Project would not be constructed within 5 miles of any local, county, or state recreational facilities. Therefore, the geographic area analyzed for cumulative recreational impacts is the Jean/Roach Lake SMRA and the Ivanpah Lake SRMA.

Existing Cumulative Conditions

As discussed in Section 3.11, Recreation, there are four annual races that take place in the Jean/Roach Lake SRMA. These races include the Battle at Primm, the SNORE 250, the SCORE Terrible‘s Primm 300, and the Henderson Fabtech Desert Classic. A portion of Terrible‘s Primm 300 goes through the Proposed Project area.

Past, Present, and Reasonably Foreseeable Projects and Changes

Ongoing and foreseeable development throughout the cumulative effects area for recreation is dominated by proposed renewable energy projects. As shown in Figure 3.19-1 and described in Table 3.19-1 (see Section 3.19, Cumulative Impacts Scenario), additional renewable energy development is expected in the area. Other projects in the vicinity of the Proposed Project include the Primm Valley Golf Course, the Ivanpah Dry Lake SRMA, and Molycorp Mine.

The Proposed Project would have impacts on recreation during both the construction and operational phase. The Primm Valley Golf Course, Ivanpah Dry Lake SRMA, and Molycorp Mine are already constructed or their operations have already started. The start time for construction of most of the renewable energy projects is 2010 or later, although some of these may not go forward; however, they could be constructed during the same time as the Proposed Project and, therefore, are included in the analysis.

Cumulative Impact Analysis

This section discusses the combined effects on access and levels of use of existing recreation areas or sites of the Proposed Project and past, present, and reasonably foreseeable projects. Relevant impacts of the Proposed Project are Effect REC-2 and Effect REC-3.

<u>Cumulative Impact REC-1: Changes in access to existing recreation areas or sites.</u>

Construction and operation of the Proposed Project would result in the Project site being fenced in, thus making the entire project site off limits to the public. This portion of the Jean/Roach Lake SRMA would no longer be accessible to the public engaged in recreational model rocket launching, movie, commercial, and music video filming, big game hunting, horseback riding events, hiking, and music festivals. This would result in an increase in the level of use of other parts of the Jean/Roach Lake SRMA by members of the public engaged in the above described activities since this portion of the SRMA would no longer be available to the public. OHV activity would not be allowed within the Proposed Project site and Terrible‘s Primm 300 would no longer go through the Proposed Project site.

A number of renewable energy projects, including transmission projects, would be constructed during the timeframe the Proposed Project is in operation. The First Solar, BrightSource, Cogentrix, Iberdrola, and Power Partners Southwest solar projects would collectively occupy over 20,000 acres of land if they were all constructed. Since solar projects typically occupy 90 percent of their footprint, this area would no longer be accessible by the public. Recreational activities described above for the Jean/Roach Lake SRMA would no longer be able take place in these areas and the public would be forced to move these activities to other areas which could cause an increase in activity in these locations.

The Table Mountain Wind and Competitive Power Vent Wind projects would also affect access to recreation areas; however, this effect would be limited to the construction period and there would be only small portions of the Project footprint that would be permanently off limits (i.e., the wind turbines and fenced areas such as the substation and O&M building).

OHV activity would be directly affected by the renewable energy projects because access through these project sites would be prohibited. OHV recreational activity and races would not be allowed within these areas and new routes would be designated.

BLM would designate a temporary bypass route to enable backcountry access during construction of the county road. The Applicant would construct an unimproved 4-wheel-drive OHV route to allow casual OHV uses to continue in the vicinity of the Proposed Project area. This OHV route would extend along the northern boundary of the Proposed Project site across Section 1, and then south along the eastern project boundary within Sections 1 and 12. At this point, it would connect to the existing OHV road that provides access to the Lucy Gray Mountains. The final alignment of the route would be determined by the BLM, and the road would be operated by the BLM. The Primm 300 race would be rerouted outside the Proposed Project site; however, it would still go through the same general area of the Jean/Roach Lake SRMA.

These Applicant- and BLM-provided mitigation measures would not fully mitigate these impacts and they would be unavoidable.

Alternatives

Alternative 3 would have a larger project footprint (4,818 acres) than Alternative 2 (2,966 acres) due to the additional drainage features, and a larger fenced in area (3,365 acres) as compared to Alternative 2 (2,865 acres). This would increase the impacts to recreation since a larger area would be made inaccessible to the public.

4.19.12 Visual Resources

Geographic Extent

The geographic scope for the analysis of the Proposed Project‘s contribution to cumulative impacts to visual resources includes all projects within the same viewshed as the Proposed Project. The BLM defines any area more than 15 miles distant as a ―seldom-seen zone;” therefore, the cumulative analysis boundary is 15 miles from viewpoints.

Cumulative impacts could occur if activities associated with the construction or operation of any of the Projects occurs, or if any of the Projects are constructed or are operational after the EITP is built. Given the amount of development planned in the Project area, and given that renewable projects already or may eventually intend to connect to the EITP, it is reasonable to assume that some construction activities may take place concurrently and that the EITP would be in operation at the same time as some of the Projects that are part of this cumulative analysis.

Existing Cumulative Conditions

Section 3.12, Visual Resources, provides an overview of the existing visual setting including applicable VRM designations and views from selected KOPs. The Ivanpah Valley is predominantly intact scenically, and characterized by large expanses of open scrub land punctuated by flat, barren, dry lakes. These vast expanses of gently sloping bajada contrast dramatically with the jagged peaks of the Clark, Lucy Gray, and New York mountain ranges that surround the Ivanpah Valley.

As described in Section 3.12, Visual Resources, the landscape has been significantly altered by human use. Because of its strategic location between Los Angeles and Las Vegas, this portion of the Ivanpah Valley has historically been used as a major transportation and utility corridor. Built features near the Proposed Project site include an interstate highway (I-15); the resort town of Primm; a railroad track; several high-voltage transmission lines that converge in this area; and the Bighorn Electric Generating Station, a natural gas power plant with highly visible heat recovery steam generators, switchyard, stacks, and air-cooled condenser. Primm is approximately 2 miles west of the Proposed Project site. Three large casinos (Buffalo Bill‘s Resort and Casino, Primm Valley Resort and Casino, and Whiskey Pete‘s Hotel and Casino), an outlet mall; and the Desert Oasis apartment complex (for casino employees) are all located in Primm.

Section 3.12.2.2, Visual Resources Management Classes and Visual Sensitivity, describes the applicable VRM classifications for the Proposed Project site as well as viewer groups. Viewer groups in the Ivanpah Valley include the communities of Primm, Jean, Goodsprings, and Nipton; recreational users of the Ivanpah Dry Lake, the Roach Dry Lake, and the Lucy Gray OHV trail; users of the Mojave National Preserve; and motorists along I-15.

Past, Present, and Reasonably Foreseeable Future Projects and Changes

Existing and planned development in the area is listed in Table 3.19-1 (see Section 3.19, Cumulative Impacts Scenario); these projects are also shown in relation to the Proposed Project in Figure 3.19-1 (see Section 3.19). Development in the vicinity of the Proposed Project that has already altered the visual character of the Ivanpah Valley includes I-15, an existing railroad track, the Primm Valley Golf Course, transmission lines and associated infrastructure, the existing Eldorado Substation, the Nevada Solar One Project, the Higgins Generating Station, numerous mining operations, and commercial development in Primm, Nevada. Past development in the area has introduced contrast with the natural forms, lines, colors, and textures of the landscape.

Planned development throughout the cumulative effects area for visual resources is dominated by renewable energy projects, including both solar and wind facilities, and the associated

infrastructure. The trend in renewable energy development is representative of reasonably foreseeable future projects in the cumulative effects area based on existing forecasts. Other development reflects the expansion of southern Nevada as a tourist destination; therefore, more casinos, malls, and residential developments are anticipated.

Cumulative Impact Analysis

The potential for the aesthetic and visual impacts of the Proposed Project to combine with the effects of other projects within the geographic extent of the cumulative analysis is described below. As discussed in Section 4.12, Visual Resources Impacts, the Proposed Action would result in the following degree of visual contrast for each KOP, as presented in Table 4.19-5.

Table 4.19-5. Summary of the Proposed Action's Visual Effect by KOP

Key Observation Point (KOP)	Degree of Contrast	VRM Class	Consistence with VRM Class?
KOP 1 – View from Goodsprings Road	Moderate	VRM Class III	Yes
KOP 2 – View from I-15 near Jean	Weak to Moderate	VRM Class III	Yes
KOP 3 – View from Roach Dry Lakebed	Moderate	VRM Class III	Yes
KOP 4 – View from Desert Oasis Apartment Complex	Moderate	VRM Class III	Yes
KOP 5 – View from Primm Valley Resort and Casino	Moderate	VRM Class III	Yes
KOP 6 – View from the Lucy Gray OHV Trail	Moderate	VRM Class III	Yes
KOP 7 – View from Ivanpah Dry Lakebed	Moderate	VRM Class III	Yes
KOP 8 – View from I-15 at Nipton Overpass	Moderate	VRM Class III	Yes
KOP 9 – View from Entrance the Mojave National Preserve	Moderate	VRM Class III	Yes

The methodology and impact criteria used to assess the impacts to visual resources under NEPA is discussed in Section 3.12, Visual Resources. For the cumulative analysis of impacts to aesthetics and visual resources, KOPs used in the analysis of impacts from the Proposed Project in Section 3.12 are referred to in order to provide an example of the existing visual setting from visually sensitive locations; however, due to a lack of information for the engineering and design of projects, simulations were not prepared. Instead, typical impacts to visual resources from similar types of projects are described and presented qualitatively. The locations of the KOPs relative to the projects considered for the cumulative impact analysis are listed in Table 4.19-6.

Table 4.19-6. KOPs Relative to Existing and Future Foreseeable Projects

Key Observation Point (KOP)	Relationship to Existing Projects	Relationship to Future Foreseeable Projects

Table 4.19-6. KOPs Relative to Existing and Future Foreseeable Projects

Key Observation Point (KOP)	Relationship to Existing Projects	Relationship to Future Foreseeable Projects
KOP 1 – View from Goodsprings Road	Approximately 2.25 miles west of Jean, Nevada, the existing railroad, and I-15; approximately 7 miles northwest of development near Primm, Nevada.	Adjacent to the the Table Mountain Wind Project.
KOP 2 – View from I-15 near Jean	Adjacent to Jean, Nevada, the existing railroad, and I-15; approximately 5.5 miles north of development near Primm, Nevada.	Adjacent to the Calnev Pipeline Expansion Project, the DesertXpress, the EITP, and the SNSA.
KOP 3 – View from Roach Dry Lakebed	Adjacent to the existing railroad; within 0.5 mile of I-15; approximately 4 miles north of development near Primm, Nevada.	Adjacent to the Calnev Pipeline Expansion Project, the DesertXpress, the EITP, and the SNSA.
KOP 4 – View from Desert Oasis Apartment Complex	Adjacent to development near Primm, Nevada, I-15, the existing railroad, Bighorn Electric Generating Station, and the Ivanpah Lake SRMA; approximately 3 miles north of the Primm Valley Golf Course and the Caltrans batch plant.	Adjacent to the Calnev Pipeline Expansion Project, the DesertXpress, and the EITP; approximately 1.5 miles east of the First Solar Project; approximately 3 miles northeast of the ISEGS project; and approximately 4 miles north of the Molycorp Evaporation Pond.
KOP 5 – View from Primm Valley Resort and Casino	Adjacent to development near Primm, Nevada, I-15, the existing railroad, Bighorn Electric Generating Station and the Ivanpah Lake SRMA; approximately 3 miles north of the Primm Valley Golf Course, and the Caltrans batch plant.	Adjacent to the Calnev Pipeline Expansion Project, the DesertXpress, and the EITP; approximately 1.5 miles east of the First Solar Project; approximately 3 miles northeast of the ISEGS project; and approximately 4 miles north of the Molycorp Evaporation Pond.
KOP 6 – View from the Lucy Gray OHV Trail	Approximately 2.25 miles from development near Primm, Nevada, I-15, the existing railroad, Bighorn Electric Generating Station; approximately 2.5 miles northeast of the Ivanpah Dry Lake SRMA.	Approximately 2 miles east of the DesertXpress, the Calnev Pipeline Expansion Project, the new fast food restaurant, and the EITP.
KOP 7 – View from Ivanpah Dry Lakebed	Adjacent to the Ivanpah Lake SRMA, and I-15; approximately 1 mile east of the Primm Valley Golf Course; approximately 1.5 miles south of development near Primm, Nevada and the Bighorn Electric Generating Station.	Approximately 1.5 miles east of the First Solar Project and the ISEGS project; Approximately 2 miles north of the Molycorp Evaporation Pond; approximately 1.5 miles south of the fast food restaurant; approximately 1 mile east of the Calnev Pipeline Expansion Project, the EITP, and the DesertXpress; approximately 3 miles northeast of the Joint Port of Entry Project.

Table 4.19-6. KOPs Relative to Existing and Future Foreseeable Projects

Key Observation Point (KOP)	Relationship to Existing Projects	Relationship to Future Foreseeable Projects
KOP 8 – View from I-15 at Nipton Overpass	Adjacent to I-15, the AT&T Fiber Optic cable replacement project, and the Molycorp Wastewater Pipeline; approximately 2 miles west of the Molycorp Mine; approximately 3 miles south of the Caltrans temporary batch plant and the Primm Valley Golf Course.	Adjacent to the EITP and the DesertXpress Project; approximately 1.5 miles south of the Joint Port of Entry; approximately 3 miles south of the ISEGS project and approximately 4.5 miles south of the First Solar Project.
KOP 9 – View from Entrance the Mojave National Preserve	Adjacent to the Molycorp Wastewater Pipeline and the Ivanpah Dry Lake SRMA; approximately 3 miles south of the Molycorp Evaporation Pond; approximately 3 miles east of I-15.	Adjacent to the EITP; approximately 5 miles west of the Iberdrola Wind Project; approximately 6 miles south of the ISEGS project and the First Solar Project.

This section discusses the combined effects on existing visual character and quality of the Proposed Project and past, present, and reasonably foreseeable projects. The relevant impacts of the Proposed Project are Effect VIS-1 and Effect VIS-2.

Construction Impacts

Construction impacts of the cumulative projects would be similar to that of the Proposed Action, as described in Section 4.12, Visual Resources Impacts. Construction activities would result in short-term changes to the visual character of the environment. Views of construction machinery and grading and drainage activities would be seen first. Dust suppression activities would be present on site, but emissions of fugitive dust would still occur and potentially be visible to the viewpoints identified in Table 4.19-6, above. Grading and trenching would be required for the majority of the cumulative projects as well as installation of project components. A description of the types of components required by project type is included in Section 3.19, Cumulative Impacts Scenario. These are short-term activities that would be visible up to the operation phase of the Projects.

The most notable effect due to the short-term change would be the exposed soils created during construction. These exposed soils would contrast strongly with the surrounding colors and textures found adjacent to the Proposed Project site. Typically, developers agree to revegetate and recontour land disturbed or cleared during construction, as agreed upon with the jurisdictional agency. While information on revegetation plans for the cumulative projects is not currently available, the majority of the cumulative projects considered in this analysis propose to construct on BLM land, so it is reasonable to assume that the BLM will hold these developers to the same standard as the Proposed Action. Therefore visual contrast due to construction activities for the cumulative projects would be short-term and localized.

Cumulative Impact VIS-1: Long-term change to the visual character of the environment.

Operation of the cumulative projects would permanently alter the existing form, line, color, and texture of the views from the nine viewsheds listed in Table 4.19-6. The cumulative impact to visual resources in the Ivanpah Valley would be considerable, as described below.

As shown in Table 4.19-5, the VRM classification for each KOP is VRM Class III. The corresponding objective is as follows: "The objective of this class is to partially retain the existing character of the landscape. The level of change to the landscape should be moderate. Management activities may attract attention but should not dominate the view of the casual observer. Any changes must repeat the basic elements of form, line, color, and texture found within the predominant natural features of the characteristic landscape."

Table 4.19-6 lists the cumulative projects that would be visible from each KOP, including existing projects and future foreseeable projects. Based on the best information available, Section 3.19, Cumulative Impacts Scenario, lists the typical project components by project type and provides a brief description of the size and scale of each cumulative project. Figure 3.19-1 (see Section 3.19) shows the location of these projects and provides a quantification of the acreage of land required for each project.

While any one of these projects could result in an alteration to the visual character and an introduction of contrast that would be consistent with the applicable VRM Class III, when considered in combination, the cumulative projects would not meet the VRM objectives for any of the KOPs listed in Table 4.19-5. The scale, density and number of projects existing and planned for the Ivanpah Valley area would permanently alter the existing character of the landscape, and changes to the visual landscape would dominate the view of the landscape from all nine KOPs and would introduce new elements of form, line, color, and texture. This development would not be consistent with the VRM Class III designation for the area.

The Proposed Action would contribute to the alteration of the viewshed from each of the nine KOPs. The Proposed Action would introduce moderate levels of contrast into each of the viewsheds except for KOP 2, which is the maximum allowable level of change for VRM Class III areas. The Proposed Action would contribute to the cumulative impact to visual resources described above. This cumulative impact would be inconsistent with the VRM Class III designation for the area and would be unavoidable.

4.19.13 Transportation/Motorized Vehicle Access

Geographic Extent

Traffic impacts of the Proposed Project would be limited to the regional freeways and local roads that comprise the local transportation network; therefore, the geographic area analyzed for cumulative traffic and transportation impacts is the road network within the Ivanpah Valley.

The Proposed Action would potentially impact traffic and transportation systems by increasing the volume of traffic during the construction phase of the Project. Because impacts to traffic and transportation would result primarily from construction related activities, this analysis is limited to cumulative projects that would have concurrent construction schedules.

Existing Cumulative Conditions

The Proposed Action would be located near Primm, Nevada, the only town in a rural, sparsely populated area with a significant amount of publicly owned land. Roads in the Ivanpah Valley are listed in Table 3.13-2 (see Section 3.13, Transportation/Motorized Vehicle Access), and the LOS for the roads that would be used during Project construction are listed in Table 3.13-3 (see Section 3.13).

Past, Present, and Reasonably Foreseeable Projects and Changes

Ongoing and foreseeable development throughout the cumulative effects area for traffic and transportation is dominated by proposed renewable energy projects. As shown in Figure 3.19-1 and described in Table 3.19-1 (see Section 3.19, Cumulative Impacts Scenario), additional renewable energy development is expected in the area. Based on the number of projects planned for the area, it is reasonable to assume that some would be constructed concurrently with the Proposed Action. Other projects in the vicinity of I-15 that may be potentially constructed concurrently with the Proposed Action include the Calnev Pipeline Expansion Project, the EITP, and the DesertXpress rail line.

Cumulative Impact Analysis

Cumulative Impact TRAN-1: Traffic Load, Capacity, and Level of Service.

This section discusses the combined effects on traffic load, capacity, and LOS standards of the Proposed Project and past, present, and reasonably foreseeable projects. Relevant effects of the Proposed Project are Effect TRAN-1 and Effect TRAN-2.

Most local roads in the cumulative effects area are infrequently used and would not be adversely affected by a temporary increase in road traffic. Based on the high number of vehicle trips per day and the fact that heavy equipment would be transported on these roads, MM TRAN-2 is required to minimize impacts to these local roads. This mitigation would require that any damage to streets be repaired following Project construction.

Construction of the Proposed Project would also increase use of I-15 by a maximum of 912 vehicle trips. Northbound I-15 experiences periods of heavy use on Friday from approximately noon to 10:00 p.m. due to motorists traveling between the Las Vegas and Los Angeles areas. The Proposed Project, ISEGS, the First Solar Photovoltaic Project, the Calnev Pipeline Expansion Project, the EITP, and the DesertXpress High-Speed Rail Project would be located near the I-15 corridor. It is likely that during certain periods, construction of these projects would have overlapping schedules. MM TRAN-1 requires the Applicant to develop a Traffic Management Plan, which would likely be required of the cumulative projects listed above. With concurrent construction, the number of vehicles using I-15 would increase and would adversely impact traffic load and LOS on I-15 on Fridays from noon to 10:00 p.m. The Proposed Project would only contribute a maximum of 912 vehicle trips per day during the as yet unspecified height of construction activities and would minimize impacts through use of a Traffic Management Plan. However, the Proposed Action‘s incremental effect would result in a considerable cumulative impact to traffic on I-15 based on the current LOS and usage; therefore, mitigation would be necessary.

MM TRAN-1 will require the Applicant to limit the use of northbound I-15 on Fridays from noon to 10:00 p.m. This will require using alternative routes or planning sufficiently such that vehicular use of I-15 would be limited to fewer than 15 vehicles every 15 minutes. Implementation of this mitigation measure would reduce the Proposed Project‘s incremental contribution.

Alternatives

Alternative 3 would require a larger footprint than the Proposed Action, but would be located in the same area and would require the same road usage during construction; therefore, cumulative impacts associated with Alternative 3 would be the same as the Proposed Action.

4.19.14 Human Health and Safety/Hazardous Materials

Geographic Extent

Impacts to hazards and hazardous materials caused by the Proposed Action would be limited to the Proposed Project site and land directly adjacent to the site because impacts would result only from incidents associated with hazardous materials during construction or maintenance activities. Cumulative impacts could occur during construction and operation and would be limited to the areas of concurrent construction or maintenance.

The geographic extent of the cumulative effects analysis with respect to fire hazards is limited to the Ivanpah Valley because all construction and operation activities associated with the Proposed Action would take place within the Ivanpah Valley. Cumulative impacts with respect to fire hazards could occur during construction and operation and would be limited to the areas of concurrent construction or maintenance.

Existing Cumulative Conditions

Within Primm, Nevada, there are residential developments and commercial and industrial properties. Underground storage tanks (USTs) are present at the local gas stations. The remainder of the route is primarily undeveloped open space. Within the undeveloped and open space land and residential areas, there is little likelihood of significant soil or groundwater contamination, based on a lack of uses that would involve hazardous materials.

The area along I-15 in San Bernardino County is classified as a moderate fire zone (San Bernardino County Fire 2010). Primm has a low fire hazard with low ignition risks (Resource Concepts, Inc. [RCI] 2005).

Past, Present, and Reasonably Foreseeable Projects and Changes

Existing development within the vicinity of the Proposed Project site includes development near Primm, Nevada, I-15, the existing railroad, and the Bighorn Electric Generating Station. The Desert Oasis apartment complex, which is located approximately 1.4 miles from the Proposed Project site, constitutes a potential receptor rather than a likely contributor to hazards due to contamination or fire hazards.

Foreseeable future projects identified for this analysis include the large solar and wind projects, as well as the Calnev Pipeline Expansion Project, the DesertXpress High-Speed Rail Project, and

the EITP. These are all large construction projects that would require the use of fuels and hazardous materials. These projects would also use equipment that could act as an ignition source. The analysis also examines areas with known significant soil or groundwater contamination. Although localized areas of soil contamination could be encountered by some of these projects, most are new developments in open areas.

Existing and foreseeable projects in the Ivanpah Valley could introduce public health and safety risk factors. Construction of planned facilities and O&M of existing facilities could result in the accidental release of hazardous materials and increase fire risk in the area. For planned projects, sites with known environmental contamination would be legally required to be investigated and remediated in accordance with regulatory agency standards prior to redevelopment. Areas with previously unknown contamination would likely be discovered during planning, followed by the required reporting and cleanup.

Cumulative Impact Analysis

The potential for hazards and hazardous materials impacts of the Proposed Project to combine with the effects of other projects within the geographic extent of the cumulative analysis is described below. Relevant effects of the Proposed Action are Effect HAZ-1, Effect HAZ-2, and Effect HAZ-4. With the implementation of mitigation, Effect HAZ-3, exposure of workers to contaminated or hazardous materials, would be reduced to less than levels permitted by OSHA; therefore, the potential for this effect to contribute to cumulative effects is not analyzed further.

Regarding cumulative environmental contamination impacts, the Proposed Project‘s contribution to a cumulative impact would only be considered significant if it combined with other projects to result in substantial volumes of contaminated soil that required off-site treatment and that, as a combined volume, exceeded the capacity of available treatment facilities or resulted in substantial exposure of hazardous materials to the public. For the reasons discussed below, the Proposed Project would not contribute to considerable cumulative impacts.

Hazardous Materials, Spills, and Potential Exposures

This section discusses the combined effects on hazards and hazardous materials of the Proposed Project and past, present, and reasonably foreseeable projects. Relevant effects of the Proposed Action are Effect HAZ-1 and Effect HAZ-2.

Construction and operational activities associated with the Proposed Action could result in releases of hazardous materials in localized areas on the Proposed Project site. The Applicant would implement a number programs and measures to reduce the potential for a spill and to address spills that occur. In addition to the SWPPP and the SPCC Plan that would be required, the Applicant would prepare a Waste Management Plan, a Health and Safety Plan, an Emergency Response Plan, and a Noxious Weed Control Plan. Additionally, as required in MM HAZ-1, the Applicant would implement a Hazardous Materials Management Program, which would outline procedures for storage and transport of hazardous materials and would restrict the refueling of construction equipment on site. Given the small quantities of materials to be used during construction and operations, any spill would be small and would be readily cleaned up using the Applicant‘s plans. The measures described above would reduce the potential for spills of hazardous materials and ensure cleanup measures would be implemented if a spill occurred.

Since any spills would likely be small, localized, and cleaned up, there would not be the potential for impacts of the Proposed Project to combine with impacts of other projects, and there would not be a considerable cumulative impact.

There is currently no evidence to suggest that on-site soils or groundwater are contaminated, but they have not been sampled and characterized and mining activity has been reported within the site boundaries. The Proposed Project site is currently undeveloped and vacant and there is no evidence of previous commercial or agricultural activity. Several construction activities would involve disturbance of soils and exposure of groundwater as a result of excavation, drilling, or surface disturbance including site preparation (clearing and grading), water wells and water storage pond construction, O&M building construction, substation below grade equipment installation, and foundations for the transmission line structures and the solar tracking system foundations. To reduce the potential exposure of the public and ecological receptors to contaminated soils or groundwater due to the Proposed Action construction, the Applicant would implement MM HAZ-3, which requires work to stop if discolored or odorous soil is unearthed, in addition with the proposed Health and Safety Program, Waste Management Plan, and Emergency Response Plan. Because any soil contamination encountered would be removed and/or remediated prior to construction, impacts of the Proposed Action would not combine with impacts of other projects, and there would not be a considerable cumulative effect.

Fire Hazards

This section discusses the combined effects on fire hazards of the Proposed Action and past, present, and reasonably foreseeable projects. The relevant effect of the Proposed Action is Effect HAZ-4. Wildfire risks of construction and operations are associated with combustion of native materials due to smoking, refueling, sparks from welding, and operating vehicles and other equipment off roadways. Brushing activities for vegetation control and removal during construction could result in fire. These risks would be associated with construction of the Proposed Project and large foreseeable projects, as previously discussed. The Applicant would implement a Fire Management Plan (MM HAZ-5) that would establish standards and practices to minimize the risk of fire danger, and, in case of fire, provide for immediate suppression and notification. The Ivanpah Valley in California has a moderate fire risk. In Nevada, the fire risk outside of Primm is not known, although the city of Primm has a low fire risk. Concurrent construction of the foreseeable construction in California, such as ISEGS, First Solar, the Calnev Pipeline Expansion, and the DesertXpress rail line, could increase the fire risks. However, each project would likely implement its own fire management program to reduce the potential risk of fires. Therefore, there would not be a considerable cumulative impact.

Alternatives

Potential human health and safety effects that would result from the construction, operation, and decommissioning of Alternative 3 would be identical to those identified for the Proposed Action due to the similarities in the construction and O&M practices for both alternatives; therefore, cumulative impacts to health, safety, and hazards are not analyzed for Alternative 3.

4.19.15 Socioeconomics

Geographic Extent

The socioeconomic impacts of the Proposed Project would be limited to the local and regional economy within the Ivanpah Valley and the local communities within that region; therefore, the geographic area analyzed for cumulative socioeconomic impacts is the local and regional economy and the local population within the Ivanpah Valley.

Section 4.15, Social and Economic Impacts, concluded that the Proposed Action would have no impact to public services and utilities and, therefore, cumulative impacts to public services and utilities are not analyzed for the Proposed Action.

Existing Cumulative Conditions

Section 3.15, Social and Economic Setting, describes existing socioeconomic conditions within the Proposed Project area, including demographics, housing, and workforce characteristics in this rural Ivanpah Valley setting with a limited population. Clark County has been affected by the recent recession with unemployment increasing and housing development and population growth decreasing. Employment and population growth have been trending downwards within the region since 2008.

Existing conditions have been influenced by the construction and operation of past and present projects, which have affected demand for and supply of jobs as well as housing demand, business revenues, and property values. Local demand for housing and workforce has historically reflected the prevailing level of development and growth in the area.

Past, Present, and Reasonably Foreseeable Projects and Changes

For the purposes of this analysis, all of the Projects identified in Table 3.19-1 (see Section 3.19, Cumulative Impacts Scenario) in the Ivanpah Valley are included since they would all contribute to changes in the rural character of the area. Construction and operation of the large number of proposed renewable energy development projects that are planned could increase business and tax revenues within the Ivanpah Valley. All of these projects would also increase the use of local businesses and hotels.

Cumulative Impact Analysis

The impact of the Proposed Action, when added to other past, present, and reasonably foreseeable future actions, would constitute the cumulative effects from renewable energy development. During construction of the Proposed Project, local spending would increase within the Ivanpah Valley. This would benefit the local and regional economy through expenditures on goods and services.

While all of the Projects considered in the cumulative impacts analysis would be expected to have some influence on socioeconomic resources within the Ivanpah Valley, a number of major renewable energy construction projects are planned which would be expected to have a particular influence on socioeconomic conditions. Collectively, these foreseeable projects would require large numbers of laborers during construction, but would have a smaller labor force for operations.

The addition of the foreseeable projects would likely draw on the unemployed work force, but also could draw employees from other regions. Local construction workers for the Proposed Project or any of the foreseeable projects would receive additional income for the duration of their employment. These local workers as well as non-local workers would also likely spend locally. Construction crews would use local accommodations for lodging, which would have a beneficial impact on tourism in the area. Projects would also draw on locally procured materials, goods, and services, and some regional suppliers would be stimulated by these purchases. As more clean energy projects are permitted over time to meet renewable portfolio standard mandates, key regional suppliers to providers would benefit in the future from retooling and inventory replenishment related to the clean energy infrastructure transformation in the area.

The concurrent construction of the foreseeable projects would result in a beneficial cumulative impact on the local and regional economy and tourism, and could decrease unemployment for the periods of construction.

However, the cumulative socioeconomic impacts would take place within a setting characterized by tradeoffs between desert habitat/ecological resources and alternative land uses in addition to energy development. The main theme would be managing how renewable energy generation comes on line within a fragile desert community ecosystem in a sustainable manner. Cumulative socioeconomic impacts can arise from the increased competition for remaining land (following build out to reach renewable portfolio standards targets) and desert scarcity that may arise from the cumulative effects of permitting multiple projects and their related mitigation and purchased land offset requirements to preserve habitats elsewhere. Competing against these mitigation and conservation uses will be other commercial, industrial, and residential developments proposed by municipalities. The competing pressures from collective energy developments may potentially contribute to social conflicts and dissension related to differing views concerning the highest and best use of remaining lands within municipal borders.

It is possible that some forms of tourism involving the natural appreciation of the desert and OHV use of this open space area would be impacted by the Proposed Project, but mitigation can address this potential small effect (see Section 4.11, Recreation Impacts). Collectively, however, cumulative effects from multiple renewable projects to recreation may adversely affect economic conditions and the sense of social well-being of the local, active OHV community.

Further, given that many people live in the area because of its rural character, the Proposed Action combined with other changes in the landscape may permanently alter the rural feel of the community.

Alternatives

As concluded in Section 4.15, Social and Economic Impacts, socioeconomic resource impacts that are a function of the greater land requirement and overall project footprint size (required under Alternative 3) would be impacted to a greater negative extent under Alternative 3 compared to Alternative 2 (the Proposed Action). Similar to the Proposed Action, although to a greater extent, Alternative 3‘s larger consumption of open land (and use of scarce resources such as water) would likely have a relatively larger adverse effect on social well-being. Additionally, Alternative 3 would absorb a greater amount of ecological resources which would influence the

low impact eco-tourism experience and quality of life defining the desert area as compared to Alternative 2.

Cumulative Impact Benefits

The Proposed Action would add up to 400 MW in renewable energy, which would provide the following net economic benefits:

- With collective solar capacity from multiple projects, greater ability to harness zero emission generation capacity to meet peak day regional loads;
- Cumulative electric power output sustaining future economic growth;
- Cumulative economic output, taxes, and employment from the multiple projects in the renewable energy industry that can serve to offset declining sectors in other parts of the economy;
- Short-term, beneficial impacts on the Clark County permanent and temporary housing stock during the construction phase of the Proposed Project and long-term, beneficial effects on the area‘s housing stock from the operational phase of the Proposed Project; and
- Cumulative economic impacts from building a substantial industrial capacity within the solar energy sector that includes both the development of a specialized, experienced workforce (with utility scale fabrication and installation expertise), and the creation and development of domestic supporting supply chains and manufacturing capacities related to supplying specialized inputs, parts, and replacement components.

4.19.16 Environmental Justice

Cumulative impacts to environmental justice are not analyzed for the Proposed Action because the Proposed Action would not result in disproportionately high or adverse effects on minority or low-income populations and, therefore, would not contribute to cumulative impacts to environmental justice. As discussed in Section 3.16, Environmental Justice, there are no environmental justice communities within the study area for the Proposed Action with respect to income or minority populations (including Native American communities). Further, Section 4.16, Environmental Justice Impacts, concludes that the transmission line area outside of the study area does not impact an environmental justice community, either. As there is zero population living within the identified blocks, there are no low-income communities that would be impacted by the Proposed Action.

The effect on environmental justice from Alternative 3 would be similar to that of the Proposed Action because it would also be located within the same blocks with zero population.

4.19.17 Energy and Minerals

Because the Proposed Project would not restrict access to any mining claims within or outside of the project boundary, the cumulative impacts of other projects within the vicinity of, but not in the same immediate area as, the Proposed Action are not analyzed.

The effect on energy and minerals from Alternative 3 would be similar to that of the Proposed Action due to the similarities in location and size of this alternative.

4.19.18 Fuels and Fire Management

Cumulative impacts to fuels and fire management are not analyzed because the Proposed Action would not result in an impact to fire management. The Applicant would maintain a 20-foot-wide fire break around the solar array perimeter fence year-round and keep vegetation within the Proposed Project vicinity mowed to between 6 and 12 inches in height to minimize the risk of fire. As discussed in Section 4.6, Biological Resources Impacts, noxious weeds would be managed, which would reduce potential fuel for wildland fires.

In the event of a wildfire within the vicinity of any project structures, access roads as well as a 3.85-mile-long, paved, interior maintenance road would allow fire crews and their vehicles safe ingress and egress, and safe access to structures. Because the Proposed Action would not increase the risk of fire or result in the spread of noxious and invasive weeds that could provide fuel for wildland fires, and would allow for adequate fire responder access in the event of a fire, the Proposed Action would not contribute to cumulative impacts.

Alternative 3 would have a similar fire break and emergency access design as that of Alternative 2 (the Proposed Action) and would employ similar measures to prevent the spread of noxious or invasive weeds; therefore, the contribution to cumulative impacts to fuels and fire management would be the same for Alternative 3 as for the Proposed Action.

4.20 Other NEPA Requirements

4.20.1 Unavoidable Adverse Impacts and Irreversible and Irretrievable Commitments of Resources

The CEQ regulations at 40 CFR 1502.16, and the BLM NEPA Handbook (H-1790-1, Sec. 9.2.9) require a discussion of unavoidable adverse impacts that would remain after all reasonable and effective mitigation is applied, as well as disclosure of irreversible and irretrievable commitments of resources if the Proposed Project is approved. A resource commitment is considered irreversible when direct and indirect impacts from its use limit future use options. Irreversible commitments apply primarily to nonrenewable resources, such as cultural resources, and also to those resources that are renewable only over long periods of time, such as soil productivity. A resource commitment is considered irretrievable when the use or consumption of the resource is neither renewable nor recoverable for future use. Irretrievable commitments apply to loss of production, harvest, or use of natural resources.

The following section describes irreversible and irretrievable commitments that would occur in the Proposed Project area and may be affected by construction, O&M, and decommissioning activities.

4.20.1.1 Air Quality and Climate

With the implementation of mitigation measures, construction, O&M, and decommissioning activities would result in unavoidable adverse impacts on air quality. These are identified in Section 4.1, Air Quality and Climate Impacts, as residual impacts. There would be unavoidable adverse impacts to air quality from particulate matter and vehicle emissions. The Proposed Project does not trigger federal conformity levels, and would not, therefore, cause an irreversible and irretrievable commitment of air resources.

Potential contributions from direct GHG emissions due to the Proposed Project would be considered a long-term impact; however, a comparison of the projected GHG emissions to the existing inventories and projections for Nevada indicates that the Proposed Project would not hinder attainment of the state‘s goals of reducing GHG emissions to 1990 levels by 2020.

Desert soils have a carbon storage capacity that would be lost due to construction of the Proposed Project. Considering the relative proportion between the Proposed Project area (2966 acres) and the total regional extension of the air basin, potential impacts of the Project over the existing carbon storage capacity would be negligible; however, it would, nonetheless, be an unavoidable adverse impact.

4.20.1.2 Noise

Construction activities would cause increased noise levels, including vibration. This would be a localized and temporary effect and would cease at the end of construction. However, it is expected that low-level noise from transformers and vehicle use related to O&M activities would add a long-term unavoidable impact to composite noise conditions. There are no local sensitive receptors, nor are the local noise ordinances; therefore there would not be an unavoidable adverse impact or irretrievable or irreversible commitment of this resource.

4.20.1.3 Geology, Topography, and Geologic Hazards

There would be no unavoidable adverse impacts or irreversible and irretrievable commitments of geologic or topographic resources.

4.20.1.4 Soils

As discussed in Section 4.4, Soils Impacts, it is expected that the Proposed Project would cause elevated levels of dust emissions and loss of topsoil, especially during construction and O&M activities. Mitigation measures and BMPs, such as the stockpiling of topsoil during ground-disturbing activities for later revegetation efforts, would reduce the severity and occurrence of these impacts; however, there would be an irreversible and irretrievable commitment of soil resources on areas where revegetation fails and subsequent erosion occurs.

Soil impacts could also occur from petroleum and other hazardous material spills. Should a spill occur, the affected area would be cleaned up according to the approved SPCC Plan. Affected soils would be irretrievably and irreversibly lost, which would be an unavoidable adverse impact.

4.20.1.5 Water Resources/Hydrology

For the purposes of this analysis, an irreversible and irretrievable commitment of water resources would be the permanent contamination of surface water bodies or a groundwater aquifer, the overuse of these resources by the Proposed Project to the point where they would not be available for other uses, or changes in runoff patterns that would increase erosion, sediment flow, or the risk of flooding.

Although the Proposed Project would use up to 600 acre feet of groundwater over the four construction phases and up to 21 AFA for the life of the project, it would not contaminate surface water bodies or groundwater aquifers. The incremental withdrawal of groundwater resources would not be available for other uses and would be an unavoidable adverse impact and irreversible and irretrievable commitment of the resource.

4.20.1.6 Biological Resources

Loss of 2,966 acres of native vegetation on the Proposed Project site would result in an unavoidable adverse impact for the life of the Project. Because the impacts would affect only a localized region, the loss of native vegetation would not cause an irreversible and irretrievable commitment of the resource on a regional basis.

Nine special status plants have the potential to occur within the site of the Proposed Project. An on-the-ground survey will be conducted during the spring of 2010 to determine whether any of these plants occur within the Proposed Project boundaries. Should these species be present on site, the Applicant would attempt to avoid them through modified project design. If these species could not be avoided, there would be an unavoidable adverse impact; however, the impact would be localized and would, therefore, not result in an irreversible and irretrievable commitment of the resource.

Localized and long-term unavoidable adverse impacts on wildlife, including special status species would occur. These impacts, however, would not result in an irreversible and irretrievable commitment of the resource.

4.20.1.7 Cultural Resources

Construction of the Proposed Project would not affect any properties eligible to the NRHP. However, ground disturbance during project implementation may cause the inadvertent discovery of previously unidentified subsurface cultural resources. An Unanticipated Discovery Plan would be developed for the Applicant.

4.20.1.8 Paleontological Resources

The geology of the Proposed Project site has low potential for paleontological resources and is not expected to cause an irreversible and irretrievable commitment of the resource.

4.20.1.9 Lands and Realty

Section 4.9, Lands and Realty Impacts, discusses the Proposed Project's potential impacts on existing and reasonably foreseeable lands and realty actions. Access to current utility corridors would continue throughout the construction and operational phases of the Proposed Project. The footprint of the Proposed Project would limit future use of 2,966 acres of land for other uses for the life of the Project and would irreversibly and irretrievably commit the resource.

4.20.1.10 Special Management Areas

The closest SMA is the Ivanpah Valley DWMA/ACEC, located south of the Proposed Project boundary. Mojave National Preserve is 8 miles southwest of the southern boundary of the Proposed Project. Construction, O&M, and decommissioning would not have an unavoidable adverse impact on the ACEC or National Preserve. No other SMAs or lands with special designations are directly or indirectly affected by the Proposed Project, and no irretrievable and irreversible commitment of resources would occur.

4.20.1.11 Recreation

Construction of the Proposed Project would cause unavoidable adverse impacts on recreation resources by temporarily disrupting access to the Lucy Gray Mountains OHV racing area. The existing route would be moved to allow for the permanent, continued access for race events and recreational use. The impact would not result in an overall irreversible or irretrievable commitment of recreational resources.

4.20.1.12 Visual Resources

Construction of the Proposed Project would cause unavoidable short-term and long-term adverse impacts on visual resources by disrupting the viewshed in the Proposed Project area, but the overall change in the landscape would not exceed the VRM class standards set for the area by the LVRMP.

4.20.1.13 Transportation/Motorized Vehicle Access

Construction of the Proposed Project would cause localized, temporary, and unavoidable adverse impacts on roads and traffic during the construction phases. During construction, up to 56 truck trips and a maximum of 350 personal vehicles would access the site daily. This would affect local roads and I-15. These increases would not affect the LOS for these roads. Occasional local road closures may be necessary to string conductor across the roads, but this would be a temporary impact.

During construction, oversized loads could cause short-term, temporary transportation disruptions and may require wider turning clearance. Impacts on the transportation network and impacts on traffic would occur only during construction, and occasionally during maintenance activities. The Proposed Project would not cause a change in the LOS for the affected roads and would not cause a permanent irreversible and irretrievable commitment of the resource.

4.20.1.14 Human Health and Safety/Hazardous Materials

Construction, O&M, and decommissioning of the Proposed Project could create public health and safety impacts, especially on workers. In addition, the Proposed Project could introduce hazardous materials into the environment, mostly in the form of fuel, lubricants, and solvents used in construction and operation of the facilities. Several mitigation measures have been identified to reduce potential impacts below federal and state safety limits. Therefore, the Proposed Project would cause an irreversible and irretrievable commitment of the resource or unavoidable adverse public health and safety impacts.

4.20.1.15 Social and Economic Conditions

The Proposed Project would create up to 350 jobs during construction and up to 15 permanent jobs for life of the Project. Occasional maintenance and repair activities could temporarily increase the number of on-site staff. This workforce would have a beneficial economic impact on the local economy. The Proposed Project would increase local revenues, which would have a beneficial effect. The analysis in Section 4.15, Social and Economic Impacts, indicates that no irreversible and irretrievable commitments of the economic resources would occur. The analysis also indicates that social conditions would not be adversely affected by the Proposed Project.

4.20.1.16 Environmental Justice

As discussed in Section 4.16, Environmental Justice, the Proposed Project is not located within a environmental justice community and would, therefore, not disproportionately affect low income or minority populations. No unavoidable adverse impacts or irreversible and irretrievable commitments of resources are expected.

4.20.1.17 Energy and Minerals

The Proposed Project is located in an area with little or no mining activity, and no energy minerals are found on the site. Therefore, no unavoidable adverse impacts or irreversible and irreversible commitments of energy and mineral resources are expected.

4.20.1.18 Fuels and Fire Management

While the Proposed Project does introduce flammable agents (fuels, solvents, and electrical equipment) which could cause fires, the Project would require the clearing of most of the vegetation on and surrounding the site. Additionally, the Proposed Project would have a firebreak outside the fence line, which would further reduce the incidence of fires moving to the land outside of the site. Thus, there would not be irretrievable or irreversible commitments of resources or unavoidable impacts to fuels as a result.

4.20.2 Relationship Between Short-Term Uses and Long-Term Productivity of the Environment

NEPA requires consideration of the relationship between short-term uses of the environment and long-term productivity associated with the Proposed Project. This involves the consideration of whether the Proposed Project would sacrifice a resource value that might benefit the environment in the long-term for some short-term value to the Applicant or the public. For purposes of this discussion, short-term refers to three years or less after the construction phase

ends and subsequent restoration and rehabilitation activities. Long-term refers to three years or longer.

Short-term use of the environment during construction and restoration would result in the temporary loss of some resources, such as temporary loss of some habitat and access to recreational facilities, increased noise, and air quality impacts. Approximately 2,966 acres of land would be permanently lost within the Proposed Project area, and some flora and fauna specimens in and around construction and infrastructure locations would be lost. Longer-term impacts include the permanent loss of some visual quality from the introduction of the solar arrays and associated infrastructure, access roads in previously undisturbed areas, and landscape scarring.

While there would be irreversible and irretrievable commitments of some resources, as noted above, there would be no permanent loss of the overall productivity of the environment from the Proposed Project.

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5 Consultation and Coordination

5.1 Public Participation Summary 5-1

5.1.1 Public Scoping Period 5-1
5.1.2 Scoping Meetings 5-1
5.1.3 Scoping Response 5-2
5.1.4 EIS Mailing List 5-7
5.1.5 Distribution of the Draft EIS 5-7
5.1.6 Final EIS Preparation and Distribution 5-7
5.1.7 Record of Decision 5-7

5.2 Consultation with Others 5-7

5.2.1 Federal, State, and Local Agencies 5-7
5.2.2 Non-Governmental Organizations 5-8
5.2.3 Native American Tribes 5-8

5.3 Names of Preparers 5-8

5 Consultation and Coordination

5.1 Public Participation Summary

5.1.1 Public Scoping Period

An initial 30-day scoping period for the Proposed Project was held from June 30, 2009 to July 31, 2009. The Bureau of Land Management (BLM) extended the scoping period to October 19, 2009 to ensure that all interested parties could participate in the process. The scoping period commenced with publication of the Notice of Intent (NOI) in the *Federal Register* on June 30, 2009 (74 FR 124: 31806-07). The NOI announced a period for public scoping of alternatives, issues, impacts, and planning criteria. The NOI also requested the views of other agencies as to the scope and content of the environmental information that was relevant to the statutory responsibilities or areas of expertise for those agencies. Federal, state, and local agencies, as well as individuals or organizations that were interested or may be affected by the BLM's decision on this Proposed Project, were invited to participate in the scoping process and, if eligible, could request or be requested by the BLM to participate as a cooperating agency.

5.1.2 Scoping Meetings

The BLM held three public scoping meetings near the Proposed Project location. Meeting locations, dates, and numbers of attendees are provided below:

Location	Date	No. of Attendees
Primm	August 11, 2009	20
Henderson/Las Vegas	August 12, 2009	83
Jean	August 18, 2009	60

An open house was held for 30 minutes prior to each meeting to allow participants to review displays, maps, and literature, as well as to meet members of the Environmental Impact Statement (EIS) team, BLM staff, and NextLight Renewable Power, LLC (NextLight, or the Applicant) personnel. To encourage public comment, repositories were provided for the public to deposit written comments.

Each scoping meeting began with a presentation by the BLM describing its role as lead agency to administer the National Environmental Policy Act (NEPA) process and proposed right-of-way (ROW) application. Representatives from NextLight followed, and provided an overview of the technical aspects of the Proposed Project. Lastly, the environmental consulting firm preparing the EIS on behalf of the BLM, Ecology and Environment, Inc. (E & E), explained its role as

third-party consultant, described opportunities for public involvement, and provided an overview of the environmental issues already identified to be addressed in the Draft EIS (DEIS).

Each meeting concluded with a facilitated public comment session where the BLM invited the public to provide verbal comments on the Proposed Project. A court reporter recorded the three scoping meetings and prepared transcripts of the presentations and public comments. In addition to having the opportunity to provide verbal comments at the scoping meetings, participants were also given the opportunity to provide written comments or to take a comment form to fill out and mail in at a later date. All meeting materials also contained a Project-specific email address to facilitate collection of electronic comments.

In addition to verbal comments and written comments received during these scoping meetings, the BLM received 33 electronic comment letters and/or emails from private citizens, government agencies, non-governmental organizations (NGOs), and business associations by the October 19, 2009 close of scoping.

The BLM also used the NEPA commenting process to satisfy the public involvement process for Section 106 of the National Historic Preservation Act (NHPA) (16 United States Code [U.S.C.] 470f) as provided for in 36 Code of Federal Regulations (CFR) 800.2(d)(3).

5.1.3 Scoping Response

Verbatim transcripts of each public scoping meeting were recorded and written electronic comments received during the scoping period were catalogued. During the scoping period, a total of 90 comments were received: 26 electronic comments were received from the public; two electronic comment letters were received from agencies; four electronic comment letters were received from NGOs; one electronic comment letter was received from a business association; and 42 verbal and 15 written comments were received at the public scoping meetings.

Issues Identified During Scoping

This section provides a summary of issues identified during scoping, organized by issue category. Some statements summarize multiple comments, while others present only one comment. The method used to identify and categorize issues is discussed above in the comment summary introduction.

NEPA Process

Some individuals commented that the decision to approve the Proposed Project should not rest with one person (in this case, the BLM-Las Vegas Field Manager); rather, the decision-making process should involve more people and be more democratic.

Project Alternatives

Comments received during the scoping period regarding Project alternatives included the suggestion that the DEIS should: (1) describe how each alternative was developed, how each alternative addresses each Project objective, and how each alternative would be implemented; (2) describe the rationale used to determine whether impacts of an alternative are significant or not; (3) consider the feasibility of utilizing residential and wholesale distributed generations as a

viable alternative; (4) include an analysis of the developer's other proposed solar energy sites in the United States as part of the alternatives analysis; and (5) elevate the panels to allow off-highway vehicle (OHV) racers to retain the use of their race courses.

Project Description

Comments received during the scoping period regarding the Proposed Project description included concerns about how often solar panel washing would take place, how much water would be used for washing, and where the water would come from.

Purpose and Need

Comments received during the scoping period regarding the purpose and need of the Proposed Project included the suggestion that 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 would assist the state in meeting its renewable portfolio standards and goals.

Additional concerns involved the issue of which state the electricity would be sold to. Many commenters who raised this concern were unsupportive of the electricity being sold to any state other than Nevada.

Air Quality

Comments received during the scoping period regarding air quality included requests that the analysis should : (1) provide a detailed discussion of ambient air conditions, National Ambient Air Quality Standards (NAAQS), and criteria pollutant nonattainment areas in all areas considered for solar development; (2) estimate emissions of criteria pollutants from proposed projects and discuss the time frame for release of those emissions over the life span of the Project; (3) specify the emission sources by pollutant from mobile sources, stationary sources, and ground disturbance; (4) identify the need for an Environmental Effects Monitoring Plan and Fugitive Dust Control Plan; (5) quantify and disclose the anticipated climate change benefits of solar energy; and (6) discuss whether Proposed Project activities would affect the desert's ability to store carbon.

Noise

No comments regarding noise were received during the scoping period.

Geologic Resources and Seismicity

No comments regarding geologic resources and seismicity were received during the scoping period.

Soil Resources

No comments regarding soil resources were received during the scoping period.

Water Resources

Comments received during the scoping period regarding water resources included a request that: (1) the DEIS provide information on Clean Water Act (CWA) section 303(d) impaired waters in the Proposed Project area, if any, and efforts to develop and revise Total Maximum Daily Loads (TMDLs); (2) quantify the expected surface and groundwater requirement to construct, operate, and maintain the Project, and analyze potential impacts to the aquatic resources, associated terrestrial resources, and wildlife species and plants; and (3) identify measures that would be taken to avoid, minimize, and mitigate impacts to listed and at-risk species that are dependent on surface and groundwater resources.

Concerns were raised regarding: (1) water flow and drainage as a result of the Proposed Project and its effect on plant and animal life; (2) the source of the Proposed Project's water supply (i.e., whether or not the Project would use water from local systems or drill wells); (3) the Proposed Project's impact on available water supplies in the area and the quantity of water that would be required for various Project uses; (4) the quantity of water that would be used for Project construction and operation; and (5) the quantity of water used by the Proposed Project in comparison to different solar technologies (i.e., whether or not water usage can be minimized through alternative technologies).

Concerns were also raised regarding potential impacts to the downgradient Southern Nevada Supplemental Airport (SNSA) site from the proposed drainage infrastructure, and identifying mandatory Federal Aviation Administration (FAA) guidance affecting the construction of flood control infrastructure near airports.

Vegetation Resources

Comments received during the scoping period regarding vegetation resources included requests for the DEIS to: (1) disclose how much vegetation would be removed in the Proposed Project area; (2) disclose which type of pesticides or herbicides would be used to control vegetation growth on the Proposed Project site; (3) include an invasive plant management plan to monitor and control noxious weeds; and (4) assess direct and indirect impacts to white-margined penstamon.

Fish and Wildlife

Comments received during the scoping period regarding fish and wildlife included requests that the DEIS should: (1) indicate what measures would be taken to protect important wildlife habitat areas from potential adverse effects of proposed covered activities and to ensure that desert areas are minimally impacted; (2) provide information on the direct and indirect effects to the desert tortoise and its habitat as a result of the proposed projects, and provide avoidance, minimization and mitigation measures for impacts to desert tortoise; (3) discuss the impacts associated with an increase of shade in the desert on vegetation and/or species; (4) discuss the impacts associated with constructing fences around the Proposed Project site; (5) consider whether there are options that could facilitate better protection of covered species; and (6) consult with the Nevada Department of Wildlife (NDOW) to mitigate impacts to the banded Gila monster, bighorn sheep, and desert tortoise.

Special Status Species

Comments received during the scoping period regarding special status species included requests to include a desert tortoise relocation plan in the DEIS and to provide information about the current U.S. Fish and Wildlife Service (USFWS) permit for disturbing desert tortoise habitat and whether the Proposed Project would exceed the limit allowed by the current permit.

Noxious Weed

No comments regarding noxious weeds were received during the scoping period.

Rangeland Resources

No comments regarding rangeland resources were received during the scoping period.

Cultural and Historic Resources

Comments received during the scoping period regarding cultural and historic resources included requests to: (1) include summaries of all tribal, State Historic Preservation Officer, and Tribal Historic Preservation Officer coordination; (2) include a Cultural Resource Management Plan in the DEIS; (3) identify the existence of Native American sacred sites in the Proposed Project area; (4) address and distinguish Executive Order (EO) 13007 from Section 106 of the NHPA; and (5) discuss how negative effects to sacred sites would be prevented should sacred sites be found to exist within the Proposed Project site.

Paleontological Resources

No comments regarding paleontological resources were received during the scoping period.

Lands and Realty

Comments received during the scoping period regarding lands and realty included concerns that the DEIS should assess impacts to the Mojave National Preserve and wilderness areas located near the Proposed Project area and evaluate the Project's consistency with existing land use and regulatory plans.

Concerns were also raised regarding potential inconsistent land use adjacent to and overlapping the proposed SNSA. It was suggested that BLM coordinate authorization of the Proposed Project with the Clark County Department of Aviation (CCDOA). The CCDOA also commented that the Proponent file notice with the FAA under 14 CFR Part 77.

Special Management Areas

No comments regarding special management areas were received during the scoping period. One commenter wanted to know the Proposed Project's impact on the nearby Old Spanish National Historic Trail.

Recreation

Comments received during the scoping period regarding recreation included concerns regarding whether the Proposed Project impacts to the OHV recreation would be addressed in the DEIS,

due to overall concern within the OHV community that construction of the Project would shut down OHV trails in the area.

Aesthetics and Visual Resources

Concerns raised during scoping regarding aesthetics and visual resources included whether there would be potential impacts on the proposed Southern Nevada Supplemental Airport; specifically, if glare from the solar panels would interfere with the pilots' ability to safely fly in, out, and around the proposed airport. Concerns were also raised regarding whether the Proposed Project would alter the landscape of the area and diminish the wilderness experience for visitors to the area.

Transportation

No comments regarding transportation were received during the scoping period.

Human Health and Safety/Hazardous Materials

Comments received during the scoping period regarding public health and safety included the suggestion that the Applicant should address the full product life cycle of the Proposed Project by sourcing photovoltaic (PV) panels 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.

Socioeconomics and Environmental Justice

Comments received during the scoping period regarding socioeconomics and environmental justice included: (1) concerns about whether or not the Proposed Project's burdens are being placed disproportionately on individuals and/or groups who, due to their socioeconomic status, have insufficient resources to challenge the Project specifically. Concern was raised that the DEIS should assess the economic impact on Jean and Primm, particularly if OHV area is lost or diminished greatly as a result of the Project; and (2) suggestion that an evaluation of environmental justice populations within the geographic scope of the Proposed Project should be initiated.

Energy and Minerals

No comments regarding energy and minerals were received during the scoping period.

Fuels and Wildland Fire

No comments regarding fuels and wildland fire were received during the scoping period.

Cumulative Impacts

Comments received during scoping regarding cumulative impacts included the suggestion that the DEIS should: (1) include a map of the cumulative projects in the area; (2) include an evaluation of the cumulative losses of land available for OHV recreation in the area;(3) include an assessment of the effect that all proposed projects in the area would have on the desert tortoise and desert habitat in general; (4) consider the cumulative impacts associated with multiple large-scale solar projects proposed in the desert and the potential impacts on various resources; (5)

identify whether the Proposed Project is located within one of the solar energy study areas, as defined by the BLM and the Department of Energy (DOE); (6) describe the reasonably foreseeable future land use and associated impacts that would result from the additional power supply; and (7) and consider how climate change could potentially influence and/or exacerbate Project impacts within sensitive areas.

General Comments and Concerns

General comments received during the scoping period included comments of support for the Proposed Project, and comments of disapproval. Additionally, many people requested to be added to the Project mailing list, and to be provided with information on how to shape the Resource Management Plan that is currently being drafted. Those requests have been satisfied.

5.1.4 EIS Mailing List

An EIS mailing list of interested persons was initially assembled from agencies, organizations, and other persons who expressed interest in being added to the mailing list during and after scoping. The mailing list for the Proposed Project was revised to add those persons who provided comments in response to scoping, who requested to be on the mailing list, or who signed a scoping meeting attendance list. Respondents who provided more than one comment letter were listed only once in the mailing list.

5.1.5 Distribution of the Draft EIS

The DEIS review period was initiated by publication of the Notice of Availability (NOA) for the DEIS in the *Federal Register*. The DEIS was distributed as follows:

- A NOA was published in the *Federal Register* specifying dates for the comment period;
- A news release containing the dates, times, and locations of public comment meetings was provided by the BLM at the beginning of the comment period on the DEIS. The news release was submitted to the same news organizations as for the initial public scoping announcement; and
- The DEIS was distributed to interested parties identified in the updated EIS mailing list, as described above, and also made available via the Internet.

5.1.6 Final EIS Preparation and Distribution

Letters and oral comments received on the DEIS will be reviewed and evaluated. Responses will be prepared for substantive comments, and modifications or corrections will be made to the EIS as determined necessary in response to these comments. Copies of these comments, along with responses to them, will be included in the Final EIS (FEIS). A 30-day FEIS availability period will be initiated by publication of the NOA for the FEIS by the U.S. Environmental Protection Agency (EPA) in the *Federal Register*. The FEIS will be sent to those who request copies and will be made available via the Internet. A news release will be issued to the same newspapers used for previous Project announcements.

5.1.7 Record of Decision

Subsequent to the 30-day availability period for the FEIS, the BLM will prepare a Record of Decision (ROD). The BLM ROD will be distributed to individuals and organizations as requested and posted on the Internet. A news release will be made to the same newspapers used for previous project announcements.

5.2 Consultation with Others

5.2.1 Federal, State, and Local Agencies

The following federal, state, and local agencies were consulted during preparation of the EIS:

- USFWS;
- Department of Defense (Nellis Air Force Base);
- National Park Service (NPS);
- U.S. Army Corps of Engineers (USACE);
- Nevada Department of Wildlife;
- Nevada State Historic Preservation Office (SHPO);
- Southern Nevada Water Authority (SNWA);
- CCDOA; and
- Clark County.

The following agencies provided comments during the scoping period:

- EPA;
- USFWS; and
- CCDOA.

5.2.2 Non-Governmental Organizations

The following non-governmental organizations provided comments during the public scoping period:

- Center for Biological Diversity;
- Defenders of Wildlife;
- Sierra Club; and
- Southern Nevada Off Road Enthusiasts (SNORE).

5.2.3 Native American Tribes

In accordance with 40 CFR 1501.7, which requires that scoping must be conducted both internally with appropriate BLM staff and include tribes, the following tribes were given notice of the Proposed Project as the first step in the consultation process:

- Chemehuevi Indian Tribe;
- Colorado River Indian Tribes;
- Las Vegas Paiute Tribe;
- Moapa Band of Paiutes;
- Pahrump Paiute Tribe; and
- Fort Mohave Indian Tribe.

5.3 Names of Preparers

The following individuals participated in the preparation and review of the DEIS:

Name/Organization	Responsibility
BLM - Las Vegas Field Office	
Bob Ross	Field Manager
Greg Helseth	Project Manager
Jayson Barangan	Biological Resources – T & E Species & Wildlife
Michele Bilodeau	NEPA Coordinator
Nora Caplette	Biological Resources – Invasive Plants
Mark Chandler	Lands and Realty / Visual Resources Management
Lisa Christianson	Air Quality
Bob Dieli	Recreation
Fred Edwards	Biological Resources
Krystal Johnson	Grazing and Range
Sendi Kalcic	Special Management Areas / Transportation
Gayle Marrs-Smith	Socioeconomics
Michael Moran	Public Health and Safety
Kevin Oliver	Fuels and Fire Management
Sarah Peterson	Hydrology
Kathleen Sprowl	Archaeology / Paleontology
George Varhalmi	Minerals, Geology, and Soils
Ecology and Environment, Inc.	
Ron Karpowicz, P.E.	Principal in Charge
Howard Levine, MPS	Project Manager
Jen Rouda, MS	Deputy Project Manager
Jerry Barker, Ph.D.	Range / Fuels and Fire Management
Erica Brown	Cumulative Impacts

Name/Organization	Responsibility
Danielle Cassidy	Range / Fuels and Fire Management
Erec DeVost	Transportation and Traffic / Energy and Minerals / Soils
Tom Dildine, MS	Visual Resources
Emily Doren	Water Resources and Hydrology / Energy and Minerals
Conor Doyle	Recreation / Special Management Areas
Tom Ferraro, MS, P.G.	Water Resources and Hydrology
Leslie Fischbeck	Paleontological Resources
Louise Flynn MES, MPH	Human Health and Safety & Hazardous Materials
Tim Gross, Ph.D.	Cultural Resources
H. Dru Krupinski	Air Quality and Greenhouse Gases
Ashley LaForge	Energy and Minerals
Christine McCollum	Cultural Resources / Paleontological Resources
Ian Miller	Social and Economic Conditions
Eric Mucha	GIS
Sandra Pentney	Cultural Resources
Chrissy Ringo	Technical Editing
Tom Siener, CIH	Noise
Bruce Wattle	Air Quality and Greenhouse Gases
Deepali Weyand	Environmental Justice
Christina Willis	Quality Assurance
Ed Woch	Botany and Invasive Plants
Silvia Yanez, MS	Human Health and Safety & Hazardous Materials
Jason Zoller	Wildlife – Biology
Kim Zuppiger	Noise

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7 Acronyms & Abbreviations

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7 Acronyms and Abbreviations

%g	percent of gravity
°C	degrees Celsius
°F	degrees Fahrenheit
AADT	Annual Average Daily Traffic
AC	alternating current
ACEC	Area of Critical Environmental Concern
AFA	acre-feet per annum
AHPA	Archaeological and Historic Preservation Act
AIRFA	American Indian Religious Freedom Act
ALS	Advanced Life Support
AMP	Allotment Management Plan
APE	area of potential effect
APLIC	Avian Protection on Power Lines
APM	Applicant Proposed Measure
Applicant	NextLight Renewable Power, LLC
ARPA	The Archaeological Resources Protection Act
ASME	American Society of Mechanical Engineers
BCI	Bat Conservation International
BEA	Bureau of Economic Analysis
BLM	Bureau of Land Management

BLS	Bureau of Labor and Statistics
BMP	best management practice

CAA	Clean Air Act
CAFR	Comprehensive Annual Financial Report
CAISO	California Independent System Operator
cal BP	calibrated years before present
CCAO	Clark County Assessor's Office
CCDCP	Clark County Department of Comprehensive Planning
CCDOA	Clark County Department of Aviation
CCFD	Clark County Fire Department
CCSD	Clark County School District
CDEC	California Data Exchange Center
CDFG	California Department of Fish and Game
CDWR	California Department of Water Resources
CEC	California Energy Commission
CEQ	Council on Environmental Quality
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CH_4	methane
CNDDB	California Natural Diversity Database
CNEL	community noise equivalent level
CO	carbon monoxide
CO_2	carbon dioxide
CO_2e	CO_2 equivalence
CSP	concentrating solar power
CWA	Clean Water Act

DAQEM	Department of Air Quality and Environmental Management
dB	decibel
DC	direct current
DCNR	Department of Conservation and Natural Resources
DEIR	Draft Environmental Impact Report
DEIS	Draft Environmental Impact Statement
DIR	Division of Industrial Relations
DNL	Daytime-Nighttime Noise Level
DOE	U.S. Department of Energy
DOI	U.S. Department of the Interior
DWMA	Desert Wildlife Management Area
E & E	Ecology and Environment, Inc.
ECSZ	Eastern California Shear Zone
EIS	Environmental Impact Statement
EITP	Eldorado Ivanpah Transmission Project
EO	Executive Order
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act
FAA	Federal Aviation Administration
FEIS	Final Environmental Impact Statement
FEMA	Federal Emergency Management Agency
FHWA	Federal Highway Administration
FLPMA	Federal Land Policy and Mangement Act of 1976
FMU	Fire Management Unit
FRCC	Fire Regime Condition Class
FSA	Final Staff Assessment

FTA	Federal Transit Authority
FTE	full-time equivalent
GDP	Gross Domestic Product
GHG	greenhouse gas
gpm	gallons per minute
GPS	global positioning system
GWP	global warming potential
HFC	hydrofluorocarbon
HFE	hydrofluorinated ethers
HMA	Herd Management Area
HMMP	Hazardous Materials Management Plan
HMRR	Hazard Management and Resource Restoration
HRC	Harry Reid Center for Environmental Studies
HSWA	Hazardous and Solid Waste Act
HVAC	heating, ventilation, and air conditioning
Hwy	Highway
Hz	hertz
I-15	Interstate 15
IBC	International Building Code
IECC	International Energy Conservation Code
IM	Instruction Memorandum
IMA	Intensively Managed Area
IMPLAN	Impact Analysis for Planning, Inc.
IPCC	Intergovernmental Panel on Climate Change
ISA	Instant Study Area

KOP	key observation point
kV	kilovolt
LADWP	Los Angeles Department of Water and Power
LEPC	Local Emergency Planning Committee
LIMA	Less Intensively Managed Area
LOS	Level of Service
LVFMP	Las Vegas Fire Management Plan
LVMPD	Las Vegas Metro Police Department
LVRMP	Las Vegas Resource Management Plan
LVVWD	Las Vegas Valley Water District
M	magnitude
MBTA	Migratory Bird Treaty Act
mm	millimeter
MMT	million metric tons
$MMTCO_2e$	million metric tons of carbon dioxide equivalents
mph	miles per hour
MSDS	Material Safety Data Sheets
MSHCP	Multiple Species Habitat Conservation Plan
msl	mean sea level
MUMA	Multiple Use Managed Area
MW	megawatt
N_2O	nitrous oxide
NAAQS	National Ambient Air Quality Standards
NAC	Nevada Administrative Code
NAGPRA	Native American Graves Protection and Repatriation Act

NAICS	North American Industry Classification System
NBMG	Nevada Bureau of Mines and Geology
NCCAC	Nevada Climate Change Advisory Committee
NCCAC	Nevada Climate Change Advisory Committee
NCP	National Contingency Plan
NDEM	Nevada Division of Emergency Management
NDEP	Nevada Division of Environmental Protection
NDOT	Nevada Department of Transportation
NDOW	Nevada Department of Wildlife
NDWR	Nevada Division of Water Resources
NEC	National Electrical Code
NEMA	National Electric Manufacturers Association
NEPA	National Environmental Policy Act
NextLight	NextLight Renewable Power, LLC; *also* the Applicant
NF_3	nitrogen trifluoride
NFIP	National Flood Insurance Program
NFPA	National Fire Protection Association
NGO	non-governmental organizations
NGS	National Geographic Society
NHPA	National Historic Preservation Act
NISC	National Invasive Species Council
NISC	National Invasive Species Council
NLCD	National Land Cover Database
NMNH	National Museum of Natural History
NNHP	Nevada Natural Heritage Program
NNPS	Nevada Native Plant Society
NO_2	nitrogen dioxide
NOA	Notice of Availability

NOAA	National Oceanic and Atmospheric Administration
NOI	Notice of Intent
NO_X	nitrogen oxide
NPDES	National Pollutant Discharge Elimination System
NPL	National Priorities List
NPS	National Park Service
NRHP	National Register of Historic Places
NRS	Nevada Revised Statute
NV TF-1	Nevada Task Force 1
NVCRIS	Nevada Cultural Resources Information System
NVSDO	Nevada State Demographer's Office
NYSDEC	New York State Department of Environmental Conservation
O&M	operation and maintenance
O_3	ozone
OHV	off-highway vehicle
OSHA	Occupational Safety and Health Administration
PFC	perfluorocarbon
PFYC	Potential Fossil Yield Classifications
PGA	peak ground acceleration
PM_{10}	particulate matter with an aerodynamic diameter of 10 microns or less
$PM_{2.5}$	particulate matter with an aerodynamic diameter of 2.5 microns or less
PMMP	Paleontological Mitigation and Monitoring Plan
POD	Plan of Development
PPA	Power Purchase Agreement
PRPA	Paleontological Resources Preservation Act

PV	photovoltaic
RCI	Resource Concepts, Inc.
RCRA	Resource Conservation and Recovery Act
RMP	Resource Management Plan
ROD	Record of Decision
ROW	right-of-way
SARA	Superfund Amendments and Reauthorization Act
SCADA	Supervisory Control and Data Acquisition
SCATS	Safety Consultation and Training Section
SCE	Southern California Edison
SCEC	Southern California Earthquake Center
SCLUP	South County Land Use Plan
SDWA	Safe Drinking Water Act
SEINet	Southwest Environmental Information Network
SEOC	State Emergency Operations Center
SF6	sulfur hexafluoride
SHPO	State Historic Preservation Office
SIP	State Implementation Plan
SMA	Special Management Area
SMRA	Special Management Recreation Area
SMS	solar meteorological stations
SNAA	Southern Nevada Archaeological Archive
SNHBA	Southern Nevada Home Builder's Association
SNHD	Southern Nevada Health District
SNSA	Southern Nevada Supplemental Airport
SO_2	sulfur dioxide

SP, LA&SL	San Pedro, Los Angeles, and Salt Lake Railroad Company
SPCC	Spill Prevention, Control, and Countermeasures
SR	State Route
SRMA	Special Recreation Management Area
SUT	step-up transformers
SWPPP	Stormwater Pollution Prevention Plan
T & E	threatened and endangered
TCLP	Toxicity Characteristic Leaching Procedure
TMDL	Total Maximum Daily Load
TNC	The Nature Conservancy
TSDF	treatment, storage, and disposal facility
U.S.C.	United States Code
UMA	Unmanaged Area
UMC	University Medical Center *or* Uniform Mechanical Code
UNLV	University of Nevada Las Vegas
UPC	Uniform Plumbing Code
UPRR	Union Pacific Railroad
USDA	U.S. Department of Agriculture
USDOT	U.S. Department of Transportation
USFS	U.S. Forest Service
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
UST	underground storage tank
V/C	volume to capacity

VOC	volatile organic compound
VRM	visual resource management
WBWG	Western Bat Working Group
WEAP	Worker Environmental Awareness Program
WSA	Wilderness Study Area
WSR	Wild & Scenic River Council
WUI	Wildland Urban Interface

A Emissions Calculations

Note: This appendix section is NOT fully 508 compliant. For help with its data or information, please contact the Bureau of Land Management, Southern Nevada District Office at 702-515-5000. Please reference the Silver State Solar Project, dated: April 2010.

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A Emissions Calculations

Appendix A
Emission Calculations for Construction Activities
NextLight SilverState Solar Project

Table No.	Table Description
Form A	General Project information
Form B-1	General Construction info - Section 1
Form B-2	General Construction info - Section 2 and 3
Table 1	Summary of Yearly Construction Emissions
Table 2-A	Daily and Yearly Emissions for Diesel Non-Road Equipment - Section 1
Table 2-B	Daily and Yearly Emissions for Diesel Non-Road Equipment - Sections 2 and 3
Table 3	On-Road Vehicle Usage
Table 4	On-Road Vehicle Exhaust Emission Factors
Table 5	Peak Construction Daily Exhaust Emissions for On Road Vehicles
Table 6-A	Fugitve Dust Emissions - Construction Site - Section 1
Table 6-B	Fugitve Dust Emissions - Construction Site - Section 2
Table 7	Fugitive Dust Emission Factors - Roads
EF Offroad	SCAB Fleet Average Emission Factors (Diesel)
EF Onroad	Emission Factors for On-Road Heavy-Heavy-Duty Diesel Trucks
On-road vehicles	On-Road Vehicle Classification

Form A
General Project Construction Information

Project Description:	NextLight SilverState Solar Project
Location:	Clark County, NV
Size (acres):	2,066
Construction Start Date:	1st quarter, 2011
Construction End Date:	4th quarter, 2014

*Attach project schedule as needed.

		Description
Construction Phases:	1	Environmental Clearance
	2	Site Access / Laydown
	3	Well Field / Pond
	4	Site Preperation
	5	O&M area - Building Construction
	6	Drainage Controls
	7	Substation / Switchyard
	8	Overhead Pole / Line Construction
	9	PV Equipment
	10	Installation / Commissioning
	11	Commercial Operation

COMMENTS

Assumptions:

Maximum daily emissions from on-road equipment: worst case scenario 12-hour operation

Fugitive emissions estimations: Grading applicable to the following major structures (POD, pg. 2-22 and 2-23)

a) O&M Building: 3.6 acres

b) Substations and switchyards: 8.2 acres

c) Drainage control structures: 17.7 acres

d) Roads and access way development: 138.2 acres (inside fence) + 8.3 acres (service road) Total: 146.5 acres

e) Solar fields: each 1MW Block will require grading for pad supporting inverter and transformer (area per pad not provided).

f) Trenching area: worst-case scenario is horizontal tracker technology (21.3 acres)

Major grading activities would occur during Section 1

Environmental clearance activities would only require: vehicle trips, stacking and fencing

Page 2 of 27

Form B-1
Construction Phase Information (Section 1)

Project Description: NextLight SilverState Solar Project
Construction Phase: Section 1
Construction Phase Start Date: Jan-2011
Construction Phase End Date: Mar-2012
Total Duration (in weeks):
Total Number of Work Days: 264 **Daily Work Schedule (hr/day):** 12
Number of Workers:
Disturbed Area (acres):

NON-ROAD EQUIPMENT

Equipment Description[1]	No. of Units	Engine Rating per Unit (hp)	Fuel Type	Daily Operation per Unit (hrs/day)	Average Engine Load[2] (%)	Total Work Days per Unit
Scraper	3	135	n/a	12	n/a	132
Motor grader	3	200	n/a	12	n/a	132
Excavator	4	195	n/a	12	n/a	132
Dozer	3	300	n/a	12	n/a	132
Dump truck	4	275	n/a	12	n/a	132
Pad drum vibratory roller	3	130	n/a	12	n/a	132
Concrete truck	6	250	n/a	12	n/a	132
Backhoe/loader	2	90	n/a	12	n/a	132
Truck mounted crane	5	130	n/a	12	n/a	198
Grade-all	5	100	n/a	12	n/a	132
Trencher	3	180	n/a	12	n/a	132
Drilling Rig for Water Wells	2	565	n/a	12	n/a	20
Drilling Rig Air Compressor	2	500	n/a	12	n/a	20
Welding machines	1	25	n/a	12	n/a	40
Forklifts	2	125	n/a	12	n/a	40
Crawler tractor	1	84	n/a	12	n/a	40
Jackhammer/ Skid Steer loader	1	81	n/a	12	n/a	40
Bucket trucks	3	210	n/a	12	n/a	20
Bullwheel tensioner truck	2	165	n/a	12	n/a	20
Drum puller truck	2	460	n/a	12	n/a	20

Page 4 of 27

Form B-1
Construction Phase Information (Section 1)

Pump trucks	1	350	n/a	12	n/a	7
Auger trucks	2	200	n/a	12	n/a	10
Water truck	6	220	n/a	12	n/a	264

Notes: n/a not available
1. As applicable, list the same equipment of different sizes, fuel types, daily operation, load, or total days on separate lines.
2. If engine load data is not available, load will be estimated based on USEPA nonroad equipment inventories.

ON-ROAD EQUIPMENT

Vehicle Description	No. of Units	Travel on Unpaved Roads per Roundtrip[1] (miles)	Travel on Paved Roads per Roundtrip[1] (miles)	Roundtrips per Day per Unit	Total Working Days per Unit	Vehicle Class[2]
Dump truck	1	4	70	1	132	HDDV6
Flatbed truck	5	4	70	1	198	HDDV3
Lightweight truck	50	4	70	1	198	LDGT3

Notes:
1. Estimate of the average travel distance during a single work day.
2. See types of Vehicle Class in attached Table 1

WORKER COMMUTING

No. of Workshifts: 1

Duration of Workshift (hrs): 12

Average One-Way Commute Distance (miles): 35

Percentage of workers w/transport provided (e.g., buses): N/A

COMMENTS

From POD: During peak construction, an estimated 56 truck trips per day will be required to supply concrete, construction materials, Project components, and equipment to the site.

Page 5 of 27

Form B-2
Construction Phase Information (Sections (2 and 3)

Project Description: NextLight SilverState Solar Project

Construction Phase: Sections 2/3

Construction Phase Start Date: Section 2: Mar-2012; Section 3: Mar-2013

Construction Phase End Date: Section 2: Jun-2013; Section 3: Jun-2014

Total Duration (in weeks):

Total Number of Work Days: 792 **Daily Work Schedule (hr/day):** 12

Number of Workers:

Disturbed Area (acres):

NON-ROAD EQUIPMENT

Equipment Description[1]	No. of Units	Engine Rating per Unit (hp)	Fuel Type	Daily Operation per Unit (hrs/day)	Average Engine Load[2] (%)	Total Work Days per Unit
Scraper	3	135	n/a	12	n/a	396
Motor grader	3	200	n/a	12	n/a	396
Excavator	4	195	n/a	12	n/a	396
Dozer	3	300	n/a	12	n/a	396
Dump truck	4	275	n/a	12	n/a	396
Pad drum vibratory roller	3	130	n/a	12	n/a	396
Concrete truck	6	250	n/a	12	n/a	396
Backhoe/loader	2	90	n/a	12	n/a	396
Truck mounted crane	5	130	n/a	12	n/a	594
Grade-all	5	100	n/a	12	n/a	396
Trencher	3	180	n/a	12	n/a	396
Drilling Rig for Water Wells	2	565	n/a	12	n/a	0
Drilling Rig Air Compressor	2	500	n/a	12	n/a	0
Welding machines	1	25	n/a	12	n/a	310
Forklifts	2	125	n/a	12	n/a	310
Crawler tractor	1	84	n/a	12	n/a	310
Jackhammer/ Skid Steer loader	1	81	n/a	12	n/a	310
Bucket trucks	3	210	n/a	12	n/a	160
Bullwheel tensioner truck	2	165	n/a	12	n/a	160
Drum puller truck	2	460	n/a	12	n/a	160

Page 6 of 27

Form B-2
Construction Phase Information (Sections (2 and 3)

Pump trucks	1	350	n/a	12	n/a	20
Auger trucks	2	200	n/a	12	n/a	50
Water truck	6	220	n/a	12	n/a	792

Notes: n/a not available

1. As applicable, list the same equipment of different sizes, fuel types, daily operation, load, or total days on separate lines.
2. If engine load data is not available, load will be estimated based on USEPA nonroad equipment inventories.

ON-ROAD EQUIPMENT

Vehicle Description	No. of Units	Travel on Unpaved Roads per Roundtrip[1] (miles)	Travel on Paved Roads per Roundtrip[1] (miles)	Roundtrips per Day per Unit	Total Working Days per Unit	Vehicle Class[2]
Dump truck	1	4	70	1	396	HDDV6
Flatbed truck	5	4	70	1	594	HDDV3
Lightweight truck	50	4	70	1	594	LDGT3

Notes:

1. Estimate of the average travel distance during a single work day.
2. See types of Vehicle Class in attached Table 1

WORKER COMMUTING

No. of Workshifts: 1

Duration of Workshift (hrs): 12

Average One-Way Commute Distance (miles): 35

Percentage of workers w/transport provided (e.g., buses): N/A

COMMENTS

From POD: During peak construction, an estimated 56 truck trips per day will be required to supply concrete, construction materials, Project components, and equipment to the site.

Page 7 of 27

Table 1
Summary of Yearly Construction Emissions
NextLight SilverState Solar Project

Year	Emissions (tons/year)						GHG Total Emissions (metric tons/year)		
	ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	CO2e
2011	7.48	24.41	66.72	0.07	2.90	2.90	5,904.75	1.64	5939.27
2012	5.88	19.16	52.09	0.06	2.29	2.29	4610.91	0.48	4621.03
2013	5.88	19.16	52.09	0.06	2.29	2.29	4610.91	0.48	4621.03
2014	5.88	19.16	52.09	0.06	2.29	2.29	4610.91	0.48	4621.03
	25.12	81.89	223.00	0.24	9.77	9.77	19,737.49	3.09	19802.35

Table 2-A
Daily and Yearly Emissions for Diesel Non-Road Equipment - Section 1
NextLight SilverState Solar Project

Construction Phase	Equipment Type	No. of Units	Equipment Engine Size (hp) [a]	Fuel Type	Estimated daily usage [b] (hrs/day)	Criteria Pollutants Total Emissions (lbs/day)					GHG Total Emissions (lbs/day)	
						ROG	CO	NO_x	SO_2	PM	CO_2	CH_4
All Construction Activities	Scraper	3	135	Diesel	12	8.61	33.44	65.82	0.06	3.79	5330.7	0.8
	Motor grader	3	200	Diesel	12	6.34	17.76	64.45	0.07	2.38	6196.1	0.6
	Excavator	4	195	Diesel	12	6.97	18.88	71.69	0.09	2.49	7616.77	0.63
	Dozer	3	300	Diesel	12	12.16	50.86	107.61	0.09	4.64	8607.65	1.10
	Dump truck	4	275	Diesel	12	7.87	20.65	77.52	0.09	2.76	7994.18	0.71
	Pad drum vibratory roller	3	130	Diesel	12	5.32	22.57	43.28	0.04	2.37	3893.26	0.48
	Concrete truck	6	250	Diesel	12	11.80	30.97	116.28	0.13	4.14	11991.27	1.07
	Backhoe/loader	2	90	Diesel	12	2.18	8.70	13.59	0.01	1.24	1241.47	0.20
	Truck mounted crane	5	130	Diesel	12	7.27	29.28	55.81	0.05	3.23	4820.67	0.66
	Grade-all	5	100	Diesel	12	6.33	24.65	60.70	0.08	2.65	7365.77	0.57
	Trencher	3	180	Diesel	12	6.03	17.67	27.35	0.03	2.29	2113.90	0.54
	Drilling Rig for Water Wells	2	565	Diesel	12	2.53	12.35	27.20	0.04	1.20	3956.48	0.23
	Drilling Rig Air Compressor	2	500	Diesel	12	3.61	13.92	46.07	0.05	1.43	5108.55	0.33
	Welding machines	1	25	Diesel	12	0.30	0.79	1.31	0.00	0.09	135.43	0.03
	Forklifts	2	125	Diesel	12	1.65	5.57	12.39	0.01	0.67	1305.50	0.15
	Crawler tractor	1	84	Diesel	12	1.86	6.02	10.85	0.01	0.98	789.73	0.17
	Jackhammer/ Skid Steer loader	1	81	Diesel	12	0.73	3.39	4.96	0.01	0.43	513.14	0.07
	Bucket trucks	3	210	Diesel	12	5.90	15.48	58.14	0.07	2.07	5995.63	0.53
	Bullwheel tensioner truck	2	165	Diesel	12	4.16	18.30	30.71	0.03	1.85	3002.11	0.37
	Drum puller truck	2	460	Diesel	12	5.98	18.10	55.65	0.06	2.09	6536.01	0.54
	Pump truck	1	350	Diesel	12	2.98	8.91	28.66	0.03	1.05	3121.25	0.27
	Auger truck	2	200	Diesel	12	3.93	10.32	38.76	0.04	1.38	3997.09	0.36
	Water truck	6	220	Diesel	12	11.80	30.97	116.28	0.13	4.14	11991.27	1.07
	TOTAL					**126.3**	**419.6**	**1135.1**	**1.2**	**49.4**	**113,624**	**11.4**

Notes:
(a) Emission factors recommended by the South Coast Air Management District were used per equipment
(b) Maximum daily usage assumed as the total daily construction hours (7 am to 7 pm)

Section 1 Timeframe 1 year
Conversion factors 2000 lbs/ton 2204 lbs/tonne

Criteria Pollutants Total Emissions (tons per year)					GHG Total Emissions (metric tons/year)	
ROG	CO	NO_x	SO_2	PM	CO_2	CH_4
0.57	2.21	4.34	0.00	0.25	319.3	0.0
0.42	1.17	4.25	0.00	0.16	371.1	0.0
0.46	1.25	4.73	0.01	0.16	456.18	0.04
0.80	3.36	7.10	0.01	0.31	515.52	1.10
0.52	1.36	5.12	0.01	0.18	478.78	0.04
0.35	1.49	2.86	0.00	0.16	233.17	0.03
0.78	2.04	7.67	0.01	0.27	718.17	0.06
0.14	0.57	0.90	0.00	0.08	74.35	0.01
0.72	2.90	5.53	0.01	0.32	433.07	0.06
0.42	1.63	4.01	0.01	0.17	441.14	0.03
0.40	1.17	1.81	0.00	0.15	126.60	0.03
0.03	0.12	0.27	0.00	0.01	35.90	0.00
0.04	0.14	0.46	0.00	0.01	46.36	0.00
0.01	0.02	0.03	0.00	0.00	2.46	0.00
0.03	0.11	0.25	0.00	0.01	23.69	0.00
0.04	0.12	0.22	0.00	0.02	14.33	0.00
0.01	0.07	0.10	0.00	0.01	9.31	0.00
0.06	0.15	0.58	0.00	0.02	54.41	0.00
0.04	0.18	0.31	0.00	0.02	27.24	0.00
0.06	0.18	0.56	0.00	0.02	59.31	0.00
0.01	0.03	0.10	0.00	0.00	9.91	0.00
0.02	0.05	0.19	0.00	0.01	18.14	0.00
1.56	4.09	15.35	0.02	0.55	1436.34	0.13
7.5	**24.4**	**66.7**	**0.1**	**2.9**	**5,906**	**1.6**

Table 2-B
Daily and Yearly Emissions for Diesel Non-Road Equipment - Sections 2 and 3
NextLight SilverState Solar Project

Construction Phase	Equipment Type	No. of Units	Equipment Engine Size (hp) [a]	Fuel Type	Estimated daily usage [b] (hrs./day)	Criteria Pollutants Total Emissions (lbs/day)					GHG Total Emissions (lbs/day)	
						ROG	CO	NO_x	SO_2	PM	CO_2	CH_4
All Construction Activities	Scraper	3	135	Diesel	12	8.61	33.44	65.82	0.06	3.79	5330.7	0.8
	Motor grader	3	200	Diesel	12	6.34	17.76	64.45	0.07	2.38	6196.1	0.6
	Excavator	4	195	Diesel	12	6.97	18.88	71.69	0.09	2.49	7616.77	0.63
	Dozer	3	300	Diesel	12	12.16	50.86	107.61	0.09	4.64	8607.65	1.10
	Dump truck	4	275	Diesel	12	7.87	20.65	77.52	0.09	2.76	7994.18	0.71
	Pad drum vibratory roller	3	130	Diesel	12	5.32	22.57	43.28	0.04	2.37	3893.26	0.48
	Concrete truck	6	250	Diesel	12	11.80	30.97	116.28	0.13	4.14	11991.27	1.07
	Backhoe/loader	2	90	Diesel	12	2.18	8.70	13.59	0.01	1.24	1241.47	0.20
	Truck mounted crane	5	130	Diesel	12	7.27	29.28	55.81	0.05	3.23	4820.67	0.66
	Grade-all	5	100	Diesel	12	6.33	24.65	60.70	0.08	2.65	7365.77	0.57
	Trencher	3	180	Diesel	12	6.03	17.67	27.35	0.03	2.29	2113.90	0.54
	Drilling Rig for Water Wells [c]	2	565	Diesel	12	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Drilling Rig Air Compressor [c]	2	500	Diesel	12	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Welding machines	1	25	Diesel	12	0.30	0.79	1.31	0.00	0.09	135.43	0.03
	Forklifts	2	125	Diesel	12	1.65	5.57	12.39	0.01	0.67	1305.50	0.15
	Crawler tractor	1	84	Diesel	12	1.86	6.02	10.85	0.01	0.98	789.73	0.17
	Jackhammer/ Skid Steer loader	1	81	Diesel	12	0.73	3.39	4.96	0.01	0.43	513.14	0.07
	Bucket trucks	3	210	Diesel	12	5.90	15.48	58.14	0.07	2.07	5995.63	0.53
	Bullwheel tensioner truck	2	165	Diesel	12	4.16	18.30	30.71	0.03	1.85	3002.11	0.37
	Drum puller truck	2	460	Diesel	12	5.98	18.10	55.65	0.06	2.09	6536.01	0.54
	Pump truck	1	350	Diesel	12	2.98	8.91	28.66	0.03	1.05	3121.25	0.27
	Auger truck	2	200	Diesel	12	3.93	10.32	38.76	0.04	1.38	3997.09	0.36
	Water truck	6	220	Diesel	12	11.80	30.97	116.28	0.13	4.14	11991.27	1.07
	TOTAL					**120.2**	**393.3**	**1061.8**	**1.2**	**46.7**	**104,559**	**10.8**

Notes:
(a) Emission factors recommended by the South Coast Air Management District were used per equipment
(b) Maximum daily usage assumed as the total daily construction hours (7 am to 7 pm)
(c) Daily and yearly emissions for the drilling rig equipment are applicable to Section 1 only

Sections 2/3 Timeframe 4 years
Conversion factors 2000 lbs/ton 2204 lbs/tonne

Criteria Pollutants Total Emissions (tons per year)					GHG Total Emissions (metric tons/year)	
ROG	CO	NO_x	SO_2	PM	CO_2	CH_4
0.43	1.66	3.26	0.00	0.19	239.4	0.0
0.31	0.88	3.19	0.00	0.12	278.3	0.0
0.34	0.93	3.55	0.00	0.12	342.1	0.0
0.60	2.52	5.33	0.00	0.23	386.6	0.0
0.39	1.02	3.84	0.00	0.14	359.1	0.0
0.26	1.12	2.14	0.00	0.12	174.9	0.0
0.58	1.53	5.76	0.01	0.20	538.6	0.0
0.11	0.43	0.67	0.00	0.06	55.8	0.0
0.54	2.17	4.14	0.00	0.24	324.8	0.0
0.31	1.22	3.00	0.00	0.13	330.9	0.0
0.30	0.87	1.35	0.00	0.11	95.0	0.0
0.00	0.00	0.00	0.00	0.00	0.0	0.0
0.00	0.00	0.00	0.00	0.00	0.0	0.0
0.01	0.03	0.05	0.00	0.00	4.8	0.0
0.06	0.22	0.48	0.00	0.03	45.9	0.0
0.07	0.23	0.42	0.00	0.04	27.8	0.0
0.03	0.13	0.19	0.00	0.02	18.0	0.0
0.12	0.31	1.16	0.00	0.04	108.8	0.0
0.08	0.37	0.61	0.00	0.04	54.5	0.0
0.12	0.36	1.11	0.00	0.04	118.6	0.0
0.01	0.02	0.07	0.00	0.00	7.1	0.0
0.02	0.06	0.24	0.00	0.01	22.7	0.0
1.17	3.07	11.51	0.01	0.41	1077.3	0.1
5.9	**19.2**	**52.1**	**0.1**	**2.3**	**4,611**	**0.5**

Table 3
On-Road Vehicle Usage
NextLight SilverState Solar Project

Section 1

Vehicle Type	Construction Phase	Vehicle Description	Vehicle Class	Number of trips per day	Total Working Hours	Total Working Days	Working hours per day	Estimated speed (mph)	Total Daily VMT per Unit (VMT/day)			Total Daily VMT All Units (VMT/day)			Total Overall VMT of All Units (VMT)		
									Unpaved Roads	Paved Roads	TOTAL	Unpaved Roads	Paved Roads	TOTAL	Unpaved Roads	Paved Roads	TOTAL
Heavy Duty Diesel Truck	All	Dump Truck	HDDV6	1	1584	132	12	25	4.0	70	74	4	70	74	528	9,240	9,768
		Flatbed Truck	HDDV3	5	2376	198	12	25	4.0	70	74	20	350	370	3,960	13,860	17,820
	Subtotal	-			-	-	-	-	**8**	**140**	**148**	**24**	**420**	**444**	**4,488**	**23,100**	**27,588**
Light Duty Truck		Lightweight Truck	LDGT3	50	2376	198	12	25	4	70	74	200	3,500	3,700	39,600	693,000	732,600
	Subtotal	-			-		-	-	**4**	**70**	**74**	**200**	**3,500**	**3,700**	**39,600**	**693,000**	**732,600**

Section 2

Vehicle Type	Construction Phase	Vehicle Description	Vehicle Class	Number of trips per day	Total Working Hours	Total Working Days	Working hours per day	Estimated speed (mph)	Total Daily VMT per Unit (VMT/day)			Total Daily VMT All Units (VMT/day)			Total Overall VMT of All Units (VMT)		
									Unpaved Roads	Paved Roads	TOTAL	Unpaved Roads	Paved Roads	TOTAL	Unpaved Roads	Paved Roads	TOTAL
Heavy Duty Diesel Truck	All	Dump Truck	HDDV6	1	4752	396	12.0	25	4.0	70	74	4	70	74	1,584	27,720	29,304
		Flatbed Truck	HDDV3	5	7128	594	12.0	25	4.0	70	74	20	350	370	11,880	207,900	219,780
	Subtotal	-			-	-	-	-	**8**	**140**	**148**	**24**	**420**	**444**	**13,464**	**235,620**	**249,084**
Light Duty Truck		Lightweight Truck	LDGT3	50	7128	594	12	25	4	70	74	200	3,500	3,700	118,800	2,079,000	2,197,800
	Subtotal	-			-		-	-	**4**	**70**	**74**	**200**	**3,500**	**3,700**	**118,800**	**2,079,000**	**2,197,800**

Table 4
On-Road Vehicle Exhaust Emission Factors
NextLight SilverState Solar Project

Equipment Type	Emission Factor[a] (pounds/VMT)							
	ROG	CO	NOx	SOx	PM10	PM2.5	CO2	CH_4
Heavy Duty Diesel Trucks	0.003042	0.011955	0.038221	0.000041	0.001831	0.001601	4.211206	0.000142
Light Duty Trucks	0.002590	0.01844	0.02062	0.0000270	0.0007512	0.0006243	2.732	0.0001258
Gasoline Passenger Vehicles	0.0009140	0.00826	0.0009181	0.00001077	0.00008698	0.00005478	1.096	0.00008146
ATVs	0.0046270	0.10146	0.0009048	0.00010582	0.00014550	0.00014550	0.517	0.00000000

Notes:
a. Emission Factors for On-Road Heavy-Heavy-Duty Diesel Trucks. SCAQMD (Scenario Year: 2010).

Table 5
Peak Construction Daily Exhaust Emissions for On Road Vehicles
NextLight SilverState Solar Project

Section 1

Vehicle Type	Miles Travelled per Day (VMT/day)	Total Emissions (lbs/day)							
		ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4
Heavy Duty Diesel Trucks	27,588	83.91	329.80	1054.44	1.14	50.50	44.16	116,179	3.92
Light Duty Trucks	732,600	1897.43	13509.14	15106.21	19.78	550.33	457.36	2,001,463	92.16
Total	**-**	**1981.3**	**13838.9**	**16160.7**	**20.9**	**600.8**	**501.5**	**2,117,642**	**96.1**

Sections 2/3

Vehicle Type	Miles Travelled per Day (VMT/day)	Total Emissions (lbs/day)							
		ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4
Heavy Duty Diesel Trucks	249,084	757.61	2977.69	9520.24	10.29	455.98	398.74	1048943.98	35.37
Light Duty Trucks	2,197,800	5692.30	40527.43	45318.64	59.34	1650.99	1372.09	6004389.60	276.48
Total	**-**	**6449.91**	**43505.12**	**54838.88**	**69.63**	**2106.97**	**1770.83**	**7,053,334**	**311.86**

Table 6-A
Fugitve Dust Emissions - Construction Site - Section 1
NextLight SilverState Solar Project

Construction Activity	Total Disturbance (acres)	Duration of Activity (month)	Emission Factor[a] (ton/acre/month)		Emissions (tons)		Daily Emissions (lbs/day)	
			PM_{10}	$PM_{2.5}$	PM_{10}	$PM_{2.5}$	PM_{10}	$PM_{2.5}$
Grading O&M and North Substation	3.6	6	0.090	0.0126	1.94	0.27	22	3
Grading Solar field	415	6	0.090	0.0126	224.10	31.37	2490	349
Trenching (PV Installation)	2.8	1	0.090	0.0126	0.25	0.04	16.8	2.4
Roadwork	27.6	6	0.090	0.0126	14.90	2.09	165.6	23.2
Transmission line construction	2.8	6	0.090	0.0126	1.51	0.21	16.8	2.4
34.5kV Collection Lines	1.6	6	0.090	0.0126	0.86	0.12	9.6	1.3
Total	**453.4**	**-**	**-**	**-**	**241.20**	**33.77**	**2720**	**381**

Notes:
a. See emission factor derivation table below.

Emission Factor Derivation Table

Parameter	Units	TSP[1]	PM_{10}[(2)]	$PM_{2.5}$[(3)]
Uncontrolled Emission Factor[1] (based on 30 days/month)	ton/acre/month	0.2	0.15	0.021
Controlled Emission Factor[5] (based on 24 days/month)	ton/acre/month	0.12	0.090	0.0126

Notes:
1. Emission factor from AP-42 Section 13.2.3 for TSP.
2. PM_{10} emission factor calculated by multiplying TSP emission factor by 0.75 (AP-42 Section 11.9, Table 11.9-1)
3. $PM_{2.5}$ emission factor calculated by multiplying TSP emission factor by 0.105 (AP-42 Section 11.9, Table 11.9-1)
4. Calculated by multiplying 30-day emission factor by 0.8 (24 days/ 30 days).
5. Assume dust 40% duct control factor based on as-needed watering. Does not include any control for winter conditions (frozen ground)

Table 6-B
Fugitve Dust Emissions - Construction Site - Section 2
NextLight SilverState Solar Project

Construction Activity	Total Disturbance (acres)	Duration of Activity (months)	Emission Factor[a] (ton/acre/month)		Emissions (tons)		Daily Emissions (lbs/day)	
			PM_{10}	$PM_{2.5}$	PM_{10}	$PM_{2.5}$	PM_{10}	$PM_{2.5}$
Drainage Control (Berms)	17.7	4	0.090	0.0126	6.37	0.89	106.2	14.9
Drainage Control Construction Area	11	4	0.090	0.0126	3.96	0.55	66.0	9.2
Grading South Substation/Switchyard	5.4	3	0.090	0.0126	1.46	0.20	32.4	4.5
Grading Solar field	2160	5	0.090	0.0126	972.00	136.08	12960.0	1814.4
Roadwork	53.7	5	0.090	0.0126	24.17	3.38	322.2	45.1
Trenching (PV Installation)	21.3	6	0.090	0.0126	11.50	1.61	127.8	17.9
34.5kV Collection Lines	33.9	6	0.090	0.0126	18.31	2.56	203.4	28.5
Transmission line construction	16.3	6	0.090	0.0126	8.80	1.23	97.8	13.7
Total	-	-	-	-	**1019.46**	**142.72**	**13614.6**	**1906.0**

Notes:
a. See emission factor derivation table below.

Emission Factor Derivation Table

Parameter	Units	TSP[1]	PM_{10}[(2)]	$PM_{2.5}$[(3)]
Uncontrolled Emission Factor[1] (based on 30 days/month)	ton/acre/month	0.2	0.15	0.021
Controlled Emission Factor[5] (based on 24 days/month)	ton/acre/month	0.12	0.090	0.0126

Notes:
1. Emission factor from AP-42 Section 13.2.3 for TSP.
2. PM_{10} emission factor calculated by multiplying TSP emission factor by 0.75 (AP-42 Section 11.9, Table 11.9-1)
3. $PM_{2.5}$ emission factor calculated by multiplying TSP emission factor by 0.105 (AP-42 Section 11.9, Table 11.9-1)
4. Calculated by multiplying 30-day emission factor by 0.8 (24 days/ 30 days).
5. Assume dust 40% duct control factor based on as-needed watering. Does not include any control for winter conditions (frozen ground)

Table 7
Fugitive Dust Emission Factors - Roads

Unpaved Roads - Emission Factor Derivation

$E = k(s/12)^a(W/3)^b$ AP-42 Section 13.2.2 (11/06 version)

where:

E = particulate emission factor (lb/VMT)
k, a, b = empirical constants for industrial roads
s = surface material silt content (%)
W = average vehicle weight (tons)

Parameter	Units	PM_{10}	$PM_{2.5}$	Reference
Mean Vehicle Weight	tons	12	12	Assumption
Constant, k	lb/VMT	1.5	0.15	Table 13.2.2-2 (worst case)
Constant, a		0.9	0.9	Table 13.2.2-2 (worst case)
Constant, b		0.45	0.45	Table 13.2.2-2 (worst case)
Silt content, s	%	8.5	8.5	Table 13.2..2-1 (construction sites)
Uncontrolled Emission factor, E	**lb/VMT**	**2.05**	**0.205**	**Calculation**
Control Efficiency for Watering	%	0.65	0.65	Assumption
Controlled Emission factor, E	**lb/VMT**	**0.72**	**0.072**	**Calculation**

Paved Roads - Emission Factor Derivation Table

$E = (k(sL/2)^{0.65}(W/3)^{1.5}-C)$ AP-42 Section 13.2.1 (11/06 version)

where:

E = particulate emission factor (lb/VMT)
k = particle size multiplier
sL = road surface silt loading (g/m^2)
W = average vehicle weight (tons)
C = emission factor for 1980's vehicle fleet exhaust, break wear and tire wear

Parameter	Units	PM_{10}	$PM_{2.5}$	Reference
Mean Vehicle Weight	tons	12	12	Assumption
k factor	lb/VMT	0.016	0.0024	Table 13.2-1.1
Silt Loading, sL	g/m^2	0.6	0.6	Table 13.2.1-3
Emission factor, C	lb/VMT	0.00047	0.00036	Table 13.2.1-2
Uncontrolled Emission factor, E	**lb/VMT**	**0.05805**	**0.008419**	**Calculation**

SCAB Fleet Average Emission Factors (Diesel)

EF-OFFROAD

Air Basin	SC

		(lb/hr)	(lb/hr)	(lb/hr)	(lb/hr)	(lb/hr)	(lb/hr)	(lb/hr)
Equipment	MaxHP	ROG	CO	NOX	SOX	PM	CO2	CH4
Aerial Lifts	15	0.0104	0.0529	0.0662	0.0001	0.0037	8.7	0.0009
	25	0.0210	0.0577	0.1013	0.0001	0.0065	11.0	0.0019
	50	0.0756	0.1937	0.1984	0.0003	0.0189	19.6	0.0068
	120	0.0702	0.2501	0.4502	0.0004	0.0361	38.1	0.0063
	500	0.1506	0.5801	1.9198	0.0021	0.0598	213	0.0136
	750	0.2803	1.0486	3.5605	0.0039	0.1096	385	0.0253
Aerial Lifts Composite		0.0670	0.2093	0.3600	0.0004	0.0248	34.7	0.0060
Air Compressors	15	0.0144	0.0513	0.0838	0.0001	0.0061	7.2	0.0013
	25	0.0325	0.0847	0.1397	0.0002	0.0098	14.4	0.0029
	50	0.1163	0.2813	0.2386	0.0003	0.0265	22.3	0.0105
	120	0.1014	0.3351	0.5977	0.0006	0.0545	47.0	0.0091
	175	0.1274	0.5113	1.0082	0.0010	0.0568	88.5	0.0115
	250	0.1225	0.3413	1.3983	0.0015	0.0462	131	0.0111
	500	0.1943	0.6778	2.2062	0.0023	0.0752	232	0.0175
	750	0.3054	1.0476	3.5002	0.0036	0.1179	358	0.0276
	1000	0.5203	1.8591	6.0195	0.0049	0.1809	486	0.0469
Air Compressors Composite		0.1120	0.3613	0.7320	0.0007	0.0526	63.6	0.0101
Bore/Drill Rigs	15	0.0120	0.0632	0.0754	0.0002	0.0031	10.3	0.0011
	25	0.0196	0.0660	0.1257	0.0002	0.0065	16.0	0.0018
	50	0.0545	0.2505	0.2820	0.0004	0.0194	31.0	0.0049
	120	0.0722	0.4812	0.6155	0.0009	0.0456	77.1	0.0065
	175	0.0930	0.7543	0.9148	0.0016	0.0481	141	0.0084
	250	0.0957	0.3460	1.1847	0.0021	0.0384	188	0.0086
	500	0.1488	0.5566	1.7054	0.0031	0.0614	311	0.0134
	750	0.2996	1.0997	3.4821	0.0062	0.1231	615	0.0270
	1000	0.5360	1.7074	8.3092	0.0093	0.2078	928	0.0484
Bore/Drill Rigs Composite		0.1052	0.5146	1.1331	0.0017	0.0498	165	0.0095
Cement and Mortar Mixers	15	0.0079	0.0388	0.0505	0.0001	0.0029	6.3	0.0007
	25	0.0346	0.0942	0.1633	0.0002	0.0107	17.6	0.0031
Cement and Mortar Mixers Composite		0.0101	0.0434	0.0599	0.0001	0.0035	7.2	0.0009
Concrete/Industrial Saws	25	0.0200	0.0678	0.1279	0.0002	0.0063	16.5	0.0018
	50	0.1231	0.3210	0.3070	0.0004	0.0301	30.2	0.0111
	120	0.1342	0.4976	0.8601	0.0009	0.0719	74.1	0.0121
	175	0.1927	0.8786	1.6459	0.0018	0.0864	160	0.0174
Concrete/Industrial Saws Composite		0.1270	0.4273	0.6566	0.0007	0.0552	58.5	0.0115
Cranes	50	0.1284	0.3166	0.2547	0.0003	0.0289	23.2	0.0116
	120	0.1117	0.3723	0.6542	0.0006	0.0602	50.1	0.0101
	175	0.1211	0.4880	0.9302	0.0009	0.0538	80.3	0.0109
	250	0.1243	0.3464	1.2372	0.0013	0.0470	112	0.0112
	500	0.1821	0.6625	1.7722	0.0018	0.0685	180	0.0164
	750	0.3082	1.1113	3.0564	0.0030	0.1166	303	0.0278
	9999	1.0894	4.1317	12.1879	0.0098	0.3792	971	0.0983
Cranes Composite		0.1594	0.5431	1.4515	0.0014	0.0842	129	0.0144

SCAB Fleet Average Emission Factors (Diesel)

EF-OFFROAD

Air Basin	SC

		(lb/hr)	(lb/hr)	(lb/hr)	(lb/hr)	(lb/hr)	(lb/hr)	(lb/hr)
Equipment	MaxHP	ROG	CO	NOX	SOX	PM	CO2	CH4
Crawler Tractors	50	0.1446	0.3520	0.2780	0.0003	0.0320	24.9	0.0131
	120	0.1551	0.5018	0.9038	0.0008	0.0819	65.8	0.0140
	175	0.1941	0.7597	1.4788	0.0014	0.0856	121	0.0175
	250	0.2051	0.5743	1.9440	0.0019	0.0784	166	0.0185
	500	0.2913	1.1931	2.7255	0.0025	0.1101	259	0.0263
	750	0.5240	2.1290	4.9881	0.0047	0.1989	465	0.0473
	1000	0.7980	3.3726	8.5998	0.0066	0.2810	658	0.0720
Crawler Tractors Composite		0.1861	0.6409	1.3854	0.0013	0.0854	114	0.0168
Crushing/Proc. Equipment	50	0.2271	0.5592	0.4700	0.0006	0.0520	44.0	0.0205
	120	0.1760	0.5956	1.0382	0.0010	0.0960	83.1	0.0159
	175	0.2367	0.9736	1.8607	0.0019	0.1068	167	0.0214
	250	0.2243	0.6225	2.5465	0.0028	0.0841	245	0.0202
	500	0.3091	1.0542	3.4510	0.0037	0.1187	374	0.0279
	750	0.4956	1.6226	5.6506	0.0059	0.1900	589	0.0447
	9999	1.3820	4.8014	16.0752	0.0131	0.4812	1,308	0.1247
Crushing/Proc. Equipment Composite		0.2152	0.7260	1.4394	0.0015	0.0935	132	0.0194
Dumpers/Tenders	25	0.0108	0.0336	0.0645	0.0001	0.0036	7.6	0.0010
Dumpers/Tenders Composite		0.0108	0.0336	0.0645	0.0001	0.0036	7.6	0.0010
Excavators	25	0.0199	0.0677	0.1261	0.0002	0.0057	16.4	0.0018
	50	0.1131	0.3145	0.2638	0.0003	0.0276	25.0	0.0102
	120	0.1398	0.5318	0.8402	0.0009	0.0781	73.6	0.0126
	175	0.1465	0.6701	1.1143	0.0013	0.0663	112	0.0132
	250	0.1451	0.3934	1.4935	0.0018	0.0519	159	0.0131
	500	0.1984	0.6161	1.9285	0.0023	0.0711	234	0.0179
	750	0.3313	1.0196	3.3023	0.0039	0.1198	387	0.0299
Excavators Composite		0.1483	0.5581	1.1502	0.0013	0.0638	120	0.0134
Forklifts	50	0.0666	0.1824	0.1530	0.0002	0.0163	14.7	0.0060
	120	0.0601	0.2243	0.3497	0.0004	0.0342	31.2	0.0054
	175	0.0738	0.3306	0.5540	0.0006	0.0337	56.1	0.0067
	250	0.0652	0.1707	0.7163	0.0009	0.0227	77.1	0.0059
	500	0.0868	0.2343	0.8909	0.0011	0.0307	111	0.0078
Forklifts Composite		0.0686	0.2319	0.5161	0.0006	0.0281	54.4	0.0062
Generator Sets	15	0.0172	0.0726	0.1154	0.0002	0.0069	10.2	0.0016
	25	0.0300	0.1033	0.1705	0.0002	0.0107	17.6	0.0027
	50	0.1117	0.2904	0.3070	0.0004	0.0284	30.6	0.0101
	120	0.1395	0.5054	0.9075	0.0009	0.0714	77.9	0.0126
	175	0.1672	0.7471	1.4780	0.0016	0.0721	142	0.0151
	250	0.1618	0.5018	2.0720	0.0024	0.0618	213	0.0146
	500	0.2305	0.8858	2.9974	0.0033	0.0917	337	0.0208
	750	0.3838	1.4300	4.9046	0.0055	0.1502	544	0.0346
	9999	1.0080	3.6008	12.1384	0.0105	0.3600	1,049	0.0909
Generator Sets Composite		0.0961	0.3293	0.6440	0.0007	0.0396	61.0	0.0087

SCAB Fleet Average Emission Factors (Diesel)

EF-OFFROAD

Air Basin	SC

Equipment	MaxHP	ROG (lb/hr)	CO (lb/hr)	NOX (lb/hr)	SOX (lb/hr)	PM (lb/hr)	CO2 (lb/hr)	CH4 (lb/hr)
Graders	50	0.1400	0.3584	0.2961	0.0004	0.0323	27.5	0.0126
	120	0.1553	0.5459	0.9268	0.0009	0.0649	75.0	0.0140
	175	0.1743	0.7409	1.3532	0.0014	0.0783	124	0.0157
	250	0.1761	0.4934	1.7904	0.0019	0.0662	172	0.0159
	500	0.2149	0.7523	2.1198	0.0023	0.0807	229	0.0194
	750	0.4580	1.5877	4.6098	0.0049	0.1729	486	0.0413
Graders Composite		0.1723	0.6314	1.4338	0.0015	0.0753	133	0.0155
Off-Highway Tractors	120	0.2457	0.7439	1.4200	0.0011	0.1255	93.7	0.0222
	175	0.2326	0.8561	1.7665	0.0015	0.1014	130	0.0210
	250	0.1881	0.5347	1.7050	0.0015	0.0735	130	0.0170
	750	0.7400	3.5496	6.8440	0.0067	0.2854	568	0.0668
	1000	1.1197	5.5155	11.4633	0.0082	0.4009	814	0.1010
Off-Highway Tractors Composite		0.2368	0.8385	1.9897	0.0017	0.0974	151	0.0214
Off-Highway Trucks	175	0.1732	0.7625	1.2796	0.0014	0.0771	125	0.0156
	250	0.1639	0.4301	1.6150	0.0019	0.0574	167	0.0148
	500	0.2492	0.7542	2.3188	0.0027	0.0872	272	0.0225
	750	0.4069	1.2210	3.8814	0.0044	0.1436	442	0.0367
	1000	0.6440	2.0615	7.3260	0.0063	0.2219	625	0.0581
Off-Highway Trucks Composite		0.2480	0.7429	2.3885	0.0027	0.0875	260	0.0224
Other Construction Equipment	15	0.0118	0.0617	0.0737	0.0002	0.0030	10.1	0.0011
	25	0.0162	0.0545	0.1039	0.0002	0.0053	13.2	0.0015
	50	0.1033	0.2930	0.2787	0.0004	0.0263	28.0	0.0093
	120	0.1320	0.5419	0.8649	0.0009	0.0740	80.9	0.0119
	175	0.1168	0.5001	0.9927	0.0012	0.0543	107	0.0105
	500	0.1705	0.6068	1.9821	0.0025	0.0678	254	0.0154
Other Construction Equipment Composite		0.1056	0.4108	1.0117	0.0013	0.0442	123	0.0095
Other General Industrial Equipmen	15	0.0066	0.0391	0.0466	0.0001	0.0017	6.4	0.0006
	25	0.0186	0.0632	0.1177	0.0002	0.0054	15.3	0.0017
	50	0.1281	0.3073	0.2413	0.0003	0.0285	21.7	0.0116
	120	0.1459	0.4647	0.8218	0.0007	0.0795	62.0	0.0132
	175	0.1516	0.5816	1.1364	0.0011	0.0676	95.9	0.0137
	250	0.1400	0.3676	1.5016	0.0015	0.0509	136	0.0126
	500	0.2500	0.8031	2.6018	0.0026	0.0919	265	0.0226
	750	0.4153	1.3236	4.4083	0.0044	0.1538	437	0.0375
	1000	0.6374	2.2063	7.1530	0.0056	0.2212	560	0.0575
Other General Industrial Equipmen Composite		0.1847	0.5948	1.6649	0.0016	0.0740	152	0.0167
Other Material Handling Equipment	50	0.1773	0.4246	0.3355	0.0004	0.0395	30.3	0.0160
	120	0.1417	0.4524	0.8014	0.0007	0.0772	60.7	0.0128
	175	0.1914	0.7367	1.4429	0.0014	0.0856	122	0.0173
	250	0.1481	0.3917	1.6024	0.0016	0.0542	145	0.0134
	500	0.1782	0.5784	1.8750	0.0019	0.0660	192	0.0161
	9999	0.8390	2.9174	9.4509	0.0073	0.2912	741	0.0757
Other Material Handling Equipment Composite		0.1773	0.5556	1.6150	0.0015	0.0715	141	0.0160
Pavers	25	0.0278	0.0845	0.1603	0.0002	0.0092	18.7	0.0025
	50	0.1624	0.3860	0.3110	0.0004	0.0356	28.0	0.0147
	120	0.1638	0.5223	0.9693	0.0008	0.0853	69.2	0.0148
	175	0.2049	0.7959	1.6028	0.0014	0.0903	128	0.0185
	250	0.2426	0.7011	2.3337	0.0022	0.0953	194	0.0219
	500	0.2622	1.1661	2.5319	0.0023	0.1023	233	0.0237

SCAB Fleet Average Emission Factors (Diesel)

EF-OFFROAD

Air Basin	SC

		(lb/hr)	(lb/hr)	(lb/hr)	(lb/hr)	(lb/hr)	(lb/hr)	(lb/hr)
Equipment	**MaxHP**	**ROG**	**CO**	**NOX**	**SOX**	**PM**	**CO2**	**CH4**
Pavers Composite		0.1774	0.5644	0.9868	0.0009	0.0709	77.9	0.0160
Paving Equipment	25	0.0155	0.0521	0.0993	0.0002	0.0051	12.6	0.0014
	50	0.1384	0.3277	0.2654	0.0003	0.0303	23.9	0.0125
	120	0.1282	0.4084	0.7600	0.0006	0.0668	54.5	0.0116
	175	0.1599	0.6208	1.2577	0.0011	0.0704	101	0.0144
	250	0.1506	0.4363	1.4619	0.0014	0.0592	122	0.0136
Paving Equipment Composite		0.1336	0.4478	0.8963	0.0008	0.0629	68.9	0.0121
Plate Compactors	15	0.0050	0.0263	0.0317	0.0001	0.0015	4.3	0.0005
Plate Compactors Composite		0.0050	0.0263	0.0317	0.0001	0.0015	4.3	0.0005
Pressure Washers	15	0.0083	0.0348	0.0553	0.0001	0.0033	4.9	0.0007
	25	0.0122	0.0410	0.0691	0.0001	0.0043	7.1	0.0011
	50	0.0413	0.1143	0.1388	0.0002	0.0115	14.3	0.0037
	120	0.0388	0.1487	0.2674	0.0003	0.0193	24.1	0.0035
Pressure Washers Composite		0.0199	0.0666	0.0989	0.0001	0.0070	9.4	0.0018
Pumps	15	0.0148	0.0528	0.0862	0.0001	0.0062	7.4	0.0013
	25	0.0439	0.1142	0.1884	0.0002	0.0133	19.5	0.0040
	50	0.1339	0.3428	0.3479	0.0004	0.0333	34.3	0.0121
	120	0.1441	0.5136	0.9216	0.0009	0.0744	77.9	0.0130
	175	0.1709	0.7489	1.4815	0.0016	0.0742	140	0.0154
	250	0.1593	0.4846	1.9941	0.0023	0.0609	201	0.0144
	500	0.2450	0.9411	3.1080	0.0034	0.0973	345	0.0221
	750	0.4167	1.5559	5.2721	0.0057	0.1631	571	0.0376
	9999	1.3269	4.8008	15.8590	0.0136	0.4723	1,355	0.1197
Pumps Composite		0.0036	0.3096	0.5545	0.0006	0.0393	49.6	0.0084
Rollers	15	0.0074	0.0386	0.0461	0.0001	0.0019	6.3	0.0007
	25	0.0164	0.0551	0.1049	0.0002	0.0054	13.3	0.0015
	50	0.1270	0.3169	0.2753	0.0003	0.0292	26.0	0.0115
	120	0.1201	0.4177	0.7383	0.0007	0.0641	59.0	0.0108
	175	0.1478	0.6270	1.2022	0.0012	0.0659	108	0.0133
	250	0.1542	0.4540	1.6232	0.0017	0.0603	153	0.0139
	500	0.1987	0.7785	2.0882	0.0022	0.0783	219	0.0179
Rollers Composite		0.1176	0.4212	0.7749	0.0008	0.0547	67.1	0.0106
Rough Terrain Forklifts	50	0.1590	0.4186	0.3558	0.0004	0.0377	33.9	0.0143
	120	0.1213	0.4447	0.7326	0.0007	0.0676	62.4	0.0109
	175	0.1640	0.7302	1.2875	0.0014	0.0749	125	0.0148
	250	0.1523	0.4270	1.6632	0.0019	0.0567	171	0.0137
	500	0.2097	0.6871	2.1987	0.0025	0.0788	257	0.0189
Rough Terrain Forklifts Composite		0.1272	0.4766	0.7988	0.0008	0.0678	70.3	0.0115
Rubber Tired Dozers	175	0.2398	0.8686	1.7881	0.0015	0.1036	129	0.0216
	250	0.2776	0.7758	2.4482	0.0021	0.1071	183	0.0250
	500	0.3621	1.7411	3.2071	0.0026	0.1370	265	0.0327
	750	0.5457	2.6075	4.9024	0.0040	0.2071	399	0.0492
	1000	0.8464	4.1786	8.4813	0.0060	0.3018	592	0.0764

SCAB Fleet Average Emission Factors (Diesel)

EF-OFFROAD

Air Basin	SC

		(lb/hr)	(lb/hr)	(lb/hr)	(lb/hr)	(lb/hr)	(lb/hr)	(lb/hr)
Equipment	MaxHP	ROG	CO	NOX	SOX	PM	CO2	CH4
Rubber Tired Dozers Composite		0.3379	1.4127	2.9891	0.0025	0.1288	239	0.0305
Rubber Tired Loaders	25	0.0206	0.0697	0.1314	0.0002	0.0064	16.9	0.0019
	50	0.1560	0.4005	0.3333	0.0004	0.0361	31.1	0.0141
	120	0.1206	0.4268	0.7227	0.0007	0.0660	58.9	0.0109
	175	0.1476	0.6326	1.1513	0.0012	0.0664	106	0.0133
	250	0.1493	0.4210	1.5357	0.0017	0.0563	149	0.0135
	500	0.2172	0.7648	2.1684	0.0023	0.0819	237	0.0196
	750	0.4484	1.5625	4.5660	0.0049	0.1700	486	0.0405
	1000	0.6154	2.2308	7.1368	0.0060	0.2156	594	0.0555
Rubber Tired Loaders Composite		0.1440	0.5078	1.1537	0.0012	0.0651	109	0.0130
Scrapers	120	0.2236	0.7169	1.3034	0.0011	0.1177	93.9	0.0202
	175	0.2391	0.9290	1.8284	0.0017	0.1053	148	0.0216
	250	0.2618	0.7368	2.4818	0.0024	0.1006	209	0.0236
	500	0.3650	1.5182	3.4250	0.0032	0.1386	321	0.0329
	750	0.6328	2.6115	6.0373	0.0056	0.2413	555	0.0571
Scrapers Composite		0.3202	1.2424	2.9078	0.0027	0.1256	262	0.0269
Signal Boards	15	0.0072	0.0377	0.0450	0.0001	0.0017	6.2	0.0006
	50	0.1492	0.3827	0.3689	0.0005	0.0364	36.2	0.0135
	120	0.1495	0.5380	0.9446	0.0009	0.0792	80.2	0.0135
	175	0.1907	0.8437	1.6203	0.0017	0.0846	155	0.0172
	250	0.2049	0.6138	2.5094	0.0029	0.0789	255	0.0185
Signal Boards Composite		0.0224	0.0953	0.1615	0.0002	0.0091	16.7	0.0020
Skid Steer Loaders	25	0.0249	0.0700	0.1252	0.0002	0.0079	13.8	0.0022
	50	0.0785	0.2507	0.2463	0.0003	0.0217	25.5	0.0071
	120	0.0607	0.2822	0.4131	0.0005	0.0355	42.8	0.0055
Skid Steer Loaders Composite		0.0692	0.2489	0.2919	0.0004	0.0252	30.3	0.0062
Surfacing Equipment	50	0.0589	0.1520	0.1451	0.0002	0.0142	14.1	0.0053
	120	0.1192	0.4334	0.7683	0.0007	0.0624	63.8	0.0108
	175	0.1071	0.4787	0.9169	0.0010	0.0472	85.8	0.0097
	250	0.1254	0.3883	1.3783	0.0015	0.0494	135	0.0113
	500	0.1854	0.7785	2.0517	0.0022	0.0741	221	0.0167
	750	0.2960	1.2171	3.2929	0.0035	0.1173	347	0.0267
Surfacing Equipment Composite		0.1550	0.6164	1.5685	0.0017	0.0606	166	0.0140
Sweepers/Scrubbers	15	0.0124	0.0729	0.0870	0.0002	0.0033	11.9	0.0011
	25	0.0239	0.0808	0.1524	0.0002	0.0075	19.6	0.0022
	50	0.1508	0.3893	0.3297	0.0004	0.0355	31.6	0.0136
	120	0.1490	0.5329	0.8645	0.0009	0.0843	75.0	0.0134
	175	0.1856	0.8049	1.4276	0.0016	0.0854	139	0.0167
	250	0.1344	0.3643	1.5598	0.0018	0.0489	162	0.0121
Sweepers/Scrubbers Composite		0.1548	0.5380	0.8473	0.0009	0.0686	78.5	0.0140
Tractors/Loaders/Backhoes	25	0.0214	0.0681	0.1317	0.0002	0.0072	15.9	0.0019
	50	0.1257	0.3548	0.3114	0.0004	0.0312	30.3	0.0113
	120	0.0910	0.3623	0.5664	0.0006	0.0515	51.7	0.0082
	175	0.1216	0.5881	0.9646	0.0011	0.0562	101	0.0110
	250	0.1418	0.4037	1.5493	0.0019	0.0523	172	0.0128
	500	0.2630	0.8495	2.7242	0.0039	0.0980	345	0.0237
	750	0.3986	1.2725	4.2276	0.0058	0.1496	517	0.0360
Tractors/Loaders/Backhoes Composite		0.1021	0.3930	0.6747	0.0008	0.0521	66.8	0.0092

SCAB Fleet Average Emission Factors (Diesel)

EF-OFFROAD

Air Basin	SC

		(lb/hr)	(lb/hr)	(lb/hr)	(lb/hr)	(lb/hr)	(lb/hr)	(lb/hr)
Equipment	**MaxHP**	**ROG**	**CO**	**NOX**	**SOX**	**PM**	**CO2**	**CH4**
Trenchers	15	0.0099	0.0517	0.0617	0.0001	0.0023	8.5	0.0009
	25	0.0400	0.1355	0.2555	0.0004	0.0125	32.9	0.0036
	50	0.1837	0.4365	0.3620	0.0004	0.0405	32.9	0.0166
	120	0.1509	0.4840	0.9082	0.0008	0.0776	64.9	0.0136
	175	0.2254	0.8843	1.7973	0.0016	0.0990	144	0.0203
	250	0.2770	0.8161	2.6802	0.0025	0.1103	223	0.0250
	500	0.3468	1.6352	3.4013	0.0031	0.1373	311	0.0313
	750	0.6586	3.0677	6.5218	0.0059	0.2602	587	0.0594
Trenchers Composite		0.1675	0.4907	0.7598	0.0007	0.0637	58.7	0.0151
Welders	15	0.0124	0.0441	0.0720	0.0001	0.0052	6.2	0.0011
	25	0.0254	0.0661	0.1091	0.0001	0.0077	11.3	0.0023
	50	0.1231	0.3025	0.2724	0.0003	0.0287	26.0	0.0111
	120	0.0807	0.2738	0.4899	0.0005	0.0428	39.5	0.0073
	175	0.1333	0.5515	1.0896	0.0011	0.0590	98.2	0.0120
	250	0.1052	0.3022	1.2367	0.0013	0.0400	119	0.0095
	500	0.1327	0.4823	1.5648	0.0016	0.0520	168	0.0120
Welders Composite		0.0805	0.2246	0.2920	0.0003	0.0270	25.6	0.0073

Highest (Most Conservative) EMFAC2007 (version 2.3) Emission Factors for On-Road Heavy-Heavy-Duty Diesel Trucks

Projects in the SCAQMD (Scenario Years 2007 - 2026)
Derived from Peak Emissions Inventory (**Winter**, **Annual**, **Summer**)

Vehicle Class:
Heavy-Heavy-Duty Diesel Trucks (33,001 to 60,000 pounds)

The following emission factors were compiled by running the California Air Resources Board's EMFAC2007 (version 2.3) Burden Model and extracting the **Heavy-Heavy-Duty Diesel Truck (HHDT)** Emission Factors.

These emission factors can be used to calculate on-road mobile source emissions for the vehicle/emission categories listed in the tables below, by use of the following equation:

Emissions (pounds per day) = N x TL x EF

where N = number of trips, TL = trip length (miles/day), and EF = emission factor (pounds per mile)

The **HHDT-DSL** vehicle/emission category accounts for all emissions from heavy-heavy-duty diesel trucks, including start, running and idling exhaust. In addition, ROG emission factors account for diurnal, hot soak, running and resting emissions, and the PM10 & PM2.5 emission factors account for tire and brake wear.

The **HHDT-DSL, Exh** vehicle/emission category includes only the exhaust portion of PM10 & PM2.5 emissions from heavy-heavy-duty diesel trucks.

Scenario Year: 2007
All model years in the range 1965 to 2007

HHDT-DSL (pounds/mile)	
CO	0.01446237
NOx	0.04718166
ROG	0.00372949
SOx	0.00003962
PM10	0.00230900
PM2.5	0.00204018
CO2	4.22184493

HHDT-DSL, Exh (pounds/mile)	
PM10	0.00216752
PM2.5	0.00199491

Scenario Year: 2008
All model years in the range 1965 to 2008

HHDT-DSL (pounds/mile)	
CO	0.01361368
NOx	0.04458017
ROG	0.00351579
SOx	0.00004136
PM10	0.00215635
PM2.5	0.00189990
CO2	4.21067145
CH4	0.00016269

HHDT-DSL, Exh (pounds/mile)	
PM10	0.00201296
PM2.5	0.00185303

Scenario Year: 2009
All model years in the range 1965 to 2009

HHDT-DSL (pounds/mile)	
CO	0.01282236
NOx	0.04184591
ROG	0.00329320
SOx	0.00004013
PM10	0.00199572
PM2.5	0.00175227
CO2	4.21080792
CH4	0.00015249

HHDT-DSL, Exh (pounds/mile)	
PM10	0.00185393
PM2.5	0.00170680

Scenario Year: 2010
All model years in the range 1966 to 2010

HHDT-DSL (pounds/mile)	
CO	0.01195456
NOx	0.03822102
ROG	0.00304157
SOx	0.00004131
PM10	0.00183062
PM2.5	0.00160083
CO2	4.21120578
CH4	0.00014201

HHDT-DSL, Exh (pounds/mile)	
PM10	0.00168861
PM2.5	0.00155435

Rev. 03/07 Page 23 of 27

Highest (Most Conservative) EMFAC2007 (version 2.3) Emission Factors for On-Road Heavy-Heavy-Duty Diesel Trucks

Projects in the SCAQMD (Scenario Years 2007 - 2026)
Derived from Peak Emissions Inventory (**Winter**, **Annual**, **Summer**)

Vehicle Class:
Heavy-Heavy-Duty Diesel Trucks (33,001 to 60,000 pounds)

Scenario Year: 2011
All model years in the range 1967 to 2011

HHDT-DSL (pounds/mile)	
CO	0.01112463
NOx	0.03456809
ROG	0.00279543
SOx	0.00003972
PM10	0.00166087
PM2.5	0.00144489
CO2	4.22045680
CH4	0.00012910

HHDT-DSL, Exh (pounds/mile)	
PM10	0.00151936
PM2.5	0.00139772

Scenario Year: 2012
All model years in the range 1968 to 2012

HHDT-DSL (pounds/mile)	
CO	0.01021519
NOx	0.03092379
ROG	0.00252764
SOx	0.00004042
PM10	0.00149566
PM2.5	0.00129354
CO2	4.21590774
CH4	0.00011651

HHDT-DSL, Exh (pounds/mile)	
PM10	0.00135537
PM2.5	0.00124837

Scenario Year: 2013
All model years in the range 1969 to 2013

HHDT-DSL (pounds/mile)	
CO	0.00931790
NOx	0.02742935
ROG	0.00226308
SOx	0.00004086
PM10	0.00133697
PM2.5	0.00114629
CO2	4.21518556
CH4	0.00010441

HHDT-DSL, Exh (pounds/mile)	
PM10	0.00119623
PM2.5	0.00109863

Scenario Year: 2014
All model years in the range 1970 to 2014

HHDT-DSL (pounds/mile)	
CO	0.00846435
NOx	0.02418049
ROG	0.00201594
SOx	0.00004092
PM10	0.00118458
PM2.5	0.00100582
CO2	4.21279345
CH4	0.00009261

HHDT-DSL, Exh (pounds/mile)	
PM10	0.00104243
PM2.5	0.00096059

Scenario Year: 2015
All model years in the range 1971 to 2015

HHDT-DSL (pounds/mile)	
CO	0.00766891
NOx	0.02122678
ROG	0.00178608
SOx	0.00004082
PM10	0.00104715
PM2.5	0.00087977
CO2	4.20902225
CH4	0.00008369

HHDT-DSL, Exh (pounds/mile)	
PM10	0.00090631
PM2.5	0.00083282

Scenario Year: 2016
All model years in the range 1972 to 2016

HHDT-DSL (pounds/mile)	
CO	0.00704604
NOx	0.01887374
ROG	0.00161035
SOx	0.00003952
PM10	0.00094448
PM2.5	0.00078443
CO2	4.21063031
CH4	0.00007508

HHDT-DSL, Exh (pounds/mile)	
PM10	0.00080419
PM2.5	0.00073898

Rev. 03/07 Page 24 of 27

Highest (Most Conservative) EMFAC2007 (version 2.3) Emission Factors for On-Road Heavy-Heavy-Duty Diesel Trucks

Projects in the SCAQMD (Scenario Years 2007 - 2026)
Derived from Peak Emissions Inventory (**Winter**, **Annual**, **Summer**)

Vehicle Class:
Heavy-Heavy-Duty Diesel Trucks (33,001 to 60,000 pounds)

Scenario Year: 2017
All model years in the range 1973 to 2017

HHDT-DSL (pounds/mile)	
CO	0.00650533
NOx	0.01690387
ROG	0.00145203
SOx	0.00004033
PM10	0.00084894
PM2.5	0.00069721
CO2	4.20820129
CH4	0.00006722

HHDT-DSL, Exh (pounds/mile)	
PM10	0.00070873
PM2.5	0.00065111

Scenario Year: 2018
All model years in the range 1974 to 2018

HHDT-DSL (pounds/mile)	
CO	0.00604721
NOx	0.01526414
ROG	0.00131697
SOx	0.00003934
PM10	0.00076808
PM2.5	0.00062383
CO2	4.20756838
CH4	0.00006182

HHDT-DSL, Exh (pounds/mile)	
PM10	0.00062758
PM2.5	0.00057700

Scenario Year: 2019
All model years in the range 1975 to 2019

HHDT-DSL (pounds/mile)	
CO	0.00565433
NOx	0.01389113
ROG	0.00120235
SOx	0.00004032
PM10	0.00070198
PM2.5	0.00056085
CO2	4.20637830
CH4	0.00005499

HHDT-DSL, Exh (pounds/mile)	
PM10	0.00056085
PM2.5	0.00051320

Scenario Year: 2020
All model years in the range 1976 to 2020

HHDT-DSL (pounds/mile)	
CO	0.00532242
NOx	0.01274755
ROG	0.00110621
SOx	0.00003957
PM10	0.00064574
PM2.5	0.00050904
CO2	4.20541416
CH4	0.00005216

HHDT-DSL, Exh (pounds/mile)	
PM10	0.00050364
PM2.5	0.00046227

Scenario Year: 2021
All model years in the range 1977 to 2021

HHDT-DSL (pounds/mile)	
CO	0.00503726
NOx	0.01179977
ROG	0.00103095
SOx	0.00004033
PM10	0.00059437
PM2.5	0.00046287
CO2	4.21495573
CH4	0.00004734

HHDT-DSL, Exh (pounds/mile)	
PM10	0.00045411
PM2.5	0.00041729

Scenario Year: 2022
All model years in the range 1978 to 2022

HHDT-DSL (pounds/mile)	
CO	0.00478830
NOx	0.01098794
ROG	0.00096142
SOx	0.00004106
PM10	0.00055427
PM2.5	0.00042597
CO2	4.21520828
CH4	0.00004448

HHDT-DSL, Exh (pounds/mile)	
PM10	0.00041399
PM2.5	0.00037807

Rev. 03/07 Page 25 of 27

Highest (Most Conservative) EMFAC2007 (version 2.3)
Emission Factors for On-Road Heavy-Heavy-Duty Diesel Trucks

Projects in the SCAQMD (Scenario Years 2007 - 2026)
Derived from Peak Emissions Inventory (**Winter**, **Annual**, **Summer**)

Vehicle Class:
Heavy-Heavy-Duty Diesel Trucks (33,001 to 60,000 pounds)

Scenario Year: 2023
All model years in the range 1979 to 2023

HHDT-DSL (pounds/mile)	
CO	0.00457902
NOx	0.01031407
ROG	0.00090210
SOx	0.00004009
PM10	0.00052122
PM2.5	0.00039592
CO2	4.21483461
CH4	0.00004176

HHDT-DSL, Exh (pounds/mile)	
PM10	0.00037922
PM2.5	0.00034915

Scenario Year: 2024
All model years in the range 1980 to 2024

HHDT-DSL (pounds/mile)	
CO	0.00444444
NOx	0.00974372
ROG	0.00084009
SOx	0.00003930
PM10	0.00050766
PM2.5	0.00038320
CO2	4.19552935
CH4	0.00003930

HHDT-DSL, Exh (pounds/mile)	
PM10	0.00036682
PM2.5	0.00033735

Scenario Year: 2025
All model years in the range 1981 to 2025

HHDT-DSL (pounds/mile)	
CO	0.00431086
NOx	0.00932573
ROG	0.00080206
SOx	0.00004018
PM10	0.00048541
PM2.5	0.00036326
CO2	4.19512979
CH4	0.00003697

HHDT-DSL, Exh (pounds/mile)	
PM10	0.00034397
PM2.5	0.00031664

Scenario Year: 2026
All model years in the range 1982 to 2026

HHDT-DSL (pounds/mile)	
CO	0.00420297
NOx	0.00898990
ROG	0.00077178
SOx	0.00003946
PM10	0.00046717
PM2.5	0.00034564
CO2	4.19349747
CH4	0.00003630

HHDT-DSL, Exh (pounds/mile)	
PM10	0.00032670
PM2.5	0.00029830

Rev. 03/07 Page 26 of 27

Table 1
On-Road Vehicle Classification

Number	Abbreviation	Description
1	LDGV	Light-Duty Gasoline Vehicles (Passenger Cars)
2	LDGT1	Light-Duty Gasoline Trucks 1 (0-6,000 lbs. GVWR, 0-3,750 lbs. LVW)
3	LDGT2	Light-Duty Gasoline Trucks 2 (0-6,001 lbs. GVWR, 3,751-5750 lbs. LVW)
4	LDGT3	Light-Duty Gasoline Trucks 3 (6,001-8500 lbs. GVWR, 0-5750 lbs. ALVW)
5	LDGT4	Light-Duty Gasoline Trucks 4 (6,001-8500 lbs. GVWR, 5,751 lbs. and greater A LVW)
6	HDGV2b	Class 2b Heavy-Duty Gasoline Vehicles (8501-10,000 lbs. GVWR)
7	HDGV3	Class 3 Heavy-Duty Gasoline Vehicles (10,001-14,000 lbs. GVWR)
8	HDGV4	Class 4 Heavy-Duty Gasoline Vehicles (14,001-16,000 lbs. GVWR)
9	HDGV5	Class 5 Heavy-Duty Gasoline Vehicles (16,001-19,500 lbs. GVWR)
10	HDGV6	Class 6 Heavy-Duty Gasoline Vehicles (19,501-26,000 lbs. GVWR)
11	HDGV7	Class 7 Heavy-Duty Gasoline Vehicles (26,001-33,000 lbs. GVWR)
12	HDGV8a	Class 8a Heavy-Duty Gasoline Vehicles (33,001-60,000 lbs. GVWR)
13	HDGV8b	Class 8b Heavy-Duty Gasoline Vehicles (>60,000 lbs. GVWR)
14	LDDV	Light-Duty Diesel Vehicles (Passenger Cars)
15	LDDT12	Light-Duty Diesel Trucks 1and 2 (0-6,000 lbs. GVWR)
16	HDDV2b	Class 2b Heavy-Duty Diesel Vehicles (8501-10,000 lbs. GVWR)
17	HDDV3	Class 3 Heavy-Duty Diesel Vehicles (10,001-14,000 lbs. GVWR)
18	HDDV4	Class 4 Heavy-Duty Diesel Vehicles (14,001-16,000 lbs. GVWR)
19	HDDV5	Class 5 Heavy-Duty Diesel Vehicles (16,001-19,500 lbs. GVWR)
20	HDDV6	Class 6 Heavy-Duty Diesel Vehicles (19,501-26,000 lbs. GVWR)
21	HDDV7	Class 7 Heavy-Duty Diesel Vehicles (26,001-33,000 lbs. GVWR)
22	HDDV8a	Class 8a Heavy-Duty Diesel Vehicles (33,001-60,000 lbs. GVWR)
23	HDDV8b	Class 8b Heavy-Duty Diesel Vehicles (>60,000 lbs. GVWR)
24	MC	Motorcycles (Gasoline)
25	HDGB	Gasoline Buses (School, Transit and Urban)
26	HDDBT	Diesel Transit and Urban Buses
27	HDDBS	Diesel School Buses
28	LDDT34	Light-Duty Diesel Trucks 3 and 4 (6,001-8,500 lbs. GVWR)

B Biological Mitigation Measures

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B Biological Mitigation Measures

This section lists measures intended to minimize take of desert tortoise that would be implemented during construction.

1. Authorized biologists would conduct activities including locating desert tortoises and their sign (i.e., conduct presence/absence and clearance surveys) and attempting to ensure that the effects of the project on the desert tortoise and its habitat are minimized in accordance with the measures stated in this BA and the terms and conditions of the biological opinion. Authorized biologists would keep current with the latest information on USFWS protocols and guidelines. An authorized biologist would have thorough and current knowledge of desert tortoise behavior, natural history, and ecology, physiology, and would have demonstrated substantial field experience and training to safely and successfully:

- Handle and temporarily hold desert tortoises
- Excavate burrows to locate desert tortoise or eggs
- Relocate desert tortoises
- Reconstruct desert tortoise burrows
- Unearth and relocate desert tortoise eggs
- Locate, identify, and record all forms of desert tortoise sign

NextLight would obtain approval of authorized biologists from USFWS for individuals who have the appropriate qualifications.

2. Desert tortoise monitors would oversee all project construction activities with the potential to affect the desert tortoise. Desert tortoise monitors would provide oversight to ensure proper implementation of protective measures, record and report desert tortoise and tortoise sign observations in accordance with approved protocol, report incidents of noncompliance in accordance with the biological opinion and other relevant permits, and move desert tortoises from harm's way and place the animals in "safe areas" pre-selected by authorized biologists or maintain the desert tortoises in their immediate possession until an authorized biologist assumes care of the animal.

The desert tortoise monitors would assist the authorized biologists during surveys and often serve as "apprentices" to acquire experience. Desert tortoise monitors would not be authorized to conduct desert tortoise presence/absence or clearance surveys unless directly supervised by an authorized biologist. Directly supervised means the authorized biologist would be in direct voice and sight contact with the desert tortoise monitor.

Desert tortoise monitors would be individuals who have appropriate qualifications and have been approved by an authorized biologist.

3. A Worker Environmental Awareness Program (WEAP) would be prepared to address the types of construction activities that may affect the desert tortoise. The WEAP would describe the protective measures stipulated in the biological assessment and in the terms and conditions of the biological opinion. Special emphasis would be placed on explaining the protective measures developed for the desert tortoise and the consequences of noncompliance. At a minimum, the program would contain information on physical characteristics, distribution, behavior, ecology, sensitivity to human activities, legal protection, penalties for violations, reporting requirements, and protective measures associated with the desert tortoise. Information provided in a fact sheet developed by BLM entitled "The Threatened Desert Tortoise" would be incorporated into the WEAP. The WEAP would be administered to all onsite personnel including employees, contractors, contractors' employees, supervisors, inspectors, subcontractors, and delivery personnel. The program would be administered onsite by the authorized biologist or desert tortoise monitor. It may include an oral presentation, video/PowerPoint, and written materials. The WEAP would be approved by the BLM and USFWS.

4. NextLight would designate a field contact representative (FCR) who would be responsible for overseeing compliance with the protective measures. The FCR would be onsite during all activities that may result in the take of the desert tortoise. The FCR would have the authority to halt all activities that are in violation of the desert tortoise protective measures identified in the biological opinion. If the FCR identifies a violation of the desert tortoise protective measures, work would proceed only after corrective measures have been taken. The FCR would have a copy of the biological opinion with them during all construction activities. The FCR may be an authorized biologist, desert tortoise monitor, construction supervisor, or any other employee with the authority to halt construction activity.

5. During construction, NextLight would comply with the Guidelines for Handling Desert Tortoises during Construction Projects (Desert Tortoise Council, 1999) or the most current guidelines available.

(a) The boundaries of all areas to be disturbed (for example, project site, stormwater drainage control features, and linear corridors) would be flagged before beginning any activities, and all disturbances would be confined to the flagged areas. All survey crews on site prior to construction would be escorted by an authorized biologist. All

project vehicles and equipment would be confined to the flagged areas. Survey crew vehicles would remain on existing roads. Disturbance beyond the construction zone would be prohibited except to complete a specific task within designated areas or emergency situations.

(b) NextLight would relocate tortoises currently occupying the area within the solar field following the USFWS-approved protocol (Desert Tortoise Council, 1999). If the Desert Tortoise Council releases a revised protocol for handling desert tortoises before initiation of project activities, the revised protocol would be implemented for the Project. The relocation/translocation effort would adhere to the following procedures as well as those stipulated in the Terms and Conditions of the Biological Opinion.

(c) NextLight would identify relocation/translocation sites for tortoises relocated from within the solar field and prioritize selection of potential relocation/translocation sites that are located immediately adjacent to the north, east, and west of the Project site subject to approval by the BLM and USFWS.

(d) The authorized biologist would maintain a record of all desert tortoises encountered and relocated during project surveys and monitoring. This information would include for each individual: the locations (narrative, vegetation type, and maps) and dates of observations; general conditions and health; all apparent injuries and state of healing; if moved, the location from which it was captured and the location in which it was released (whether animals voided their bladders); and diagnostic markings (such as identification numbers, if present).

(e) All burrows with the potential to be occupied by tortoises within the solar field fenced area would be searched for presence. In some cases, a fiber optic scope could be used to determine presence or absence within a deep burrow. Burrows inhabited by tortoises would be excavated using hand tools by authorized biologists or desert tortoise monitors. The biologists or monitors would be supervised by an authorized biologist. To prevent reentry by a tortoise or other wildlife, all burrows would be collapsed after absence has been determined. Tortoises excavated from burrows would be relocated immediately following excavation to unoccupied natural or artificial burrows outside the fenced area. Prior to release, tortoises would have an identification number affixed to the shell with epoxy.

(f) Tortoises within the solar field fenced area would be relocated to unoccupied natural or artificially constructed burrows. Relocated tortoises would be placed in burrows of similar size, shape, and orientation. If an existing burrow similar to the original burrow is not available, the authorized biologist or desert tortoise monitor would construct one. Burrow construction would follow the appropriate protocols outlined in Guidelines for Handling Desert Tortoise during Construction Projects (Desert Tortoise Council, 1999) .The animals would be transported in clean cardboard boxes. A new box would be used for each individual tortoise and would be properly discarded after a single use. The new burrow would be located at least 300 feet from the outside of a fenced area and would be of similar size, shape and orientation to the

original burrow. The new burrow locations would be determined by the authorized biologist. Relocated tortoises would not be placed in existing occupied burrows.

(g) The authorized biologist would wear disposable surgical gloves when handling desert tortoises. A new pair of gloves would be used for each tortoise handled to avoid the transmission of upper respiratory tract disease (URTD). Shell notching would not be performed. All equipment used on the tortoises would be sterilized between each use.

(h) Desert tortoises would be treated in a manner to ensure that they do not overheat, exhibit signs of overheating (gaping, foaming at the mouth, etc.), or are placed in a situation where they cannot maintain surface and core temperatures necessary to their well-being. Desert tortoises would be kept shaded at all times until it is safe to release them. No desert tortoise would be captured, moved, transported, released, or purposefully caused to leave its burrow for any reason when the ambient air temperature is above 95 degrees Fahrenheit (°F) (35°C). Ambient air temperature would be measured in the shade, protected from wind, at a height of 2 inches (5 centimeters) above the ground surface. No desert tortoise would be captured if the ambient air temperature is anticipated to exceed 95°F (35°C) before handling and relocation/translocation can be completed. If the ambient air temperature exceeds 95°F (35°C) during handling or processing, desert tortoises would be kept shaded in an environment that does not exceed 95°F (35°C), and the animals would not be released until ambient air temperature declines to below 95°F (35°C).

(i) To monitor for survivorship and health, for a period of 1 year following their relocation/translocation, the desert tortoises within the relocation/translocation area would be surveyed monthly by the authorized biologist during the periods of activity (spring: March to May, and fall: August to October) and once during the two non-active periods (summer: June to July, and winter: November to February). For the following 2 years, the relocation/translocation area would be surveyed at least once in the spring and once in the fall. The focus of these surveys would be to locate and observe relocated tortoises. An authorized biologist would determine the level of effort and methods needed to locate tortoises. All pertinent information on tortoises observed would be recorded, such as behavior, physical characteristics, health characteristics and any visible signs of URTD, as well as any potential anomalies the individual desert tortoise might display.

6. Tortoise handling, artificial burrow construction, egg handling and other procedures would follow those described in the Guidelines for Handling Desert Tortoise during Construction Projects (Desert Tortoise Council, 1999) for all tortoise relocation/translocation.

7. A relocation/translocation plan for desert tortoises would be developed following guidance from the DTRO. This guidance is currently in draft form. All relocation and translocation activities would adhere to this plan as well as the terms and conditions of the Biological Opinion.

8. Prior to the initiation of solar field construction activities of, NextLight would enclose the boundary of a solar field construction area with desert tortoise exclusionary fencing; both permanent and temporary. Permanent chain-link fencing around the perimeter of the solar field would include desert tortoise exclusionary fencing attached to the bottom of the chain link fencing in areas where appropriate to permanently maintain the separation of the solar field and remaining desert tortoise habitat. The design of the permanent desert tortoise exclusionary fencing would follow that specified by USFWS. Desert tortoise guards would be installed at the gated entries to prevent desert tortoises from gaining entry. Permanent fencing would prevent tortoises from entering the Project site for the duration of facility operation. The temporary exclusionary fencing of construction areas would consist of galvanized hard wire cloth, silt fencing, or orange construction fencing. The fencing would be buried approximately 6 inches below ground or bent at a right angle toward the outside of the work area and covered with dirt, rocks, or gravel to discourage desert tortoises from digging under the fence. Temporary fencing would prevent tortoises from entering a cleared construction area.

9. The exclusionary fencing of a solar field construction area would be installed prior to the onset of clearing and grubbing. The fence installation would be supervised and monitored under the direction of authorized biologists and desert tortoise monitors. Ongoing maintenance of the fencing would be performed with the oversight of an authorized biologist.

10. Within 24 hours before installing the desert tortoise exclusionary fencing around the boundary of a solar field construction area, a desert tortoise survey would be conducted using techniques providing 100 percent coverage of the fenced construction area to provide coverage of an area approximately 60 feet wide centered on the fence alignment. Transects would be no greater than 30 feet apart. The fence alignment would be flagged prior to the biological survey. Two complete passes of complete coverage would be conducted. All desert tortoise burrows, and burrows constructed by other species that might be used by desert tortoises, would be examined and excavated to their terminus to determine occupancy. Any burrow within the fence line would be collapsed after confirmation that it is not occupied by a desert tortoise, or if occupied, the desert tortoise has been removed. Removed tortoises would be relocated. The authorized biologists would be primarily responsible for this survey.

(a) Following installation of desert tortoise exclusionary fencing, the solar field construction area would be cleared of desert tortoises. Up to three complete passes with complete coverage would be conducted. The first pass transects would be conducted at 15-foot intervals. Subsequent transects would be no wider than 30 feet. Each separate survey would be walked in a different direction to allow opposing angles of observation. Two consecutive passes would be completed without finding any tortoises or new tortoise sign prior to declaring the site clear of tortoises. If no desert tortoises are observed during the second survey, a third survey would not be conducted. The authorized biologists would be primarily responsible for the clearance

surveys. Some authorized biologists may be substituted with desert tortoise monitors and would be placed between authorized biologists during the surveys. After the area surveyed is determined to be absent of desert tortoises, the areas may be open to a vegetation salvage program, if the BLM stipulates vegetation salvage.

(b) All potential desert tortoise burrows located would be excavated by hand by an authorized biologist, desert tortoises removed, and collapsed or blocked to prevent occupation by desert tortoises. If excavated during May through July, the authorized biologist would search for desert tortoise nests/eggs, which are typically located near the entrance to burrows. All desert tortoise handling and removal, and burrow excavations, including nests, would be conducted by an authorized biologist in accordance with the USFWS-approved protocol (Desert Tortoise Council, 1999). If the Desert Tortoise Council releases a revised protocol for handling of desert tortoises before initiation of project activities, the revised protocol would be implemented for the project.

(c) Following the desert tortoise clearance and relocation/translocation out of a solar field construction area and vegetation salvage, heavy equipment would enter the solar field fenced sites to clear, grub, level, and trench. A desert tortoise monitor would be on site during initial clearing and grading to relocated tortoises missed during the clearance survey. Should a desert tortoise be discovered, an authorized biologist would remove the tortoise.

11. The transmission line and new access ROWs would be surveyed and, if necessary, cleared of desert tortoises. Tortoises would not be relocated from these areas unless an occupied burrow is observed. Tortoises excavated from burrows would be relocated to unoccupied natural or artificially constructed burrows immediately following excavation. The artificial or unoccupied natural burrows must occur 150 to 300 feet from the original burrow. Relocated tortoises would not be placed in existing occupied burrows. If an existing burrow that is similar in size, shape, and orientation to the original burrow is unavailable, the authorized biologist would construct one. Desert tortoises moved during less active periods would be monitored for at least 2 days after placement in the new burrows to ensure their safety. The authorized biologist would be allowed some judgment and discretion to ensure that survival of the desert tortoise is likely. Desert tortoises that are found above ground and need to be moved from harm's way would be placed in the shade of a shrub, from 150 to 300 feet from the point of encounter. The authorized biologist would inform workers in the area that the tortoise is present and may re-enter the work area. Relocation/translocation would be authorized by the USFWS biological opinion and would be part of the overall project relocation/translocation activity.

12. The stormwater drainage control features construction areas would be temporarily fenced. The temporary exclusionary fencing would consist of galvanized hard wire cloth, silt fencing, or orange construction fencing. The fencing would be buried approximately 6 inches below ground or bent at a right angle toward the outside of the work area and covered with dirt, rocks or gravel

to discourage desert tortoises from digging under the fence. The fence installation would be supervised and monitored under the direction of authorized biologists and desert tortoise monitors during construction. The stormwater drainage control features construction areas would be surveyed and, if necessary, cleared of desert tortoises. Tortoises found in a burrow would be relocated. Tortoises excavated from burrows would be relocated to unoccupied natural or artificially constructed burrows immediately following excavation. The artificial or unoccupied natural burrows would be located 150 to 300 feet from the boundary of the construction area. Relocated tortoises would not be placed in existing occupied burrows. If an existing burrow that is similar in size, shape, and orientation to the original burrow is unavailable, the authorized biologist would construct one. Desert tortoises moved during less active periods would be monitored for at least 2 days after placement in the new burrows to ensure their safety. The authorized biologist would be allowed some judgment and discretion to ensure that survival of the desert tortoise is likely.

13. Access by project-related personnel to the Project site would be restricted to established access roads. Cross-country vehicle and equipment use outside designated work areas would be prohibited.

14. NextLight would require personnel to exercise caution when traveling to and from the site. To minimize the likelihood of vehicle strikes of desert tortoises outside the fenced areas, a 25 mile per hour speed limit would be enforced on authorized access routes to the work site. Speed limit signs would be posted on both sides of these roads.

15. Trash receptacles at the work site would have self-locking lids to prevent entry by opportunistic predators such as common ravens and coyotes. Trash receptacles would be emptied at least weekly or when full.

16. Other than law enforcement or security personnel, project personnel would be prohibited from bringing pets and firearms to the project site.

17. Project employees working outside a cleared, fenced area would be required to check under a vehicle or equipment before it is moved. If a desert tortoise is encountered the vehicle would not be moved until the animal has voluntarily moved a safe distance from the parked vehicle. Desert tortoises may be moved by an authorized biologist or desert tortoise monitor for this purpose.

All activities would be restricted to pre-approved locations. If unforeseen circumstances require expansion of activities, the potential expanded work areas would require approval by the BLM and possibly re-initiation of the Section 7 consultation. The expanded work areas would be

surveyed by an authorized biologist for desert tortoises prior to requesting approval from the BLM. Use of protection measures would be implemented within the expanded work areas based on the judgment of the BLM and an authorized biologist.

18. At the end of each work day, NextLight would ensure that bores and other excavations outside the permanently fenced area that constitute wildlife pitfalls would either be immediately backfilled, sloped at a 3:1 ratio at the ends to provide tortoises and other wildlife escape ramps, covered, or fully enclosed with fencing to prevent any entrapment. All excavations outside a fenced area would be inspected periodically throughout and at the end of each workday by an authorized biologist, desert tortoise monitor, or the FCR. Should a tortoise become entrapped, an authorized biologist would remove and relocate the tortoise to a safe location.

19. Any construction pipe, culvert, or similar structure with a diameter greater than 3 inches, stored less than 8 inches above ground and within desert tortoise habitat (outside a fenced area) for one or more nights, would be inspected for tortoises before the material is moved, buried, or capped. As an alternative, all such structures may be capped before being stored outside the fenced area, or placed on pipe racks. These materials would not need to be inspected or capped if they are stored within a fenced area after the clearance surveys have been completed.

20. All vehicles and equipment would be maintained in proper working condition to minimize the potential for fugitive emissions of motor oil, antifreeze, hydraulic fluid, grease, or other hazardous materials. All fuel or hazardous waste leaks, spills, or releases would be stopped or repaired immediately and cleaned up at the time of occurrence. NextLight would be responsible for spill material (including contaminated soil) removal and disposal to an approved offsite landfill or other licensed facility. Servicing of construction equipment would take place only at a designated area. Service/maintenance vehicles would carry a bucket and pads to absorb leaks or spills.

21. All unused material and equipment, including soil and rock piles, would be removed upon completion of any construction activities located outside the permanently fenced area.

22. To compensate for desert tortoise impacts of the Project, NextLight would offset these effects by paying a per acre fee for lands that are being disturbed. This remuneration would be used by the federal agencies to fund management actions expected to provide a direct benefit to the tortoise over time. Action may include: habitat acquisition, population or habitat enhancement or protection, research that increases knowledge of desert tortoise biology, habitat requirements or factors affecting habitat attributes, reducing loss of animals, or other actions.

23. An authorized biologist or FCR would notify the BLM and USFWS within 24 hours upon locating a dead or injured desert tortoise. The notification would be made by telephone and in writing. The report would include the date and time of the finding or incident (if known), location of the carcass, a photograph, cause of death (if known), and other pertinent information. Tortoises fatally injured or killed from Project-related activities would be submitted for necropsy, at the expense of NextLight, as outlined in Salvaging Injured, Recently Dead, Ill, and Dying Wild, Free-Roaming Desert Tortoises (Gopherus agassizii) (Berry, 2001). Tortoises with minor injuries would be transported to a nearby qualified veterinarian for treatment at the expense of NextLight. If an injured animal recovers, the BLM, USFWS, and NDOW would be contacted by NextLight for final disposition of the animal.

24. A Noxious Weed Control Plan would be prepared and submitted to the BLM for review and approval before construction begins. This plan would follow the Las Vegas Field Office's Resource Management Plan (BLM, 1998), Noxious Weed Plan (BLM, 2006), and the interagency guidance Partners Against Weeds (BLM, 2007) for an active integrated weed management program using weed control BMPs. (Note more detail is provided in the POD in Section 1.3.10.2, Noxious Weed Control).

25. NextLight would develop a Site Rehabilitation Plan for the revegetation and rehabilitation of areas disturbed by the Project. This plan would be implemented immediately after construction for the areas that are temporarily disturbed, such as portions of the transmission line route that involve disturbance.

Operation and Maintenance Minimization Measures

The following protection measures would be common to all O&M activities performed during life of the Project outside of the permanently fenced solar field areas:

1. NextLight would designate an FCR who would be responsible for overseeing compliance with the desert tortoise protection measures during operation or maintenance activities outside of the permanently fenced area of the solar field. The on-call FCR would be an authorized biologist approved by the BLM and USFWS. The FCR would follow the applicable measures described in Section 2.6.1 to reduce effects to desert tortoise or further habitat disturbance.

2. NextLight would notify the BLM and USFWS within 24 hours upon locating a dead or injured desert tortoise. Tortoises with minor injuries would be transported to a nearby qualified veterinarian for treatment at the expense of NextLight. If an injured animal recovers, the BLM and USFWS would be contacted by NextLight for final disposition of the animal.

3. Vehicle parking, material stockpiles, and construction-related materials used for maintenance or repair activities would be located within the permanently fenced area.

4. WEAP training would continue for all Project personnel during the operation phase. All employees and contractors involved with operation and maintenance would attend the agency-approved WEAP training. These employees would participate in the education program prior to initiation of work activities. New employees would receive formal, approved training prior to working on site. During the WEAP training, employees would be instructed to exercise caution when commuting to the project area. To minimize the likelihood for vehicle strikes of desert tortoises, the posted speed limit on the access roads would be 25 miles per hour. Speed limit signs would be posted on both sides of access roads to remind drivers of the speed limit when entering and exiting. This training would be conducted by NextLight personnel familiar with the approved WEAP.

5. Existing routes of travel to and from the Project site would be used outside the cleared and fenced areas. Cross-country use of vehicles and equipment outside the cleared and fenced areas would be strictly prohibited.

C Visual Resources Contrast Rating Forms

Note: This appendix section is NOT fully 508 compliant. For help with its data or information, please contact the Bureau of Land Management, Southern Nevada District Office at 702-515-5000. Please reference the Silver State Solar Project, dated: April 2010.

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C Visual Resources Contrast Rating Forms

The following appendix includes the visual resources contrast rating forms prepared by the applicant in consultation with BLM (CH2M Hill 2009).

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Draft

Appendix
Contrast Rating Forms

SECTION A. PROJECT DESCRIPTION

District/Field Office: Las Vegas Field Office	Date: 11/19/09
Key Observation Point: 1 Goodsprings Road	
Location: 2234631.105 x 760173.7145	

SECTION B. CHARACTERISTIC LANDSCAPE DESCRIPTION

	Land/Water	Vegetation	Structures
Form	Upward sloping plain in the foreground, conical and linear hill forms in the middle to background	Mixed with short rounded shrubs and scattered, jagged vertical Joshua trees in foreground Middleground and background indistinct	Linear utility poles in middleground are indistinct. Distant buildings faint in the background
Line	Edge of alluvial fun creates line in foreground, Triangular mountain in foreground, . mountains in BG undulating and smooth	Joshua trees add a weak vertical element	Power line in MG creates a weak vertical line BG: Primm and power plant create weak lines.
Color	FG: grey to grayish brown BG: Off-white lake bed and light to dark browns sloped areas	Warm tones of green, olive, brown and gray in FG brownish gray with black shadows in background	Appear grayish from this distance.
Texture	Ivanpah Valley floor is smooth, mountains in middle and background are of medium texture.	Foreground vegetation is coarse grained and of medium density. Middle and background vegetation seen as a smooth surface.	Primm, the power plant, and the utility poles are of medium coarseness but sparsely distributed.

SECTION C. PROPOSED ACTIVITY DESCRIPTION

	Land/Water	Vegetation	Structures
Form	same	Same	Solar collector fields create flat, slightly contrasting geometric appearing forms on alluvial fan in the distant view.
Line	Same	Same	Flat forms created by collector fields defined by straight lines.
Color	Same	Same	Dark color of collector fields contrasts with the vegetated surface of the alluvial fan on which they are located.
Texture	Same	Same	At this distance, collector fields appear to have a smooth texture.

SAC/993303(NEXTLIGHT_SILVER STATE VISUAL APPENDIX_CONTRAST RATING FORMS_121509.DOC) 1

SECTION D. CONTRAST RATING ☐ SHORT TERM ☒ LONG TERM

1. Degree of Contrast		Features												2. Does project design meet VRM objectives? ☒ Yes ☐ No (explain on back)
		Land/Water Body				Vegetation				Structures				
		Strong	Moderate	Weak	None	Strong	Moderate	Weak	None	Strong	Moderate	Weak	None	3. Additional mitigating measures recommended ☒ Yes ☐ No (explain on back)
Elements	Form				X				X		X			Evaluator's Names: Mark Chandler, Tom Priestley, Tom Dildine, MariaElena Conserva Date: 11/19/09
	Line				X				X		X			
	Color				X				X		X			
	Texture				X				X			X		

Comment from item 2.

See Visual Resources Technical Report (CH2M HILL, 2009) for detailed discussion of analysis.

Additional Measures (See item 3)

As the impact analysis described in the Visual Resources Report indicates, the Project would be consistent with the VRM Class III objectives that the BLM has established for the lands included within the Project area. Because the BLM has requested that the visual changes associated with the Project be minimized, the following mitigation measures have been recommended by the BLM, and NextLight will implement these voluntary measures:

Solar field access ways will be offset at appropriate intervals to minimize the appearance of straight lines within the solar field.

The exterior of the inverter boxes and the exterior of the O&M building should be factory treated with a dull finish and a BLM standard environmental color, such as Yuma Green or Covert Green that will minimize their contrast with the surrounding environment.

A plan will be prepared to revegetate areas disturbed by construction of flood control berms and channel improvements. Berms and channel improvements will be blended into the natural landscape to the extent practical.

SAC/393303(NEXTLIGHT_SILVER STATE VISUAL APPENDIX_CONTRAST RATING FORMS_121509.DOC) 2

SECTION A. PROJECT DESCRIPTION

District/Field Office: Las Vegas Field Office	Date: 11/19/09
Key Observation Point: 2 I-15 near Jean	
Location: taken from a moving car along Highway 15	

SECTION B. CHARACTERISTIC LANDSCAPE DESCRIPTION

	Land/Water	Vegetation	Structures
Form	Flat plain in the foreground, linear and diagonal undulating hill forms in the middle to background	FG: low and shrubby and dispersed creating a low, flat carpet BG: indistinct	Horizontal freeway and barrier wall and linear utility poles in foreground. Horizontal buildings and rectangular road signs in middle to background.
Line	Edge of dry lake creates a straight line in the middleground. In BG, mountain ridges create angular to curvilinear lines	FG and BG: Indistinct	Freeway and barrier wall in FG create straight horizontal lines. utility poles in FG create straight vertical lines In MG and BG, signs and buildings have straight vertical and horizontal lines.
Color	FG: Off-white and brown BG: grayish blues	Medium to brownish green in foreground, brownish gray in middleground and background	Appear grayish from this distance.
Texture	Dry lake bed has smooth texture, vegetated alluvial fan and mountain backdrop have medium texture	Foreground vegetation is medium grained and of medium density. Middle and background vegetation creates a smooth surface.	I-15 has a smooth texture, but utility poles have a coarse texture. Textures of the more distant Primm and power plant are indistinct.

SECTION C. PROPOSED ACTIVITY DESCRIPTION

	Land/Water	Vegetation	Structures
Form	Same	Same	The solar collectors appear as several sets of flat, rectangular forms.
Line	Same	Same	The arrangement of the blocks of solar collectors appears to create a set of straight lines.
Color	Same	Same	From this angle, the collector fields appear to have a dark, grayish tone.
Texture	Same	Same	The collector fields appear to have a medium texture.

SAC/993303(NEXTLIGHT_SILVER STATE VISUAL APPENDIX_CONTRAST RATING FORMS_121509.DOC) 3

SECTION D. CONTRAST RATING ☐ SHORT TERM ☒ LONG TERM

1. Degree of Contrast		Features												2. Does project design meet VRM objectives? ☒Yes ☐ No (explain on back)
		Land/Water Body				Vegetation				Structures				
		Strong	Moderate	Weak	None	Strong	Moderate	Weak	None	Strong	Moderate	Weak	None	3. Additional mitigating measures recommended ☒ Yes ☐ No (explain on back)
Elements	Form				X				X		X			Evaluator's Names: Tom Priestley, MariaElena Conserva Date: 12/4/09
	Line				X				X		x			
	Color				X				X		X			
	Texture				X				X			X		

Comment from item 2.

The existing surrounding environment already includes prominently visible lines created by structural elements in the foreground and middleground of the view. The existing foreground of KOP 2 is dominated by structures including I-15, the highway barrier wall and signs, and a steel-pole transmission line. These existing structures create strong horizontal and vertical lines in the landscape composition. Although the arrangement of the blocks of solar collectors appears to create a set of straight lines, the contrast of these lines with their overall landscape setting is moderate at most in consideration of the strong pattern of horizontal lines created by the Interstate Highway's roadway and the wall in the center median and the myriad of vertical lines created by the tubular steel transmission structures in the foreground and middleground of the view.

See Visual Resources Technical Report (CH2M HILL, 2009) for detailed discussion of analysis.

Additional Measures (See item 3)

As the impact analysis described in the Visual Resources Report indicates, the Project would be consistent with the VRM Class III objectives that the BLM has established for the lands included within the Project area. Because the BLM has requested that the visual changes associated with the Project be minimized, the following mitigation measures have been recommended by the BLM, and NextLight will implement these voluntary measures:

Solar field access ways will be offset at appropriate intervals to minimize the appearance of straight lines within the solar field.

The exterior of the inverter boxes and the exterior of the O&M building should be factory treated with a dull finish and a BLM standard environmental color, such as Yuma Green or Covert Green that will minimize their contrast with the surrounding environment.

A plan will be prepared to revegetate areas disturbed by construction of flood control berms and channel improvements. Berms and channel improvements will be blended into the natural landscape to the extent practical.

SAC/393303(NEXTLIGHT_SILVER STATE VISUAL APPENDIX_CONTRAST RATING FORMS_121509.DOC) 4

SECTION A. PROJECT DESCRIPTION

District/Field Office: Las Vegas Field Office	Date: 11/19/09
Key Observation Point: 3 Roach Lake	
Location: 2237664.986 x 738983.807791	

SECTION B. CHARACTERISTIC LANDSCAPE DESCRIPTION

	Land/Water	Vegetation	Structures
Form	Flat plain in the foreground, jagged peaks in the background	Shrubs in FG are dispersed and have low rounded forms.	Dominant lattice steel transmission towers have lattice forms. Transmission line conductors are linear in form. Power plant appears to be a rectangular cube
Line	Horizontal line where the ground plane meets the base of the mountains.	Vegetation has soft, busy forms.	Transmission towers have fine horizontal, vertical, and diagonal elements. Transmission line conductors create horizontal lines that appear to range from straight to concave. Power plant has straight horizontal and vertical lines.
Color	FG: Off-white and light to dark browns, very light tan, khaki BG: grayish blue	FG: Pale to medium green, olive MG: olive to black	Utility structures and power plant appear to be black.
Texture	Ivanpah Valley floor is smooth. mountains in background are of coarse texture.	Foreground vegetation is coarse grained and of high density. Middle and background vegetation is not visible.	Utility structures and power plant have a coarse texture.

SECTION C. PROPOSED ACTIVITY DESCRIPTION

	Land/Water	Vegetation	Structures
Form	same	Same	Solar collectors appear to have a flat, linear form. O&M building has the form of a rectangular solid. New transmission towers are thin and tubular.
Line	Same	Same	Solar collectors appear to create straight lines at the base of the mountains. O&M building creates straight vertical, horizontal, and diagonal lines. New transmission towers create straight vertical lines.
Color	Same	Same	Solar collector fields appear to be gray to white. O&M building is a dark, grayish green.
Texture	Same	Same	Solar collector fields are medium in texture. O&M building appears to be smooth in texture.

SAC/993303(NEXTLIGHT_SILVER STATE VISUAL APPENDIX_CONTRAST RATING FORMS_121509.DOC) 5

SECTION D. CONTRAST RATING ☐ SHORT TERM ☒ LONG TERM

1. Degree of Contrast		Features												2. Does project design meet VRM objectives? ☒ Yes ☐ No (explain on back)
		Land/Water Body				Vegetation				Structures				
		Strong	Moderate	Weak	None	Strong	Moderate	Weak	None	Strong	Moderate	Weak	None	3. Additional mitigating measures recommended ☒ Yes ☐ No (explain on back)
Elements	Form				X				X			X		Evaluator's Names: Mark Chandler, Tom Priestley, Tom Dildine, MariaElena Conserva Date: 11/19/09
	Line				X				X		X			
	Color				X				X		X			
	Texture				X				X			X		

Comment from item 2.

See Visual Resources Technical Report (CH2M HILL, 2009) for detailed discussion of analysis.

Additional Measures (See item 3)

As the impact analysis described in the Visual Resources Report indicates, the Project would be consistent with the VRM Class III objectives that the BLM has established for the lands included within the Project area. Because the BLM has requested that the visual changes associated with the Project be minimized, the following mitigation measures have been recommended by the BLM, and NextLight will implement these voluntary measures:

Solar field access ways will be offset at appropriate intervals to minimize the appearance of straight lines within the solar field.

The exterior of the inverter boxes and the exterior of the O&M building should be factory treated with a dull finish and a BLM standard environmental color, such as Yuma Green or Covert Green that will minimize their contrast with the surrounding environment.

A plan will be prepared to revegetate areas disturbed by construction of flood control berms and channel improvements. Berms and channel improvements will be blended into the natural landscape to the extent practical.

SAC/993303(NEXTLIGHT_SILVER STATE VISUAL APPENDIX_CONTRAST RATING FORMS_121509.DOC) 6

SECTION A. PROJECT DESCRIPTION

District/Field Office: Las Vegas Field Office	Date: 11/19/09
Key Observation Point: 4 Desert Oasis Apartments	
Location: 2237261.50276 x 737399.214039	

SECTION B. CHARACTERISTIC LANDSCAPE DESCRIPTION

	Land/Water	Vegetation	Structures
Form	Flat plain in the foreground, undulating hill forms in the background	Trees in foreground have conical to cylindrical form. More distant vegetation is indistinct.	Structures dominate foreground including rectangular forms of vehicles, trailers, and utility boxes, Vertical structures include light poles and transmission towers.
Line	Mountains have undulating lines.	Tree lines are vertical and horizontal.	Except for tank structures are linear.
Color	Off-white and light to dark browns	Pale to medium green	Gray asphalt, red landscaping rock, white retaining wall, yellow utility box, multiple colors on vehicles
Texture	Ivanpah Valley floor is smooth, mountains in background are of coarse texture.	Trees in parking lot have a coarse texture but are sparsely planted. Middle and background vegetation creates a coarse texture on the surface of the land.	Vehicles, retaining walls, and utility structures have a coarse texture.

SECTION C. PROPOSED ACTIVITY DESCRIPTION

	Land/Water	Vegetation	Structures
Form	same	Same	Solar collector fields appear to create flat, rectangular forms on the alluvial fan. Small inverter structures are cubic in form.
Line	Same	Same	Solar collector fields are formed by straight horizontal and vertical lines. Inverter structures have straight horizontal and vertical lines.
Color	Same	Same	Solar collector fields appear to white to black in color.
Texture	Same	Same	Surfaces of solar collector fields appear medium to coarse. Inverter structures are smooth in texture.

SAC/993303(NEXTLIGHT_SILVER STATE VISUAL APPENDIX_CONTRAST RATING FORMS_121509.DOC) 7

SECTION D. CONTRAST RATING ☐ SHORT TERM ☒ LONG TERM

1. Degree of Contrast		Features												2. Does project design meet VRM objectives? ☒ Yes ☐ No (explain on back)
		Land/Water Body				Vegetation				Structures				
		Strong	Moderate	Weak	None	Strong	Moderate	Weak	None	Strong	Moderate	Weak	None	3. Additional mitigating measures recommended ☒ Yes ☐ No (explain on back)
Elements	Form				X				X			X		Evaluator's Names: Mark Chandler, Tom Priestley, Tom Dildine, MariaElena Conserva Date: 11/19/09
	Line				X				X			X		
	Color				X				X		X			
	Texture				X				X			X		

Comment from item 2.

See Visual Resources Technical Report (CH2M HILL, 2009) for detailed discussion of analysis.

Additional Measures (See item 3)

As the impact analysis described in the Visual Resources Report indicates, the Project would be consistent with the VRM Class III objectives that the BLM has established for the lands included within the Project area. Because the BLM has requested that the visual changes associated with the Project be minimized, the following mitigation measures have been recommended by the BLM, and NextLight will implement these voluntary measures:

Solar field access ways will be offset at appropriate intervals to minimize the appearance of straight lines within the solar field.

The exterior of the inverter boxes and the exterior of the O&M building should be factory treated with a dull finish and a BLM standard environmental color, such as Yuma Green or Covert Green that will minimize their contrast with the surrounding environment.

A plan will be prepared to revegetate areas disturbed by construction of flood control berms and channel improvements. Berms and channel improvements will be blended into the natural landscape to the extent practical.

SAC/993303(NEXTLIGHT_SILVER STATE VISUAL APPENDIX_CONTRAST RATING FORMS_121509.DOC) 8

SECTION A. PROJECT DESCRIPTION

District/Field Office: Las Vegas Field Office	Date: 11/19/09
Key Observation Point: 5 Primm Valley Resort and Casino	
Location: 2236999.35527 x 737147.562771	

SECTION B. CHARACTERISTIC LANDSCAPE DESCRIPTION

	Land/Water	Vegetation	Structures
Form	FG: area exposed dirt forming a flat surface and sloped berms. Sloping alluvial plain with flat-appearing surface in middleground. Solid, high, jagged mountains in background	indistinct	Flat road surface, tubular light poles, and angular fence posts in foreground. Angular lattice transmission towers in middleground.
Line	Straight horizontal line where the alluvial plain butts up against the base of the mountains. Mountain ridges create angular to curved horizontal lines	Indistinct	Road creates a straight horizontal line. Light poles create straight vertical lines. In middleground, railway berm creates a thin horizontal line.
Color	Areas of exposed earth in foreground are off-white and light to medium browns. Mountains in background are purplish gray.	Vegetation on alluvial fan in middleground appears dark olive to gray in color	Asphalt road is gray. Light poles are gray, ranging from light to dark based on shadowing. Transmission towers appear dark gray
Texture	Ivanpah Valley floor is smooth, mountains in background are of coarse texture.	Middleground vegetation is fairly continuous and of medium texture. Background vegetation is indistinct	Asphalt road appears smooth.

SECTION C. PROPOSED ACTIVITY DESCRIPTION

	Land/Water	Vegetation	Structures
Form	Same	Same	Solar collector fields create flat, geometric forms. Inverter structures appear as small, rectangular forms.
Line	Same	Same	Solar collector fields defined by straight horizontal and diagonal lines. Inverter structures have straight horizontal and vertical lines.
Color	Same	Same	Surfaces of solar collector fields range from white to gray in color. Inverter structures appear grayish in color.
Texture	Same	Same	Surfaces of solar collector field vary from medium to coarse in texture. Surfaces of inverter structures appear smooth,

SAC/993303(NEXTLIGHT_SILVER STATE VISUAL APPENDIX_CONTRAST RATING FORMS_121509.DOC) 9

SECTION D. CONTRAST RATING ☐ SHORT TERM ☒ LONG TERM

1. Degree of Contrast		Features												2. Does project design meet VRM objectives? ☒ Yes ☐ No (explain on back)
		Land/Water Body				Vegetation				Structures				
		Strong	Moderate	Weak	None	Strong	Moderate	Weak	None	Strong	Moderate	Weak	None	3. Additional mitigating measures recommended ☒ Yes ☐ No (explain on back)
Elements	Form				X				X			X		Evaluator's Names: Mark Chandler, Tom Priestley, Tom Dildine, MariaElena Conserva Date: 11/19/09
	Line				X				X		X			
	Color				X				X		X			
	Texture				X				X		X			

Comment from item 2.

See Visual Resources Technical Report (CH2M HILL, 2009) for detailed discussion of analysis.

Additional Measures (See item 3)

As the impact analysis described in the Visual Resources Report indicates, the Project would be consistent with the VRM Class III objectives that the BLM has established for the lands included within the Project area. Because the BLM has requested that the visual changes associated with the Project be minimized, the following mitigation measures have been recommended by the BLM, and NextLight will implement these voluntary measures:

Solar field access ways will be offset at appropriate intervals to minimize the appearance of straight lines within the solar field.

The exterior of the inverter boxes and the exterior of the O&M building should be factory treated with a dull finish and a BLM standard environmental color, such as Yuma Green or Covert Green that will minimize their contrast with the surrounding environment.

A plan will be prepared to revegetate areas disturbed by construction of flood control berms and channel improvements. Berms and channel improvements will be blended into the natural landscape to the extent practical.

SAC/393303(NEXTLIGHT_SILVER STATE VISUAL APPENDIX_CONTRAST RATING FORMS_121509.DOC) 10

SECTION A. PROJECT DESCRIPTION

District/Field Office: Las Vegas Field Office	Date: 11/19/09
Key Observation Point: 6 Lucy Gray OHV	
Location: 2244505.09445 x 734414.949687	

SECTION B. CHARACTERISTIC LANDSCAPE DESCRIPTION

	Land/Water	Vegetation	Structures
Form	Sloping alluvial plain in the FG, flat plain with dry lake bed and sharp jagged peaks in the BG.	In FG, shrubs have mostly rounded form. In BG, vegetation is indistinct	FG: No structures BG: Casinos in Primm and power plant – irregular and blocky
Line	Mountains have jagged lines; otherwise lines are indistinct	FG: uniform overlay BG: indistinct.	FG: no structures BG: Pimm creates a line of development; railroad a linear feature
Color	Off-white. light to dark browns, and grays	FG: pale to dark greens, with mix of khakis, browns and yellows BG: brown, grays, and blacks	Whites, red, gray, khakis, black
Texture	Ivanpah Valley floor is smooth, mountains in background are of coarse texture.	FG: Coarse BG: smooth	BG: coarse urban node at Primm

SECTION C. PROPOSED ACTIVITY DESCRIPTION

	Land/Water	Vegetation	Structures
Form	same	Same	Collector fields appear as flat, linear forms. Inverter boxes appear as small rectangular forms.
Line	Same	Same	Edges of collector fields create straight horizontal lines
Color	Same	Same	Surfaces of collector fields vary in color from light and reflective to dark and non-reflective
Texture	Same	Same	Surfaces of collector fields appear coarse and dotted

SECTION D. CONTRAST RATING ☐ **SHORT TERM** ☒ **LONG TERM**

1. Degree of Contrast		Features												2. Does project design meet VRM objectives? ☒ Yes ☐ No (explain on back) 3. Additional mitigating measures recommended ☒ Yes ☐ No (explain on back)
		Land/Water Body				Vegetation				Structures				
		Strong	Moderate	Weak	None	Strong	Moderate	Weak	None	Strong	Moderate	Weak	None	
Elements	Form				X				X			X		Evaluator's Names: Mark Chandler, Tom Priestley, Tom Dildine, MariaElena Conserva Date: 11/19/09
	Line				X				X			X		
	Color				X				X		X			
	Texture				X				X			X		

SAC/393303(NEXTLIGHT_SILVER STATE VISUAL APPENDIX_CONTRAST RATING FORMS_121509.DOC) 11

SECTION D. (Continued)

Comment from item 2.

See Visual Resources Technical Report (CH2M HILL, 2009) for detailed discussion of analysis.

Additional Measures (See item 3)

As the impact analysis described in the Visual Resources Report indicates, the Project would be consistent with the VRM Class III objectives that the BLM has established for the lands included within the Project area. Because the BLM has requested that the visual changes associated with the Project be minimized, the following mitigation measures have been recommended by the BLM, and NextLight will implement these voluntary measures:

Solar field access ways will be offset at appropriate intervals to minimize the appearance of straight lines within the solar field.

The exterior of the inverter boxes and the exterior of the O&M building should be factory treated with a dull finish and a BLM standard environmental color, such as Yuma Green or Covert Green that will minimize their contrast with the surrounding environment.

A plan will be prepared to revegetate areas disturbed by construction of flood control berms and channel improvements. Berms and channel improvements will be blended into the natural landscape to the extent practical.

SAC/993303(NEXTLIGHT_SILVER STATE VISUAL APPENDIX_CONTRAST RATING FORMS_121509.DOC) 12

SECTION A. PROJECT DESCRIPTION

District/Field Office: Las Vegas Field Office	Date: 11/19/09
Key Observation Point: 7 Ivanpah Lake	
Location: 2236491.28094 x 732565.887423	

SECTION B. CHARACTERISTIC LANDSCAPE DESCRIPTION

	Land/Water	Vegetation	Structures
Form	Flat plain in foreground. Flat, sloped alluvial fan in middleground, solid, jagged mountains in background.	Low-growing shrubs have rounded form.	Power plant includes rectangular building and conical stacks. Lattice transmission towers create vertical forms
Line	Horizontal liens at edge of dry lake and edge of alluvial fan at base of mountains. Mountain ridge creates an irregular, angular line	Shrubs form a uniform carpet across the alluvial fan. Lines created where carpet meets edge of dry lake bed and at base of mountain.	Power plant building has straight horizontal and vertical lines. Power plant stacks create straight vertical lines
Color	Dry lake bed: off-white to light brown. Mountains in backdrop grayish blue	Dark olive green	Power plant, stacks, and transmission lines are dark in color. Small areas of white on power pant complex
Texture	Dry lake bed is smooth, mountains in background are of coarse texture.	Continuous and of medium coarseness	Medium texture due to distance

SECTION C. PROPOSED ACTIVITY DESCRIPTION

	Land/Water	Vegetation	Structures
Form	Same	Same	Solar collector fields create low, flat-appearing linear forms
Line	Same	Same	Edges of solar collector fields create straight-appearing parallel horizontal lines contrasting against the vegetated alluvial fan
Color	Same	Same	Surfaces of solar collector fields have a gray appearance
Texture	Same	Same	Surfaces of solar collector fields appear medium-fine in the middle and coarse at the ends

SAC/393303(NEXTLIGHT_SILVER STATE VISUAL APPENDIX_CONTRAST RATING FORMS_121509.DOC) 13

SECTION D. CONTRAST RATING ☐ SHORT TERM ☒ LONG TERM

1. Degree of Contrast		Features												2. Does project design meet VRM objectives? ☒ Yes ☐ No (explain on back)
		Land/Water Body				Vegetation				Structures				
		Strong	Moderate	Weak	None	Strong	Moderate	Weak	None	Strong	Moderate	Weak	None	3. Additional mitigating measures recommended ☒ Yes ☐ No (explain on back)
Elements	Form				X				X			X		Evaluator's Names: Mark Chandler, Tom Priestley, Tom Dildine, MariaElena Conserva Date: 11/19/09
	Line				X				X		X			
	Color				X				X		X			
	Texture				X				X			X		

Comment from item 2.

See Visual Resources Technical Report (CH2M HILL, 2009) for detailed discussion of analysis.

Additional Measures (See item 3)

As the impact analysis described in the Visual Resources Report indicates, the Project would be consistent with the VRM Class III objectives that the BLM has established for the lands included within the Project area. Because the BLM has requested that the visual changes associated with the Project be minimized, the following mitigation measures have been recommended by the BLM, and NextLight will implement these voluntary measures:

Solar field access ways will be offset at appropriate intervals to minimize the appearance of straight lines within the solar field.

The exterior of the inverter boxes and the exterior of the O&M building should be factory treated with a dull finish and a BLM standard environmental color, such as Yuma Green or Covert Green that will minimize their contrast with the surrounding environment.

A plan will be prepared to revegetate areas disturbed by construction of flood control berms and channel improvements. Berms and channel improvements will be blended into the natural landscape to the extent practical.

SAC/393303(NEXTLIGHT_SILVER STATE VISUAL APPENDIX_CONTRAST RATING FORMS_121509.DOC) 14

SECTION A. PROJECT DESCRIPTION

District/Field Office: Las Vegas Field Office	Date: 11/19/09
Key Observation Point: 8 I-15 at Nipton Road	
Location: 2231526.97094 x 721841.10411	

SECTION B. CHARACTERISTIC LANDSCAPE DESCRIPTION

	Land/Water	Vegetation	Structures
Form	Flat plain in foreground. Undulating hills in background.	Rounded to indistinct.	Freeway and barrier in foreground have horizontal form. Buildings in Primm and power plant appear as cubes
Line	Mountains have undulating lines.	Indistinct	Freeway and barrier in foreground have horizontal lines. Buildings in Primm and power plant are indistinct.
Color	Off-white and light to dark browns.	Brownish -green.	Whites, browns, grays.
Texture	Ivanpah Valley floor is smooth, mountains in background are of coarse texture.	Continuous and of medium texture.	Primm, power plant, and utility poles are of medium texture.

SECTION C. PROPOSED ACTIVITY DESCRIPTION

	Land/Water	Vegetation	Structures
Form	Same	Same	Solar collector fields create low, flat, angular forms similar to dry lakebeds
Line	Same	Same	Edges of solar collector fields create distinct, straight-appearing horizontal and diagonal lines. Lines are pronounced because of color differences between structures and vegetated areas. In closest collector field, inverter boxes create an appearance of a repeated series of lines.
Color	Same	Same	Surfaces of solar collector fields have a gray appearance, repeating road colors but different from color of power plant and buildings in Primm
Texture	Same	Same	Surfaces of closest solar collector fields appear dotted and ordered. More distant fields appear smooth and indistinct

SAC/993303(NEXTLIGHT_SILVER STATE VISUAL APPENDIX_CONTRAST RATING FORMS_121509.DOC) 15

SECTION D. CONTRAST RATING ☐ SHORT TERM ☒ LONG TERM

1. Degree of Contrast		Features												2. Does project design meet VRM objectives? ☒ Yes ☐ No (explain on back)
		Land/Water Body				Vegetation				Structures				
		Strong	Moderate	Weak	None	Strong	Moderate	Weak	None	Strong	Moderate	Weak	None	3. Additional mitigating measures recommended ☒ Yes ☐ No (explain on back)
Elements	Form				X				X		X			Evaluator's Names: Mark Chandler, Tom Priestley, Tom Dildine, MariaElena Conserva Date: 11/19/09
	Line				X				X		X			
	Color				X				X		X			
	Texture				X				X			X		

Comment from item 2.

See Visual Resources Technical Report (CH2M HILL, 2009) for detailed discussion of analysis.

Additional Measures (See item 3)

As the impact analysis described in the Visual Resources Report indicates, the Project would be consistent with the VRM Class III objectives that the BLM has established for the lands included within the Project area. Because the BLM has requested that the visual changes associated with the Project be minimized, the following mitigation measures have been recommended by the BLM, and NextLight will implement these voluntary measures:

Solar field access ways will be offset at appropriate intervals to minimize the appearance of straight lines within the solar field.

The exterior of the inverter boxes and the exterior of the O&M building should be factory treated with a dull finish and a BLM standard environmental color, such as Yuma Green or Covert Green that will minimize their contrast with the surrounding environment.

A plan will be prepared to revegetate areas disturbed by construction of flood control berms and channel improvements. Berms and channel improvements will be blended into the natural landscape to the extent practical.

SAC/993303(NEXTLIGHT_SILVER STATE VISUAL APPENDIX_CONTRAST RATING FORMS_121509.DOC) 16

SECTION A. PROJECT DESCRIPTION

District/Field Office: Las Vegas Field Office	Date: 11/19/09
Key Observation Point: 9 Mojave National Preserve Entrance	
Location: 2236937.68048 x 720272.198522	

SECTION B. CHARACTERISTIC LANDSCAPE DESCRIPTION

	Land/Water	Vegetation	Structures
Form	Flat plain in foreground. Undulating hills in background.	Rounded and inverted conical forms.	Road is horizontal. Signs are linear.
Line	Mountains have undulating lines.	Vegetation has diagonal linear quality.	Road is horizontal. Signs are linear.
Color	Off-white and light to dark browns.	Medium to dark greens.	Gray, orange, red, and green.
Texture	Ivanpah Valley floor is smooth, mountains in background are of medium texture.	Continuous and of medium texture.	Road signs are of moderate texture.

SECTION C. PROPOSED ACTIVITY DESCRIPTION

	Land/Water	Vegetation	Structures
Form	Same	Same	Solar collector fields create low, flat-appearing angular forms
Line	Same	Same	Edges of solar collector fields create straight-appearing horizontal and angular lines
Color	Same	Same	Surfaces of solar collector fields have a gray matte appearance
Texture	Same	Same	Surfaces of solar collector fields appear indistinct to smooth

SECTION D. CONTRAST RATING ☐ **SHORT TERM** ☒ **LONG TERM**

1. Degree of Contrast		Features: Land/Water Body				Features: Vegetation				Features: Structures				2. Does project design meet VRM objectives? ☒ Yes ☐ No (explain on back)
		Strong	Moderate	Weak	None	Strong	Moderate	Weak	None	Strong	Moderate	Weak	None	3. Additional mitigating measures recommended ☒ Yes ☐ No (explain on back)
Elements	Form				X				X			X		Evaluator's Names: Mark Chandler, Tom Priestley, Tom Dildine, MariaElena Conserva Date: 11/19/09
	Line				X				X		X			
	Color				X				X		X			
	Texture				X				X			X		

SAC/393303(NEXTLIGHT_SILVER STATE VISUAL APPENDIX_CONTRAST RATING FORMS_121509.DOC) 17

SECTION D. (Continued)

Comment from item 2.

See Visual Resources Technical Report (CH2M HILL, 2009) for detailed discussion of analysis.

Additional Measures (See item 3)

As the impact analysis described in the Visual Resources Report indicates, the Project would be consistent with the VRM Class III objectives that the BLM has established for the lands included within the Project area. Because the BLM has requested that the visual changes associated with the Project be minimized, the following mitigation measures have been recommended by the BLM, and NextLight will implement these voluntary measures:

Solar field access ways will be offset at appropriate intervals to minimize the appearance of straight lines within the solar field.

The exterior of the inverter boxes and the exterior of the O&M building should be factory treated with a dull finish and a BLM standard environmental color, such as Yuma Green or Covert Green that will minimize their contrast with the surrounding environment.

A plan will be prepared to revegetate areas disturbed by construction of flood control berms and channel improvements. Berms and channel improvements will be blended into the natural landscape to the extent practical.

SAC/993303(NEXTLIGHT_SILVER STATE VISUAL APPENDIX_CONTRAST RATING FORMS_121509.DOC) 18

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