PUBLIC DRAFT

ENVIRONMENTAL ASSESSMENT

For

CONSTRUCTION AND OPERATION OF A SOLAR PHOTOVOLTAIC SYSTEM

At

NAVAL AIR STATION FALLON, NEVADA

APRIL 2016

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Abstract

Designation:	Environmental Assessment
Title of Proposed Action:	Construction and Operation of a Solar Photovoltaic System at Naval Air Station Fallon, Nevada
Project Location:	Naval Air Station Fallon, Nevada
Lead Agency for the EA:	United States Department of the Navy
Affected Region:	Churchill County, Nevada
Action Proponent:	United States Department of the Navy
Point of Contact:	Naval Facilities Engineering Command Southwest Attn: Code JE20.WG 1220 Pacific Highway San Diego County, California 92132-5190
Date:	April 2016

The Department of the Navy has prepared this Environmental Assessment in accordance with the National Environmental Policy Act (NEPA), as implemented by the Council on Environmental Quality regulations and Navy regulations for implementing NEPA. The Proposed Action would result in the construction and operation of up to a 20 megawatt solar photovoltaic system at Naval Air Station Fallon. The Proposed Action is needed to support the renewable energy standards put forth by the Secretary of the Navy's (SECNAV's) 1 Gigawatt Initiative and other energy goals. Among the SECNAV's energy goals is that by 2020, the Department of the Navy will produce 50 percent of its energy from alternative sources. To achieve this goal, the 1 Gigawatt Initiative emphasizes development of large scale renewable energy projects. The SECNAV's energy goals and other similar energy directives align towards an overarching requirement to provide secure, reliable, and affordable energy to the Navy and Marine Corps (Navy, 2012).

This Environmental Assessment evaluates the potential environmental impacts associated with the two action alternatives, Alternatives 1 and 2, and the No Action Alternative to the following resource areas: air quality, water resources, cultural resources, biological resources, visual resources, utilities, transportation, public health and safety, socioeconomics, and noise.

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EXECUTIVE SUMMARY

Proposed Action

Under the Proposed Action, the United States Department of the Navy (Navy) and a private partner would enter into an agreement to allow the private partner to use Navy land to construct, operate, and own a solar photovoltaic (PV) system at Naval Air Station (NAS) Fallon, Nevada. Once the solar PV system is operational, the private partner would be responsible for maintenance and operation. The energy generated would be used by the local community, NAS Fallon, or a combination of both.

Purpose of and Need for the Proposed Action

The purpose of the Proposed Action is to increase Navy installation energy security, operational capability, strategic flexibility, and resource availability through the development of renewable energy generating assets at Navy installations by the construction and operation of the proposed solar PV system at NAS Fallon.

The need for the Proposed Action is to meet the required renewable energy standards put forth by the Secretary of the Navy's (SECNAV's) 1 Gigawatt Initiative and other energy goals.

Among the SECNAV's energy goals is that by 2020, the Navy will produce 50 percent of its energy from alternative sources. To achieve this goal, the 1 Gigawatt Initiative emphasizes development of large scale renewable energy projects. The SECNAV's energy goals and other similar energy directives align towards an overarching requirement to provide secure, reliable, and affordable energy to the Navy and Marine Corps (Navy, 2012).

Alternatives Considered

Alternatives were developed for analysis based upon the following reasonable alternative screening factors:

- Must not interfere with the NAS Fallon mission or create unsafe conditions.
- Should contribute to SECNAV's energy goals of obtaining 1 gigawatt of renewable energy by the end of 2020 by providing a sufficiently sized parcel (or parcels) of land for a solar PV system.
- Should provide a location and/or design capable of contributing meaningfully to energy stability in the region.

The Navy is considering two action alternatives that meet the purpose and need for the Proposed Action and a No Action Alternative. Alternative 1 (Preferred Alternative) would consist of construction and operation of up to a 20 megawatt solar PV system at Sites A and B (in total covering approximately 230 acres). Alternative 2 would consist of construction and operation of up to a 15 megawatt solar PV system at Site A (covering approximately 126 acres). The No Action Alternative represents the status quo and the Navy would not enter into an agreement with a private partner to construct and operate a solar PV system at NAS Fallon.

Summary of Environmental Resources Evaluated in the EA

Council on Environmental Quality regulations, National Environmental Policy Act (NEPA), and Navy instructions for implementing NEPA, specify that an Environmental Assessment (EA) should address those resource areas that are potentially subject to more-than-trivial impacts. In addition, the level of analysis should be commensurate with the anticipated level of environmental impact.

The following resource areas have been addressed in this EA: air quality, water resources, cultural resources, biological resources, visual resources, utilities, transportation, public health and safety, socioeconomics, and noise.

Because potential impacts were considered to be negligible or nonexistent, the following resources have not been evaluated in detail in this EA: geological resources, land use, airspace, hazardous materials and wastes, and environmental justice.

Summary of Potential Environmental Consequences of the Action Alternatives and Major Mitigating Actions

Table ES-1 provides a tabular summary of the potential impacts to the resources associated with each of the alternative actions analyzed.

Public Involvement

Regulations from the Council on Environmental Quality (40 Code of Federal Regulations part 1506.6) direct agencies to involve the public in preparing and implementing their NEPA procedures. The Navy is circulating the Draft EA for public review on the Navy Region Southwest website at http://www.cnic.navy.mil/regions/cnrsw.html and at the Churchill County Library, located at 553 South Maine Street, Fallon, Nevada 89406.

Table ES-1 Summary of Potential Impacts to Resource Areas

Resource Area	*No Action Alternative*	*Alternative 1: Up to 20 Megawatts at Sites A and B (Preferred Alternative)*	*Alternative 2: Up to 15 Megawatts at Site A*
Air Quality	No Significant Impact. There would be no change in existing conditions; therefore, no impacts would occur.	No Significant Impact. Minor and temporary increase in emissions. Potential for dust generated to migrate off-site, depending on conditions. Operationally, fewer greenhouse gas and particulate matter emissions due to the development of renewable energy. Emissions would be negligible and would not trigger the need for a formal Conformity Determination under the Clean Air Act General Conformity Rule.	No Significant Impact. Potential impacts would be similar to those described for Alternative 1, though at a slightly smaller scale (126 acres).
Water Resources	No Significant Impact. There would be no change in existing conditions; therefore, no impacts would occur.	No Significant Impact. Construction and operation activities would not reach depths that would affect groundwater resources. Standard erosion control measures, Best Management Practices (BMPs) and Low Impact Design (LID) would reduce potential impacts resulting from runoff, erosion, and sedimentation during construction and operation activities.	No Significant Impact. Potential impacts would be similar to those described for Alternative 1, though at a slightly smaller scale.
Cultural Resources	No Effect. There would be no change in existing conditions; therefore, no impacts would occur.	No Significant Impact. There are eighteen archaeological sites and architectural resources located within the Alternative 1 footprint; one may be eligible and one is eligible for listing in the National Register of Historic Properties (NRHP). These sites would be avoided during construction activities. A determination of impacts is pending; the Navy has requested the State Historic Preservation Officer (SHPO) concur with a finding of "No Historic Properties Affected"	No Significant Impact. Five archaeological sites are located within Site A; however, all of the sites located in Site A are recommended not eligible for listing in in the NRHP. A determination of impacts is pending; the Navy has requested the SHPO concur with a finding of "No Historic Properties Affected"
Biological Resources	No Significant Impact. There would be no change in existing conditions; therefore, no impacts would occur.	No Significant Impact. Up to 230 acres of black greasewood vegetation would be removed. Wildlife would be subject to auditory/visual disturbances; potential for injury or mortality from construction equipment; and altered foraging, nesting, and breeding habitat. It is unlikely that any special status species would be directly	No Significant Impact. Potential impacts would be similar to those described for Alternative 1, though at a smaller scale. Up to 126 acres of black greasewood vegetation would be removed.

Table ES-1 Summary of Potential Impacts to Resource Areas

Resource Area	*No Action Alternative*	*Alternative 1: Up to 20 Megawatts at Sites A and B (Preferred Alternative)*	*Alternative 2: Up to 15 Megawatts at Site A*
		impacted. Impact Avoidance and Minimization Measures described in Table 3.11-2 would reduce potential impacts to biological resources.	
Visual Resources	No Significant Impact. There would be no change in existing conditions; therefore, no impacts would occur.	No Significant Impact. Construction impacts to visual resources would be temporary and limited to viewers from adjacent roadways, agriculture parcels, the operations area on NAS Fallon, and housing. The proposed solar PV system (up to 15-feet high) would represent a visual change from open desert views to developed utility infrastructure. The new transmission line power poles would be up to 65-feet high, consistent with existing transmission lines in the area.	No Significant Impact. Potential impacts would be similar to those described for Alternative 1.
Utilities	No Significant Impact. There would be no change in existing conditions; therefore, no impacts would occur.	No Significant Impact. Temporary and localized power disruption could occur when the solar PV system is brought on-line. Increase in power supply, resulting in electrical benefits for the region.	No Significant Impact. Potential impacts would be similar to those described for Alternative 1, though at a slighter smaller scale.
Transportation	No Significant Impact. There would be no change in existing conditions; therefore, no impacts would occur.	No Significant Impact. Minor and temporary increase in average daily traffic generated as a result of construction and operational maintenance.	No Significant Impact. Potential impacts would be similar to those described for Alternative 1, though at a slighter smaller scale.
Public Health and Safety	No Significant Impact. There would be no change in existing conditions; therefore, no impacts would occur.	No Significant Impact. There would be no airspace penetration, reflectivity concerns, and no interference with communications. No increased hazard to flight safety during construction or operation. Glare visible to air traffic control tower from Site A, but not Site B. Potential for glare to cause an after image for aviators during short periods of the day. Glare impacts would be minimized by implementing measures listed in Table 3.11-2.	No Significant Impact. Potential impacts would be similar to those described for Alternative 1.

Table ES-1 Summary of Potential Impacts to Resource Areas

Resource Area	*No Action Alternative*	*Alternative 1: Up to 20 Megawatts at Sites A and B (Preferred Alternative)*	*Alternative 2: Up to 15 Megawatts at Site A*
Socioeconomics	No Significant Impact. There would be no change in existing conditions; therefore, no impacts would occur.	No Significant Impact. There would be a beneficial, temporary impact to the local economy during the construction phase. There would also be a beneficial, long-term impact to the region due to the additional electric power available from the proposed project. There would be no disproportionally high environmental or health impacts on low-income or minority populations.	No Significant Impact. Potential impacts would be similar to those described for Alternative 1, though at a slighter smaller scale.
Noise	No Significant Impact. There would be no change in existing conditions; therefore, no impacts would occur.	No Significant Impact. Construction noise would be temporary, throughout the site and limited to regular working hours. Approximately 15 residences along the perimeter of the military family housing area could experience an increase in noise levels due to trucks transporting equipment and materials or road grading and improvements. This increase would be temporary and limited to daylight hours on typical workdays. Due to these factors noise annoyance, speech interference, and sleep disturbance would not occur.	No Significant Impact. Potential impacts would be similar to those described for Alternative 1, though at a smaller scale and duration.

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Abbreviations and Acronyms

Acronym	Definition
°F	Fahrenheit
AICUZ	Air Installation Compatible Use Zone
APE	Area of Potential Effect
APZ	Accident Potential Zone
AQCR	Air Quality Control Region
BASH	Bird and Wildlife Air Strike Hazard
BLM	Bureau of Land Management
BMP	Best Management Practice
BP	before present
CAA	Clean Air Act
CDC	Child Development Center
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CO	carbon monoxide
CO_2	carbon dioxide
CO_2e	carbon dioxide equivalent
CWA	Clean Water Act
dB	decibels
dBA	A-weighted decibel level
DNL	Day-Night Average Sound Level
DoD	Department of Defense
DOE	Department of Energy
EA	Environmental Assessment
EIS	Environmental Impact Statement
EO	Executive Order
ESA	Endangered Species Act
ESQD	explosive safety quantity distance
FAA	Federal Aviation Administration
FHWA	Federal Highway Administration
FRTC	Fallon Range Training Complex
ft	feet
FY	fiscal year
GHG	greenhouse gas
GIS	geographic information system
HAP	hazardous air pollutant
HMA	Herd Management Area
Hz	hertz
ICRMP	Installation Cultural Resources Management Plan
INRMP	Integrated Natural Resources Management Plan
kV	kilovolt
kWh	kilowatt-hour
LID	Low Impact Design
m	meters
MBTA	Migratory Bird Treaty Act
mm	millimeters
MW	megawatt
NAAQS	National Ambient Air Quality Standards
NAAS	Naval Air Auxiliary Station
NAS	Naval Air Station
Navy	United States Department of the Navy
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NNHP	Nevada Natural Heritage Program
NO_2	nitrogen dioxide
NO_x	nitrogen oxide
NPDES	National Pollutant Discharge Elimination System
NRHP	National Register of Historic Places
O_3	ozone
OPNAVINST	Office of the Chief of Naval Operations Instruction
PA	Programmatic Agreement
Pb	lead

Acronym	Definition
pH	Potential of Hydrogen
PM_{10}	particulate matter less than or equal to 10 microns in diameter
$PM_{2.5}$	particulate matter less than or equal to 2.5 microns in diameter
PV	photovoltaic
ROI	region of influence
SECNAV	Secretary of the Navy
SWPPP	Storm Water Pollution Prevention Plan
SGHAT	Solar Glare Hazard Analysis Tool
SHPO	State Historic Preservation Officer
SO_2	sulfur dioxide
SR	State Route
TACTS	Tactical Air Crew Combat Training System
TMDL	Total Maximum Daily Load
tpy	tons per year
U.S.	United States
U.S.C.	United States Code
USACE	U.S. Army Corps of Engineers
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
USGCRP	U.S. Global Change Research Program
USGS	U.S. Geological Survey
USMC	U.S. Marine Corps
VFC	Flight Squadron Composite
VOC	volatile organic compound

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1 Purpose of and Need for the Proposed Action

1.1 Introduction

The United States (U.S.) Department of the Navy (Navy) proposes to enter into an agreement with a private partner to construct and operate a proposed solar photovoltaic (PV) system at Naval Air Station (NAS) Fallon, Nevada. This proposed project is one of several renewable energy projects that the Navy is currently evaluating within the Renewable Energy Program Office Southwest area of responsibility. NAS Fallon is the action proponent for this proposed project.

The Navy has prepared this Environmental Assessment (EA) in accordance with the National Environmental Policy Act (NEPA), as implemented by the Council on Environmental Quality (CEQ) regulations and Navy regulations for implementing NEPA.

1.1.1 Secretary of the Navy Renewable Energy Goals and Strategies

1.1.1.1 Goals

In October 2009, the Secretary of the Navy (SECNAV) established renewable energy goals for the shore-based installations to meet by 2020. These goals include:

1. The Navy will produce or procure at least 50 percent of the total quantity of electric energy consumed by shore-based facilities and activities each fiscal year from alternative energy sources.
2. Fifty percent of Navy installations will be net zero (i.e., over the course of a fiscal year, an installation matches or exceeds the electrical energy it consumes ashore with electrical energy generated from alternative energy sources) (Navy, 2012).

To achieve the goals set forth by the SECNAV's renewable energy goals, the 1 Gigawatt Initiative emphasizes development of large scale renewable energy projects. The SECNAV's energy goals and other similar energy directives align towards an overarching requirement to provide secure, reliable, and affordable energy to the Navy and Marine Corps (Navy, 2012).

1.1.1.2 Strategies

The Navy's energy strategy is centered on energy security, energy efficiency, and sustainability while remaining the pre-eminent maritime power:

Energy efficiency increases mission effectiveness. Efficiency improvements minimize operational risks while saving time and money.

Energy security is critical to mission success. Energy security safeguards energy infrastructure and shields the Navy from a volatile energy supply.

Sustainable energy efforts protect mission capabilities. Investment in environmentally responsible technologies afloat and ashore reduces greenhouse gas emissions and lessens dependence on fossil fuels (Navy, 2015a).

The SECNAV has established a goal for the Navy to develop 1 gigawatt of renewable energy generation capacity by the year 2020 (Navy, 2012). The Navy has developed acquisition strategies based on the following three separate models (Figure 1-1) to procure or generate renewable energy to meet SECNAV's goals.

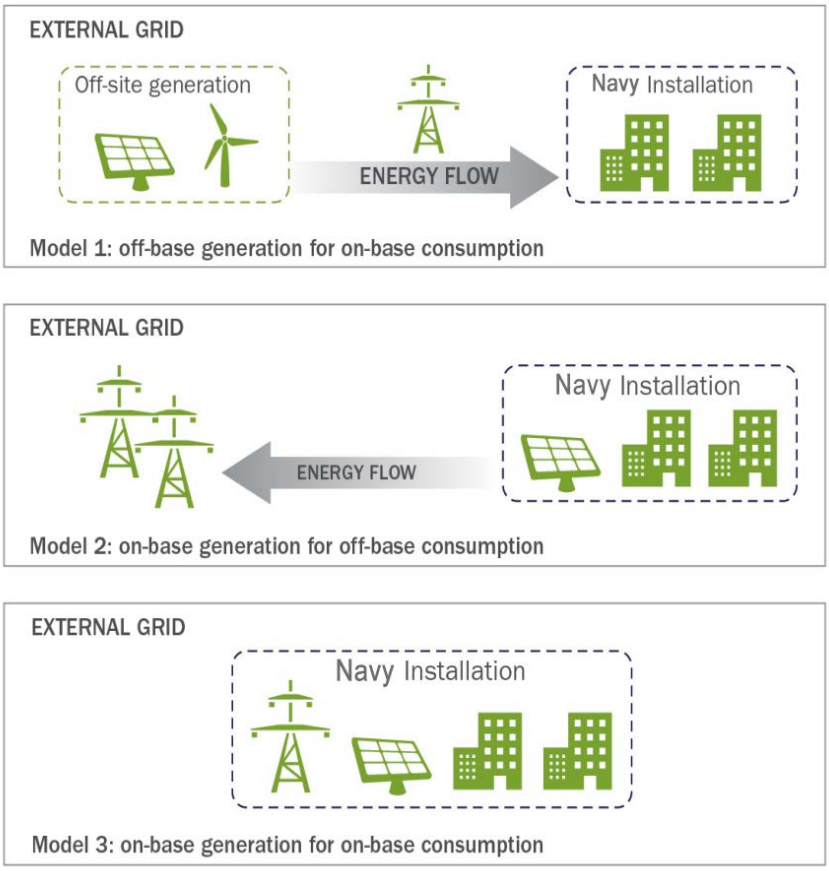


Figure 1-1 Renewable Energy Models

Model 1: Off-base generation for on-base consumption:

- Navy purchases new renewable energy generation for on-base load
- Renewable energy generation provides price stability and diversifies energy portfolio
- Acquisition: Inter-agency Agreement

Model 2: On-base generation for off-base consumption:

- Third party produces renewable energy on Navy property and exports energy to grid (allows for much higher capacity of production vs Model 3)
- Navy to receive energy security via lease terms
- Acquisition: Real estate outgrant

Model 3: On-base generation for on-base consumption:

- Navy consumes all renewable energy generated
- Price stability and diversifies energy portfolio
- Acquisition: Power Purchase Agreement

The Navy proposes to implement Model 2, Model 3, or a combination of Models 2 and 3 at NAS Fallon to support achievement of SECNAV's renewable energy goals. Model 1 is not being considered for this proposed project.

1.1.2 Solar PV Systems

A ***Solar PV System*** consists of all components needed to generate and transmit solar-generated power. This includes solar PV arrays, transmission lines, and supporting infrastructure such as a switching station. Solar PV energy projects generally require 10 acres to produce 1 megawatt (MW)[1] [2] of power.

Solar PV technology uses solar cells to convert energy from direct and diffuse solar radiation into electricity. The basic unit in a solar PV system is a solar cell made up of semiconductor material that absorbs solar radiation and converts solar radiation to an electrical current. Solar cells are contained within solar modules that are assembled into solar panels. A series of panels comprises a solar field, or as termed in this EA, is a ***Solar PV Array***. Solar PV arrays are comprised of hundreds and sometimes thousands of individual ***Solar PV Panels***. Solar PV arrays generate direct current electricity, which is converted to alternating current for transmission on the electrical grid and ultimate end-use in alternating current form. The conversion from direct current to alternating current occurs at a power conditioning station that contains inverters. Transmission lines and substations then transfer the power to the nearest utility grid point of connection.

Photo 1. Fixed-Axis Solar PV Array

The vast majority of the solar PV market uses Flat Plate PV technology. In this design, the manufacturer arranges the cells on a flat panel, sandwiches the cells between a transparent encapsulant and a thin backing sheet of polymer, and then tops the cells with a layer of tempered glass that allows light to reach the PV cells. An anti-reflective coating covers this top layer so more light can be absorbed by each cell (U.S. Department of Energy, 2013). Each panel can be stationary (fixed axis), or track the sun with either single-axis or multi-axis tracking equipment. Photo 1 provides an example of a solar PV array at Marine Corps Air Ground Combat Center, California. This example, covering approximately 6.5 acres, consists of fixed axis panels that generate approximately 1.1 MW of power. Photo 2 provides an

Photo 2. Typical Single-Axis Solar PV Array

[1] The watt is a method of measuring the rate of energy transfer of an appliance. A one-watt light bulb will change one joule of electrical energy into light energy every second. It is a measure of an appliance's power. 1,000,000 watts is called a megawatt, written as MW. MW is the typical unit used to describe how much electricity is needed by a large town.

[2] This general ratio of 10 acres for 1 MW of solar power generation is subject to site-specific conditions. In the below example, the 6.5 acres to 1.1 MW ratio at this location is due to higher amounts of solar energy received at this desert location.

example of a solar PV array where the panels have a single-axis; the axis allows the panels to move as the array tracks the sun across the sky.

1.2 NAS Fallon

NAS Fallon is located approximately 6 miles southeast of Fallon and 60 miles east of Reno in Churchill County in west-central Nevada (Figure 1-2). Comprising approximately 8,600 acres of federally owned and withdrawn land, the installation includes an airfield with control tower, runways, maintenance and support facilities, personnel housing, retail and recreation facilities, and administration and utility support facilities. The installation lies within the central portion of the Carson Desert in the Lahontan Valley and is surrounded by federal and private lands, primarily agricultural fields and vacant desert land.

1.3 Potential Solar PV Sites

The project area consists of the two potential solar PV sites: Sites A and B (covering 126 and 104 acres, respectively), access roads, and existing and proposed transmission line infrastructure (Figure 1-3). As depicted on Figure 1-3, there is an existing transmission line located near to the southern border of Site A and an existing substation is located east of Site A. The existing transmission line and the substation are included as part of the project area. Sites A and B are undeveloped former Bureau of Land Management lands that were recently transferred to the Navy. The sites are generally flat. A Truckee-Carson Irrigation District water supply canal owned by the Bureau of Reclamation demarks the border between Sites A and B (Figure 1-3).

1.4 Purpose of and Need for the Proposed Action

The purpose of the Proposed Action is to increase Navy installation energy security, operational capability, strategic flexibility, and resource availability through the development of renewable energy generating assets at Navy installations by the construction and operation of the proposed solar PV system at NAS Fallon.

The need for the Proposed Action is to meet the required renewable energy standards put forth by the SECNAV's 1 Gigawatt Initiative and other energy goals.

Energy Security Policy

The policy requirements for energy security and increased production of energy from alternative sources include a requirement that project infrastructure be 'micro-grid-ready,' meaning that the Navy would have the option to use any energy produced on-base in the event of an area power outage or other circumstances.

1.5 Scope of Environmental Analysis

This EA includes an analysis of potential environmental impacts associated with the action alternatives and the No Action Alternative. The environmental resource areas analyzed in this EA include: air quality, water resources, cultural resources, biological resources, visual resources, utilities, transportation, public health and safety, socioeconomics, and noise. The study area for each resource analyzed may differ due to how the Proposed Action interacts with or impacts the resource. For instance, the study area for geological resources may only include the construction footprint of a building whereas the noise study area would expand out to include areas that may be impacted by airborne noise.

Figure 1-2
Regional Location
of NAS Fallon

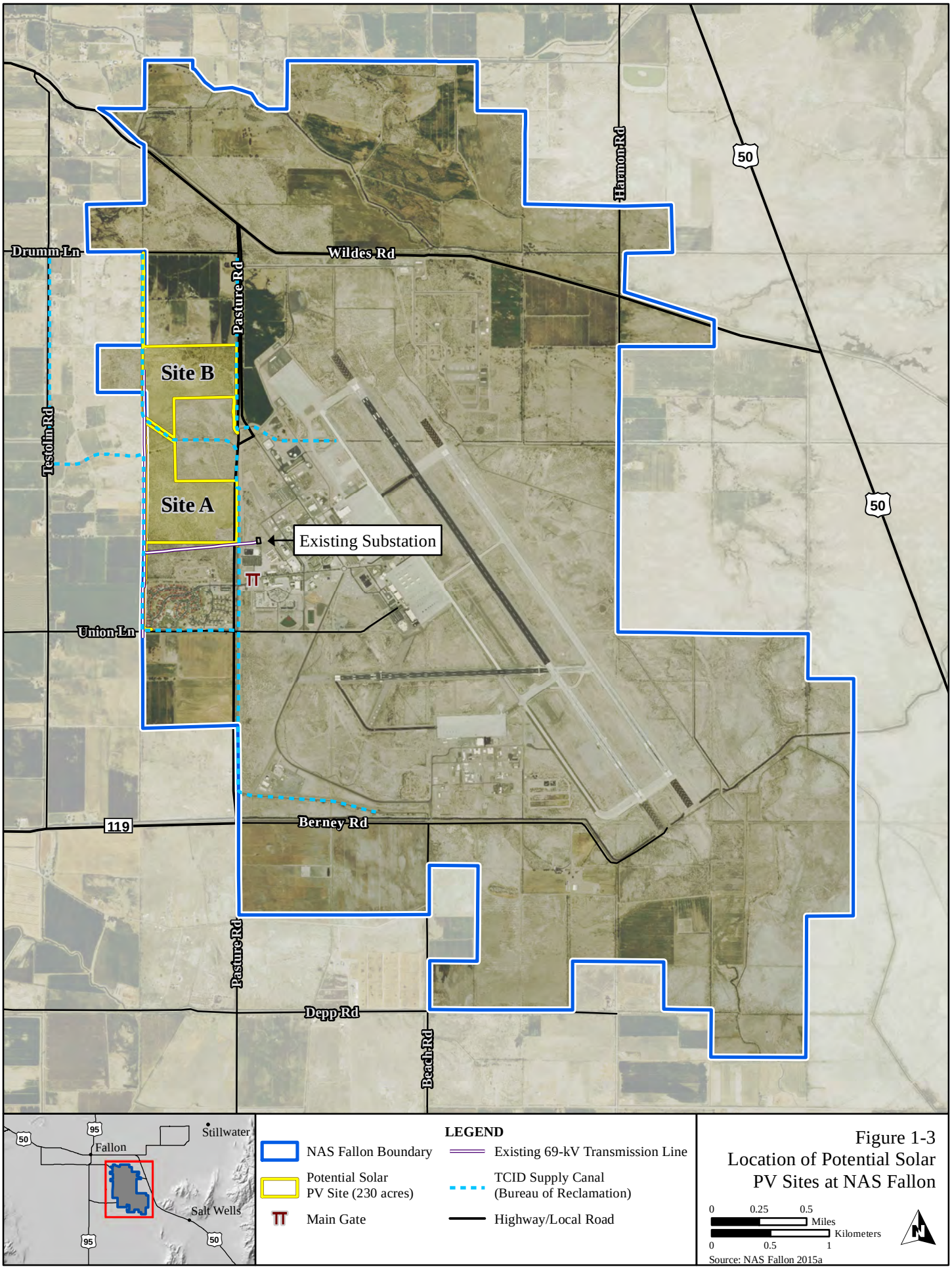


Figure 1-3
Location of Potential Solar PV Sites at NAS Fallon

1.6 Key Documents

Key documents are sources of information incorporated into this EA. Documents are considered to be key because of similar actions, analyses, or impacts that may apply to this Proposed Action. CEQ guidance encourages incorporating documents by reference. Documents incorporated by reference in part or in whole can be found in Chapter 6. Documents incorporated herein by reference are available upon request during the public review period by contacting the Navy via the contact information provided in the Abstract.

1.7 Relevant Laws and Regulations

The Navy has prepared this EA based upon federal and state laws, statutes, regulations, and policies that are pertinent to the implementation of the proposed action, including the following:

- NEPA (42 United States Code [U.S.C.] sections 4321-4370h), which requires an environmental analysis for major federal actions that have the potential to significantly impact the quality of the human environment
- CEQ regulations for Implementing the Procedural Provisions of NEPA (40 Code of Federal Regulations (CFR) parts 1500-1508)
- Navy regulations for implementing NEPA (32 CFR part 775), which provides Navy policy for implementing CEQ regulations and NEPA
- Clean Air Act (42 U.S.C. section 7401 et seq.)
- Clean Water Act (33 U.S.C. section 1251 et seq.)
- National Historic Preservation Act (54 U.S.C. section 306108 et seq.)
- Endangered Species Act (16 U.S.C. section 1531 et seq.)
- Migratory Bird Treaty Act (16 U.S.C. section 703-712)
- Bald and Golden Eagle Protection Act (16 U.S.C. section 668-668d)
- Executive Order (EO) 11988, Floodplain Management
- EO 12088, Federal Compliance with Pollution Control Standards
- EO 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-income Populations
- EO 13045, Protection of Children from Environmental Health Risks and Safety Risks
- EO 13423, Strengthening Federal Environmental, Energy, and Transportation Management
- EO 13175, Consultation and Coordination with Indian Tribal Governments
- EO 13693, Planning for Federal Sustainability in the Next Decade

A description of the Proposed Action's consistency with these laws, policies, and regulations, as well as the names of regulatory agencies responsible for their implementation, will be presented in Chapter 5 (Table 5-1).

1.8 Public and Agency Participation and Intergovernmental Coordination

Regulations from the CEQ (40 CFR part 1506.6) direct agencies to involve the public in preparing and implementing their NEPA procedures. The Navy will circulate the Draft EA for public review.

The Navy has published a Notice of Availability of the Draft EA for three consecutive days in the Lahontan Valley News and the Reno Gazette. The notice describes the Proposed Action and alternatives, solicits public comments on the Draft EA, provides dates of the public comment period, and announces that the EA is be available for review on the Navy Region Southwest website at http://www.cnic.navy.mil/regions/cnrsw.html and at the Churchill County Library, located at 553 South Maine Street, Fallon, Nevada 89406.

The Navy will coordinate or consult with the U.S. Fish and Wildlife Service, the Nevada Department of Wildlife, the State Historic Preservation Officer, the Bureau of Reclamation, the Bureau of Land Management, and potentially other agencies (e.g., Nevada Department of Transportation and Churchill County) regarding the Preferred Alternative, as necessary. Agency correspondence documentation will be provided in an appendix to this EA.

2 Proposed Action and Alternatives

2.1 Proposed Action

The Navy proposes to enter into an agreement with a private partner to allow the private partner to use Navy land to construct, operate, and own a solar photovoltaic (PV) system at Naval Air Station (NAS) Fallon, Nevada. Once the solar PV system is operational, the private partner would be responsible for maintenance and operation. The energy generated would be used by the local community, NAS Fallon, or a combination of both.

Under Model 2, the Navy and a private partner would enter into a 37-year agreement to allow the private partner to use Navy land to construct, operate, and own the solar PV system. Once the system is operational, the private partner would sell the power to regional customers. The private partner would be responsible for maintenance and operation of the solar PV system. Under Model 3, the Navy and a private partner would enter into a 27-year agreement to allow the private partner to use Navy land to generate power for the Navy's use at NAS Fallon. Under a combination of Models 2 and 3, the private partner would sell the power to regional customers and NAS Fallon. The duration of a combined Models 2 and 3 approach would be up to 37 years. Refer to Section 1.1.1.2 for a description of the Renewable Energy Model Types.

2.2 Screening Factors

The National Environmental Policy Act's (NEPA's) implementing regulations provide guidance on the consideration of alternatives to a federally proposed action and require rigorous exploration and objective evaluation of reasonable alternatives. Only those alternatives determined to be reasonable and to meet the purpose and need require detailed analysis. Potential alternatives that meet the purpose and need were evaluated against the following screening factors:

- Must not interfere with the NAS Fallon mission or create unsafe conditions.
- Should contribute to the Secretary of the Navy's (SECNAV's) goal of obtaining 1 gigawatt of renewable energy by the end of 2020 by providing a sufficiently sized parcel (or parcels) of land for a solar PV system.
- Should provide a location and/or design capable of contributing meaningfully to energy stability in the region.

2.3 Alternatives Carried Forward for Analysis

Based on the reasonable alternative screening factors and meeting the purpose and need for the proposed action, two action alternatives in addition to the No Action Alternative were identified and have been analyzed within this Environmental Assessment (EA).

2.3.1 No Action Alternative

Under the No Action Alternative, the Proposed Action would not occur. The Navy would not enter into an agreement with a private partner to construct and operate a solar PV system at NAS Fallon. The No Action Alternative represents the status quo. The No Action Alternative would not meet the purpose and need for the Proposed Action with regard to meeting Navy renewable energy goals; however, as required by NEPA, the No Action Alternative is carried forward for analysis in this EA and provides a baseline for measuring the environmental consequences of the action alternatives.

2.3.2 Alternative 1: Up to 20 Megawatts at Sites A and B (Preferred Alternative)

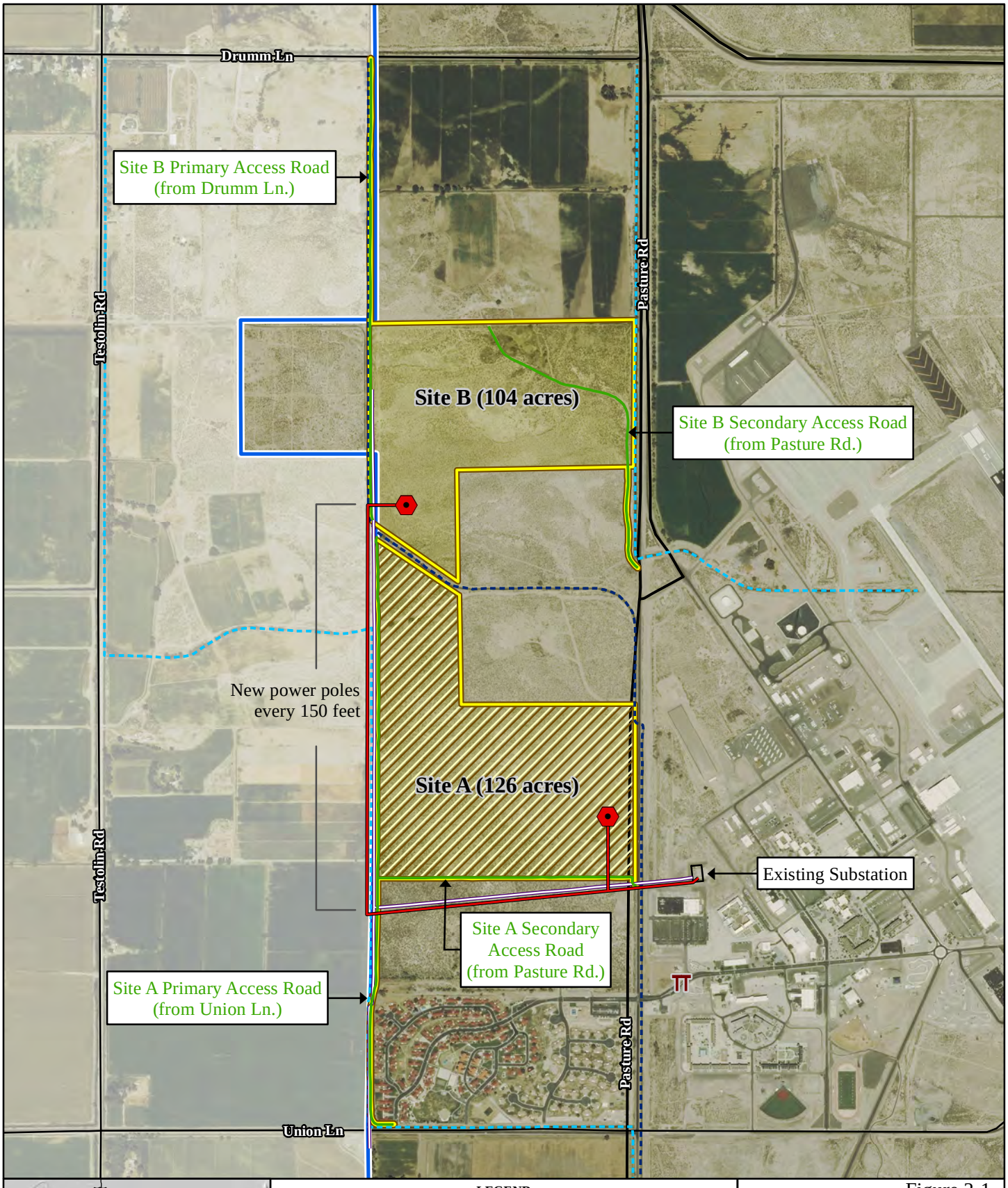
Under Alternative 1, up to 230 acres at Sites A and B would be developed to support the construction and operation of up to a 20 megawatt (MW) solar PV system at NAS Fallon (Figure 2-1).

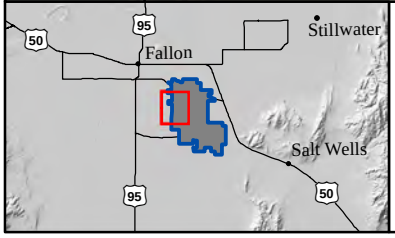
2.3.2.1 Acquisition Strategies and Future Considerations

Under Alternative 1, a solar PV system would be constructed to generate renewable energy at NAS Fallon under either Model 2, Model 3, or combination of Models 2 and 3. Under a Model 2 acquisition strategy, the Navy and the private partner would enter into a lease agreement (or real estate outgrant) to allow the private partner to use Navy land to construct, operate, and own the solar PV system. The Navy land would be used, as well as existing Navy infrastructure (transmission lines and existing substation), by the private partner under the Model 2 acquisition strategy. The Navy would receive compensation for the lease, but would not directly receive the power generated by the solar PV system. The private partner would sell the generated power to regional customers. While the energy would flow into the Navy substation, a meter would track the input from the solar PV system to enable accounting of power input. The private partner would be responsible for all maintenance and service of the system; no federal tax dollars would be used for maintenance/service. The approximate contract duration would be 37 years. The 37-year agreement would consist of approximately 2 years for construction, followed by an initial 25-year operating term and two 5-year operating extensions (10 years). This acquisition strategy maximizes the total capacity (size) of the system based on available land (in this instance, on Sites A and B), and not NAS Fallon's electrical demand.

In support of SECNAV's energy goals, the Navy would utilize a real estate action (lease) to ensure fair compensation for the use of Navy lands where renewable energy generation would occur at NAS Fallon. The real estate action facilitates on-base generation of renewable energy for on and off-base consumption via a third-party developer. In keeping with authority of 10 U.S.C. section 2667, outgrants (or leases) under Model 2 shall provide for consideration (rent) to be paid, either in cash or in-kind, in an amount not less than the fair market value of the lease. Potential projects provided by lessee to apply towards rents as in-kind consideration would meet necessary environmental regulations and requirements under separate reporting.

Under a Model 3 acquisition strategy, the Navy would enter into a lease agreement (or other real estate outgrant) plus a Power Purchase Agreement, for the private partner to construct, operate, and own a solar PV system on NAS Fallon. Once the solar PV system is operational, the Navy would purchase and use all of the electricity generated from the solar PV system. The private partner would be responsible for all maintenance and service of the system; no federal tax dollars would be used for maintenance/service. The approximate contract duration would be 27 years. The 27-year agreement would consist of approximately 2 years for construction, followed by an initial 20-year operating term and one 5-year operating extension. This acquisition strategy limits the total capacity (size) of the system based on NAS Fallon's electrical demand, and not the total amount of land available.





LEGEND

- Existing 69-kV Transmission Line
- Proposed Transmission Connection Line for Sites A and B (illustrative)
- Transmission Connection Node

TCID (Bureau of Reclamation) Features

- Supply Canal
- Drainage Ditch

- NAS Fallon Boundary
- Main Gate
- Proposed Access Road
- Highway/Local Road

Potential Solar PV Sites

- Site A
- Site B

Figure 2-1
Alternative 1:
Up to 20 Megawatts at
Sites A and B (230 acres)

0 500 1,000 Feet
0 250 500 Meters

Source: NAS Fallon 2015a

Under both the Model 2 and Model 3 strategies, the construction and function of the facility would be nearly identical. The only notable difference would be the routing of electrical distribution lines (i.e., point of connection from solar PV system to internal base grid) to either serve the public grid, or NAS Fallon's grid. Under the combination of Models 2 and 3, some power generated would be used by the Navy and some by outside regional customers. The private partner would be responsible for all maintenance and service of the system; no federal tax dollars would be used for maintenance/service.

2.3.2.2 Construction

Construction of the solar PV system is currently estimated to begin in March 2017 and end in March 2019. The total construction duration would be approximately 24 months. Water for use in the proposed construction activities would be brought in from off-site sources; the Navy would not provide the water.

Access to Site A would be along the unnamed road that extends from Union Lane to the Truckee-Carson Irrigation District Supply Canal that separates Site A from Site B (see Figure 2-1). The access road located south of Site A would also be used when necessary and only during non-peak traffic hours on Pasture Road. Access to Site B would be along the unnamed road that extends from Drumm Lane to the Truckee-Carson Irrigation District supply canal that separates Site A from Site B. No bridge would be constructed over the canal, nor would any fill within the canal occur. The access roads coming from the north and south would terminate prior to the canal. The access road located near the northeast border of Site B would also be improved and would only be used when necessary and only during non-peak traffic hours on Pasture Road. All access roads would be improved per the engineering specifications and permitting requirements identified during the design phase of the project. All access roads would be a graded single lane road covered with a gravel surface.

After the execution of the agreement between the Navy and private partner, the proposed construction area would be graded and vegetation would be cleared. Site preparation activities would include trenching (up to 3 feet deep per Unified Facilities Criteria codes) for underground electrical lines and circuitry. The solar PV system would consist of solar PV panels, steel tracking structure, inverters, combiner boxes, electrical switchgears, a switching/metering station, and associated electrical wiring, connections, and other items required for the solar PV system. All electrical equipment, including inverters and transformers would be placed on concrete pads and all solar PV panel wiring would be routed underground. Gravel roads would be graded between the rows of solar PV panels and around the site perimeter (outside of the fence line) for maintenance access. A chain link fence with barbed-wire outriggers in accordance with force protection standards, including safety signage and perimeter lighting, would enclose the proposed solar PV array to minimize the potential for unauthorized individuals to enter the area.

The proposed solar PV panels may be constructed as fixed or tilt-axis array. The panels would be constructed in east to west oriented rows to maximize solar radiation absorption. If installed as fixed panels, the angle of the panels would likely equal the degrees latitude of the geographic location of the site, which, for this location, is approximately 35 degrees. The solar PV panels would be affixed atop constructed mounting structures, mounted on posts bored into the ground, or be placed on concrete block above ground (see Photos 1 and 2). Foundations for the mounting structures would be built on engineered fill or native soil at a minimum of 24 inches below adjacent grade or finished grade. Each pole footing would consist of a 4-inch cross-sectional area and would require a depth of 4 to 6.5 feet below ground surface. Upon completion, the highest point of the solar PV array would be no higher than

approximately 15 feet above the ground surface. The solar PV panels would have an anti-reflective coating that would improve light absorption and reduce or eliminate the potential for glint and glare[3] impacts.

The solar PV panels would be fabricated elsewhere (in a factory). Solar PV panel assembly could occur either on- or off-site, or a combination thereof. A construction staging area would be delineated within the project area and all construction work would be done on-site. Materials would be transported to the project area by truck where they would be staged, assembled, and moved into place. Equipment used to construct the solar PV system would likely include bulldozers, loaders, scrapers, backhoes, pile drivers, water trucks, trenchers, forklifts, and truck-mounted mobile cranes. A spray-on erosion control fiber matrix (soil stabilizer) would be applied to the soil following construction to reduce the potential for soil erosion.

A switching/metering station would be constructed within the project area to meter and convey the solar PV power generated from the site (see "Node" on Figure 2-1). To link the solar PV array to the existing power monitoring and distribution system, 85-foot long utility poles would be installed and buried up to 20 feet below ground surface, at approximately 150-foot intervals along the access roads located west of Sites A and B (Figure 2-1). The resulting poles would be approximately 65 feet high. The new transmission line would then either be connected to the existing 69-kV transmission line, (which has capacity for handling up to 20 MW of additional power), or a new transmission line (to include new 65-foot high poles) would be constructed adjacent to the existing line. The transmission line would terminate at the existing substation located east of Site A, where upon the solar power would feed into the existing power grid (Figure 2-1). Power generated from Site B would be conveyed over the Truckee-Carson Irrigation District supply canal to Site A via a conduit; no bridge would be constructed over the canal, and no fill of the canal would occur.

Construction would create a minimal amount of debris that would be removed and disposed of in compliance with the Navy's Sustainability and Environmental Management Policy Statement (dated September 16, 2009) and sustainability goals (e.g., recycling approximately 50 percent of municipal trash and 40 percent of construction and demolition waste). All construction would be done in compliance with all Navy regulations applicable to conducting work activities on NAS Fallon.

2.3.2.3 Operation and Maintenance

Post-construction site operations would include, but would not be limited to, maintenance and repair activities. Regular inspections of the proposed solar PV system would be performed to ensure that the system is in good operating condition. The private partner or their designated contractor would perform any repairs and regular service. Typical maintenance of the solar PV panels would consist of washing down the panels approximately twice a year to remove dust and dirt build-up. One or two persons using a single water truck would perform this cleaning. Water would be provided by the private partner; the Navy would not provide maintenance water for the proposed solar PV system.

Ground cover and other vegetation beneath and near the panels would be trimmed periodically and could be controlled with herbicides or pesticides to ensure that vegetation does not obscure or shadow

[3] Glint is the momentary flash of bright light. Glare is a continuous source of bright light.

the panels. The private partner would be required to use any herbicides or pesticides in accordance with applicable federal, state, and local regulations, as well as manufacturer's guidelines. The private partner would be required to notify the Navy prior to the application of any herbicide or pesticide this includes obtaining the approval of the Installation Pest Management Coordinator. Existing access roads would be maintained as needed. Storm water management controls would be regularly maintained and inspected to ensure storm water from the site does not flow into the supply canal. All operations and maintenance activities would be done in compliance with all Navy regulations applicable to conducting work activities on NAS Fallon.

Decommissioning of the proposed solar PV system is not discussed or analyzed in this EA. Decommissioning of the solar PV system is a remote and speculative event, and discussion of any environmental impacts potentially associated with decommissioning would likewise be speculative. Moreover, it is not anticipated that there would be any significant or extraordinary actions or impacts associated with any eventual decommissioning and/or removal of the system.

2.3.3 Alternative 2: Up to 15 Megawatts at Site A

Under Alternative 2, up to 126 acres within Site A would be developed to support the construction and operation of up to a 15 MW solar PV system (Figure 2-2). Under Alternative 2, construction and operation of the 15 MW solar PV system at Site A would be as generally described in Section 2.3.2; however, construction would be at a slightly smaller scale. The construction duration would be approximately 24 months.

Similar to Alternative 1, a switching/metering station would be constructed within Site A to meter and convey the solar PV power generated from the site (see "Node" on Figure 2-2). To link the solar PV array to the existing power monitoring and distribution system, 85-foot long utility poles would be installed and buried up to 20 feet below ground surface, at approximately 150-foot intervals (Figure 2-2). The new transmission line would then either be connected to the existing 69-kV transmission line, (which has capacity for handling up to 20 MW of additional power), or a new transmission line (to include new 65-foot high poles) would be constructed adjacent to the existing line. The transmission line would terminate at the existing substation located east of Site A, where upon the solar power would feed into the existing power grid (Figure 2-2).

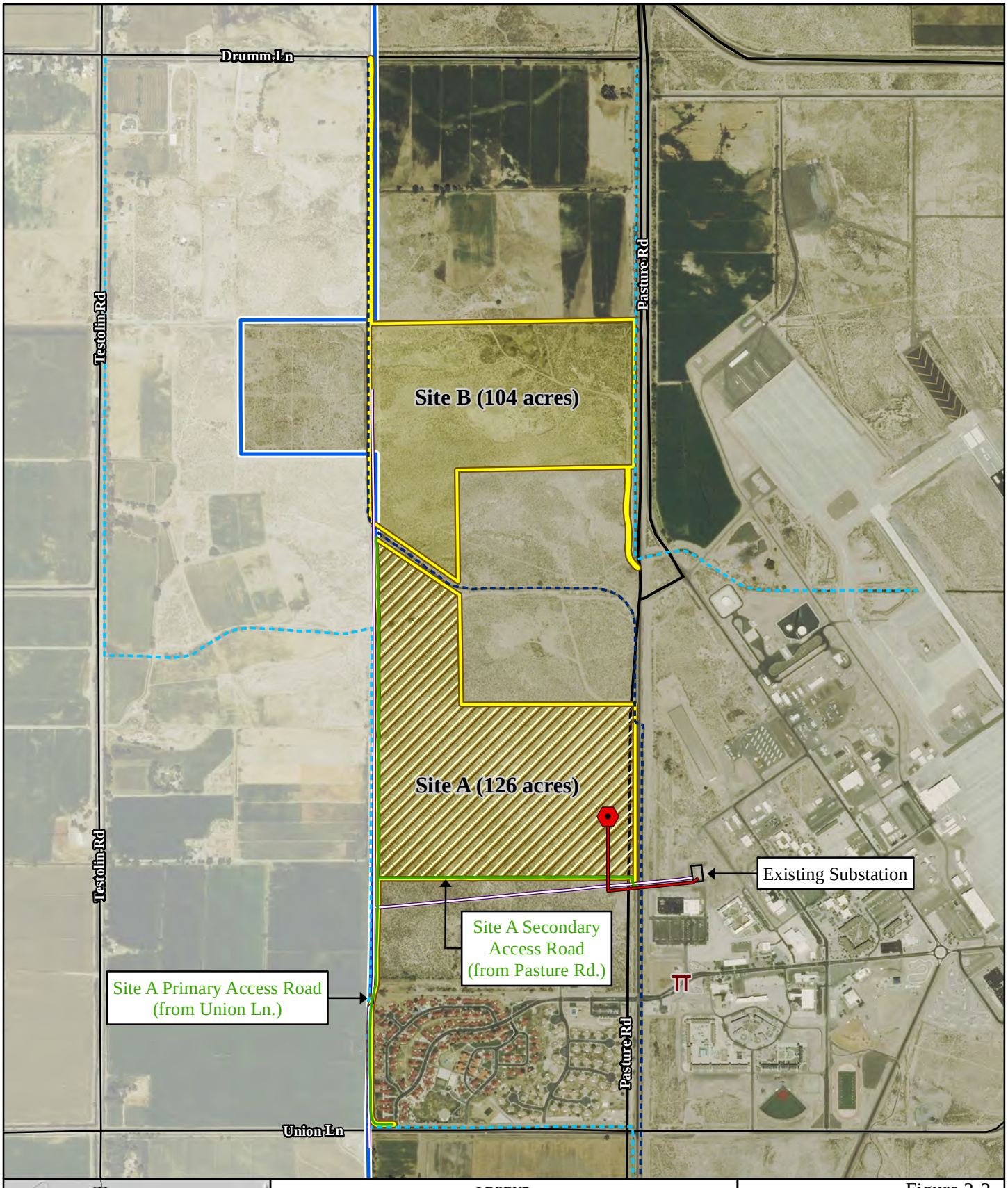


Figure 2-2
Alternative 2:
Up to 15 Megawatts at
Site A (126 acres)

Source: NAS Fallon 2015a

2.4 Alternatives Considered but not Carried Forward for Detailed Analysis

NAS Fallon conducted a screening analysis of potential solar PV site locations at NAS Fallon. Foremost in this analysis was that a potential alternative site must not interfere with the NAS Fallon mission or create unsafe conditions. The screening analysis identified and evaluated 15 sites (including the project area). Due to the potential operational/environmental constraints (e.g., within explosive safety quantity distance arcs or water wells) or the excessive distance from the existing substation with adequate capacity, all sites (14 in total) except for the project area (site PV #1) were determined to not be viable sites for the proposed project. Therefore, these potential sites represent alternatives considered, but not carried forward for detailed analysis in this EA, as they did not meet the purpose and need for the project and/or satisfy the reasonable alternative screening factors presented in Section 2.2, *Screening Factors*.

Figure 2-3 shows the general location of the alternatives considered but not carried forward for detailed analysis. These sites were all eliminated for one of the following primary reasons: (1) environmental/ safety constraints (e.g., within explosive safety quantity distance arcs or water wells); or (2) excessive distance from an existing substation (Table 2-1).

Table 2-1 Alternatives Considered but not Carried Forward for Detailed Analysis

Eliminated Alternative Site No.	*Approximate Size (Acres)*	*Primary Reason for Elimination*	
		1	*2*
PV #2	19.6	x	
PV #3	13.6	x	
PV #4	14.5	x	
PV #5	26.5	x	
PV #6	81.0	x	
PV #7	11.4	x	
PV #8	30.7	x	
PV #9	159.7		x
PV #10	66.9		x
PV #11	15.8		x
PV #12	163.6		x
PV #13	98.8		x
PV #14	216.9		x

Notes: (1) Environmental/Safety Constraints
(2) Excessive distance from an existing substation

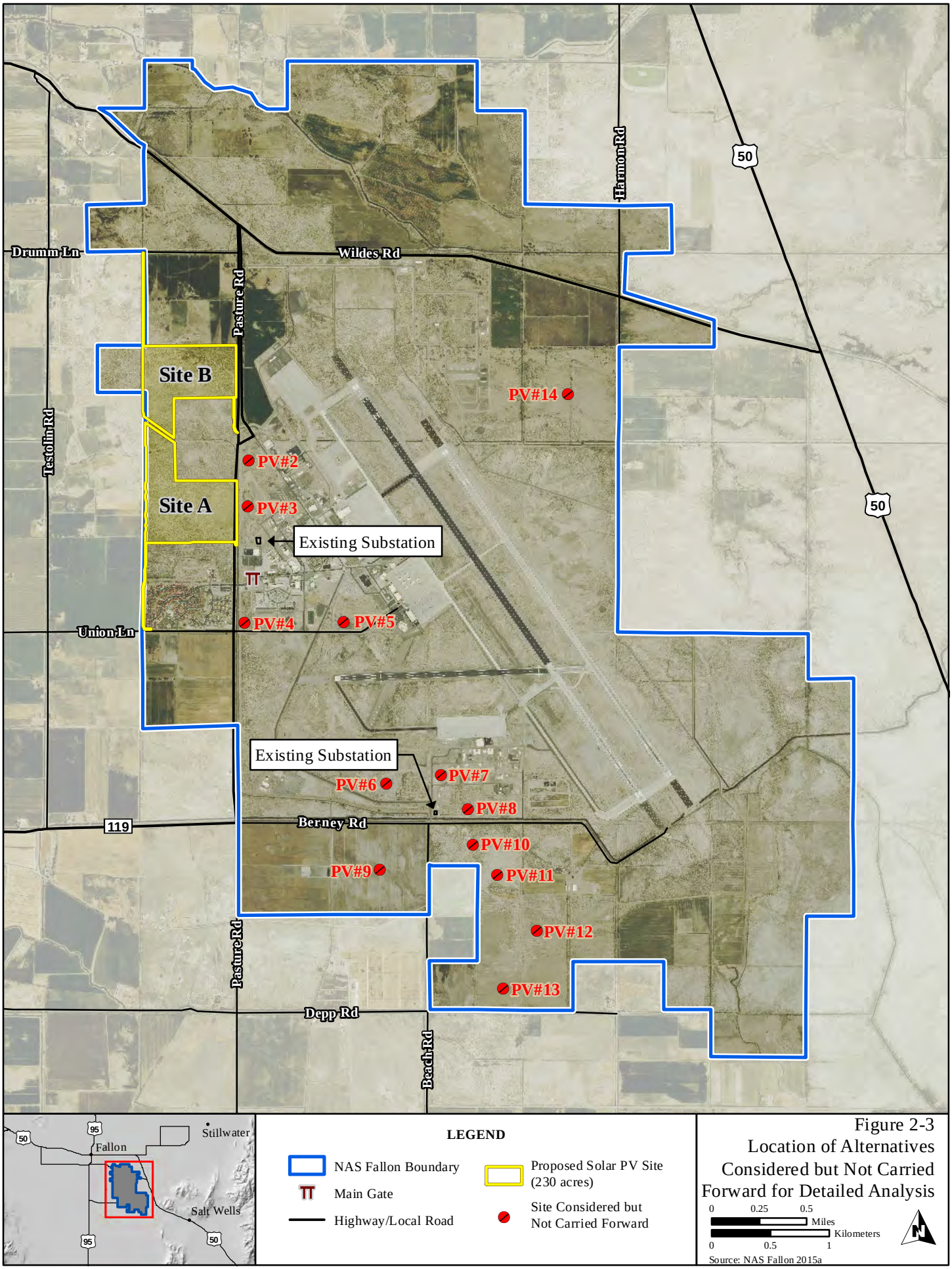


Figure 2-3
Location of Alternatives Considered but Not Carried Forward for Detailed Analysis

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3 Affected Environment and Environmental Consequences

This chapter presents a description of the environmental resources and baseline conditions that could be affected from implementing any of the alternatives and an analysis of the potential direct and indirect effects of each alternative.

All potentially relevant environmental resource areas were initially considered for analysis in this Environmental Assessment (EA). In compliance with National Environmental Policy Act (NEPA), Council on Environmental Quality (CEQ), and 32 Code of Federal Regulations (CFR) part 775 guidelines, the discussion of the affected environment (i.e., existing conditions) focuses on those resource areas that are potentially subject to more-than-trivial impacts. In addition, the level of detail used in describing a resource is commensurate with the anticipated level of potential environmental impact.

"Significantly," as used in NEPA, requires considerations of both context and intensity. Context means that the significance of an action must be analyzed in several contexts such as society as a whole (e.g., human, national), the affected region, the affected interests, and the locality. Significance varies with the setting of a proposed action. For instance, in the case of a site-specific action, significance would usually depend on the effects in the locale rather than in the world as a whole. Both short- and long-term effects are relevant (40 CFR part 1508.27). Intensity refers to the severity or extent of the potential environmental impact, which can be thought of in terms of the potential amount of the likely change. In general, the more sensitive the context, the less intense a potential impact needs to be in order to be considered significant. Likewise, the less sensitive the context, the more intense a potential impact would need to be, to be considered significant.

This section includes air quality, water resources, cultural resources, biological resources, visual resources, utilities, transportation, public health and safety, socioeconomics, and noise.

The potential impacts to the following resource areas are considered to be negligible or non-existent so they were not analyzed in detail in this EA.

Geological Resources: No unique topographic features exist in the project area. The Proposed Action would not have impacts on the seismic conditions of the region. The Naval Air Station (NAS) Fallon area includes the lakebed sediments of Pleistocene Lake Lahontan. As an internally drained basin, the Lahontan Basin receives the dissolved solids that are the result of leaching in the watershed. Soils in the project area consist of Isolde-Appian clay substratum complex, Fallon fine sandy loam slightly saline, Bunejug-erber complex, and Fernley sand (U.S. Department of Agriculture, 2016). A soils map of the project area is provided in Appendix A. The potential of hydrogen (pH) of these soils is high due to accumulation of calcium, magnesium, potassium, and especially sodium in the soil profile due to insufficient leaching (NAS Fallon, 2014a). Implementation of the action alternatives would temporarily disturb soils within the project area, resulting in an increased potential for dust generation and erosion. However, these potential effects would be temporary, minor, and would be controlled through the implementation of the impact avoidance and minimization measures presented in Table 3.11-2. A spray-on erosion control fiber matrix (soil stabilizer) would be applied to the soil following construction, which would reduce the potential for soil erosion and dust. Therefore, implementation of the alternatives would result in negligible impacts to geological resources.

Land Use: The project area was formerly Bureau of Land Management (BLM) land that was recently transferred to the United States Department of the Navy (Navy). The Navy currently owns the area, which is unoccupied and is not being leased or parceled out for leasing. The land is designated as

"undeveloped" and "Reserve for Future Installation Expansion." The project area is not identified as an agriculture lease area, irrigated pasture and croplands, or pasture area. A land parcel identified as 4AO2, directly north of Site B, is part of the Navy's Agricultural Outlease Program. Land use of leased land under this program include cattle grazing, farming of alfalfa, corn, sundangrass, hay, and combinations of these uses (NAS Fallon, 2002). Pedestrian and vehicle trespassing has been noted at the project area. Under the Proposed Action, the land would be converted from native vegetation and dunes to a solar PV system. No change in land use designation would occur. The site would be fenced to minimize the potential for unauthorized access. The Proposed Action would not impact the current use of adjacent land parcels. Therefore, implementation of the alternatives would not result in significant impacts to land use.

Airspace: Airspace is defined in vertical and horizontal dimensions by time. Military operations are conducted within designated airspace and follow specific procedures to maximize flight safety for military, commercial, and civil aircraft. NAS Fallon directly supports flying missions. The alternatives would not affect the designated airspace or specific flight procedures associated with commercial, military, or general aviation. Therefore, implementation of the alternatives would result in no impacts to airspace.

Hazardous Materials and Wastes: No Installation Restoration (IR) sites are located within the project area. IR Site 26 (Offsite Rubble Disposal Area) is located approximately 500 feet south of the eastern portion of Site B. This site was closed with a no further action status in August 2001. Concrete, asphalt, and wood from station road and runway projects were reportedly buried at this site (NAS Fallon, 2014a). Additional IR sites are located further than 1,000 feet to the east of the project area. Due to their location and the nature of the Proposed Action, none of the IR sites would be impacted by the Proposed Action. Small leaks or spills may potentially occur from vehicles and equipment used during the proposed construction and operation of the solar PV system. To manage any accidental releases, all solar PV system-related activities would be conducted in accordance with the NAS Fallon Integrated Contingency Plan for Oil and Hazardous Substance Spill Prevention and Response as required by the Oil Pollution Act of 1990 and Office of the Chief of Naval Operations M-5090.1, *Environmental Readiness Program Manual* (Navy, 2014). Hazardous materials and wastes used and/or generated as part of the construction/operation of the solar PV system would be handled and disposed of in accordance with the NAS Fallon Hazardous Waste Management Plan and all applicable federal, military, state, and local laws and regulations. Therefore, implementation of the alternatives would result in negligible impacts to hazardous materials and wastes.

Environmental Justice: Executive Order (EO) 12898 requires federal agencies to consider human health and environmental conditions in minority and low-income communities (EO, 1994). Implementation of the action alternatives would be entirely within Churchill County. The population surrounding the project area in Churchill County is not considered minority, because the populations for Census Tracts 9501, 9504, and 9507 are primarily white and non-Hispanic (86.4 percent, 68.6 percent, and 89.4 percent, respectively). While most of this area has a higher median income than Churchill County as a whole ($53,977 for Census Tract 9501 and $73,428 for Census Tract 9507, versus $51,597 for Churchill County), the median household income for Census Tract 9504 in the area is lower ($33,672). This latter area is not within the immediate vicinity of the project and would not be disproportionately affected by the Proposed Action because its extended distance from the proposed project location. Additionally, this community would receive electricity produced by the project at the same rate and dependability as other communities in the area. While most of the areas near the project area have a lower percentage

of populations living in poverty than the county as a whole (Census Tracts 9501 and 9504 have poverty rates of 6.0 percent and 1.9 percent, respectively, versus 8.8 percent for the county), one area near the project has a slightly larger population living in poverty (8.9 percent for Census Tract 9507) (U.S. Census Bureau, 2010a). Maps of these Census Tracts are provided in Appendix A. The location of the action alternatives would be within an area designated for military use and would not be located near any concentrated residential areas. One residence is present on an agricultural property within a half mile of the western boundary of the proposed project along Testolin Road. Other than the potential for minimal and temporary construction noise impacts and operational visual impacts (power poles and transmission lines), no impacts to this property would occur with implementation of the Proposed Action. Implementation of the action alternatives would not cause disproportionately high and adverse human health or environmental effects on any minority or low-income populations.

EO 13045 helps ensure that federal agencies' policies, programs, activities, and standards address environmental health and safety risks to children (EO, 1997). A child development center is located approximately 1,200 feet from the project area. The proposed solar PV system would be constructed on Navy property, where access is controlled. A fence would be constructed around the solar PV system to minimize the potential for unauthorized access. Therefore, there would be no disproportionate impact to the health and safety of children from implementation of the alternatives.

3.1 Air Quality

This discussion of air quality includes criteria pollutants, standards, sources, and greenhouse gases. Air quality in a given location is defined by the concentration of various pollutants in the atmosphere. A region's air quality is influenced by many factors including the type and amount of pollutants emitted into the atmosphere, the size and topography of the air basin, and the prevailing meteorological conditions.

Most air pollutants originate from human-made sources, including mobile sources (e.g., cars, trucks, buses) and stationary sources (e.g., factories, refineries, power plants), as well as indoor sources (e.g., some building materials and cleaning solvents). Air pollutants are also released from natural sources such as volcanic eruptions and forest fires.

3.1.1 Regulatory Setting

Criteria Pollutants and National Ambient Air Quality Standards

The principal pollutants defining the air quality, called "criteria pollutants," include carbon monoxide (CO), sulfur dioxide (SO_2), nitrogen dioxide (NO_2), ozone(O_3), suspended particulate matter less than or equal to 10 microns in diameter (PM_{10}), fine particulate matter less than or equal to 2.5 microns in diameter ($PM_{2.5}$), and lead (Pb). CO, SO_2, Pb, and some particulates are emitted directly into the atmosphere from emissions sources. Ozone, NO_2, and some particulates are formed through atmospheric chemical reactions that are influenced by weather, ultraviolet light, and other atmospheric processes.

Under the Clean Air Act (CAA), the United States (U.S.) Environmental Protection Agency (USEPA) has established National Ambient Air Quality Standards (NAAQS) (40 CFR part 50) for these pollutants. NAAQS are classified as primary or secondary. Primary standards protect against adverse health effects; secondary standards protect against welfare effects, such as damage to farm crops and vegetation and damage to buildings. Some pollutants have long-term and short-term standards. Short-term standards

are designed to protect against acute, or short-term, health effects, while long-term standards were established to protect against chronic health effects.

Areas that are and have historically been in compliance with the NAAQS are designated as attainment areas. Areas that violate a federal air quality standard are designated as nonattainment areas. Areas that have transitioned from nonattainment to attainment are designated as maintenance areas and are required to adhere to maintenance plans to ensure continued attainment.

The CAA requires states to develop a general plan to attain and maintain the NAAQS in all areas of the country and a specific plan to attain the standards for each area designated nonattainment for a NAAQS. These plans, known as State Implementation Plans, are developed by state and local air quality management agencies and submitted to USEPA for approval.

In addition to the NAAQS for criteria pollutants, national standards exist for hazardous air pollutants (HAPs), which are regulated under Section 112(b) of the 1990 CAA Amendments. The *National Emission Standards for Hazardous Air Pollutants* regulate HAP emissions from stationary sources (40 CFR part 61). Because the Proposed Action does not involve any new stationary sources of emissions, HAPs are not discussed further in this section.

General Conformity

The USEPA General Conformity Rule applies to federal actions occurring in nonattainment or maintenance areas when the total direct and indirect emissions of nonattainment pollutants (or their precursors) exceed specified thresholds. The emissions thresholds that trigger requirements for a conformity analysis are called *de minimis* levels. *De minimis* levels (in tons per year [tpy]) vary by pollutant and also depend on the severity of the nonattainment status for the air quality management area in question.

A conformity applicability analysis is the first step of a conformity evaluation and assesses if a federal action must be supported by a conformity determination. This is typically done by quantifying applicable direct and indirect emissions that are projected to result due to implementation of the federal action. Indirect emissions are those emissions caused by the federal action and originating in the region of interest, but which can occur at a later time or in a different location from the action itself and are reasonably foreseeable. The federal agency can control and will maintain control over the indirect action due to a continuing program responsibility of the federal agency. Reasonably foreseeable emissions are projected future direct and indirect emissions that are identified at the time the conformity evaluation is performed. The location of such emissions is known and the emissions are quantifiable, as described and documented by the federal agency based on its own information and after reviewing any information presented to the federal agency. If the results of the applicability analysis indicate that the total emissions would not exceed the *de minimis* emissions thresholds, then the conformity evaluation process is completed. *De minimis* threshold emissions are presented in Table 3.1-1. Volatile organic compounds (VOCs) and nitrogen oxides (NO_x) emissions are used to represent O_3 generation because they are precursors of O_3.

Table 3.1-1 General Conformity de minimis levels

Pollutant	*Area Type*	*tpy*
Ozone (VOC or NO_x)	Serious nonattainment	50
	Severe nonattainment	25
	Extreme nonattainment	10
	Other areas outside an ozone transport region	100
Ozone (NO_x)	Marginal and moderate nonattainment inside an ozone transport region	100
	Maintenance	100
Ozone (VOC)	Marginal and moderate nonattainment inside an ozone transport region	50
	Maintenance within an ozone transport region	50
	Maintenance outside an ozone transport region	100
Carbon monoxide, SO_2 and NO_2	All nonattainment & maintenance	100
PM_{10}	Serious nonattainment	70
	Moderate nonattainment and maintenance	100
$PM_{2.5}$ Direct emissions, SO_2, NOx (unless determined not to be a significant precursor), VOC or ammonia (if determined to be significant precursors)	All nonattainment & maintenance	100
Pb	All nonattainment & maintenance	25

Greenhouse Gases

Greenhouse Gases (GHG) are gas emissions that trap heat in the atmosphere. These emissions occur from natural processes and human activities. Scientific evidence indicates a trend of increasing global temperature over the past century due to an increase in GHG emissions from human activities. The climate change associated with this global warming is predicted to produce negative economic and social consequences across the globe.

Revised draft guidance from CEQ, dated December 18, 2014, recommends that agencies consider both the potential effects of a proposed action on climate change, as indicated by its estimated GHG emissions, and the implications of climate change for the environmental effects of a proposed action. The guidance also emphasizes that agency analyses should be commensurate with projected greenhouse gas emissions and climate impacts, and should employ appropriate quantitative or qualitative analytical methods to ensure useful information is available to inform the public and the decision-making process in distinguishing between alternatives and mitigations. It recommends that agencies consider 25,000 metric tons of carbon dioxide equivalent (CO_2e) emissions on an annual basis as a reference point below which a quantitative analysis of greenhouse gas is not recommended unless it is easily accomplished based on available tools and data.

The USEPA issued the Final *Mandatory Reporting of Greenhouse Gases Rule* on September 22, 2009. GHGs covered under the Final *Mandatory Reporting of Greenhouse Gases Rule* are carbon dioxide (CO_2), methane, NO_x, hydrofluorocarbons, perfluorocarbons, sulfur hexafluoride, and other fluorinated gases including nitrogen trifluoride and hydrofluorinated ethers. Each GHG is assigned a global warming potential. The global warming potential is the ability of a gas or aerosol to trap heat in the atmosphere. The global warming potential rating system is standardized to CO_2, which has a value of one. The

equivalent CO_2 rate is calculated by multiplying the emissions of each GHG by its global warming potential and adding the results together to produce a single, combined emissions rate representing all GHGs. Under the rule, suppliers of fossil fuels or industrial GHGs, manufacturers of mobile sources and engines, and facilities that emit 25,000 metric tons or more per year of GHG emissions as CO_2e are required to submit annual reports to USEPA.

In an effort to reduce energy consumption, reduce GHGs, reduce dependence on petroleum, and increase the use of renewable energy resources the Navy has implemented a number of renewable energy projects. The Navy has established Fiscal Year 2020 GHG emissions reduction targets of 34 percent from a fiscal year 2008 baseline for direct GHG emissions and 13.5 percent for indirect emissions. Examples of Navy-wide GHG reduction projects include energy efficient construction, thermal and photovoltaic solar systems, geothermal power plants, and the generation of electricity with wind energy. The Navy continues to promote and install new renewable energy projects.

3.1.2 Affected Environment

NAS Fallon is in Churchill County, which is not located within an Air Quality Control Region (AQCR). The Nevada Division of Environmental Protection is responsible for implementing and enforcing state and federal air quality regulations in Nevada. Churchill County is classified by USEPA as unclassified/ attainment for all criteria pollutants. Therefore, a General Conformity evaluation is not required.

The most recent emissions inventory for Churchill County is shown in Table 3.1-2. VOC and NOx emissions are used to represent O_3 generation because they are precursors of O_3.

Table 3.1-2 Churchill County Air Basin Air Emissions Inventory (2011)

Location	*NO_x (tpy)*	*VOC (tpy)*	*CO (tpy)*	*SO_2 (tpy)*	*PM_{10} (tpy)*	*$PM_{2.5}$ (tpy)*
Churchill County	2,670	36,644	16,066	49	3,714	653

Source: (USEPA, 2013)

Current stationary sources at NAS Fallon include abrasive blasting units, air handling units, generators, and fuel storage. The potential to emit emissions from all permitted mission related significant sources are presented in Table 3.1-3. The inventory includes VOCs and NOx because these are ozone precursors. These sources are covered under Nevada Division of Environmental Protection Class II Operating Permit AP9711-0293.03, which was renewed on September 2, 2011 and expires on August 13, 2016.

Table 3.1-3 NAS Fallon Basewide Potential to Emit Emissions for All Permitted Mission Related Significant Sources

Year	*NO_x (tpy)*	*VOC (tpy)*	*CO (tpy)*	*SO_2 (tpy)*	*PM_{10} (tpy)*	*HAPs (tpy)*
2011	18.17	1.01	14.97	0.12	1.38	8.46

Source: (NAVFAC SW, 2011)

3.1.3 Environmental Consequences

Effects on air quality are based on estimated direct and indirect emissions associated with the action alternatives. The region of influence (ROI) for assessing air quality impacts is the air basin in which the project is located. In the state of Nevada, AQCRs and air basins are not defined; therefore, for the purposes of this analysis, the ROI for air quality is Churchill County, Nevada, which is included in the Carson Desert Basin Hydrographic Area.

Estimated emissions from a proposed federal action are typically compared with the relevant national and state standards to assess the potential for increases in pollutant concentrations. Although the ROI is in attainment of the NAAQS for all criteria pollutants and no *de minimis* thresholds apply, emission estimates are provided and are compared with *de minimis* thresholds of 100 tons per year for criteria pollutants (i.e., *de minimis* threshold for a basic nonattainment area), for planning purposes only.

3.1.3.1 Approach to Analysis

The air quality analysis estimated the magnitude of emissions that would occur from proposed construction activities. Construction-related activities would include clearing vegetation, grading to prepare the site and access roads, trenching for utilities, pole mounting and/or concrete footing for the solar PV system installation, and construction/installation of the substations, switching/metering stations, transmission poles, and solar PV panels.

Operational emissions from maintenance and repair activities would be minor and infrequent, and are therefore evaluated only briefly and qualitatively herein. Emissions would be generated from operational activities such as the use of vehicles and equipment with combustive engines, and generation of fugitive dust when driving vehicles on unpaved surfaces within and around the solar PV system.

3.1.3.2 Emissions Evaluation Methodology

Air quality impacts from construction activities proposed under each action alternative would primarily occur from combustive emissions due to the use of fossil fuel-powered equipment and fugitive dust emissions (PM_{10} and $PM_{2.5}$) from the operation of equipment on exposed soil. Construction emissions were estimated using the California Emissions Estimator Model, which is the current comprehensive tool for quantifying air quality impacts from land use projects. Assumptions were made regarding the total number of days each piece of equipment would be used and the number of hours per day each type of equipment would be used. Assumptions and model inputs are located within the modeling calculations in Appendix A.

3.1.3.3 No Action Alternative

Under the No Action Alternative, the Proposed Action would not occur and there would be no change to baseline air quality. Therefore, no significant impacts to air quality or air resources would occur with implementation of the No Action Alternative.

3.1.3.4 Alternative 1: Up to 20 Megawatts at Sites A and B (Preferred Alternative)

Potential Impacts to Air Quality:

- Minor and temporary increase in vehicle emissions during construction
- Dust generation (PM_{10}) during construction; potential to migrate off-site
- Long-term direct and indirect benefits to air quality

Construction

Construction would include clearing vegetation, grading to prepare the site and access roads, trenching for utilities, pole mounting and/or concrete footing for the solar PV system installation, improvements to access roads, transmission connections, and installation of fencing and lighting. These activities would generate dust, which would have the potential to migrate off-site, depending on wind

and soil conditions and the intensity of surface disturbance on any day. Construction activities would be temporary (over the course of approximately 24 months, beginning in March 2017).

Table 3.1-4 presents a summary of the annual emissions associated with construction activities at NAS Fallon under Alternative 1. Because the potential emissions from construction activities would be in different years, they are not additive. As shown in Table 3.1-4, construction emissions would be below the *de minimis* thresholds of a basic nonattainment area. As previously discussed, the ROI is in attainment of the NAAQS for all criteria pollutants and even if the ROI was located in a basic nonattainment area, the estimated emissions would not trigger a formal Conformity Determination under the CAA General Conformity Rule.

Table 3.1-4 Alternative 1 – Construction Emissions at NAS Fallon with Evaluation of Conformity

Emission Source	*Emissions (tons/year)*					
	VOCs	*NO_x*	*CO*	*SO_2*	*PM_{10}*	*$PM_{2.5}$*
Year - 2017	1.43	14.80	10.07	0.01	1.75	1.18
Year - 2018	1.68	16.59	12.05	0.02	0.90	0.78
Year - 2019	0.38	3.70	2.83	0.005	0.20	0.17
Conformity *de minimis* Limits *(for a basic nonattainment area)*[1]	100	100	100	100	100	100
Exceeds Conformity *de minimis* Limits?[1]	No	No	No	No	No	No

Note: [1] The ROI is in attainment of the NAAQS for all criteria pollutants and no *de minimis* thresholds apply; however, emission estimates have been provided and are compared with the *de minimis* thresholds of a basic nonattainment area, for planning purposes only.

The emissions predicted in Table 3.1-4 would be negligible and would not trigger a formal Conformity Determination under the CAA General Conformity Rule. Standard Best Management Practices (BMPs) such as proper maintenance of vehicles and construction equipment and dust suppression methods (watering of exposed soil, and use of a spray-on erosion control fiber matrix/soil stabilizer) would be implemented by the construction contractor to minimize and further reduce air quality impacts (see Table 3.11-2). The same BMPs identified in Section 3.2, *Water Resources* would further reduce dust impacts. In addition, because the Proposed Action involves clearing more than 5 acres of land, the construction contractor would be required to obtain a Dust Control Permit Construction Permit from the Churchill County Building Department and would be responsible for complying with the permit requirements.

Although the manufacture of solar PV cells or panels occur off-installation, the manufacturing of solar PV cells requires potentially toxic heavy metals such as Pb, mercury, and cadmium. The manufacturing process can also produce GHGs, such as CO_2, that contribute to global climate change. However, existing research suggest that the operation of solar PV systems, compared with conventional fossil fuel-burning power plants, significantly reduces air pollution (Intergovernmental Panel on Climate Change, 2012).

Operation

Operational emissions from maintenance and repair activities would be minor and infrequent. Minor and temporary emissions would be generated from operational activities such as the use of vehicles and equipment with combustive engines, and generation of fugitive dust when driving vehicles on gravel access roads within and around the solar PV system.

On a region-wide scale, the use of solar PV panels would result in beneficial air quality impacts because fossil fuels would not be used for the necessary electricity generation, resulting in fewer air emissions (including GHG and criteria pollutant emissions). Existing research suggests that the operation of solar PV systems, compared with conventional fossil fuel-burning power plants, significantly reduces air pollution (Intergovernmental Panel on Climate Change, 2012).

General Conformity

The General Conformity rule applies to federal actions proposed within areas that are designated as either nonattainment or maintenance areas for a NAAQS for any of the criteria pollutants. Emissions of pollutants for which an area is in attainment are exempt from conformity analyses. As such, a Record of Non-Applicability for CAA conformity is not required for this project.

Because the ROI is in attainment of all criteria pollutants, the *de minimis* thresholds for General Conformity Applicability analysis do not apply. The temporary and minor increases in construction and operation emissions would be negligible (as shown in Table 3.1-4) and would not trigger a formal Conformity Determination under the CAA General Conformity Rule.

Greenhouse Gases

Implementation of Alternative 1 would contribute a nominal amount of emissions of GHGs from the combustion of fossil fuels from construction and operational activities. Due to the relatively small project scale, the annual GHG emissions would fall well below the CEQ threshold of 25,000 metric tons. The limited amount of emissions would not likely contribute to global warming to any discernible extent.

Furthermore, long-term beneficial impacts to air quality would occur with implementation of the proposed solar PV system due to the benefits of contributing to the energy/power grid through alternative energy development and reducing GHG emissions.

Summary

Long-term beneficial impacts to air quality would occur with implementation of the proposed solar PV system due to the benefits of contributing to the energy/power grid through alternative energy development and reducing GHG emissions. These potential long-term beneficial impacts would offset the minor emissions generated as a result of construction and operational maintenance of the proposed solar PV system. Therefore, implementation of Alternative 1 would not result in significant impacts to air quality.

3.1.3.5 Alternative 2: Up to 15 Megawatts at Site A

Air quality impacts under Alternative 2 would be similar as described for Alternative 1 with the exception that emissions associated with construction and operational activities would be slightly less when compared to Alternative 1. Table 3.1-5 presents a summary of the annual emissions associated with construction activities at NAS Fallon under Alternative 2.

Table 3.1-5 Alternative 2 – Construction Emissions at NAS Fallon with Evaluation of Conformity

Emission Source	*Emissions (tons/year)*					
	VOCs	*NO_x*	*CO*	*SO_2*	*PM_{10}*	*$PM_{2.5}$*
Year - 2017	1.12	11.76	7.95	0.01	1.38	0.93
Year - 2018	1.24	12.53	9.08	0.02	0.67	0.58
Year - 2019	0.28	2.79	2.13	0.004	0.15	0.13
Conformity *de minimis* Limits *(for a basic nonattainment area)*[1]	100	100	100	100	100	100
Exceeds Conformity *de minimis* Limits?[1]	No	No	No	No	No	No

Note: [1] The ROI is in attainment of the NAAQS for all criteria pollutants and no *de minimis* thresholds apply; however, emission estimates have been provided and are compared with the *de minimis* thresholds of a basic nonattainment area, for planning purposes only.

Similar to Alternative 1, the emissions predicted in Table 3.1-5 for Alternative 2 would be temporary and minor and would not trigger a formal Conformity Determination under the CAA General Conformity Rule. The potential long-term beneficial impacts would offset the minor emissions generated as a result of construction and operational maintenance of the solar PV system. Therefore, implementation of Alternative 2 would not result in significant impacts to air quality.

3.2 Water Resources

This discussion of water resources includes groundwater, surface water, wetlands, and floodplains. This section discusses the physical characteristics of water resources; wildlife and vegetation are addressed in Section 3.4, *Biological Resources*. Groundwater is water that flows or seeps downward and saturates soil or rock, supplying springs and wells.

Surface water resources generally consist of wetlands, lakes, rivers, and streams. Surface water is important for its contributions to the economic, ecological, recreational, and human health of a community or locale. A Total Maximum Daily Load (TMDL) is the maximum amount of a substance that can be assimilated by a water body without causing impairment. A water body can be deemed impaired if water quality analyses conclude that exceedances of water quality standards occur. Canals and drains within the project vicinity are owned by the Nevada Bureau of Reclamation and operated by the Truckee-Carson Irrigation District. These surface water features were identified using the Truckee-Carson Irrigation District Composite Drainage and Distribution Map. Lower Diagonal Deep Drain, which is approximately 1.5 miles south of the project area, and Lower Diagonal 1 Drain, which is adjacent to the eastern perimeter of Site B, are considered jurisdictional waters of the U.S. under the Clean Water Act (CWA) and are Bureau of Reclamation facilities (Figure 3.2-1).

Wetlands are jointly defined by USEPA and U.S. Army Corps of Engineers (USACE) as “those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions.” Wetlands generally include “swamps, marshes, bogs, and similar areas.”

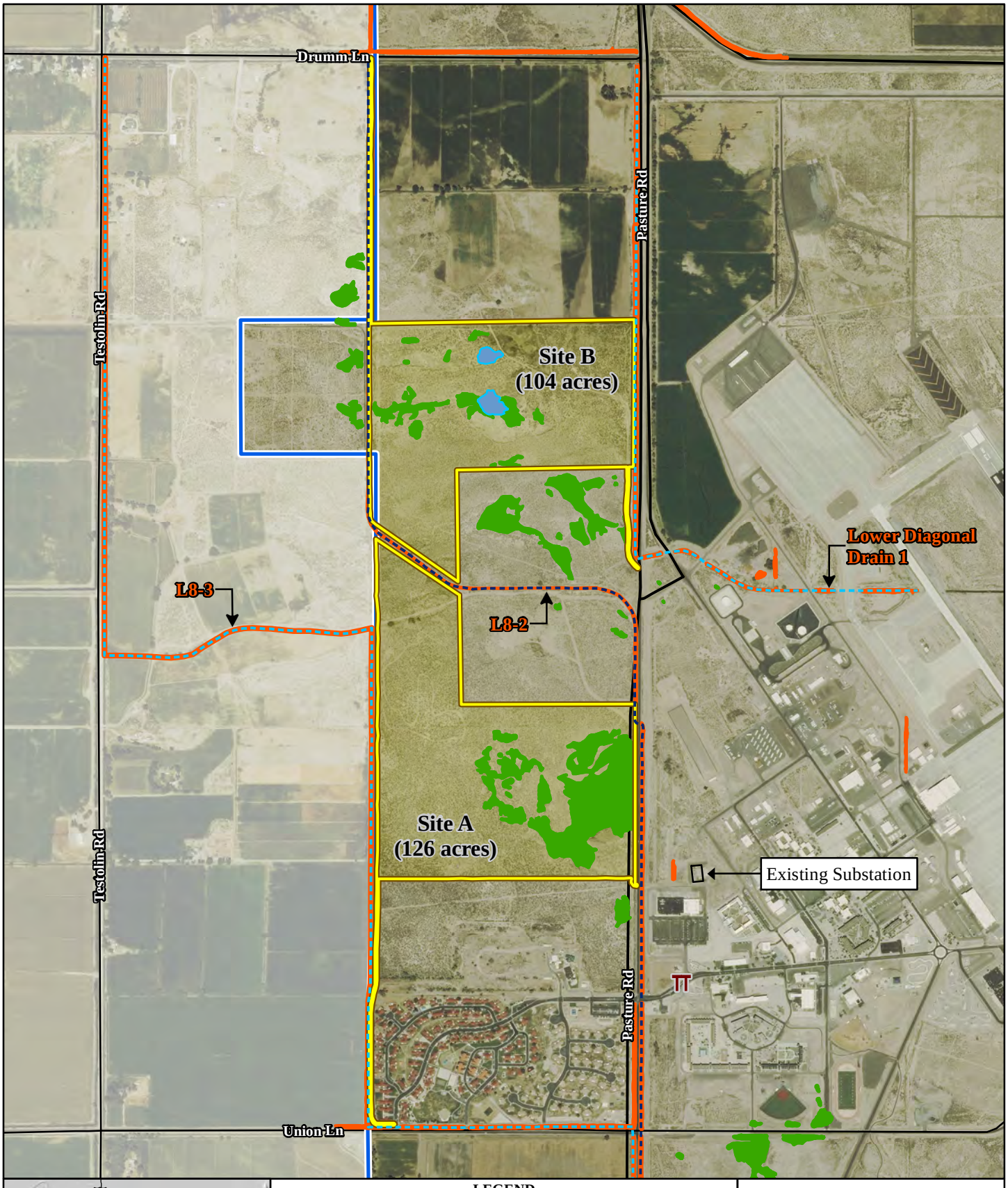


Figure 3.2-1
Water Resources within and near the Project Area

Source: NAS Fallon 2015a

Floodplains are areas of low-level ground present along rivers, stream channels, large wetlands, or coastal waters. Floodplain ecosystem functions include natural moderation of floods, flood storage and conveyance, groundwater recharge, and nutrient cycling. Floodplains also help to maintain water quality and are often home to a diverse array of plants and animals. In their natural vegetated state, floodplains slow the rate at which the incoming overland flow reaches the main water body. Floodplain boundaries are most often defined in terms of frequency of inundation, that is, the 100-year and 500-year flood. Floodplain delineation maps are produced by the Federal Emergency Management Agency and provide a basis for comparing the locale of the Proposed Action to the floodplains.

3.2.1 Regulatory Setting

Groundwater quality and quantity are regulated under several statutes and regulations, including the Safe Drinking Water Act.

The CWA establishes federal limits, through the National Pollutant Discharge Elimination System (NPDES) program, on the amounts of specific pollutants that can be discharged into surface waters of the U.S to restore and maintain the chemical, physical, and biological integrity of the water. The NPDES program regulates the discharge of point (i.e., end of pipe) and nonpoint sources (i.e., storm water) of water pollution to waters of the U.S. The CWA requires that Nevada establish a Section 303(d) list to identify impaired waters and establish TDMLs for the sources causing the impairment (CWA, 2002). As referenced above, lateral canals L8-2 and L8-3, located adjacent to the project area drains to the Lower Diagonal Deep Drain that, although an impaired waterway, has yet to have TMDLs established for it.

Section 438 of the Energy Independence and Security Act establishes storm water design requirements for development and redevelopment projects. Under these requirements, federal facility projects larger than 5,000 ft^2 must "maintain or restore, to the maximum extent technically feasible, the predevelopment hydrology of the property with regard to the temperature, rate, volume, and duration of flow" (Energy Independence and Security Act, 2007).

The Nevada NPDES storm water program requires construction site operators engaged in clearing, grading, and excavating activities that that disturb one acre or more and will result in discharge to waters of the U.S. to obtain coverage under a NPDES Construction General Permit (NVR100000) for storm water discharges issued by the Nevada Division of Environmental Protection. Construction or demolition that necessitates inclusion under this permit requires preparation of a Notice of Intent to discharge storm water and a Storm Water Pollution Prevention Plan that is implemented during construction. As part of the 2010 Final Rule for the CWA, titled *Effluent Limitations Guidelines and Standards for the Construction and Development Point Source Category*, activities covered by this permit must implement non-numeric erosion and sediment controls and pollution prevention measures.

Wetlands are regulated by USACE under Section 404 of the CWA as a subset of all waters of the U.S. Waters of the U.S. are broadly defined under the CWA and incorporates deepwater aquatic habitats and special aquatic habitats, including wetlands. Waters of the U.S. regulated under the CWA include coastal and inland waters, lakes, rivers, ponds, streams, intermittent streams, and "other" waters that, if degraded or destroyed, could affect interstate commerce. The full regulatory definition of waters of the U.S. is provided at 33 CFR section 328.3.

EO 11990, *Protection of Wetlands,* requires that federal agencies adopt a policy to avoid, to the extent possible, long- and short-term adverse impacts associated with destruction and modification of

wetlands and to avoid the direct and indirect support of new construction in wetlands whenever there is a practicable alternative (EO, 1977).

Section 404 of the CWA authorizes the Secretary of the Army, acting through the Chief of Engineers, to issue permits for the discharge of dredge or fill into wetlands and other waters of the U.S. Any discharge of dredge or fill into waters of the U.S. requires a permit from USACE (CWA, 2002).

EO 11988, *Floodplain Management*, requires federal agencies to avoid to the extent possible the long- and short-term adverse impacts associated with the occupancy and modification of floodplains and to avoid direct and indirect support of floodplain development unless it is the only practicable alternative. Flood potential of a site is usually determined by the 100-year floodplain, which is defined as the area that has a one percent chance of inundation by a flood event in a given year (EO, 1979).

3.2.2 Affected Environment

The following discussions provide a description of the existing conditions for each of the categories under water resources at NAS Fallon.

3.2.2.1 Groundwater

The Basin and Range Physiographic Province contains three principal aquifer types, which are collectively referred to as the "Basin and Range aquifers." The three principal aquifer types are volcanic-rock aquifers, which are primarily tuff, rhyolite, or basalt of Tertiary age; carbonate-rock aquifers, which are primarily limestones and dolomites of Mesozoic and Paleozoic age; and basin-fill aquifers, which are primarily unconsolidated sand and gravel of Quaternary and Tertiary age. These aquifers are not continuous or regional because of the complex faulting in the region. Any or all three aquifer types may be in, or may underlie, a particular basin. Each aquifer type may constitute a separate water source, but can also be hydraulically connected (Planert, M and Williams, J, 1995).

The ground-water system in the Fallon area is divided into four subsystems on the basis of hydrologic characteristics. The subsystems are (1) a shallow, unconsolidated sedimentary aquifer (0 to 50 ft below land surface); (2) an intermediate depth, unconsolidated sedimentary aquifer (from 50 ft below land surface to 500-1,000 ft); (3) a deep, generally unconsolidated sedimentary aquifer (beginning 500 to 1,000 ft below land surface); and (4) a highly permeable basalt aquifer that stratigraphically transects all three sedimentary aquifers. The basalt aquifer is the principal source of domestic and industrial water to the City of Fallon and NAS Fallon (USGS, 2000).

In 2002, test drilling was conducted by U.S. Geological Survey (USGS), the Bureau of Reclamation, and NAS Fallon into this aquifer approximately one mile northwest of NAS Fallon, approximately halfway between the northwestern perimeter of NAS Fallon and the City of Fallon. Results from this report indicate that water level depths in the basalt aquifer are expected to be between 52 and 47 feet below the land surface (USGS, 2002). Due to the lack of site-specific groundwater data for the project area, this report is used as an indicator for what the groundwater depths may be in the project area; however, groundwater could be encountered at a shallower depth. Groundwater beneath the project area generally flows southeast toward Carson Lake, located about three miles south of the facility (USGS, 2000).

3.2.2.2 Surface Water

NAS Fallon is located in the Carson Desert Hydrographic Basin, within the terminus sub-basin of the larger Carson River Basin (also referred to as the Lahontan Valley Basin). The Carson River Basin covers

4,000 square miles in California and Nevada and stretches north and northeast from its headwaters located south of the Lake Tahoe Basin to its terminus in the Nevada desert. The Carson River's two forks merge in the northern part of Carson Valley and form the main stream of the Carson River. The Carson Desert Hydrographic Basin encompasses 2,022 square miles within Churchill, Pershing, and Lyon counties in Nevada (NAS Fallon, 2014a). Runoff in this basin eventually reaches wetlands at Carson Lake and the Carson Sink. It is a hydrologically closed depression that is entirely within the rain shadow of the Sierra Nevada Mountains. The Carson River provides over 95 percent of all irrigation water for the Carson Desert (Navy, 2008a).

Major surface waters occurring throughout the region include the S Line Reservoir directly north of NAS Fallon, Harmon Reservoir and Stillwater Point Reservoir to the northeast, Lahontan Reservoir to the west; and Carson Lake to the south.

Annual average precipitation for the region is approximately 5 inches (NAS Fallon, 2014a). The majority of the runoff at NAS Fallon occurs from snowmelt. The natural drainage pattern within the Carson Desert and on NAS Fallon generally follows a northwest to southeast pattern. Several engineered flow patterns have been created on NAS Fallon to redirect water flow into irrigation conveyances and drainage features. There are 137 drainage areas on NAS Fallon, 35 of which are internal drainages, or "sinks," that never discharge to a drain. The remaining basins discharge to Reclamation facilities through 35 outfalls (Navy, 2008a).

Much of the area around NAS Fallon and the project area is irrigated, and there are several irrigation canals to deliver surface water and two drains to remove excess surface water. The Truckee-Carson Irrigation District drainage and distribution system is adjacent to the project area. Lower Diagonal Deep Drain, which is approximately 1.5 miles south of the project area, is considered jurisdictional waters of the U.S. under the CWA. Lower Diagonal 1 Drain runs north to south along the west side of Pasture Road along the eastern perimeter of Site B and then turns east approximately 1,000 feet before intersecting with lateral canal L8-2. Lower Diagonal 1 Drain is a jurisdictional water of the U.S. The Lower Diagonal Deep Drain and Lower Diagonal 1 Drain are impaired waterways with no established TMDLs.

The lateral supply canal, identified as L8-2, runs adjacent to the western and southern boundaries of Site B and along the northern and eastern borders of Site A. Another lateral supply canal, identified as L8-3, runs outside the installation property along the western perimeter of Site A. Lateral canals L8-2 and L8-3 are used to irrigate land within the Truckee-Carson Irrigation District drainage and distribution system. Runoff from these lateral canals eventually drains into Lower Diagonal Deep Drain approximately 1.5 miles south of the project area.

3.2.2.3 Wetlands

NAS Fallon has approximately 442 acres of surface waters and wetlands, including marshes, moist-saline meadows and flats, riparian woodlands, natural drainages, ponds and ditches, and playas (Table 3.2-1). There are no natural perennial or intermittent streams located on the installation. The only jurisdictional surface waters on NAS Fallon are the Lower Diagonal 1 Drain and the Lower Deep Diagonal Drain, which are considered by the State of Nevada to be waters of the U.S. and subject to the CWA. None of the wetlands on NAS Fallon are considered jurisdictional (NAS Fallon, 2014a).

Three types of non-jurisdictional wetlands and waters exist within Sites A and B (Table 3.2-1; see Figure 3.2-1). Wetlands within Sites A and B are small, isolated playas and/or saline flats within and amongst the natural vegetation that are devoid of perennial plant species and hold water only immediately after

rains. Lateral canals L8-2 and L8-3 that run through the project area are supply canals and are not considered jurisdictional wetlands (NAS Fallon, 2014a).

Table 3.2-1 Acreages of Surface Water Features in the Project Area

Wetland/Water	*Site A (acres)*	*Site B (acres)*	*TOTAL (acres)*
Playas	19.56	4.56	**24.12**
Moist-Saline Meadows and Flats	0	1.58	**1.58**
Canals, Laterals, Ponds and Ditches	0.05	1.02	**1.07**
TOTAL	**19.61**	**7.16**	**25.77**

Source: (NAS Fallon, 2015a)

3.2.2.4 Floodplains

A small portion of NAS Fallon on the eastern side of the airfield is located within a Special Flood Hazard Area subject to a 100- year flood (Federal Emergency Management Agency, 2008). The Proposed Action does not occur within a Special Flood Hazard Area. Therefore, floodplains are not analyzed further in this EA.

3.2.3 Environmental Consequences

Water resources were analyzed for potential changes to water quality or supply, damage to unique hydrologic characteristics, increased public health hazards, and violations of established laws, regulations, or permit requirements from implementation of the alternatives.

3.2.3.1 No Action Alternative

Under the No Action Alternative, the Proposed Action would not occur and there would be no change to baseline water resources. Therefore, no significant impacts to water resources would occur with implementation of the No Action Alternative.

3.2.3.2 Alternative 1: Up to 20 Megawatts at Sites A and B (Preferred Alternative)

Under Alternative 1, up to 230 acres within Sites A and B would be developed to support the construction and operation of up to a 20 megawatt (MW) solar PV system at NAS Fallon.

Potential Impacts to Water Resources:

- Localized erosion and sedimentation
- Impacts to non-jurisdictional wetlands
- Increase in storm water runoff from the site

Construction

Groundwater

Construction activities are not expected to reach depths that would impact groundwater, as it is located more than 50 feet below the surface, based on nearby groundwater investigations (USGS, 2002). No groundwater pumping would occur at the site; water would be trucked in from off-site for use in controlling dust during construction.

Surface Water

Grading activities associated with construction would temporarily (until construction is completed and the site is stabilized) increase the potential for localized erosion, which could potentially runoff into surface water bodies and deposit in wetlands. As more than one acre would be disturbed, the private partner would obtain and comply with the Nevada NPDES General Permit for Storm Water Associated

with Construction Activities (NVR100000) which includes the development and implementation of a Storm Water Pollution Prevention Plan (SWPPP) including standard erosion control measures (BMPs) to avoid runoff from the site including the access roads. Potential BMPs could include silt fences, straw bale dikes, berms, surface flow directional controls, vegetation, mulch binders, sediment barriers, fiber rolls, erosion blankets, turf mats and stone bag filters, as summarized in Table 3.11-2. Installation of the PV panel mounting structures would avoid the non-jurisdictional wetlands and ponds/flats to the greatest extent feasible.

Sites A and B currently consist of native vegetation and sand dunes. These surfaces are generally porous and direct precipitation and/or storm water runoff quickly percolates to the underlying soil. Under Alternative 1, a large percentage of the surface of Sites A and B would be converted to less permeable surfaces (e.g., panels, gravel, and concrete). This result change in surface would result in a potential increase in storm water runoff both at and from the site.

To manage the increase in storm water, soils in the disturbed areas would be stabilized. To do this, a spray-on erosion control fiber matrix (soil stabilizer) would be applied to the soil following construction, which would reduce the potential for soil erosion and dust. In addition to the BMPs, Low Impact Design (LID) management practices such as surface flow directional controls, bio-retention cells, bio-retention swales and soil amendments would be implemented during construction to minimize off-site runoff, erosion, and sedimentation into water supply canals. All construction activities would be done in compliance with all Navy regulations applicable to conducting work activities on NAS Fallon.

Operation

Typical maintenance of the solar PV panels would consist of washing down the panels approximately twice a year to remove dust and dirt build-up with only water and no cleaning chemicals. Water would be provided by the private partner; the Navy would not provide maintenance water for the Proposed Action. Pumping of groundwater supplies in the project area would not occur under Alternative 1 because water would be trucked in from off-site.

Excess surface water associated with washing the panels during the proposed operations and maintenance activities would potentially have at most minor and localized effects on surface flows and/or substrates within drainages or wetlands. Storm water management controls (LID and BMPs) would be designed, implemented, maintained, and inspected during operations to prevent surface water flows into lateral canals L8-2, L8-3, and Lower Diagonal 1 Drain (see Figure 3.2-1). The resulting storm water discharge from the site would not exceed current runoff rates or create new drainage patterns – or – all storm water runoff would be contained on-site.

The private partner would be responsible for the application of any herbicides or pesticides and prevention of runoff into waterways. The private partner would be required to apply any herbicide or pesticide used to control vegetation beneath the panels in accordance with applicable federal, state, and local regulations, as well as manufacturer's guidelines.

Existing access roads would be maintained as needed and maintenance would include all applicable BMPs to minimize and reduce erosion. All operations and maintenance activities would be done in compliance with all Navy regulations applicable to conducting work activities on NAS Fallon.

Summary

Construction and operation activities associated with Alternative 1 would not impact groundwater resources. Water would be trucked in from off-site for use during construction for dust control and during maintenance. Standard erosion control measures would be implemented, maintained, and inspected to minimize erosion, runoff, and sedimentation into lateral canals L8-2, L8-3, and Lower Diagonal 1 Drain (see Figure 3.2-1). Installation of the solar PV system would avoid localized surface drainages and non-jurisdictional wetlands to the greatest extent feasible, and would result in minor and localized, if any, effects on flows or substrate within drainages and wetlands. The private partner would be required to use any herbicides or pesticides for controlling vegetation beneath the panels in accordance with applicable federal, state, and local regulations, as well as manufacturer's guidelines. Therefore, implementation of Alternative 1 would not result in significant impacts to water resources.

3.2.3.3 Alternative 2: Up to 15 Megawatts at Site A

Under Alternative 2, construction and operation of the 15 MW solar PV system at Site A would be generally the same as described in Section 3.2.3.2; however, construction would be at a slightly smaller scale. The same impact avoidance and minimization measures would be implemented to minimize erosion, runoff, and sedimentation. Therefore, implementation of Alternative 2 would not result in significant impacts to water resources.

3.3 Cultural Resources

This discussion of cultural resources includes prehistoric and historic archaeological sites; historic buildings, structures, and districts; and physical entities and human-made or natural features important to a culture, a subculture, or a community for traditional, religious, or other reasons. Cultural resources can be divided into three major categories:

- Archaeological resources (prehistoric and historic) are locations where human activity measurably altered the earth or left deposits of physical remains.
- Architectural resources include standing buildings, structures, landscapes, and other built-environment resources of historic or aesthetic significance.
- Traditional cultural properties may include archaeological resources, structures, neighborhoods, prominent topographic features, habitat, plants, animals, and minerals that Native Americans or other groups consider essential for the preservation of traditional culture.

3.3.1 Regulatory Setting

Cultural resources are governed by other federal laws and regulations, including the National Historic Preservation Act (NHPA), American Indian Religious Freedom Act, Archaeological Resources Protection Act of 1979, and the Native American Graves Protection and Repatriation Act of 1990. Federal agencies' responsibility for protecting historic properties is defined primarily by sections 106 and 110 of the NHPA. Section 106 requires federal agencies to take into account the effects of their undertakings on historic properties. Section 110 of the NHPA requires federal agencies to establish—in conjunction with the Secretary of the Interior—historic preservation programs for the identification, evaluation, and protection of historic properties. Cultural resources also may be covered by state, local, and territorial laws. However, there are no state or local laws protecting cultural resources in the project area.

3.3.2 Affected Environment

Cultural resources that are listed in the National Register of Historic Places (NRHP) or eligible for listing in the NRHP are "historic properties" as defined by the NHPA. The list was established under the NHPA and is administered by the National Park Service on behalf of the Secretary of the Interior. The NRHP includes properties on public and private land. Properties can be determined eligible for listing in the NRHP by the Secretary of the Interior or by a federal agency official with concurrence from the applicable State Historic Preservation Office (SHPO). A NRHP-eligible property has the same protections as a property listed in the NRHP. The historic properties include archaeological and architectural resources.

The Navy has conducted inventories of cultural resources at NAS Fallon to identify historic properties that are listed or potentially eligible for listing in the NRHP (Bowers, 2009) (Estes, 2015) (Jones & Dougherty, 2016).

3.3.2.1 Archaeological Resources

NAS Fallon currently functions under an Installation Cultural Resources Management Plan (ICRMP), which was written and approved in 2013 (NAVFAC SW, 2013). Earlier management plans included a 1993 Cultural Resource Management Plan, a draft ICRMP written in 2000, and a 2007 ICRMP. The NAS Fallon ICRMP lists 10 federally recognized tribal groups who have potential concerns regarding the Fallon Range Training Complex and Navy activities. Other interested parties include the Bureau of Reclamation, the Oregon-California Trails Association, the Lincoln Highway Association, and the Churchill County Museum.

Since 1996, NAS Fallon has had a Programmatic Agreement (PA) in place. The PA streamlines the cultural resource process by allowing small projects that clearly have "no effect" or "no adverse effect" to forego consultation with the Nevada SHPO. Because the majority of projects at NAS Fallon are very small maintenance projects, this document greatly facilitates day-to-day operations. The PA lists several types of Exempt Undertakings that do not require SHPO consultation and concurrence. The document was revised in 2010.

Currently about 93 percent of NAS Fallon Main Station has been surveyed for archaeological resources. To date, 87 sites have been recorded on Main Station. NAS Fallon manages 20 archaeological sites that are eligible for inclusion to the NRHP. In addition to archaeological resources, the installation includes nearly 200 buildings and structures that date from World War II (1941–1945) through the Cold War (1946–1989).

Sixteen archaeological sites have been identified within the boundaries of the project area (Table 3.3-1). These sites were recorded within the last seven years during three Class III cultural resource inventories (Bowers, 2009) (Estes, 2015) (Jones & Dougherty, 2016). Five sites are located in Site A and 11 sites are located in Site B. Site A contains four prehistoric lithic scatters and one historic trash scatter. Site B contains one prehistoric lithic scatter, three prehistoric lithic and groundstone scatters, five historic trash scatters, and three multi-component sites.

Table 3.3-1 Cultural Resources Located in the Project Area

Site Number	*Historic/ Prehistoric*	*Description*	*Location*	*Alternative*	*Reference*	*NRHP Eligibility Recommendation*
26CH2079	Prehistoric	Lithic scatter	Site A	1 and 2	(Bowers, 2009)	Not Eligible
26CH2651	Prehistoric	Lithic scatter	Site B	2	(Estes, 2015)	Not Eligible
26CH2652	Prehistoric	Lithic scatter	Site A	1 and 2	(Bowers, 2009)	Not Eligible
26CH2655	Both	Multi-component	Site B	1	(Bowers, 2009)	Not Eligible
26CH2656	Both	Multi-component	Site B	1	(Estes, 2015)	Not Eligible
26CH2675	Both	Multi-component	Site A	1 and 2	(Jones & Dougherty, 2016)	Not Eligible
26CH2792	Historic	Trash scatter	Site B	1	(Estes, 2015)	Not Eligible
26CH4210	Historic	Trash scatter	Site B	1	(Estes, 2015)	Not Eligible
26CH4212	Prehistoric	Lithic and groundstone scatter	Site B	1	(Estes, 2015)	Not Eligible
26CH4213	Prehistoric	Lithic and groundstone scatter	Site B	1	(Estes, 2015)	Not Eligible
26CH4214	Historic	Trash scatter	Site B	1	(Estes, 2015)	Not Eligible
26CH4216	Historic	Trash scatter	Site B	1	(Estes, 2015)	Not Eligible
26CH4217	Historic	Trash scatter	Site B	1	(Estes, 2015)	Not Eligible
26CH4218	Prehistoric	Lithic and groundstone scatter	Site B	1	(Estes, 2015)	Not Eligible
26CH4230	Prehistoric	Lithic scatter	Site A	1 and 2	(Jones & Dougherty, 2016)	Not Eligible
26CH4231	Historic	Trash scatter	Site A	1 and 2	(Jones & Dougherty, 2016)	Not Eligible

In 1981, human remains were recovered from a borrow pit located between, but not in, Sites A and B. This site was assigned the trinomial 26CH911. The remains (two skulls and a radius) were sent to the University of Nevada, Las Vegas to be analyzed by two physical anthropologists. Their assessments aged the remains to a child (approximately 3.5 to 4.5 years of age) and a 19-year-old female. The hardened condition of the sand in which the child's radius was embedded, coupled with the wear patterns on the 19-year-old's molars, lead the researchers to the opinion that the remains originated from prehistoric burials. The remains are housed in the Physical Anthropology Laboratory at University of Nevada, Las Vegas. No archaeological site was defined for the area where the remains were recovered, and no detailed record of their exact provenience exists, though the borrow pit is still evident.

3.3.2.2 Architectural Resources

Three historic building inventories have been completed at the NAS Fallon Main Station including one in 1998, 2007, and 2011. The first studies determined that two buildings are eligible for inclusion to the NRHP: the Air Force Semi-Automatic Ground Environment and Back Up Interceptor Control System buildings. The study completed in 2011 suggested that seven additional buildings are eligible for listing on the NRHP. These buildings include: Building 4 (Hangar 7), Buildings 9 and 96 (World War II aircraft

beacon and beacon vault), and the buildings that comprise the 800 complex (Buildings 800, 801, 804, and 806).

Two historic architectural resources are located in the project area: the L8-2 Canal and the Lower Diagonal Drain. Both resources are located within Site B and last encountered by Estes (2015). The L8-2 Canal has been recommended as eligible for listing in the NRHP. The Lower Diagonal Drain has not been evaluated for listing in the NRHP.

Table 3.3-2 Architectural Resources Located in the Project Area

Site Number	*Historic/ Prehistoric*	*Description*	*Location*	*Alternative*	*Reference*	*NRHP Eligibility*
26CH2411/26CH2653	Historic	L8-2 canal	Site B	1	(Estes, 2015)	Eligible
26CH3359	Historic	Newlands Project Lower Diagonal 1 Drain	Site B	1	(Estes, 2015)	Unevaluated

3.3.2.3 Traditional Cultural Properties

There are 10 federally recognized Native American tribes who may have potential concerns on NAS Fallon landholdings. NAS Fallon conducts ongoing consultation with these tribes. The Fallon Paiute-Shoshone Reservations is located approximately 3.5 miles north of the Main Station. Because of its proximity, the people of this reservation have the greatest occasion to interact with NAS Fallon.

NAS Fallon has not been the subject of any traditional cultural properties studies. Therefore, it is not known if traditional cultural properties exist within the Project Area.

3.3.3 Environmental Consequences

Analysis of potential impacts to cultural resources considers both direct and indirect impacts. Direct impacts may be the result of physically altering, damaging, or destroying all or part of a resource, altering characteristics of the surrounding environment that contribute to the importance of the resource, introducing visual, atmospheric, or audible elements that are out of character for the period the resource represents (thereby altering the setting), or neglecting the resource to the extent that it deteriorates or is destroyed.

3.3.3.1 No Action Alternative

Under the No Action Alternative, the Proposed Action would not occur and there would be no change to cultural resources. Therefore, no significant direct or indirect impacts to cultural resources would occur with implementation of the No Action Alternative.

3.3.3.2 Alternative 1: Up to 20 Megawatts at Sites A and B (Preferred Alternative)

Construction

Eighteen archaeological sites and architectural resources are located within the project area for Alternative 1 (see Table 3.3-1 and 3.3-2). Sixteen of these sites would be disturbed by grading and construction of the proposed solar PV panels. However, these sixteen sites are

Potential Impacts to Cultural Resources:

- Subject to SHPO concurrence, no adverse effect to historic properties

recommended not eligible for inclusion in the NRHP. Contingent on concurrence from the Nevada SHPO, disturbance of these sites would not result in an adverse effect to a historic property. One site, 26CH3359, has not been evaluated but is presumed eligible for listing in the NRHP. Because the site has not been evaluated but is considered presumptively eligible for listing, it would be avoided during construction as a mitigation action. Site 26CH2411/26CH2653 has been recommended as eligible for inclusion in the NRHP and would be avoided during construction.

Any ground disturbing activity under Alternative 1 would be monitored by a forensic anthropologist or archaeologist with training in human osteology. The discovery of human remains in 1981 may indicate additional inhumations in the area, and a monitor proficient in the identification and analysis of human remains would be present during any excavation. This monitor would have the ability to halt construction in the event of the inadvertent discovery of cultural material or human remains, at which point the NAS Fallon Cultural Resource Manager would be immediately contacted, along with appropriate authorities before construction could continue.

Operation

Under Alternative 1, post-construction site operations as well as maintenance and repair work would occur. As these activities would occur on the roads (and therefore create no additional disturbance) and no ground disturbance would occur beyond what has been discussed earlier herein, there would be no adverse effects to historic properties.

Summary

Eighteen archaeological sites and architectural resources are found within the project area of Alternative 1. Sixteen of these sites are recommended not eligible for inclusion in the NRHP, and are therefore not historic properties. Site 26CH3359, as an unevaluated site, would be avoided during construction. Site 26CH2411/26CH2653, as an eligible NRHP site, would be avoided during construction.

Any ground disturbing activity under Alternative 1 would be monitored by a forensic anthropologist or archaeologist with training in human osteology. The discovery of human remains in 1981 may indicate additional inhumations in the area, and a monitor proficient in the identification and analysis of human remains should be present during any excavation. This monitor would have the ability to halt construction in the event of the inadvertent discovery of cultural material or human remains, at which point the NAS Fallon Cultural Resource Manager would be immediately contacted, along with appropriate authorities, before construction could continue.

The Navy has requested the SHPO concur with a finding of "No Historic Properties Affected" for Alternative 1. The implementation of Alternative 1 would not result in significant impacts to historic properties, contingent on concurrence from the Nevada SHPO on the NRHP eligibility status of the eighteen sites and architectural resources within the project area and the adoption of impact avoidance measures to avoid sites 26CH3359 and 26CH2411/26CH2653.

3.3.3.3 Alternative 2: Up to 15 Megawatts at Site A

Construction

Five archaeological sites are located within Site A (see Table 3.3-1). These sites would be disturbed by grading and construction of the proposed solar PV panels. However, all of the sites located in Site A are

recommended not eligible for inclusion in in the NRHP. Contingent on concurrence from the Nevada SHPO, disturbance of these sites would not result in an adverse effect to a historic property.

Any ground disturbing activity under Alternative 2 would be monitored by a forensic anthropologist or archaeologist with training in human osteology. The discovery of human remains in 1981 may indicate additional inhumations in the area, and a monitor proficient in the identification and analysis of human remains would be present during any excavation. This monitor would have the ability to halt construction in the event of the inadvertent discovery of cultural material or human remains, at which point the NAS Fallon Cultural Resource Manager would be immediately contacted, along with appropriate authorities before construction could continue.

Operation

Under Alternative 2, post-construction site operations as well as maintenance and repair work would include the use of gravel roads placed between the rows of solar PV panels and those around the fenced perimeter. As these activities would occur on the roads (and therefore create no additional disturbance) and no ground disturbance would occur beyond what has been described herein, there would be no adverse effects to historic properties.

Summary

Five archaeological sites are found within the project area of Alternative 2. However, these sites are recommended not eligible for inclusion in the NRHP, and are therefore not historic properties.

Any ground disturbing activity under Alternative 2 should be monitored by a forensic anthropologist or archaeologist with training in human osteology. The discovery of human remains in 1981 may indicate additional inhumations in the area, and a monitor proficient in the identification and analysis of human remains should be present during any excavation. This monitor would have the ability to halt construction in the event of the inadvertent discovery of cultural material or human remains, at which point the NAS Fallon Cultural Resource Manager would be immediately contacted, along with appropriate authorities, before construction could continue.

The implementation of Alternative 2 would not result in significant impacts to historic properties, contingent on concurrence from the Nevada SHPO on the NRHP eligibility status of the five sites within the project area.

3.4 Biological Resources

Biological resources include plant and animal species and the habitats within which they occur. Plant associations are referred to generally as vegetation, and animal species are referred to generally as wildlife. Habitat can be defined as the resources and conditions present in an area that support a plant or animal.

Within this EA, biological resources are divided into two categories: (1) vegetation, and (2) wildlife. Threatened, endangered, and other special status species are discussed in their respective categories. Table 3.4-1 lists all special status species that are potentially present.

3.4.1 Regulatory Setting

Special-status species, for the purposes of this EA, are those species listed as threatened or endangered under the Endangered Species Act (ESA), and species afforded protection under federal laws and

regulations such as the Migratory Bird Treaty Act (MBTA) and the Bald and Golden Eagle Protection Act. In addition, consideration is given to at-risk species and other species protected by the state of Nevada.

Birds, both migratory and most native-resident bird species, are protected under the MBTA, and their conservation by federal agencies is mandated by EO 13186 (Migratory Bird Conservation). Under the MBTA it is unlawful by any means or in any manner, to pursue, hunt, take, capture, kill, attempt to take, capture, or kill, [or] possess migratory birds or their nests or eggs at any time, unless permitted by regulation. The 2003 National Defense Authorization Act gave the Secretary of the Interior authority to prescribe regulations to exempt the Armed Forces from the incidental taking of migratory birds during authorized military readiness activities. The final rule authorizing the DoD to take migratory birds in such cases include a requirement that the Armed Forces must confer with the U.S. Fish and Wildlife Service (USFWS) to develop and implement appropriate conservation measures to minimize or mitigate adverse effects of the Proposed Action if the action will have a significant negative effect on the sustainability of a population of a migratory bird species.

Bald and golden eagles are protected by the Bald and Golden Eagle Protection Act. This act prohibits anyone, without a permit issued by the Secretary of the Interior, from taking bald eagles, including their parts, nests, or eggs. The Act defines "take" as "pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest or disturb."

3.4.2 Affected Environment

The following discussions provide a description of the existing conditions for each of the categories under biological resources at NAS Fallon.

3.4.2.1 Vegetation

Vegetation includes terrestrial plant communities and constituent plant species.

Sites A and B are both entirely dominated by black greasewood vegetation on saline, loamy sand flats (NAS Fallon, 2015a) (Figure 3.4-1). Black greasewood (*Sarcobatus vermiculatus*) is a rapidly growing, 3- to 10-foot tall, semi-evergreen shrub. Although black greasewood is considered poor for grazing because of potential toxicity to animals and low protein levels, it provides important cover for wildlife, including resting and/or nesting sites for song birds, especially during the winter (U.S. Department of Agriculture, 2015) (U.S. Department of Agriculture, 2007). Common plant associates in the black greasewood community include pickleweeds (*Salicornia spp.*), saltbushes (*Atriplex spp.*), seepweeds (*Suaeda spp.*), and a number of herbs and grasses that can tolerate saline soils.

Playa wetlands that occur in Site A are isolated saline flats that pond water immediately after rains. Impacts to these non-jurisdictional wetlands are addressed in Section 3.2, *Water Resources*.

No federally listed threatened or endangered plant species are known to occur near NAS Fallon. Other special status plant species that are deemed sensitive by the Nevada Natural Heritage Program (NNHP) with the potential to occur in the ROI are listed in Table 3.4-1. During rare plant surveys conducted at NAS Fallon in 2014 and 2015, the following four species of sensitive plants were observed on NAS Fallon lands: sand cholla (*Grusonia pulchella*), Nevada oryctes (*Oryctes nevadensis*), Lahontan indigobush (*Psorothamnus kingii*), and Nevada suncup (*Camissonia nevadensis*) (NAS Fallon, 2015b). The project area was not included in these surveys.

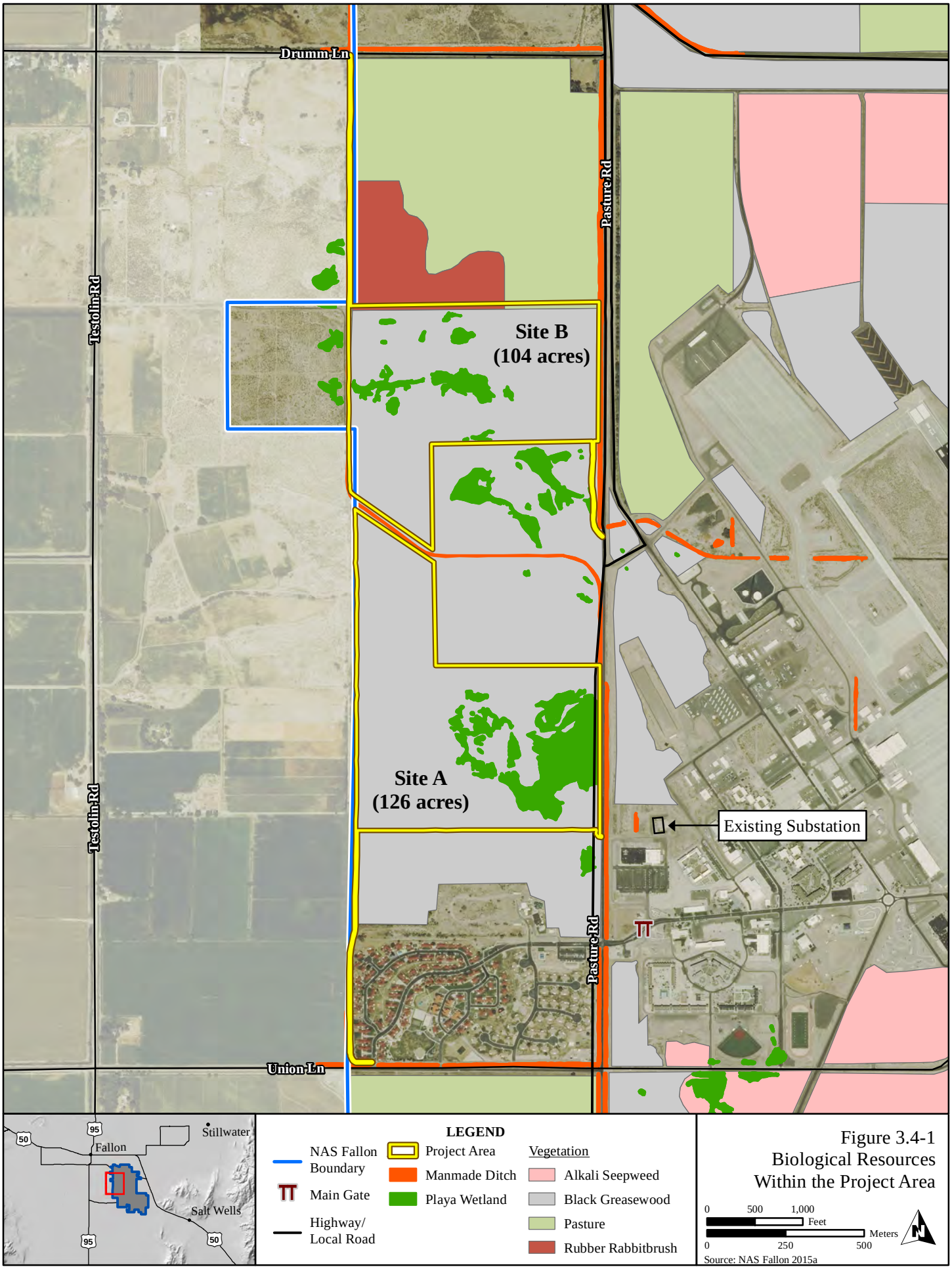


Figure 3.4-1
Biological Resources
Within the Project Area

Source: NAS Fallon 2015a

Table 3.4-1 Special Status Plant Species Potentially Occurring in the Region of Influence

Common Name	***Scientific Name***	***NNHP List***	***Habitat***	***Potential to Occur in the Region of Influence***
Lahontan Milkvetch	*Astragalus porrectus*	Watch list	sandy to gravelly soils on clay badlands, knolls, or playa edges in shadscale habitats	low; not known to occur
Tonopah Milkvetch	*Astragalus pseudiodanthus*	At-Risk List	sandy soils of stabilized and active dune margins, old beaches, valley floors, or drainages in black greasewood and other salt desert scrub habitats	moderate; not known to occur
Winged Milkvetch	*Astragalus pterocarpus*	Watch list	alkaline, sandy silt or clay soils of saltgrass meadows, shrubby bottomlands, and low knolls in shadscale and lower sagebrush habitats	low; not known to occur
Nevada Suncup	*Camissonia nevadensis*	Watch list	open, sandy, gravelly, or clay slopes and flats in shadscale or big sagebrush habitats	low; not known to occur
Sand Cholla	*Grusonia pulchella*	At-Risk List	desert scrub, borders of dry lakes, sandy flats	high; not known to occur
Dune Sunflower	*Helianthus deserticola*	At-Risk List	loose sandy soils of aeolian deposits, vegetated dunes, and dune skirt areas, on flats and gentle slopes, generally in alkaline areas, often on road berms and other stabilized disturbances	low; not known to occur
Dune Linanthus	*Linanthus arenicola*	Watch list	dunes and other sandy substrates in desert scrub	low; not known to occur
Candelaria Blazingstar	*Mentzelia candelariae*	Watch list	Barren, gravelly or clay soils on weathered volcanic ash deposits, scree slopes, hot spring mounds, washes, or road banks in desert scrub	low; not known to occur
Inyo Blazingstar	*Mentzelia inyoensis*	At-Risk List	rocky slopes, canyons, washes, and clay hills	low; not known to occur
Nevada Oryctes	*Oryctes nevadensis*	At-Risk List	desert scrub on sandy soils and dunes	moderate; not known to occur
Nevada Dune Beardtongue	*Penstemon arenarius*	At-Risk List	sandy soils of valley bottoms, aeolian deposits, and dune skirts, often in alkaline areas, sometimes on road banks and other recovering disturbances in desert scrub habitats	moderate; not known to occur
Lahontan Beardtongue	*Penstemon palmeri* var. *macranthus*	At-Risk List	washes, roadsides and canyon floors, usually where subsurface moisture is available throughout most of the summer	low; not known to occur
Lahontan Indigobush	*Psorothamnus kingii*	At-Risk List	sand-flats and hollows in dunes	low; not known to occur

Sources: (NAS Fallon, 2014a) (NAS Fallon, 2015b) (NNHP, 2015)

3.4.2.2 Wildlife

Animal species known to occur and/or utilize resources at NAS Fallon to date include: 112 invertebrates, 165 birds, 6 fish, 6 amphibians, 16 reptiles, and 37 mammals (NAS Fallon, 2014a). No federally listed threatened or endangered wildlife species are known to be residents or regular seasonal visitors to NAS Fallon. No critical habitat occurs on NAS Fallon. The federally endangered Lahontan cutthroat trout *(Oncorhynchus clarkii henshawi)* and the federally threatened western snowy plover *(Charadrius nivosus nivosus)* are found in Churchill County (USFWS, 2012) (NNHP, 2015). However, neither of these species have been observed on NAS Fallon, and are unlikely to occur within the vicinity due to lack of suitable habitat (NAS Fallon, 2014a). Although not federally listed, the bald eagle *(Haliaeetus leucocephalus)* and golden eagle *(Aquila chrysaetos)* are both protected by the Bald and Golden Eagle Protection Act (16 U.S.C. section 668(a); 50 CFR 22) and have the potential to occur at NAS Fallon. Special status wildlife species with potential to occur in the project area are presented in Table 3.4-2.

Table 3.4-2 Special Status Wildlife Species Potentially Occurring in the Region of Influence

Common Name	*Scientific Name*	*Federal Status*	*State Status*	*Potential Habitat in Project Area*
Bats				
California Myotis	*Myotis californicus*	none	Watch List	foraging
Western Small-Footed Myotis	*Myotis ciliolabrum*	none	Watch List	foraging
Townsend's big-eared bat	*Corynorhinus townsendii*	none	At-Risk	foraging
Long-Eared Myotis	*Myotis evotis*	none	Watch List	foraging
Little Brown Bat	*Myotis lucifugus*	none	Watch List	foraging
Long-legged Myotis	*Myotis Volans*	none	Watch List	foraging
Yuma Myotis	*Myotis yumanensis*	none	Watch List	foraging
Western Red Bat	*Lasiurus blossevillii*	none	At-Risk	foraging
Hoary Bat	*Lasiurus cinereus*	none	Watch List	foraging
Silver-Haired Bat	*Lasionycteris noctivagans*	none	Watch List	foraging
Western Pipistrelle	*Parastrellus hesperus*	none	Watch List	foraging
Big Brown Bat	*Eptesicus fuscus*	none	Watch List	foraging
Pallid Bat	*Antrozous pallidus*	none	Watch List	foraging
Brazilian Free-Tailed Bat	*Tadarida brasiliensis*	none	Watch List	foraging
Other Mammals				
Mule Deer	*Odocoileus hemionus*	none	Protected Big Game Mammal	foraging
Desert kangaroo rat	*Dipodomys deserti*	none	Watch List	foraging/burrowing
Birds				
Bald eagle	*Haliaeetus leucocephalus*	BCC	At-Risk	fly over/foraging
Western Burrowing owl	*Athene cunicularia hypugaea*	BCC	Watch List	nesting/foraging
Ferruginous Hawk	*Buteo regalis*	BCC	At-Risk	fly over/foraging
Golden eagle	*Aquila chrysaetos*	BCC	Watch List	fly over/foraging
Loggerhead shrike	*Lanius ludovicianus*	BCC	Watch List	foraging
Prairie falcon	*Falco mexicanus*	BCC	Watch List	fly over/foraging
Swainson's hawk	*Buteo swainsoni*	BCC	Watch List	fly over/foraging
White-faced ibis	*Plegadis chihi*	none	Watch List	Likely forage in irrigated fields north of project area

Source: (NAS Fallon, 2014a)
Note: BCC = Bird of Conservation Concern.

3.4.3 Environmental Consequences

This analysis focuses on wildlife or vegetation types that are important to the function of ecosystems or are protected under federal or state law or statute.

3.4.3.1 No Action Alternative

Under the No Action Alternative, the Proposed Action would not occur and there would be no change to biological resources. Therefore, no significant impacts to biological resources would occur with implementation of the No Action Alternative.

3.4.3.2 Alternative 1: Up to 20 Megawatts at Sites A and B (Preferred Alternative)

The study area for the analysis of effects to biological resources associated with Alternative 1 includes Sites A and B and all immediately surrounding lands that would potentially be impacted by Alternative 1.

Potential Impacts to Biological Resources:

- Removal of up to 230 acres of black greasewood vegetation
- Wildlife exposed to auditory/visual disturbance, and could be crushed/harmed by construction equipment
- Wildlife foraging, burrowing, and breeding habitats altered in the project area
- Potential for collision mortality due to "lake effect" of panels on bird and bat species

Vegetation

Construction

Under Alternative 1, construction activities at Sites A and B would result in the removal of up to 230 acres of black greasewood vegetation (see Figure 3.4-1). No tree removal would be required for construction of the solar PV system sites.

Although no federally listed plant species are known to occur on NAS Fallon, the potential exists for plants deemed sensitive by the NNHP to occur within the project area; therefore, as described in Table 3.11-2, rare plant surveys would be conducted in the project area prior to construction. If rare plants are found within the project area, appropriate impact avoidance and/or minimization measures would be developed with NAS Fallon and implemented prior to construction (see Table 3.11-2).

Operation

Following construction and during operation, ground cover and other vegetation beneath and near the panels would be trimmed periodically and controlled with herbicides to ensure that vegetation does not obscure or shadow the panels. No new areas of vegetated habitat would require removal beyond those that were removed during the construction phase of Alternative 1. Therefore, there would be no additional impacts to native or natural plant communities.

Wildlife

Construction

Under Alternative 1, wildlife near construction activities would be exposed to auditory and visual disturbance from human presence and construction equipment. Use of construction equipment and vehicles could potentially crush and/or injure wildlife, especially reptiles, small mammals, and burrowing species that are unable to leave the areas of direct impact quickly enough. Wildlife species that are

more mobile, such as birds and larger mammals, would leave the sites during construction and migrate to other more suitable locations.

To avoid impacts to ground-nesting birds potentially occurring in the project area, such as burrowing owls and killdeer (*Charadrius vociferus*), a survey for active nests or nesting activity would be conducted before construction should clearing and grubbing occur during the nesting season (typically March 15 to August 31). If the survey finds active nests, construction personnel would either avoid the nests until fledglings have left, or permitted personnel would relocate the eggs and chicks following all federal and state regulations and permitting requirements.

Special status wildlife species would be subject to the same types of impacts described in the above paragraph. It is highly unlikely that any special status species would be present in Sites A and B during construction activities. Pre-construction nesting surveys would be conducted as described above to reduce potential impacts to special status species.

Operation

Operation of the solar PV system would not result in a complete loss of foraging, burrowing, breeding, or nesting habitat for wildlife, including special status species. However, such habitats would be substantially altered by the placement of the solar PV arrays and chain link fencing around the solar PV system. Chain link fencing would present barriers to wildlife overland movement, especially to larger species. It is expected that smaller species, such as small rodents, would be able to fit through the chain link fencing. However, larger animals would likely be able to move around the fences without expending energy to the point of affecting major life functions. The solar panels and the fencing surrounding the solar PV arrays and stations would alter the local environment to the point that hiding spots, preying strategies, and food availability would likely be changed.

Little research has been done to date concerning solar projects and potential impacts to birds and bats. However, bird and bat mortalities have been documented at utility-scale solar projects in southern California (Kagan, Viner, Trail, & Espinoza, 2014); (BLM, 2014). Three main causes of bird mortality have been documented at solar energy facilities in southern California: impact trauma, solar flux, and predation (Kagan, Viner, Trail, & Espinoza, 2014). Solar flux has been identified as a potential threat to bird species at solar power towers that use mirrors to focus solar energy to a tower. However, in Kagan et al. 2014 (Kagan, Viner, Trail, & Espinoza, 2014), of 61 bird deaths analyzed at a solar PV system, solar flux was not documented as a cause of death in a single case, as solar PV systems do not create temperatures high enough to scorch birds that fly over.

Impact trauma was the leading cause of bird death documented at a single PV site in southern California in 2014 (Kagan, Viner, Trail, & Espinoza, 2014). A large proportion of birds killed at utility-scale solar projects die from striking project components because panels are oriented vertically, or, from apparently mistaking the solar PV arrays for water (Kagan, Viner, Trail, & Espinoza, 2014). “Lake effect” is commonly used to describe the phenomenon whereby birds, bats, and their insect prey can mistake a reflective solar facility for a water body because they share several characteristics, namely large, smooth, dark surfaces that reflect horizontally polarized sunlight and skylight (Upton, 2014).

Many insects rely on polarized light as a cue to indicate the presence of lakes and rivers (Horvath, et al., 2010). Aggregations of flying insects at solar PV panels likely attract insect-eating birds and/or bats, thereby increasing the likelihood of bird/bat collisions with solar PV panels (Kagan, Viner, Trail, & Espinoza, 2014). Although solar PV panels are inherently absorptive (i.e., non-reflective), they do reflect horizontally polarized light similar to the way a lake’s smooth, dark surface horizontally polarizes

reflected sunlight and skylight. This feature may confuse birds that use polarized light for orientation or behavioral cues (Desert Renewable Energy Conservation Plan Independent Science Advisors, 2010). Lake effect seems to be most influential when panels or heliostats are oriented horizontally, collectively forming a smooth, continuous surface (Kagan, Viner, Trail, & Espinoza, 2014). As noted in Section 2.3.2.2 above, the PV panels associated with the Proposed Action would be oriented at an angle of approximately 35 degrees, and thus would not present a smooth, continuous horizontal surface that could potentially be more attractive and thus potentially more harmful to birds or bats. Further, visual cues such as contrasting or ultraviolet-reflective dividing strips placed on solar PV panels may break up the reflection and reduce attraction of aquatic invertebrates and insects (Horvath, et al., 2010) (The Royal Society for the Protection of Birds, 2014).

Estimating the number of birds and bats that may be injured or killed due to lake effect from implementation of Alternative 1 is impossible at this time because of the lack of studies on this phenomenon as it relates to solar projects. Under Section 1502.22 of CEQ Regulations for Implementing NEPA, "when an agency is evaluating reasonably foreseeable … adverse effects on the human environment … and there is incomplete or unavailable information, the agency shall always make clear that such information is lacking" (40 CFR section 1502.22). While the collective evidence suggests that lake effect does contribute to avian mortalities on solar PV projects, no scientifically rigorous studies have been conducted to test the validity of this conclusion. However, based on the available data, utility-scale solar power projects have the potential to cause some mortality to birds and bats. Efforts to minimize potential lake effect impacts to birds and bats from the implementation of Alternative 1 can still be achieved by using the best available science and appropriate design specifications during construction.

While acknowledging the incompleteness of the current data on the topic, this analysis concludes that any potential lake effect-related bird or bat strikes at the proposed solar PV array location(s) would not rise to the level of a significant impact for purposes of NEPA analysis. Therefore, under Alternative 1, no population-level adverse effects to birds or bats as a result of mortalities related to potential "lake effect" of solar PV panels would occur.

As discussed in Table 3.11-2, regular monitoring of the solar PV system sites would be conducted to assess any potential impacts the solar PV array might be having on wildlife and special status species, including visual reconnaissance of dead and/or injured species. The results of the monitoring surveys would be reported to the USFWS and the Nevada Department of Wildlife for comments and recommendations to minimize impacts from continuing operations.

Threatened and Endangered Species

No threatened or endangered species are likely to occur within Sites A and B. Therefore, implementation of Alternative 1 would result in no impact on threatened or endangered species.

Summary

Up to 230 acres of black greasewood vegetation would be removed under Alternative 1. Wildlife occurring in Sites A and B would potentially be subjected to auditory/visual disturbances; potential for injury or mortality from construction equipment; and altered foraging, nesting, and breeding habitat in Sites A and B. However, Alternative 1 is not likely to have a significant impact on any local or regional species' population or sensitive habitat. It is unlikely that any special status species would be directly impacted by Alternative 1. Therefore, Alternative 1 would not result in significant impacts to biological

resources. Measures incorporated herein (see Table 3.11-2) would further avoid or minimize the less than significant impacts associated with Alternative 1.

3.4.3.3 Alternative 2: Up to 15 Megawatts at Site A

The study area for the analysis of effects to biological resources associated with Alternative 2 includes Site A and all immediately surrounding lands that would potentially be impacted by Alternative 2.

Under Alternative 2, impacts to biological resources associated with construction and operation would be as generally described for those associated with Alternative 1. Potential differences in impacts to biological resources under Alternative 2, as compared to Alternative 1, are described below.

Vegetation

Under Alternative 2, construction activities at Site A would result in the removal of up to 126 acres of black greasewood vegetation (see Figure 3.4-1). As described in Table 3.11-2, rare plant surveys would be conducted in the project area prior to construction. If rare plants are found within the project area, appropriate avoidance and/or minimization measures would be developed with NAS Fallon and implemented prior to construction (see Table 3.11-2). Operation impacts to vegetation would be as generally described for Alternative 1, but would occur only at Site A.

Wildlife

Construction and operational impacts to wildlife would be as generally described for Alternative 1, but would occur only within Site A (approximately 126 acres).

Threatened and Endangered Species

No threatened or endangered species are likely to occur within Site A. Therefore, implementation of Alternative 2 would result in no impact on threatened or endangered species.

Summary

Up to 126 acres of black greasewood vegetation would be removed under Alternative 2. Wildlife occurring in Site A would potentially be subjected to auditory/visual disturbances; potential for injury or mortality from construction equipment; and altered foraging, nesting, and breeding habitat in Site A. However, Alternative 2 is not likely to have a significant impact on any local or regional species' population or sensitive habitat. It is unlikely that any special status species would be directly impacted by Alternative 2. Therefore, Alternative 2 would not result in significant impacts to biological resources. Measures incorporated herein (see Table 3.11-2) would further avoid or minimize the less than significant impacts associated with Alternative 2.

3.5 Visual Resources

This discussion of visual resources includes the natural and built features of the landscape visible from public views that contribute to an area's visual quality. Visual perception is an important component of environmental quality that can be impacted through changes created by various projects. Visual impacts occur as a result of the relationship between people and the physical environment. Public concern over adverse visual impacts can be a major source of project opposition.

3.5.1 Affected Environment

Visual resources consist of NAS Fallon Operations Area to the east, open agricultural fields and natural desert scrub vegetation to the north and west, and NAS Fallon family housing to the south at a distance of approximately 1,200 feet (see Appendix A, Visual Resources figures). The project area consists of native vegetation (black greasewood vegetation) and dunes. This area is flat with little topographic relief. The visible landscape elements consist of power lines, dirt roads, agricultural fields, distant mountains, and the NAS Fallon Operations Area.

3.5.2 Environmental Consequences

The evaluation of visual resources in the context of environmental analysis typically addresses the contrast between visible landscape elements. Collectively, these elements comprise the aesthetic environment, or landscape character. The landscape character is compared to the Proposed Action's visual qualities to determine the compatibility or contrast resulting from the buildout and demolition activities associated with the Proposed Action.

3.5.2.1 No Action Alternative

Under the No Action Alternative, the Proposed Action would not occur and there would be no change to visual resources. Therefore, no significant impacts would occur with implementation of the No Action Alternative.

3.5.2.2 Alternative 1: Up to 20 Megawatts at Sites A and B (Preferred Alternative)

The site proposed for Alternative 1 and adjacent lands define the study area for visual resources analyses.

Potential Impacts to Visual Resources:

- Temporary presence of construction equipment, workers, and materials
- Dust; potentially migrating off-site
- 65-foot high transmission line poles
- 15-foot high solar PV system where native vegetation used to be

Construction

During the estimated 24-month construction phase of the proposed solar PV system, short-term visual impacts from construction would include the staging of construction equipment, vehicles, materials, and workers, and the generation of dust during site grading. Because the area is topographically flat, visual effects from construction activities would be limited to adjacent roadways and parcels. Impacts to the visual environment from construction would be temporary and depend on the viewer's proximity and line-of-sight to Sites A and B.

The visual character of the site would change from native vegetation and dunes to a solar PV system up to approximately 15-feet high. In addition, long-term visual impacts from construction would include removal of native vegetation and dunes. In addition, 85-foot high utility poles would be installed along the existing utility corridor west of Sites A and B, and potentially south of Site A. Once installed, approximately 65 feet of the poles would be visible. As the topography of the area is relatively flat, the solar PV system would be viewable from nearby roadways, buildings on NAS Fallon, and adjacent parcels.

Operation

The solar PV panels would have an anti-reflective coating that would improve light absorption and reduce or eliminate the potential for glint and glare impacts to NAS Fallon operations. The change in

visual character from desert lands to a solar PV system would be consistent with regional development, where multiple solar PV projects are active, under construction, or proposed.

Summary

Construction impacts to visual resources would be temporary and limited to viewers from adjacent roadways, agriculture parcels, the operations area on NAS Fallon, and NAS Fallon family housing located to the south of the proposed solar PV system. The proposed solar PV system would represent a visual change from open desert views to developed utility infrastructure, but would be generally consistent with the adjacent NAS Fallon visual setting (i.e., developed infrastructure). The solar PV panels would have an anti-reflective coating that would improve light absorption and reduce or eliminate the potential for glint and glare impacts to NAS Fallon operations. Therefore, implementation of Alternative 1 would not result in significant impacts to visual resources.

3.5.2.3 Alternative 2: Up to 15 Megawatts at Site A

Under Alternative 2, impacts to visual resources would be similar as described for Alternative 1, though at a smaller scale due to the smaller site footprint. Therefore, implementation of Alternative 2 would not result in significant impacts to visual resources.

3.6 Utilities

For the purpose of this EA, a utility is defined as a linear facility (such as a pipe or a cable) used to convey water, electricity, fuel, telecommunications data (e.g., telephone, cable television), storm water, gas, sewer, or steam. Utilities may be placed aboveground (e.g., mounted on utility poles or suspended on bridges), or they may be installed in underground conduits. Utilities fulfill a critical function in developed areas by supplying water, power and telecommunications data to public and private users, removing wastewater for treatment, and managing the flow of storm water over impervious surfaces, such as roads and parking lots.

As the Proposed Action involves the construction and operation of a solar PV system, it is not expected to increase demand or affect fuel, telecommunications, storm water, gas, sewer or steam facilities, or services. Given the nature of the Proposed Action, this section primarily discusses electricity but also considers potable water supply and its use for dust suppression during construction and periodic cleaning of panels during operation.

3.6.1 Affected Environment

Electricity

NV Energy provides electricity to NAS Fallon. NV Energy, NAS Fallon Public Works Department, and the City of Fallon Engineering and Public Works Department jointly maintain transmission and distribution lines that service the installation (NAS Fallon, 2014b).

There is an existing 69-kV transmission line located south of Site A that has capacity for handling up to 20 MW of additional power. An electrical substation is located east of the proposed project location (see Figure 2-1). The substation is connected to the existing 69-kV transmission line.

Water

Groundwater provides NAS Fallon and the City of Fallon with potable water. NAS Fallon Public Works Department provides potable water services for the installation, while the City of Fallon Engineering and

Public Works Department provides water services to the surrounding area (NAS Fallon, 2014b). Raw groundwater is drawn from wells and is treated at the City of Fallon Water Treatment Plan. Treated water is then distributed to NAS Fallon and city residents through systems maintained by the NAS Fallon Public Works Department and City of Fallon Engineering and Public Works Department, respectively (NAS Fallon, 2015c).

3.6.2 Environmental Consequences

The evaluation of utilities impacts in the context of environment consequences examines the potential impacts on publicly provided utilities (electricity and water) during the construction and operation of the proposed solar PV system. Direct impacts may affect the ability of publicly provided utilities to meet local demands for service.

3.6.2.1 No Action Alternative

Under the No Action Alternative, the Proposed Action would not occur and there would be no change to utilities. Therefore, no impacts would occur with implementation of the No Action Alternative.

3.6.2.2 Alternative 1: Up to 20 Megawatts at Sites A and B (Preferred Alternative)

Construction

Electricity

Under Alternative 1, power used by construction equipment and vehicles would primarily be generated from the consumption of diesel and gasoline. Temporary and localized power disruption could potentially occur when the proposed solar PV system is brought on-line. However, such a disruption would be temporary and with backup generators provided for the installation, no appreciable impacts would occur to the public or NAS Fallon's mission.

Potential Impacts to Utilities:

- Temporary and localized power disruptions when the solar PV system is brought on-line
- Beneficial electrical impacts to the region (e.g., increased supply)

Water

Proposed construction activities would require water, primarily for dust suppression during initial grading and site preparation activities. The water would be brought to the project area by the private partner; NAS Fallon would not supply water for construction activities. If available and feasible, reclaimed water (tertiary treated) would be used during construction and potable water use would be minimized to the extent practicable.

Operation

Electricity

Under the Model 2 approach, once the proposed solar PV system is operational, the Navy would receive compensation for the lease, but would not directly receive the power generated by the solar PV system. The private partner would sell the generated power to regional customers. Under the Model 3 approach, once the proposed solar PV system is operational, the Navy would purchase and use all of the electricity generated from the solar PV system. The integration of solar PV power within the region and/or NAS Fallon would improve power supply, reliability, and availability. Implementation of

Alternative 1 would support achievement of the Navy's renewable energy goals and strategies and contribute towards meeting Nevada's renewable portfolio standard.

Water

Cleaning of the solar PV panels would typically occur twice a year during regular maintenance. The cleaning would require deionized water. Using a factor of 0.05 acre-feet of water per MW, to clean up to 20 MW of solar PV panels, an annual volume of approximately 2 acre-feet of deionized water would be required. The private partner would use deionized water provided by an off-site source. The water would be trucked in and then applied to the solar PV panels for cleaning. The periodic cleaning process would produce little to no over-spray or accumulation of water below the solar PV panels.

Summary

Under Alternative 1, there would be the potential for temporary and localized power disruption when the proposed solar PV system comes on-line. Alternative 1 would support achievement of Navy's renewable energy goals and strategies. Under the Model 2 and combination of Models 2 and 3, there would be an increase in regional power supply. Under Model 3, a local renewable energy source would be created for NAS Fallon resulting in beneficial impacts at NAS Fallon. Existing electrical infrastructure would be sufficient to support the proposed solar PV system. The private partner would use off-site sources to meet all project water needs; NAS Fallon would not supply the water. There would be no impact to NAS Fallon water supply or use. Therefore, implementation of Alternative 1 would not result in significant impacts to utilities.

3.6.2.3 Alternative 2: Up to 15 Megawatts at Site A

Under Alternative 2, impacts to utilities would similar as described for Alternative 1, though there would be a smaller increase in regional power supply. In addition, there would be a slight decrease in water necessary for dust suppression during construction and for cleaning of the PV solar panels once the proposed PV system has been installed. Therefore, implementation of Alternative 2 would not result in significant impacts to utilities.

3.7 Transportation

For the purpose of the EA, transportation refers to the movement of people, goods, and/or equipment on a surface transportation network. A surface transportation network may include many different types of facilities that serve a variety of transportation modes, such as vehicular traffic, public transit, and non-motorized travel (e.g., pedestrians and bicycles). The relative importance of various transportation modes is influenced by development patterns and the characteristics of transportation facilities. In general, compact areas that contain a mixture of land uses tend to encourage greater use of public transit and/or non-motorized modes, especially if pedestrian, bicycle, and transit facilities provide desired connections and are well operated and well maintained. More dispersed and segregated land uses tend to encourage greater use of passenger cars and other vehicles, particularly if extensive parking is provided. Given that the Proposed Action is surrounded primarily by agricultural land uses and undeveloped land, the primary mode of access for the Proposed Action would be by vehicular traffic moving on both public roadways and internal streets adjacent or near NAS Fallon.

3.7.1 Regulatory Setting

Interstates, U.S. routes, and state highways fall under the jurisdiction of Nevada Department of Transportation (NDOT). Other roadways are under county or city jurisdictions, which, for the purposes of this analysis, are Churchill County and the City of Fallon. The roadway network within NAS Fallon is under the control of the Navy.

3.7.2 Affected Environment

The affected environment for transportation includes the internal road network of NAS Fallon and surrounding public streets in Churchill County. Regional access to the area is provided by the intersection of U.S. Route 50 (Lincoln Highway) and U.S. Route 95 (Schurz Highway). U.S. Route 50 runs generally east/west through the City of Fallon before turning southeast towards the City of Salt Wells southeast of the Installation. U.S. Route 95 runs north/south through the City of Fallon, connecting with Interstate 80 approximately 32 miles north of the City of Fallon. U.S. Route 50 and U.S. Route 95 connect to local roads leading to the following three access gates: Main Gate, Union Gate, and the South Gate. Primary access to the project area is from the north via Wildes Road to Pasture Road (Figure 3.7-1).

According to a capacity analysis cited in the County's General Plan, there are number of transportation network deficiencies near NAS Fallon. The deficiencies noted were congestion on access routes to NAS Fallon and intersection safety along Wildes Road, specifically at the Wildes Road and Pasture Road intersection (Churchill County, 2010). The *Fallon Urban Area 2020 Transportation Plan* identified a number of roadway capacity improvements and improvement alternatives for the county including ways to address the congestion on access routes to NAS Fallon. These improvements included widening Berney Road, Union Lane, and Wildes Road from U.S. Route 95 to increase capacity and physical improvements to the Wildes Road/Pasture Road intersection and Berney Road/Pasture Road intersection (City of Fallon & Churchill County, 2000). Based on data collected by NDOT (NDOT, 2014) for roadway segments near NAS Fallon, the portion of Pasture Road between SR-118 (Wildes Road) and SR-720 (Union Lane) has an existing average daily traffic volume of 4,637, which is much higher than most roads in the vicinity.

3.7.3 Environmental Consequences

The transportation analysis with respect to environmental concerns analyzes the potential impacts that construction and operation of the Proposed Action may have on local and arterial roadways.

3.7.3.1 No Action Alternative

Under the No Action Alternative, the Proposed Action would not occur and there would be no change to transportation. Therefore, no significant impacts would occur with implementation of the No Action Alternative.

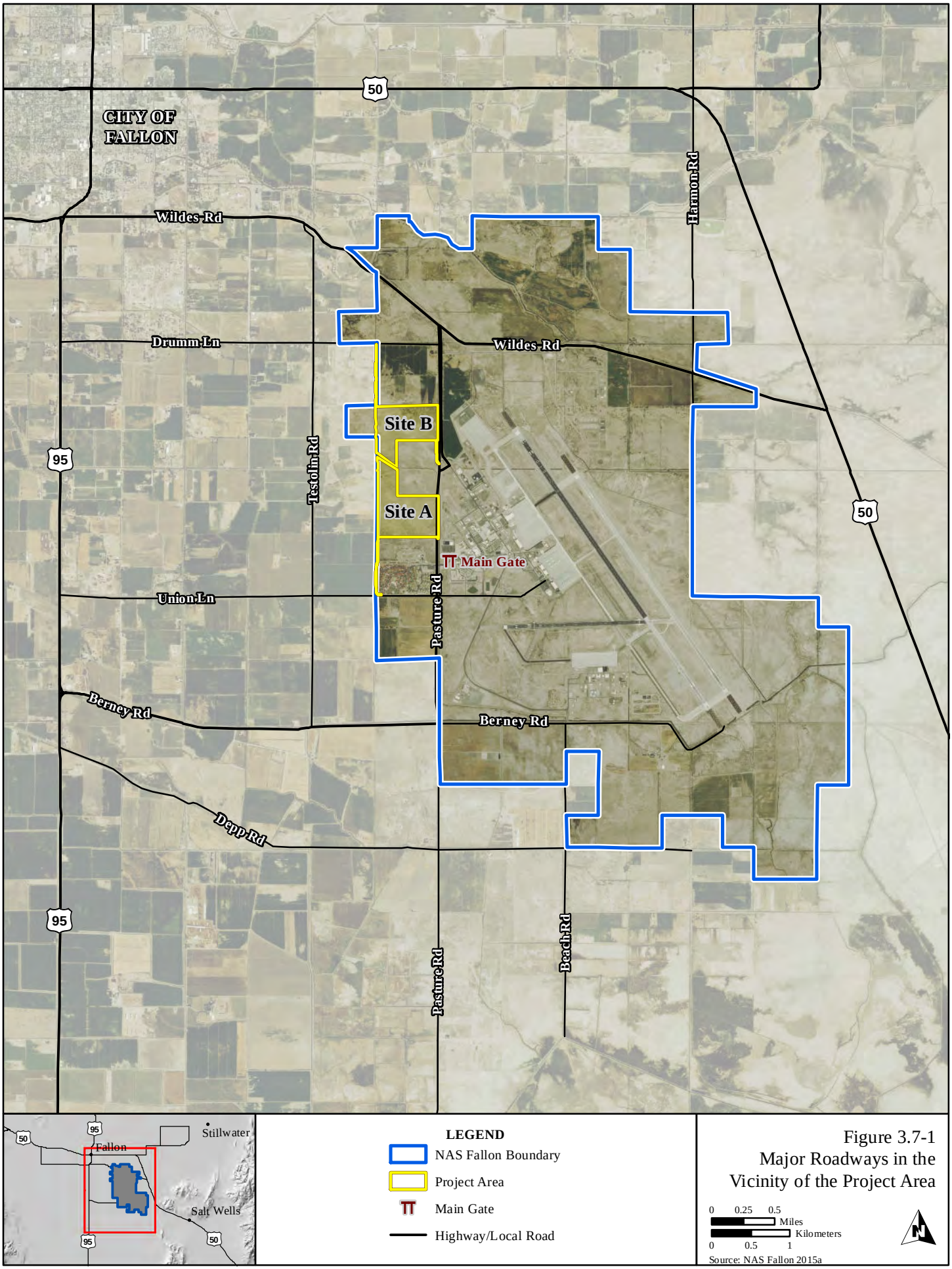


Figure 3.7-1
Major Roadways in the Vicinity of the Project Area

3.7.3.2 Alternative 1: Up to 20 Megawatts at Sites A and B (Preferred Alternative)

Construction

A construction staging area would be delineated within the overall project area and all construction work would be done on-site. Materials would be transported to the project area on existing regional roadways including Pasture Road, Berney Road, Union Lane, Drumm Lane, Wildes Road, U.S. Route 50, and U.S. Route 95. The existing dirt roads would be graded and improved with a gravel surface to provide access to the site.

Potential Impacts to Transportation:

- Minor and temporary increase in average daily traffic levels during construction
- Negligible impact during operation for maintenance trips
- Improved gravel access roads

In addition to the delivery of construction materials and equipment and the removal of construction debris, construction workers would travel to and from Sites A and B over the duration of the construction period. As a result, there would be a temporary increase in daily traffic volume. Construction and worker trips could coincide with the traditional peak commuting periods (typically between 7:00 a.m. and 9:00 a.m. and 4:30 p.m. to 6:30 p.m.). The increase in daily traffic volume would be distributed to Pasture Road, Berney Road, Union Lane, Drumm Lane, Wildes Road, U.S. Route 50, and U.S. Route 95. The increase in daily traffic volume would be temporary and associated with the delivery of construction equipment, the removal of debris from the site, and from worker trips.

Access to Site A would be primarily along the unnamed road that extends from Union Lane, and access to Site B would be primarily along the unnamed road that extends from Drumm Lane. Use of the access road located south of Site A and use of the access road located near the north and east border of Site B may also occur, but only when necessary and would only occur during non-peak commute hours. Because traffic congestion along Pasture Road at the Main Gate entrance occurs during peak commute hours, these routes near Pasture Road would be avoided to maximum extent practical during that period.

Operation

Maintenance activities that would occur periodically and would require a small number of vehicle trips per year to the proposed solar PV system. All maintenance trips would occur outside of the fenced areas of NAS Fallon, and would not contribute toward delays and queues at the NAS Fallon access gates. Therefore, no operational impacts to regional transportation would occur.

Summary

Alternative 1 would involve temporary increases in traffic associated with construction and operation activities. Some of the trips associated with these activities (i.e., delivery of construction materials and equipment; the removal of construction debris; and operations and maintenance) would be periodic, and would not regularly add traffic to the roadway network for a prolonged period. Construction-related vehicle trips would occur over approximately 24 months. Vehicle trips associated with operational maintenance would be negligible. Therefore, implementation of Alternative 1 would not result in significant impacts to transportation.

3.7.3.3 Alternative 2: Up to 15 Megawatts at Site A

Under Alternative 2, impacts to transportation would be similar to those described for Alternative 1, with the exception that the access roads to Site B would not be used. Alternative 2 would result in similar (though slightly less) traffic generation as Alternative 1 with construction of the panels occurring off-site and project trips generated by delivery of construction materials and equipment; the removal of construction debris; and operations and maintenance. As with Alternative 1, Alternative 2 would temporarily increase traffic associated with the delivery of construction operation equipment, the removal of debris from Site A, and from worker trips. Therefore, implementation of Alternative 2 would not result in significant impacts to transportation.

3.8 Public Health and Safety

This discussion of public health and safety includes consideration for any activities, occurrences, or operations that have the potential to affect the safety, well-being, or health of members of the public. The primary goal is to identify and prevent potential accidents or impacts on the general public.

A safe environment is one in which there is no, or optimally reduced, potential for death, serious bodily injury or illness, or property damage. Human health and safety addresses public safety during construction, demolition, and renovation activities; and during subsequent operations of those facilities. Various stressors in the environment can adversely affect human health and safety. Identification and control or elimination of these stressors can reduce risks to health and safety to acceptable levels or eliminate risk entirely.

Emergency services are organizations which ensure public safety and health by addressing different emergencies. The three main emergency service functions include police, fire and rescue service, and emergency medical service.

The Air Installation Compatible Use Zone (AICUZ) Program delineates accident potential zones (APZs), which are areas around an airfield where an aircraft mishap is most likely to happen. APZs are not predictors of accidents nor do they reflect accident probability. The DoD defines an APZ as a planning tool for local planning agencies. The APZs follow departure, arrival, and flight pattern tracks from an airfield and are based upon historical accident data.

Environmental health and safety risks to children are defined as those that are attributable to products or substances a child is likely to come into contact with or ingest, such as air, food, water, soil, and products that children use or to which they are exposed.

3.8.1 Regulatory Setting

3.8.1.1 Operational Risk Management

DoD Instruction 6055.07: Mishap Notification, Investigation, Reporting, and Record Keeping

NAS Fallon maintains detailed emergency and mishap response plans to react to an aircraft or ground accident, should one occur. These plans assign agency responsibilities and prescribe functional activities necessary to react to major mishaps, whether on or off base. Response would normally occur in two phases. The initial response focuses on rescue, evacuation, fire suppression, safety, elimination of explosive devices, ensuring security of the area, and other actions immediately necessary to prevent loss of life or further property damage. The initial response element usually consists of the Fire Chief, who would normally be the first On-scene Commander, fire-fighting and crash-rescue personnel, medical

personnel, security police, and crash-recovery personnel. The second phase is the mishap investigation, which is comprised of an array of organizations whose participation would be governed by the circumstances associated with the mishap and actions required to be performed (DoD, 2011).

Federal Aviation Regulations Part 91: General Operating and Flight Rules

Aircraft safety is based on the physical risks associated with aircraft flight. Military aircraft fly in accordance with Federal Aviation Regulations Part 91, *General Operating and Flight Rules,* which govern such things as operating near other aircraft, right-of-way rules, aircraft speed, and minimum safe altitudes. These rules include the use of tactical training and maintenance test flight areas, arrival and departure routes, and airspace restrictions as appropriate to help control air operations. In addition, naval aviators must also adhere to the flight rules, air traffic control, and safety procedures provided in Navy guidance (FAA, 2015a).

3.8.2 Affected Environment

The Proposed Action would be sited in accordance with established land use development guidelines addressing safety, functionality, and environmental protection zones. The project area is located on undeveloped former BLM lands that were recently transferred to the Navy and is removed from major population centers and public facilities. The affected environment for the Proposed Action is focused on the operating areas of the installation, specifically the airspace.

3.8.2.1 Installation Operations and Airfield Surfaces

The goal of the AICUZ Program is to protect the health, safety, and welfare of those living on and near a military airfield while preserving the operational capability of the airfield. The AICUZ recommends compatible land uses to local communities with planning and zoning authority in the airfield environs that will be compatible with noise levels, accident potential and obstruction clearance criteria associated with military airfield operations. The AICUZ boundary is generally defined as that area contained within the accident potential and noise zones. The development of the final boundary of the AICUZ shall also take into account natural and manmade features that can impact land use development underlying the imaginary surfaces of the airfield (Navy, 2008b). Sites A and B are located less than one mile from the primary surface of the runway, under the Inner Horizontal Surface and Noise Zone 2 (Figure 3.8-1).

3.8.2.2 Range Operations and Safety Zones

Explosive Safety Quantity Distance (ESQD) arcs are safety zones established to reduce the risk of injury or harm to personnel based on the potential locations of the explosion and how far it could reach. No ESQD arcs overlap Site A; however, a small area of the eastern portion of Site B and part of Pasture Road are encumbered by an ESQD arc (Figure 3.8-2). The Explosive Safety Exemption EIA-81 for NAS Fallon permits non-labor intensive activities such as cattle grazing and Alfalfa hay on NAS Fallon Greenbelt lands (AMHAZ, 2015).

3.8.2.3 Emergency Services

Police protection and emergency response on NAS Fallon is provided by the NAS Fallon Security Department. The Security Department may work in conjunction with other local law enforcement branches, such as the Fallon Police Department or Churchill County Sheriff, as necessary (Churchill County, 2015).

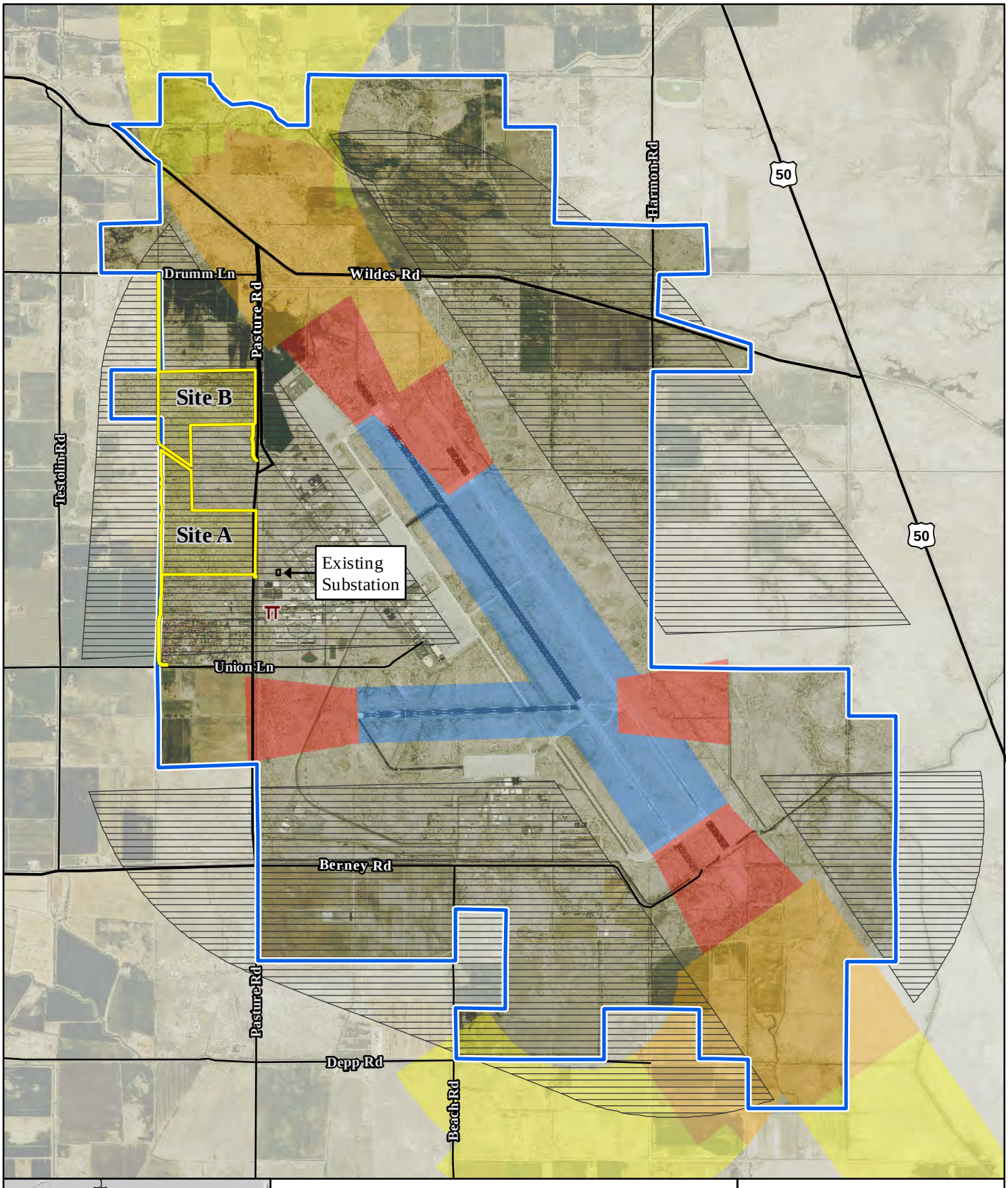


Figure 3.8-1
Imaginary Surfaces
at NAS Fallon

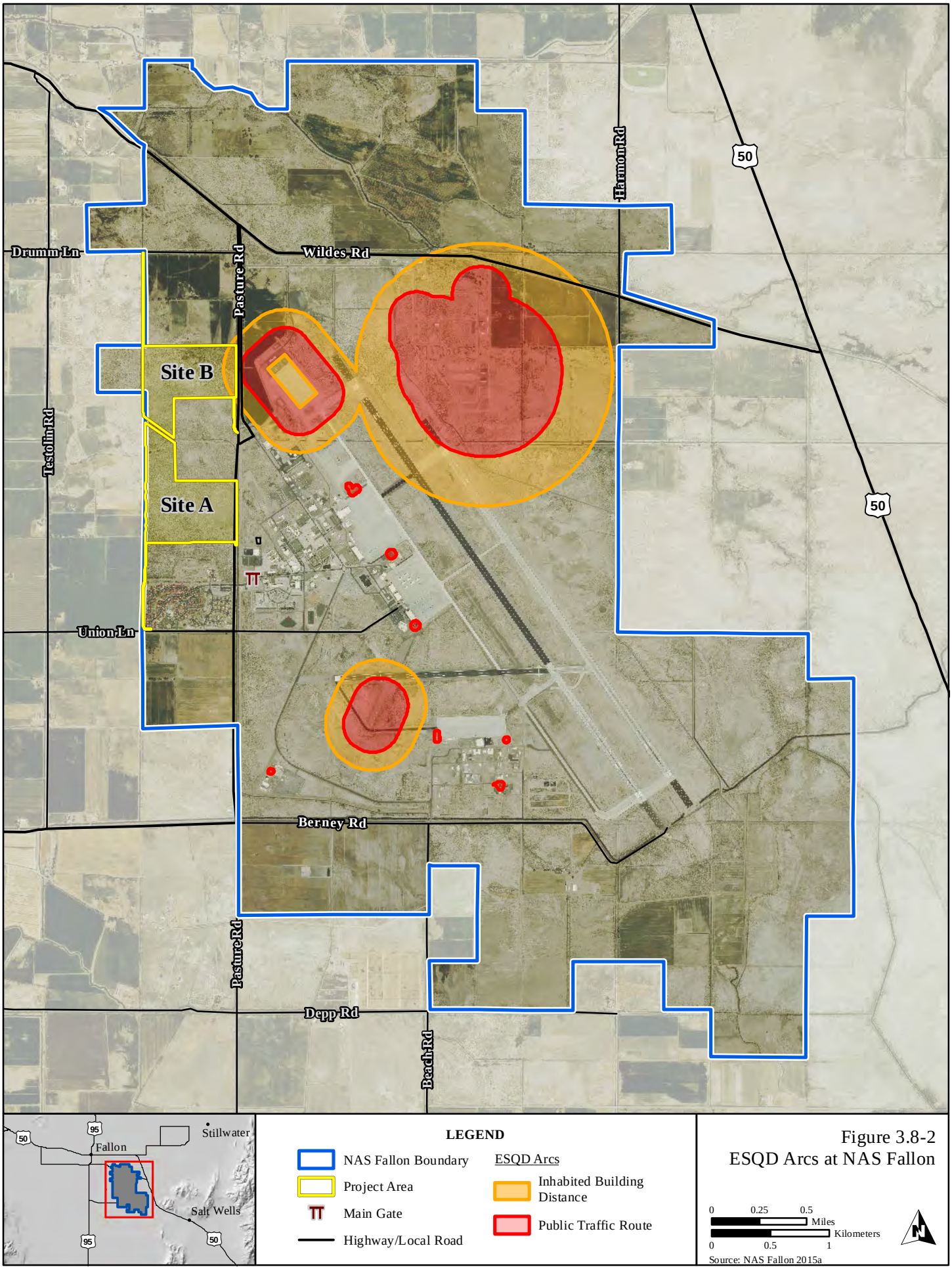


Figure 3.8-2
ESQD Arcs at NAS Fallon

Source: NAS Fallon 2015a

Fire protection on NAS Fallon is provided by the NAS Fallon Fire Department. In surrounding areas, fire protection is provided by the Fallon/Churchill Volunteer Fire Department which currently averages 400 fire and extrication calls per year and has an average response time of less than 6 minutes per call (Churchill County, 2015).

3.8.2.4 Flight Safety: Airspace Penetration, Reflectivity, and Communications Interference

The project area is located less than one mile from the primary surface of the runway and beneath the Inner Horizontal Imaginary Surface. The placement of solar projects near an airfield must assess three factors: airspace penetration, reflectivity, and interference with communications systems. A substantial amount of research has recently been conducted on solar energy technologies and their potential safety impacts on aviation.

Airspace Penetration

For airspace penetration, objects or facilities cannot extend into the "imaginary surfaces" that define the navigable airspace. Such surfaces are closest to the ground nearest the runway and become higher with distance. Because solar PV projects, generally, extend only a few feet above the ground, the Federal Aviation Administration (FAA) has concluded that solar PV arrays can be located relatively close to a runway without penetration issues (FAA, 2010). Denver International, Fresno Yosemite, Bakersfield Meadows Field, and Oakland International all have ground solar panels in proximity to active runways, while numerous other large airports (e.g., San Francisco International, Houston George Bush, and Boston Logan) have roof-mounted systems (FAA, 2010).

Reflectivity

With growing numbers of solar energy installations throughout the U.S., glare from solar PV arrays and concentrating solar systems has received increased attention as a hazard for pilots, air-traffic control personnel, motorists, and others.

The amount of light reflected off a solar panel surface depends on two primary factors: the amount of sunlight hitting the surface and the reflectivity of the surface. As such, reflectivity problems preclude the use of several types of solar energy technologies at the NAS Fallon sites. As discussed in the *FAA's Technical Guidance for Evaluating Selected Solar Technologies on Airports* (FAA, 2010), these technologies use mirrors to focus sunlight onto a specified surface and produce substantial reflectivity (up to 90 percent of the sunlight received), thereby, posing a glare hazard that may blind or distract pilots on approach to the runway (FAA, 2010). Therefore, the FAA recommends against placing reflective technology (i.e., Concentrated PV Arrays [Fields], Concentrated Solar Power, Parabolic Trough, Linear Fresnel Reflectors and Dish Engine) within airport boundaries. In contrast, the FAA study notes that solar PV employs glass panels designed for efficiency to maximize absorption and minimize reflection (FAA, 2015b).

From a study the FAA conducted of pilots and air traffic controllers at six airports where solar facilities have been operational for one to three years, the FAA concluded that significant glare is not occurring during operation of the airports, or, if it is occurring, it is not creating a negative effect (FAA, 2010). Another recent study, completed by Nellis Air Force Base and NV Energy, found that, under the worst-case scenario, a slight potential would exist for glint resulting from reflected direct sunlight off of flat-plate solar PV modules and that this glint is similar to what would result off of water and less than that produced by weathered, white concrete or snow. The study concluded that pilots would be able to mitigate this worst-case scenario glint by using glare shields and sunglasses, which would reduce light

reflection by approximately 80 percent and render any reflected sunlight from solar panels insignificant (U.S. Air Force, 2011).

In the 2011 *Airport Cooperative Research Program's Investigating Safety Impacts of Energy Technologies on Airports and Aviation* (Barrett & Devita, 2011), FAA tower personnel and airport managers from several airports were interviewed for anecdotal information about reflectivity from operating solar PV systems at airports. Two notable sites are Meadows Field in Bakersfield, California, which hosts an 800 kW solar facility, located approximately 250 feet from the runway taxiway, and Fresno Yosemite International Airport in Fresno, California, where there is a 2 MW facility in the Runway Protection Zone (the civilian equivalent of the military APZ) near the end of one of the runways. The Meadows Field solar project has been in operation since January 2009, whereas Fresno's project has been operational since June 2008. In both cases, the air traffic controllers stated that glare has not affected their operations and they had not received complaints from pilots about glare being a problem (Barrett & Devita, 2011).

A recent National Renewable Energy Laboratory study *Implementing Solar Technologies at Airports* (NREL, 2014), analyzes the impacts of siting solar PV systems at airports and airfields, and cites current policy and guidance, including the potential for ocular impacts to pilots from glint and glare from the solar facilities. In addition to the FAA 2010 guidance discussed above, which is under review, two other recent documents address glint and glare with respect to solar facilities sited at airports. In Interim Policy, 78 CFR 63276 *FAA Review of Solar Energy System Projects on Federally Obligated Airports* (FAA, 2013), the FAA and Department of Energy established a standard for measuring the ocular impact of glint and glare from reflective surfaces, as well as thresholds for when glint and glare would impact aviation safety. The solar glare hazard analysis plot and associated Solar Glare Hazard Analysis Tool (SGHAT) are the methods recommended in the interim policy. The policy also encourages the use of the guidance and tools for non-federally obligated airports or solar energy systems adjacent to airports.

The DoD memorandum "Glint and Glare Issues on or Near Department of Defense Aviation Operations" (Conger, 2014) similarly acknowledges the FAA's conclusion that glint and glare from some solar energy systems could result in ocular impact to pilots and addresses DoD requirements for assessing it (relative to military aviation operations and mission compatibility) using the SGHAT and other methods. The DoD memorandum addresses solar PV projects that are within 2 nautical miles (2.3 statute miles) of military aviation operations, whether those projects are within or outside of installation boundaries.

The SGHAT is used to calculate the potential for after-image and eye damage, which is divided into three categories: (1) potential for permanent eye damage (retinal burn), (2) potential for temporary after-image, and (3) low potential for temporary after-image. The FAA interim policy (FAA, 2013) states that a solar energy system constructed at a federally obligated airport must meet the following standards:

1. No potential for glint or glare in the existing or planned Airport Traffic Control Tower cab, and
2. No potential for glare or low potential for after-image along the final approach path for any existing landing threshold or future landing thresholds as shown on the current FAA-approved airport layout plan. The final approach path is defined as two miles from 50 feet above the landing threshold using a standard three-degree glide path.

However, based on Office of the Secretary of Defense guidance, the determination of glint/glare risk and its acceptability is at the discretion of the Navy - in particular, the base and its tenant commands, with concurrence coming from the installation Commanding Officer.

Communications Interference

Communications interference can result from solar energy technologies. Potential impacts increase with larger structure size (and cross section) and shorter distance to radar facilities. Transmission lines can also cause interference resulting from electromagnetic signals issuing from the lines. Typically, concern about electromagnetic release is confined to 345-kV or greater lines.

Radar interference can occur when objects are located too close to a radar antenna and reflect or block the transmission of signals between the radar antenna and the receiver. Navigational aids can also be impacted, but they include passive systems with no transmitting signals. Impacts on infrared communications can result because the solar collectors and receivers can retain and emit heat, and the heat they release can be picked up by infrared communications in aircraft causing an unexpected signal (Barrett & Devita, 2011).

Communication systems interference includes negative impacts on radar, navigational aids, and infrared instruments. While Global Positioning Systems that communicate with satellites and limit the need for traditional surveillance radar are being employed more widely and are expected to be the fundamental component of future navigational systems, the integrity of traditional radar facilities remains central to the current operational environment (Barrett & Devita, 2011).

3.8.2.5 Bird Aircraft Strike Hazard

There are at least 69 bird species that represent Bird and Wildlife Air Strike Hazard (BASH) potential at NAS Fallon with over 200 species in neighboring areas. Sixty-five perfect of all strikes occur in the airfield environment with a greater percentage occurring when migratory species are present during the months of September through February (NAS Fallon, 2013). NAS Fallon's historical annual reported average of bird or wildlife strikes is eighteen (NAS Fallon, 2016a).

To identify areas of concern and assist in prevention or reduction of aviation hazards from birds and other wildlife, NAS Fallon has established a Bird Hazard Working Group and published a local BASH plan. The BASH Program is an ongoing process including both information dissemination and active/passive bird control techniques and other procedures involving numerous NAS Fallon aviation, safety, and environmental personnel and include restrictions when adverse conditions to air operations occur (NAS Fallon, 2013).

However, a recent landmark research paper compared bird use of solar PV arrays to that of nearby airfield grasslands to determine whether solar PV arrays receive greater use by birds, thus potentially adversely affecting aviation safety (DeVault, et al., 2014). The year-long study considered 5 U.S. locations where solar PV arrays were close to airfields: 1 in western Ohio, 2 in the high plains of Colorado, and 2 in the Arizona Mountains. Each location consisted of an airfield grassland-solar PV array pair, for a total of 10 study sites.

The results from 1,402 bird surveys suggest that converting airport grasslands to solar PV arrays would not increase hazards associated with bird-aircraft collisions. Fewer bird species were observed in solar PV arrays than in the corresponding airfield grasslands, and overall the level of bird use observed at solar PV arrays was low (DeVault, et al., 2014). Some small birds used solar PV arrays in the summer and to a lesser degree in spring, for shade and perches. Because perches and shade can influence local bird abundance, a qualified biologist supplied by the private partner and approved by NAS Fallon would be responsible for monitoring bird activity at solar PV arrays at times when shade and perches are most important to birds.

Bird use of solar PV arrays has been documented; however, the overall level of bird use of solar PV arrays is lower than in native habitats. In addition, DeVault et al. found that small bird species (i.e., songbirds) were more likely to occur in solar PV arrays, either perched or under panels, than were larger species, such as waterfowl or raptors. Although all bird species pose a potential BASH risk, smaller species that do not form large flocks are less hazardous to aircraft than larger species (DeVault, et al., 2014). Likewise, bird species that tend to form large flocks in agricultural habitats and that also pose a substantial BASH risk, such as European starling (*Sturnus vulgaris*) and blackbirds (Barras, 2009), would likely not utilize the solar PV arrays as frequently as the current agricultural fields, thereby reducing BASH risk.

DeVault et al. found little evidence that birds responded to polarized light reflected by the solar PV panels or by increased abundance or availability of insects attracted to the panels. No bird causalities were observed to be caused by stranding or collision with panels, and birds were rarely observed foraging on or near solar PV arrays. While solar PV arrays were not devoid of birds, observations indicated that solar PV arrays would likely not increase the risk of a damaging bird strikes at most locations. Although birds might be present in solar PV arrays, they do not present risk to aircraft when they are perched- either on, or under the panels. The conversion of airfield habitat to solar PV arrays in some locations could decrease bird-strike risk relative to current grass or other natural land covers used on airports (DeVault, et al., 2014).

3.8.3 Environmental Consequences

The safety and environmental health analysis contained in the respective sections addresses issues related to the health and well-being of military personnel and civilians living on or in the vicinity of NAS Fallon. Specifically, this section provides information on hazards associated with airfield operations and flight safety.

3.8.3.1 No Action Alternative

Under the No Action Alternative, the Proposed Action would not occur and there would be no change to public health and safety. Therefore, no significant impacts would occur with implementation of the No Action Alternative.

3.8.3.2 Alternative 1: Up to 20 Megawatts at Sites A and B

Construction

The construction contractor would develop a health and safety plan consistent with Occupational Safety and Health Administration standards and regulations, including EM 385-1 and Occupational Safety and Health Administration's Electric Power Generation, Transmission and Distribution Standard, 29 CFR 1910.269 (*Solar System Safe Work Practices and Worker Training Requirements*). The plans and procedures would specifically outline health and safety measures related to: solar PV systems; overhead utility lines; aircraft operations; fall protection (competent person training);

Potential Impacts to Public Health and Safety:

- No airspace penetration, reflectivity concerns, or interference with communications
- Solar PV system fenced to minimize potential for unauthorized access
- No substantial increase in BASH
- Glare visible to air traffic control tower from Site A, but not Site B
- Potential for glare to cause an after image for aviators during short periods of the day
- Compatible with ESQD regulations

electrical - lockout/tagout (shock and electrocution); crane and hoist safety; ladder safety; heat stress; personal protective equipment; use of hazardous chemicals; risk of fire (remove fuels and burnable materials from work site); ensure clear marking of solar system components with appropriate warnings; dust control - air monitoring and respiratory hazards; and provide installation safety personnel with copies of all relevant American Heart Association training/medical exams.

Construction activities that have the potential to generate substantial amounts of dust (e.g., initial site grading) would be first coordinated and scheduled with NAS Fallon Operations to avoid potential impacts to aviation training.

Wildlife species that are more mobile, such as birds and larger mammals, would typically leave the area during construction and migrate to other more suitable locations. If there are ground-nesting birds present during construction, construction personnel would either avoid the nests until fledglings have left, or permitted personnel would relocate the eggs and chicks following all federal and state regulations and permitting requirements. Such precautions would reduce the risk to the species as well as any BASH risks for NAS Fallon Operations.

Operation

Airspace Penetration

Alternative 1 would result in the placement of solar PV panels at Sites A and B, which are located west of NAS Fallon's runway (see Figure 2-1). As previously mentioned, the FAA requires assessment of three factors for solar projects near airports: airspace penetration, reflectivity, and interference with communications systems (FAA, 2010). Considering these factors and the proximity of the NAS Fallon runways, the flat-plate solar PV array technology is compatible for use at Alternative 1.

The FAA has concluded that solar PV panels can lie relatively close to a runway without penetration issues due to solar PV configuration options that extend only a few feet above the ground (FAA, 2010). Upon completion, the highest point of the solar PV array of the Proposed Action would be no higher than approximately 15 feet above the ground surface. In addition, 65-foot high utility poles would be installed. The proposed solar PV system would be compatible with NAS Fallon's mission and would be below the 150-foot airfield height restriction (i.e., imaginary surface restriction) and consistent with recommended land uses within Noise Zone 2.

Communication Interference

Typically, concern about electromagnetic release from transmission lines is confined to 345-kV or greater lines, with NAS Fallon proposing to use a new and/or an existing 69-kV transmission line. Electromagnetic wave emissions from solar panels and their supporting facilities for the Proposed Action would not extend over distances sufficient to interfere with radar signal transmissions.

Glint and Glare Hazard

Glint and glare from solar PV facilities are potential concerns for on-base aviation operations due to the potential for ocular impacts on aviators and air traffic controllers, which could affect air traffic safety.

The solar panels used for the Proposed Action would be constructed of dark, light-absorbing materials and would be covered with an anti-reflective coating. As a result, they would reflect as little as two percent of the incoming sunlight, depending on the angle of the sun (FAA, 2010). Certain measures could be used to further minimize impacts from glint and glare, such as optimizing panel placement (both in the direction the panels face and the tilt of the panels) to reduce glint and glare, the use of anti-

reflective coatings on the solar panels, and the use of matte finishes and dark paints on metal surfaces where feasible.

As part of this project, the National Renewable Energy Laboratory completed an assessment of potential glare impacts of the proposed action on aviation operations at NAS Fallon (Van Voorhis Field) using the SGHAT. The assessment analyzed both fixed-tilt and single-axis tracking array concepts located on Sites A and B (Figure 3.8-3). For the fixed-tilt concept, it was assumed that the solar PV panels would be oriented facing due south and titled down from horizontal 30-degrees. For the single-axis tracking concept, it was assumed that rotational axis was parallel to the ground surface and oriented north-south, and that the panels would rotate up to 45-degrees from horizontal from east-to-west. The analysis was completed with respect to the air traffic control tower and various landing patterns and approaches employed by Navy pilots at NAS Fallon (input and feedback were provided by the NASF Air Operations staff).

Figure 3.8-3 Sites A (PV1) and B (PV2) and Air Traffic Control Tower (ATCT) used in SGHAT Analysis

Fixed-Tilt Concept: Results for panels occupying the entirety of Sites A and B indicated that glare would occur to the air traffic control tower from panels on Site A, but not on Site B. Reducing Site A to the area shown in Figure 3.8-4 would eliminate glare to the air traffic control tower. No matter the land allocation, glare with a potential to cause an after image could affect small sections of the landing pattern for short periods of time during the day. Specifically, those sections of the flight pattern to the west of the solar PV array during sunrise hours and west of the solar PV array during the hour leading up to sunset. A review of plots where glare had the potential to cause an after image indicates that, in all cases, the glare intensity was low and could be reduced to low-potential for after image (i.e., acceptable) ranges if the pilots were to employ tinted visors/glasses.

Figure 3.8-4 Reduced Site Footprint and Air Traffic Control Tower (ATCT) considered in SGHAT Analysis

Finally, the results of prior glare analyses have been briefed to installation leadership (including air wing commanding officers) and the Commander of Atlantic Fleet Forces and staff. Concern has been with the final 180-degree turn and straight-in approach to landing and their desire that no glare with the potential to cause and after image occur within that those sections the flight pattern. For both fixed-tilt concepts analyzed, no glare (of any intensity) would occur to those sections of the flight pattern.

Single-Axis Tracking Concept: Results for panels occupying the entirety of Sites A and B indicated that glare would occur to the air traffic control tower. The results also indicated that some glare with a low-potential to cause after image could occur in the flight pattern, but that it would be limited to those sections where direct overflight of the solar PV array occurred, which would further minimize impact due to line of sight restrictions caused by the aircraft. In addition, no glare would occur in the final 180-degree turn and landing approaches from arrays modeled at either Site A or B.

As part of the project siting and approval process for the proposed solar PV facilities at NAS Fallon, FAA review and approval may be required before construction begins. In addition, the Navy and the private partner should notify the FAA of its intent to construct any solar installation by filing FAA Form 7460-1, if applicable according to the FAA interim policy (FAA, 2013). The Navy and the private partner would coordinate with the FAA regarding the solar PV designs selected for the sites and any requirements for further evaluating glint and glare for air traffic. The private partner would then fill out and submit FAA Form 7460-1.

Glint and glare impacts would be managed through deliberate choices in construction materials and optimized panel placement. Therefore, there would be no significant public health and safety impacts from implementation of Alternative 1.

Bird Aircraft Strike Hazard

As the development and installation of solar PV arrays is relatively recent, little data exist on BASH potential with regard to solar PV arrays. However, as previously discussed there is evidence to suggest

that converting airport grasslands to solar PV arrays would not increase hazards associated with BASH (DeVault, et al., 2014).

As discussed in Table 3.11-2, regular monitoring of the proposed solar PV system sites would be conducted by a qualified biologist supplied by the private partner and approved by NAS Fallon to assess any potential impacts the solar PV array might be having on wildlife and special status species, including visual reconnaissance of dead and/or injured species. The results of the monitoring surveys would be reported to the USFWS for comments and recommendations to minimize impacts from continuing operations. This monitoring would also serve the purpose of assessing the increase (or decrease) of birds that would pose a hazard to aircraft.

Personnel Safety

The proposed solar PV arrays would be fenced off to minimize the potential for unauthorized access. Ground cover and periodic water spraying of the sites would combine to minimize dust generation within the project area. Some of the proposed solar PV arrays for Alternative 1 would be located within an ESQD arc (see Figure 3.8-2) at Site B; however, as no habitable structures would be constructed and maintenance activities would be intermittent, there would be no potential ESQD impact.

Summary

Construction and operation maintenance activities would be conducted in compliance with health and safety regulations and the solar PV system would be fenced. Due to the lack of airspace penetration, reflectivity, and non-interference with communications from Sites A and B, and no evidence that solar PV arrays would increase bird activity, no impacts on flight safety during construction or operation of the proposed solar PV panels would occur. Impact avoidance and minimization measures presented in Table 3.11-2 would reduce the potential for an increase in BASH events. Glare would be visible at the air traffic control tower from Site A, but not Site B. There would be a potential for glare to cause an after image for aviators during short periods of the day. No habitable structures would be constructed within the ESQD arc that intersects Site B, thus there would be no potential ESQD impact. Therefore, implementation of Alternative 1 would not result in significant impacts to public health and safety.

3.8.3.3 Alternative 2: Up to 15 Megawatts at Site A

Under Alternative 2, construction and operation impacts to public health and safety would be similar to those discussed for Alternative 1, with the exception that the solar PV system would be smaller, and the no system components would located within an ESQD arc. Therefore, implementation of Alternative 2 would not result in significant impacts to public health and safety.

3.9 Socioeconomics

This section discusses population demographics, employment characteristics, schools, and housing occupancy status. This data provides key insights into socioeconomic conditions that might be affected by the Proposed Action.

3.9.1 Regulatory Setting

Socioeconomic data shown in this section are presented at the U.S. Census Bureau Tract, Metropolitan Statistical Area, state, and national levels to characterize baseline socioeconomic conditions in the context of regional, state, and national trends. A Metropolitan Statistical Area is a geographic entity defined for use by federal statistical agencies based on the concept of a core urban area with a high

degree of economic and social integration with surrounding communities. Data have been collected from previously published documents issued by federal, state, and local agencies and from state and national databases (e.g., U.S. Bureau of Economic Analysis' Regional Economic Information System).

3.9.2 Affected Environment

The following discussion is based on a review of available literature and existing background data, including the following resources:

- U.S. Census Bureau 2010 Population Data (U.S. Census Bureau, 2010a); (U.S. Census Bureau, 2010b); (U.S. Census Bureau, 2010c);
- U.S. Census Bureau 2000 Population Data (U.S. Census Bureau, 2000);
- Nevada Population Projections by County (Nevada State Demographers Office, 2011);
- Final Integrated Natural Resources Management Plan and Environmental Assessment for Naval Air Station Fallon, Nevada (NAS Fallon, 2014a);
- Churchill County 2010 Master Plan (Churchill County, 2010); and
- Fallon Range Training Complex Draft Range Air Installations Compatible Use Zones Study (Navy, 2010).

3.9.2.1 Population

Table 3.9-1 presents population characteristics for the state of Nevada, Churchill County, and the City of Fallon, including populations in 2000 and 2010, projected populations for 2020 and 2030, and the percent change for these statistical areas.

In 2010, approximately 35 percent of Churchill County's population resided in the City of Fallon. Between 2000 and 2010, the population of the City of Fallon grew by 14.2 percent, which was higher than Churchill County's rate of growth (3.7 percent) and less than Nevada's rate of growth (35.1 percent) for the same time period (Table 3.9-1). As indicated in Table 3.9-1, population growth in the area of the Project is expected to continue through the year 2030. More specifically, Churchill County's total population is expected to increase by nearly 27.1 percent from 2010 to 2030, while the state's population is projected to increase at a slightly slower rate for the same time period (24.5 percent) to slightly over 3 million.

Table 3.9.1 Population Trends in the Project Area

Jurisdiction	*2000*[1]	*2010*[2]	*Percent Change 2000 - 2010*	*2020 Projection*[3]	*2030 Projection*[3]	*Expected Percent (%) Change 2010 - 2030*
Nevada	1,998,257	2,700,551	35.1%	3,069,268	3,363,704	24.5%
Churchill County	23,982	24,877	3.7%	29,753	31,628	27.1%
City of Fallon	7,536	8,606	14.2%	(X)	(X)	(X)

Sources: [1] (U.S. Census Bureau, 2000)
[2] (U.S. Census Bureau, 2010a), (U.S. Census Bureau, 2010b), (U.S. Census Bureau, 2010c)
[3] (Nevada State Demographers Office, 2011)
Note: (X) = the estimate is not applicable or data are not available

There are approximately 1,450 civilian and military personnel and 70 aircraft permanently stationed at NAS Fallon. When training is being conducted, these numbers can increase by up to an additional 2,000 personnel and 90 aircraft. NAS Fallon supports approximately 1,038 active duty and 394 civilians (NAS Fallon, 2014a). In addition, up to 20,000 transient personnel visit the base annually to participate in training programs at NAS Fallon (Churchill County, 2010). This transient population is not included in the population trends identified in Table 3.9.1.

3.9.2.2 Employment Characteristics

The employment status for the state of Nevada, Churchill County, and the City of Fallon, as summarized by the U.S. Census Bureau in 2010, is shown in Table 3.9-2. According to U.S. Census data, in 2010, average unemployment rates for the City of Fallon and Churchill County were 2.9 and 5.6 percent, respectively—well below the state's unemployment rate of 6.0 percent for the same time period (U.S. Census Bureau, 2010c).

Table 3.9-2 Employment Status for Populations in Nevada, Churchill County, and the City of Fallon (2010)

Subject	*Nevada*		*Churchill County,*		*City of Fallon, Nevada*	
	Number	*Percent*	*Number*	*Percent*	*Number*	*Percent*
Employment Status (Population 16 Years and Over)						
Total Population 16 years and over	2,050,325	100%	19,186	100%	6,521	100%
In labor force	1,387,343	67.7%	12,024	62.7%	4,336	66.5%
Civilian labor force	1,377,921	67.2%	11,356	59.2%	4,083	62.6%
Employed	1,254,163	61.2%	10,288	53.6%	3,892	59.7%
Unemployed	123,758	6.0%	1,068	5.6%	191	2.9%
Armed Forces	9,422	0.5%	668	3.5%	253	3.9%
Not in labor force	662,982	32.3%	7,162	37.3%	2,185	33.5%
Percent Unemployed	(X)	9.0%	(X)	9.4%	(X)	4.7%

Source: (U.S. Census Bureau, 2010a)
Note: (X) = the estimate is not applicable or data are not available.

Based on 2010 census data, the industries that employed the greatest number of people in Churchill County included the arts, entertainment and recreation sector (14.9 percent), followed by the education, health care, and social assistance sector (13.7 percent), and retail trade sector (11.9 percent). Based on 2010 census data, the industries that employed the greatest number of people in the City of Fallon include the arts, entertainment and recreation sector (21.7 percent), followed by retail trade sector (13.9 percent), and the public administration sector (10.6 percent). Employment by industry for the State of Nevada, Churchill County, and the City of Fallon is shown in Table 3.9-3.

NAS Fallon also plays an important role in the economy of Churchill County. Approximately 3,000 people work at NAS Fallon or earn their livelihood in station-supported industries (Navy, 2010). The salaries of those who work at NAS Fallon account for approximately $70 million per year, and overall the Navy contributes approximately $200 million to the local economy (Navy, 2010). The Employment by Industry Table 3.9-3 does not include the Armed Forces population identified above. The table represents the employment by industry for the employed labor force identified above in Table 3.9-2.

Table 3.9-3 Employment by Industry in Nevada, Churchill County, and the City of Fallon (2010)

Industry	*Nevada*		*Churchill County, Nevada*		*City of Fallon, Nevada*	
	Number Employed	*Percent Employed*	*Number Employed*	*Percent Employed*	*Number Employed*	*Percent Employed*
Agriculture, forestry, fishing and hunting, and mining	18,22	1.5%	615	6.0%	117	3.0%
Construction	115,602	9.2%	816	7.9%	224	5.8%
Manufacturing	54,763	4.4%	733	7.1%	176	4.5%
Wholesale trade	29,700	2.4%	240	2.3%	108	2.8%
Retail trade	142,339	11.3%	1,224	11.9%	540	13.9%
Transportation and warehousing, and utilities	62,482	5.0%	780	7.6%	168	4.3%
Information	21,043	1.7%	142	1.4%	11	0.3%
Finance and insurance, and real estate and rental and leasing	81,155	6.5%	439	4.3%	114	2.9%
Professional, scientific, and management, and administrative and waste management services	129,611	10.3%	916	8.9%	403	10.4%
Educational services, and health care, and social assistance	182,042	14.5%	1,412	13.7%	495	12.7%
Arts, entertainment, and recreation, and accommodation and food	307,792	24.5%	1,530	14.9%	843	21.7%
Other services, except public administration	51,230	4.1%	516	5.0%	282	7.2%
Public administration	58,162	4.6%	925	9.0%	411	10.6%

Source: (U.S. Census Bureau, 2010a)

3.9.2.3 Schools

The project area is located within the Churchill County School District. The district provides K-12 education, and all of the schools in this district are within the City of Fallon, which is located approximately 4 miles northeast of the project area.

3.9.2.4 Housing

According to the 2010 census, the housing stock in Churchill County included 10,775 units, with 4,111 units located in the City of Fallon (Table 3.9-4). The largest portion of the county's housing stock in 2010 was composed of single-family detached units (61.7 percent) (U.S. Census Bureau, 2010b). Mobile homes accounted for 18.8 percent of the remaining housing stock in the county (U.S. Census Bureau, 2010b).

Table 3.9-4 shows housing occupancy type and vacancy trends for the State of Nevada, Churchill County, and the City of Fallon from 2000 and 2010. Between 2000 and 2010, the total number of housing units in these census areas increased. Owner occupancy decreased slightly at the state and county levels, with a greater decrease occurring in the City of Fallon, which experienced a decline from 45.2 percent in 2000 to 40 percent in 2010. Vacancy rates for owner-occupied housing units decreased in Churchill County and the City of Fallon, while it increased statewide from 2000 to 2010. Rental vacancy rates increased in the state, county and in the City of Fallon between 2000 and 2010.

NAS Fallon provides 39 officer family units; 271 family housing units; 532 unaccompanied officer units; and 1,931 unaccompanied enlisted units. There is one primary military family housing area at NAS Fallon, located on the west side of Pasture Road and south of Site A. In addition, there are personnel support facilities, including bachelor quarters, religious services/family services, Morale, Welfare and Recreation facilities and clubs, medical, retail services, recycling yard, and auto hobby (NAS Fallon, 2014a).

Table 3.9-4 Housing in the Project Area

	Nevada	***Churchill County***	***City of Fallon***
Total Units			
2000	827,457	9,732	3,336
2010	1,140,555	10,775	4,111
Percent Change	37.8%	10.7%	23.2%
Owner Occupied			
2000	60.9%	65.8%	45.2%
2010	60.1%	64.5%	40.0%
Vacancy: Owner			
2000	2.6%	2.6%	4.4%
2010	4.3 %	1.0 %	2.7%
Vacancy: Renter			
2000	9.7%	8.5%	9.6%
2010	10.6%	21.6%	22.4%

Sources: (U.S. Census Bureau, 2000); (U.S. Census Bureau, 2010b)

3.9.2.5 Power

The average price of commercial electricity in Fallon is 12.44 cents/kWh (kilowatt-hour), 40.88 percent higher than the Nevada state average rate of 8.83 cents/kWh. The average price of residential electricity in Fallon is 12.86 cents/kWh, 8.71 percent higher than the Nevada state average rate of 11.83 cents/kWh. The average price of industrial electricity in Fallon is 11.71 cents/kWh, 80.71 percent higher than the Nevada state average rate of 6.48 cents/kWh (Electricity Local, 2015).

3.9.3 Environmental Consequences

Analysis of impacts to socioeconomics is focused on the issues of the effects of the alternatives on population, income, employment, schools, and housing.

3.9.3.1 No Action Alternative

Under the No Action Alternative, the Proposed Action would not occur and there would be no change to the socioeconomics of the local area or region. Therefore, no significant impacts would occur with implementation of the No Action Alternative.

3.9.3.2 Alternative 1: Up to 20 Megawatts at Sites A and B (Preferred Alternative)

Potential Impacts to Socioeconomics:

- Beneficial, temporary impact to the local economy during the construction phase
- No change to housing, employment, population, ethnicities or age distribution
- Increase in regional power supply

The study area for socioeconomic analyses for Alternative 1 is defined as the City of Fallon in Churchill County, Nevada.

Construction

Alternative 1 would occur within the boundaries of a military installation, and the construction activities associated with Alternative 1 would not result in a permanent change to housing, employment, population, ethnicities, or age distribution. The Navy owns the project area and it is unoccupied and is not being leased or parceled out for leasing. Furthermore, off-installation land near the project area is sparsely populated with a few privately owned and operated farms immediately west; as such, impacts to land value would be negligible. A comparison to similar size solar PV projects indicates that approximately 100 temporary construction jobs would be created under Alternative 1 (Navy, 2015b) (Navy, 2015c). These construction jobs would provide a temporary benefit to the local economy. Because the proposed solar PV system would be located entirely on federal land, there would be no change to local tax revenues.

Operation

Alternative 1 would occur within the boundaries of a military installation and the operational activities associated with Alternative 1 would not result in a permanent change to housing, employment, population, ethnicities, or age distribution. When the proposed solar PV system is operational under Alternative 1 an increase would occur in the amount of power available to regional users and/or NAS Fallon. The increase in power supply could serve to buffer users both at NAS Fallon and those living locally from price fluctuations, providing a potential economic benefit to the region.

Summary

There would be a beneficial, temporary impact to the local economy during the construction phase. There would also be a beneficial, long-term impact to the region due to the additional electric power available from the proposed project. Therefore, implementation of Alternative 1 would not result in significant direct or indirect impacts to the socioeconomics of the local area or region.

3.9.3.3 Alternative 2: Up to 15 Megawatts at Site A

Under Alternative 2, construction and operation impacts to socioeconomics would be similar to those discussed for Alternative 1, though at a smaller scale due to the smaller project size. Therefore, implementation of Alternative 2 would not result in significant direct or indirect impacts to the socioeconomics of the local area or region.

3.10 Noise

This discussion of noise includes the types or sources of noise and the associated sensitive receptors in the human environment. Noise in relation to biological resources and wildlife species is discussed in Section 3.4, Biological Resources.

Sound is a physical phenomenon consisting of minute vibrations that travel through a medium, such as air or water, and are sensed by the human ear. Sound is all around us. The perception and evaluation of sound involves three basic physical characteristics:

- Intensity – the acoustic energy, which is expressed in terms of sound pressure, in decibels (dB)
- Frequency – the number of cycles per second the air vibrates, in Hertz (Hz)
- Duration – the length of time the sound can be detected

Noise is defined as unwanted or annoying sound that interferes with or disrupts normal human activities. Although continuous and extended exposure to high noise levels (e.g., through occupational exposure) can cause hearing loss, the principal human response to noise is annoyance. The response of different individuals to similar noise events is diverse and is influenced by the type of noise, perceived importance of the noise, its appropriateness in the setting, time of day, type of activity during which the noise occurs, and sensitivity of the individual. While aircraft are not the only sources of noise in an urban or suburban environment, they are readily identified by their noise output and are given special attention in this EA.

3.10.1 Basics of Sound and A-weighted Sound Level

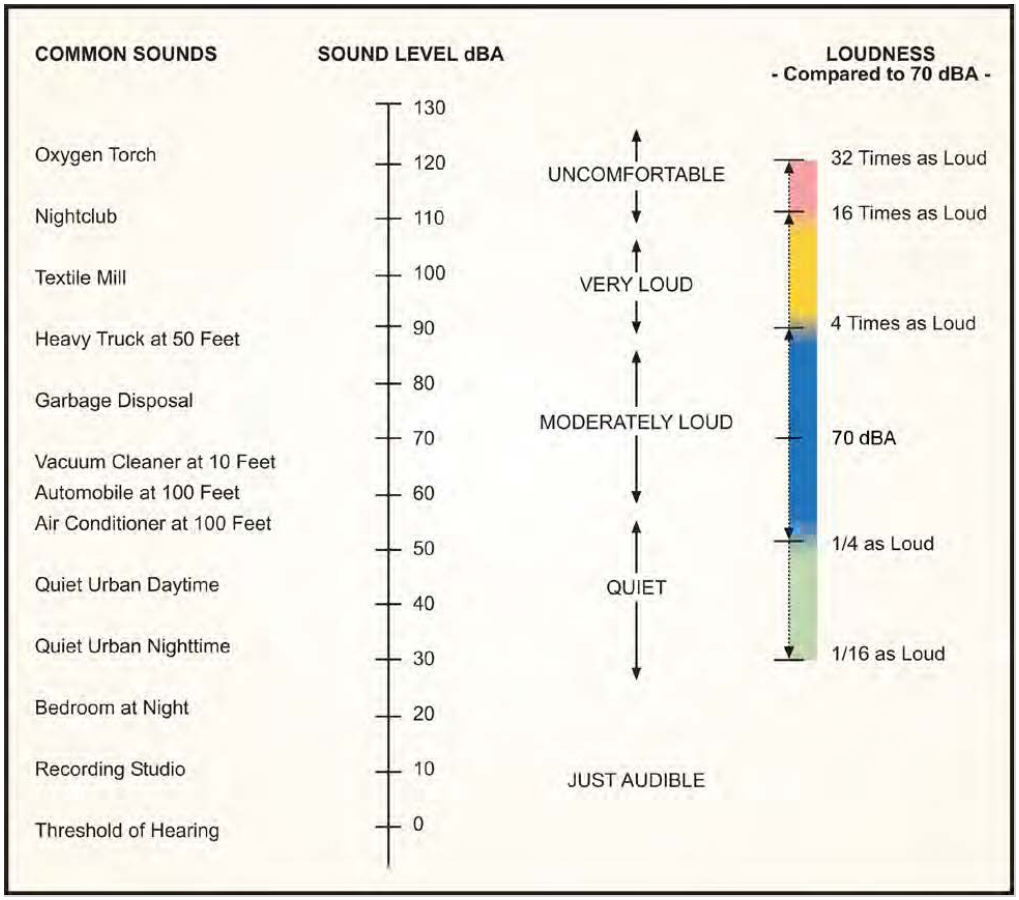
The loudest sounds that can be detected comfortably by the human ear have intensities that are a trillion times higher than those of sounds that can barely be detected. This vast range means that using a linear scale to represent sound intensity is not feasible. The dB is a logarithmic unit used to represent the intensity of a sound, also referred to as the sound level. All sounds have a spectral content, which means their magnitude or level changes with frequency, where frequency is measured in cycles per second or Hz. To mimic the human ear's non-linear sensitivity and perception of different frequencies of sound, the spectral content is weighted. For example, environmental noise measurements are usually on an "A-weighted" scale that filters out very low and very high frequencies in order to replicate human sensitivity. It is common to add the "A" to the measurement unit in order to identify that the measurement has been made with this filtering process (dBA). In this document, the dB unit refers to A-weighted sound levels. Table 3.10-1 provides a comparison of how the human ear perceives changes in loudness on the logarithmic scale.

Table 3.10-1 Subjective Responses to Changes in A-Weighted Decibels

Change	*Change in Perceived Loudness*
3 dB	Barely perceptible
5 dB	Quite noticeable
10 dB	Dramatic – twice or half as loud
20 dB	Striking – fourfold change

Figure 3.10-1 provides a chart of A-weighted sound levels from typical noise sources. Some noise sources (e.g., air conditioner, vacuum cleaner) are continuous sounds that maintain a constant sound level for some period of time. Other sources (e.g., automobile, heavy truck) are the maximum sound produced during an event like a vehicle pass-by. Other sounds (e.g., urban daytime, urban nighttime) are averages taken over extended periods of time. A variety of noise metrics have been developed to describe noise over different time periods, as discussed below.

Noise levels from aircraft operations that exceed background noise levels at an airfield typically occur beneath main approach and departure corridors, in local air traffic patterns around the airfield, and in areas immediately adjacent to parking ramps and aircraft staging areas. As aircraft in flight gain altitude, their noise contributions drop to lower levels, often becoming indistinguishable from the background noise.



Sources: Derived from Harris (1979) and Federal Interagency Committee on Aviation Noise (1997).

Figure 3.10-1 A-Weighted Sound Levels from Typical Sources

Noise Effects

An extensive amount of research has been conducted regarding noise effects including annoyance, speech interference and sleep disturbance. These effects are summarized below.

Annoyance

As previously noted, the primary effect of aircraft noise on exposed communities is long-term annoyance, defined by USEPA as any negative subjective reaction on the part of an individual or group. The scientific community has adopted the use of long-term annoyance as a primary indicator of community response and there is a consistent relationship between noise levels and the level of community annoyance (Federal Interagency Committee on Noise, 1992).

Speech Interference

Speech interference associated with aircraft or construction noise is a primary cause of annoyance for communities. Speech interference can cause disruption of routine activities, such as enjoyment of radio or television programs, telephone use, or family conversation, giving rise to frustration, or irritation. In extreme cases, speech interference may cause fatigue and vocal strain to individuals who try to communicate over the noise.

Sleep Disturbance

The disturbance of sleep is a major concern for communities exposed to nighttime noise. In this EA, sleep disturbance is analyzed by determining the probability of awakening from sleep during nighttime hours 7:00 p.m., to 7:00 a.m. These are based upon the type of work being performed and the proximity relative to the receptor.

Noise Modeling

To determine multiple pieces of construction equipment at various distances from a receptor or multiple receptors, a program or spreadsheet is used that logarithmically sums noise levels from different types of construction equipment at selected receptor locations. The Road Construction Noise Model, developed by the Federal Highway Administration (FHWA), is the standard construction model used. The Road Construction Noise Model uses the above equation and a database of noise levels of different construction equipment (FHWA, 2006).

3.10.2 Regulatory Setting

For land use planning purposes, the Navy generally defines three categories of noise exposure as part of the Air Installations Compatible Use Zones Program (NAS Fallon, 2014b).

- Noise Zone I – Area of minimal impact: Refers to DNL values less than 65 dBA. Within this area, less than 15 percent of the population and closest communities has been reported as highly annoyed.
- Noise Zone II – Area of moderate impact: Refers to DNL values between 65 dBA and 75 dBA. Within this area, 15 to 39 percent of the population has been reported as highly annoyed by range training activities; and,
- Noise Zone III – Area of most severe impact: Refers to DNL values greater than 75 dBA. In this area, more than 39 percent of the population has been reported as highly annoyed by range training activities.

3.10.3 Affected Environment

Aircraft noise represents the dominant source of noise in the project area. In addition, vehicle-generated noise from adjacent roadways contributes to the noise environment within and adjacent to the project area. The baseline DNL within the military family housing area is between 70-75 dB (Wyle, 2013).

A noise sensitive receptor is defined as a land use where people involved in indoor or outdoor activities may be subject to stress or considerable interference from noise. Such locations or facilities often include residential dwellings, hospitals, nursing homes, educational facilities, and libraries. Sensitive receptors may also include noise-sensitive cultural practices, some domestic animals, or certain wildlife species. Sensitive noise receptors located near the project area are depicted in Figure 3.10-2. The baseline DNL within the Lincoln military housing area is between 70-75 dB (Wyle, 2013).

3.10.3.1 Environmental Consequences

Analysis of potential noise impacts includes estimating likely noise levels from the Proposed Action and determining potential effects to sensitive receptor sites.

3.10.3.2 No Action Alternative

Under the No Action Alternative, the Proposed Action would not occur and there would be no change to baseline noise levels. Therefore, no significant impacts due to the noise environment would occur with implementation of the No Action Alternative.

3.10.3.3 Alternative 1: Up to 20 Megawatts at Sites A and B (Preferred Alternative)

Under Alternative 1, up to 230 acres within Sites A and B would be developed to support the construction and operation of up to a 20 MW solar PV system at NAS Fallon.

Potential Impacts to the Noise Environment:

- Temporary construction- and vehicle-generated noise
- Aircraft operations continue to dominate noise environment

Construction

Construction activities would consist of access road improvements, grading, trenching, installing utility poles, assembling, and mounting PV panels including the transport of equipment along access roads. According to the *U.S. Department of Transportation Federal Highway Administration Construction Noise Handbook* (FHWA, 2006), lists typical construction equipment used for construction projects and this project would use many of the equipment on the list. Construction noise is calculated assuming the worst case when all or most of the equipment would be concentrated at the work site boundary that is nearest to the sensitive receptor. Table 3.10-4 shows the sensitive receptors and expected noise levels at each respective distance from the project area. These receptors are mapped in Figure 3.10-2 in relation to the project area.

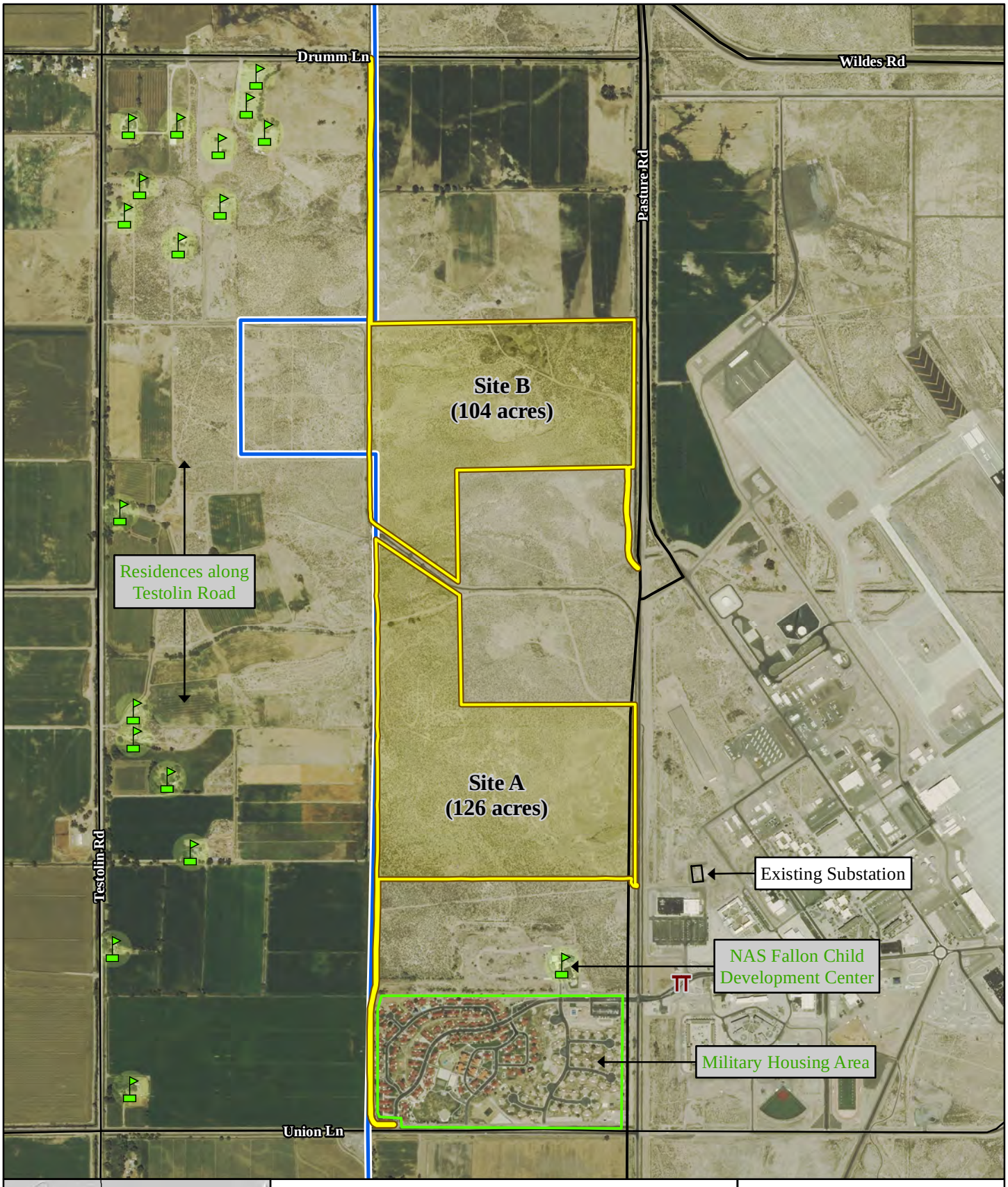


Figure 3.10-2
Sensitive Noise Receptors
near the Project Area

Table 3.10-4 Distance and Noise Levels at Sensitive Noise Receptors Near the Project Area

Receptor	*Shortest Distance to Project Area*	*Noise Level (equivalent noise level)*
NAS Fallon CDC	690 feet (210 m)	66
Military Family Housing Area	66 feet (20 m)	74
Nearest Residence on Testolin Road	1,998 feet (609 m)	57
NAS Fallon Nature Trail	2,673 feet (815 m)	55

Construction noise would be temporary, transitory throughout the site, and limited to regular working hours and construction noise levels at nearest sensitive receptors would only be elevated when the construction occurs in areas nearest the closest receptor. When construction activities move to the opposite side of the construction site, then noise levels would be considerably less than those listed in Table 3.10-4. Construction would take place during daytime hours only, which would not cause nighttime sleep disturbance. Portions of the military family housing area are as close as approximately 66 feet from the access road for Site A. This access road would be used to transport heavy equipment via trucks and would be graded and maintained as needed. Access to the site would be limited to daytime hours and would be temporary. Noise associated with road grading, road improvements and transportation of equipment and materials via trucks could cause a temporary increase in noise levels during the day to the closest immediate residences, within the military family housing area, to the Site A access road. Construction noise would impact approximately 15 residences along Orchard Drive and Cottonwood Drive. Receptors at these residences could hear average noise levels of approximately 74 decibels outside, during the workday, but the noise would be intermittent because the noise source would be road improvements and transportation. Noise would be elevated to 74 dB at the nearest receptor only when construction activities are at their closest point to the individual receptor at the time. For example, if road construction involves grading starting at Union Lane, the noise would be loudest (~74 dB) at the residences adjacent to Union Lane and Cottonwood Drive while residences on Orchard Drive and Willow Way. Conversely, later in the day when grading activities move closer to Site A, then the Orchard and Willow residences would be in the 74 dB range and the Cottonwood Drive residents would be back to baseline noise levels.

Construction in the area near these residences would be temporary and work during morning and evening hours would be minimized to the extent practicable. After road construction completion, the access road would be used to haul equipment and materials to the site. Noise levels from hauling activities would be greatest during the beginning and end of the construction phases. During site preparation, trucks would haul graders, excavators, and other heavy equipment to the site, then leave and then return days or weeks later to retrieve the equipment. During the PV installation stage, trucks hauling materials would come in phases, as materials are needed on site and fluctuate from many deliveries at the beginning of the project phase and tailing off to almost no trips towards the end of the PV installation phase. Receptors at the NAS Fallon CDC could expect to hear noise levels from construction related activities similar to an automobile at 100 feet during peak construction times. Residences on Testolin Road could hear construction related noise levels similar to an air conditioner at 100 feet (see Figure 3.10-1).

Receptors at the NAS Fallon Nature Trail would not hear any noise related to construction as the ambient noise level in the area would be greater than construction noise levels. Receptors in the immediate vicinity of Site A access road along the western perimeter of the military family housing area

would be temporarily impacted by increased noise levels during construction. This noise would be minimal and restricted to daylight hours during work days when residences would likely not be disturbed.

Due to the temporary and transitory nature of the construction and the distance of sensitive receptors from the project area, noise annoyance or speech interference would not occur. There would be no conflict with the AICUZ Program.

Operation

During operations, the solar PV system would make little or no sound except for noise from cooling fans in the inverters and a low hum from transmission lines and transmission connection nodes. This noise would not be heard beyond a few meters from the project area. Vehicles used for periodic maintenance activities will generate noise on a limited, temporary basis. Given the ambient noise levels due to aircraft operations at NAS Fallon, these noise sources would not be noticeable.

Summary

Construction noise would be temporary, transitory throughout the site, and limited to regular working hours. Approximately 15 residences along the western perimeter of the military family housing area could experience an increase in noise levels due to trucks transporting equipment and materials or road grading and improvements. This increase would be temporary and limited to daylight hours on typical workdays to avoid annoyance to the receptors to the extent practicable. Noise annoyance, speech interference, and sleep disturbance would not occur. Aircraft operations would continue to dominate the noise environment. Therefore, implementation of Alternative 1 would not result in significant noise impacts to the noise environment

3.10.3.4 Alternative 2: Up to 15 Megawatts at Site A

Under Alternative 2, noise levels at the military family housing area, NAS Fallon CDC, and residents near Testolin Lane would be approximately the same as Alternative 1 because the transportation, construction, and operational activities at Site A would be similar to those described under Alternative 1. No impacts to annoyance, speech interference, or sleep disturbance would occur. Aircraft operations would continue to dominate the noise environment. There would be no conflict with the Range Air Installations Compatible Use Zones program. Therefore, implementation of Alternative 2 would not result in significant impacts to noise.

3.11 Summary of Potential Impacts to Resources and Impact Avoidance and Impact Avoidance and Minimization

A summary of the potential impacts associated with each of the action alternatives and the No Action Alternative and impact avoidance and minimization measures are presented in Tables 3.11-1 and 3.11-2, respectively. Table 3.11-2 provides a comprehensive list of all proposed impact avoidance and minimization measures associated with the Proposed Action.

Table 3.11-1 Summary of Potential Impacts to Resource Areas

Resource Area	*No Action Alternative*	*Alternative 1: Up to 20 Megawatts at Sites A and B (Preferred Alternative)*	*Alternative 2: Up to 15 Megawatts at Site A*
Air Quality	No Significant Impact. There would be no change in existing conditions; therefore, no impacts would occur.	No Significant Impact. Minor and temporary increase in emissions. Potential for dust generated to migrate off-site, depending on conditions. Operationally, fewer greenhouse gas and particulate matter emissions due to the development of renewable energy. Emissions would be negligible and would not trigger the need for a formal Conformity Determination under the Clean Air Act General Conformity Rule.	No Significant Impact. Potential impacts would be similar to those described for Alternative 1, though at a slightly smaller scale (126 acres).
Water Resources	No Significant Impact. There would be no change in existing conditions; therefore, no impacts would occur.	No Significant Impact. Construction and operation activities would not reach depths that would affect groundwater resources. Standard erosion control measures, Best Management Practices (BMPs) and Low Impact Design (LID) would reduce potential impacts resulting from runoff, erosion, and sedimentation during construction and operation activities.	No Significant Impact. Potential impacts would be similar to those described for Alternative 1, though at a slightly smaller scale.
Cultural Resources	No Effect. There would be no change in existing conditions; therefore, no impacts would occur.	No Significant Impact. There are eighteen archaeological sites and architectural resources located within the Alternative 1 footprint; one may be eligible and one is eligible for listing in the National Register of Historic Properties (NRHP). These sites would be avoided during construction activities. A determination of impacts is pending; the Navy has requested the State Historic Preservation Officer (SHPO) concur with a finding of "No Historic Properties Affected"	No Significant Impact. Five archaeological sites are located within Site A; however, all of the sites located in Site A are recommended not eligible for listing in in the NRHP. A determination of impacts is pending; the Navy has requested the SHPO concur with a finding of "No Historic Properties Affected."
Biological Resources	No Significant Impact. There would be no change in existing conditions; therefore, no impacts would occur.	No Significant Impact. Up to 230 acres of black greasewood vegetation would be removed. Wildlife would be subject to auditory/visual disturbances; potential for injury or mortality from construction equipment; and altered foraging, nesting, and breeding habitat. It is unlikely that any special status species would be directly	No Significant Impact. Potential impacts would be similar to those described for Alternative 1, though at a smaller scale. Up to 126 acres of black greasewood vegetation would be removed.

Table 3.11-1 Summary of Potential Impacts to Resource Areas

Resource Area	*No Action Alternative*	*Alternative 1: Up to 20 Megawatts at Sites A and B (Preferred Alternative)*	*Alternative 2: Up to 15 Megawatts at Site A*
		impacted. Impact Avoidance and Minimization Measures described in Table 3.11-2 would reduce potential impacts to biological resources.	
Visual Resources	No Significant Impact. There would be no change in existing conditions; therefore, no impacts would occur.	No Significant Impact. Construction impacts to visual resources would be temporary and limited to viewers from adjacent roadways, agriculture parcels, the operations area on NAS Fallon, and housing. The proposed solar PV system (up to 15-feet high) would represent a visual change from open desert views to developed utility infrastructure. The new transmission line power poles would be up to 65-feet high, consistent with existing transmission lines in the area.	No Significant Impact. Potential impacts would be similar to those described for Alternative 1.
Utilities	No Significant Impact. There would be no change in existing conditions; therefore, no impacts would occur.	No Significant Impact. Temporary and localized power disruption could occur when the solar PV system is brought on-line. Increase in power supply, resulting in electrical benefits for the region.	No Significant Impact. Potential impacts would be similar to those described for Alternative 1, though at a slighter smaller scale.
Transportation	No Significant Impact. There would be no change in existing conditions; therefore, no impacts would occur.	No Significant Impact. Minor and temporary increase in average daily traffic generated as a result of construction and operational maintenance.	No Significant Impact. Potential impacts would be similar to those described for Alternative 1, though at a slighter smaller scale.
Public Health and Safety	No Significant Impact. There would be no change in existing conditions; therefore, no impacts would occur.	No Significant Impact. There would be no airspace penetration, reflectivity concerns, and no interference with communications. No increased hazard to flight safety during construction or operation. Glare visible to air traffic control tower from Site A, but not Site B. Potential for glare to cause an after image for aviators during short periods of the day. Glare impacts would be minimized by implementing measures listed in Table 3.11-2.	No Significant Impact. Potential impacts would be similar to those described for Alternative 1.

Table 3.11-1 Summary of Potential Impacts to Resource Areas

Resource Area	*No Action Alternative*	*Alternative 1: Up to 20 Megawatts at Sites A and B (Preferred Alternative)*	*Alternative 2: Up to 15 Megawatts at Site A*
Socioeconomics	No Significant Impact. There would be no change in existing conditions; therefore, no impacts would occur.	No Significant Impact. There would be a beneficial, temporary impact to the local economy during the construction phase. There would also be a beneficial, long-term impact to the region due to the additional electric power available from the proposed project. There would be no disproportionally high environmental or health impacts on low-income or minority populations.	No Significant Impact. Potential impacts would be similar to those described for Alternative 1, though at a slighter smaller scale.
Noise	No Significant Impact. There would be no change in existing conditions; therefore, no impacts would occur.	No Significant Impact. Construction noise would be temporary, throughout the site and limited to regular working hours. Approximately 15 residences along the perimeter of the military family housing area could experience an increase in noise levels due to trucks transporting equipment and materials or road grading and improvements. This increase would be temporary and limited to daylight hours on typical workdays. Due to these factors noise annoyance, speech interference, and sleep disturbance would not occur.	No Significant Impact. Potential impacts would be similar to those described for Alternative 1, though at a smaller scale and duration.

Table 3.11-2 Impact Avoidance and Minimization Measures

Resource	*Measure*	*Anticipated Benefit*	*Evaluating Effectiveness*	*Implementing and Monitoring*	*Responsibility*	*Estimated Completion Date*
Alternative 1 and Alternative 2						
Section 3.1: Air Quality	Proper and routine maintenance of all vehicles and other construction equipment to ensure that emissions are within design standards.	Minimize air quality emissions.	N/A	N/A	Private Partner	Construction completion
	Dust suppression methods (such as using water trucks to wet the construction area during construction would minimize fugitive dust emissions. In addition, a spray-on erosion control fiber matrix (soil stabilizer) would be applied to the soil following construction, which would reduce the potential for soil erosion and dust.	Minimize air quality emissions.	N/A	N/A	Private Partner	Construction completion
Section 3.2: Water Resources	Standard erosion control measures as identified in the Nevada Contractors Field Guide for Construction Site BMPs would be used. These include but are not limited to silt fences, straw bale dikes, berms, surface flow directional controls, vegetation, mulch binders, sediment barriers, fiber rolls, erosion blankets, turf mats and stone bag filters.	Prevent runoff, sedimentation, and erosion.	Evaluate spills on site	Maintain and monitor during use.	Private Partner	Construction completion
	Herbicides or pesticides used to control vegetation beneath the panels would be applied in accordance with regulations as well as manufacturer's guidelines. This includes obtaining the approval of the Installation Pest Management Coordinator prior to use.	Prevent runoff from spill or use of herbicides and pesticides.	N/A	Follow federal, state, and local regulations, and manufacturer guidelines. Pesticide use on Navy lands must be approved and the amount of pesticide applied submitted to the Installation Pest Management Coordinator.	Private Partner	Construction completion
	Adhere to NAS Fallon's requirements related to storm water pollution prevention and storm water controls. The standard erosion	Spill, storm water pollution, and erosion prevention.	N/A	Draft and implement SWPPP.	Private Partner	Construction completion

Table 3.11-2 Impact Avoidance and Minimization Measures

Resource	*Measure*	*Anticipated Benefit*	*Evaluating Effectiveness*	*Implementing and Monitoring*	*Responsibility*	*Estimated Completion Date*
	control measures as identified in the General Permit for Storm Water Associated with Industrial Activities and Storm Water Pollution Prevention Plan (SWPPP) would be utilized to reduce erosion during grading and construction activities.					
	Runoff from the site would be controlled through the use of Low Impact Design (LID) management practices such as bio-retention cells, bio-retention swales and soil amendments.	Prevent storm water pollution, runoff sedimentation, and erosion.	N/A	Include LID practices in project design plans. Periodically maintain and monitor.	Private Partner	Construction Completion
Section 3.3: Cultural Resources	Ground disturbing activity in the Project Area should be monitored by a forensic anthropologist or archaeologist with training in human osteology. The discovery of human remains in 1981 may indicate additional inhumations in the area, and a monitor proficient in the identification and analysis of human remains should be present during any excavation. This monitor should have the ability to halt construction in the event of the inadvertent discovery of cultural material or human remains, at which point the NAS Fallon Cultural Resource Manager should be immediately contacted, along with appropriate authorities.	Avoidance of potential cultural resources until they can be evaluated as to their importance.	N/A	N/A	Private Partner/Navy	Construction completion

Table 3.11-2 Impact Avoidance and Minimization Measures

Resource	*Measure*	*Anticipated Benefit*	*Evaluating Effectiveness*	*Implementing and Monitoring*	*Responsibility*	*Estimated Completion Date*
Section 3.4: Biological Resources	Prior to construction, a qualified biologist would conduct rare plant surveys in the project area to determine the presence and locations of potential rare plants. If rare plants are found within the project area, appropriate avoidance and/or minimization measures would be developed with NAS Fallon and implemented prior to construction.	Protect rare plant species.	N/A	N/A	Private Partner	Prior to construction
	All project activities would comply with the MBTA and its general requirements related to nest impact avoidance guidelines.	Protect breeding/migratory birds.	N/A	N/A	Private Partner/Navy	Project entirety
	To avoid impacts to ground-nesting birds, a survey for active nests or nesting activity would be conducted before construction should such activities occur during the nesting season (typically March 15 to August 31). If the survey finds active nests, then construction personnel would either avoid the nests until fledglings have left, or permitted personnel would relocate eggs and chicks following all federal and state regulations and permitting requirements.	Protect breeding/migratory birds.	N/A	N/A	Private Partner/Navy	Construction completion
	To the extent feasible, construction activities in or near suitable or occupied bird nesting habitat during the breeding season would be avoided (March 15 to August 31).	Protect breeding/migratory birds.	N/A	N/A	Private Partner/Navy	Construction completion

Table 3.11-2 Impact Avoidance and Minimization Measures

Resource	*Measure*	*Anticipated Benefit*	*Evaluating Effectiveness*	*Implementing and Monitoring*	*Responsibility*	*Estimated Completion Date*
	If construction activities occur during the nesting season for migratory birds, a qualified biologist would conduct preconstruction nesting bird surveys within 14 days before construction activities within a given work area. The initial survey would be conducted at least 14 days before construction to allow sufficient time to develop an avoidance strategy if nests are identified. A final survey would be conducted within 24 hours of ground-disturbing activities.	Protect breeding/migratory birds.	N/A	N/A	Private Partner/Navy	Construction completion
Section 3.4: Biological Resources	If an active nest is identified near a given work area and work cannot be conducted outside the nesting season (March 15 to August 31), a no-activity zone would be established around the nest by a qualified biologist in coordination with the USFWS. Fencing and/or flagging would be used to delineate the no-activity zone. The no-activity zone would be large enough to avoid nest abandonment and would be between 50 and 1,000 feet from the nest, or as otherwise required by the USFWS.	Protect breeding/migratory birds.	N/A	N/A	Private Partner/Navy	Construction completion
	During construction, a qualified biologist would be on-site daily to monitor and record activities as they pertain to biological resources. Results would be reported on a monthly basis, unless a species of concern is found or suspected to be found, and then the species would be reported immediately. The results of the monitoring would be reported to the NAS Fallon biologist.	Protection of biological resources.	N/A	Biological resources monitoring	Private Partner/Navy	Construction completion

Table 3.11-2 Impact Avoidance and Minimization Measures

Resource	*Measure*	*Anticipated Benefit*	*Evaluating Effectiveness*	*Implementing and Monitoring*	*Responsibility*	*Estimated Completion Date*
Section 3.4: Biological Resources	During the operations phase, weekly monitoring surveys would be conducted in spring and summer (when there are many migratory birds in the area). The surveys would be conducted by a qualified biologist supplied by the private partner and approved by NAS Fallon to assess use of the areas by wildlife, vegetation changes, and potential bird/bat mortalities and/or injuries. Results of the surveys would be provided to USFWS and Nevada Department of Wildlife for comments and recommendations to minimize impacts from continuing operations. In addition, quarterly monitoring data would be shared and coordinated with wildlife hazard management operations already occurring at NAS Fallon, including BASH surveys and associated wildlife determent and/or relocation/removal.	Protection of biological resources.	N/A	BASH monitoring	Private Partner	Entirety of operations phase
	If federally listed species are observed in the project area following construction activities and/or during operation of the solar PV system, NAS Fallon would be immediately notified. The Navy would assess whether ongoing operations might affect any such species and engage in consultation with the USFWS to discuss current and future management strategies, as appropriate.	Protection of federally listed species	N/A	N/A	Private Partner/Navy	Entirety of operations phase
Section 3.5: Visual Resources	No Impact Avoidance and Minimization Measures were identified for this resource.					

Table 3.11-2 Impact Avoidance and Minimization Measures

Resource	*Measure*	*Anticipated Benefit*	*Evaluating Effectiveness*	*Implementing and Monitoring*	*Responsibility*	*Estimated Completion Date*
Section 3.6: Utilities	No Impact Avoidance and Minimization Measures were identified for this resource.					
Section 3.7: Transportation	Any access road improvements off Pasture Road would be coordinated with Churchill County.	Coordinate and minimize potential impacts to local transportation	N/A	Based on the outcome of coordination	Private Partner	Prior to construction
Section 3.8: Public Health and Safety	The panel placement (both in the direction the panels face and the tilt of the panels) would be optimized to reduce glint and glare, the use of anti-reflective coatings on the solar panels, and the use of matte finishes and dark paints on metal surfaces where feasible.	Reduction of glint and glare impact to aircraft operations.	N/A	Materials established in construction standards	Private Partner	Project entirety
	During the operations phase, weekly monitoring surveys and reporting would be conducted year-round (except in winter) by a qualified biologist supplied by the private partner and approved by NAS Fallon to assess use of the areas by wildlife, vegetation changes, and potential bird/bat mortalities and/or injuries. Results of the surveys would be provided to USFWS and Nevada Department of Wildlife for comments and recommendations to minimize impacts from continuing operations. In addition, quarterly monitoring data would be shared and coordinated with wildlife hazard management operations already occurring at NAS Fallon, including BASH surveys and associated wildlife determent and/or relocation/removal.	Protection of biological resources.	N/A	BASH monitoring	Private Partner/Navy	Entirety of operations phase

Table 3.11-2 Impact Avoidance and Minimization Measures

Resource	*Measure*	*Anticipated Benefit*	*Evaluating Effectiveness*	*Implementing and Monitoring*	*Responsibility*	*Estimated Completion Date*
	Aviators would wear tinted visors/glasses to reduce the potential for an after image to acceptable ranges	Aviator safety	N/A	Visors/glasses provided to aviators	Navy	Entirety of operations phase
Section 3.9: Socioeconomics	No Impact Avoidance and Minimization Measures were identified for this resource.					
Section 3.10 Noise	No Impact Avoidance and Minimization Measures were identified for this resource.					

Note: N/A = Not Applicable

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4 Cumulative Impacts

This section (1) defines cumulative impacts, (2) describes past, present, and reasonably foreseeable future actions relevant to cumulative impacts, (3) analyzes the incremental interaction the proposed action may have with other actions, and (4) evaluates cumulative impacts potentially resulting from these interactions.

4.1 Definition of Cumulative Impacts

The approach taken in the analysis of cumulative impacts follows the objectives of National Environmental Policy Act (NEPA), Council on Environmental Quality (CEQ) regulations, and CEQ guidance. Cumulative impacts are defined in 40 Code of Federal Regulations (CFR) section 1508.7 as "the impact on the environment that results from the incremental impact of the action when added to the other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time."

To determine the scope of environmental impact statements, agencies shall consider cumulative actions, which when viewed with other proposed actions have cumulatively significant impacts and should therefore be discussed in the same impact statement.

In addition, CEQ and U.S. Environmental Protection Agency (USEPA) have published guidance addressing implementation of cumulative impact analyses—Guidance on the Consideration of Past Actions in Cumulative Effects Analysis (CEQ, 2005) and Consideration of Cumulative Impacts in USEPA Review of NEPA Documents (USEPA, 1999). CEQ guidance entitled Considering Cumulative Impacts Under NEPA (CEQ, 1997) states that cumulative impact analyses should

"…determine the magnitude and significance of the environmental consequences of the proposed action in the context of the cumulative impacts of other past, present, and future actions...identify significant cumulative impacts…[and]…focus on truly meaningful impacts."

Cumulative impacts are most likely to arise when a relationship or synergism exists between a proposed action and other actions expected to occur in a similar location or during a similar time period. Actions overlapping with or in close proximity to the proposed action would be expected to have more potential for a relationship than those more geographically separated. Similarly, relatively concurrent actions would tend to offer a higher potential for cumulative impacts. To identify cumulative impacts, the analysis needs to address the following three fundamental questions.

- Does a relationship exist such that affected resource areas of the proposed action might interact with the affected resource areas of past, present, or reasonably foreseeable actions?
- If one or more of the affected resource areas of the proposed action and another action could be expected to interact, would the proposed action affect or be affected by impacts of the other action?
- If such a relationship exists, then does an assessment reveal any potentially significant impacts not identified when the proposed action is considered alone?

4.2 Scope of Cumulative Impacts Analysis

The scope of the cumulative impacts analysis involves both the geographic extent of the effects and the time frame in which the effects could be expected to occur. For this Environmental Assessment (EA), the

study area delimits the geographic extent of the cumulative impacts analysis. In general, the study area will include those areas previously identified in Chapter 3 for the respective resource areas. The time frame for cumulative impacts centers on the timing of the proposed action.

Another factor influencing the scope of cumulative impacts analysis involves identifying other actions to consider. Beyond determining that the geographic scope and time frame for the actions interrelate to the proposed action, the analysis employs the measure of "reasonably foreseeable" to include or exclude other actions. For the purposes of this analysis, public documents prepared by federal, state, and local government agencies form the primary sources of information regarding reasonably foreseeable actions. Documents used to identify other actions include notices of intent for EAs, management plans, land use plans, and other planning-related studies.

4.3 Past, Present, and Reasonably Foreseeable Actions

This section will focus on past, present, and reasonably foreseeable future projects at and near Naval Air Station (NAS) Fallon. In determining which projects to include in the cumulative impacts analysis, a preliminary determination was made regarding the past, present, or reasonably foreseeable action. Specifically, using the first fundamental question included in Section 4.1 *Definition of Cumulative Impacts*, it was determined if a relationship exists such that the affected resource areas of the proposed action (included in this EA) might interact with the affected resource area of a past, present, or reasonably foreseeable action. If no such potential relationship exists, the project was not carried forward into the cumulative impacts analysis. In accordance with CEQ guidance (CEQ, 2005), these actions considered but excluded from further cumulative effects analysis are not catalogued here as the intent is to focus the analysis on the meaningful actions relevant to inform decision-making. Projects included in this cumulative impacts analysis are listed in Table 4-1 and briefly described in the following subsections.

Table 4-1 Cumulative Action Evaluation

Action	***Level of NEPA Analysis Completed***
Past Actions	
Salt Wells Geothermal Energy Projects	EIS (2011)
Bango Refining Facility, Class II Air Quality Operating Permit	N/A
Powdered Milk Processing Plant	N/A
Management of the Greenbelt Area at NAS Fallon	EA (1995)
Present and Reasonably Foreseeable Future Actions	
Airfield Operations at NAS Fallon	EA (2013)
Electronic Warfare/Communication Site Improvements	Categorical Exclusion
Joint Unmanned Aircraft Systems Center of Excellence	N/A
Solar Energy Projects	PEIS (2010)
Lahontan Valley Land Sales Project	EIS (1996)
Carson City District Drought Management	EA (2013)
Implementation of INRMP	EA (2014)
Housing Redevelopment Project at NAS Fallon	Categorical Exclusion
Authorization of NAS Fallon Storm Water Discharge	EA (2015)
Conveyance of Non-Project Treated Effluent Water in Newlands Project Lower Deep Diagonal Drain	EA (2009)

4.3.1 Past Actions

4.3.1.1 Salt Wells Geothermal Energy Projects, Churchill County, Nevada

In 2009, NV Energy (also known as Sierra Pacific Power Company) proposed to build two switching stations, one 230-kilovolt (kV) transmission line, two 60-kV electric line folds, and one substation (BLM, 2011). The new switching station, Bass Flat, is at the junction of the existing Fort Churchill-to-Austin 230-kV transmission line and the Sierra Pacific Power Company 230-kV transmission line, leading from the existing Enel Geothermal Power Plant on Lawrence Lane in Fallon, Nevada to the Fort Churchill-to-Austin line. The new Pony Express Switching Station would be constructed adjacent to the existing Enel Geothermal Power Plant. In addition, a new Greenwave Substation would be constructed on the south side of Sheckler Road in Fallon, Nevada, and a 230-kV transmission line would connect the proposed Pony Express Switching Station to the proposed Greenwave Substation. The transmission line would be approximately 22 miles long. Two 60-kV electric line folds would also be installed on four single-pole structures, connecting the proposed Greenwave Substation to the existing 60-kV lines that connect to the existing Fallon Substation north of Hammond Road.

Ormat Technologies, Inc. proposed to develop the Carson Lake Binary Power Plant and Substation, the Macari Switching Station, a 230-kV transmission line between the Carson Lake Substation and the Macari Switching Station, and an electric line fold for the Sierra Pacific Power Company 230-kV transmission line (BLM, 2011). The power plant would produce up to 40 megawatts (MW) (gross) electricity. These facilities would be developed on a private 80-acre parcel north of Macari Lane in Fallon, Nevada. Up to 13 well pads in addition to the 9 previously approved well pads on Reclamation land, associated pipelines, and roads would also be constructed on federal land.

The Bureau of Land Management (BLM) prepared an Environmental Impact Statement (EIS) analyzing the environmental impacts of these two projects proposed by Sierra Pacific Power Company and Ormat as well as another project proposed by Vulcan[4] in the Salt Wells area of Nevada. Together, the three projects are referred to as the Salt Wells Geothermal Energy Projects (BLM, 2011).

Potential impacts of geothermal projects are primarily related to construction and include the following:

- Fugitive dust generation (mitigated through implementation of a fugitive dust control plan).
- Surface water degradation (mitigated through implementation plans for the protection of streams, wetlands, springs, and canals; these plans include Best Management Practices (BMPs) that minimize potential for soil erosion, including a storm water pollution prevention plan).
- Impacts associated with wetland and water body crossings.
- Impacts on migratory birds (e.g., golden eagles) (mitigated through implementation of avian protection plans).
- Impacts on cultural resources (mitigated through mitigation and monitoring strategies as detailed in programmatic agreements between BLM, Bureau of Reclamation, State Historic Preservation Office [SHPO], and the energy companies).

[4] The Vulcan project is unlikely to contribute to a cumulative effect and is not discussed further.

- Impacts on Native American religious concerns (mitigated through coordination with the local tribes and alteration of the timing of construction activities to eliminate any impacts).
- Impacts on existing livestock grazing activities (mitigated by proactively ensuring that barriers are maintained to prevent the movement of livestock off range).
- Impacts on recreation (mitigated through cooperation with off-road race coordinators).
- Temporary noise impacts.

4.3.1.2 Bango Refining Facility, Class II Air Quality Operating Permit

In 2008, an application was submitted to the Nevada Division of Environmental Protection by Bango Oil, LLC requesting a revision of Class II Air Quality Operating Permit AP2992-1473 (Nevada Division of Environmental Protection, 2009). The permit application was deemed administratively complete on May 27, 2011. The revised permit is for continued operation of a used oil and recycled fuel oil re-refining facility that processes used oil and recycled fuel oil into value-added products. The permit was originally issued on January 25, 2005 and renewed on July 8, 2011. The revised permit includes several system and equipment modifications, including those to Oil Heater #1, RFO Re-Refining Unit #1, Oil Heater #2, Cooling Tower #1, Oil Heater #3, RFO Re-Refining Unit #2, Cooling Tower #2, Oil Heater #4, Cooling Tower #3, and several new system additions (Nevada Division of Environmental Protection, 2011).

The changes to the facility-wide emissions result in a net increase of 13.69 tons/year for particulate matter and particulate matter less than or equal to 10 micrometers in diameter (PM_{10}), a net increase of 8.51 tons/year for nitrogen oxides (NO_x), a net decrease of 46.41 tons/year for sulfur dioxide, a net increase of 12.58 tons/year for carbon monoxide (CO), and a net increase of 1.63 tons/year for volatile organic compounds.

4.3.1.3 Milk Processing Plant in Fallon, Nevada

In April of 2014, the Dairy Farmers of America opened a 90,000 square foot milk processing plant in Fallon, Nevada's New River Industrial Park. The powdered milk processing plant has boosted the local economy through creation of 45 full-time jobs and hundreds of indirect jobs. The plant processes 2 million pounds of raw milk each day for worldwide distribution. The regional dairy herd is growing. Churchill, Washoe, Lyon, and Pershing counties are expected to benefit economically (Nevada Appeal, 2015).

4.3.1.4 Management of Greenbelt Areas at NAS Fallon

In 1995, a land management plan for the Greenbelt area at Naval Air Station (NAS) Fallon was adopted. The plan is in compliance with the Fallon Paiute-Shoshone Tribe Settlement Act (Public Law 101-618, Sec. 206). The Navy requirements are listed in Title II the Truckee-Carson-Pyramid Lake Water Rights Settlement Act Section 206c of Public Law 101-618. The requirements instruct the Navy to implement a land management plan for the greenbelt area to achieve NAS Fallon safety objectives of dust control, fire abatement and safety, and foreign object damage control in a manner that reduces direct surface water deliveries.

The plan, which involved 1,914 acres of irrigated land and 1,681 acres of non-irrigated land in the greenbelt area, is based on recommendations of the Natural Resources Management Plan prepared by the U.S. Department of Agriculture Extension Service. According to the plan, a cropping pattern would consist of alfalfa hay (405 acres), tall fescue mixed with trefoil (900 acres), barley (230 acres), tall

wheatgrass mixed with clover (358 acres), and improved irrigated pasture (21 acres). Native and introduced dry land species would occupy the non-irrigated area. The plan would incorporate 10-year lease periods and extensive water saving prescriptions, such as lining ditches, creating wind breaks, and laser-leveling irrigated fields.

The Navy prepared an EA to analyze the environmental impacts of the Greenbelt Management Plan. As stated in the EA, implementation of the plan would result in annual savings of 3,570 acre-feet of water, which would be made available to the U.S. Fish and Wildlife Service (USFWS) for other uses. No significant impacts from the proposed action were identified in the EA. A Finding of No Significant Impact (FONSI) was signed on May 1, 1995 (Navy, 1995).

4.3.2 Present and Reasonably Foreseeable Actions

4.3.2.1 Airfield Operations at Naval Air Station Fallon

In 2013, the Navy evaluated existing and future airfield operations at NAS Fallon in an EA (Navy, 2013). The Navy would maintain current/baseline airfield operations, conduct airfield operations with new types of aircraft, and increase airfield operations to support future potential training conditions. Airfield operations at NAS Fallon currently support advanced tactical training events by carrier air wings and other aviation units. As aircraft transitions occur, carrier air wings and other aviation units would arrive at NAS Fallon to participate in training events with newer aircraft, such as the F-35C Lightning II, EA-18G Growler, and RQ-7B Shadow. The Navy would progressively transition aging aircraft to newer aircraft beginning in 2015, with the transition to be complete by 2028. Training courses with the F-35C would begin in 2017. Proposed facility development required to support aircraft missions at NAS Fallon would include space for aircraft maintenance, crew and equipment, administration, training, and an unmanned aircraft system runway and staging area.

The potential impacts associated with NAS Fallon airfield operations and facility developments include:

- Changes in noise zones (slightly smaller noise zones northeast of NAS Fallon and slightly larger noise zones southwest of NAS Fallon).
- Temporary and localized increases in aircraft operations and construction emissions, but not in excess of the 250 tons per year comparative threshold.
- Slightly positive economic impacts on the Churchill County economy through increased population, payroll, and housing demand.
- Temporary construction-related increases in traffic volumes on area roadways and long-term minor increases in traffic volumes.
- Adverse effect on one archeological site within the new hangar's parking apron to be addressed through a memorandum of agreement to minimize and mitigate the impact.
- Noise zone decrease in the area of the Fallon Paiute Shoshone Reservation.
- Temporary wildlife disturbance during construction phase and during increased airfield operations.
- Common vegetation disturbance during construction and demolition activities and introduction of additional impervious surface (offset by BMPs).

- Potential increases in erosion, runoff, and sedimentation associated with new impervious surfaces.

4.3.2.2 Electronic Warfare/Communication Site Improvements at Fallon Range Training Complex

The Navy is proposing to improve three existing electronic warfare/communication sites at Fallon Range Training Complex (FRTC) to support ongoing training activities. These projects include:

- White Rock Remote Radio Unit 6. This project would upgrade technology used in the existing B-20 communication system. New communications equipment and a helicopter landing area would be established at a new site on BLM land. The Navy has requested right-of-way for the project from BLM. Surface distance associated with the improvements would be approximately 2,500 square feet.
- Fairview Peak is a BLM-designated communication site that is occupied by several users. Currently the Navy shares a communications facility and tower with other users. Over time, the shared facilities have become crowded and electronic interference has become a problem. The proposal is for the Navy to construct and manage, within the BLM-designated communication site, a facility for Navy use only. The proposed Navy facility would consist of a 60-foot tower, a 30 foot monopole, and two support buildings. The Navy has requested right-of-way (approximately 200 feet by 75 feet) for the project from BLM, and BLM will complete the NEPA process with support from the Navy. Surface disturbance would be less than one-third acre.
- Electronic Warfare Site 32. The Navy is proposing to site mobile Electronic Warfare equipment at Electronic Warfare Site 32. This project would involve expansion of the existing parking area at the site to accommodate the mobile Electronic Warfare equipment and employee parking. This project would occur within the existing fenced BLM right-of way at Site 32. The increase in parking area size would be 20 feet by 120 feet or 2,400 square feet.

These projects would contribute to changing visual character at each location, and increase in impermeable surfaces, potential change in helicopter flight paths with the addition of a new landing area, and the potential for minor changes in traffic patterns.

4.3.2.3 Future Range Design Changes at Fallon Range Training Complex

The Navy continues to develop and introduce new weapons and aircraft to the fleet. As new systems are fielded for use, additional or changing training requirements emerge. In addition, the tactics, techniques, and procedures are constantly evaluated against changing threats worldwide.

The Navy is evaluating potential proposals for future design changes at FRTC to enhance warfighting proficiency, readiness, and realistic training. Options available to meet existing and future training requirements are changes to the land space, airspace, target systems, electronic warfare systems and communications infrastructure, as well as changes to flight patterns and weapons delivery parameters. A cumulative effects analysis based on any potential changes at this time is both speculative and premature. Any potential significant changes to FRTC based on validated training requirements, as well as the potential renewal of the 1999 Land Withdrawal, which expires in November 2021, would be analyzed separately in accordance with NEPA.

4.3.2.4 Department of Defense Joint Unmanned Aircraft Systems Center of Excellence

In July 2005, the Joint Requirements Oversight Council established a new Joint Unmanned Aircraft Systems Center of Excellence to focus on unmanned aircraft systems operational issues (U.S. Government Accountability Office, 2006). The Center of Excellence is a multi-service unit of the U.S. Armed Forces based at Creech Air Force Base in Indian Springs, Nevada. Creech Air Force Base is located approximately 350 miles to the southeast of the project area, just 40 miles northwest of Las Vegas. The Center of Excellence is responsible for facilitating the development and integration of unmanned aircraft systems common operating standards, capabilities, concepts, doctrine, tactics, techniques, procedures, and training. The Center of Excellence has been charged with developing a joint concept of operations for unmanned aircraft systems.

In general, the potential impacts associated with unmanned aerial vehicle training activities include:

- Temporary and localized generation of emissions such as particulates and exhaust emissions.
- Disturbance of wildlife and wildlife habitat.
- Minor increases in training flights within the special use airspace.
- Minor, localized visual resource alterations.

4.3.2.5 Solar Projects in the Southwestern United States

Beginning in 2008, the BLM and the DOE began jointly preparing a programmatic EIS to evaluate actions that the agencies are considering taking to further facilitate utility-scale solar energy development in six southwestern states (Arizona, California, Colorado, Nevada, New Mexico, and Utah) (BLM, 2012). For the BLM, this included the evaluation of a new Solar Energy Program applicable to solar development on BLM-administered lands. For the DOE, it included the evaluation of new guidance to further facilitate utility-scale solar energy development and maximize the mitigation of associated environmental impacts. The proposed Solar Energy Program furthers the BLM's ability to meet the goals of EO 13212 and the Energy Policy Act of 2005; it also has been designed to meet the requirements of Secretarial Order 3285A1 regarding the identification and prioritization of specific locations best suited for utility-scale solar energy development on public lands.

Under the solar energy development program alternative, the BLM proposed categories of lands to be excluded from utility-scale solar energy development (about 79 million acres proposed for exclusion) and identified specific locations well suited for utility-scale production of solar energy (i.e., solar energy zones) where the BLM proposed to prioritize development (about 285,000 acres in Solar Energy Zones) (BLM, 2012). In Nevada, 9,076,145 acres were identified as being in variance areas and 60,395 acres were identified as developable acreage in solar energy zones. None of the solar energy zones are within the Study Area, but some variance areas are within five miles of the Study Area.

As part of the variance process, the BLM would consult the Department of Defense (DoD) to minimize or eliminate impacts on military operations and encourage compatible development. This consultation would include both general discussions for early planning and detailed assessments of specific proposals at the local level. The BLM would accept formal DoD submissions once they have been vetted through both the military departments and the DoD Siting Clearinghouse.

Potential impacts related to construction and operations of solar projects may include:

- Interference with recreational uses (e.g., desert racing and other off-highway vehicle use).

- Project fencing-related impacts on free flow of big game mammalian species.
- Potential impacts on National Register of Historic Places (NRHP)-listed cultural resources and Native American sacred sites.
- Interference with grazing permittee's pasture land, fences, and improvements.
- Temporary disturbance and permanent loss of wash and playa habitats.
- Noise and air pollutant emissions.
- Water depletion affecting specially designated areas and lands with wilderness characteristics.

4.3.2.6 Lahontan Valley Land Sale

Since 1990, the USFWS has been acquiring water rights for wetlands in Northern Nevada's Lahontan Valley, including wetlands within Stillwater National Wildlife Refuge and Carson Lake and Pasture (USFWS, 2010). The primary acquisition authority from Congress, Public Law 101-618, was analyzed and implemented in the 1996 Final EIS and Record of Decision – Water Rights Acquisition for Lahontan Valley Wetlands (USFWS, 1996). The USFWS continues to acquire water rights from willing sellers, and in many cases, land and other real estate is included in the transaction. Not all of the real estate purchased is suitable to keep in the National Wildlife Refuge System. The USFWS proposes to sell lands outside the refuge, both those it has already acquired and those it may acquire in the future. At present, the USFWS owns 65 parcels with about 5,891 acres of land that would be eligible for sale.

The USFWS anticipates acquiring a similar number of parcels and acreage during the remainder of its Lahontan Valley water rights purchase program. The total acreage of lands and the exact locations of the properties that will be offered for sale are not fully known. Because the existing water rights acquisition program may last for another 15 years or more, the need to sell acquired land is expected to continue for a similar period.

Land sale revenues would be deposited into the Lahontan Valley and Pyramid Lake Fish and Wildlife Fund and used for additional water rights purchases for Lahontan Valley wetlands, payment of annual operations, and maintenance charges for water delivery and other authorized expenditures. These revenues would help offset the need for future federal appropriations to acquire and maintain water rights for Lahontan Valley wetlands.

Potential impacts related to the land sales project may include:

- Minor unknown erosion and introduction of noxious weeds.
- Minor unknown air quality impacts.
- Minor unknown impacts on vegetation.
- Minor positive impacts on agricultural products, income and employment, farmlands, recreation, land use, social values, and Indian trust assets.
- Minor adverse impacts on cultural resources and municipal/community services.

4.3.2.7 Carson City District Drought Management

The BLM Carson City District prepared an EA to address potential environmental consequences associated with different management actions carried out during drought (BLM, 2013). The EA focuses

primarily on the environmental impacts of drought and potential responses that could be implemented to alleviate impacts on sensitive resources.

Implementation of the BLM drought management program is expected to positively affect drought-related issues by allowing rapid response during drought conditions. Appropriate rapid drought response actions are used to alleviate the impacts of authorized uses and activities on natural resources that are at risk of being adversely affected by drought. The potential response actions (and associated impacts) include the following:

- Temporary changes in livestock season of use (socioeconomic impacts).
- Reductions in livestock animal unit months or livestock grazing duration (socioeconomic impacts).
- Targeted grazing (socioeconomic impacts).
- Wild horse and burro removals (biological resources impacts).
- Temporary water hauls (land use impacts).
- Above-ground pipelines and fences (soil impacts).
- Temporary closures to off-highway vehicles (land use and recreation impacts).
- Restriction of seed collection of forest and vegetative resources (land use impacts).

4.3.2.8 Implementation of Integrated Natural Resources Management Plan

The most recent update to the Integrated Natural Resources Management Plan (INRMP) for NAS Fallon was completed in July 2014. The plan fulfills the requirements for the INRMP in accordance with the Sikes Act (16 U.S.C. sections 670a *et seq*.), as amended, DoD Instruction 4715.03, and Chief of Naval Operations Instruction 5090.1D. The INRMP was prepared and reviewed in coordination with U.S. Department of Interior, USFWS, and Nevada Department of Wildlife. The purpose of INRMP is to provide NAS Fallon with a viable framework for future management of natural resources on lands it owns or controls.

4.3.2.9 Housing Redevelopment Project at NAS Fallon

The Navy is proposing to improve the family housing community adjacent to the installation. The project will include three neighborhoods (Mountain View, Desert Winds, and Blue Sky) off-base and one home on-base. This project includes:

- The use of a previously developed (currently vacant) area to the north of the family housing community to provide storage area, jobsite office/trailer location, and construction access for family housing redevelopment project.
- Renovation of 80 existing homes with the addition of one bedroom and one bathroom to existing two bedroom homes where possible.
- Renovation of 25 homes to possibly include adding a garage space to existing garages.
- Demolition of 19 homes to prepare land and anti-terrorism force protection set-backs for new exclusive Community Center.

- Demolition of 105 homes; and the construction of 103 homes to include 6 single family homes for NAS Fallon Leadership, including 1 new Executive Flag Home.
- All existing civil infrastructure, driveways, and all other areas to be vacated will be returned to NAS Fallon.

New construction that is similar to existing land use and, when completed, the use or operation of which complies with existing regulatory requirements (e.g., a building within a cantonment area with associated discharges/runoff within existing handling capacities) (NAS Falon, 2016b).

4.3.2.10 Authorization of NAS Fallon Storm Water Discharge

NAS Fallon has discharged storm water into Newlands Project facilities since the 1950s. U.S. Bureau of Reclamation consent is required for conveyance of non-agricultural water discharges entering into Bureau of Reclamation facilities. Consent is contingent upon a determination by the Bureau of Reclamation that proposed conveyances would not interfere with the Bureau of Reclamation's use of its facilities and easements.

The project would authorize the continued discharge and conveyance of storm water from NAS Fallon through Newlands Project drainage facilities. Expected volumes and flow rates of storm water discharging to Reclamation facilities would not change from the current estimated amounts. NAS Fallon would continue to be responsible for obtaining, complying with, and renewing their Nevada Division of Environmental Protection permit (Storm Water General Permit NVR050000 for Storm Water Associated with Industrial Activity) for the continued discharge of this storm water. NAS Fallon would also continue to implement their Storm Water Pollution Prevention Plan, Installation Restoration Program, Installation Storm Water Site Inspection Program, and structural and non-structural Best Management Practices for storm water discharges, as required by the State of Nevada.

The Bureau of Reclamation completed an EA in 2015. Based on the EA, the Bureau of Reclamation found that the Proposed Action is not a major Federal action that would significantly affect the quality of the human environment. A FONSI was signed on December 11, 2015 (Bureau of Reclamation, 2015).

4.3.2.11 Conveyance of Non-Project Treated Effluent Water in Newlands Project Lower Deep Diagonal Drain

Bureau of Reclamation consent is required for conveyance of non-project water in Bureau of Reclamation facilities. Effluent water from the NAS Fallon has been conveyed through Bureau of Reclamation's Lower Diagonal Deep Drain to Stillwater National Wildlife Refuge since the 1950s. NAS Fallon constructed a wastewater treatment plant in 1995 and the treated effluent water has been conveyed in the Lower Diagonal Deep Drain to Stillwater National Wildlife Refuge since that time. The Bureau of Reclamation has never authorized the conveyance of this non-project water in their facilities.

The purpose of the proposed action is for authorization by the Bureau of Reclamation to continue conveyance of NAS Fallon treated effluent water through the Lower Diagonal Deep Drain to wetlands at Stillwater National Wildlife Refuge. Expected flows would be approximately 320 acre feet per year up to a maximum of 840-acre feet per year.

A Memorandum of Agreement with the Bureau of Reclamation, NAS Fallon, and Stillwater National Wildlife Refuge to define the roles and responsibilities of the three entities for the use of federal water diversion, storage and conveyance facilities to deliver water to Lahontan Valley wetlands.

The Bureau of Reclamation completed an EA for the proposed action in 2008 and a FONSI was signed in January of 2009 (Bureau of Reclamation, 2009).

4.4 Cumulative Impact Analysis

Where feasible, the cumulative impacts were assessed using quantifiable data; however, for many of the resources included for analysis, quantifiable data is not available and a qualitative analysis was undertaken. In addition, where an analysis of potential environmental effects for future actions has not been completed, assumptions were made regarding cumulative impacts related to this EA where possible. The analytical methodology presented in Chapter 3, which was used to determine potential impacts to the various resources analyzed in this document, was also used to determine cumulative impacts.

4.4.1 Air Quality

4.4.1.1 Description of Geographic Study Area

In the state of Nevada, Air Quality Control Regions (AQCRs) and air basins are not defined; therefore, for purpose of this analysis, the region of influence (ROI) for air quality is Churchill County, Nevada, which is included in the Carson Desert Basin Hydrographic Area. Churchill County is classified by U.S. Environmental Protection Agency (USEPA) as unclassified/attainment for all criteria pollutants.

4.4.1.2 Relevant Past, Present, and Future Actions

The Bango Refining Facility system and equipment modifications, the Powdered Milk Processing Plant, and the NAS Fallon Greenbelt Management Plan all have the potential to contribute to regional air quality through their ongoing operations. NAS Fallon follows a Greenbelt Management Plan and had an EA published in 1995 for the Management of the Greenbelt Area. This management plan covers dust control, fire safety, and foreign object damage control to aircraft on the 3,500 acres of lands surrounding the Main Station.

Future changes to airfield operations at NAS Fallon as well and Unmanned Aircraft operations would likewise contribute to regional air quality on an ongoing basis. Construction associated with the Electronic Warfare/Communication Site Improvements, solar energy projects, and restoration activities would involve temporary air quality impacts.

4.4.1.3 Cumulative Impact Analysis

Cumulative air quality impacts from past, present, and future actions within the ROI would be less than significant because the project area is in attainment of the NAAQS; the listed cumulative projects would be required to conform to Clear Air Act (CAA) General Conformity Rule requirements and/or the requirements set forth by the Nevada Division of Environmental Protection and would not produce significant amounts of air emissions; and the Proposed Action in itself would not have the potential to contribute meaningfully to any hypothetical significant cumulative impacts. In addition, implementation of dust suppression methods (such as using water trucks to wet the project area) during construction and the regular application of a soil stabilizer post-construction would reduce potential dust impacts. The minor impacts to air quality from Alternatives 1 or 2 that could contribute to potential cumulative impacts would be from the short-term air emissions from trucks and vehicles used during the construction of the project. Of the identified reasonably foreseeable future actions with the potential to contribute to a cumulative impact to air quality, only the changes in airfield operations at NAS Fallon

have quantified those impacts. Airfield operations at NAS Fallon would overlap potential impacts associated with the Proposed Action in the year 2017. The estimated emissions in 2017 for the proposed Airfield operations would be 0.61 ton per year of VOCs, 4.21 tons per year of CO, 6.68 tons per year of NO_x, 0.10 tons per year of SO_2, 22.87 tons per year of PM_{10}, and 2.60 tons per year of $PM_{2.5}$. When combined with the total emissions estimated for the proposed project (see Tables 3.1-4 and 3.1-5), combined emissions for the overlapped year would still not approach *de minimis* thresholds (of a basic nonattainment are) for these pollutants. As noted, in Section 3.1, the project area is considered to be in attainment of the NAAQS and *de minimis* thresholds are not applicable to the Proposed Action; however, estimated emission were provided for the purposes of providing a quantitative analysis. As such, the cumulative impact of construction of the Proposed Action, combined with the past, present, and reasonably foreseeable future projects, would not result in significant impacts within the ROI.

Operational air emissions from proposed maintenance activities under Alternatives 1 or 2 would be negligible compared to the existing condition, and would not result in significant long-term increases in air emissions. During operations, there would be a regional reduction in air emissions due to the reduction in the use of fossil fuels to produce electricity. Other regional projects would contribute to a cumulative effect on air quality. These would include sustained impacts from futures actions such as the NAS Fallon airfield operations and unmanned aircraft operations, as well as more discrete or temporary impacts associated with prescribed burning activities, or construction of features such as other solar arrays. However, the Proposed Action would only have minimal impacts to air quality and would not have the potential to meaningfully contribute to any cumulative impacts, significant or otherwise. Therefore, implementation of the Proposed Action combined with the past, present, and reasonably foreseeable future projects, would not result in significant impacts within the ROI.

4.4.2 Water Resources

4.4.2.1 Description of Geographic Study Area

The ROI for cumulative effects on water resources is defined as the Lahontan Valley Basin.

4.4.2.2 Relevant Past, Present, and Future Actions

The Lahontan Valley Land Sales Project, Carson City Drought Management Plan, and the NAS Fallon Greenbelt Management Plan all have the potential to contribute to a regional cumulative impact to water quality. NAS Fallon follows a Greenbelt Management Plan and had an EA published in 1995 for the Management of the Greenbelt Area. This management plan covers dust control, fire safety, and foreign object damage control to aircraft on the 3,500 acres of lands surrounding the Main Station.

In the reasonably foreseeable future, the recent Authorization of NAS Fallon Storm Water Discharge and Conveyance of Non-Project Treated Effluent Water in Newlands Project Lower Deep Diagonal Drain, by the Bureau of Reclamation have the potential to contribute to regional cumulative impact on water quality. Both actions are continuations of actions that have been regularly occurring since the 1950s. The recent actions were authorizations for continued use of the Bureau of Reclamation systems.

4.4.2.3 Cumulative Impact Analysis

Cumulative water resources impacts from past, present, and future actions within the ROI would be less than significant because the Proposed Action has minimal impacts on water resources.

Cumulative water resources impacts that would occur with implementation of the Proposed Action would be negligible. The Proposed Action would not significantly impact local, regional, or statewide water sources, including groundwater and surface water. Cumulatively, the construction projects described in Section 4.4.2.2 would not have any appreciable cumulative impact to water resources in terms of quality and availability. Other proposed projects in the area would each undergo separate environmental review under NEPA, which would ensure that significant impacts related to water resources would be avoided, minimized, and/or compensated, to the extent practicable. In addition, the Proposed Action would only have minimal impacts to water resources and would not have the potential to meaningfully contribute to any cumulative impacts, significant or otherwise. Therefore, implementation of the Proposed Action combined with the past, present, and reasonably foreseeable future projects, would not result in significant impacts to water resources.

4.4.3 Cultural Resources

4.4.3.1 Description of Geographic Study Area

The ROI for cumulative impacts analysis is the project area and lands adjacent to the project area. Eighteen documented archaeological resources are present within the project area: These sites are prehistoric lithic scatters, historic trash scatters, multi-component sites, and two historic drains.

Subject to SHPO concurrence, sixteen of these sites are not eligible for inclusion in the NRHP and are not considered historic properties. It has been recommended that sites 26CH3359 and 26CH2411/26CH2653 be avoided during construction of the solar PV system as a means of impact avoidance. Therefore, implementation of the Proposed Action combined with the past, present, and reasonably foreseeable future projects, would not result in significant impacts within the ROI.

4.4.3.2 Relevant Past, Present, and Future Actions

Changing airfield operations and unmanned aircraft operations at NAS Fallon include ground-disturbing activities that have the potential to contribute to a cumulative impact within the ROI; adverse effects would occur to one archeological site within the new hangar's parking apron. However, these impacts would be addressed through a memorandum of agreement to minimize and mitigate the impacts. Regionally, activities associated with solar energy and land restoration could impact the larger cultural resource landscape surrounding the Proposed Action.

4.4.3.3 Cumulative Impact Analysis

Cumulative impacts to cultural resources from past, present, and future actions within the ROI would be less than significant because these projects have been, and would similarly be required to avoid or mitigate direct and indirect effects to cultural resources. In addition, the Proposed Action would only have minimal impacts to cultural resources and would not have the potential to meaningfully contribute to any cumulative impacts, significant or otherwise. Therefore, implementation of the Proposed Action combined with the past, present, and reasonably foreseeable future projects, would not result in significant impacts within the ROI.

4.4.4 Biological Resources

4.4.4.1 Description of Geographic Study Area

The ROI for cumulative impact analysis for biological resources is the project area and lands having similar habitats and species in the region. As renewable energy projects, urbanization, and military training pressures increase within the region, impacts to biological resources within the region are increasing on a cumulative level. When the Proposed Action is considered with other past, present, and probable future projects listed in Section 4.4.4.2, loss of habitat, habitat fragmentation, and other direct impacts to species would contribute to the cumulative impacts to biological resources.

4.4.4.2 Relevant Past, Present, and Future Actions

The NAS Fallon Greenbelt Management Plan has the potential to contribute to a regional cumulative impact. NAS Fallon follows a Greenbelt Management Plan and had an EA published in 1995 for the Management of the Greenbelt Area. This management plan covers dust control, fire safety, and foreign object damage control to aircraft on the 3,500 acres of lands surrounding the Main Station. Changing airfield and aircraft activities at NAS Fallon would also potentially impact biological resources at NAS Fallon. Regionally, proposed solar energy projects and land management and restoration activities would also contribute to a cumulative impact to biological resources.

4.4.4.3 Cumulative Impact Analysis

Cumulative biological resource impacts from past, present, and future actions within the ROI would be less than significant because, like the Proposed Action, the projects described in Section 4.4.4.2 have all committed to a number of impact avoidance, minimization, and/or mitigation measures, including but not limited to conservation measures, restoration plans, revegetation plans, and weed control efforts. In addition, the Proposed Action would only have minimal impacts to biological resources and would not have the potential to meaningfully contribute to any cumulative impacts, significant or otherwise. Therefore, implementation of the Proposed Action combined with the past, present, and reasonably foreseeable future projects, would not result in significant impacts within the ROI.

4.4.5 Visual Resources

4.4.5.1 Description of Geographic Study Area

The ROI for cumulative impact analysis for visual resources is the project area and lands adjacent to the project area. The project area consists of native vegetation and dunes. The area is flat with little topographic relief. The visual resource areas from Sites A and B are similar, consisting of NAS Fallon Operations Area to the west, open agricultural fields to the north and east, and NAS Fallon family housing, located approximately 1,200 feet south of Site A. The visible landscape elements consist of power lines, dirt access roads, agricultural fields, distant mountains, and the NAS Fallon Operations Area. Overall, the visual landscape of the area is rural with vast agricultural fields, roadways, and irrigation ditches dominating the visual setting.

4.4.5.2 Relevant Past, Present, and Future Actions

The electronic warfare/communication site improvements would also modify the cumulative visual environment. Regionally, proposed solar energy projects and land management and restoration activities would also contribute to a cumulative impact to visual resources.

4.4.5.3 Cumulative Impact Analysis

Implementation of the Proposed Action would alter the visual environmental from native vegetation and dunes to a solar PV system. The proposed solar PV system would be compatible with NAS Fallon's visual character. In addition, the change in visual character would be consistent with regional development, where multiple solar PV projects are active, under construction, or proposed on previously or currently agricultural use lands. In addition, the Proposed Action would only have minimal impacts to visual resources and would not have the potential to meaningfully contribute to any cumulative impacts, significant or otherwise. Therefore, implementation of the Proposed Action combined with the past, present, and reasonably foreseeable future projects, would not result in significant impacts within the ROI.

4.4.6 Utilities

4.4.6.1 Description of Geographic Study Area

The ROI for Utilities includes transmissions lines from NV Energy that supply the installation with electrical power as well as potable water sources supplied by the City of Fallon Engineering and Public Works Department.

4.4.6.2 Relevant Past, Present, and Future Actions

Changing utility demand associated with airfield operations and electronic warfare/communication site improvements have the potential to impact cumulative utility demand at NAS Fallon. Regionally, geothermal, wind, and solar power projects that are operating and/or under development contribute to impacts associated with power supply and demand.

4.4.6.3 Cumulative Impact Analysis

Cumulative utility impacts from past, present, and future actions within the ROI would be less than significant because the existing electrical infrastructure would be sufficient to support the solar PV system and the private partner would use off-site sources to meet all project water needs. Cumulative utilities impacts that would occur with implementation of the alternatives would include a local renewable energy source that would create beneficial impacts regionally and locally. The minimal impacts to utilities associated with the Proposed Action would not have the potential to meaningfully contribute to any cumulative impacts, significant or otherwise. Therefore, implementation of the Proposed Action combined with the past, present, and reasonably foreseeable future projects, would not result in significant impacts within the ROI.

4.4.7 Transportation

4.4.7.1 Description of Geographic Study Area

The ROI for Transportation includes U.S. Route and State Routes that are proximate to the installation, specifically: Pasture Road, Berney Road, Union Road, Wildes Road, U.S. Route 50, and U.S. Route 95.

4.4.7.2 Relevant Past, Present, and Future Actions

Changing staffing at NAS Fallon associated with changing airfield operations, combined with the increased employment associated with the renewable energy facilities proposed could potentially

impact regional traffic patterns. In addition, the Housing Redevelopment Project at NAS Fallon has the potential to impact regional traffic patterns.

4.4.7.3 Cumulative Impact Analysis

Cumulative transportation impacts from past, present, and future actions within the ROI would be less than significant because trips generated specifically for the installation would be comparatively light and temporary. The additional volume of vehicle trips is not expected to results in congestions, including delays and/or queues. In addition, the Proposed Action would only have minimal impacts to transportation and would not substantially contribute to potential cumulative impacts. Therefore, implementation of the Proposed Action combined with the past, present, and reasonably foreseeable future projects, would not result in significant impacts within the ROI.

4.4.8 Public Health and Safety

4.4.8.1 Description of Geographic Study Area

The ROI for Public Health and Safety includes an analysis of hazards associated with airfield operations and flight safety.

4.4.8.2 Relevant Past, Present, and Future Actions

The identified cumulative projects near the NAS Fallon airfield would meet the requirements and height restrictions for APZ-I and APZ-II areas. None of the identified cumulative projects would increase the risk for aircraft accidents.

4.4.8.3 Cumulative Impact Analysis

Cumulative public health and safety impacts from past, present, and future actions within the ROI would be less than significant because there would be a lack of airspace penetration, no reflectivity issues, and no interference with communications. There is no evidence that solar PV arrays would increase bird activity that would ordinarily add to BASH concerns. The Proposed Action would not have the potential to meaningfully contribute to any cumulative impacts, significant or otherwise. Therefore, implementation of the Proposed Action combined with the past, present, and reasonably foreseeable future projects, would not result in significant impacts within the ROI.

4.4.9 Socioeconomics

4.4.9.1 Description of Geographic Study Area

The geographic area of study for socioeconomics is Churchill County, Nevada.

4.4.9.2 Relevant Past, Present, and Future Actions

Past and future alternative energy projects (geothermal, wind, and solar power) represent temporary and permanent employment opportunities in the region. These projects could also potentially affect the cost of energy within the ROI. Any projects involving construction or additional personnel could have a temporary impact to the economy, employment, and population. Changing airfield operations at NAS Fallon contribute to both temporary and permanent socioeconomic impacts. The BLM Carson City District Drought Management Plan would contribute to a cumulative socioeconomic impact by altering existing grazing patterns in the region.

4.4.9.3 Cumulative Impact Analysis

Cumulative impacts to socioeconomics that would occur with implementation of the alternatives would include additional jobs and population changes related to construction and personnel needs for related actions. In addition, there would be a beneficial, long-term impact to the region due to the additional electric power available from the proposed project. The beneficial socioeconomic impacts of the Proposed Action would not have the potential to meaningfully contribute to any cumulative impacts, significant or otherwise. Therefore, implementation of the Proposed Action combined with the past, present, and reasonably foreseeable future projects, would not result in significant impacts within the ROI.

4.4.10 Noise

4.4.10.1 Description of Geographic Study Area

The geographic area of study for noise is the surrounding vicinity of NAS Fallon and the project area, specifically any sensitive noise receptors in the human environment within this area.

4.4.10.2 Relevant Past, Present, and Future Actions

Future changes to airfield operations at NAS Fallon as well and Unmanned Aircraft operations would contribute to regional noise levels on an ongoing basis. Construction associated with the Electronic Warfare/Communication Site Improvements, solar energy projects, and restoration activities would involve temporary impacts to noise levels in the region.

4.4.10.3 Cumulative Impact Analysis

Cumulative impacts to noise that would occur with implementation of the alternatives would include an increase in construction related noise levels to receptors within the immediate vicinity of the project area during construction activities occurring on the site in areas closest to the receptor. Otherwise, construction occurring in areas away from receptors would not cause elevated noise levels at the receptors. Baseline noise levels in the area are and would continue to be dominated by aircraft operations at NAS Fallon. The Proposed Action would not have the potential to meaningfully contribute to any cumulative noise impacts, significant or otherwise. Therefore, implementation of the Proposed Action combined with the past, present, and reasonably foreseeable future projects, would not result in significant impacts within the ROI.

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5 Other Considerations Required by NEPA

5.1 Consistency with Other Federal, State, and Local Laws, Plans, Policies, and Regulations

In accordance with 40 Code of Federal Regulations ([CFR] section 1502.16(c), analysis of environmental consequences shall include discussion of possible conflicts between the Proposed Action and the objectives of federal, regional, state and local land use plans, policies, and controls. Table 5-1 identifies the principal federal and state laws and regulations that are applicable to the Proposed Action, and describes briefly how compliance with these laws and regulations would be accomplished.

Table 5-1 Principal Federal and State Laws Applicable to the Proposed Action

Federal, State, Local, and Regional Land Use Plans, Policies, and Controls	***Status of Compliance***
National Environmental Policy Act (NEPA) (42 United States Code [U.S.C.] section 4321 et seq.); Center for Environment Quality [CEQ] NEPA implementing regulations (40 CFR parts 1500-1508; Navy procedures for Implementing NEPA (32 CFR part 775 and Chief of Naval Operations Instruction [OPNAVINST] 5090.1D)	This Environment Assessment (EA) has been prepared in accordance with NEPA, CEQ regulations implementing NEPA, and Navy NEPA procedures.
Clean Air Act (42 U.S.C. section 7401 et seq.)	The air quality analysis in this EA concludes that under Alternatives 1 and 2 no significant impacts to air quality would occur. The region of influence (ROI) is in attainment of all criteria pollutants. As such, a Record of Non-Applicability for Clean Air Act conformity is not required for this project.
Clean Water Act (33 U.S.C. section 1251 et seq.)	Alternatives 1 or 2 would be implemented in compliance with Nevada's General Construction Permit. Proposed construction activities would require preparation of a Storm Water Pollution Prevention Plan and use of Best Management Practices (BMPs) to limit potential erosion and runoff.
National Historic Preservation Act (Section 106, 16 U.S.C. section 470 et seq.)	None of the archeological sites within the project area are eligible for listing under the National Register of Historical Place (NRHP). The Navy has requested the State Historical Preservation Officer concur with a finding of "No Historic Properties Affected" finding (Appendix B). *[To Be Provided once consultation is completed].*
Endangered Species Act (16 U.S.C. section 1531 et seq.)	Neither Alternative 1 nor Alternative 2 would affect ESA-listed species or suitable habitat for ESA-listed species at NAS Fallon. Critical habitat has not been designated on NAS Fallon.
Migratory Bird Treaty Act (16 U.S.C. sections 703-712)	Both Alternatives 1 and 2 would be in compliance with the Migratory Bird Treaty Act.
EO 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-income Populations*	Neither Alternative 1 nor 2 would result in disproportionately high and adverse human health or environmental effects on minority populations and low-income populations.
EO 13045, *Protection of Children from Environmental Health Risks and Safety Risks*	Neither Alternative 1 nor Alternative 2 would result in environmental health risks and safety risks that may disproportionately affect children.

Table 5-1 Principal Federal and State Laws Applicable to the Proposed Action

Federal, State, Local, and Regional Land Use Plans, Policies, and Controls	*Status of Compliance*
EO 13175, *Consultation and Coordination with Indian Tribal Governments*	The Navy will complete consultation with Tribal Governments via the SHPO.
EO 13696, *Planning for Federal Sustainability in the Next Decade*	Implementation of Alternative 1 or Alternative would comply with the required renewable energy standards put forth by the Secretary of the Navy's (SECNAV's) 1 Gigawatt Initiative and other energy goals.

5.2 Climate Change

The Revised Draft Guidance on the Consideration of Greenhouse Gas Emissions and the Effects of Climate Change in National Environmental Protection Act (NEPA) Reviews issued by the Council on Environment Quality (CEQ) on December 18, 2014 recommends incorporating impacts associated with climate change as part of the standard cumulative impact analysis of all NEPA documents. The draft guidance encourages agencies to determine which climate change impacts warrant consideration in their analyses based on both the Proposed Action's potential impact to climate changes and the potential impact a changing climate may have on implementation of the Proposed Action. In addition, Executive Order (EO) 13653, *Preparing the United States for the Impacts of Climate Change*, directs federal agencies to continue to develop, implement, and update comprehensive plans that integrate consideration of climate change into agency operations and overall mission objectives.

The U.S. Environmental Protection Agency (USEPA) developed a "State of Knowledge" website following the 2007 Intergovernmental Panel on Climate Change report. The USEPA affirms that while the contribution is uncertain, human activities are substantially increasing greenhouse gas (GHG) emissions, which, in turn, are contributing to a global warming trend (USEPA, 2015). The U.S. Global Change Research Program (USGCRP) is a working group coordinating the efforts of 13 different federal agencies, including the U.S. Department of Agriculture, the Department of the Interior, the Department of Defense (DoD), and the Department of Energy. The USGCRP releases regular reports presenting the most current scientific consensus of predicted changes associated with global climate change. The 2014 National Climate Assessment report is the most recent complete report. This report summarizes the science of climate change and the impacts of climate change on the U.S., now and in the future, and is recommended by the CEQ 2014 draft guidance as the primary source for framing climate change discussions.

5.2.1 Predicted Future Conditions

The USGCRP looks to two potential future conditions as part of its predictive modeling process. Under conditions of lower GHG emissions, the average temperature may increase as much as 2.5 Fahrenheit (°F) by 2050, 3.5°F by 2070, and 4.5°F by 2099. Under conditions of higher continuous GHG emissions, the potential increase is greater in the long-term, and may be as much as 7.5°F by 2099. Projected changes in long-term climate predict more frequent extreme events such as heat waves and droughts (USGCRP, 2014).

Current simulations predict decreasing precipitation, snowpack, runoff, and soil moisture for the region into the future. Specifically, winter and spring precipitation may decrease between 0 and 30 percent from currently observed levels, with biggest reduction predicted under the higher emissions scenario. While total precipitation is projected to decrease, the frequency of extreme rain events with the high

potential for flooding is projected to increase. At the same time, extreme heat events are also expected to increase in frequency and magnitude. The temperatures observed during extreme events are projected to increase by 3°F to 9°F, depending on the emissions scenario used for predictive modeling (USGCRP, 2014). This change in precipitation and heat would likely alter agricultural and ecosystem conditions.

As temperatures increase in the current century, optimal zones for growing crops will shift. Pests that were historically unable to survive in cooler areas may spread northward. Milder winters and earlier springs also may encourage greater numbers of pest species. Rising carbon dioxide levels in the atmosphere may increase growth of both crop and weed species. In some areas, water scarcity may reduce or even eliminate certain types of agricultural production. Similarly, changes in temperature and precipitation affect the composition and diversity of native animals and plants through altering their breeding patterns, water and food supply, and habitat availability. In a changing climate, populations of some pests such as red fire ants and rodents, better adapted to a warmer climate, are projected to increase (USGCRP, 2014).

5.2.2 Impact of the Proposed Action on Climate Change

The Proposed Action has the potential to impact climate change in a beneficial way via the long-term benefits of contributing to the energy/power grid through alternative energy development and reducing GHG as described in Section 3.1, *Air Quality*.

Emissions under each alternative would be well below the 25,000 metric tons of carbon dioxide equivalent level proposed in the draft NEPA guidance by the CEQ as the threshold warranting a more substantial evaluation of—but not necessarily a determination of—significance of climate change impact (CEQ, 2014). Thus, the implementation of any of the evaluated alternatives would not contribute significantly to global climate change.

5.2.3 Impact of Climate Change on the Proposed Action

Climate change does not have the potential to impact the operations included in the Proposed Action.

5.3 Irreversible or Irretrievable Commitments of Resources

Resources that are irreversibly or irretrievably committed to a project are those that are used on a long-term or permanent basis. This includes the use of non-renewable resources such as metal and fuel, and natural or cultural resources. These resources are irretrievable in that they would be used for this project when they could have been used for other purposes. Human labor is also considered an irretrievable resource. Another impact that falls under this category is the unavoidable destruction of natural resources that could limit the range of potential uses of that particular environment.

The action alternatives would comply with EO 13693, *Planning for Federal Sustainability in the Next Decade*. EO 13693 superseded EO 13423*, Strengthening Federal Environmental, Energy, and Transportation Management*, and EO 13514, *Federal Leadership in Environmental, Energy, and Economic Performance*. The goal of EO 13693 is to maintain federal leadership in sustainability and GHG emission reductions.

Both Alternative 1 and Alternative 2 would require a similar amount of construction materials and energy; the smaller footprint of the Alternative 1 would equate to a similarly smaller construction material and energy demand. The total amount of construction materials (e.g., concrete, insulation,

wiring) required for Alternative 1 or Alternative 2 is relatively small when compared to the resources available in the region. The construction materials and energy required for facility development and operations are not in short supply. Moreover, the use of construction materials and energy would not have an adverse impact on the continued availability of these resources. The commitment of energy resources to implement Alternative 1 or Alternative 2 would not be excessive in terms of region-wide usage. Furthermore, compliance with EO 13693 requirements would minimize irreversible or irretrievable effects to multiple non-renewable and renewable resources, while implementation of the action alternatives would further the goals and intentions of EO 13693 by increasing the amount of energy generated and/or used at Naval Air Station (NAS) Fallon that is derived from renewable sources.

Implementation of Alternatives 1 or 2 would not result in significant irreversible or irretrievable commitment of resources.

5.4 Unavoidable Adverse Impacts

This EA has determined that the alternatives considered would not result in any significant impacts. No resource area would be subject to significant adverse impacts that would require mitigating. Table 3.11-2 presents the resource area impact avoidance and minimization measures identified for the alternatives.

5.5 Relationship between Short-Term Use of the Environment and Long-Term Productivity

NEPA requires an analysis of the relationship between a project's short-term impacts on the environment and the effects that these impacts may have on the maintenance and enhancement of the long-term productivity of the affected environment. Impacts that narrow the range of beneficial uses of the environment are of particular concern. This refers to the possibility that choosing one development site reduces future flexibility in pursuing other options, or that using a parcel of land or other resources often eliminates the possibility of other uses at that site.

Short-term uses of the environment associated with the action alternatives would include the elimination of vegetative ground cover and termination within the project area. Project-related construction activities would temporarily increase air pollution emissions in the immediate vicinity of the affected area(s).

As discussed in Chapter 3, the action alternatives would result in both short- and long-term environmental effects. Construction and operation of the solar photovoltaic system is unlikely to result in the types of impacts that would reduce environmental productivity, have long-term impacts on sustainability, affect biodiversity, or narrow the range of long-term beneficial uses of the environment. Biotic productivity within the affected parcels would be eliminated, while renewable energy benefits would be realized. In summary, implementation of Alternatives 1 or 2 would not result in any impacts that would significantly reduce environmental productivity or permanently narrow the range of beneficial uses of the environment.

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7 List of Preparers

This Environmental Assessment was prepared collaboratively between Navy and contractor staff.

U.S. Department of the Navy

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Appendix A
Resource Specific Technical Data

A.1 Soils Map

A.2 Census Tract Maps

A.3 Air Quality Calculations

A.4 Visual Resources Figures

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A.1 Soils Map

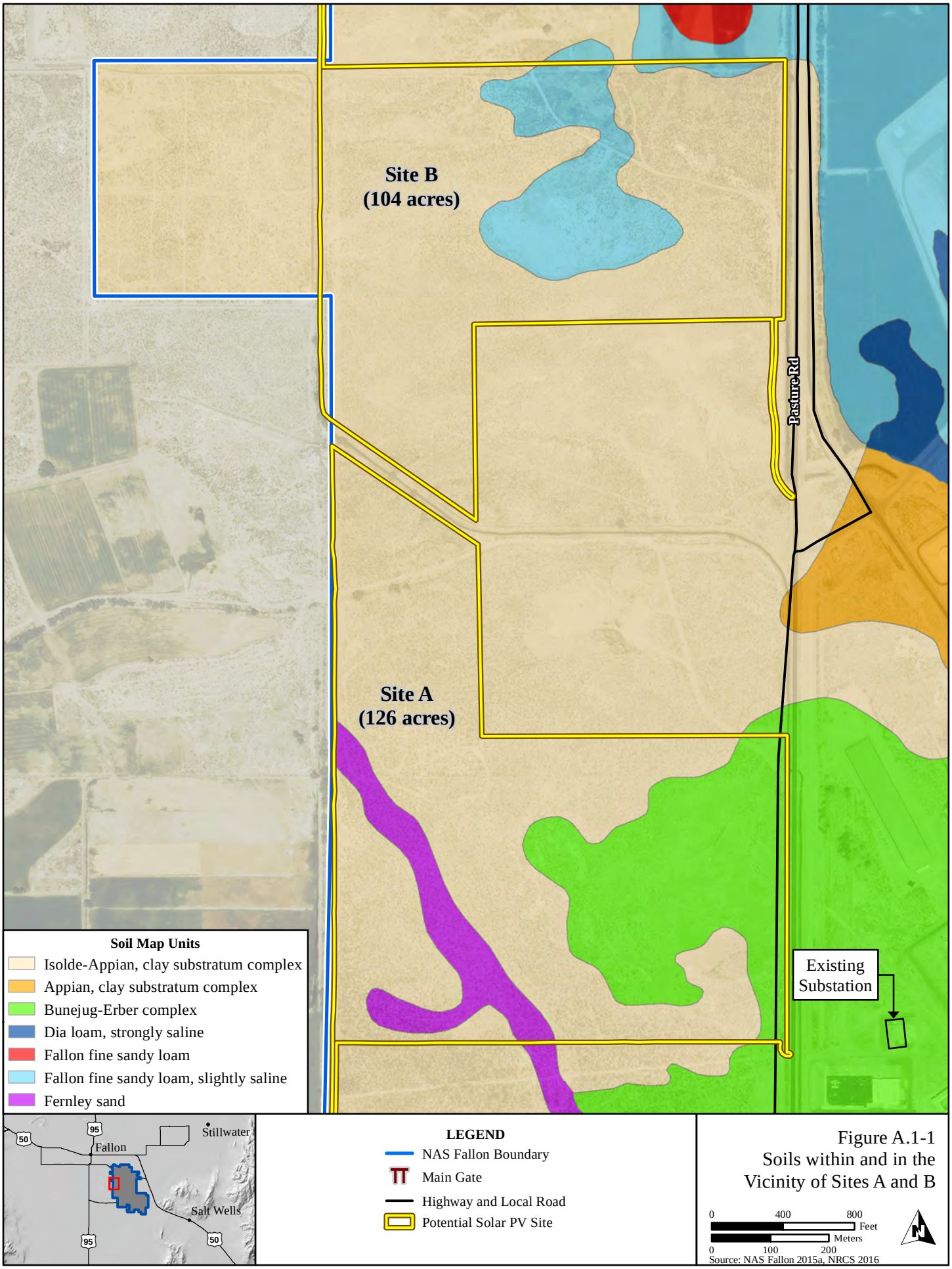

Figure A.1-1
Soils within and in the
Vicinity of Sites A and B

A.2 Census Tract Maps

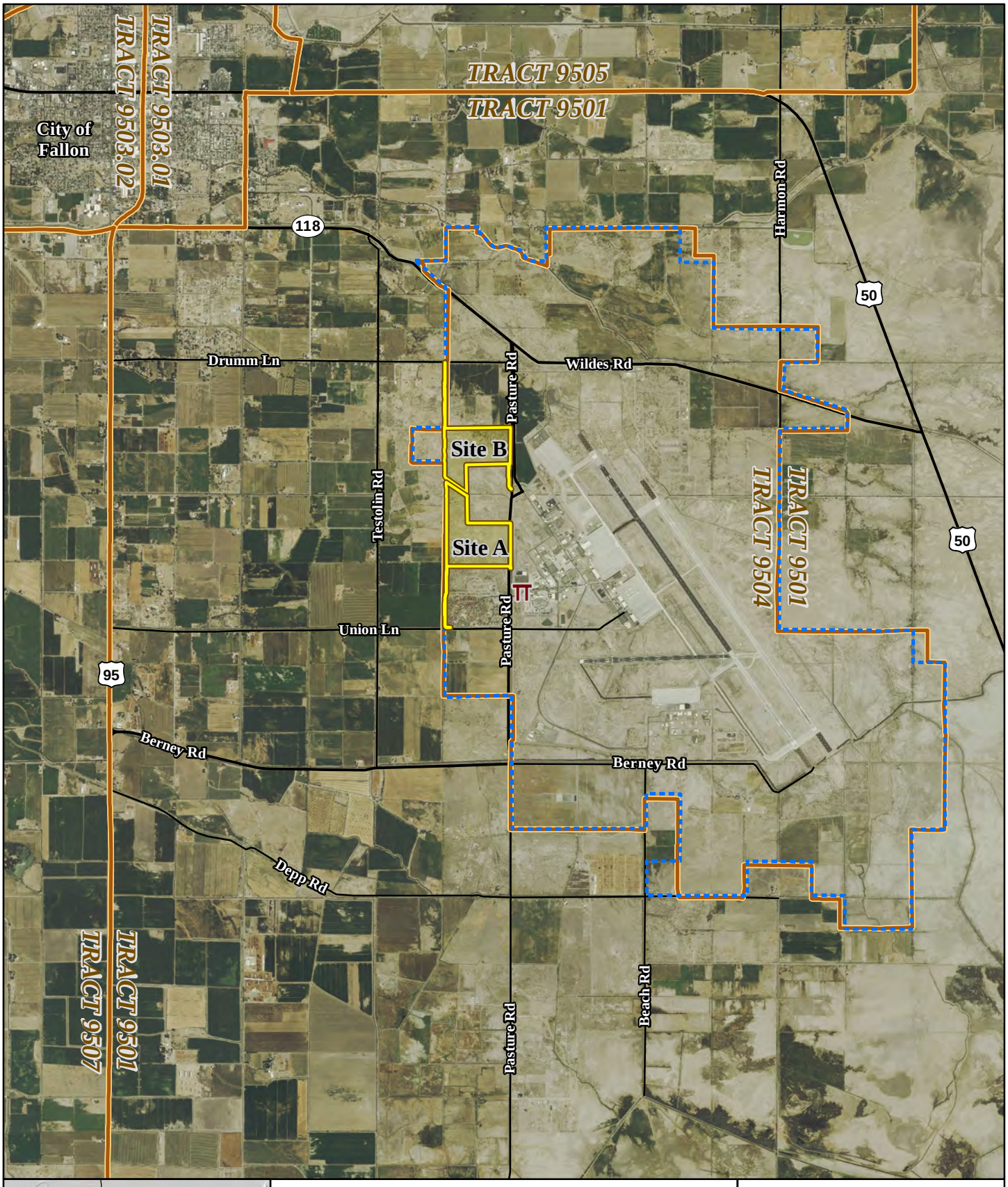

Figure A.2-1
2010 Census Tracts in the Vicinity of the Project Area

A.3 Air Quality Calculations

NAS Fallon Solar PV EA - Alternative 1 (20 MW)

Great Basin Valleys Air Basin, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
General Light Industry	117.00	1000sqft	2.69	117,000.00	0

1.2 Other Project Characteristics

Urbanization	Rural	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	54
Climate Zone	14			**Operational Year**	2016
Utility Company	Pacific Gas & Electric Company				
CO2 Intensity (lb/MWhr)	641.35	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - General Light Industry was the closest Land Use Type option. "Unit amount" = the proposed "construction" (substation + s/m station + switching station + trans poles), using the PV EA at NAS Lemoore as a representative example of a 20 MW project.

Construction Phase - No demolition, paving, or architectural coating phases. Assumed 4 months site prep, 4 months grading, 16 months construction (24 months total).

Off-road Equipment - Equipment mix per DOPPA. Water trucks are "off-highway trucks".

Grading - Assumed that the entire 215-acre site was prepared, and half of the site was graded. Also assumed that grading of secondary access roads would result in approx. 3.8 additional acres. Assumed that all cut/fill was balanced on site (no material imported or exported).

2.0 Emissions Summary

2.1 Overall Construction

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2017	1.4278	14.8006	10.0692	0.0147	2.1989	0.7230	2.9218	1.1118	0.6678	1.7796	0.0000	1,343.1215	1,343.1215	0.3825	0.0000	1,351.1531
2018	1.6757	16.5864	12.0488	0.0198	0.0934	0.8113	0.9047	0.0251	0.7523	0.7774	0.0000	1,765.0731	1,765.0731	0.4884	0.0000	1,775.3295
2019	0.3781	3.7014	2.8274	4.8400e-003	0.0229	0.1785	0.2014	6.1500e-003	0.1655	0.1716	0.0000	426.0606	426.0606	0.1192	0.0000	428.5635
Total	**3.4817**	**35.0884**	**24.9453**	**0.0393**	**2.3151**	**1.7128**	**4.0279**	**1.1430**	**1.5856**	**2.7287**	**0.0000**	**3,534.2552**	**3,534.2552**	**0.9900**	**0.0000**	**3,555.0460**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2017	1.4278	14.8006	10.0692	0.0147	1.0295	0.7230	1.7524	0.5110	0.6678	1.1788	0.0000	1,343.1200	1,343.1200	0.3825	0.0000	1,351.1516
2018	1.6757	16.5864	12.0488	0.0198	0.0934	0.8113	0.9047	0.0251	0.7523	0.7774	0.0000	1,765.0712	1,765.0712	0.4884	0.0000	1,775.3275
2019	0.3781	3.7014	2.8274	4.8400e-003	0.0229	0.1785	0.2014	6.1500e-003	0.1655	0.1716	0.0000	426.0602	426.0602	0.1192	0.0000	428.5630
Total	**3.4817**	**35.0884**	**24.9453**	**0.0393**	**1.1457**	**1.7128**	**2.8585**	**0.5422**	**1.5856**	**2.1278**	**0.0000**	**3,534.2513**	**3,534.2513**	**0.9900**	**0.0000**	**3,555.0420**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**50.51**	**0.00**	**29.03**	**52.56**	**0.00**	**22.02**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Site Preparation	Site Preparation	3/1/2017	6/30/2017	5	88	
2	Grading	Grading	7/1/2017	10/31/2017	5	87	
3	Building Construction	Building Construction	11/1/2017	3/30/2019	5	368	

Acres of Grading (Site Preparation Phase): 215

Acres of Grading (Grading Phase): 110.8

Acres of Paving: 0

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Site Preparation	Graders	1	6.00	174	0.41
Site Preparation	Off-Highway Trucks	5	6.00	400	0.38
Site Preparation	Other Construction Equipment	2	6.00	171	0.42
Site Preparation	Rubber Tired Dozers	5	6.00	255	0.40
Site Preparation	Scrapers	1	6.00	361	0.48
Site Preparation	Tractors/Loaders/Backhoes	5	6.00	97	0.37
Grading	Concrete/Industrial Saws	2	6.00	81	0.73
Grading	Graders	4	6.00	174	0.41
Grading	Off-Highway Trucks	5	6.00	400	0.38
Grading	Rubber Tired Dozers	5	6.00	255	0.40
Grading	Tractors/Loaders/Backhoes	7	6.00	97	0.37
Building Construction	Cranes	2	6.00	226	0.29
Building Construction	Forklifts	4	6.00	89	0.20
Building Construction	Generator Sets	2	6.00	84	0.74
Building Construction	Off-Highway Trucks	5	6.00	400	0.38

Building Construction	Other Construction Equipment	2	6.00	171	0.42
Building Construction	Rubber Tired Dozers	4	6.00	255	0.40
Building Construction	Scrapers	1	6.00	361	0.48
Building Construction	Tractors/Loaders/Backhoes	5	6.00	97	0.37
Building Construction	Trenchers	2	6.00	80	0.50
Building Construction	Welders	2	6.00	46	0.45

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Site Preparation	19	48.00	0.00	0.00	16.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT
Grading	23	58.00	0.00	0.00	16.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	29	49.00	19.00	0.00	16.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Use Soil Stabilizer

Water Exposed Area

NAS Fallon Solar PV EA - Alternative 2 (15 MW)

Great Basin Valleys Air Basin, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
General Light Industry	87.75	1000sqft	2.01	87,750.00	0

1.2 Other Project Characteristics

Urbanization	Rural	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	54
Climate Zone	14			**Operational Year**	2016
Utility Company	Pacific Gas & Electric Company				
CO2 Intensity (lb/MWhr)	641.35	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - General Light Industry was the closest Land Use Type option. "Unit amount" = the proposed "construction" (substation + s/m station + switching station + trans poles) using Alternative 1 (20 MW PV system) as the comparison.

Construction Phase - No demolition, paving, or architectural coating phases. Assumed 4 months site prep, 4 months grading, 16 months construction (24 months total).

Off-road Equipment - Equipment mix per DOPPA. Water trucks are "off-highway trucks".

Grading - Assumed that the entire 126-acre site was prepared, and half of the site was graded, and that approx. 1.8 acres of grading was required for the access road. Assumed that all cut/fill was balanced on site.

2.0 Emissions Summary

2.1 Overall Construction

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2017	1.1223	11.7633	7.9545	0.0116	1.7384	0.5680	2.3065	0.8949	0.5240	1.4189	0.0000	1,062.7157	1,062.7157	0.3065	0.0000	1,069.1525
2018	1.2402	12.5268	9.0784	0.0150	0.0702	0.6014	0.6716	0.0189	0.5562	0.5751	0.0000	1,343.0343	1,343.0343	0.3801	0.0000	1,351.0164
2019	0.2805	2.7926	2.1287	3.6700e-003	0.0172	0.1324	0.1496	4.6300e-003	0.1224	0.1270	0.0000	324.0395	324.0395	0.0929	0.0000	325.9901
Total	**2.6430**	**27.0826**	**19.1617**	**0.0303**	**1.8259**	**1.3018**	**3.1277**	**0.9184**	**1.2025**	**2.1209**	**0.0000**	**2,729.7895**	**2,729.7895**	**0.7795**	**0.0000**	**2,746.1591**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2017	1.1223	11.7633	7.9545	0.0116	0.8133	0.5680	1.3814	0.4110	0.5240	0.9349	0.0000	1,062.7145	1,062.7145	0.3065	0.0000	1,069.1513
2018	1.2402	12.5268	9.0784	0.0150	0.0702	0.6014	0.6716	0.0189	0.5562	0.5751	0.0000	1,343.0328	1,343.0328	0.3801	0.0000	1,351.0149
2019	0.2805	2.7926	2.1287	3.6700e-003	0.0172	0.1324	0.1496	4.6300e-003	0.1224	0.1270	0.0000	324.0391	324.0391	0.0929	0.0000	325.9898
Total	**2.6430**	**27.0826**	**19.1617**	**0.0303**	**0.9008**	**1.3018**	**2.2026**	**0.4345**	**1.2025**	**1.6370**	**0.0000**	**2,729.7864**	**2,729.7864**	**0.7795**	**0.0000**	**2,746.1560**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**50.66**	**0.00**	**29.58**	**52.69**	**0.00**	**22.82**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Site Preparation	Site Preparation	3/1/2017	6/30/2017	5	88	
2	Grading	Grading	7/1/2017	10/31/2017	5	87	
3	Building Construction	Building Construction	11/1/2017	3/30/2019	5	368	

Acres of Grading (Site Preparation Phase): 126

Acres of Grading (Grading Phase): 64.8

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Site Preparation	Graders	1	6.00	174	0.41
Site Preparation	Off-Highway Trucks	4	6.00	400	0.38
Site Preparation	Other Construction Equipment	2	6.00	171	0.42
Site Preparation	Rubber Tired Dozers	4	6.00	255	0.40
Site Preparation	Scrapers	1	6.00	361	0.48
Site Preparation	Tractors/Loaders/Backhoes	4	6.00	97	0.37
Grading	Concrete/Industrial Saws	1	6.00	81	0.73
Grading	Graders	3	6.00	174	0.41
Grading	Off-Highway Trucks	4	6.00	400	0.38
Grading	Rubber Tired Dozers	4	6.00	255	0.40
Grading	Tractors/Loaders/Backhoes	5	6.00	97	0.37
Building Construction	Cranes	1	6.00	226	0.29
Building Construction	Forklifts	3	6.00	89	0.20
Building Construction	Generator Sets	1	6.00	84	0.74
Building Construction	Off-Highway Trucks	4	6.00	400	0.38
Building Construction	Other Construction Equipment	2	6.00	171	0.42

Building Construction	Rubber Tired Dozers	3	6.00	255	0.40
Building Construction	Scrapers	1	6.00	361	0.48
Building Construction	Tractors/Loaders/Backhoes	4	6.00	97	0.37
Building Construction	Trenchers	1	6.00	80	0.50
Building Construction	Welders	1	6.00	46	0.45

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Site Preparation	16	40.00	0.00	0.00	16.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT
Grading	17	43.00	0.00	0.00	16.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	21	37.00	14.00	0.00	16.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Use Soil Stabilizer

Water Exposed Area

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A.4 Visual Resources Figures

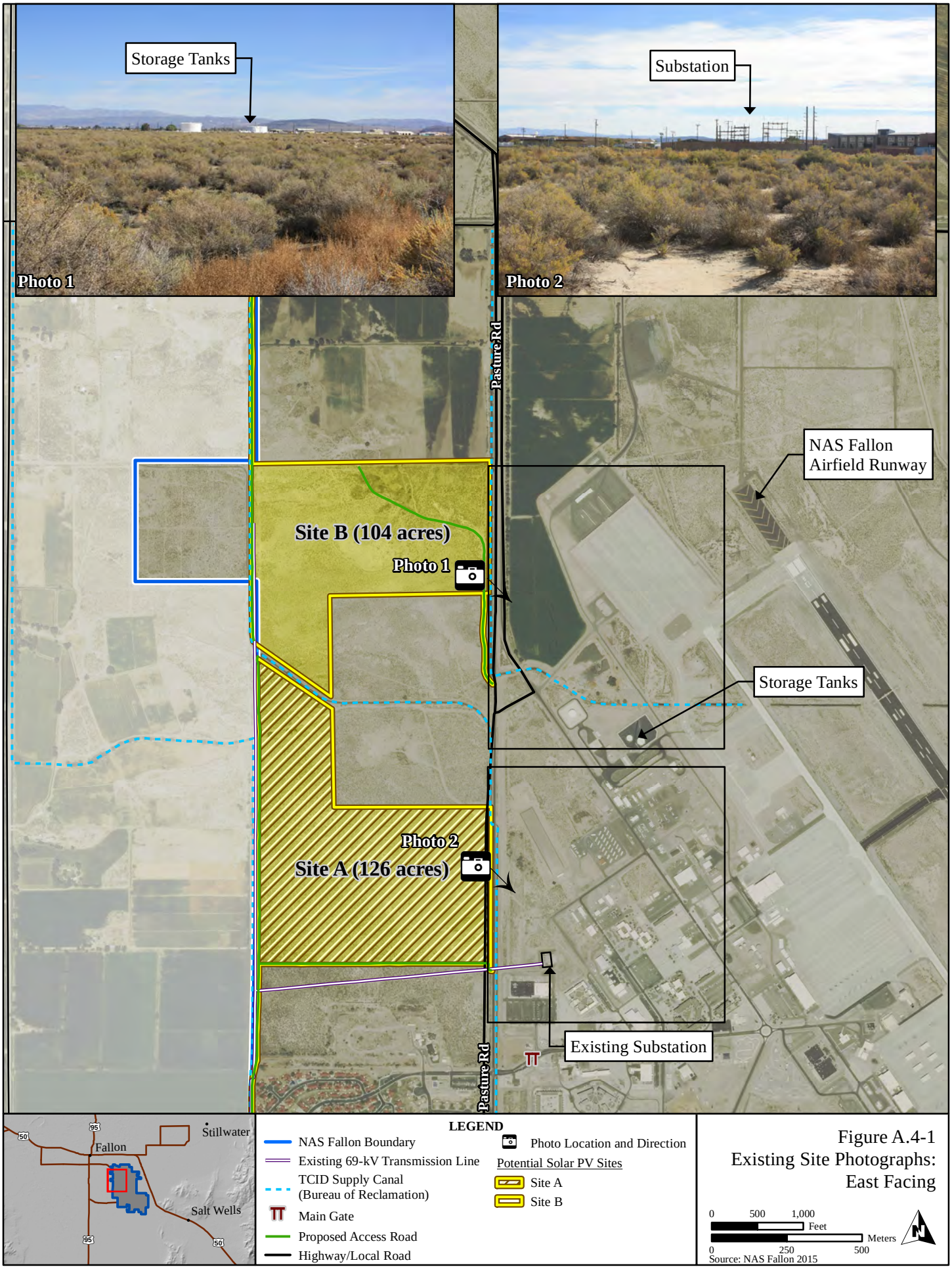

Figure A.4-1
Existing Site Photographs:
East Facing

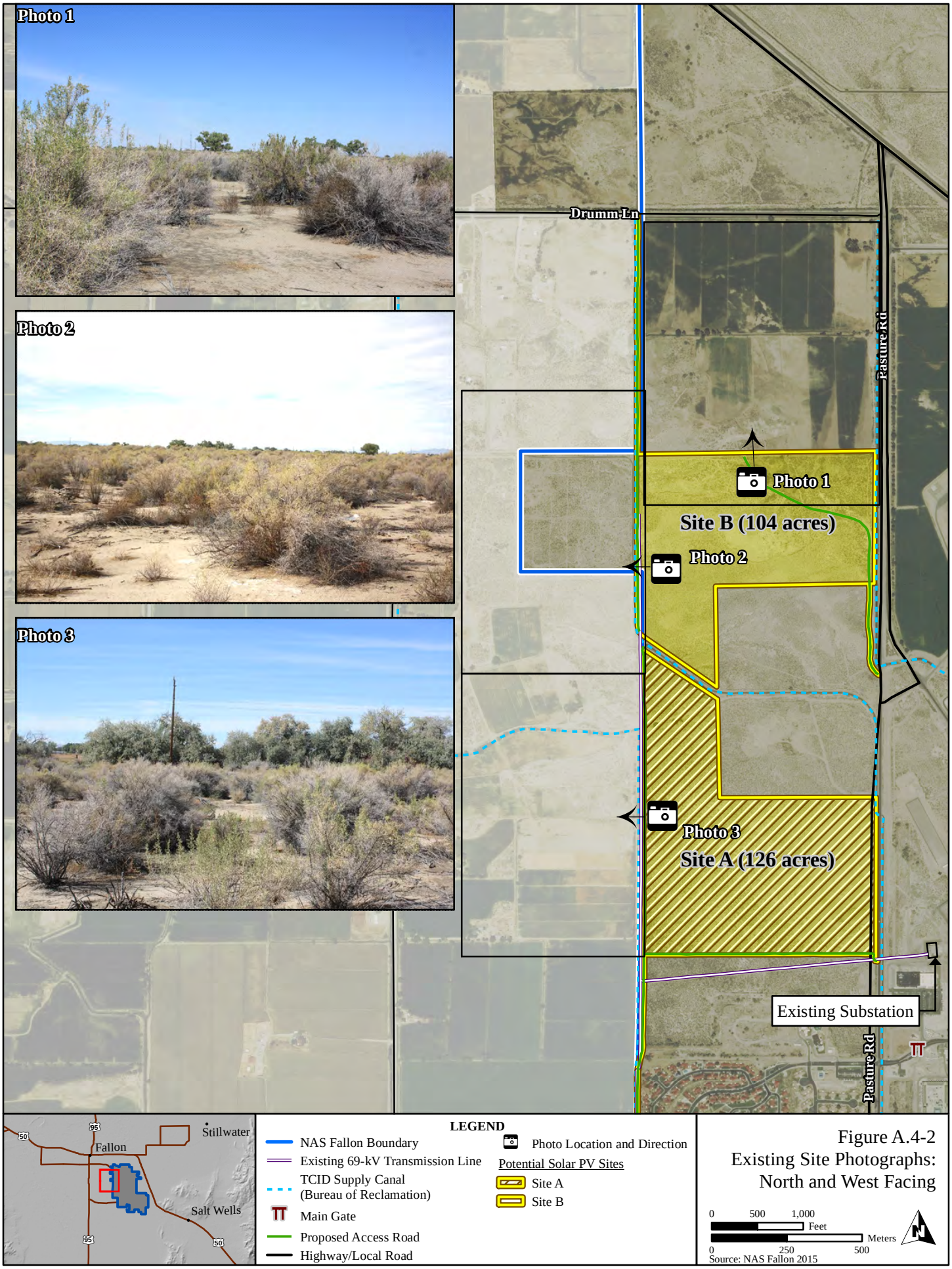

Figure A.4-2
Existing Site Photographs:
North and West Facing

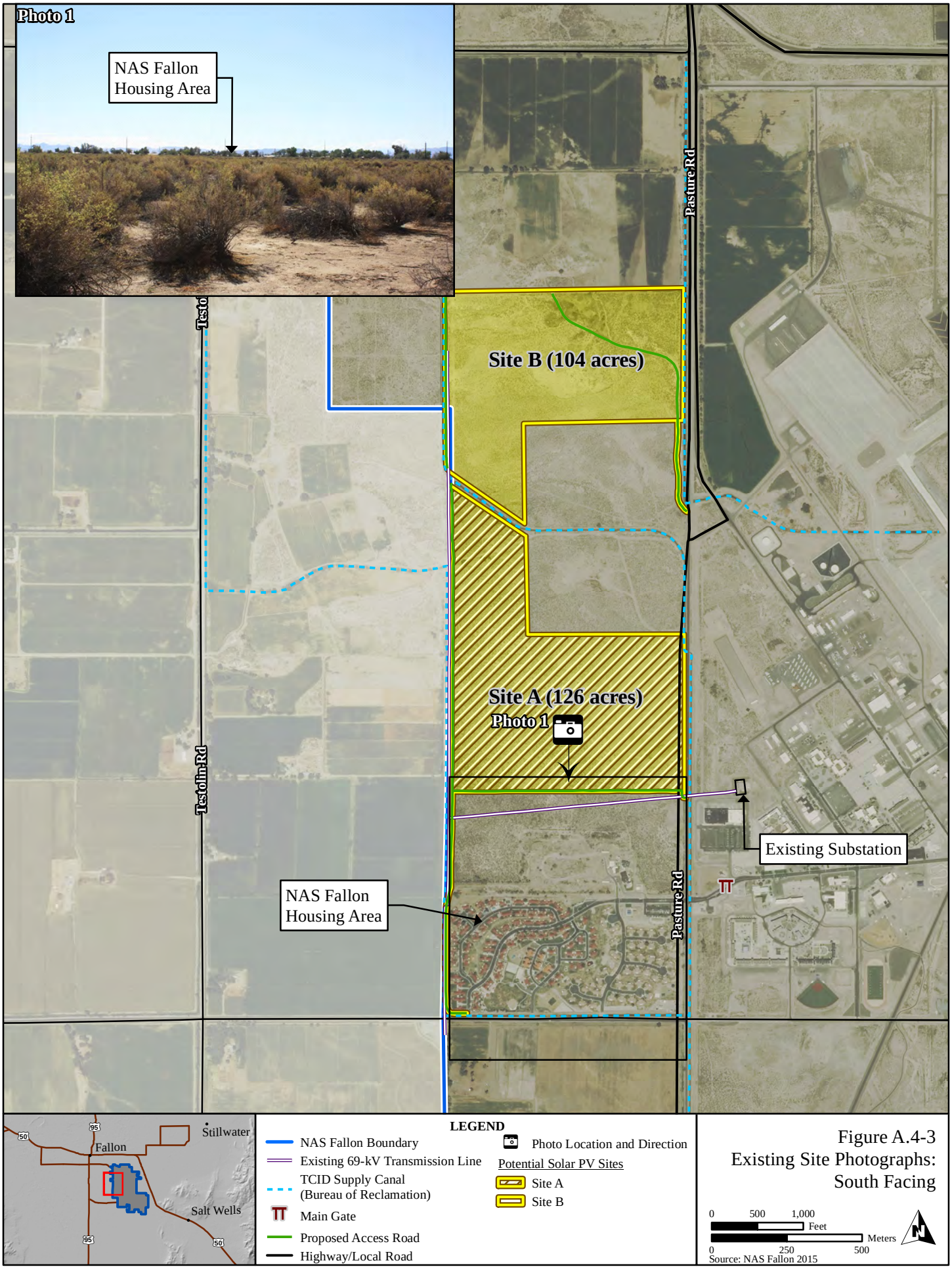

Figure A.4-3
Existing Site Photographs: South Facing

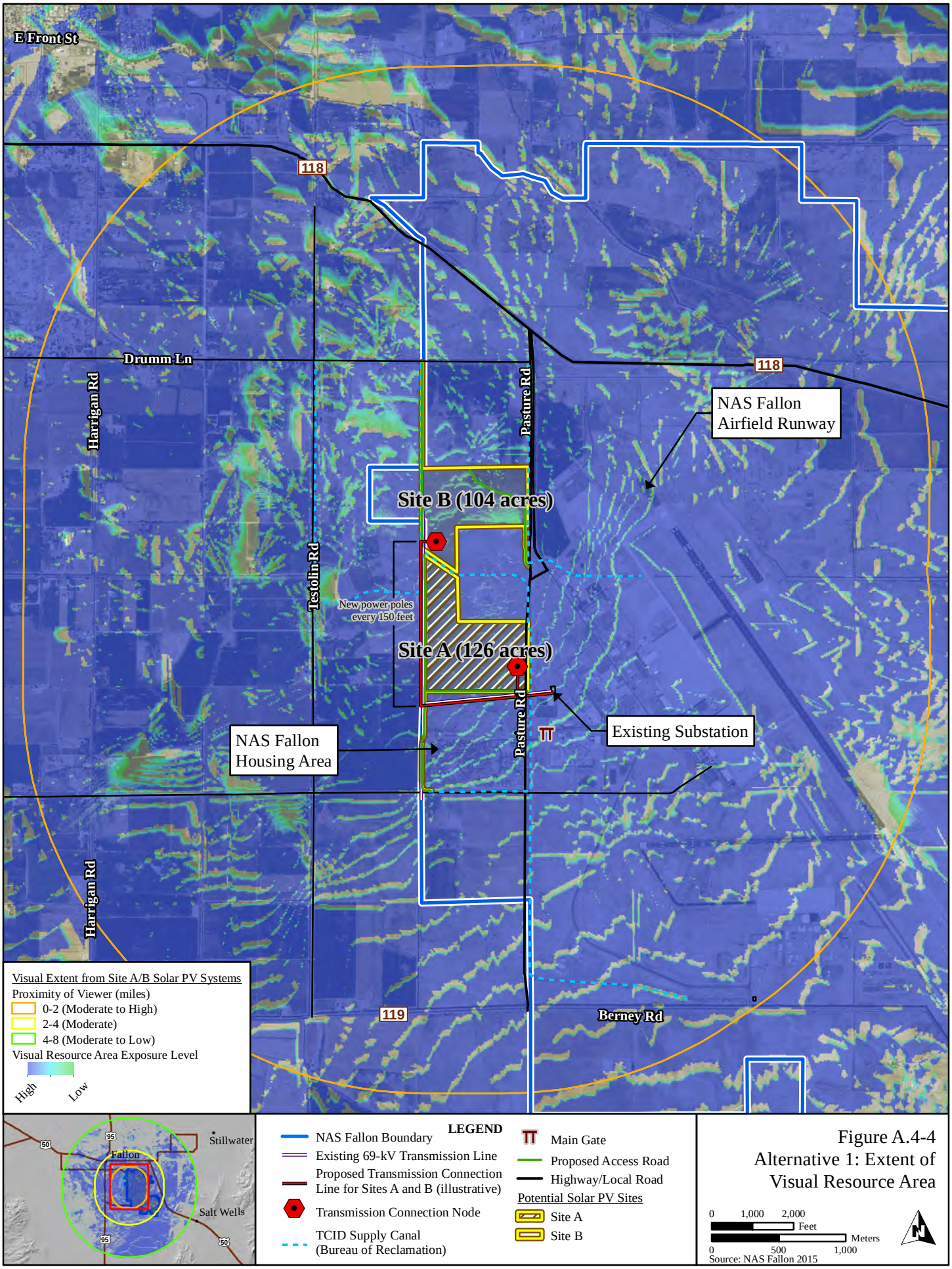

Figure A.4-4
Alternative 1: Extent of Visual Resource Area

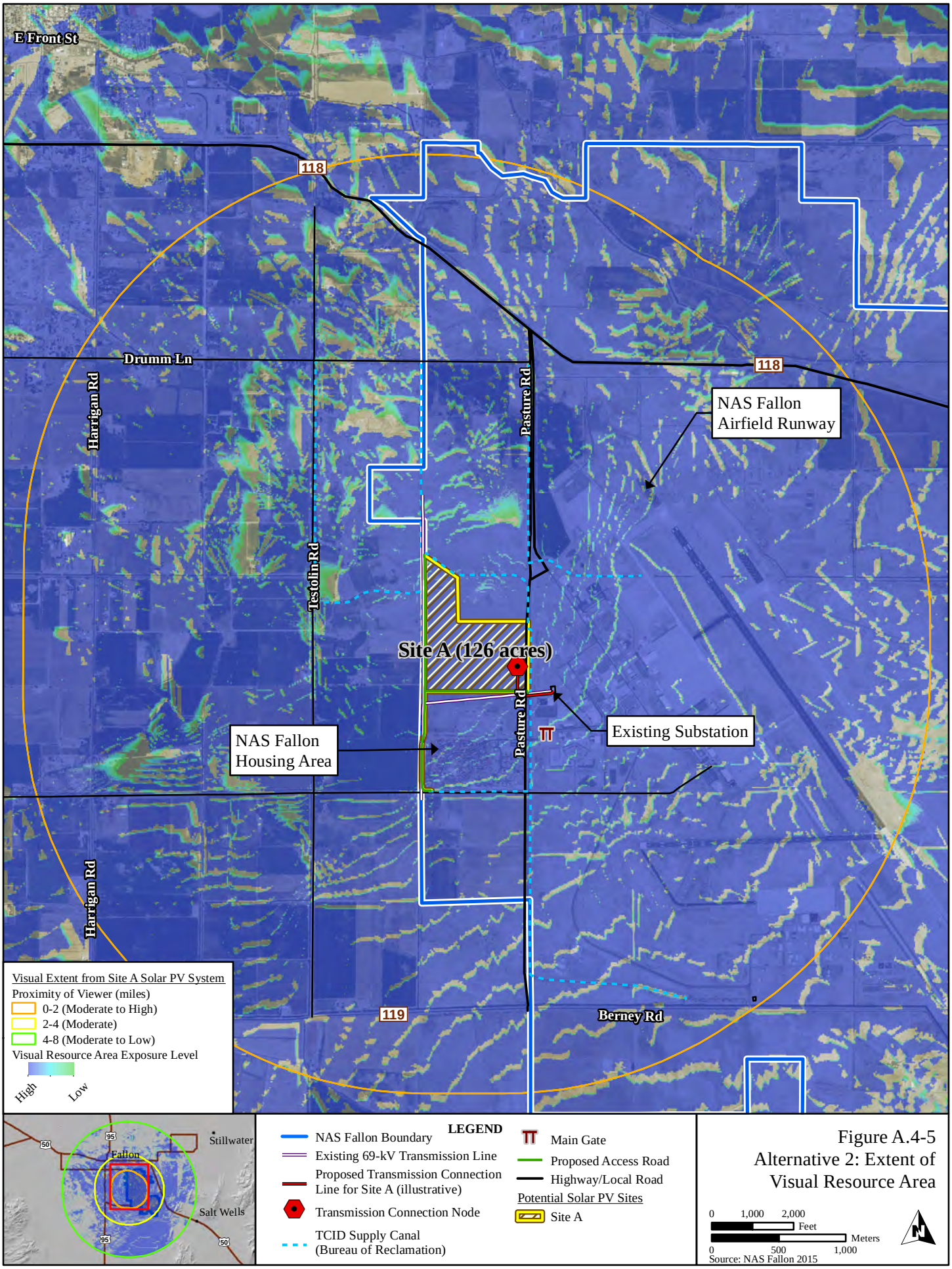

Figure A.4-5
Alternative 2: Extent of Visual Resource Area