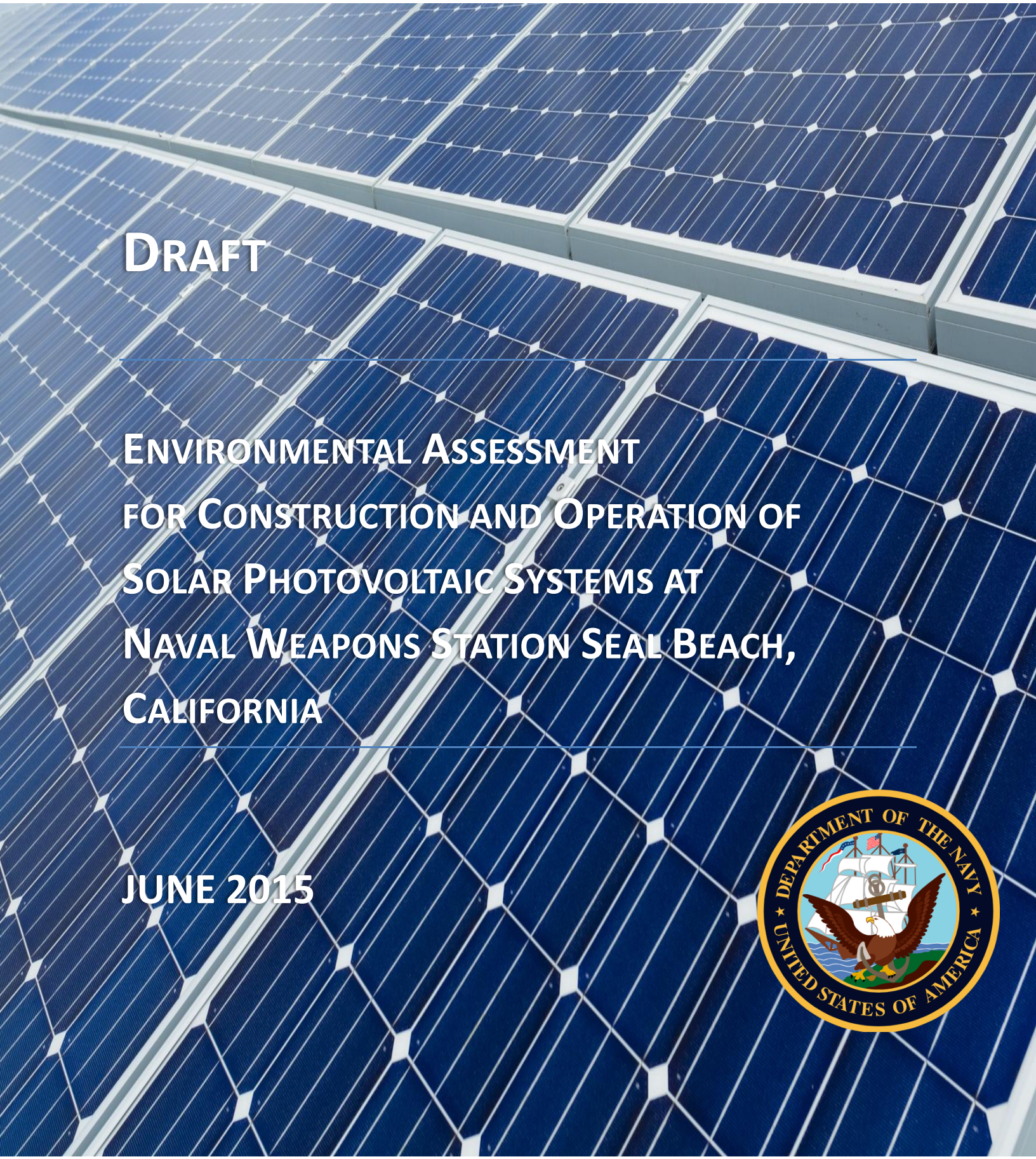

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ENVIRONMENTAL ASSESSMENT FOR CONSTRUCTION AND OPERATION OF SOLAR PHOTOVOLTAIC SYSTEMS AT NAVAL WEAPONS STATION SEAL BEACH, CALIFORNIA

JUNE 2015

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Cover Sheet

Responsible Federal Agency: U.S. Department of Navy

Cooperating Agencies: None

Title: Environmental Assessment for Construction and Operation of Solar Photovoltaic Systems at Naval Weapons Station Seal Beach, California

Location: Seal Beach, California

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Abstract:

The United States (U.S.) Department of the Navy (Navy) has prepared an Environmental Assessment (EA) to analyze the potential environmental impacts of the Construction and Operation of Solar Photovoltaic (PV) Systems at Naval Weapons Station (NAVWPNSTA) Seal Beach in Seal Beach, California. The analysis considers construction, operation, maintenance, and decommissioning of a PV system at NAVWPNSTA Seal Beach. As part of the proposed project, the Navy and local electric utility provider (Private Partner) would enter into a lease agreement (or a real estate outgrant) to allow the Private Partner to use Navy land to construct, operate, and own the PV system(s). The Navy would receive compensation for the lease terms to enhance the installation's energy generation capability and energy security. The Private Partner would sell the generated power to customers outside the Navy for a contract duration of up to 37 years, with 35 years of system(s) service and 2 years for construction and decommissioning.

The Navy identified two sites (Sites A and B) as potential locations for PV systems, including existing agricultural lease land or vacant areas. Three alternatives as well as a No Action Alternative are considered. The Proposed Action/Alternative 1 consists of the installation of a ground-mounted PV system at both sites, and includes a combined acreage of approximately 138 acres (55.9 hectares). Implementation of the Proposed Action/Alternative 1 would result in a renewable energy generation asset up to 25 megawatts (MW) in capacity. Alternatives 2 and 3 consider construction at each individual site. Alternative 2 considers a PV system at Site A, an approximately 64-acre (26-hectare) parcel that would contribute an estimated 10 MW of renewable energy. Alternative 3 considers a PV system at Site B, an approximately 73-acre (29-hectare) parcel that would contribute an estimated 15 MW of renewable energy. The Proposed Action/Alternative 1 and Alternatives 2 and 3 would support the Navy's goal of having 1 Gigawatt (GW) of renewable energy under contract by the end of 2015.

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Executive Summary

ES.1 Introduction/Background

The United States (U.S.) Department of the Navy (Navy) has prepared this Environmental Assessment (EA) in accordance with the National Environmental Policy Act (NEPA) of 1969, its Council on Environmental Quality implementing regulations for procedural provisions of NEPA, and other applicable laws. It presents an analysis of the potential environmental impacts of a Proposed Action/Alternative 1, Alternative 2, Alternative 3, and No Action Alternative pertaining to the Construction and Operation of Solar Photovoltaic (PV) Systems at Naval Weapons Station (NAVWPNSTA) Seal Beach in Seal Beach, California.

The purpose of the proposed project is to increase Navy installation energy security, operational capability, strategic flexibility, and resource availability through the development of renewable energy generating assets at NAVWPNSTA Seal Beach by the construction and operation of a solar PV system(s). The proposed project is required to meet the renewable energy standards put forth by the 1 Gigawatt (GW) Initiative, Executive Order (EO) 13514, and the Secretary of the Navy (SECNAV) Energy Goals. The policy for energy security and increased production of energy from alternative sources by 2015 includes a requirement, in any potential agreement (or real estate outgrant) entered into by the Navy and a local electric utility provider (Private Partner), that a project's infrastructure be 'micro-grid-ready. Under the 'micro-grid-ready' infrastructure, the Navy would have the option to use any energy produced "on station" in the event of an area power outage or other circumstances.

A PV system would be constructed to generate renewable energy at NAVWPNSTA Seal Beach under a Model 2 (10 United States Code [U.S.C.] Section [§] 2667) acquisition strategy (described in Section 1.1.2). Under a Model 2 acquisition strategy, the Navy and Private Partner would enter into a lease agreement (or a real estate outgrant) to allow the Private Partner to use Navy land to construct, operate, and own the PV system(s). The Navy would receive compensation for the lease terms to enhance the installation's energy generation capability and energy security through the following factors:

- Legal access to renewable energy during regional grid outage
- No capital cost to the Navy to install the specified on-site renewable energy
- Standard rates to access the renewable energy during emergency conditions (no access fees applicable)
- Foundation from which the Navy could develop an on-station microgrid.

The Private Partner would sell the generated power to customers outside the Navy. The approximate contract duration would be up to 37 years, with 35 years of system(s) service and 2 years for construction and decommissioning. This acquisition strategy maximizes the total capacity (size) of the system(s) based on available land and is not limited by the installation's electrical load.

NAVWPNSTA Seal Beach identified potential sites suitable for construction of a PV system. Site selection considered locations where long-term economically viable projects could be constructed without adversely impacting mission requirements. Additionally, sites were considered based on their proximity to magazines and other explosives storage areas.

After eliminating other land parcels discussed in Section 2.7, the Navy identified two sites as potential locations to be analyzed for construction and operation of a PV system at NAVWPNSTA Seal Beach (see Figure ES-1). These sites include existing agricultural lease land or vacant areas. Both sites are topographically flat with minimal vegetation cover, and are described in detail in Sections 2.2 through 2.5. The Proposed Action/Alternative 1 consists of the installation of a ground-mounted PV system at both parcels. The total acreage of the combined two sites would be approximately 138 acres (55.8 hectares). The proposed project includes the construction phase, operation of the PV system, maintenance, and decommissioning at the end of the lease term. Implementation of the proposed project would result in a renewable energy generation asset up to 25 megawatts (MW) in capacity.

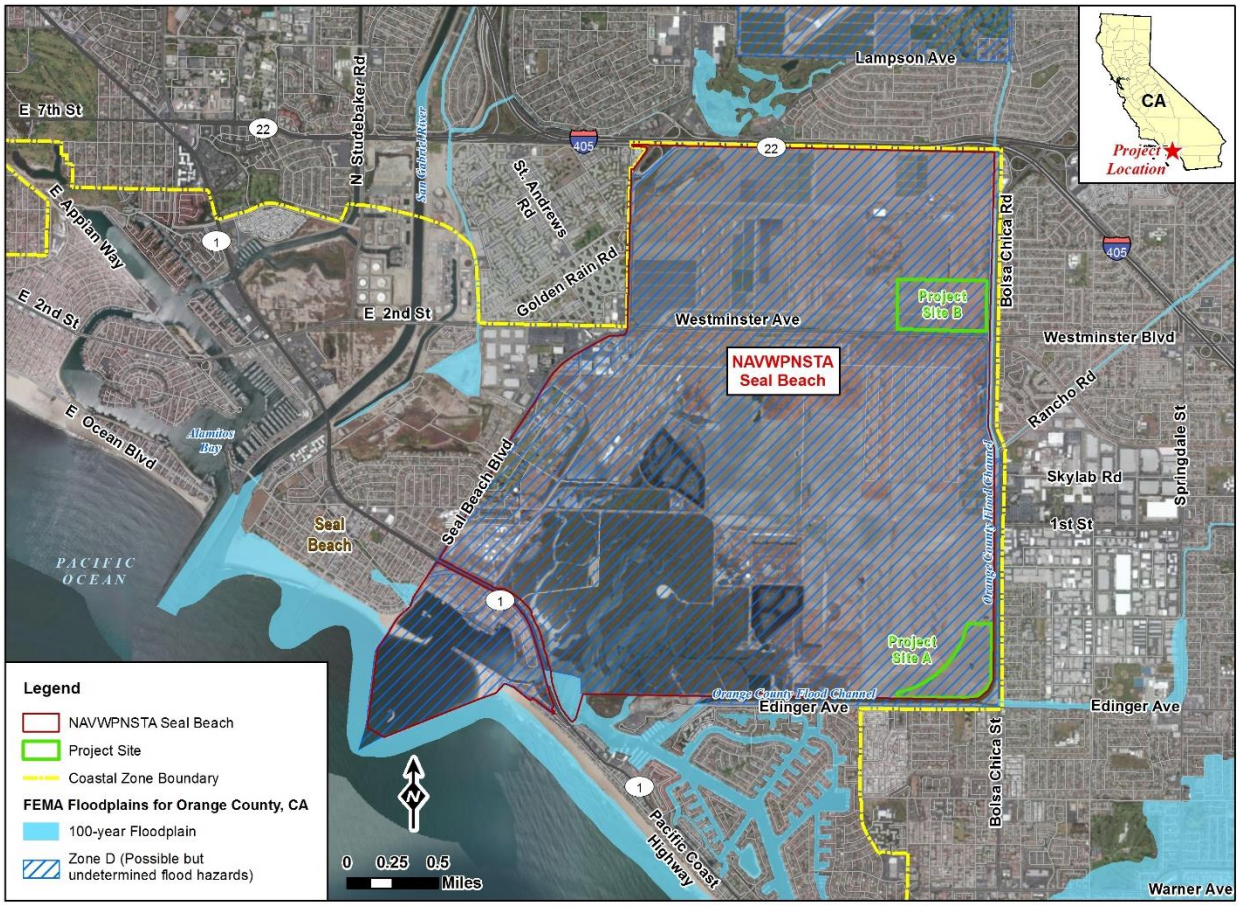

Figure ES-1. Location of PV Development Sites

Environmental resource areas analyzed in detail in this EA include the following:

- Land Use and Coastal Resources
- Cultural Resources
- Biological Resources
- Noise
- Topography, Geology, and Soils
- Water Resources
- Air Quality and Climate Change
- Traffic and Circulation
- Utilities
- Public Health and Safety
- Visual Resources

No significant impacts were identified. Table ES-1 provides a summary of each resource and the impacts identified during the analyses presented in Chapter 3.

Summary of Potential Impacts and Impact Avoidance and Minimization Measures

Resource Area	Proposed Action/ Alternative 1	Alternative 2	Alternative 3	No Action Alternative
Land Use and Coastal Resources	No Significant Impacts	No Significant Impacts	No Significant Impacts	No Impacts
	Under the Proposed Action/Alternative 1, a long term (up to 37 years), but temporary change in land use from agricultural to renewable energy would occur. The Proposed Action/Alternative 1 would be compatible with adjacent land uses on the installation. No prime, unique, or farmland of statewide importance occur at NAVWPNSTA Seal Beach. Therefore, there would be no significant impacts to land use. The Proposed Action/Alternative 1 would be located in an area restricted from the public and would not change any existing public or recreation access to coastal areas. Due to the distance of the sites from the shoreline, the proposed project would not obstruct any views of the coast. There would be no significant impacts to coastal resources.	Potential impacts under Alternative 2 would be similar to those described for the Proposed Action/ Alternative 1; however, land affected would include only Site A (approximately 64 acres [26 hectares]). There would be no significant impacts to land use and coastal resources.	Potential impacts under Alternative 3 would be similar to those described for the Proposed Action/ Alternative 1; however, land affected would include only Site B (approximately 73 acres [29 hectares]). There would be no significant impacts to land use and coastal resources.	Under the No Action Alternative, there would be no change in existing conditions; therefore, no impacts would occur.
Cultural Resources	No Significant Impacts	No Significant Impacts	No Significant Impacts	No Impacts
	There are no cultural resources on or eligible for the National Register of Historic Places (NRHP) within the Area of Potential Effects (APE). There would be no significant impacts to cultural resources.	There are no cultural resources on or eligible for the NRHP within the APE under Alternative 2. There would be no significant impacts to cultural resources.	There are no cultural resources on or eligible for the NRHP within the APE under Alternative 3. There would be no significant impacts to cultural resources.	Under the No Action Alternative, there would be no change in existing conditions; therefore, no impacts to cultural resources would occur.
Biological Resources	No Significant Impacts	No Significant Impacts	No Significant Impacts	No Impacts
	Construction, Operations, and Eventual Decommissioning Impacts that could result from construction, operation, and eventual decommissioning of the Proposed Action/Alternative 1 include the following: • Construction equipment within the Proposed Action/Alternative 1 footprint or in off-site areas in the vicinity of Site A or Site B could provide temporary perching for raptors and other avian predators and increase predation on nearby or adjacent nesting birds. • Potential permanent indirect impacts associated with operations include additional perch locations for raptors and other avian predators on PV structures, thereby increasing predation on nearby and adjacent nesting birds. • Construction and/or demolition activities have the potential for temporary and indirect impacts to less mobile wildlife species. However, these effects would be limited in location and/or duration, and no significant adverse impacts to general wildlife species would occur. **Vegetation Communities and Land Types** Construction would result in the removal of approximately 138 acres (55.8 hectares) of a combination of active agricultural, unplanted land, and ruderal vegetation (weedy and commonly introduced plants growing where the vegetation cover has been interrupted by human activity) along the edges of the solar sites.	The potential impacts to biological resources under Alternative 2 would be similar to those described for the Proposed Action/ Alternative 1; however, Alternative 2 would only result in the removal of approximately 64 acres (26 hectares) of agricultural, unplanted land, and ruderal vegetation along the edges of the solar sites. No significant impacts to biological resources would occur. **Impact Avoidance and Minimization Measures** Impact avoidance and minimization measures would be the same as described for the Proposed	The potential impacts under Alternative 3 to biological resources would be similar to those described for the Proposed Action/ Alternative 1; however, Alternative 3 would only result in the removal of approximately 73 acres (29 hectares) of agricultural, unplanted land, and ruderal vegetation along the edges of the solar sites. No significant impacts to biological resources would occur. **Impact Avoidance and Minimization Measures** Impact avoidance and minimization measures would be the same as described for the Proposed	Under the No Action Alternative, there would be no change in existing conditions; therefore, no impacts would occur.

Summary of Potential Impacts and Impact Avoidance and Minimization Measures

Resource Area	Proposed Action/ Alternative 1	Alternative 2	Alternative 3	No Action Alternative
Biological Resources (Continued)	These areas are ill-suited to serve as habitat for federally listed or state-listed plant species, and no significant impacts to vegetation communities would occur. **Federally Listed Wildlife** There would be no adverse effects to federally listed species due to the absence of federally listed species and suitable habitat within the vicinity of the project footprint. No population-level adverse effects to birds or bats would occur as a result of mortalities related to “lake effect” of solar PV panels. Therefore, no significant impacts to federally listed wildlife would occur. **Special Status Wildlife Species** Potential impacts to special status wildlife species such as black-tailed jackrabbit, western burrowing owl, and ferruginous hawk, as well as migratory birds protected under the MBTA would occur. Potential temporary impacts associated with construction activities include clearing and grubbing, site grading, and trenching for electrical connections. Potential indirect impacts associated with operations include bird strikes on the solar PV arrays, potentially induced by the “lake effect.” No population-level significant adverse impacts to birds would occur as a result of mortalities related to “lake effect.” **Impact Avoidance and Minimization Measures** To reduce the risk of take of nesting birds protected under the MBTA, mowing, clearing, and grading of any vegetated areas would be conducted during the nonbreeding season (October through January). Should burrowing owls move into the Proposed Action/Alternative 1 area prior to construction, the owls would be relocated to other suitable habitat. Relocation during the breeding season would not be permitted under any circumstances. Any burrow within 164 feet (50 meters) of construction activities, during any time of the year, would have noise/disturbance barriers placed near burrows to minimize impacts to those owls. NAVWPNSTA Seal Beach would actively relocate burrowing owls under the direction of the Station Conservation Manager. To minimize potential impacts due to the “lake effect” phenomenon, the best available science and appropriate design specifications would be used during construction and operation of the Proposed Action/Alternative 1, and regular monitoring of site conditions, including bird mortality would be conducted. Possible design specifications include breaking up the reflection of solar panels (e.g., through panel spacing), or orienting panels in a non-vertical position.	Action/Alternative 1.	Action/Alternative 1.	

Summary of Potential Impacts and Impact Avoidance and Minimization Measures

Resource Area	Proposed Action/ Alternative 1	Alternative 2	Alternative 3	No Action Alternative
Noise	No Significant Impacts	No Significant Impacts	No Significant Impacts	No Impacts
	A temporary increase in noise levels during construction activities would be experienced by receptors at the closest residential areas (approximately 400 feet [122 meters] from the construction area), and by pedestrians walking near the station boundary. Construction-related noise levels are anticipated to increase by a level of 6 to 13 dBA. These temporary noise increases from construction activities would not be highly noticeable by sensitive noise receptors in the vicinity as the noise would be generally consistent with the developed nature of the area. There would be no increase in noise levels during operations. A temporary increase in noise during decommissioning activities is anticipated to be similar to that experienced during construction. Overall, no significant impacts from noise would occur. **Impact Avoidance and Minimization Measures** Although no significant impacts to noise have been identified, impact avoidance and minimization measures described in Section 2.6 would be incorporated as part of the project design. The Navy would limit construction activities to between the hours of 7:00 AM and 5:00 PM weekdays and Saturdays. Limited Sunday work would be permitted. No holiday or nighttime operation of construction equipment would be permitted. All applicable regulations would be followed during construction.	Under Alternative 2, construction activities and noise level increases would be similar to those discussed under the Proposed Action/ Alternative 1, although limited further to sensitive noise receptors near Site A. No significant impacts from noise would occur. **Impact Avoidance and Minimization Measures** Impact avoidance and minimization measures would be the same as described for the Proposed Action/Alternative 1.	Under Alternative 3, construction activities and noise level increases would be similar to those discussed under the Proposed Action/ Alternative 1, although limited further to sensitive noise receptors near Site B. No significant impacts from noise would occur. **Impact Avoidance and Minimization Measures** Impact avoidance and minimization measures would be the same as described for the Proposed Action/Alternative 1.	Under the No Action Alternative, there would be no change in existing conditions; therefore, no impacts to noise would occur.
Topography, Geology, and Soils	No Significant Impacts	No Significant Impacts	No Significant Impacts	No Impacts
	Topography and Geology There would be no significant impacts to topography or geology with implementation of the Proposed Action/Alternative 1. Construction and operations of the PV system would comply with all seismic design criteria and construction requirements. **Soils** During construction, site development would temporarily increase the potential for erosion-induced sedimentation of nearby receiving waters, including the Orange County Flood Control Channel. However, excavation and grading activities would not be excessive due to the relatively flat topography of the construction site and implementation of erosion control measures outlined in Section 2.6.5. Soils may be cut and moved around the vicinity of the sites to level the grading, but no significant soils would be removed from the sites. The decommissioning and restoration process would involve the removal of PV structures, restoration of topsoil, revegetation, and seeding. No significant impacts to soils would occur. **Impact Avoidance and Minimization Measures** Although no significant impacts to topography, geology, and soils have been identified, impact avoidance and minimization measures described in Section 2.6.5 would be incorporated as part of the project design. Erosion and sedimentation control best management practices (BMPs) would be employed during construction, operations, and decommissioning activities.	Under Alternative 2, potential impacts would be similar to those described for the Proposed Action/ Alternative 1, though at a smaller scale. No significant impacts to topography, geology and soils would occur. **Impact Avoidance and Minimization Measures** Impact avoidance and minimization measures would be the same as described for the Proposed Action/Alternative 1.	Under Alternative 3 potential impacts would be similar to those described for the Proposed Action/ Alternative 1, though at a smaller scale. No significant impacts to topography, geology and soils would occur. **Impact Avoidance and Minimization Measures** Impact avoidance and minimization measures would be the same as described for the Proposed Action/Alternative 1.	Under the No Action Alternative, there would be no change in existing conditions; therefore, no impacts to topography, geology, and soils would occur.

Summary of Potential Impacts and Impact Avoidance and Minimization Measures

Resource Area	Proposed Action/ Alternative 1	Alternative 2	Alternative 3	No Action Alternative
Water Resources	No Significant Impacts	No Significant Impacts	No Significant Impacts	No Impacts
	Hydrology Surface disturbance (e.g., grading, localized excavation) would occur during construction and trenching for underground electrical conduits. During construction, storm water runoff from the project sites could result in a slight increase in turbidity; however, this would not degrade the local water quality or adversely affect current uses of local surface waters. **Floodplains** Project structures would not increase the potential for flooding in local surface water bodies, restrict or redirect runoff flows, or cause localized flooding at Sites A or B, and no significant impacts to floodplains would occur. **Groundwater** Construction and maintenance would not require the use of NAVWPNSTA Seal Beach-supplied groundwater. No impacts to groundwater would occur. **Impact Avoidance and Minimization Measures** Although no significant impacts to water resources have been identified, impact avoidance and minimization measures described in Section 2.6.5 would be incorporated as part of the project design.	Under Alternative 2 potential impacts would be similar to those described for the Proposed Action/ Alternative 1, though at a smaller scale. No significant impacts to surface hydrology would occur. **Impact Avoidance and Minimization Measures** Impact avoidance and minimization measures would be the same as described for the Proposed Action/Alternative 1.	Under Alternative 3 potential impacts would be similar to those described for the Proposed Action/ Alternative 1, though at a smaller scale. No significant impacts to surface hydrology would occur. **Impact Avoidance and Minimization Measures** Impact avoidance and minimization measures would be the same as described for the Proposed Action/Alternative 1.	Under the No Action Alternative, there would be no change in existing conditions; therefore, no impacts to water resources would occur.
Air Quality/ Climate Change	No Significant Impacts	No Significant Impacts	No Significant Impacts	No Impacts
	Implementation of the Proposed Action/Alternative 1 would result in localized, short-term effects on air quality at NAVWPNSTA Seal Beach. During operation, emissions of nitrogen oxide (NO_X), sulfur dioxide (SO_2), and carbon dioxide equivalent (CO_2e) would be avoided by reduced consumption of grid-supplied electricity, and would more than offset the short-term construction emissions within the first year of operation. Subsequent years of operation would also avoid emissions produced from conventional non-renewable generating sources. As total construction emissions would be below the *de minimis* thresholds and operation emissions would result in beneficial effects to air quality, no significant adverse impacts to air quality would occur under the Proposed Action/ Alternative 1. **Impact Avoidance and Minimization Measures** Although no significant impacts to air quality/climate change have been identified, impact avoidance and minimization measures described in Section 2.6.2 would be incorporated as part of the project design.	Under Alternative 2, potential impacts would be similar to those described for the Proposed Action/ Alternative 1, though at a smaller scale. No significant adverse impacts to air quality would occur. **Impact Avoidance and Minimization Measures** Impact avoidance and minimization measures would be the same as described for the Proposed Action/Alternative 1, except that the PV system would be constructed, operated, and maintained at Site A only.	Under Alternative 3, potential impacts would be similar to those described for the Proposed Action/ Alternative 1, though at a smaller scale. No significant adverse impacts to air quality would occur. **Impact Avoidance and Minimization Measures** Impact avoidance and minimization measures would be the same as described for the Proposed Action/Alternative 1, except that the PV system would be constructed, operated, and maintained at Site B only.	Under the No Action Alternative, there would be no change in existing conditions; therefore, no impacts to air quality/climate change would occur.

Summary of Potential Impacts and Impact Avoidance and Minimization Measures

Resource Area	Proposed Action/ Alternative 1	Alternative 2	Alternative 3	No Action Alternative
Traffic and Circulation	No Significant Impacts	No Significant Impacts	No Significant Impacts	No Impacts
	There would be a temporary increase in traffic associated with construction and decommissioning (64 daily vehicle trips). Trips associated with these activities include the delivery of construction materials and equipment, and the removal of construction debris. There would be a negligible increase in traffic associated with operations, maintenance, and decommissioning. These trips would be periodic and would not regularly contribute to local or regional traffic. No significant adverse impacts to traffic and circulation would occur.	Under Alternative 2, potential impacts would be similar to those described for the Proposed Action/ Alternative 1, except that the PV system would be constructed, operated, and maintained at Site A only. Therefore, traffic generated during construction and decommissioning activities would be slightly less. No significant adverse impacts to traffic and circulation would occur.	Under Alternative 3, potential impacts would be similar to those described for Proposed Action/ Alternative 1, except that the PV system would be constructed, operated, and maintained at Site B only. Therefore, traffic generated during construction and decommissioning activities would be slightly less. No significant adverse impacts to traffic and circulation would occur.	Under the No Action Alternative, there would be no change in existing conditions; therefore, no impacts to traffic and circulation would occur.
Utilities	No Significant Impacts	No Significant Impacts	No Significant Impacts	No Significant Impacts
	Storm Water Conveyance The additional impervious area would be negligible. There would be no change in existing grades, runoff characteristics, patterns or flow rates. The pre-project runoff amounts would be the same for post-project conditions. There would be no significant adverse impacts to storm water. **Energy** Ground-mounted solar PV panels and associated electrical equipment (e.g., electrical feed meters, switchgear, inverters, circuit breakers, and transformers) would connect to the existing electrical grid. The Navy would enter into an agreement with a Private Partner, allowing it to construct, operate, maintain, own, and decommission a PV system(s) at the installation for a determined lease period. During construction, all equipment requiring sources of electricity would be operated using gas- or diesel-powered generators provided by construction contractors. No significant adverse impacts related to disruption of the existing electrical services would occur with implementation of the Proposed Action/Alternative 1. Existing power lines on Site A would be removed and new electrical cable would be installed on either existing overhead utility poles, or trenched below ground surface. Direct energy requirements under the Proposed Action/Alternative 1 would be limited to those necessary to operate vehicles and equipment. There would be an overall beneficial impact of generating an estimated 25 MW of renewable energy. Thus, implementation of the Proposed Action/Alternative 1 would provide an indirect, long-term, beneficial impact to electricity delivery at NAVWPNSTA Seal Beach. Decommissioning activities would involve removal of structures, restoration of topsoil, revegetation, and seeding. The site would be returned to pre-project conditions and there would not be an increase in utility demand; therefore, there would be no significant impacts from decommissioning.	Potential impacts would be similar to those described for the Proposed Action/ Alternative 1, though at a smaller scale. There would be no significant adverse impacts to utilities.	Potential impacts would be similar to those described for the Proposed Action/ Alternative 1, though at a smaller scale. There would be no significant adverse impacts to utilities.	Under the No Action Alternative, there would be no change in existing conditions; therefore, no impacts would occur.

Summary of Potential Impacts and Impact Avoidance and Minimization Measures

Resource Area	Proposed Action/ Alternative 1	Alternative 2	Alternative 3	No Action Alternative
Public Health and Safety	No Significant Impacts	No Significant Impacts	No Significant Impacts	No Impacts
	Public Services There could be some increase in need for public services during construction but it would be minimal and temporary. **Hazardous and Toxic Materials and Waste** The Proposed Action/Alternative 1 does not include demolition activities that would cause on-station workers to encounter lead-based paint and asbestos. No new sources of hazardous electromagnetic radiation would be introduced through construction, maintenance or decommissioning phases of the project. Due to the very low levels of electromagnetic radiation expected, and the physical separation of Sites A and B from ordnance areas, the Proposed Action/Alternative 1 would not create any additional HERO hazards. Decommissioning would involve the removal of structures, restoration of topsoil, revegetation, and seeding. Because the site would be returned to previous conditions (agricultural use) and decommissioning would include the removal and disposal of PV system infrastructure in accordance with pertinent laws and regulations, there would be no significant impacts from decommissioning at the close of the 37-year period. There would be no significant impact to public health and safety with implementation of the Proposed Action/Alternative 1. **Impact Avoidance and Minimization Measures** The Private Partner would submit a Hazardous Waste Management Section as part of the Environmental Protection Plan prior to commencement of construction activities. The management and disposal of hazardous waste would comply with all applicable federal, state and local regulations. The Private Party would be required to coordinate hazardous waste shipments with the Environmental Office to ensure an Environmental Office representative is available to review waste profiles and sign manifests.	Potential impacts to public health and safety from implementation of Alternative 2 would be the same as for the Proposed Action/Alternative 1. There would be no significant adverse impacts to public services. **Impact Avoidance and Minimization Measures** Impact avoidance and minimization measures would be the same as described for the Proposed Action/Alternative 1.	Potential impacts to public health and safety from implementation of Alternative 3 would be the same as for the Proposed Action/Alternative 1. There would be no significant adverse impacts to public services. **Impact Avoidance and Minimization Measures** Impact avoidance and minimization measures would be the same as described for the Proposed Action/Alternative 1.	Under the No Action Alternative, there would be no change in existing conditions; therefore, no impacts would occur.
Visual Quality	No Significant Impacts	No Significant Impacts	No Significant Impacts	No Impacts
	Construction Impacts The visual landscape would be temporarily affected by construction of the proposed solar facilities and ancillary features, including graded maintenance roads, perimeter fencing, and freestanding electrical equipment including the electrical current inverters and grid connection switchgear. Given the inherent visual aspects of construction activities, temporary viewshed disturbances would result from the staging, stockpiling, and placement of PV panels and inverter stations; construction-related traffic and equipment; temporary debris storage; and standard ground-clearing operations for construction. However, these temporary impacts would not be significant. **Operational Impacts** Visual changes would be more apparent to viewers in the vicinity of Site B due to a higher number of viewers and direct foreground viewing opportunities. As such,	Impacts to visual resources with implementation of Alternative 2 would be similar to those discussed under the Proposed Action/Alternative 1 but would be limited to temporary, construction-related viewshed disturbances at Site A only. Direct impacts to viewers and existing resources would be low, as contrast	Impacts to visual resources with implementation of Alternative 3 would be similar to those discussed under the Proposed Action/Alternative 1 but would be limited to temporary, construction-related viewshed disturbances at Site B only. Direct impacts to viewers and existing resources would be moderate, as	Under the No Action Alternative, there would be no change to baseline visual quality. Therefore, no impacts would occur.

Summary of Potential Impacts and Impact Avoidance and Minimization Measures

Resource Area	Proposed Action/ Alternative 1	Alternative 2	Alternative 3	No Action Alternative
Visual Quality (Continued)	the resulting level of impact would be low to moderate at Sites A and B. Ultimately, implementation of the Proposed Action/Alternative 1 would not substantially alter existing visual character and visual impacts would be less than significant. Indirect viewshed impacts would result from disturbance by occasional maintenance operations and as-needed equipment replacement associated with the Proposed Action/Alternative 1. **Decommissioning Impacts** Impacts to visual resources during decommissioning would be temporary and not significant, and would be similar in nature to construction impacts. No visual impacts would remain following decommissioning. **Impact Avoidance and Minimization Measures** Although no significant impacts to visual quality would occur, impact avoidance and minimization measures described in Section 2.6.7 would be incorporated into the project design. Those measures include the installation of fencing around the proposed project area. The fencing could incorporate fabric screening ("scrim") on the public-facing side to obstruct, or further obstruct, views of the proposed project area.	would be weak in this location, and viewer sensitivity would be low to moderate due to limited existing site visibility. Alternative 2 would not substantially alter existing visual character and resulting visual impacts would be less than significant. **Impact Avoidance and Minimization Measures** Impact avoidance and minimization measures would be the same as described for the Proposed Action/Alternative 1.	contrast would be weak in this location; however, viewer sensitivity would be moderate due to the daily number of viewers and frequency of direct foreground-middleground views of the project site. Alternative 3 would not substantially alter existing visual character and resulting visual impacts would be less than significant. **Impact Avoidance and Minimization Measures** Impact avoidance and minimization measures would be the same as described for the Proposed Action/Alternative 1.	

Key: APE = area of potential effects; BMP = Best Management Practice; CO_2e = carbon dioxide equivalent; dBA = decibel A-weighted; MBTA = Migratory Bird Treaty Act; NOx = nitrogen oxide, NRHP = National Register of Historic Places; NAVWPNSTA = Naval Weapons Station; PV = photovoltaic; SO_2 = sulfur dioxide

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ACRONYMS AND ABBREVIATIONS

§	Section
ADT	Average Daily Traffic
APE	area of potential effect
ARB	Air Resources Board
BMP	Best Management Practice
B.P.	before present
BSA	Biological Study Area
CAAQS	California Ambient Air Quality Standards
Cal/EPA	California Environmental Protection Agency
CDFW	California Department of Fish and Wildlife
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CNDDB	California Natural Diversity Database
CO	carbon monoxide
CO_2	carbon dioxide
CO_2e	carbon dioxide equivalents
CWA	Clean Water Act
CZMA	Coastal Zone Management Act
dB	decibels
dBA	A-weighted sound level
DoD	Department of Defense
EA	Environmental Assessment
EIS	Environmental Impact Statement
EO	Executive Order
ESA	Endangered Species Act
FONSI	Finding of No Significant Impact
FR	Federal Register
GHG	Greenhouse Gas
GIS	Geographic Information System
GW	Gigawatt
HERO	Hazards of Electromagnetic Radiation to Ordnance
I	Interstate
INRMP	Integrated Natural Resources Management Plan
IRP	Installation Restoration Program
KOP	key observation point
kWh	kilowatt hours
Leq	Equivalent Sound Level
LOS	Level of Service
MBTA	Migratory Bird Treaty Act
MW	megawatt
NAAQS	National Ambient Air Quality Standards
NAVFAC	Naval Facilities Engineering Command

NAVSEA OP	Naval Sea Systems Command Operations
NAVWPNSTA	Naval Weapons Station
Navy	U.S. Department of the Navy
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NO_x	oxides of nitrogen
NPDES	National Pollutant Discharge Elimination System
NRHP	National Register of Historic Places
PM_x	fine particulate matter less than or equal to *X* microns in diameter
PV	photovoltaic
ROI	Region of Influence
RONA	Record of Non-Applicability
RWQCB	Regional Water Quality Control Board
SBNWR	Seal Beach National Wildlife Refuge
SCA	Soil Conservation Act
SECNAV	Secretary of the Navy
SO_2	sulfur dioxide
SR	State Route
SWPPP	Storm Water Pollution Prevention Plan
SWRCB	State Water Resources Control Board
UFC	Unified Facilities Criteria
U.S.	United States
U.S.C.	U.S. Code
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
VOCs	volatile organic compounds

1.0 Purpose and Need for Project

1.1 Introduction/Background

The United States (U.S.) Department of the Navy (Navy) has prepared this Environmental Assessment (EA) to evaluate the environmental consequences of the construction, operation, and eventual decommission of a solar photovoltaic (PV) system at one or more sites at Naval Weapons Station (NAVWPNSTA or station) Seal Beach, California.

The Navy would lease land at NAVWPNSTA Seal Beach to a local electric utility provider (Private Partner) who would construct and operate the solar PV system(s). Land would be leased for a period of up to 37 years. After the terms of the lease are expired, the Navy and the Private Partner would either renew the lease or decommission the facility.

This EA has been prepared in accordance with the National Environmental Policy Act of 1969 (NEPA); (42 United States Code [U.S.C.] Section [§] 4321); Council on Environmental Quality (CEQ) regulations (40 Code of Federal Regulations [CFR] § 1500; and Navy procedures for implementing NEPA (32 CFR §775).

1.1.1 History and Mission of the Station

The key function and activity of NAVWPNSTA Seal Beach is the receipt, segregation, storage, and issuance of ordnance. The mission of the station is to provide shore-based infrastructure support to the Navy's ordnance mission and other fleet and fleet support activities.

NAVWPNSTA Seal Beach was commissioned in 1944 as a Naval Ammunition and Net Depot. The station at that time had two primary missions: storage and loading of ammunition onto Pacific Fleet ships bound for the war, and servicing the anti-submarine nets used to protect fleet bases and anchorages around the world. The depot was built next to the community of Seal Beach located on the northwest corner of Orange County, California. Seal Beach was considered an ideal site due to both a large amount of available open space for weapons storage and the area's proximity to the Navy fleet concentrations in Long Beach and San Diego.

Since World War II, the station has evolved into the Navy's primary West Coast ordnance storage, loading, and maintenance installation. In 1962, the facility was designated a U.S. NAVWPNSTA. Under the station's primary tenant, the Navy Munitions Command, cruisers, destroyers, frigates, and medium-sized amphibious assault ships are loaded with missiles, torpedoes, countermeasures devices, and conventional ammunition at the facility's 1,000-foot-long (304.8-meter-long) wharf. In addition, larger ships can be accommodated at a protected explosives anchorage located in nearby Long Beach Harbor. Personnel also perform maintenance on some weapons systems. On average, 50 vessels are loaded or unloaded each year. NAVWPNSTA Seal Beach services a majority of the U.S. Pacific Fleet.

1.1.2 Secretary of the Navy and the Renewable Energy Program Office

The Secretary of the Navy (SECNAV) has directed the development of an accelerated plan to obtain 1 Gigawatt (GW) of renewable energy capacity for the Navy. One GW equals one-thousand megawatts (MW). The Navy's intended outcome is to have the 1 GW of renewable energy under contract by the end of 2015. Assistant Secretary of the Navy (Energy, Installations

& Environment) has established a Renewable Energy Program Office to maintain focus and supply resources to obtain 1 GW of renewable energy within the SECNAV-directed timeline.

The Navy has developed acquisition strategies based on three separate models to procure or generate renewable energy to meet SECNAV goals. Figure 1-1 depicts the three renewable energy models. The anticipated strategy for the proposed NAVWPNSTA Seal Beach renewable energy project is Model 2.

In keeping with authority of 10 U.S.C. § 2667, outgrants (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 the lessee to apply towards rents as in-kind consideration would meet necessary environmental regulations and requirements under separate reporting.

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

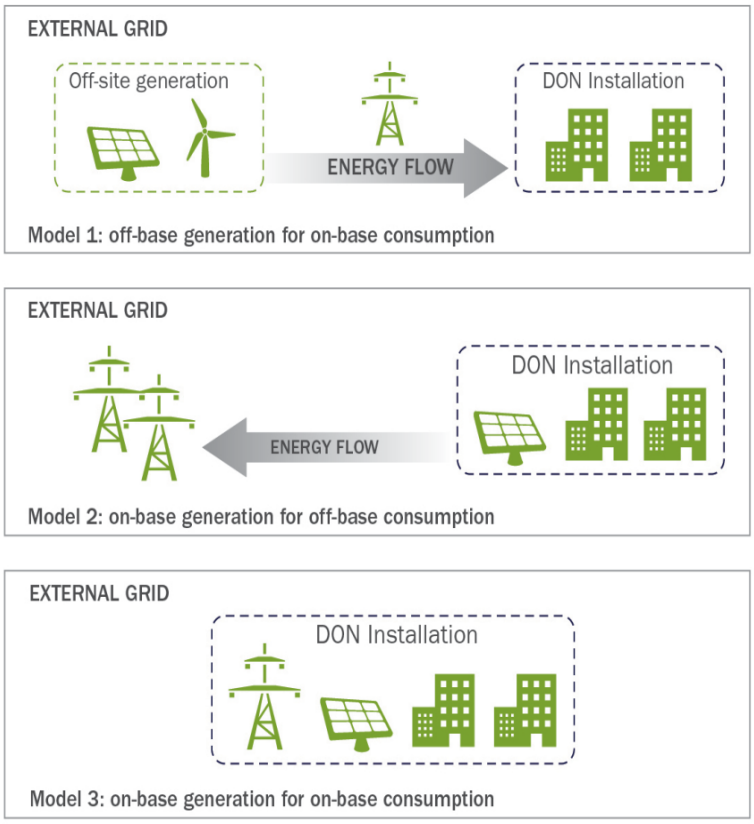
- Navy purchases new renewable energy generation for on-station load
- Renewable energy generation provides price stability and diversifies energy portfolio
- Acquisition: Inter-agency Agreement

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

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

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

- Navy consumes all energy generated
- Provides price stability and diversifies energy portfolio
- Potential opportunity to increase energy security through micro-grid integration
- Acquisition: Power Purchase Agreement



DON = Navy

Figure 1-1. Renewable Energy Models

1.2 Project Location Description

NAVWPNSTA Seal Beach is located in the City of Seal Beach in southern California (Figure 1-2). It is located in northern Orange County between Huntington Beach and Long Beach, approximately 25 miles (40 kilometers) south of the Los Angeles urban center. NAVWPNSTA Seal Beach is bordered by developments associated with the City of Seal Beach to the west, southwest, and north. The City of Westminster borders the station on the northeast, and the City of Huntington Beach borders the station to the south/southeast.

Interstate (I)-405 parallels the northern boundary of NAVWPNSTA Seal Beach. Westminster Avenue bisects the station from east to west between I-405 and the Pacific Ocean. Pacific Coast Highway (State Route [SR]-1) is elevated across the southwestern portion of NAVWPNSTA Seal Beach via a bridge over the Anaheim Bay. Bolsa Chica Road and Seal Beach Boulevard form the eastern and western boundaries of the station, respectively.

1.3 Legal Requirements, Policy Directives, and Navy Guidance

The federal government has passed legislation and provided directives to federal agencies like the Navy requiring agencies to reduce energy use, reduce reliance on traditional fossil fuel-based energy sources, and increase the consumption and production of renewable energy sources at their installations. Renewable energy sources include wind, solar, geothermal, biomass, and other sustainable methods. The following provides a brief summary of these federal requirements.

- **Executive Order (EO) 13514**, October 5, 2009, Federal Leadership in Environmental, Energy, and Economic Performance sets federal energy requirements in several areas, including: Accountability and Transparency; Strategic Sustainability; Performance Planning; Greenhouse Gas (GHG) Management; Sustainable Buildings and Communities; Water Efficiency; Electronic Products and Services; Fleet and Transportation Management; and Pollution Prevention and Waste Reduction. This EO states that all federal agencies are to increase the use of renewable energy and implement renewable energy generation projects on federal property.
- **SECNAV Energy Goals**, October 14, 2009, the Secretary of Navy established five aggressive renewable energy goals for the Navy's shore-based installations to meet by 2020. The goals pertain to improved fuel use in aircrafts as well as energy reduction and production. The goal that pertains most to this document is *the Navy will produce at least 50 percent of shore-based energy requirements from alternative sources*.
- **1GW Initiative**, October 1, 2012, in support of the SECNAV Energy goals, Secretary Mabus chartered the 1 Gigawatt Task Force (1GW) to enable the Navy to procure 1 GW of renewable energy generation capacity by 2015. 1 GW of renewable energy generation directly addresses several of the mandates and goals for which the Navy is accountable: EO 13514 GHG reduction, the 10 U.S.C. § 2911 "25 by 25" mandate (25 percent by 2025), Energy Policy Act 2005 graduated renewable energy targets, and EO 13423 renewable energy consumption goals, in addition to the Secretary's departmental goals. To reach the 50 percent renewable energy generation goal (which the 1GW goal directly supports) in a cost-effective fashion, the Navy must purchase or facilitate the production of significant quantities of renewable energy while reducing power consumed through energy efficiencies. The overall Navy energy strategy therefore includes both lines of effort: deploy renewable energy in support of the 1GW goal and simultaneously bring the 50 percent renewable energy generation goal closer by reducing overall energy consumption.

Figure 1-2. Regional Location Map

1.4 Purpose and Need for the Project

The purpose of the proposed project is to increase Navy installation energy security, operational capability, strategic flexibility and resource availability through the development of renewable energy generating assets at NAVWPNSTA Seal Beach through the construction and operation of a solar PV system(s). The proposed project is required to meet the renewable energy standards put forth by the 1 GW Initiative, EO 13514, and the SECNAV Energy Goals. The policy for energy security and increased production of energy from alternative sources by 2020 includes a requirement in any potential agreement (or real estate outgrant) entered into by the Navy and a private partner that a project's infrastructure be 'micro-grid-ready', meaning that the Navy would have the option to use any energy produced "on station" in the event of an area power outage or other circumstances.

1.5 Decision to be Made

The decision to be made as a result of the analysis in this EA is to decide if an Environmental Impact Statement (EIS) needs to be prepared. An EIS would need to be prepared if it is determined that the proposed project or other alternative ultimately selected for implementation would have significant impacts to the human or natural environment. Should an EIS be deemed unnecessary based on the analysis of environmental impacts for the alternative selected for implementation, the selection would be documented in a Finding of No Significant Impact (FONSI).

1.6 Scope of Analysis

NAVWPNSTA Seal Beach conducted a review of current land uses aboard the station to identify potential feasible locations to construct and operate a PV system. Current land use, surrounding land uses, and available space were considered for each site. This review resulted in the identification of Sites A and B, the two sites considered for evaluation in the preparation of this EA.

Resource areas analyzed in detail in this EA include the following:

- Land Use and Coastal Resources
- Cultural Resources
- Biological Resources
- Noise
- Topography, Geology, and Soils
- Water Resources
- Air Quality and Climate Change
- Traffic and Circulation
- Utilities
- Public Health and Safety
- Visual Resources

Two additional resource areas were considered, but were not carried forward for detailed analysis in this EA because potential impacts from the alternatives would be non-existent or

would be at most negligible. Resources not analyzed further include Socioeconomics and Environmental Justice.

***Socioeconomics*:** In the context of NEPA, the purpose of socioeconomic analysis is to assess the potential effects of a proposed project on the human environment related to economics and social conditions. A socioeconomics analysis consists of demographics, employment, income, industry, housing, community resources, and public finance.

Construction and operation of PV systems on NAVWPNSTA Seal Beach would have no demonstrable long-term socioeconomic effect on the surrounding community. It would not attract a long-term worker population to the project vicinity nor affect the need for housing in the area. It is expected that the crews required for the proposed construction activities would be comprised of local contractors in the surrounding county areas. Proposed operations would not require a regular staff of on-station workers. There would be short-term economic benefits from creation of short-term construction jobs. The alternatives' effects on the local and regional economy and socioeconomic environment would be negligible and short-term.

***Environmental Justice*:** EO 12898 – Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations – directs federal agencies to identify and address the disproportionately high and adverse human health or environmental effects of their actions on minority and low-income populations, to the greatest extent practicable and permitted by law. The order also directs each agency to develop a strategy for implementing environmental justice. The order is also intended to promote nondiscrimination in federal programs that affect human health and the environment, as well as provide minority and low-income communities' access to public information and public participation.

As the alternatives would take place within the NAVWPNSTA Seal Beach property boundaries, there would be no disproportionately high environmental or health impacts on low-income or minority populations. Therefore, impacts would not occur.

1.7 Public Participation

The Navy invites public participation in decision-making on new proposals through the NEPA process. Consideration of the views and information of all interested persons promotes open communication and enables better federal decision-making. Agencies, organizations, and members of the public with a potential interest in the proposed project are encouraged to participate. Appendix A provides a record of public involvement and agency coordination and consultation conducted in support of preparation of this EA.

1.7.1 Public Review

Prior to preparing the EA, the Navy published and distributed initial project announcements in the form of postcards mailed to the public and other interested parties in the community. The postcards were mailed on December 19, 2014 and provided the Navy point of contact and address to submit all comments and questions by January 12, 2015. In addition, a notice of the Navy's intent to prepare an EA was printed in local newspapers for 3 consecutive days beginning December 19, 2014 in the Orange County Register, a daily publication; on

December 18, 2014 in the Huntington Beach Independent, a weekly publication; and on December 18, 2014 in the Seal Beach Sun, a weekly publication. Through the initial agency and public scoping process, 13 comment submissions were received. The types of comments received and general comment issues are listed in Appendix A.

This Draft EA has been distributed for a 15-day public review and comment period. Notices of availability were published in the following local newspapers:

- Orange County Register, a daily newspaper (3 consecutive days [Friday, June 5 through Sunday, June 7, 2015])
- Seal Beach Sun, a weekly newspaper (Thursday, June 4, 2015)
- Huntington Beach Independent, a weekly newspaper (Thursday, June 4, 2015)

Copies were made available for public review at:

The Mary Wilson Public Library
707 Electric Avenue
Seal Beach, California 90740-6103

Huntington Beach Central Library
7111 Talbert Avenue
Huntington Beach, California 92648

Westminster Branch Library
8180 13th Street
Westminster, California 92683

and online at: www.cnic.navy.mil/NWSSBSolarPV

The cities of Seal Beach, Westminster, and Huntington Beach also received copies of the document.

All comments submitted during the Draft EA public comment period will be considered in the development of the Final EA. The Final EA and FONSI, if applicable, will be available for public review at The Mary Wilson Public Library, Huntington Beach Central Library, and Westminster Branch Library listed above, and on the Commander, Navy Region Southwest website. The Notice of Availability for the Final EA and FONSI, if applicable, will appear in the newspapers listed above.

1.8 Intergovernmental Coordination

Through the interagency/intergovernmental coordination for environmental planning process, NEPA requires that federal agencies responsible for preparing NEPA analyses and documentation do so "in cooperation with State and local governments" and other agencies with jurisdiction by law or special expertise (42 U.S.C. § 4331[a] and § 4332[c]). The Navy coordinated with the following agencies during the preparation of this EA:

- California Coastal Commission – The Navy considered the effects that the Proposed Action/Alternative 1 would have on coastal uses and resources for purposes of federal consistency review under the Coastal Zone Management Act (CZMA) and determined there would be no reasonably foreseeable direct or indirect effects on coastal uses and resources. The Navy prepared a Coastal Consistency Negative Determination and submitted it to the California Coastal Commission for concurrence.
- California State Historic Preservation Officer – The Navy has requested concurrence on a “No Historic Properties Affected” determination.
- City of Seal Beach
- City of Westminster
- City of Huntington Beach
- Gabrielino/Tongva Nation
- Gabrielino/Tongva Indians of California
- Gabrielino/Tongva Band of Mission Indians of San Gabriel

2.0 Description of Proposed Action and Alternatives

2.1 Reasonable Alternative Screening Factors

CEQ regulations for implementing the procedural provisions of NEPA establish policies for federal agencies, including "using the NEPA process to identify and assess the reasonable alternatives to the Proposed Action that will avoid or minimize adverse effects of these actions on the quality of the human environment (40 CFR 1500.2 [e])". This EA only carries forward for detailed analysis those alternatives that could meet the purpose of and need for the project as defined in Chapter 1.0 and the below-listed reasonable alternative screening factors.

1. Contribute to the SECNAV's goal of obtaining 1 GW of renewable energy by the end of 2015 by providing a sufficiently sized parcel of land for PV system placement.
2. Be a suitable location and/or design capable of providing electricity at or below the current cost of traditional power (e.g., orientation/location/slope relative to the sun for generating higher amounts of power, or a lower system cost relative to output).
3. Be consistent with the Naval Sea Systems Command Operations (NAVSEA OP) 5 Volume 1 Ammunition and Explosives Safety Ashore manual, which directs explosives planning and safety policies of the Navy.
4. Avoid disruption to the station's ordnance mission (new construction not permitted in Explosives Safety Quantity Distance arcs).
5. Avoid impacts to environmentally sensitive areas, such as wetlands and potential migratory bird nesting and foraging habitats.
6. Ensure land use activities are consistent with continued viability of the land for agricultural farming and maintenance areas after a potential lease agreement is complete.

2.2 Proposed Action/Alternative 1 – Construction and Operation of Solar PV Systems at Naval Weapons Station Seal Beach

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. The real estate action facilitates on-base generation of renewable energy for on and off-base consumption via a Private Partner. In accordance with 10 U.S.C. § 2667, the leases shall provide for consideration (rent) to be paid in an amount not less than the fair market value of the leasehold interest, either in cash or in-kind.

A PV system would be constructed to generate renewable energy at NAVWPNSTA Seal Beach under a Model 2 (10 U.S.C. § 2667) acquisition strategy (described in Section 1.1.2). Under a Model 2 acquisition strategy, the Navy and local electric utility provider (Private Partner) would enter into a lease agreement (or a real estate outgrant) to allow the Private Partner to use Navy land to construct, operate, and own the PV system(s). The Navy would receive compensation

for the lease terms to enhance the installation's energy generation capability and energy security through the following factors:

- Legal access to renewable power during regional grid outage
- No capital cost to the Navy to install the specified of on-site renewable energy
- No fees to access the power during emergency conditions (standard rates apply)
- Foundation from which the Navy could develop an on-station microgrid.

The Private Partner would sell the generated power to customers outside the Navy. The approximate contract duration would be up to 37 years, with 35 years of system(s) service and 2 years for construction and decommissioning. This acquisition strategy maximizes the total capacity (size) of the system(s) based on available land, and is not limited by the installation's electrical load.

The Navy identified two areas, Sites A and B, as potential PV sites. The Proposed Action/ Alternative 1 consists of construction, operation, maintenance, and eventual decommissioning of ground-mounted PV systems at Sites A and B. Site A is comprised of approximately 64 acres (26 hectares) and Site B comprised of approximately 73 acres (29 hectares), with the total acreage of the combined sites rounding upward to 138 acres (55.8 hectares). Implementation of the Proposed Action/Alternative 1 would result in the generation of a total estimated 25 MW of renewable energy toward the Navy's goal of having 1 GW of renewable energy under contract by the end of Year 2015. The approximate potential of PV system(s) of up to 25 MW in capacity sited at NAVWPNSTA Seal Beach would be capable of producing 39,150,000 kilowatt hours (kWh), which is enough to power 70,287 homes and eliminate 23,882 tons of carbon dioxide (CO_2) emissions per year that would otherwise be generated from the burning of fossil and other non-renewable fuels.

2.2.1 Site A

Site A is a topographically flat, approximately 64-acre (26-hectare) parcel currently used for agricultural purposes. It is located adjacent to Bolsa Chica Street[1] and Edinger Avenue, and directly adjacent to Perimeter Road, which is located directly inside the station security fence line (see Figure 2-1). Site A is regularly planted and harvested for green beans, melons, peppers, lettuce, lima beans, beets, and carrots, and is considered disturbed with minimal habitat value. It is bounded by the Orange County Flood Control Channel on two sides, which is adjacent to Bolsa Chica Road and Edinger Avenue. The flood control channel is fenced, approximately 100 feet (30.5 meters) wide, and has a man-made rocky slope and bank.

[1] Note that this roadway is known as Bolsa Chica Street in the City of Huntington Beach (near Site A) but changes names to Bolsa Chica Road when it crosses into the City of Westminster (near Site B).

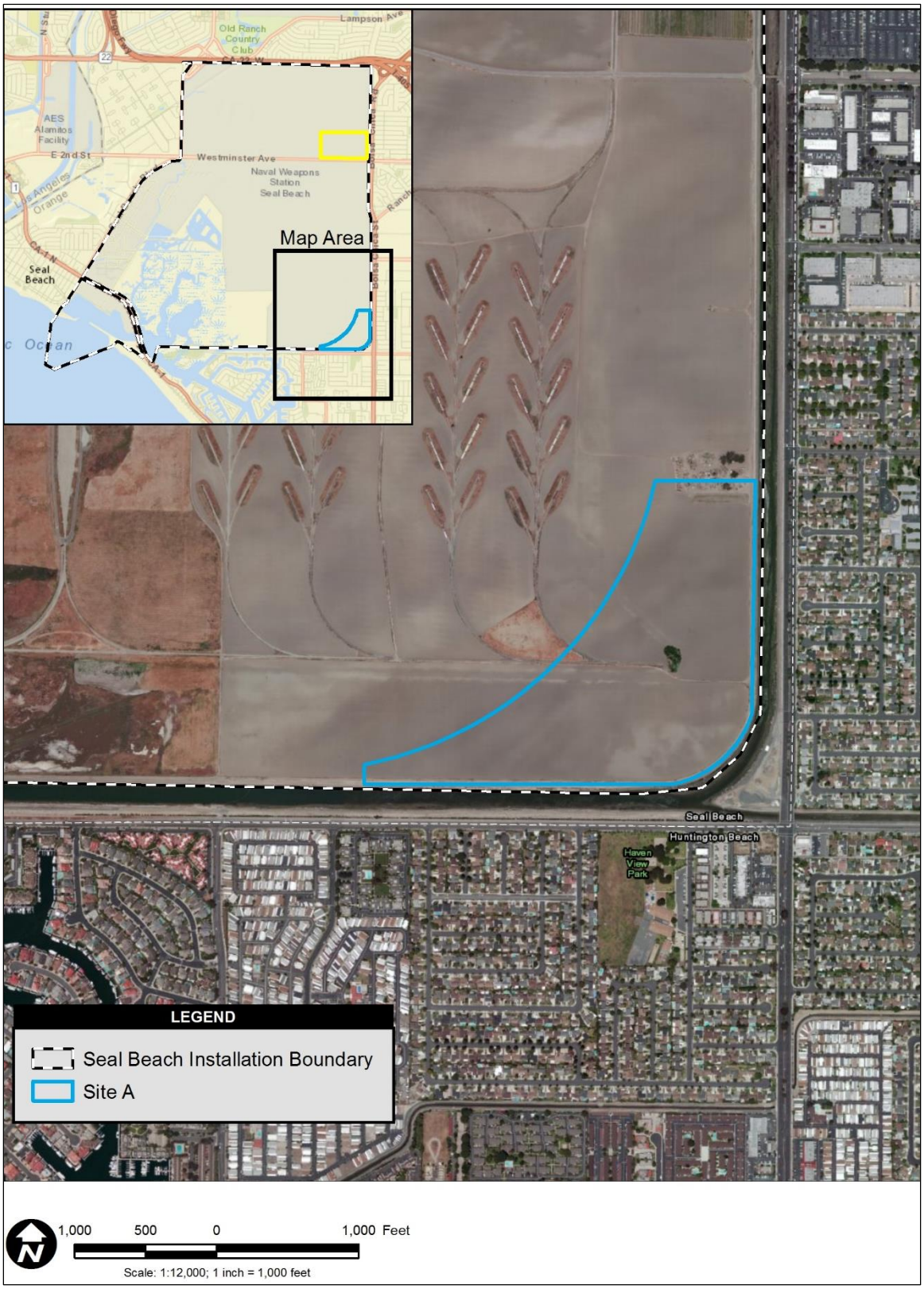


Figure 2-1. Proposed Project Site A

The channel is designed to handle water flow from storm drains and other runoff and direct the water into the Orange County Flood Channel which flows into Huntington Harbor, Anaheim Bay, and the Seal Beach National Wildlife Refuge (SBNWR), and then into the Pacific Ocean. Maintenance, regular inspections, and cleaning are performed as needed in the channel. Implementation of the Proposed Action/Alternative 1 at Site A would result in a renewable energy generation asset up to 10 MW in capacity.

2.2.2 Site B

Site B is a topographically flat, approximately 73-acre (29-hectare) parcel currently used for agricultural purposes. Approximately half of the site is regularly planted and harvested. The other half was historically farmed, but is currently in a maintenance/mow status. Buildings 878 and 879, a corrugated metal warehouse and a weapons shop, respectively, are within the site boundary. It is bounded by the Orange County Flood Channel, which is adjacent to Bolsa Chica Road, to the east and Westminster Avenue to the south (see Figure 2-2). Implementation of the Proposed Action/Alternative 1 at Site B would result in a renewable energy generation asset up to 15 MW in capacity.

2.2.3 Ground-Mounted Photovoltaic Systems

Ground-mounted solar PV systems would be built on relatively flat, agricultural land. In areas with surface vegetation, ground-mounted solar PV systems may require the site to be cleared and grubbed. Access to ground-mounted solar panels would be restricted by perimeter chain link fencing, 8 feet high (2.4 meters) with three strands of barbed wire that would encompass the entire facility perimeter. Fences facing the community may be covered with fabric to mitigate view concerns. A ground-mounted system would occupy all of the space contained within its fence line, and the area may include the construction of all-weather gravel roads between the rows of solar panels and around the site perimeter for maintenance access. Exterior access roads would be approximately 24 feet wide (7.3 meters). Interior site roads would be approximately 20 feet wide (6.1 meters). Ground-mounted systems require either an underground or an overhead electrical line to provide electrical feedback to the nearest point of connection. Underground conduit would be used for cables to cross under roads. A typical configuration for this type of system is to install vertical members into the ground, with panel mounting hardware, frames, motors, and/or the solar panels themselves affixed atop the constructed mounting structure. Pole footings (or similar) would be used, and each footing would consist of a 4 inch (10 centimeter) cross-sectional area and would require a depth of 4 to 6.5 feet (1.2 to 2 meters) below ground surface (see Figure 2-3). Note that pole footings and pile depth indicated are typical approximations. The actual pile depth would be dependent on the site geotechnical data and final structure design. Pile spacing would be dependent on the final design configuration proposed by the installer.

Two types of ground-mounted systems may be constructed at the project sites, depending on the Private Partner's site design: fixed-tilt panel systems or tracker-mounted panel systems. Fixed-tilt solar arrays would remain stationary, whereas tracker-mounted arrays would be mounted on an axis and would be free to move throughout the day to maintain the best sun angle and maximize power output (see Figure 2-4).

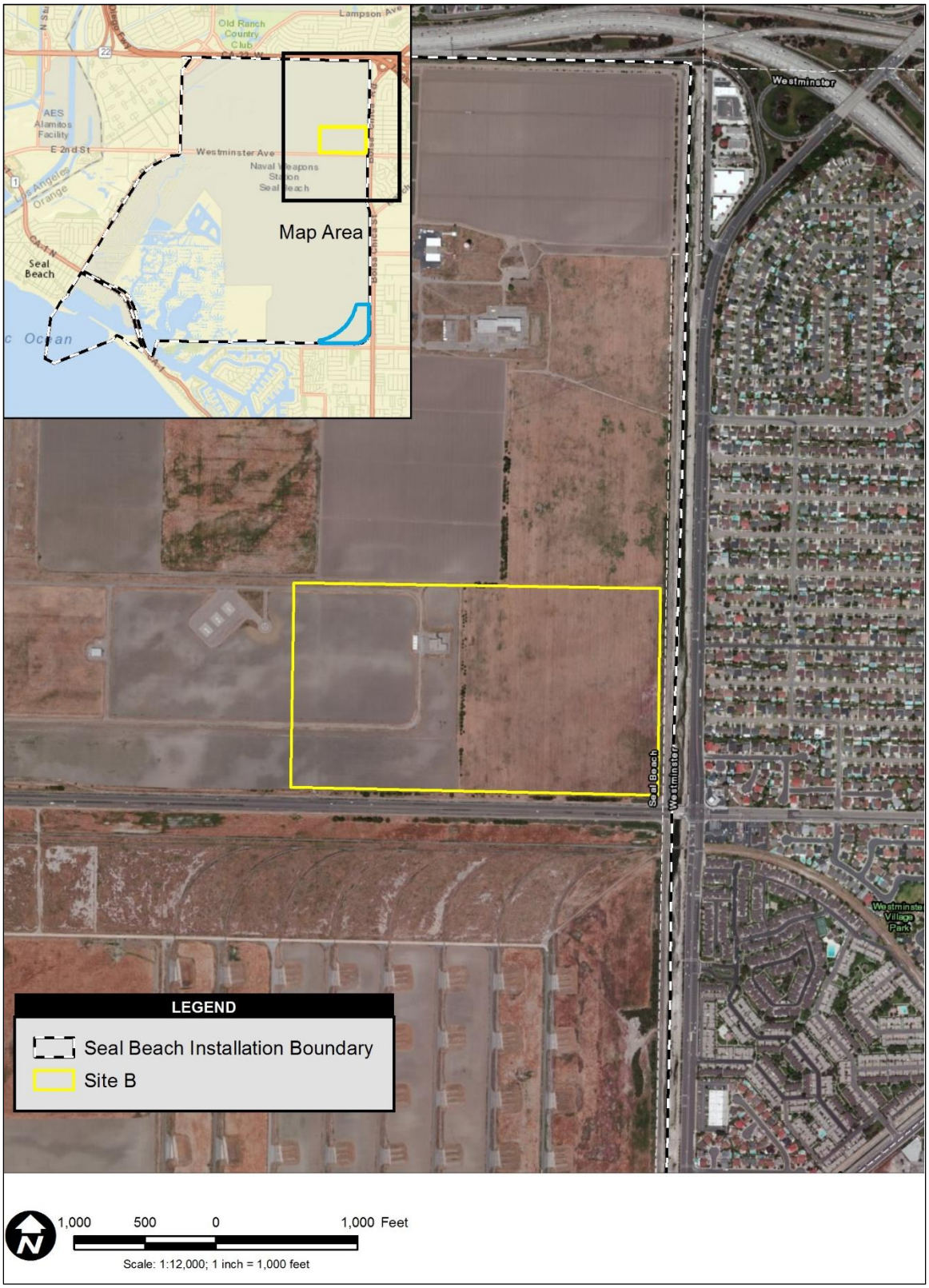


Figure 2-2. Proposed Project Site B

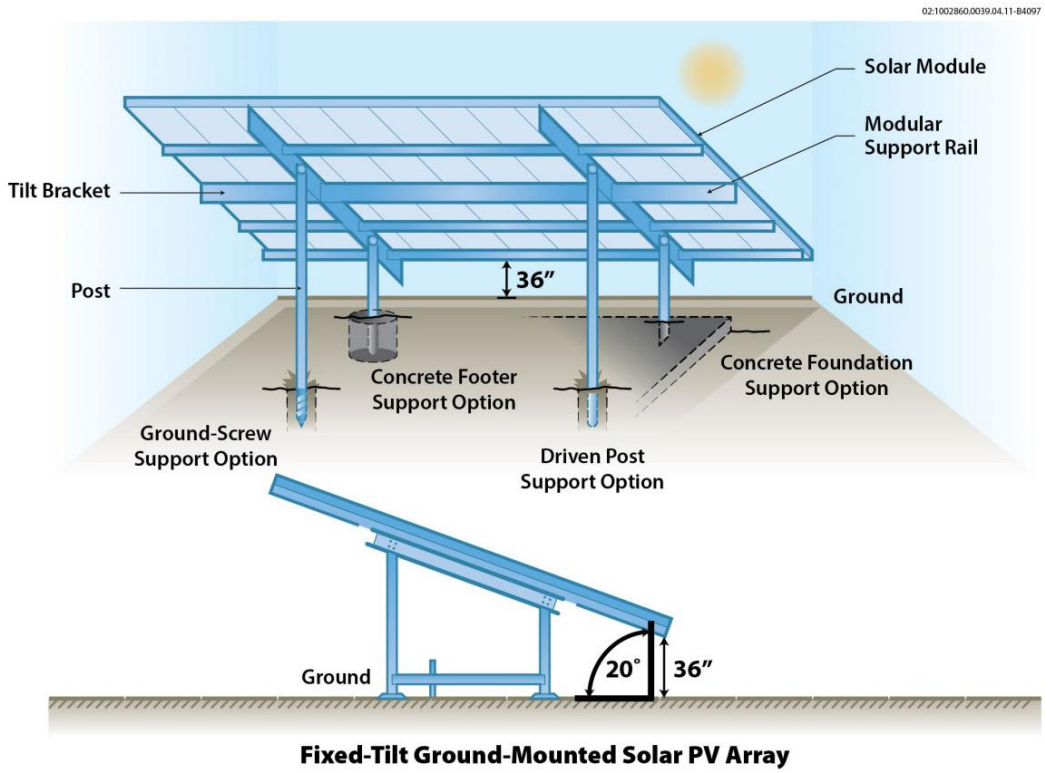


Figure 2-3. Panel Mounting Methods

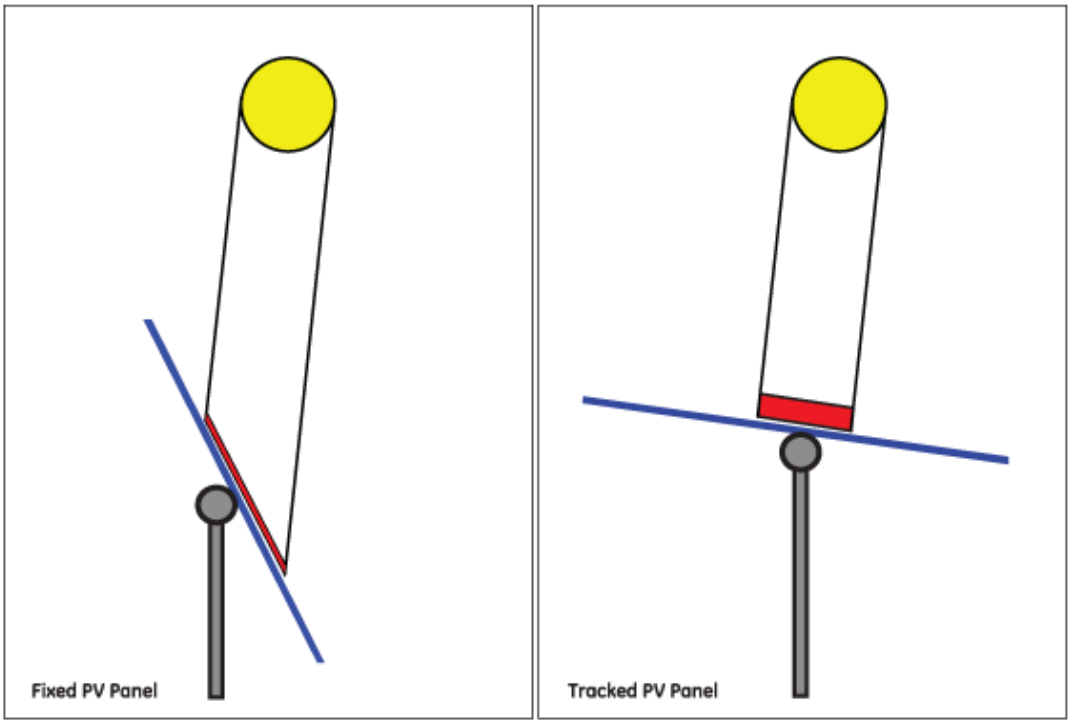


Figure 2-4. Fixed-Tilt Panel Versus Single-Axis Tracking

It is estimated that the highest point of the solar array for a ground-mounted solar PV system would not exceed 8 feet (2.4 meters) above the ground surface and would depend on the solar PV system type (i.e., fixed-tilt or tracker-mounted) and tilt of the arrays. Fixed-tilt panels would maintain a fixed height, whereas the maximum height of tracker-mounted arrays would vary as the arrays move to track the sun. Ground-mounted panels would be approximately 5 feet (1.5 meters) wide and 3 feet (0.9 meter) long. The number of panels in each array, the type of ground-mounted system used, and the array configuration would depend on the Private Partner's site design.

The Private Partner would develop a conceptual design that allowed for the most efficient placement and configuration of PV panels on the property while minimizing environmental impacts. Installation of the panels and associated infrastructure would be conducted by the Private Partner. Once the systems are operational, the Private Partner would be responsible for maintenance and operation of the facilities. The Private Partner would also be responsible for the decommissioning and disposal of the facilities and for restoring the sites to existing conditions at the end of the 37-year lease agreement period.

2.2.4 Construction

All construction activities would be conducted in accordance with the impact avoidance and minimization measures described in Section 2.6 of this EA. The facilities to be constructed include solar PV panels, steel tracking structure, inverters, combiner boxes, electrical switchgear, and associated electrical wiring and poles, connections, and other items required for the PV system. The ground-mounted systems would be enclosed by 8-foot-high (2.4-meter-high) chain link panels with barbed-wire outriggers in accordance with force protection standards. The purpose of the fencing would be to provide a safety barrier for unintended access to the site and equipment and as a security measure to protect from vandalism and theft.

Construction and installation of ground-mounted PV panels may involve the following site preparations:

- Grading to bare mineral soil to remove vegetation
- Installation of underground electrical lines (3 feet [1 meter] deep as required by Unified Facilities Criteria [UFC] codes)
- Boring or digging to a depth of 4 to 6.5 feet (1.2 to 2 meters) below ground surface to accommodate support poles and footings, depending on support system design
- Installation of poles to connect the solar PV system to the electrical grid
- Placement of 6 to 8 inches (15 to 20 centimeters) of gravel over areas, as necessary
- Installation of fencing around the perimeter of the project
- Dumpsters to separate recyclable construction demolition debris
- Equipment used to install the PV arrays may include bulldozers, scrapers, backhoes, pile drivers, water trucks, trenchers, and truck-mounted mobile cranes.

Trenching would be conducted between panels and in other areas as needed to install, connect and bury power lines. Power lines may also be strung overhead on poles to a single connection point that would connect the PV systems to a public power grid. Exact locations are not known at this time; however, prior to trenching, the Private Partner would conduct appropriate geotechnical surveys in accordance with pertinent laws and regulations to ensure the area to be trenched is clear. The number of poles that would be placed is unknown at this time.

For Site A, the potential connection point is located at the corner of Edinger Avenue and Bolsa Chica Street. For Site B, the proposed connection point to the public grid is located on the eastern perimeter of the station at the corner of Westminster Avenue and Bolsa Chica Road.

Construction would create debris that would be removed by the Private Partner upon completion of installation of the PV system. All materials would be disposed of in accordance with a project-specific Solid Waste Management Plan described in Section 2.6.6.

2.2.5 Operation and Maintenance

The PV system would connect to an inverter unit that would be installed to convert the energy from the solar panels to electricity. A power line would be strung on newly installed poles to an existing pole, and then to an off-station, existing substation to connect to the public grid or to an internal Navy microgrid that could be developed (see Section 2.2). Operations activities would include, but not be limited to, use of all aspects of the project site, including existing access roads and electrical and mechanical systems for maintenance and repair.

Quarterly inspections of the PV system would be conducted to ensure infrastructure is in good operating condition. Any repairs or regular service would be conducted by the Private Partner with access to NAVWPNSTA Seal Beach using existing roads. The ground-mounted solar PV panels would be cleaned as necessary using water trucked to the PV system by the Private Partner. The NAVWPNSTA Seal Beach water supply would not be used. Panels are typically cleaned when efficiency and energy production are diminished. The Private Partner would comply with all Navy regulations applicable to conducting work activities on station as well as the impact avoidance and minimization measures described in Section 2.6.

2.2.6 Decommissioning and Restoration

A decommissioning plan would be prepared in accordance with Navy requirements at the time of demolition of the PV system(s). The plan would ensure that facilities would be decommissioned and removed and the site would be restored to pre-construction conditions. Soils and impacted areas would be reclaimed to a level that would, at a minimum, support uses for the land consistent with pre-construction activities.

The decommissioning and restoration process would involve the removal of structures, restoration of topsoil, revegetation, and seeding. Temporary erosion and sedimentation control best management practices (BMPs) would be used during the decommissioning phase of the project.

2.2.7 Access

During construction, operations, and maintenance activities, construction and maintenance workers would enter NAVWPNSTA Seal Beach from the Westminster Gate via Westminster Avenue. No access improvements would be required under the Proposed Action/Alternative 1.

2.3 Alternative 2: Construction and Operation of a Photovoltaic System at Site A

Alternative 2 would be the same as the Proposed Action/Alternative 1, except that the PV system would only be constructed, operated, and maintained at Site A, an approximately 64-acre (26-hectare) parcel that would contribute an estimated 10 MW of renewable energy toward the Navy's goal of having 1 GW of renewable energy under contract by the end of Year 2015. The impact avoidance and minimization measures would be the same as for the Proposed Action/Alternative 1.

2.4 Alternative 3: Construction and Operation of a Photovoltaic System at Site B

Alternative 3 would be the same as the Proposed Action/Alternative 1, except that the PV system would only be constructed, operated, and maintained at Site B, an approximately 73-acre (29-hectare) parcel that would contribute an estimated 15 MW of renewable energy toward the Navy's goal of having 1 GW of renewable energy under contract by the end of Year 2015. The impact avoidance and minimization measures would be the same as for the Proposed Action/Alternative 1.

2.5 No Action Alternative

Under the No Action Alternative, a PV system would not be constructed, operated, and maintained at NAVWPNSTA Seal Beach, and the station would not contribute toward the SECNAV goal of having 1 GW of renewable energy under contract by the end of 2015. Land use for Sites A and B would continue to be active agriculture or an open, unplanted field in a maintenance/mow status. The No Action Alternative provides a measure of the baseline/existing conditions against which the impacts of the alternatives can be compared. In this EA, the No Action Alternative is described in Chapter 3, Affected Environment and Environmental Consequences. The No Action Alternative is analyzed by resource area in Chapter 3 on the assumption that operations would be maintained at the status quo (no new land use would occur on Sites A or B).

2.6 Impact Avoidance and Minimization Measures

This section presents proposed impact avoidance and minimization measures that would be applied during the design, construction, operations, and maintenance stages of the proposed project and other alternatives to avoid and/or minimize potential impacts to health and safety, air quality, biological resources, cultural resources, and visual resources. These measures also address storm water, erosion, solid waste, and hazardous waste. The impact avoidance and minimization measures presented here are included as part of the impact analysis in Chapter 3.

2.6.1 Environmental Protection Plan

The Private Partner would submit an Environmental Protection Plan for approval by the Navy prior to commencement of construction. The plan would discuss measures that the Private Partner would take to prevent or control releases of contaminants into the air, soil, and water during construction. Specifically, the plan would address:

- Weed control, including adherence with the Station Integrated Pest Management Plan
- Management and removal of trash and rubbish
- Human waste management (sewage, trash)
- Air pollution controls on equipment and operations
- Dust control
- Application of paints and coatings
- Fire prevention precautions
- Recycling of project waste or demolition debris
- Contractor parking and laydown areas
- Temporary utility services
- Schedule
- Limits on construction activity due to wildlife or habitat
- Procedures if site contamination is discovered
- Historical, archaeological, and paleontological preservation procedures
- Clearing and grubbing
- Equipment maintenance and fueling
- Hazardous materials use by the contractor
- Hazardous waste storage and disposal
- Smoking plan
- Grading plan, including soil removal

2.6.2 Air Quality

Particulate matter emissions from construction and operations activities would be minimized through dust abatement measures, including:

- Applying soil stabilizers to disturbed, inactive portions of the project site to help bind soil together and make it less susceptible to erosion
- Replacing ground cover in disturbed areas with a bonding or adhesive agent that is used for hydraulic seeding and/or appropriate native plant species, as appropriate
- Watering exposed soil in disturbed areas with adequate frequency for continued moist soil
- Suspending excavation and grading activities during periods of high wind activity

- Cleaning (washing) all vehicles before they leave the project site
- Locating staging areas as far away from sensitive receptors as practicable
- Limiting idling time and scheduling construction truck trips during non-peak hours to the extent practicable to reduce peak-hour vehicle exhaust emissions

The project would comply with South Coast Management District Rule 403, if applicable.

2.6.3 Biological Resources

The following impact avoidance and minimization measures would be included in the proposed project to reduce the potential for impacts to sensitive biological resources.

General Biological Impact Avoidance and Minimization Measures

On-going vegetation maintenance would be conducted to ensure uninterrupted energy production. The designated work area flagging and erosion control BMPs would be established and checked regularly, including within 24 hours of any storm event, and maintained throughout the construction phase. Topsoil would be retained and reused in the revegetation of temporary disturbance areas. Soils may be cut and moved around the vicinity of the sites in order to level the grading, but no significant amount of soils would be removed from the sites. The anticipated earthwork would only involve clearing and grubbing of the trees and bushes.

Lighting shall be designed in such a way to ensure that all light posts and permanent nighttime lighting associated with the project would provide the lowest illumination possible while still allowing for safe operations. To prevent disturbance to sensitive natural resources, lighting would be set at the lowest height possible and would be shielded to direct it only toward areas needing illumination.

To reduce perching by raptors and other birds, light posts and tall structures would be designed to prevent perching and/or would be equipped with spike strips. To avoid attracting predators during construction, the project site would be kept clean of debris.

All vehicle traffic would be restricted to construction areas and currently established dirt or paved roads. No off-road vehicle use would be permitted. Construction activities at NAVWPNSTA Seal Beach would only take place during daylight hours (sunrise to sunset) and no lighted nighttime work would be permitted.

Impact Avoidance and Minimization Measures for Nesting Birds

To reduce the risk of take of nesting birds protected under the Migratory Bird Treaty Act (MBTA), mowing, clearing, and grading of vegetated areas and demolition activities would be conducted during the non-breeding season (October through January at NAVWPNSTA Seal Beach) to the maximum extent practicable. If mowing, clearing, or grading of vegetated areas or demolition activities must occur during the breeding season (February through September at NAVWPNSTA Seal Beach), a nest search survey would be conducted no more than 72 hours prior to these activities. Trees in and within 200 feet (61 meters) of the project sites would be searched for active nests. Any active nests found during the survey would be provided with a

buffer (buffer size would be determined on a case-by-case basis by the Station Conservation Manager) and avoided until the birds have fledged.

Minimize Impacts to Burrowing Owl and its Burrows

Pre-construction surveys would be conducted at Sites A and B by a qualified biologist within 30 days prior to ground disturbance to avoid the direct take of burrowing owls. If burrowing owls or active burrows were found within the project footprints before or during construction, protective measures would be implemented. If burrowing owls and their habitat can be protected in place on or adjacent to the project site, the use of buffer zones, visual screens, or other measures would be used to minimize disturbance impacts from project activities. If any burrows were located within the project footprint outside of the breeding season, owls would be actively relocated to a designated location by a qualified biologist in accordance with the guidelines set forth in the Burrowing Owl Consortium 1993 (Haug et al. 1993). Artificial burrows would be constructed at a ratio of 2 to 1 for relocation. Siting of the artificial burrows would be coordinated with the Station Conservation Manager. Potential burrowing owl relocation is discussed further in Section 3.3, Biological Resources.

During the burrowing owl breeding season on NAVWPNSTA Seal Beach, no construction or other disturbance would occur within 150 feet (46 meters) of any active burrow (Haug et al. 1993). Relocation during the breeding season would not be permitted under any circumstances.

2.6.4 Cultural Resources

If potential subsurface archaeological deposits were detected during construction, a halt-work order would be issued and all work in the discovery area would cease until the Station Cultural Resources Manager or a designated qualified archaeologist could examine and determine the significance of the resource. The potential resource would be evaluated against the eligibility criteria for inclusion on the National Register of Historic Places (NRHP), and if found to be potentially eligible, a treatment plan detailing either preservation in-place or mitigation of impacts through data recovery would be developed and implemented by the Private Partner with approval by the Navy.

2.6.5 Storm Water and Erosion

2.6.5.1 Storm Water Pollution Prevention Plans and Spill Prevention Plans

Construction and Operation of a PV system(s) would require a National Pollutant Discharge Eliminations System (NPDES) New Construction General Permit for Storm Water Discharges Associated with Construction Activities. The General Permit application would require the Navy to provide the State Water Resources Control Board (SWRCB) with permit registration documents, including a Storm Water Pollution Prevention Plan (SWPPP) for review and approval. All construction activities with the potential to impact water quality due to runoff would be conducted in accordance with SWPPP requirements.

In addition to the SWPPP, the Private Partner would be required to prepare a Spill Response Plan. The Spill Response Plan would include station points of contact in the event of a large spill and an NAVWPNSTA Seal Beach Environmental Department point of contact in the event of a

small spill. The Spill Response Plan would also address the requirements to incorporate BMPs (e.g., placing drip pans under any diesel tanks, conducting training, and using appropriate personal protective equipment).

2.6.5.2 Erosion Control Plan

An Erosion Control Plan that includes standard erosion control BMPs to reduce potential impacts to water quality during construction would also be prepared. SWPPP BMPs may include, but would not be limited to, erosion, sediment, and storm water control measures such as sandbags, silt fences, earthen berms, fiber rolls, sediment traps, seed-free straw bales, erosion control fabric, etc. To minimize erosion potential during project construction, parking and driving would be restricted to designated areas, and no off-road vehicular traffic, including parking or driving in undisturbed areas, would be allowed.

Re-vegetation would be performed using native species in any areas that were cleared for construction. Vegetation efforts would be coordinated with and approved by the Station Conservation Manager. Top soil would be retained and re-used in revegetation of temporarily disturbed areas. No significant soils would be removed from the sites. Soils may be cut and moved around the vicinity of the sites for grading purposes.

2.6.6 Solid Waste and Hazardous Waste

2.6.6.1 Solid Waste Management

Should proposed construction of PV systems exceed a cost of $100,000 and generate greater than 1 ton of construction/demolition debris, the Private Partner would develop a Solid Waste Management Plan in accordance with Command Navy Region Southwest Instruction 11350.1B.

Remaining non-hazardous wastes and debris would be reused, recycled, or disposed of at the local Class III landfill.

2.6.6.2 Hazardous Waste Management

The Private Partner would submit a Hazardous Waste Management Section as part of the Environmental Protection Plan prior to commencement of construction activities. The management and disposal of hazardous waste would comply with all applicable federal, state and local regulations. The state of California recognizes that PV systems can create hazardous waste streams, and any broken or damaged units that cannot be recycled would be managed as hazardous waste. The Private Partner would be required to coordinate hazardous waste shipments with the NAVWPNSTA Seal Beach Environmental Office to ensure an Environmental Office representative is available to review waste profiles and sign manifests.

2.6.6.3 Health and Safety Plan

The Private Partner would submit a Health and Safety Plan for approval by the Navy prior to commencement of construction activities. The Health and Safety Plan for the project would address site-specific health and safety issues, including specific emergency response services and procedures and evacuation measures which will be compliant with the U.S. Army Corps of Engineers Safety and Health Requirements Manual EM-385-1-1. All project construction activities would be conducted in accordance with the approved Health and Safety Plan.

2.6.7 Visual Resources

Impact avoidance and minimization measures would be implemented to avoid and/or minimize color contrast that could result from implementation of the project. Visual contrast of vertical PV system elements within the landscape would be minimized by using the same or similar colors for surface coatings of the project area boundary fencing. The surface of the public-facing side of the project area fencing may include a fabric covering, or “scrim,” to conceal or obstruct PV system views.

2.6.8 Noise

Construction activities would only be conducted between the hours of 7:00 AM and 5:00 PM weekdays and Saturdays. Limited Sunday work would be permitted. No holiday or nighttime operation of construction equipment would be permitted. All applicable regulations would be followed during construction.

2.7 Alternatives Considered But Not Carried Forward for Detailed Analysis

NAVWPNSTA Seal Beach reviewed available locations on station to identify potential sites for construction of PV systems, including carport and roof-top mounted systems. Factors considered in site selection included locations where available acreage was sufficient to allow for a PV system that would produce renewable energy sufficient to offset the cost of system installation, and loss of acreage that could potentially be available to support mission requirements. Additionally, sites were considered based on their proximity to magazines and other explosives storage areas.

An additional site on the northern side of the station adjacent to the western boundary and Seal Beach Boulevard was considered as a potential location for installation of a PV system because it offered sufficient acreage of useable land. However, because the station foresees potential future changes to mission requirements, the site location would not meet the requirements set forth under NAVSEA OP 5 Volume 1 Ammunition and Explosives Safety Ashore Manual.

The NAVSEA OP 5 Volume 1 Ammunition and Explosives Safety Ashore Manual documents the explosives safety policies of the Navy. This manual specifies standardized safety regulations for all operations where ammunition and explosives are or are intended to be present to ensure mission objectives are fulfilled in a safe manner. These policies emphasize safe and efficient operating procedures while:

- Providing maximum possible protection to personnel and property from the damaging effects of potential accidents involving Navy ammunition and explosives
- Limiting exposure of a minimum number of persons, for a minimum time, to the minimum amount of ammunition and explosives consistent with safe and efficient operations

A site in the northwestern portion of NAVWPNSTA Seal Beach was also considered but eliminated from further analysis because a solar PV project there would potentially affect the station’s primary mission, which is the receipt, segregation, storage, and issuance of ordnance

to support Fleet operations. As such, it did not meet the purpose and need for the project or satisfy the reasonable alternative screening factors (Section 2.1, Reasonable Alternative Screening Factors).

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3.0 Affected Environment and Environmental Consequences

This chapter presents the affected environment in the project area and environmental consequences of implementing the proposed project, Construction and Operation of Solar PV Systems at NAVWPNSTA Seal Beach. Resources considered for this analysis include:

- Land Use and Coastal Resources
- Cultural Resources
- Biological Resources
- Noise
- Topography, Geology, and Soils
- Water Resources
- Air Quality and Climate Change
- Traffic and Circulation
- Utilities
- Public Health and Safety
- Visual Resources

Table 3.0-1 presents a summary of potential impacts identified for each alternative.

Summary of Potential Impacts and Impact Avoidance and Minimization Measures

Resource Area	Proposed Action/ Alternative 1	Alternative 2	Alternative 3	No Action Alternative
Land Use and Coastal Resources	No Significant Impacts	No Significant Impacts	No Significant Impacts	No Impacts
	Under the Proposed Action/Alternative 1, a long term (up to 37 years), but temporary change in land use from agricultural to renewable energy would occur. The Proposed Action/Alternative 1 would be compatible with adjacent land uses on the installation. No prime, unique, or farmland of statewide importance occur at NAVWPNSTA Seal Beach. Therefore, there would be no significant impacts to land use. The Proposed Action/Alternative 1 would be located in an area restricted from the public and would not change any existing public or recreation access to coastal areas. Due to the distance of the sites from the shoreline, the proposed project would not obstruct any views of the coast. There would be no significant impacts to coastal resources.	Potential impacts under Alternative 2 would be similar to those described for the Proposed Action/ Alternative 1; however, land affected would include only Site A (approximately 64 acres [26 hectares]). There would be no significant impacts to land use and coastal resources.	Potential impacts under Alternative 3 would be similar to those described for the Proposed Action/ Alternative 1; however, land affected would include only Site B (approximately 73 acres [29 hectares]). There would be no significant impacts to land use and coastal resources.	Under the No Action Alternative, there would be no change in existing conditions; therefore, no impacts would occur.
Cultural Resources	No Significant Impacts	No Significant Impacts	No Significant Impacts	No Impacts
	There are no cultural resources on or eligible for the National Register of Historic Places (NRHP) within the Area of Potential Effects (APE). There would be no significant impacts to cultural resources.	There are no cultural resources on or eligible for the NRHP within the APE under Alternative 2. There would be no significant impacts to cultural resources.	There are no cultural resources on or eligible for the NRHP within the APE under Alternative 3. There would be no significant impacts to cultural resources.	Under the No Action Alternative, there would be no change in existing conditions; therefore, no impacts to cultural resources would occur.
Biological Resources	No Significant Impacts	No Significant Impacts	No Significant Impacts	No Impacts
	Construction, Operations, and Eventual Decommissioning Impacts that could result from construction, operation, and eventual decommissioning of the Proposed Action/Alternative 1 include the following: • Construction equipment within the Proposed Action/Alternative 1 footprint or in off-site areas in the vicinity of Site A or Site B could provide temporary perching for raptors and other avian predators and increase predation on nearby or adjacent nesting birds. • Potential permanent indirect impacts associated with operations include additional perch locations for raptors and other avian predators on PV structures, thereby increasing predation on nearby and adjacent nesting birds. • Construction and/or demolition activities have the potential for temporary and indirect impacts to less mobile wildlife species. However, these effects would be limited in location and/or duration, and no significant adverse impacts to general wildlife species would occur. **Vegetation Communities and Land Types** Construction would result in the removal of approximately 138 acres (55.8 hectares) of a combination of active agricultural, unplanted land, and ruderal vegetation (weedy and commonly introduced plants growing where the vegetation cover has been interrupted by human activity) along the edges of the solar sites. These areas are ill-suited to serve as habitat for federally listed or state-listed	The potential impacts to biological resources under Alternative 2 would be similar to those described for the Proposed Action/ Alternative 1; however, Alternative 2 would only result in the removal of approximately 64 acres (26 hectares) of agricultural, unplanted land, and ruderal vegetation along the edges of the solar sites. No significant impacts to biological resources would occur. **Impact Avoidance and Minimization Measures** Impact avoidance and minimization measures would be the same as described for the Proposed	The potential impacts under Alternative 3 to biological resources would be similar to those described for the Proposed Action/ Alternative 1; however, Alternative 3 would only result in the removal of approximately 73 acres (29 hectares) of agricultural, unplanted land, and ruderal vegetation along the edges of the solar sites. No significant impacts to biological resources would occur. **Impact Avoidance and Minimization Measures** Impact avoidance and minimization measures would be the same as described for the Proposed	Under the No Action Alternative, there would be no change in existing conditions; therefore, no impacts would occur.

Summary of Potential Impacts and Impact Avoidance and Minimization Measures

Resource Area	Proposed Action/ Alternative 1	Alternative 2	Alternative 3	No Action Alternative
Biological Resources (Continued)	plant species, and no significant impacts to vegetation communities would occur. **Federally Listed Wildlife** There would be no adverse effects to federally listed species due to the absence of federally listed species and suitable habitat within the vicinity of the project footprint. No population-level adverse effects to birds or bats would occur as a result of mortalities related to "lake effect" of solar PV panels. Therefore, no significant impacts to federally listed wildlife would occur. **Special Status Wildlife Species** Potential impacts to special status wildlife species such as black-tailed jackrabbit, western burrowing owl, and ferruginous hawk, as well as migratory birds protected under the MBTA would occur. Potential temporary impacts associated with construction activities include clearing and grubbing, site grading, and trenching for electrical connections. Potential indirect impacts associated with operations include bird strikes on the solar PV arrays, potentially induced by the "lake effect." No population-level significant adverse impacts to birds would occur as a result of mortalities related to "lake effect." **Impact Avoidance and Minimization Measures** To reduce the risk of take of nesting birds protected under the MBTA, mowing, clearing, and grading of any vegetated areas would be conducted during the nonbreeding season (October through January). Should burrowing owls move into the Proposed Action/Alternative 1 area prior to construction, the owls would be relocated to other suitable habitat. Relocation during the breeding season would not be permitted under any circumstances. Any burrow within 164 feet (50 meters) of construction activities, during any time of the year, would have noise/disturbance barriers placed near burrows to minimize impacts to those owls. NAVWPNSTA Seal Beach would actively relocate burrowing owls under the direction of the Station Conservation Manager. To minimize potential impacts due to the "lake effect" phenomenon, the best available science and appropriate design specifications would be used during construction and operation of the Proposed Action/Alternative 1, and regular monitoring of site conditions, including bird mortality would be conducted. Possible design specifications include breaking up the reflection of solar panels (e.g., through panel spacing), or orienting panels in a non-vertical position.	Action/Alternative 1.	Action/Alternative 1.	

Summary of Potential Impacts and Impact Avoidance and Minimization Measures

Resource Area	Proposed Action/ Alternative 1	Alternative 2	Alternative 3	No Action Alternative
Noise	No Significant Impacts	No Significant Impacts	No Significant Impacts	No Impacts
	A temporary increase in noise levels during construction activities would be experienced by receptors at the closest residential areas (approximately 400 feet [122 meters] from the construction area), and by pedestrians walking near the station boundary. Construction-related noise levels are anticipated to increase by a level of 6 to 13 dBA. These temporary noise increases from construction activities would not be highly noticeable by sensitive noise receptors in the vicinity as the noise would be generally consistent with the developed nature of the area. There would be no increase in noise levels during operations. A temporary increase in noise during decommissioning activities is anticipated to be similar to that experienced during construction. Overall, no significant impacts from noise would occur. **Impact Avoidance and Minimization Measures** Although no significant impacts to noise have been identified, impact avoidance and minimization measures described in Section 2.6 would be incorporated as part of the project design. The Navy would limit construction activities to between the hours of 7:00 AM and 5:00 PM weekdays and Saturdays. Limited Sunday work would be permitted. No holiday or nighttime operation of construction equipment would be permitted. All applicable regulations would be followed during construction.	Under Alternative 2, construction activities and noise level increases would be similar to those discussed under the Proposed Action/ Alternative 1, although limited further to sensitive noise receptors near Site A. No significant impacts from noise would occur. **Impact Avoidance and Minimization Measures** Impact avoidance and minimization measures would be the same as described for the Proposed Action/Alternative 1.	Under Alternative 3, construction activities and noise level increases would be similar to those discussed under the Proposed Action/ Alternative 1, although limited further to sensitive noise receptors near Site B. No significant impacts from noise would occur. **Impact Avoidance and Minimization Measures** Impact avoidance and minimization measures would be the same as described for the Proposed Action/Alternative 1.	Under the No Action Alternative, there would be no change in existing conditions; therefore, no impacts to noise would occur.
Topography, Geology, and Soils	No Significant Impacts	No Significant Impacts	No Significant Impacts	No Impacts
	Topography and Geology There would be no significant impacts to topography or geology with implementation of the Proposed Action/Alternative 1. Construction and operations of the PV system would comply with all seismic design criteria and construction requirements. **Soils** During construction, site development would temporarily increase the potential for erosion-induced sedimentation of nearby receiving waters, including the Orange County Flood Control Channel. However, excavation and grading activities would not be excessive due to the relatively flat topography of the construction site and implementation of erosion control measures outlined in Section 2.6.5. Soils may be cut and moved around the vicinity of the sites to level the grading, but no significant soils would be removed from the sites. The decommissioning and restoration process would involve the removal of PV structures, restoration of topsoil, revegetation, and seeding. No significant impacts to soils would occur. **Impact Avoidance and Minimization Measures** Although no significant impacts to topography, geology, and soils have been identified, impact avoidance and minimization measures described in Section 2.6.5 would be incorporated as part of the project design. Erosion and sedimentation control best management practices (BMPs) would be employed during construction, operations, and decommissioning activities.	Under Alternative 2, potential impacts would be similar to those described for the Proposed Action/ Alternative 1, though at a smaller scale. No significant impacts to topography, geology and soils would occur. **Impact Avoidance and Minimization Measures** Impact avoidance and minimization measures would be the same as described for the Proposed Action/Alternative 1.	Under Alternative 3 potential impacts would be similar to those described for the Proposed Action/ Alternative 1, though at a smaller scale. No significant impacts to topography, geology and soils would occur. **Impact Avoidance and Minimization Measures** Impact avoidance and minimization measures would be the same as described for the Proposed Action/Alternative 1.	Under the No Action Alternative, there would be no change in existing conditions; therefore, no impacts to topography, geology, and soils would occur.

Summary of Potential Impacts and Impact Avoidance and Minimization Measures

Resource Area	Proposed Action/ Alternative 1	Alternative 2	Alternative 3	No Action Alternative
Water Resources	No Significant Impacts	No Significant Impacts	No Significant Impacts	No Impacts
	Hydrology Surface disturbance (e.g., grading, localized excavation) would occur during construction and trenching for underground electrical conduits. During construction, storm water runoff from the project sites could result in a slight increase in turbidity; however, this would not degrade the local water quality or adversely affect current uses of local surface waters. **Floodplains** Project structures would not increase the potential for flooding in local surface water bodies, restrict or redirect runoff flows, or cause localized flooding at Sites A or B, and no significant impacts to floodplains would occur. **Groundwater** Construction and maintenance would not require the use of NAVWPNSTA Seal Beach-supplied groundwater. No impacts to groundwater would occur. **Impact Avoidance and Minimization Measures** Although no significant impacts to water resources have been identified, impact avoidance and minimization measures described in Section 2.6.5 would be incorporated as part of the project design.	Under Alternative 2 potential impacts would be similar to those described for the Proposed Action/ Alternative 1, though at a smaller scale. No significant impacts to surface hydrology would occur. **Impact Avoidance and Minimization Measures** Impact avoidance and minimization measures would be the same as described for the Proposed Action/Alternative 1.	Under Alternative 3 potential impacts would be similar to those described for the Proposed Action/ Alternative 1, though at a smaller scale. No significant impacts to surface hydrology would occur. **Impact Avoidance and Minimization Measures** Impact avoidance and minimization measures would be the same as described for the Proposed Action/Alternative 1.	Under the No Action Alternative, there would be no change in existing conditions; therefore, no impacts to water resources would occur.
Air Quality/ Climate Change	No Significant Impacts	No Significant Impacts	No Significant Impacts	No Impacts
	Implementation of the Proposed Action/Alternative 1 would result in localized, short-term effects on air quality at NAVWPNSTA Seal Beach. During operation, emissions of nitrogen oxide (NO_X), sulfur dioxide (SO_2), and carbon dioxide equivalent (CO_2e) would be avoided by reduced consumption of grid-supplied electricity, and would more than offset the short-term construction emissions within the first year of operation. Subsequent years of operation would also avoid emissions produced from conventional non-renewable generating sources. As total construction emissions would be below the *de minimis* thresholds and operation emissions would result in beneficial effects to air quality, no significant adverse impacts to air quality would occur under the Proposed Action/ Alternative 1. **Impact Avoidance and Minimization Measures** Although no significant impacts to air quality/climate change have been identified, impact avoidance and minimization measures described in Section 2.6.2 would be incorporated as part of the project design.	Under Alternative 2, potential impacts would be similar to those described for the Proposed Action/ Alternative 1, though at a smaller scale. No significant adverse impacts to air quality would occur. **Impact Avoidance and Minimization Measures** Impact avoidance and minimization measures would be the same as described for the Proposed Action/Alternative 1, except that the PV system would be constructed, operated, and maintained at Site A only.	Under Alternative 3, potential impacts would be similar to those described for the Proposed Action/ Alternative 1, though at a smaller scale. No significant adverse impacts to air quality would occur. **Impact Avoidance and Minimization Measures** Impact avoidance and minimization measures would be the same as described for the Proposed Action/Alternative 1, except that the PV system would be constructed, operated, and maintained at Site B only.	Under the No Action Alternative, there would be no change in existing conditions; therefore, no impacts to air quality/climate change would occur.

Summary of Potential Impacts and Impact Avoidance and Minimization Measures

Resource Area	Proposed Action/ Alternative 1	Alternative 2	Alternative 3	No Action Alternative
Traffic and Circulation	No Significant Impacts	No Significant Impacts	No Significant Impacts	No Impacts
	There would be a temporary increase in traffic associated with construction and decommissioning (64 daily vehicle trips). Trips associated with these activities include the delivery of construction materials and equipment, and the removal of construction debris. There would be a negligible increase in traffic associated with operations, maintenance, and decommissioning. These trips would be periodic and would not regularly contribute to local or regional traffic. No significant adverse impacts to traffic and circulation would occur.	Under Alternative 2, potential impacts would be similar to those described for the Proposed Action/ Alternative 1, except that the PV system would be constructed, operated, and maintained at Site A only. Therefore, traffic generated during construction and decommissioning activities would be slightly less. No significant adverse impacts to traffic and circulation would occur.	Under Alternative 3, potential impacts would be similar to those described for Proposed Action/ Alternative 1, except that the PV system would be constructed, operated, and maintained at Site B only. Therefore, traffic generated during construction and decommissioning activities would be slightly less. No significant adverse impacts to traffic and circulation would occur.	Under the No Action Alternative, there would be no change in existing conditions; therefore, no impacts to traffic and circulation would occur.
Utilities	No Significant Impacts	No Significant Impacts	No Significant Impacts	No Significant Impacts
	Storm Water Conveyance The additional impervious area would be negligible. There would be no change in existing grades, runoff characteristics, patterns or flow rates. The pre-project runoff amounts would be the same for post-project conditions. There would be no significant adverse impacts to storm water. **Energy** Ground-mounted solar PV panels and associated electrical equipment (e.g., electrical feed meters, switchgear, inverters, circuit breakers, and transformers) would connect to the existing electrical grid. The Navy would enter into an agreement with a Private Partner, allowing it to construct, operate, maintain, own, and decommission a PV system(s) at the installation for a determined lease period. During construction, all equipment requiring sources of electricity would be operated using gas- or diesel-powered generators provided by construction contractors. No significant adverse impacts related to disruption of the existing electrical services would occur with implementation of the Proposed Action/Alternative 1. Existing power lines on Site A would be removed and new electrical cable would be installed on either existing overhead utility poles, or trenched below ground surface. Direct energy requirements under the Proposed Action/Alternative 1 would be limited to those necessary to operate vehicles and equipment. There would be an overall beneficial impact of generating an estimated 25 MW of renewable energy. Thus, implementation of the Proposed Action/Alternative 1 would provide an indirect, long-term, beneficial impact to electricity delivery at NAVWPNSTA Seal Beach. Decommissioning activities would involve removal of structures, restoration of topsoil, revegetation, and seeding. The site would be returned to pre-project conditions and there would not be an increase in utility demand; therefore, there would be no significant impacts from decommissioning.	Potential impacts would be similar to those described for the Proposed Action/ Alternative 1, though at a smaller scale. There would be no significant adverse impacts to utilities.	Potential impacts would be similar to those described for the Proposed Action/ Alternative 1, though at a smaller scale. There would be no significant adverse impacts to utilities.	Under the No Action Alternative, there would be no change in existing conditions; therefore, no impacts would occur.

Summary of Potential Impacts and Impact Avoidance and Minimization Measures

Resource Area	Proposed Action/ Alternative 1	Alternative 2	Alternative 3	No Action Alternative
Public Health and Safety	No Significant Impacts	No Significant Impacts	No Significant Impacts	No Impacts
	Public Services There could be some increase in need for public services during construction but it would be minimal and temporary. **Hazardous and Toxic Materials and Waste** The Proposed Action/Alternative 1 does not include demolition activities that would cause on-station workers to encounter lead-based paint and asbestos. No new sources of hazardous electromagnetic radiation would be introduced through construction, maintenance or decommissioning phases of the project. Due to the very low levels of electromagnetic radiation expected, and the physical separation of Sites A and B from ordnance areas, the Proposed Action/Alternative 1 would not create any additional HERO hazards. Decommissioning would involve the removal of structures, restoration of topsoil, revegetation, and seeding. Because the site would be returned to previous conditions (agricultural use) and decommissioning would include the removal and disposal of PV system infrastructure in accordance with pertinent laws and regulations, there would be no significant impacts from decommissioning at the close of the 37-year period. There would be no significant impact to public health and safety with implementation of the Proposed Action/Alternative 1. **Impact Avoidance and Minimization Measures** The Private Partner would submit a Hazardous Waste Management Section as part of the Environmental Protection Plan prior to commencement of construction activities. The management and disposal of hazardous waste would comply with all applicable federal, state and local regulations. The Private Party would be required to coordinate hazardous waste shipments with the Environmental Office to ensure an Environmental Office representative is available to review waste profiles and sign manifests.	Potential impacts to public health and safety from implementation of Alternative 2 would be the same as for the Proposed Action/Alternative 1. There would be no significant adverse impacts to public services. **Impact Avoidance and Minimization Measures** Impact avoidance and minimization measures would be the same as described for the Proposed Action/Alternative 1.	Potential impacts to public health and safety from implementation of Alternative 3 would be the same as for the Proposed Action/Alternative 1. There would be no significant adverse impacts to public services. **Impact Avoidance and Minimization Measures** Impact avoidance and minimization measures would be the same as described for the Proposed Action/Alternative 1.	Under the No Action Alternative, there would be no change in existing conditions; therefore, no impacts would occur.
Visual Quality	No Significant Impacts	No Significant Impacts	No Significant Impacts	No Impacts
	Construction Impacts The visual landscape would be temporarily affected by construction of the proposed solar facilities and ancillary features, including graded maintenance roads, perimeter fencing, and freestanding electrical equipment including the electrical current inverters and grid connection switchgear. Given the inherent visual aspects of construction activities, temporary viewshed disturbances would result from the staging, stockpiling, and placement of PV panels and inverter stations; construction-related traffic and equipment; temporary debris storage; and standard ground-clearing operations for construction. However, these temporary impacts would not be significant. **Operational Impacts** Visual changes would be more apparent to viewers in the vicinity of Site B due to a higher number of viewers and direct foreground viewing opportunities. As such,	Impacts to visual resources with implementation of Alternative 2 would be similar to those discussed under the Proposed Action/Alternative 1 but would be limited to temporary, construction-related viewshed disturbances at Site A only. Direct impacts to viewers and existing resources would be low, as contrast	Impacts to visual resources with implementation of Alternative 3 would be similar to those discussed under the Proposed Action/Alternative 1 but would be limited to temporary, construction-related viewshed disturbances at Site B only. Direct impacts to viewers and existing resources would be moderate, as	Under the No Action Alternative, there would be no change to baseline visual quality. Therefore, no impacts would occur.

Summary of Potential Impacts and Impact Avoidance and Minimization Measures

Resource Area	Proposed Action/ Alternative 1	Alternative 2	Alternative 3	No Action Alternative
Visual Quality (Continued)	the resulting level of impact would be low to moderate at Sites A and B. Ultimately, implementation of the Proposed Action/Alternative 1 would not substantially alter existing visual character and visual impacts would be less than significant. Indirect viewshed impacts would result from disturbance by occasional maintenance operations and as-needed equipment replacement associated with the Proposed Action/Alternative 1. **Decommissioning Impacts** Impacts to visual resources during decommissioning would be temporary and not significant, and would be similar in nature to construction impacts. No visual impacts would remain following decommissioning. **Impact Avoidance and Minimization Measures** Although no significant impacts to visual quality would occur, impact avoidance and minimization measures described in Section 2.6.7 would be incorporated into the project design. Those measures include the installation of fencing around the proposed project area. The fencing could incorporate fabric screening ("scrim") on the public-facing side to obstruct, or further obstruct, views of the proposed project area.	would be weak in this location, and viewer sensitivity would be low to moderate due to limited existing site visibility. Alternative 2 would not substantially alter existing visual character and resulting visual impacts would be less than significant. **Impact Avoidance and Minimization Measures** Impact avoidance and minimization measures would be the same as described for the Proposed Action/Alternative 1.	contrast would be weak in this location; however, viewer sensitivity would be moderate due to the daily number of viewers and frequency of direct foreground-middleground views of the project site. Alternative 3 would not substantially alter existing visual character and resulting visual impacts would be less than significant. **Impact Avoidance and Minimization Measures** Impact avoidance and minimization measures would be the same as described for the Proposed Action/Alternative 1.	

Key: APE = area of potential effects; BMP = Best Management Practice; CO_2e = carbon dioxide equivalent; dBA = decibel A-weighted; MBTA = Migratory Bird Treaty Act; NOx = nitrogen oxide, NRHP = National Register of Historic Places; NAVWPNSTA = Naval Weapons Station; PV = photovoltaic; SO_2 = sulfur dioxide

3.1 Land Use and Coastal Resources

Definition of Resource

For the purposes of this analysis, land uses are characterized by the types of uses within a particular area, including urban, agricultural, residential, military, scenic, natural, or recreational. Land management plans include those documents prepared by agencies, including the Navy, to establish appropriate goals for future use and development. As part of this process, sensitive land use areas are often identified by agencies as being worthy of more rigorous or protective management.

Coastal resources describe the coastal waters of the state, their natural resources, related marine and wildlife habitat and adjacent shore lands, both developed and undeveloped, that together form an integrated terrestrial and estuarine ecosystem.

Regulatory Setting

The following laws regulate land use at NAVWPNSTA Seal Beach and in the surrounding communities.

Coastal Zone Management Act (CZMA)

This project has the potential to affect resources protected by the CZMA. The CZMA is the primary federal law enacted to preserve and protect coastal resources. The CZMA sets up a program under which coastal states are encouraged to develop coastal management programs.

California has developed a Coastal Zone Management Plan and has enacted its own law, the California Coastal Act of 1976, to protect the coastline. The policies established by the California Coastal Act are similar to those for the CZMA. They include the protection and expansion of public access and recreation; the protection, enhancement, and restoration of environmentally sensitive areas; the protection of agricultural lands; the protection of scenic beauty; and the protection of property and life from coastal hazards. The California Coastal Commission is responsible for implementation and oversight under the California Coastal Act.

The CZMA gives the California Coastal Commission regulatory authority over all federal activities, permits, licenses, and funding approvals for projects that affect coastal resources. This “federal consistency review” authority is a way other state agencies and local coastal communities can address their concerns about adverse effects of federal activities.

Farmland Protection Policy Act

The Farmland Protection Policy Act requires federal agencies to coordinate with the Natural Resources Conservation Service if their activities may irreversibly convert farmland (directly or indirectly) to nonagricultural use, but does not require federal agencies to alter projects to avoid or minimize farmland conversion. For purposes of the Farmland Protection Policy Act, farmland includes prime farmland, unique farmland, and land of statewide or local importance.

Management Plans

The following plans serve as the primary management tools to coordinate the protection of natural resources and Navy mission requirements on Navy-owned land.

Integrated Natural Resources Management Plan (INRMP)
The NAVWPNSTA Seal Beach INRMP (Navy 2014), a planning document required by the Sikes Act, is the station's primary tool for providing a viable framework for future management of natural resources on lands it owns or controls. The INRMP provides land use categories and descriptions of NAVWPNSTA lands.

NAVWPNSTA Seal Beach Complex Master Plan Update
The NAVWPNSTA Seal Beach Master Plan Update (Navy 1989) is the primary tool through which a Navy activity and facilities, including siting, design, purpose, and functional relationship to other facilities on station and in the local area are coordinated to meet the requirements of NAVWPNSTA Seal Beach's mission.

3.1.1 Affected Environment for Land Use and Coastal Resources

3.1.1.1 Land Use

NAVWPNSTA Seal Beach encompasses a 5,256-acre (2,127-hectare) area in Seal Beach, California (Navy 2009). The primary functions, and consequently the primary land uses, of NAVWPNSTA Seal Beach are the receipt, segregation, storage, and issuance of ordnance. Land uses at NAVWPNSTA Seal Beach are identified as Ordnance Storage, National Wildlife Refuge, Waterfront, Personnel Support, Industrial, and Administration and Training (Navy 2009). The NAVWPNSTA Seal Beach INRMP (Navy 2014) categorizes these land uses using 11 area types, including:

- Administration
- Housing/Community Support
- Low Intensity Use/Open Area
- Maintenance/Production
- Mixed Use (Housing and Community Support, Administration, Medical)
- Mixed Use (Research, Testing, and Evaluation area)
- National Wildlife Refuge
- Operations
- Ordnance Storage
- Supply
- Test Facilities

Sites A and B, which are used for agricultural production, are included under Low Intensity Use/ Open Area in the NAVWPNSTA Seal Beach INRMP (Navy 2014). As of April 2015, 2,742 acres (1,110 hectares) of NAVWPNSTA are set aside for agricultural production. This represents approximately 52 percent of the overall land area of NAVWPNSTA Seal Beach.

As described in Chapter 2, the proposed project sites being considered for construction, operation, and maintenance of PV systems have been designated as Site A and Site B. Site A is a topographically flat, approximately 64-acre (26-hectare) parcel currently used for agricultural purposes. It is located adjacent to Bolsa Chica Street and Edinger Avenue, which are off station, and directly adjacent to Perimeter Road. Perimeter Road is located directly next to the station's

security fence (see Figure 2-1). Site A is regularly planted and harvested and is considered disturbed. It is bounded by the Orange County Flood Control Channel on two sides, which is adjacent to Bolsa Chica Street and Edinger Avenue. The flood control channel is fenced, approximately 100 feet wide (30 meters), and has a fabricated rocky slope and bank.

Site B is a topographically flat, approximately 73-acre (29-hectare) parcel of land currently used for agricultural purposes. Approximately half of the site is regularly planted and harvested and the other half was historically farmed, but is currently in a maintenance/mow status. Hence, the site is considered disturbed. It is bounded by the Orange County Flood Channel, which is adjacent to Bolsa Chica Road, to the east and Westminster Avenue to the South (see Figure 2-2).

Although Sites A and B are currently set aside for agricultural use, no Prime Farmland, Unique Farmland, or Farmland of Statewide Importance exist within the boundaries of NAVWPNSTA Seal Beach. Sites A and B would be converted to non-agricultural use by construction or operation of a solar PV system. According to the California Department of Conservation, Division of Land Resource Protection, and the Farmland Mapping and Monitoring Program, the land that comprises Sites A and B is designated as grazing land, which is land on which the existing vegetation is suited to the grazing of livestock. This classification defines land type and suitability rather than use. No grazing occurs on NAVWPNSTA Seal Beach.

3.1.1.2 Coastal Resources

NAVWPNSTA Seal Beach is located adjacent to Anaheim Bay and associated marshlands (see Figure 3.1-1). The inner harbor of Anaheim Bay has docking facilities for Navy vessels. With the exception of the SBNWR in the southwest portion of the station, much of NAVWPNSTA Seal Beach has been developed to support station operations (storage and handling of ordnance [munitions]). There is no coastal farmland in the area. Orange County is in the top 10 urbanized environments in southern California.

The SBNWR encompasses 911 acres (368.7 hectares) of remnant saltwater marsh in the Anaheim Bay estuary and serves as a significant stopover and wintering area along the Pacific Flyway for shorebirds. As urban sprawl and population growth result in the loss and degradation of wildlife habitats, the refuge serves as a vital resource to dwindling populations of native plants and animals and provides essential habitat for three endangered species. See Section 3.3 for a discussion of Biological Resources on NAVWPNSTA Seal Beach.

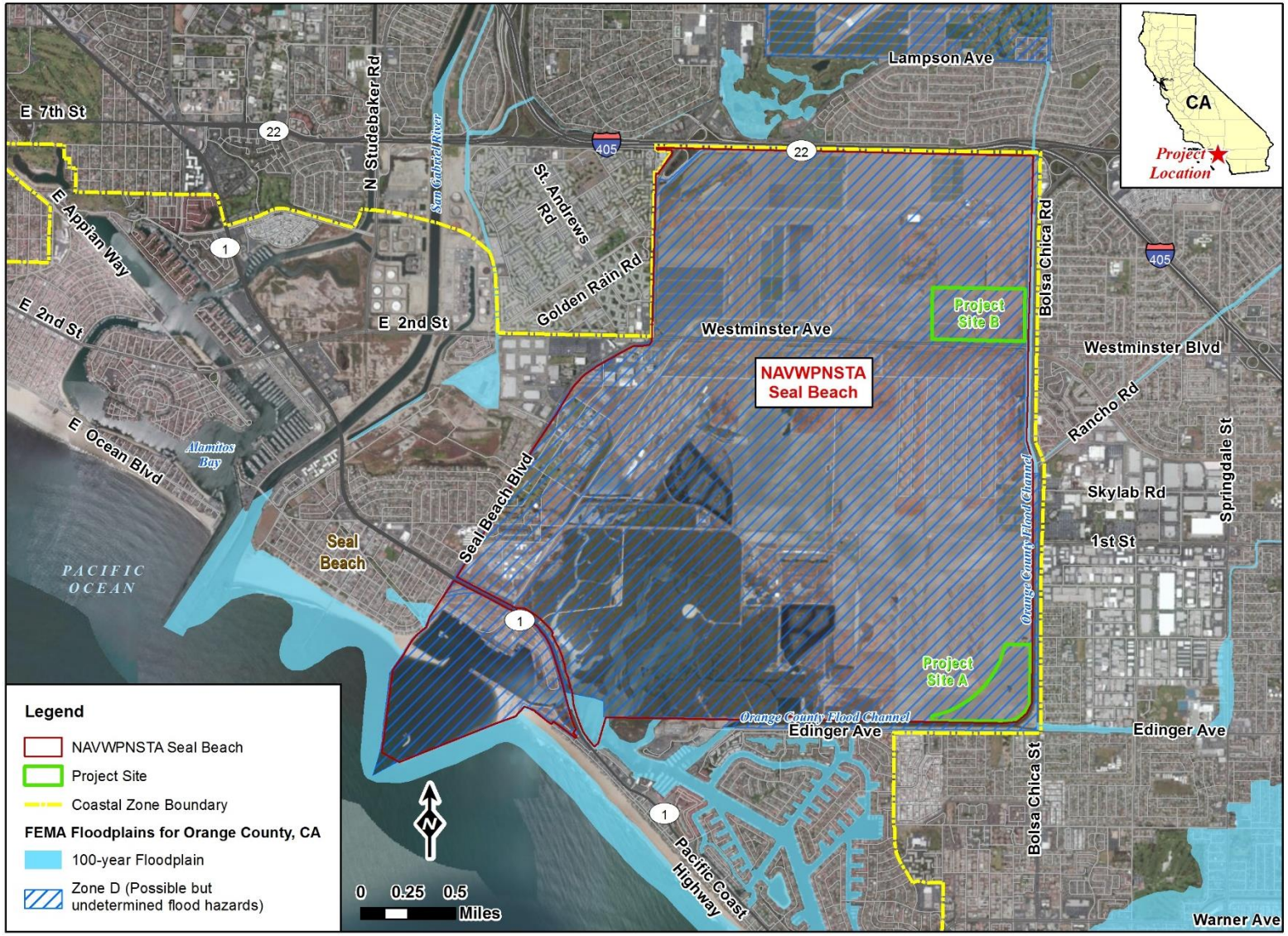

Figure 3.1-1. Coastal Zone Boundary and 100-Year Floodplain

Because the refuge is located within an active military weapons station, where the military mission is the storage and handling of ordnance (munitions), public access is very limited. The SBNWR is closed to the public except during once monthly guided tours (excluding December), special events, and planned once monthly volunteer workdays. Access for monthly escorted visits to the SBNWR, including guided tours, special events and volunteer opportunities, is through the NAVWPNSTA Main Gate.

Site A is located on the eastern boundary of the station approximately 1.5 miles (2.4 kilometers) from the Pacific Ocean shoreline and approximately 3,000 feet (914 meters) east of the closest point of the SBNWR. Site B, also located on the eastern boundary of the station, is approximately 3 miles (4.8 kilometers) from the Pacific Ocean shoreline and approximately 7,500 feet (2,286 meters) northwest of the closest point of the SBNWR. There are no coastal resources within or immediately adjacent to either site, and there is currently no public access to any coastal areas. Section 3.3, Biological Resources, provides a detailed discussion of the species known to occur on NAVWPNSTA Seal Beach.

3.1.2 Environmental Consequences to Land Use and Coastal Resources

3.1.2.1 Proposed Action/Alternative 1

Land Use

Under the Proposed Action/Alternative 1, ground-mounted solar PV systems would be constructed and operated at Sites A and B on land totaling approximately 138 acres (55.8 hectares) at NAVWPNSTA Seal Beach. The solar PV panel arrays and associated facilities would be located on land historically used for agricultural production. A long-term but temporary land use change (up to 37 years) would occur for these parcels from current and historic agricultural use to renewable energy development. After decommissioning at the close of the lease period, the land would be restored to existing conditions.

Agricultural leases at NAVWPNSTA Seal Beach serve two purposes. They serve as safety buffers to support mission requirements and as productive use of those buffers (agricultural production). A long-term shift in land use from agricultural to renewable energy production would occur, but the shift would constitute one productive secondary use for another. The acreage that would be discontinued for agricultural use when compared to all out leased agriculture property on the installation is approximately 138 acres of 2,743 acres (55.8 hectares of 1,012 hectares) or 5.5 percent of the total which would be a minor loss. The long-term shift in land use would be consistent with the NAVWPNSTA Seal Beach Master Plan Update (Navy 1989) and the INRMP (Navy 2014).

As stated in Section 3.1.1.1, no Prime Farmland, Unique Farmland, or Farmland of Statewide Importance exists on NAVWPNSTA Seal Beach; therefore, no land currently designated as Prime or Unique Farmland or Farmland of Statewide Importance would be converted to non-agricultural use by construction or operation of the solar PV system(s). Further, the land would remain under Navy use, and development of the site for renewable energy generation would be compatible with the adjacent uses on the installation (Industrial, Ordnance).

Implementation of the Proposed Action/Alternative 1 at NAVWPNSTA Seal Beach would not result in significant adverse impacts to land use.

Coastal Resources

The Proposed Action/Alternative 1 would be located in an area restricted from the public and would not change any existing public or recreation access to coastal areas. Due to the distance of the sites from the shoreline, the Proposed Action/Alternative 1 would not obstruct any views of the coast. Implementation of the Proposed Action/Alternative 1 at NAVWPNSTA Seal Beach would not result in significant adverse impacts to coastal resources.

3.1.2.2 Alternative 2

Land Use

Under Alternative 2, a ground-mounted solar PV system would be constructed and operated only on Site A, a topographically flat, approximately 64-acre (26-hectare) parcel of land. Impacts with the implementation of Alternative 2 would be the same as for the Proposed Action/ Alternative 1 except the land area affected would be less. Implementation of Alternative 2 would not result in significant adverse impacts to land use.

Coastal Resources

Potential impacts would be similar to those described for the Proposed Action/Alternative 1, except that the PV system would only be constructed, operated, and maintained at Site A. Implementation of Alternative 2 would not result in significant adverse impacts to coastal resources.

3.1.2.3 Alternative 3

Land Use

Under Alternative 3, a ground-mounted solar PV system would be constructed and operated only on Site B, a topographically flat, approximately 73-acre (29-hectare) parcel of land. Impacts with the implementation of Alternative 3 would be the same as for the Proposed Action/ Alternative 1. Implementation of Alternative 3 would not result in significant adverse impacts to land use.

Coastal Resources

Potential impacts would be similar to those described for the Proposed Action/Alternative 1, except that the PV system would only be constructed, operated, and maintained at Site B. Implementation of Alternative 3 would not result in significant adverse impacts to coastal resources.

3.1.2.4 No Action Alternative

Under the No Action Alternative, a PV system would not be constructed, operated, or maintained at NAVWPNSTA Seal Beach. Land uses for Sites A and B would continue under current operations. Implementation of the No Action Alternative would not result in significant adverse impacts to land use or coastal resources.

3.2 Cultural Resources

Definition of Resource

Cultural resources consist of 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 the three major categories summarized below.

- 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.

Regulatory Setting

Cultural resources are addressed under the National Historic Preservation Act (NHPA), as amended (16 U.S.C. §§ 470-470x-6), the Archaeological Resources Protection Act of 1979 (16 U.S.C. §§ 470aa-470mm), and subject to protection under the Native American Graves Protection and Repatriation Act (25 U.S.C. §§ 3001-3013) and the American Indian Religious Freedom Act (42 U.S.C. §§ 1996 and 1996a). Compliance with Section 106 of the NHPA requires that federal agencies take into account the effects of their undertakings on historic properties and provides the opportunity to the Advisory Council on Historic Preservation to comment on those impacts. Requirements are outlined in the Advisory Council on Historic Preservation's regulations, "Protection of Historic Properties" (36 CFR Part 800).

Cultural Setting

The earliest evidence for the occupation of coastal southern California dates to about 13,000 years before present (B.P.) on the Channel Islands and about 10,000 B.P. on the mainland (Erlandson et al. 2007). Although these earliest inhabitants were initially described as highly mobile foragers focused on the hunting of terrestrial game (Wallace 1955; Warren 1968), evidence of the intensive and systematic use of shellfish and other marine resources is more consistent with a generalized marine adaptation at this time. Archaeological components in the region increased dramatically in number after about 8000 B.P., with significant concentrations along the margins of resource-rich coastal bays and estuaries. By around 6000 B.P. there appears to have been expansion of habitation into areas that had previously seen only limited occupation, such as Landing Hill at the western margin of NAVWPNSTA Seal Beach (Cleland et al. 2007). A number of settlement shifts are indicated after about 4000 B.P., as some locations fell into disuse and others were occupied more intensively (Cleland et al. 2007; Koerper et al. 2002; Mason and Peterson 1994). By the Late Prehistoric period (after about 1350 B.P.) settlement in this region seems to have focused on a series of permanent villages surrounded by satellite camps focused on specific resource patches (Cleland et al. 2007). At

historic contact, the area was occupied by the Gabrielino (also known as the Tongva), whose territory included the Los Angeles Basin as well as San Clemente, Santa Catalina, and San Nicolas Islands.

By 1774, most of the Gabrielino-Tongva had been removed to the Spanish missions, primarily Mission San Gabriel. This area later became part of the Rancho Los Alamitos land grant and during the early 19th century was used primarily as rangeland for cattle. With increasing commerce during the late 19th century, agriculture became increasingly important and much of what is now NAVWPNSTA Seal Beach was used as farmland. In 1915, the City of Seal Beach was incorporated, initially focusing on tourism and later on oil development. The Navy Ammunition and Net Depot was established in 1944 as an ammunition storage facility, becoming NAVWPNSTA Seal Beach in 1962.

3.2.1 Affected Environment for Cultural Resources

The Navy has conducted an inventory of cultural resources within Sites A and B to identify historical properties that are listed or potentially eligible for listing in the NRHP (Cooley and York 2015). The inventory included archival research to identify all known cultural resources within the project area as well as an intensive pedestrian survey that included the entire footprints of Sites A and B. The archival research consisted of a records search conducted by the South Central Coastal Information Center of the California Historical Resources Inventory, housed at California State University, Fullerton, and identified all previously recorded archaeological and historic architectural resources within 1 mile (1.6 kilometers) of Sites A and B. The pedestrian survey was conducted by a team of archaeologists walking parallel transects spaced no more than 33 feet (10 meters) apart.

3.2.1.1 Archaeological Resources

Archaeological resources identified during the inventory included one historic period archaeological site (temporary designation SB-S-H-001) and an isolated prehistoric artifact (SB-I-P-002). Archaeological site SB-S-H-001 is in the eastern portion of Site A and consists of a scatter of several types of historic artifacts, including glass bottle or jar fragments, dishware fragments, terracotta orange ceramic fragments, and pieces of domestic animal bone. Based on temporal indicators such as bottle finishes and glass types, it appears that these materials date to the first half of the 20th century. This site has been recommended as ineligible for the NRHP (Cooley and York 2015). The isolated artifact, also found on Site A, is a metavolcanic flake. As an isolated artifact, it also has been recommended ineligible for the NRHP (Cooley and York 2015).

3.2.1.2 Architectural Resources

Three historic structures are located within Project Site B. Two of these (Buildings 878 and 879) represent a small weapons complex that is a component of historic resource P-30-176863, which includes five additional buildings at various locations on NAVWPNSTA Seal Beach (Crawford 1992a). Building 878 is a corrugated metal Butler-style warehouse, while Building 879 is a weapons shop. Both buildings were built in 1966 and have been determined ineligible for the NRHP (JRP 1999). The third structure is a component of historic resource P-30-176491,

which includes 13 small utility structures at various locations (Crawford 1992b). It is a small electrical utility structure located about 30 feet (10 meters) south of Building 879 within Project Site B that has been determined ineligible for the NRHP (JRP 1999). Demolition of Buildings 878 and 879 are currently under consideration by the Navy.

3.2.1.3 Traditional Cultural Resources

The Navy consults with federally recognized Indian Tribes on actions with the potential to impact Indian lands, protected tribal resources or rights under treaties, and issues of concern to Tribal Governments on Navy lands. Although Sites A and B are not within the traditional territory of any federally recognized tribe, NAVWPNSTA Seal Beach does consult with Gabrielino/Tongva tribal entities regarding the potential effects of specific undertakings on traditional properties. For the proposed project, NAVWPNSTA Seal Beach is currently consulting with three Gabrielino/Tongva tribes that have expressed interest regarding lands within the station: the Gabrielino/Tongva Nation, the Gabrielino Tongva Indians of California, and the Gabrielino/Tongva Band of Mission Indians of San Gabriel.

3.2.2 Environmental Consequences to Cultural Resources

NEPA analyses focus on properties that are listed in, eligible for listing in, or potentially eligible for inclusion in the NRHP.

The project area for cultural resources is the geographic area or areas within which an undertaking (project, activity, program or practice) may cause changes in the character or use of any historic properties present. The area of potential effect (APE) is influenced by the scale and nature of the undertaking and may be different for various kinds of effects caused by the undertaking.

3.2.2.1 Proposed Action/Alternative 1

The APE for this alternative includes both Sites A and B. Site A, measuring approximately 64 acres (26 hectares), is located at the southeast corner of the station, immediately north of the south perimeter road and west of Bolsa Chica Street; Site B (approximately 73 acres [29 hectares]) is located immediately west of Bolsa Chica Road and north of Westminster Avenue. An intensive pedestrian survey was conducted for Sites A and B and one isolated artifact was found at Site A, a metavolcanic flake that has been recommended as ineligible for the NRHP. With implementation of the Proposed Action/Alternative 1, land disturbance would occur throughout Sites A and B. Although it is highly unlikely that an artifact would be encountered, if identification occurs, a halt-work order for that area would be issued immediately and the Station Cultural Resources Manager or a designated qualified cultural resources specialist would examine the site to determine the existence of other resources and evaluate site conditions. Because none of the cultural resources within the undertaking's APE are eligible for the NRHP, implementation of the Proposed Action/Alternative 1 would not result in significant adverse impacts to cultural resources.

The decommissioning and restoration process would involve the removal of structures, restoration of topsoil, revegetation, and seeding. Temporary erosion and sedimentation control BMPs would be used during the decommissioning phase of the project. Because none of the

cultural resources within the undertaking's APE are eligible for the NRHP, decommissioning at the close of the 37-year period would not result in significant adverse impacts.

3.2.2.2 Alternative 2

The APE for this alternative includes Site A only. Like the Proposed Action/Alternative 1, it is highly unlikely that an artifact would be encountered during land disturbing activities. However, if an artifact is identified, a halt-work order for that area would be issued immediately and the Station Cultural Resources Manager or a designated qualified cultural resources specialist would examine the site to determine the existence of other resources and evaluate site conditions. Because none of the cultural resources within the undertaking's APE is eligible for the NRHP, implementation of Alternative 2 would not result in significant adverse impacts to cultural resources.

The decommissioning and restoration process would be the same as for the Proposed Action/ Alternative 1. Because none of the cultural resources within the undertaking's APE are eligible for the NRHP, decommissioning at the close of the 37-year period would not result in significant adverse impacts.

3.2.2.3 Alternative 3

The APE for this alternative includes Site B only. No cultural resources were identified at Site B either during the pedestrian survey or the records search. Like the Proposed Action/ Alternative 1, it is highly unlikely that an artifact would be encountered during land disturbing activities. However, if an artifact is identified, a halt-work order for that area would be issued immediately and the Station Cultural Resources Manager or a designated qualified cultural resources specialist would examine the site to determine the existence of other resources and evaluate site conditions. Because none of the cultural resources within the undertaking's APE is eligible for the NRHP, implementation of Alternative 3 would not result in significant adverse impacts to cultural resources.

The decommissioning and restoration process would be the same as for the Proposed Action/ Alternative 1. Because none of the cultural resources within the undertaking's APE are eligible for the NRHP, decommissioning at the close of the 37-year period would not result in significant adverse impacts.

3.2.2.4 No Action Alternative

Under the No Action Alternative, the proposed project would not occur and there would be no change to cultural resources. Implementation of the No Action Alternative would not result in significant adverse impacts to cultural resources.

3.3 Biological Resources

Definition of Resource

This section describes the plant and wildlife species that occur or have the potential to occur within or adjacent to Sites A and B. Throughout this section, and for project-specific impact analyses in Section 3.3.2, discussions of relevant resources are organized as follows: (1) vegetation communities and other land types, (2) federally listed plants, (3) federally listed wildlife, (4) critical habitat, (5) other special-status rare plants, (6) other special-status wildlife, and (7) wildlife corridors.

Regulatory Setting

Federal regulations applicable to this project include:

- The Federal Endangered Species Act (ESA) of 1973 (16 U.S.C. §§ 1531 et seq.) – This is the primary federal law protecting threatened and endangered species. Threatened or endangered species are species of plants and animals that are formally listed as endangered under the ESA. Federal agencies are required to determine if a proposed project would involve—and possibly affect—proposed or listed species or their critical habitat. Critical habitat is defined as geographic locations critical to the existence of a threatened or endangered species. Under Section 7 of this act, federal agencies, such as the Navy, are required to consult with the U.S. Fish and Wildlife Service (USFWS) to ensure that they are not undertaking, funding, permitting, or authorizing actions likely to jeopardize the continued existence of listed species or destroy or adversely modify designated critical habitat.
- The Migratory Bird Treaty Act (MBTA) of 1918 (16 U.S.C. §§ 703–712) – The MBTA is an international agreement among the United States, Canada, and Mexico that protects designated species of birds. Specifically, the MBTA controls the taking of these birds, their nests, eggs, parts, or products. Virtually all birds are protected under the MBTA, with only a few exceptions, such as the California quail. A complete list of all species of all migratory birds protected by the MBTA is in the *Federal Register* (50 CFR 10.13). EO 13186, *Responsibilities of Federal Agencies to Protect Migratory Birds*, directs federal agencies to take actions to further implement the MBTA. A Memorandum of Understanding between the Department of Defense (DoD) and the USFWS was developed under EO 13186 to promote the conservation of migratory birds.

3.3.1 Affected Environment for Biological Resources

Existing condition information portrayed in the text and tables includes biological resources located within or adjacent to Sites A and B. The figures in this section illustrate the spatial distribution of biological resources under existing conditions, and focus on the project limits associated with each alternative.

No marine resources coincide with the proposed project. No construction activities associated with the proposed project would involve disturbance to the Pacific Ocean, Anaheim Bay, or other water body. All potential runoff created by construction and operation would be subject to

SWPPP and BMP guidelines, which are described in Section 2.6.5. The proposed project would be entirely confined to terrestrial habitats; therefore, no marine resources will be discussed in this EA.

3.3.1.1 Biological Study Area and Survey Methods

To provide for an appropriate environmental analysis, a Biological Study Area (BSA) was established for biological resources that are of importance or that are protected under federal law or statute. For biological resources, the BSA is defined as an approximately 138-acre (55.8-hectare) area, encompassing two noncontiguous parcels, referred to as Site A (approximately 64 acres [26 hectares]) and Site B (approximately 73 acres [29 hectares]), plus a 500-foot (150-meter) buffer surrounding each site.

Methodologies for the collection and analysis of biological resource information consisted of analyzing existing data and supplementing with additional field surveys. Available biological data were reviewed and analyzed to further describe the BSA, including the following:

- Integrated Natural Resources Management Plan, Naval Weapons Station Seal Beach (Navy 2014)
- Burrowing Owl Management and Conservation Plan Naval Weapons Station Seal Beach (Bloom et al. 2010)
- California Department of Fish and Wildlife (CDFW) California Natural Diversity Database (CNDDB) (CDFW 2014)
- General Entomology and Herpetology Survey Of Naval Weapons Station Seal Beach (NAVWPNSTA Seal Beach 2014b)
- Naval Weapons Station Seal Beach 2007 Herpetological Survey Report (NAVWPNSTA Seal Beach 2008)
- USFWS Special-Status Species Database Geographic Information Systems (USFWS 2012a)

In addition, existing information reviewed included geographic information system (GIS) data from the Navy, which provided information on the status, distribution, and known locations of sensitive biological resources within and surrounding the BSA.

The following field surveys were conducted to supplement the existing sources of data: a general herpetological survey (AECOM 2015a) and a focused survey for the western burrowing owl (*Athene cunicularia*) (AECOM 2015b).

Herpetological surveys were conducted by walking various survey routes and investigating features that could attract reptiles or amphibians (e.g., cover objects, rocks). Reptile or amphibian species observed during visual encounter surveys were identified to species. Incidental observations of other wildlife species were also recorded.

Surveys for the western burrowing owl were conducted per the CDFW Staff Report on Burrowing Owl Mitigation (CDFG 2012).

Areas that were inaccessible, including the Orange County Flood Control Channel, were surveyed from a distance using binoculars. Any sensitive species observations were mapped using Global Positioning System equipment.

Vegetation Communities and Land Types

Vegetation communities described herein were mapped for the 2014 NAVWPNSTA Seal Beach INRMP. Vegetation community descriptions are based on Holland (1986) with supplemental information from Sawyer and Keeler-Wolf (1995). The vegetation communities and land types are described below.

Sites A and B are topographically flat. Site A is currently used for active agriculture activities (e.g., plowing, harvesting crops, etc.). The Site A buffer area consists of active agriculture and developed areas. Site B is partially used for cultivation of agriculture crops, while the remaining area consists of unplanted land that is mowed for maintenance. The portion of Site B that lies unplanted has been so for more than 15 years because dust from agricultural practices affected adjacent residential areas. The Site B buffer is similar to the Site A buffer, consisting primarily of cultivated fields, roads, disturbed areas, and development. Vegetation within Sites A and B are mapped as 'cultivated' in the NAVWPNSTA Seal Beach Final INRMP (Navy 2014).

The Orange County Flood Control Channel runs along the east side of both sites and along the south side of Site A. The channel is outside of the boundaries of Site A, but falls within the BSA. This flood control channel is outside the NAVWPNSTA Seal Beach physical fence line and is managed by the Orange County Flood Control District. Although this flood control channel occurs within the Site A and Site B buffer area, it is not addressed further in this document because it is located outside the physical fence line of NAVWPNSTA Seal Beach and would not experience direct impacts from implementation of the Proposed Action/Alternative 1 or the other alternatives.

Cultivated (Cultural Vegetation)

Cultural vegetation is a vegetation cover type defined by Sawyer and Keeler-Wolf, and includes a broad variety of cultivated agricultural crops, including row crops, orchards, and other managed horticultural crops. Portions of NAVWPNSTA Seal Beach are currently outleased to local growers and are referred to as the "South Agricultural Lease" and "North Agricultural Lease," separated by Westminster Avenue. These leases have been active for many years, and currently comprise approximately 2,743 acres (1,110 hectares), although not all available land is generally cultivated each year and some acreage is reserved for storage and maintenance activities (Navy 2014). Some typical crops grown in the outleased agricultural lands include green beans, strawberries, melons, peppers, and lima beans.

Sites A and B are located on the eastern edge of a larger swath of cultivated lands (and other disturbed or developed areas). Cultivated areas provide little value in terms of wildlife habitat or areas where native plant species can typically survive. Routine actions associated with cultivating crops (such as tilling, harvesting, etc.) result in relatively low biodiversity.

Roads and Developed/Disturbed Habitat

Within Sites A and B are developed areas that are built upon or have the remains of former buildings, roads, or other structures. Generally, these areas are not considered natural habitat. Within Site A, there are dirt roads, several small buildings, storage containers, and stored agricultural equipment. Within Site B, there are two buildings with a surrounding asphalt apron and a paved road (Alpha Road). These developed and disturbed areas are relatively unattractive to native plant and animal species.

Federally Listed Plants

Vegetation communities and land cover types for Sites A and B consist of active cultivated land, roads, and otherwise developed or disturbed habitat. Because of the active agricultural activities and vegetation maintenance on land not under active agricultural production, and information provided in data searches and the INRMP, it was concluded that no federal plant species have the potential to occur on site. Therefore, federally listed plant species are not discussed further in this EA.

Federally Listed Wildlife

Biological surveys were conducted for the BSA in November and December 2014, and January 2015, and suitability for ESA-listed wildlife species was determined. Based on habitat suitability assessments, the only federally listed species with potential to occur within the BSA as occasional flyover species are California least tern (*Sternula antillarum browni*) and Ridgway's rail[2] (*Rallus obsoletus levipes*; formally known as light-footed clapper rail) [*Rallus longirostris levipes*]) (CDFW 2015). These species breed outside and to the west of the BSA within the SBNWR. The refuge boundary is approximately 3,000 feet (914 meters) west of Site A and approximately 7,500 feet (2,286 meters) southwest of Site B. The refuge is unique, in that it is located within the boundary of NAVWPNSTA Seal Beach, and is addressed in the INRMP (Navy 2014). No federally listed wildlife species are known to occur within the BSA nor would any listed species be anticipated to use habitat within the BSA for breeding or foraging. California least tern and Ridgway's rail have been noted at the SBNWR. The California least tern has also been documented as foraging in the Edinger Flood Control Channel to the east of Site A. Therefore, the California least tern could fly over the BSA while foraging between the SBNWR and the flood control channel (USFWS 2015). Ridgway's rail has the potential to fly over the BSA during migration into and out of the SBNWR.

Critical Habitat

There are no critical habitat designations within the BSA for federally listed species. The BSA is not coincident with federally designated critical habitat for western snowy plover (*Charadrius nivosus nivosus*). The closest occurrence of critical habitat for the western snowy plover is located outside of NAVWPNSTA Seal Beach, approximately 1.5 miles (2.4 kilometers) to the southwest of Site A, south of the intersection of SR-1 (Pacific Coast Highway) and Warner Avenue (USFWS 2012b). No critical habitat designations have been published for the California

[2] See 50 CFR § 10.13 for a list of avian species protected by the MBTA and 70 Federal Register 28907-28908 for a list of non-native species that are not protected by the MBTA.

least tern or Ridgway's rail. In addition, there are no critical habitat designations within the BSA for federally listed plants, therefore federally designated critical habitat is not discussed further in this EA.

Special Status Plant Species

Through the NAVWPNSTA Seal Beach INRMP, the protection and conservation of various special status rare plant species are addressed. For the purpose of this analysis, special status plant species include those considered sensitive by the CDFW and the California Native Plant Society, and managed under the NAVWPNSTA Seal Beach INRMP. Vegetation communities and land cover types for Sites A and B consist of active cultivated land and roads and developed disturbed habitat. Because of the active agricultural activities, the vegetation maintenance on land not under active agricultural production, and information provided in data searches (Navy GIS) and the INRMP, it was concluded that no special status rare plant species have the potential to occur on-site. Therefore, special status rare plant species are not discussed further in this EA.

Special Status Wildlife Species

Through the NAVWPNSTA Seal Beach INRMP, the protection and conservation of various special status rare wildlife species are addressed. For the purpose of this analysis, special status wildlife species include those considered sensitive by the CDFW and managed under the NAVWPNSTA Seal Beach INRMP. Three special status wildlife species have the potential to occur within the BSA: western burrowing owl (*Athene cunicularia hypugaea*), ferruginous hawk (*Buteo regalis*), and San Diego black-tailed jackrabbit (*Lepus californicus bennettii)*.

Western Burrowing Owl

The burrowing owl is considered by USFWS to be a Bird of Conservation Concern at the national level (Klute et al. 2003), protected under the MBTA, and is a California Species of Special Concern that is declining throughout its range, especially California's coastal populations. The burrowing owl's population collapse is well documented (Unitt 2004). Burrowing owls are year-round residents of southern California (Haug et al. 1993).Throughout their range, burrowing owls are threatened by habitat loss, predation, vehicle impacts, and control programs for ground squirrels (Kaufman 1996). Burrowing owls can form loose colonies made up of both year-round resident burrowing owls and winter migratory burrowing owls. Eggs are produced from late March to mid-June (Unitt 2004), and fledglings are active through August (Unitt 1984). A statewide census in 1991–1993 estimated that there are 9,266 pairs of burrowing owls in California (Navy 2014).

Burrowing owls enlarge and inhabit burrows created by ground squirrels or other mammals. Consequently, burrowing owls are vulnerable to predation by a wide variety of terrestrial predators such as raccoon (*Procyon lotor*), striped skunk (*Mephitis mephitis*), coyote (*Canis latrans*), and red fox (*Vulpes vulpes*) at NAVWPNSTA Seal Beach. Burrowing owls feed primarily on invertebrates but also forage on rodents, reptiles, amphibians, and small birds. Within NAVWPNSTA Seal Beach, a substantial number of earthen bunkers, railroad track corridors, and berms strategically imbedded within the agricultural zones provide nesting habitat

for burrowing owls and their host species, the California ground squirrel (*Otospermophilus beecheyi*) (Bloom et al. 2010).

As of 2013, a maximum of three pairs of burrowing owls was documented as resident on NAVWPNSTA Seal Beach. Burrowing owl surveys conducted for the project in the nonbreeding season of 2014/2015 did not reveal the presence of burrowing owls or active owl burrows within Site A or Site B. During the surveys, two burrowing owls were observed outside of the BSA. One owl was observed approximately 1,180 feet (360 meters) west of Site A, and the other burrowing owl observed was approximately 2,450 feet (747 meters) west of Site B (AECOM 2015b). A Burrowing Owl Management and Conservation Plan was developed for NAVWPNSTA Seal Beach in 2010. The plan provides a brief history of burrowing owls at NAVWPNSTA Seal Beach and outlines management strategies for increasing the population of burrowing owls without affecting other listed species (Bloom et al. 2010). The plan includes enhancement of the eastern portion of Site B as a burrowing owl management area.

Ferruginous Hawk

Ferruginous hawks are protected under the MBTA and by California state law (CDFW codes 3503, 3505, and 3513), and are considered winter migrants in southern California. The INRMP considers the ferruginous hawk as a transient species on NAVWPNSTA Seal Beach (Navy 2014). Ferruginous hawks are found in open arid areas of the west including grasslands, sagebrush plains, rangeland, and desert. They feed mainly on ground squirrels, gophers, voles, insects, snakes, young jackrabbits, and other good-sized prey. Ferruginous hawks nest in trees and sometimes cliff faces (Audubon Society 2015).

There are recorded occurrences of ferruginous hawks on NAVWPNSTA Seal Beach in 2004 and 2005 (Navy 2014), with a recent sighting in 2014 (AECOM 2015b) during field surveys. Ferruginous hawks are regularly observed during winter (Schallmann 2015). The agricultural land within Sites A and B does not represent suitable breeding habitat; however, it does represent suitable foraging habitat for transient ferruginous hawks.

San Diego Black-Tailed Jackrabbit

The San Diego black-tailed jackrabbit is a California Species of Special Concern that has been documented within NAVWPNSTA Seal Beach. This species is associated with open habitats with some scrub cover and feeds on forbs and grasses (CDFW 1999). They are most active at night when temperatures are low. Common predators of this species include foxes, coyotes, raptors, and snakes. This species breeds year-round if food resources are adequate and the female can bear more than one litter per year (Navy 2014).

Mammal surveys conducted on NAVWPNSTA Seal Beach in 2013 and 2014 found that San Diego black-tailed jackrabbits are primarily distributed along the western edge and just north of the SBNWR. No black-tailed jackrabbits were documented north of Westminster Avenue or within either Site A or Site B (NAVWPNSTA Seal Beach 2014a). However, potentially suitable habitat for this species does exist on Sites A and B and in the surrounding areas. Ongoing studies on the black-tailed jackrabbit are being conducted in coordination with the Station Conservation Manager.

Migratory Birds

The SBNWR is located approximately 3,000 feet (914 meters) west of Site A and 7,500 feet (2,286 meters) southwest of Site B. The SBNWR is located along the Pacific Flyway, where the refuge provides important nesting, foraging, and stopover habitat for migratory birds in the western United States (USFWS 2011). The National Audubon Society recognizes the SBNWR as the Orange Coast Wetlands Important Bird Area that provides essential habitats to a variety of bird species that are dependent upon coastal resources (USFWS 2011; California Audubon Society 2015). The refuge supports year-round resident bird species, migrants, summer residents, and wintering birds that nest, forage, or rest at the refuge or in adjacent areas (USFWS 2011). The agricultural land and unplanted fields within Sites A and B represent suitable foraging habitat for raptors and small passerine birds that are resident species, or migrating into and/or through the area via the Pacific Flyway. Incidental observances of migratory waterfowl have been observed. The waterfowl eat grass and lima beans.

Wildlife Corridors

Wildlife movement activities typically fall into one of three movement categories: (1) local and regional dispersal (e.g., juvenile animals from natal areas or individuals extending range distributions), (2) regional seasonal migration, and (3) local movements related to home range activities (foraging for food or water, defending territories, and searching for mates, breeding areas, or cover).

At the local level, wildlife species are likely to use Site A and Site B for movements related to dispersal and home range activities. This includes mammals such as San Diego black-tailed jackrabbit, desert cottontail (*Sylvilagus audubonii*), and coyote (*Canis latrans*), as well as resident and migrant bird species such as horned lark (*Eremophila alpestris*), house finch (*Haemorhous mexicanus*), great horned owl (*Bubo virginianus*), Anna's hummingbird (*Calypte anna*), mourning dove (*Zanaida macroura*), and other species. Additionally, avian species that breed in the SBNWR but forage over open water could potentially fly over the BSA in an east-west direction. The biological surveys conducted in 2014/2015 on the BSA recorded many species, including double-crested cormorant (*Phalacrocorax auritus*), great egret (*Ardea alba*), song sparrow (*Melospiza melodia*), California towee (*Melozone crissalis*), American crow (*Corvus brachyrhynchos*), and various shorebird species, as well as other birds that would be considered in the category of dispersal and home range. Canada goose (*Branta canadensis*) and other wintering migrant waterfowl are known to use Site B and the surrounding areas for foraging during the winter months.

Coyote management activities occurring on the refuge are implemented in accordance with the approved Endangered Species Management and Protection Plan (Protection Plan) (Navy 2014). The primary objective of this plan was the establishment of a naturally balanced ecosystem to support endangered species and other native wildlife occurring within the SBNWR and the station. Through implementation of the plan, two goals were met: (1) eliminate the non-native population of red fox on the SBNWR and adjacent station; and (2) reestablish a coyote population to maintain a healthy predator balance.

Maintaining a healthy, naturally behaving (i.e., wary of humans) population of coyote on station has aided in the control of the red fox, a non-native species possibly introduced to the area by humans for hunting and fur farming. In the 1970s, with no coyote population, the non-native red fox quickly established a population on NAVWPNSTA Seal Beach and by the mid-1980s, the fox was predating on the light-footed clapper rails and California least terns that nested on the SBNWR. The red fox, which is considered a surplus hunter that commonly kills and caches prey in excess of their immediate food needs, was considered a more serious threat to the SBNWR-listed species than the coyote. The effects of red fox predation on these listed species prompted the development and implementation of a predator management plan for the SBNWR and NAVWPNSTA Seal Beach (Navy 2014). As a result of the management measures contained in the predator management plan, the non-native red fox is no longer present on NAVWPNSTA Seal Beach or the SBNWR. To control the coyote presence, the predator management plan has outlined year-round management procedures to control coyotes, feral cats and dogs, and other potential predators. The management plan includes on-going, regular perimeter fence evaluation and maintenance.

Regional wildlife movement through the BSA is either no longer viable or severely degraded due to the extensive development surrounding NAVWPNSTA Seal Beach (Navy 2014). Since the 1970s, NAVWPNSTA Seal Beach has seen steep declines in population sizes and, in some cases, the extirpation of mesopredators such as American badger (*Taxidea taxus*), and gray fox (*Urocyon cinereoargenteus*). These species have relatively large home ranges and were historically documented within NAVWPNSTA Seal Beach, prior to urbanization of the region. The station perimeter fencing is currently being replaced in sections based on the condition of the fence. Newly installed fencing includes underground aprons to prevent digging. These aprons suppress the ability for species such as coyotes to migrate on or off station. Fencing in the areas of Sites A and B has not been replaced as of April 2015.

3.3.2 Environmental Consequences to Biological Resources

The following sections analyze the potential environmental impacts associated with implementation of the Proposed Action/Alternative 1, Alternative 2, Alternative 3, or the No Action Alternative. This includes permanent and temporary, direct and indirect impacts that may occur to federally listed and sensitive biological resources. Table 3.3-1 provides a comparison of the areas of disturbance associated with each alternative.

Table 3.3-1 Areas of Disturbance for All Alternatives

Alternative	Approximate Total Acreage
Proposed Action/Alternative 1 (Sites A and B)	138
Alternative 2 (Site A)	64
Alternative 3 (Site B)	73
No Action Alternative	0

3.3.2.1 Proposed Action/Alternative 1

The study area for the analysis of effects to biological resources with implementation of the Proposed Action/Alternative 1 consists of Sites A and B within the fence line of NAVWPNSTA

Seal Beach. The total acreage of the combined two sites would be approximately 138 acres (55.8 hectares) with Site A composed of approximately 64 acres (26 hectares) and Site B composed of approximately 73 acres (29 hectares).

Potential Impacts

Construction, Operations, and Decommissioning

Impacts that would result from construction, operation, and decommissioning of the Proposed Action/Alternative 1 include the following:

- Potential temporary direct impacts are reversible impacts within Sites A and B. Temporary direct impacts were analyzed for all new facilities and associated infrastructure. Usually, temporary direct impacts occur within the project area and are later restored. Construction equipment within the Proposed Action/Alternative 1 footprint or in off-site areas near Site A or Site B could provide perching for raptors and other avian predators and increase predation on nearby or adjacent nesting birds.
- Potential permanent indirect impacts are operations-associated impacts that affect adjacent resources (e.g., the introduction of new structures that could provide additional perch locations for raptors and other avian predators, thereby increasing predation on nearby and adjacent nesting birds).
- Potential temporary indirect impacts are caused by project construction or demolition (e.g., construction-generated fugitive dust, erosion, noise, nighttime construction lighting, ambient lighting, runoff, sedimentation, and trash) and are evaluated for habitats occupied by migratory birds covered under the MBTA. Generally, temporary indirect impacts for faunal species were considered up to 500 feet (152 meters) from the Proposed Action/Alternative 1 footprint. Similar potential temporary indirect impacts caused by project construction are evaluated for plant communities and other special-status species deemed appropriate per the NAVWPNSTA Seal Beach INRMP.

Terrestrial Wildlife

Impacts would be less than significant due to the relatively small size of the affected area and availability of suitable habitat in surrounding areas. As described in Section 3.3.1, Sites A and B are surrounded by large areas of cultivated fields, disturbed habitat, and development. Trenching for installation of electrical conduit and transmission lines could result in minor impacts to individuals of less-mobile wildlife species at Site A and Site B. Areas disturbed during trenching activity would be restored to their original condition following construction, resulting in no long-term impacts.

Additionally, the footprint of the solar PV systems would occur entirely in open fields of agricultural land or maintained annual grassland (non-native, mowed). Annual grassland (mowed) has low value as habitat for most species, but provides insect habitat that could attract reptiles and birds for foraging. Burrowing mammals (e.g., ground squirrel) were observed within the BSA, during project surveys (AECOM 2015a, 2015b). The Proposed Action/Alternative 1

BSA represents a relatively small portion of the existing cultivated or otherwise disturbed habitat on NAVWPNSTA Seal Beach, and both the Proposed Action/Alternative 1 BSA and the adjacent areas are marginal quality habitats for both native plants and animals. As such, the loss of this marginal habitat does not represent a significant impact to associated common wildlife species.

Vegetation Communities and Land Types

Construction of the PV solar facilities would result in the removal of approximately 138 acres (55.8 hectares) of a combination of active agricultural, unplanted land, and ruderal vegetation (weedy and commonly introduced plants growing where the vegetation cover has been interrupted by human activity) along the edges of the solar sites. These areas are ill suited to serve as habitat for federally listed or state-listed plant species. Implementation of the Proposed Action/Alternative 1 would result in less than significant impacts to vegetation communities and land types.

Federally Listed Wildlife

No federally listed species are likely to occur and no critical habitat has been designated within the direct impact footprint or surrounding areas. Noise, dust, or other construction-related effects would not adversely affect federally listed species associated with the SBNWR. This is because all project activities would be restricted to Site A and Site B. The SBNWR is located approximately 3,000 feet (914 meters) from Site A and approximately 7,500 feet (2,286 meters) from Site B; therefore, the construction activities would be relatively far-removed from the refuge. Construction and operations noise at this distance would be approximately the same as what currently occurs at these locations (e.g., harvesting, discing, mowing, truck traffic). Therefore, there would be no impacts to federally listed species or critical habitat from implementation of the Proposed Action/Alternative 1. Because no federally listed species or designated critical habitat are known to occur in the Proposed Action/Alternative 1 area, implementation of the Proposed Action/Alternative 1 would not result in indirect impacts to these resources.

Special Status Wildlife Species

Implementation of the Proposed Action/Alternative 1 could result in impacts to other special status wildlife species such as black-tailed jackrabbit, western burrowing owl, and ferruginous hawk, as well as migratory birds protected under the MBTA. Potential impacts to these species could be caused by construction activities, such as clearing and grubbing, site grading, and trenching for electrical connections, and through indirect impacts associated with bird strikes on the solar PV arrays, potentially induced by the “lake effect” (USFWS 2015). Implementation of the Proposed Action/Alternative 1 would result in a potential impact to the burrowing owl because the eastern portion of Site B is currently planned as a burrowing owl management area. These impacts do not rise to a level of significance because they would not affect species at the population level. Nevertheless, the impact avoidance and minimization measures described in Section 2.6.3 would be incorporated into the project design and planning to further reduce potential insignificant impacts to burrowing owls. Potential impacts associated with the “lake effect” are discussed below in this section.

Bird Strikes ("Lake Effect")

The Navy has received comments on the potential for the phenomenon known as "lake effect" to contribute to bird mortality at solar PV projects associated with the Navy's proposed construction and operation the Proposed Action/Alternative 1. Lake effect is the phenomenon whereby birds can be attracted to solar PV projects because they share several characteristics with bodies of water, namely large, smooth, dark surfaces that reflect horizontally polarized sunlight and skylight. This section specifically addresses comments expressing the concern that birds may collide with solar PV panels if they mistake the panels for a body of water. It provides an assessment of the technologies currently used by utility-scale solar facilities, highlights the difference between bird mortality associated with these solar technologies and that of the Proposed Action/Alternative 1, discusses the available lake effect literature, and outlines the Navy's responsibilities under NEPA in light of the unavailability and/or incompleteness of information about this phenomenon.

Overview of Solar Technology

Three types of utility-scale solar power technologies are in operation today: (1) parabolic trough solar technology, which uses curved mirrors to focus solar energy to heat fluid-filled pipes, which produce steam to power a turbine; (2) PV technology, which converts solar energy directly into electricity using PV cells made of a dark, semiconductor material; and (3) concentrated solar power (CSP) technology, which uses hundreds of thousands of highly reflective mirrors (heliostats) to concentrate solar energy (flux) at the top of a tower, where it heats water to produce steam. The steam powers turbines to produce electricity (IEA 2014).

Avian Mortalities on Solar Projects Representing Three Technologies

Avian mortalities have been documented at three utility-scale solar projects in southern California (USFWS 2014; KCET 2013; Ironwood Consulting 2012, 2013). The USFWS Forensics Laboratory recently released a report summarizing the causes of bird mortalities at three solar facilities in southern California: Genesis, which uses parabolic trough solar technology; Desert Sunlight, which uses PV solar technology; and the Ivanpah Solar Electric Generating System (ISEGS), which uses CSP technology (USFWS 2014). This summary is the only agency-led study on avian mortality at solar facilities to date. The report reveals that a large proportion of birds killed on these three projects die from striking project components for one of several reasons: because panels or heliostats are oriented vertically; after birds have become crippled by solar flux (i.e., singeing of flight feathers); or as a result of apparently mistaking the solar arrays for water. Because the Proposed Action/Alternative 1 would use solar PV technology, the remainder of this discussion will focus primarily on reports of lake effect at PV projects, and does not focus on bird mortalities on CSP or parabolic trough projects.

The USFWS study does not differentiate between non-lake effect-related and lake effect-related mortalities resulting from impact trauma, as the cause of bird deaths found within the arrays often could not be determined because comprehensive necropsies were not performed. The study does state; however, that "birds for which the primary habitat is water, including coots, grebes, and cormorants, were over-represented in mortalities at the Desert Sunlight facility (44 percent) compared to Genesis (19 percent) and Ivanpah (10 percent)" (USFWS 2014). Eight of the birds from Desert Sunlight were grebes, which are unable to easily take off from land.

This suggests a link between predation and stranding or impact resulting from the birds confusing the arrays with water (USFWS 2014).

The presence of water on or near a PV project may also influence the likelihood that birds will confuse the arrays for water. The USFWS study noted that birds are attracted to a water feature at Desert Sunlight and habituated to the presence of an accessible aquatic environment, and may therefore be more likely to misinterpret the arrays as water (USFWS 2014). However, unpublished data from some PV installations in the western United States indicate that birds may be attracted to PV projects even in the absence of nearby aquatic habitat (BERC 2013). 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.

Data Gaps

Scientific studies on avian mortality on solar projects are currently lacking. The USFWS Forensics Laboratory study emphasizes their incomplete knowledge on the scope of avian mortalities at the three solar projects. In addition, this dataset, which represents the best available summary of avian mortality data on solar projects, was not suitable for statistical analysis. Collection of the carcasses was opportunistic, that is, not according to a pre-determined sampling protocol. There was no attempt to quantify the number of carcasses removed by scavengers, or to compare mortality rates to baseline data on bird diversity or abundance (USFWS 2014). Conclusions based entirely on observational (non-experimental) data cannot be proven statistically, and it is therefore impossible to understand how accurate and precise the data are, and whether the data are biased. As concluded in an analysis for a 40 MW PV facility in Kern County, California, "there is no empirical evidence that PV facilities lead to significant avian mortality resulting from contact or collision with PV panels" (Kern County 2014).

A certain proportion of avian mortalities resulting from panel strikes may not be attributable to lake effect at all. Some collisions, like when a low-flying bird strikes a vertically oriented heliostat or panel, are unrelated to lake effect. Lake effect seems to be most influential when panels or heliostats are oriented horizontally, collectively forming a smooth, continuous surface (USFWS 2014). Conversely, heliostats appear to pose a greater risk for birds at ISEGS when they are oriented vertically (USFWS 2014). These collisions likely stem from the same conditions that cause birds to strike large windows, namely that the surface reflects vegetation or sky; birds are much less likely to strike a surface when it reflects the ground (Klem 1990). Sheet glass used in commercial and residential buildings has been well established as a hazard for birds (Klem 1990, 2006; Klem et al. 2004; Loss et al. 2014). Systematic studies on window strikes have concluded that birds “are easily deceived by and strike reflected images of habitat and sky on windows” when they are titled vertically, but are less likely to strike windows angled to reflect solid ground (Klem 1990). Window strike data may provide clues about the cause of lake effect and generate research questions, but cannot stand in place of empirical research on lake effect. As mentioned, the USFWS study does not differentiate between lake-effect-related and non-lake-effect-related mortalities resulting from impact trauma. In fact, it may be difficult to tell based on the carcass alone, making it impossible to obtain a true estimate of lake effect-caused

mortalities without additional information on the causes of lake effect. Clearly, there is a need for additional research, and until further data are obtained, drawing accurate conclusions on the extent and significance of avian mortality on solar projects is impossible.

Project-Specific Conclusion and the Navy's Responsibility Under NEPA
The Proposed Action/Alternative 1 includes the installation of ground-mounted solar PV arrays at NAVWPNSTA Seal Beach, which is adjacent to the Seal Beach NWR. Estimating the likelihood that birds may be injured or killed due to lake effect as a result of the Proposed Action/Alternative 1 is effectively impossible at this time because of the lack of studies on this phenomenon as it relates to solar projects. Under Section 1502.22 of the CEQ Regulations for Implementing NEPA-applied here by analogy to development of an EA- "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. § 1502.22. If the information in question "is essential to a reasoned choice among alternatives and the overall costs of obtaining it are not exorbitant," the agency must include the information (within its EA). However, if the information "cannot be obtained because the overall costs of obtaining it are exorbitant or the means to obtain it are not known, the agency shall include (the following four elements): (1) a statement that such information is incomplete or unavailable; (2) a statement of the relevance of the incomplete or unavailable information to evaluating reasonably foreseeable … adverse impacts on the human environment; (3) a summary of existing credible scientific evidence which is relevant to evaluating (such) adverse impacts …; and (4) the agency's evaluation of such impacts based upon theoretical approaches or research methods generally accepted in the scientific community. 40 CFR § 1502.22(a)-(b)(1)-(4). The discussion below expands upon these four elements.

Element 1 is addressed in detail in the above discussion of available literature pertaining to lake effect. To summarize, avian mortalities have been reported on several large solar projects utilizing different types of solar technologies. Causes of death include impact trauma, predation, and, for CSP projects, burns from solar flux. Of the birds that die of impact trauma, some may have struck vertically oriented panels, and others may have crash-landed, mistaking PV arrays for a body of water due to the lake effect phenomenon. However, additional studies are needed, and accurate conclusions about the scope or significance of avian mortalities due to lake effect cannot be drawn without them. The means of obtaining this information is known, and would involve the execution of many independent studies. These studies should focus on quantifying the number of birds killed through lake effect-related impact trauma on solar projects in different habitats and geographic locations, and which utilize different technologies. Studies should determine which species are most vulnerable to lake effect and what characteristics of a solar project or the environment influence its likelihood to attract birds via lake effect, and should compare lake effect-related mortality rates across a number of different solar projects.

Obtaining these data would take years, perhaps decades, and millions of dollars, and collaborations among the solar industry, agencies, and scientists. The best studies would be undertaken by entities independent of the solar industry using standardized survey methods (which have yet to be developed), carefully planned and executed over multiple years, and

published in peer-reviewed journals. The wind energy industry experienced a similar lack of data pertaining to bird mortalities on wind projects 20 years ago, and agencies are just beginning to finalize guidelines and best practices to reduce avian mortality. Therefore, the cost of obtaining these data is exorbitant.

With respect to element 2, the incomplete and/or unavailable data concerning lake effect-related bird collisions at solar PV power facilities is clearly relevant to assessing potential impacts associated with the Proposed Action/Alternative 1, and would—if obtainable as a practical matter—enable the Navy to make a better-informed overall decision. However, it is not necessary for the Navy to have or obtain such information in order to make a reasoned choice among potential alternatives. While acknowledging the incompleteness of the current data on the topic, it seems reasonable to conclude that any lake effect-related bird strikes at solar power facilities would not rise to the level of a significant impact for purposes of NEPA analysis (see discussion below), and is in fact likely relatively insignificant.

With respect to element 3, as with element 1, the discussion above summarizes the existing credible scientific evidence relevant to evaluating potential bird collision impacts at solar power facilities.

With respect to element 4, although it is not practical for the Navy to obtain the data needed to draw accurate conclusions about lake effect, based on the available data, it is clear that utility-scale solar power projects have the potential to adversely affect birds. However, this effect is not likely to be substantial for the Proposed Action/Alternative 1. Solar projects kill far fewer birds each year than the primary sources of human-caused avian mortality worldwide. For example, plate-glass windows kill an estimated 365 million to 988 million birds each year in the United States alone (Loss et al. 2014). Conversely, of the 233 bird carcasses found on the three solar projects mentioned above, only a fraction of those deaths could potentially be attributed to lake effect. While acknowledging the incompleteness of the current data on the topic, this analysis concludes that any lake effect-related bird strikes at the proposed solar PV array location(s) would not rise to the level of a significant impact for purposes of NEPA analysis.

Impact Avoidance and Minimization Measures

To further reduce less than significant impacts that could occur with implementation of the Proposed Action/Alternative 1, the following impact avoidance and minimization measures would be incorporated into the project design and planning.

Avoidance of Nesting Birds

To reduce the risk of take of nesting birds protected under the MBTA, mowing, clearing, and grading of any vegetated areas would be conducted during the nonbreeding season (October through January at NAVWPNSTA Seal Beach.

Minimize Impacts to Burrowing Owl and its Burrows

NAVWPNSTA Seal Beach has suitable habitat for burrowing owls; however, this species has not been recorded on Sites A and B during annual surveys (Bloom 2014). A survey conducted in the nonbreeding season of 2014/2015 did not reveal the presence of burrowing owls or any active burrows within Site A or Site B. However, burrowing owls could move into Sites A and B

given the presence of suitable habitat. As mentioned above, a Burrowing Owl Management and Conservation Plan was developed for NAVWPNSTA Seal Beach in 2010. The plan includes the potential enhancement of the eastern portion of Site B as a burrowing owl management area. Impact avoidance and minimization measures described in Section 2.6.3 would be implemented to reduce potential impacts to burrowing owls.

During the burrowing owl breeding season on NAVWPNSTA Seal Beach, no construction or other disturbance would occur within 246 feet (75 meters) of any active burrow. During non-breeding season, no construction or other disturbance would occur within 164 feet (50 meters) of active burrows.

If necessary, burrowing owls would be actively relocated to other suitable habitat. Monitoring would be conducted to discourage owls from returning to and re-inhabiting the project site during construction. Compensatory burrows at a ratio of 2 to 1 and foraging habitat would be provided, and confirmed occupation by owls of a natural or artificial burrow on the new habitat would be documented. NAVWPNSTA Seal Beach would actively relocate burrowing owls under the direction of the Station Conservation Manager. Relocation during the breeding season would not be permitted under any circumstances.

Minimize Impacts of the "Lake Effect"
Avoidance and/or minimization of potential lake effect impacts to birds from the implementation of the Proposed Action/Alternative 1 would be achieved by using appropriate design specifications during construction and operations, such as breaking up the placement of the solar panels (with spacing, visual cues, or bands), and positioning the panels at angles so that they are neither vertical nor fully-horizontal. These design elements, along with use of the best available science related to PV technology, would reduce reflection and minimize formation of both broad images of the sky as well as smooth- and continuous-looking surfaces that might resemble bodies of water. The development and implementation of a bird conservation strategy to include regular monitoring of site conditions, post-construction mortality monitoring and other conservation actions could also potentially minimize those effects.

3.3.2.2 Alternative 2

The study area for the analysis of effects to biological resources is limited to Site A, which is composed of approximately 64 acres (26 hectares).

<u>Potential Impacts</u>

Terrestrial Wildlife
The potential impacts to terrestrial wildlife from implementation of Alternative 2 would be similar to those described for the Proposed Action/Alternative 1; however, implementation of Alternative 2 would only result in the removal of approximately 64 acres (26 hectares) of agricultural or unplanted land and ruderal vegetation along the edges of Site A, thereby resulting in correspondingly lower potential impacts to terrestrial wildlife species. Implementation of Alternative 2 would not result in significant adverse impacts to terrestrial wildlife.

Vegetation Communities and Land Types

The potential impacts to vegetation from implementation of Alternative 2 would be similar to those described for the Proposed Action/Alternative 1; however, implementation of Alternative 2 would only result in the removal of approximately 64 acres (26 hectares) of agricultural or unplanted land and ruderal vegetation along the edges of Site A. Implementation of Alternative 2 would not result in significant adverse impacts to vegetation.

Federally Listed Wildlife

The potential impacts to threatened and endangered species from implementation of Alternative 2 would be the same as described for the Proposed Action/Alternative 1. No threatened and endangered species are likely to occur within the study area of Alternative 2. Implementation of Alternative 2 would not result in significant adverse impacts to threatened and endangered species.

Special Status Species

The potential impacts to special status species from implementation of Alternative 2 would be the same as described for the Proposed Action/Alternative 1. Implementation of Alternative 2 would not result in significant adverse impacts to special status species.

Bird Strikes ("Lake Effect")

The potential impacts to birds through "lake effect" from implementation of Alternative 2 would be the same as described for the Proposed Action/Alternative 1. Implementation of Alternative 2 would not result in significant adverse impacts to special status species.

Impact Avoidance and Minimization Measures

Impact avoidance and minimization measures for Alternative 2 would be the same as those described for the Proposed Action/Alternative 1.

3.3.2.3 Alternative 3

The study area for the analysis of effects to biological resources associated with Alternative 3 would be limited to Site B, which is composed of approximately 73 acres (29 hectares).

Potential Impacts

The potential impacts from Alternative 3 would be similar to Proposed Action/Alternative 1; however, the effect of the impacts would be limited to Site B, which is composed of approximately 73 acres (29 hectares). Similar to the Proposed Action/Alternative 1, implementation of Alternative 3 would result in a potential impact to the burrowing owl because the eastern portion of Site B is currently planned as a burrowing owl management area. Impact avoidance and minimization measures described in Section 2.6 would be implemented to reduce potential impacts to burrowing owls.

Terrestrial Wildlife

The potential impacts from Alterative 3 to terrestrial wildlife would be similar to Proposed Action/ Alternative 1; however, Alternative 3 would only result in the removal of approximately 73 acres (29 hectares) of agricultural or unplanted land and ruderal vegetation along the edges of Site B;

thereby, resulting in correspondingly lower potential impacts to common wildlife species. Implementation of Alternative 3 would not result in significant adverse impacts to terrestrial wildlife.

Vegetation Communities and Land Types

The potential impacts from Alterative 3 to vegetation would be similar to the Proposed Action/ Alternative 1; however, Alternative 3 would only result in the removal of approximately 73 acres (29 hectares) of agricultural or unplanted land and ruderal vegetation along the edges of Site B. Implementation of Alternative 3 would not result in significant adverse impacts to vegetation.

Federally Listed Wildlife

The potential impacts from Alterative 3 to threatened and endangered species would be the same determination as made for the Proposed Action/Alternative 1. Implementation of Alternative 3 would not result in significant adverse impacts to threatened and endangered species.

Special Status Species

The potential impacts to special status species from implementation of Alternative 3 would be the same as described for the Proposed Action/Alternative 1. Implementation of Alternative 3 would not result in significant adverse impacts to special status species

Bird Strikes ("Lake Effect")

The potential for impacts to birds through "lake effect" from implementation of Alternative 3 would be the same as described for the Proposed Action/Alternative 1. Implementation of Alternative 3 would not result in significant adverse impacts to bird strikes ("Lake Effect").

Impact Avoidance and Minimization Measures

Impact avoidance and minimization measures for Alternative 3 would be the same as those described for the Proposed Action/Alternative 1.

3.3.2.4 No Action Alternative

Under the No Action Alternative, the proposed project would not occur and there would be no change to biological resources. Implementation of the No Action Alternative would not result in significant impacts to biological resources.

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3.4 Noise

Definition of Resource

Noise Characteristics

Noise, commonly defined as unwanted sound, is characterized by pitch or loudness. Pitch is the height or depth of sound caused by the frequency of vibrations by which it is produced. Higher pitched sounds seem louder to humans than sounds of the same energy level with lower pitch.

Sound Level and Frequency

The decibel (dB) is a unit of measurement that indicates the relative amplitude of a sound. Zero on the dB scale is the lowest sound pressure that a healthy, unimpaired human ear can detect. Sound levels in dBs are calculated on a logarithmic basis. An increase of 10 dB represents a 10-fold increase in acoustic energy, while 20 dB is 100 times more intense, and 30 dB is 1,000 times more intense.

The most common scale for characterizing sound is the A-weighted sound level or dBA, which gives greater weight to the frequencies of sound to which the human ear is most sensitive. It is correlated with annoyance caused by noise sources such as traffic and construction activity. Table 3.4-1 shows typical A-weighted noise levels in various indoor and outdoor environments. It is accepted that sound pressure level changes of 3 dBA are just noticeable to most people. A change of 5 dBA is readily perceptible. An increase to 10 dBA is perceived as twice as loud.

Table 3.4-1. Typical A-Weighted Environmental Noise Levels

Common Outdoor Activities	Noise Level dBA)	Common Indoor Activities
	110	Rock Band
Jet fly-over at 1,000 feet		
	100	
Pile driver at 100 feet		Night Club with Music
	90	
Large truck pass by at 50 feet		
	80	Noisy restaurant
Gas lawn mower at 50 feet		
	70	Vacuum cleaner at 10 feet
Commercial/Urban area daytime		Normal speech at 3 feet
	60	
Suburban daytime		Active office environment
	50	
Urban area nighttime		Quiet office environment
	40	
Suburban nighttime		
Quiet rural areas	30	Library
		Quiet bedroom at night
Wilderness area	20	
	10	Quiet recording studio
Threshold of human hearing	0	Threshold of human hearing

Source: Caltrans 1998

Regulatory Setting

Navy Policy

Naval Facilities Engineering Command (NAVFAC) Publication P-970, *Planning in the Noise Environment*, (NAVFAC 1978) provides a discussion of allowable noise levels; guidance for selecting a site for new facilities within noise environments on military installations; and a discussion of noise reduction techniques that may be applied to render marginally acceptable locations suitable for use.

Federal Interagency Committee on Urban Noise

Land use compatibility with differing noise levels is regulated at the local level, although the federal government has established suggested land use compatibility criteria for different noise zones (Federal Interagency Committee on Urban Noise 1980). These criteria conclude that residential areas and schools are considered compatible where daytime noise is less than or equal to 65 dBA; outdoor recreational activities are compatible with noise levels less than or equal to 70 dBA; and, parks are compatible with noise levels less than or equal to 75 dBA.

U.S. Environmental Protection Agency Noise Standards

The U.S. Environmental Protection Agency (USEPA) identifies a 24-hour exposure level of 70 dB as the level of environmental noise at which no measurable hearing loss would be expected over a lifetime (USEPA 1974). Likewise, levels of 55 dB or less outdoors and 45 dB or less indoors are identified as not creating activity interference and annoyance. Average noise levels for various areas are identified according to the use of the area. Levels of 45 dB are acceptable for indoor residential areas, hospitals, and schools, whereas 55 dB is acceptable for certain outdoor areas where human activities occur. The level of 70 dB is the threshold for all areas in terms of avoiding hearing loss.

3.4.1 Affected Environment for Noise

3.4.1.1 Existing Noise Sources

Noise in the vicinity of NAVWPNSTA Seal Beach results from vehicular traffic on surrounding roadways and air traffic associated with Los Alamitos Joint Forces Base (approximately 2 miles [3.2 kilometers] north of Site B and approximately 4 miles [6.4 kilometers] north of Site A) and Long Beach Airport (approximately 7 miles [11.2 kilometers] northwest of Site B and approximately 8 miles [12.8 kilometers] northwest of Site A). In addition, periodic construction activities at NAVWPNSTA Seal Beach are sources of noise. Navy and civilian personnel working at the NAVWPNSTA Seal Beach are exposed to diverse sounds associated with fleet support activities.

Sites A and B are located along the eastern edge of NAVWPNSTA Seal Beach on undeveloped areas that have traditionally been leased for agriculture. Ambient noise levels at Sites A and B, as well as nearby (off-station) residential areas are primarily associated with vehicular traffic on arterial roadways such as Bolsa Chica Road/Street and Westminster and Edinger Avenues. Current, site-specific noise data are not available for baseline noise levels. However, based on a noise study conducted by the City of Seal Beach in 2002, the average noise level near the western perimeter of NAVWPNSTA Seal Beach is 65 dBA (taken at the intersection of

Westminster Avenue west of Seal Beach Boulevard), in an area with more commercial activity and traffic than on the eastern perimeter. Therefore, the ambient daytime noise level on roadways adjacent to Sites A and B is assumed to be 65 dBA (typical of an urban environment), and the ambient noise level in residential areas in the project vicinity is assumed to be 60 dBA.

3.4.1.2 Sensitive Receptors

Noise sensitivity is related to human activities at a receptor location or land uses that may be incompatible with exposure to elevated noise levels. Although exposure to high noise levels can cause hearing loss, principal human responses to environmental noise are annoyance and stress. Noise-sensitive receptors include persons who occupy areas where noise conditions are an important element of the environment, such as residential dwellings, mobile homes, hotels, hospitals, nursing homes, education facilities, and libraries. Areas within NAVWPNSTA Seal Beach near Sites A and B are primarily undeveloped and historically leased for agriculture; no sensitive receptors are identified in these areas.

Sensitive off-station receptors within 0.25 mile (0.4 kilometer) of Site A (see Figure 2-1) would include:

- Residential areas along Bolsa Chica Street, between the intersections with Edinger Avenue and Tasman Avenue
- Residential areas along Edinger Avenue between the intersections with Bolsa Chica Street and Fantasia Lane
- A private school (preschool through 8th grade) and park near intersection of Bolsa Chica Street and West McFadden Avenue
- A private school (daycare through 3rd grade) and park near intersection of Edinger Avenue and Waikiki Lane

Sensitive off-station receptors within 0.25 mile (0.4 kilometer) of Site B (see Figure 2-2) would include:

- Residential areas along Bolsa Chica Road, between the intersections with Westminster Avenue and Duncannon Avenue

The residential areas noted above begin approximately 400 feet (122 meters) from the edge of the proposed construction areas at Sites A and B, and the closest school is approximately 750 feet (229 meters) south of Site A.

Figure 3.4-1 illustrates off-station sensitive receptors within 0.25 mile (0.4 kilometer) of Sites A and B.

3.4.2 Environmental Consequences to Noise

This section discusses the effects on existing noise that may occur from the implementation of the alternatives. To compare effects, this analysis defines the temporal scale (time), extent (area), and intensity of effects for each alternative. Potential noise impacts to wildlife are discussed in Section 3.3 of this EA.

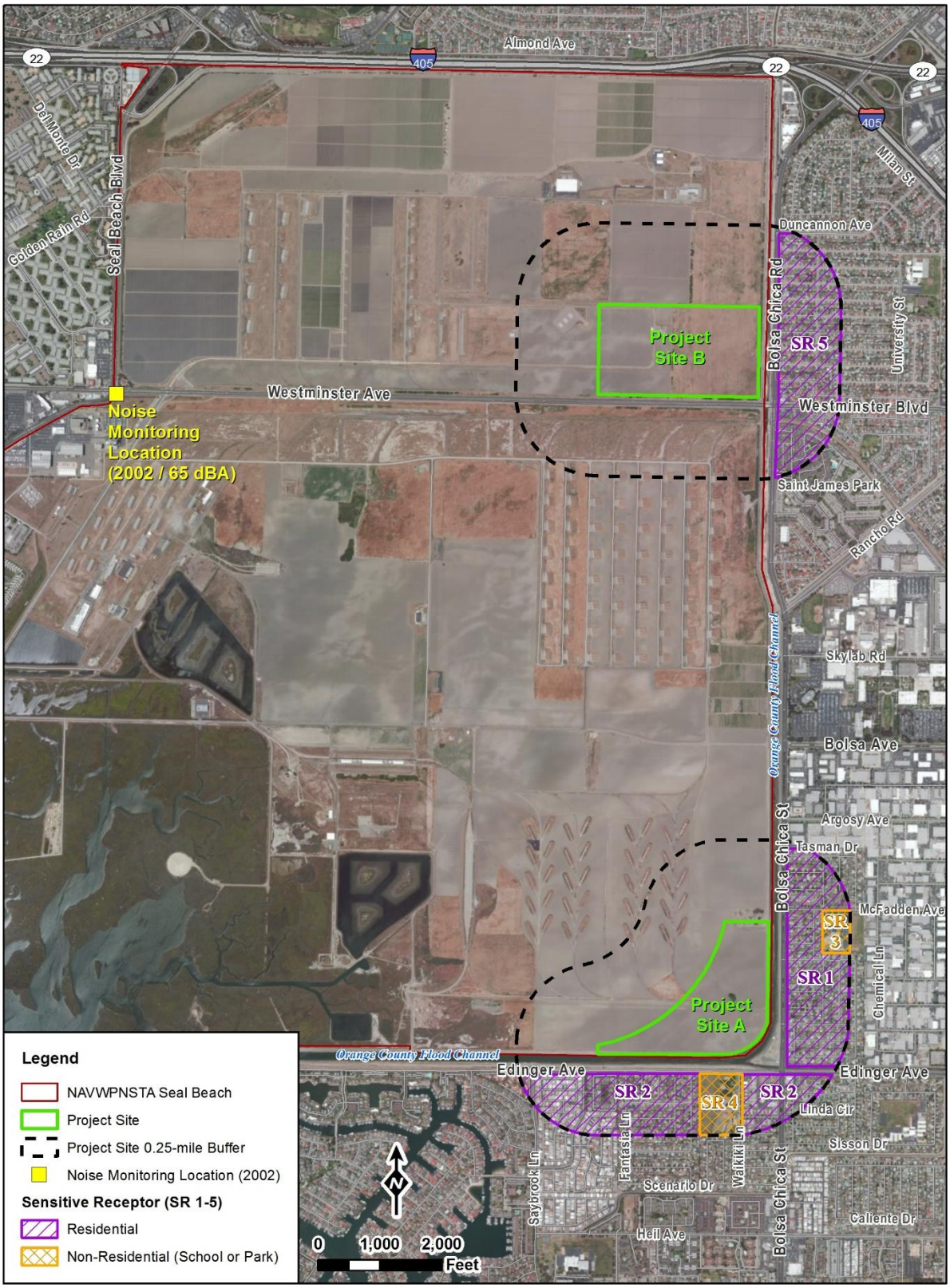

Figure 3.4-1. Off-Station Sensitive Noise Receptors

Methodology

Evaluation of potential noise impacts resulting from the alternatives involved three elements:

- Selecting sensitive receptor sites to characterize public and other noise sensitive uses in the project area
- Estimating existing baseline noise levels at the selected receptor sites
- Estimating likely noise levels from the proposed construction/demolition activities and calculating potential noise impacts at those receptors

During construction activities, overall noise levels would result from the combined effect of the noise contributions from multiple pieces of equipment in use at a given time, which typically is dominated by the three or four highest noise generators. Proposed construction equipment includes bulldozers, scrapers, backhoes, pile drivers, water trucks, trenchers, and truck-mounted mobile cranes. Short–term noise associated with construction activities may range from 75 to 90 dB at 50 feet (15 meters) from the source (FHWA 2011).

Using the U.S. Federal Highway Administration's Roadway Construction Noise Model, the Navy was able to estimate hourly average equivalent sound level (Leq) at selected distances based on the types of equipment anticipated to be on site for the construction stage. This noise estimate accounts for local ambient noise conditions noted in Section 3.4.3.

The analysis of potential noise impacts is based on the approximate distances between the sensitive receptor site and the closest construction areas. The distances between the sensitive receptors and noise sources, and the estimated hourly construction noise at the receptor sites, are provided in Table 3.4-2. Specified noise levels represent estimated peak 1-hour Leq values. This estimate is conservative in nature, and did not consider any noise shielding or attenuation effects other than distance from the noise source.

Table 3.4-2 Estimated Noise Levels Resulting from Construction

PV Road Construction Site	Receptor	Minimum Distance from Construction (feet)	Baseline Daytime Noise Levels (dBA)	Total Calculated Noise Level (dBA, Leq) 1 hour)[1]	Total Calculated Noise Level Increase (dBA, Leq 1 hour)
A	Residential areas Bolsa Chica Street, between Edinger Avenue and Tasman Avenue	400	60	65.6	+5.6
A	Residential areas Edinger Avenue between Bolsa Chica Street and Fantasia Lane	400	60	65.6	+5.6
A	Private school and park near intersection of Bolsa Chica Street and West McFadden Avenue	1,000	60	60.1	+0.1
A	Private school and park near intersection of Edinger Avenue and Waikiki Lane.	750	60	58.3	N/A
B	Residential areas Bolsa Chica Road between Westminster Avenue and Duncannon Avenue	400	60	65.6	+5.6

Notes: 1. Estimated using FHWA Roadway Construction Noise Model

Potential construction noise impacts are based on estimates of the audible increment of noise above a background level. Because a doubling of the sound pressure level is necessary to result in minimally audible 3-dBA increase in noise, substantial changes in activity can occur without causing detectable increases in noise level. However, a change of 5 dBA is readily perceptible, while an increase of 10 dBA is perceived as twice as loud as baseline conditions.

Operation and maintenance of solar PV systems at NAVWPNSTA Seal Beach would not generate any appreciable noise level increases above the baseline daytime noise levels as shown in Table 3.4-2. Therefore, potential impacts described for the proposed project alternatives in Sections 3.4.2.1 through 3.4.2.4 focus on construction- and decommissioning-related impacts.

3.4.2.1 Proposed Action/Alternative 1

While there are human noise receptors in the vicinity of the project sites, the noise that would be generated during construction would only take place during daylight hours (sunrise to sunset), when higher sound levels are more tolerable. All sound levels that would be generated by the use of construction equipment and vehicles would lessen with distance from the source. While pedestrians walking near the station boundary while construction was occurring nearby would perceive a notable increase in noise levels (approximately 13 dBA) above typical daytime levels, the total noise level (approximately 78 dBA) would be consistent with that from passing truck traffic on a busy street. While this noise level is higher than the 70 dBA thresholds established by the Federal Interagency Committee on Urban Noise (for outdoor recreation activities) and the USEPA (on a 24-hour basis for prevention of hearing loss), this noise level would be experienced only on a momentary basis by pedestrians passing by construction sites during times when equipment was operating near the site boundaries.

Receptors at the closest residential areas (within approximately 400 feet [122 meters] from the closest construction area) would experience an approximate increase of 6 dBA from daytime baseline levels. This increase would be clearly noticeable to the average person, but the total sound level (approximately 65 dBA) would still be consistent with daytime noise levels in the surrounding area, and at or below the Federal Interagency Committee on Urban Noise standards of 65 and 70 dBA for residential areas and outdoor recreation, respectively. This noise level would also be lower than the USEPA 70 dBA 24-hour standard for prevention of hearing loss.

Receptors at residential areas between approximately 400 and 800 feet (122 and 244 meters) from the noise source would be less likely to notice increases, while those farther than approximately 800 feet (244 meters) away would not experience any changes in noise levels. Receptors at schools would also not experience any noticeable changes. All calculated changes in noise levels for various receptors also assume that construction is occurring near the easternmost edges of Sites A and B. If construction activities were occurring further west, then such changes in noise levels would be further reduced and could at some point become imperceptible to the average human receptor. Implementation of the Proposed Action/Alternative 1 would not result in significant adverse impacts from noise.

The decommissioning and restoration process would involve the removal of structures, restoration of topsoil, revegetation, and seeding. Temporary erosion and sedimentation control BMPs would be used during the decommissioning phase of the project. Because the site would be returned to previous conditions and the decommissioning phase would considerably brief in comparison to construction, decommissioning at the close of the 37-year period would not result in significant adverse impacts.

Impact Avoidance and Minimization Measures

To reduce noise impacts during times when individuals would be more sensitive to changes, the Navy would limit construction activities to between the hours of 7:00 AM and 5:00 PM weekdays and Saturdays. Limited Sunday work would be permitted. No holiday or nighttime operation of construction equipment would be permitted.

All applicable federal and Navy regulations would be followed during construction. No long-term operations noise is expected from the solar PV systems. Implementation of Proposed Action/ Alternative 1 would result in temporary rises in noise near construction sites, with noise levels falling significantly with distance from the construction sites. Implementation of the Proposed Action/Alternative 1 would not result in significant adverse impacts from noise.

3.4.2.2 Alternative 2

Under Alternative 2, construction and decommissioning activities and noise level increases would be similar to those discussed under the Proposed Action/Alternative 1, although further limited to areas near Site A. Implementation of Alternative 2 would not result in significant adverse impacts from noise.

Impact Avoidance and Minimization Measures

Impact avoidance and minimization measures for Alternative 2 would be the same as for the Proposed Action/Alternative 1.

3.4.2.3 Alternative 3

Under Alternative 3, construction and decommissioning activities and noise level increases would be similar to those discussed under the Proposed Action/Alternative 1, although limited further to areas near Site B. Implementation of Alternative 3 would not result in significant adverse impacts from noise.

Impact Avoidance and Minimization Measures

Impact avoidance and minimization measures for Alternative 3 would be the same as for the Proposed Action/Alternative 1.

3.4.2.4 No Action Alternative

Under the No Action Alternative, no solar PV systems would be constructed, and no construction-related noise would result. Therefore, the No Action Alternative would have no impacts related to noise.

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3.5 Topography, Geology, and Soils

Definition of Resource

This section describes the existing topography, geology, and soils conditions that occur within and adjacent to NAVWPNSTA Seal Beach. For the purposes of evaluating topography, geology, and soils the project sites are described as the areas proposed to be used for construction and operation under the Proposed Action/Alternative 1 and alternatives. Literature and existing background data reviewed includes:

- Final INRMP, NAVWPNSTA Seal Beach (Navy 2014)
- Final Environmental Assessment, Construction and Operation of a New Laboratory and Demolition of Structures at Naval Weapons Station Seal Beach (Navy 2013)
- Cook, L. and McCuen, R. (2013). ”Hydrologic Response of Solar Farms.” *Journal of Hydrologic Engineering*, 18(5), 536–541

3.5.1 Affected Environment for Topography, Geology, and Soils

3.5.1.1 Topography

Sites A and B are located along the southwest margin of the Los Angeles Coastal Plain on the Seal Beach U.S. Geological Survey (USGS) Topo 7.5 Quadrangle map and the Los Alamitos USGS Topo 7.5 Quadrangle map, respectively. Sites A and B are currently used as agricultural outlease with a portion of Site B lying unplanted in a maintenance/mow status. The Orange County Flood Control Channel runs along the southern and eastern boundary of Site A and along the eastern boundary of Site B.

3.5.1.2 Geology

Stratigraphy

NAVWPNSTA Seal Beach sits above a series of Quaternary beach deposits that overlay old alluvium that likely originated from the Santa Ana, San Gabriel, and Los Angeles Rivers. The near-surface geology consists of artificial fill, recent alluvium, and Holocene to Late Pleistocene surficial deposits (California Geological Survey 2010). The recent alluvial sediments, which underlie project sites, generally consist of young alluvial fan deposits. These deposits consist of semi-consolidated, discontinuous sand, silt, clay, and gravel layers (California Department of Water Resources 1961). Artificial fill deposits created during prior development and agricultural practices likely consist of a mix of alluvium and terrace deposits.

Seismicity

Two active fault zones occur near NAVWPNSTA Seal Beach. The Newport-Inglewood Fault Zone runs through the southwest corner of the SBNWR, and the Palos Verdes fault zone lies approximately 8.5 miles (13.7 kilometers) offshore to the southwest. The proximity of the faults is considered a serious earthquake hazard. The primary geologic hazard at the project sites is strong seismically induced ground shaking. The project sites are located within an area where historic occurrence of liquefaction, or local geological, geotechnical, and groundwater conditions indicate a potential for permanent ground displacements (California Geological Survey 1999).

3.5.1.3 Soils

Site A is underlain by Bolsa silt loam and Site B is underlain by Bolsa silty clay loam. The soils of the Bolsa series are deep, somewhat poorly drained soils formed in mixed alluvium and are found in floodplains and basins. Soils in the project areas are somewhat poorly drained, moderately alkaline, and calcareous. Runoff is slow from these nearly level soils and the erosion hazard is slight (U.S. Department of Agriculture 1978). As stated in Section 3.1.2.1, implementation of the Proposed Action/Alternative 1 or alternatives would not affect Prime and Unique Farmland.

3.5.2 Environmental Consequences to Topography, Geology, and Soils

The following section describes potential impacts to topography, geology, and soils that could result from implementation of the Proposed Action/Alternative 1 or alternatives. Impacts to topography, geology, and soils have been evaluated based on an understanding of the project components, construction equipment and building methods, and how the sites would be used and maintained after the project is developed. All impacts from the alternatives are described as they would occur with implementation of the impact avoidance and minimization measures presented in Section 2.6.5.

3.5.2.1 Proposed Action/Alternative 1

The Proposed Action/Alternative 1 consists of the construction, operation, maintenance, and eventual decommissioning of a ground-mounted PV system(s) at Sites A and B. The total acreage of the combined two sites would be approximately 138 acres (55.8 hectares) with Site A comprised of approximately 64 acres (26 hectares) and Site B comprised of approximately 73 acres (29 hectares).

Potential Impacts

Topography

The topography of the project sites is relatively flat, and no slopes would be constructed as part of the Proposed Action/Alternative 1. Site development would require grubbing and grading to further level the ground surface. Implementation of the Proposed Action/Alternative 1 would not result in significant adverse impacts to topography.

Geology and Seismicity

Active faults located within 60 miles (96 kilometers) of the project site could result in strong seismically induced ground shaking and associated differential settlement. However, new facilities would be designed and constructed to comply with the seismic design criteria identified in the International Building Code, NAVFAC P-355 Seismic Design Manual, and the most stringent criteria identified in the latest design specifications of the Structural Engineering Association of California. In addition, all construction and design measures would involve preparation of a standard, site-specific, geotechnical investigation consistent with the design and construction recommendations set forth in the California Code of Regulations Title 24. Implementation of the Proposed Action/Alternative 1 would not result in significant adverse impacts to geology and seismicity.

Soils

The project sites are underlain by artificial fill and silty clay loam soils. Site development would include site grubbing and grading, and construction of an approximately 138-acre (55.8-hectare) solar PV system. Such activities would temporarily increase the potential for erosion-induced sedimentation of nearby receiving waters, including the Orange County Flood Control Channel. However, excavation and grading activities would not be excessive due to the relatively flat topography of the construction site and implementation of erosion control measures outlined in Section 2.6.5. Soils may be cut and moved around the vicinity of the sites to level the grading, but no significant soils would be removed from the sites. Implementation of the Proposed Action/Alternative 1 would not result in significant adverse impacts to soils.

The decommissioning and restoration process would involve the removal of structures, restoration of topsoil, revegetation, and seeding. Temporary erosion and sedimentation control BMPs would be used during the decommissioning phase of the project. Because the site would be returned to previous conditions, decommissioning at the close of the 37-year period would not result in significant adverse impacts.

Storm water and storm water conveyances are further discussed in Section 3.9, Utilities.

Impact Avoidance and Minimization Measures

Obtain coverage under the NPDES General Permit Discharges of Storm Water Associated with Construction Activity (General Permit), Water Quality Order 2009-009-DWQ would be required because project construction would disturb more than 1 acre (0.4 hectare). The construction contractor would prepare a SWPPP before project implementation (see Section 2.6.5). The SWPPP would include an Erosion Control Plan that identifies the appropriate measures (e.g., silt fences, siltation basins, gravel bags) necessary to stabilize the soil in denuded or graded areas during construction.

3.5.2.2 Alternative 2

Implementation of Alternative 2 would be the same as the Proposed Action/Alternative 1, except that the PV system would only be constructed, operated, and maintained at Site A, an approximately 64-acre (26-hectare) parcel. The decommissioning phase would be the same as for the Proposed Action/Alternative 1. Under Alternative 2, impacts to topography, geology, and soils would only occur on Site A. Implementation of Alternative 2 would not result in significant adverse impacts to topography, geology, or soils.

Impact Avoidance and Minimization Measures

Impact avoidance and minimization measures with the implementation of Alternative 2 would be the same as described for the Proposed Action/Alternative 1.

3.5.2.3 Alternative 3

Impact avoidance and minimization measures with the implementation of Alternative 3 would be the same as described for the Proposed Action/Alternative 1, except that the PV system would only be constructed, operated, and maintained at Site B, an approximately 73-acre (29-hectare) parcel. The decommissioning phase would be the same as for the Proposed Action/Alternative

1. Under Alternative 3, impacts to topography, geology, and soils would only occur at Site B. The impact avoidance and minimization measures described in Section 2.6.5 would be implemented. Implementation of Alternative 3 would not result in significant adverse impacts to topography, geology, or soils.

Impact Avoidance and Minimization Measures

Impact avoidance and minimization measures with the implementation of Alternative 3 would be the same as described for the Proposed Action/Alternative 1.

3.5.2.4 No Action Alternative

Under the No Action Alternative, the proposed project would not occur and there would be no change to baseline topography, geology, or soils. Implementation of the No Action Alternative would not result in significant adverse impacts to topography, geology, or soils.

3.6 Water Resources

Definition of Resource

Water resources includes water that is suitable for use and encompasses the water of rivers, lakes, canals, reservoirs, seas and oceans; groundwater; soil moisture; the frozen water of mountain and polar glaciers; and the water vapor of the atmosphere. The concept of water resources also includes those same bodies of water insofar as they are used for certain purposes (navigation, hydroelectric power, fishing, recreation, and tourism) without the withdrawal of water from them. This section focuses on groundwater, surface water, and water quality. Storm water and storm water conveyance are described in Section 3.9, Utilities.

Regulatory Setting

Laws and regulations serve to protect surface water quality by establishing water quality compliance standards or waste discharge requirements (WDRs). These mandates require implementation of design, construction, and operational controls that address structural and non-structural BMPs for water quality, management, treatment, and protection. Applicable regulations and the associated agencies are described below.

Coastal Zone Management Act

The CZMA of 1972 encourages coastal states to manage coastal zone uses and resources. Federal agency actions within or outside of the coastal zone that affect any land or water use or natural resource of the coastal zone must be carried out in a manner that is consistent, to the maximum extent practicable, with the enforceable policies of approved state management programs that define the coastal zone in accordance with the CZMA.

Executive Order 11988 – Floodplain Management

EO 11988 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 or indirect support of floodplain development wherever there is a practicable alternative.”

Clean Water Act

Clean Water Act (CWA) (Public Laws [P.L.] 92-500, as amended; 33 U.S.C. §§ 1251 et seq.) issued in 1972 establishes the basic structure for regulating discharges of pollutants into the waters of the United States and regulating quality standards for surface waters. Administration of the Act is delegated to the SWRCB in California and, locally, to the Santa Ana Regional Water Quality Control Board (RWQCB). The RWQCB sets water quality standards and criteria for water bodies in its regional plan and issues and enforces NPDES permits. Relevant sections of the CWA that apply to water resources include:

- **CWA Section 303(d) –** requires states to adopt water quality standards for surface waters of the United States. The law requires priority rankings be establish and action plans, referred to as Total Maximum Daily Loads (TMDLs), be developed to improve water quality. The Santa Ana RWQCB publishes the list of water-quality-limited segments in the Santa Ana region.

- **CWA Section 401 –** A Water Quality Certification must be obtained for any activity that may result in a discharge to a water body. In California, these certifications are issued by SWRCB under the auspices of RWQCB.

Sikes Act

The Sikes Act requires facilities to manage ecosystems, including watersheds and wetlands, via an approved INRMP. Consistent with the goals of the Sikes Act, the use of low impact development techniques helps to maintain the natural landscape and its hydrology.

3.6.1 Affected Environment for Water Resources

This section describes existing hydrology and water quality conditions that occur within and adjacent to NAVWPNSTA Seal Beach. Literature and existing data reviewed include:

- Best Available Floodplain Maps Web viewer (California Department of Water Resources 2013)
- California's Groundwater Bulletin 118 (California Department of Water Resources 2004)
- Federal Emergency Management Agency Stay Dry v. 3.0 (FEMA 2013)
- Final Integrated Natural Resources Management Plan, Naval Weapons Station Seal Beach (Navy 2014)
- Cook, L. and McCuen, R. (2013). "Hydrologic Response of Solar Farms." *Journal of Hydrologic Engineering*, 18(5), 536–541

The descriptions of existing conditions include regional hydrology, floodplains, and groundwater resources at NAVWPNSTA Seal Beach.

3.6.1.1 Regional Hydrology

NAVWPNSTA Seal Beach is located within the Bolsa Chica Channel-Frontal Huntington Harbor hydrologic sub-unit of the South Coast Hydrologic Region. The Bolsa Chica Channel-Frontal Huntington Harbor sub-unit is at the mouth of the Santa Ana River Watershed where it meets Anaheim Bay. Orange County Flood Control Channel is part of the flood control armoring of the Santa Ana River channel that began with the completion of the Prado Dam in 1941. Since then, sediment flow has been blocked and has prevented the river from seasonally flooding the marshes, replenishing sediment, and filtering outflows from the sea.

Runoff from the project sites either ponds or flows through man-made channels, natural ditches, and the Orange County Flood Control Channel. Flow in channels is intermittent and is dependent on rainfall and landscape irrigation runoff. The runoff eventually discharges into the City of Seal Beach municipal storm drain system, the Orange County flood control channels, SBNWR, and Anaheim Bay. Anaheim Bay is known to contain high amounts of heavy metals and pesticides/herbicides (Navy 2014).

Appendix C contains the Hydrologic Technical Memo prepared to evaluate the potential hydrologic response to construction, operation, maintenance, and eventual decommissioning of PV systems at NAVWPNSTA Seal Beach.

Floodplains

Large portions of NAVWPNSTA Seal Beach are located within a mapped floodplain. All major rivers and most small inland waterways in the area have been channelized or modified to protect the area from flooding (Navy 1989). The Federal Emergency Management Agency Flood Zone for the project sites at NAVWPNSTA Seal Beach is undetermined; however, land directly south and east of the projects sites outside of the installation boundary are considered to be in a moderate risk area (FEMA 2013). Flooding associated with a 500-year storm event on the Santa Ana River, located approximately 12 miles (19 kilometers) east of the station, could result in flooding of low-lying areas of the Seal Beach community and portions of NAVWPNSTA Seal Beach. NAVWPNSTA Seal Beach is vulnerable to tsunamis; however, the project areas are along the far eastern portion of the station, and are located outside the 100-year tsunami inundation area (Navy 1989). The flood risk in the project areas is considered low because of the flood control infrastructure currently in place. Figure 3.1-1 illustrates the locations of Sites A and B relative to the designated floodplain.

3.6.1.2 Groundwater

NAVWPNSTA Seal Beach lies toward the northern edge of the Coastal Plain of the Orange County Groundwater Basin. Upper, middle, and lower aquifer systems are recognized in the basin, with the middle aquifer being responsible for 90 to 95 percent of groundwater used. Groundwater underlies NAVWPNSTA Seal Beach at levels from 5 to 15 feet (1.5 to 4.6 meters) below surface, rising to shallower depths during heavy rain years (Navy 2014). Recharge to the Orange County Groundwater Basin comes from percolation of Santa Ana River flow, infiltration of precipitation, and injection into wells. The Santa Ana River contains natural flow, reclaimed water, and imported water that is spread in the basin reservoir. Historical groundwater flow was generally toward the ocean in the southwest, but pumping has caused water levels to drop below sea level and has encouraged seawater to migrate inland, contaminating the groundwater supply (California Department of Water Resources 2004).

3.6.2 Environmental Consequences to Water Resources

The following section describes potential impacts to water resources that could result from implementation of the alternatives. Impacts to water resources have been evaluated based on an understanding of the project components, construction equipment and building methods, and how the sites would be used and maintained after project development. All impacts from the alternatives are described as they would occur with implementation of the impact avoidance and minimization measures presented in Section 2.6.5.

3.6.2.1 Proposed Action/Alternative 1

The Proposed Action/Alternative 1 consists of the construction, operation, maintenance, and eventual decommissioning of ground-mounted PV systems at Sites A and B.

Potential Impacts

Hydrology

Surface disturbance (e.g., grading, localized excavation) would occur during construction of the solar PV panels and trenching for underground electrical conduits. During construction, storm

water runoff from the project sites could result in a slight increase in turbidity; however, this would not degrade the local water quality or adversely affect current uses of local surface waters.

With implementation of the Proposed Action/Alternative 1, there would be no significant impacts to local water quality, surface water bodies, or hydrology at the NAVWPNSTA Seal Beach project sites. Implementation of the impact avoidance and minimization measures described in Section 2.6.5, including obtaining the necessary permits, complying with permit conditions, and following procedures in the SWPPP and spill prevention plan, would further reduce already insignificant impacts.

Floodplains

With the Proposed Action/Alternative 1, construction of the solar PV systems at NAVWPNSTA Seal Beach would occur within the 500-year floodplain. The Navy would minimize potential impacts to the floodplains with implementation of impact avoidance and minimization measures described in Section 2.6 and under regional hydrology. The Proposed Action/Alternative 1 would be consistent with the regulations described in EO 11988, Floodplain Management. Therefore, project structures would not increase the potential for flooding in local surface water bodies, restrict or redirect runoff flows, or cause localized flooding at Sites A and B. Implementation of the Proposed Action/Alternative 1 would not result in significant adverse impacts to floodplains.

Groundwater

Under the Proposed Action/Alternative 1, water required for dust suppression during construction would be supplied to the sites via water trucks supplied by the Private Partner. Construction of the Proposed Action/Alternative 1 would not require the use of NAVWPNSTA Seal Beach-supplied groundwater.

During PV systems operation, water required for panel washing would be supplied by the Private Partner, and the Proposed Action/Alternative 1 would not require the use of installation-supplied groundwater. The NAVWPNSTA Seal Beach water supply would not be used. Panels are typically cleaned when efficiency and energy production are diminished. The Private Partner would comply with all Navy regulations applicable to conducting work activities on station as well as the impact avoidance and minimization measures described in Section 2.6.5.

Overall, the Navy would continue to manage groundwater resources in a manner consistent with federal and state laws and regulations. Therefore, implementation of the Proposed Action/Alternative 1 would not result in significant impacts to groundwater. Implementation of the recommended impact avoidance and minimization measures described in Section 2.6.5, including obtaining the necessary permits, complying with permit conditions, and following procedures in the SWPPP, spill prevention plan, and erosion control plan, would further reduce the already insignificant impacts.

The decommissioning and restoration process would involve the removal of structures, restoration of topsoil, revegetation, and seeding. Temporary erosion and sedimentation control BMPs would be used during the decommissioning phase of the project. Because the site would be returned to previous conditions, decommissioning at the close of the 37-year period would not result in significant adverse impacts.

Impact Avoidance and Minimization Measures

Although there would be no significant impacts to water resources under the Proposed Action/Alternative 1, a SWPPP and a Spill Response Plan would be prepared to manage storm water and potential spills during construction as described in Section 2.6.5.

3.6.2.2 Alternative 2

Implementation of Alternative 2 would be the same as for the Proposed Action/Alternative 1, except that the solar PV system would only be constructed, operated, and maintained at Site A, an approximately 64-acre (26-hectare) parcel. Under Alternative 2, potential impacts to surface hydrology, floodplains, and groundwater described under the Proposed Action/Alternative 1 would only occur on Site A. Project structures would not increase the potential for flooding local surface water bodies, restrict or redirect runoff flows, or cause localized flooding at the NAVWPNSTA Seal Beach project site. The impact avoidance and minimization measures described in Section 2.6.5 would be implemented. Implementation of Alternative 2 would not result in significant adverse impacts to water resources.

Impact Avoidance and Minimization Measures

Although there would be no significant impacts to water resources under Alternative 2, the same impact avoidance and minimization measures described under the Proposed Action/Alternative 1 would be incorporated as part of the project planning and design.

3.6.2.3 Alternative 3

Implementation of Alternative 3 would be the same as for the Proposed Action/Alternative 1, except that the PV system would only be constructed, operated, and maintained at Site B, an approximately 73-acre (29-hectare) parcel. Under Alternative 3, potential impacts to surface hydrology, floodplains, and groundwater described under the Proposed Action/Alternative 1 would only occur on Site B. Project structures would not increase the potential for flooding local surface water bodies, restrict or redirect runoff flows, or cause localized flooding at the NAVWPNSTA Seal Beach project site. The impact avoidance and minimization measures described in Section 2.6 would be implemented. Implementation of Alternative 3 at the NAVWPNSTA Seal Beach project site would not result in significant adverse impacts to water resources.

Impact Avoidance and Minimization Measures

Although there would be no significant impacts to water resources under Alternative 3, the same impact avoidance and minimization measures described under the Proposed Action/Alternative 1 would be incorporated as part of the project planning and design.

3.6.2.4 No Action Alternative

Under the No Action Alternative, the proposed project would not occur. There would be no change to baseline water resources. Therefore, no impacts to water resources would occur with the No Action Alternative.

3.7 Air Quality and Climate Change

Definition of Resource

Air quality refers to the ambient air concentrations of primary pollutants of concern, called "criteria pollutants," which include carbon monoxide (CO), sulfur dioxide (SO_2), nitrogen dioxide (NO_2), ozone, 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. Under the Clean Air Act, the USEPA has established National Ambient Air Quality Standards (NAAQS) (40 CFR 50) for these pollutants. The NAAQS represent the maximum levels of background pollution that are considered safe, with an adequate margin of safety, to protect public health and welfare.

There are two types of standards – primary and 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. Because different pollutants have different effects, the NAAQS are also different. Some pollutants have standards for both long-term and short-term averaging times. The short-term standards (i.e., 1-, 3-, 8-, and 24-hour periods) are designed to protect against acute, or short-term, health effects, while the 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 Clean Air Act requires states to develop a general plan to attain and maintain 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.

Ambient Air Quality

Ambient air quality is determined by the atmospheric concentrations of regulated air pollutants at specific locations deemed by air quality management agencies to be generally representative of local or regional conditions. The air pollutant concentrations measured at a specific location are determined by local and regional air pollutant emissions rates, local meteorology, and atmospheric chemistry. Emissions source considerations include types, rates, and locations of air pollutant emissions into the atmosphere. Wind speed and direction, vertical temperature and pressure gradients, and precipitation patterns affect the dispersal, dilution, and removal from the atmosphere of air pollutants. Lower ambient concentrations of these air pollutants generally indicate higher air quality. Regulatory agencies monitor ambient air quality to document compliance with state and federal air quality standards, and these monitoring data are reported as a mass per unit volume (e.g., micrograms per cubic meter of air) or as a volume fraction (e.g., parts per million by volume).

California has identified four additional pollutants for ambient air quality standards: visibility reducing particles, sulfates, hydrogen sulfide, and vinyl chloride. The California Air Resources Board (ARB) has also established the more stringent California Ambient Air Quality Standards (CAAQS). Areas within California in which ambient air concentrations of a pollutant are higher than the state and/or federal standard are considered to be nonattainment for that pollutant. Table 3.7-1 provides a list of NAAQS and CAAQS.

In addition to the NAAQS for criteria pollutants, national standards exist for hazardous air pollutants, which are regulated under Section 112(b) of the 1990 Clean Air Act Amendments. The National Emission Standards for Hazardous Air Pollutants regulate hazardous air pollutant emissions from stationary sources (40 CFR Part 61). Hazardous air pollutants emitted from mobile sources are called Mobile Source Air Toxics. Mobile source air pollutants are compounds emitted from highway vehicles and non-road equipment that are known or suspected to cause cancer or other serious health and environmental effects. Unlike the criteria pollutants, there are no NAAQS for benzene and other hazardous air pollutants. The primary control methodologies for these pollutants for mobile sources involves reducing their content in fuel and altering engine operating characteristics to reduce the volume of pollutants generated during combustion.

Permitting

New Source Review (Preconstruction Permit)

New major stationary sources and major modifications at existing major stationary sources are required by the Clean Air Act to obtain an air pollution permit before commencing construction. This permitting process for major stationary sources is called New Source Review and is required whether the major source or major modification is planned for nonattainment areas or attainment and unclassifiable areas. In general, permits for sources in attainment areas and for other pollutants regulated under the major source program are referred to as Prevention of Significant Deterioration permits, while permits for major sources emitting nonattainment pollutants and located in nonattainment areas are referred to as nonattainment New Source Review permits. Additional Prevention of Significant Deterioration permitting thresholds apply to increases in stationary source GHG emissions.

Title V (Operating Permit)

The Title V Operating Permit Program consolidates all Clean Air Act requirements applicable to the operation of a source, including requirements from the State Implementation Plan, preconstruction permits, and the air toxics program. It applies to stationary sources of air pollution that exceed the major stationary source emission thresholds, as well as other non-major sources specified in a particular regulation.

Table 3.7-1. National and California Ambient Air Quality Standards

Pollutant	Averaging Time	NAAQS[1]		CAAQS[2]
		Primary[3]	Secondary[4]	Concentration[5]
Ozone (O_3)[6]	1-Hour	---	---	0.09 ppm (180 µg/m^3)
	8-Hour	0.075 ppm (147 µg/m^3)	Same as Primary	0.070 ppm (137 µg/m^3)[9]
Carbon Monoxide (CO)	1-Hour	35 ppm (40 mg/m^3)	---	20 ppm (23 mg/m^3)
	8-Hour	9.0 ppm (10 mg/m^3)	---	9.0 ppm (10 mg/m^3)
Nitrogen Dioxide (NO_2)	1-Hour	0.1 ppm (188 µg/m^3)	---	0.18 ppm (338 µg/m^3)
	Annual Average	0.053 ppm (100 µg/m^3)	Same as Primary	0.03 ppm (56 µg/m^3)
Sulfur Dioxide (SO_2)7	1-Hour	0.075 ppm (196 µg/m^3)	---	0.25 ppm (715 µg/m^3)
	3-Hour	---	0.5 ppm (1,300 µg/m^3)	---
	24-Hour	---	---	0.04 ppm (114 µg/m^3)
Suspended Particulate Matter (PM_{10})	24-Hour	150 µg/m^3	Same as Primary	50 µg/m^3
	Annual Arithmetic Mean	---	---	20 µg/m^3(8)
Fine Particulate Matter ($PM_{2.5}$)	24-Hour	35 µg/m^3	Same as Primary	---
	Annual Arithmetic Mean	15 µg/m^3	Same as Primary	12 µg/m^3 (8)
Lead[9]	Rolling 3-Month Average	0.15 µg/m^3	Same as Primary	1.5 µg/m^3
Hydrogen Sulfide (H_2S)	1-Hour	No Federal Standards		0.03 ppm (42 µg/m^3)
Sulfates (SO_4)	24-Hour			25 µg/m^3
Visibility Reducing Particles	8-Hour (10am-6pm, PST)			In sufficient amount to produce extinction coefficient of 0.23 per kilometer of particles when relative humidity is less than 70
Vinyl chloride[9]	24-Hour			0.01 ppm (26 µg/m^3)

Sources: USEPA 2012; Cal/EPA ARB 2013a

Notes:

1. NAAQS (other than O_3, particulate matter, and those based on annual averages or annual arithmetic mean) are not to be exceeded more than once a year. The O_3 standard is attained when the fourth-highest 8-hour concentration in a year, averaged over 3 years, is equal to or less than the standard. For PM_{10}, the 24-hour standard is not to be exceeded more than once per year on average over 3 years. The 24-hour standard is attained when the 3-year average of the weighted annual mean at each monitor within an area does not exceed 150 µg/m^3. For $PM_{2.5}$, the 24-hour standard is attained when 98 percent of daily concentrations, averaged over 3 years, do not exceed 35 µg/m^3. The annual standard is attained when the 3-year average of the weighted annual mean at single or multiple community-oriented monitors does not exceed 15 µg/m^3.
2. CAAQS for O_3, CO (except Lake Tahoe), SO_2 (1- and 24-hour), NO_2, PM_{10} and visibility reducing particles, are values that are not to be exceeded. All others are not to be equaled or exceeded.
3. National Primary Standards: The levels of air quality necessary, with an adequate margin of safety, to protect the public health.
4. National Secondary Standards: Air quality levels necessary to protect public welfare from known/anticipated adverse impacts of a pollutant.
5. Concentration expressed first in units in which it was promulgated. Ppm refers to ppm by volume or micromoles of pollutant per mole of gas.
6. The federal 1-hour O_3 standard was revoked for most areas of the United States, including California on June 15, 2005.
7. Final rule signed June 2, 2010. The 1971 annual and 24-hour SO_2 standards were revoked in that same rulemaking.
8. On June 5, 2003, the Office of Administrative Law approved the amendments to the regulations for the state ambient air quality standards for particulate matter and sulfates. Those amendments established a new annual average standard for $PM_{2.5}$ of 12 µg/m^3 and reduced the level of the annual average standard for PM_{10} to 20 µg/m^3. Approved amendments were filed with the Secretary of State on June 5, 2003. Regulations became effective July 5, 2003.
9. The Cal/EPA ARB identified lead and vinyl chloride as "toxic air contaminants" with no threshold of exposure for adverse health impacts determined. These actions allow the implementation of control measures at levels below ambient concentrations specified for these pollutants in sufficient amount to produce an extinction coefficient of 0.23 per kilometer due to particles when relative humidity is less than 70 percent.

CAAQS = California Ambient Air Quality Standards
µg/m^3 = micrograms per cubic meter
NAAQS = National Ambient Air Quality Standards
Ppm = parts per million
PST = Pacific Standard Time

Climate Change and Greenhouse Gases

The USEPA defines climate change as any significant change in measures of climate (such as temperature, precipitation, or wind) lasting for an extended period of time (USEPA 2013b). Climate change may result from natural factors (e.g., changes in the sun's intensity or slow changes in the Earth's orbit around the sun), natural processes within the climate system (e.g., changes in ocean circulation), and human activities that change the atmosphere's composition (e.g., through burning fossil fuels) and the land surface (e.g., deforestation, reforestation, urbanization, desertification, etc.)

GHGs trap heat in the atmosphere causing a greenhouse effect. Increased atmospheric levels of CO_2 are correlated with rising temperatures, and concentrations of CO_2 have increased by 31 percent above pre-industrial levels since 1750. Climate models show that temperatures will probably increase by 1.4 to 5.8 degrees Celsius (34.52 to 42.44 degrees Fahrenheit) by the year 2100 (Intergovernmental Panel on Climate Change 2007).

The global warming potential of a GHG indicates the global warming potency of a GHG relative to CO_2. The global warming potential enables comparison of the warming effects of different GHGs using a relative scale that compares the warming effect of the gas in question with that of the same mass of CO_2. The CO_2 equivalent (CO_2e) is a measure used to sum the effect of emissions of various GHGs based on their global warming potential when projected over a time period (generally 100 years). The CO_2e for a gas is obtained by multiplying the mass of the gas (in tons) by its global warming potential.

Climate change, by its nature, is a cumulative impact resulting from multiple GHG sources. However, despite its inherently cumulative nature, climate change may have effects on particular facilities or areas. Therefore, the cumulative impacts of climate change are discussed in Chapter 4.0, Section 4.4.5. The direct emissions of GHGs from the Proposed Action/Alternative 1 and alternatives are presented in Section 3.7.3.

Local Air Quality Designations

California is divided into 15 air basins defined by generally similar meteorological and geographic conditions. Air basins in which ambient concentrations of a criteria air pollutant exceed the NAAQS are considered to be nonattainment areas for that air pollutant under the federal Clean Air Act. Nonattainment areas for some criteria air pollutants are further classified, depending upon the severity of their air quality problem, to facilitate their management:

- Ozone: marginal, moderate, serious, severe, and extreme
- CO: moderate and serious
- PM: moderate and serious

Areas that have attained the NAAQS may be designated as attainment areas or as maintenance areas, subject to maintenance plans demonstrating how the area will continue to meet the NAAQS.

Primary and Secondary Air Pollutants

Air pollutants are classified as either primary or secondary pollutants. Primary air pollutants, such as CO, SO_2, lead, particulates, and hydrogen sulfide, are emitted directly into the atmosphere. Secondary air pollutants, such as ozone, are formed through atmospheric chemical reactions. Such reactions usually involve primary air pollutants and normal constituents of the atmosphere. Sunlight and meteorological conditions, such as temperature and humidity, also can affect atmospheric chemistry. Air pollutants, such as organic gases and particulates, are a combination of primary and secondary pollutants. PM_{10} and $PM_{2.5}$ are generated as primary pollutants by various mechanical processes (e.g., abrasion, erosion, mixing, or atomization) or combustion processes. PM_{10} also may result from agricultural operations, travel on unpaved roads, and wind erosion of bare soils.

Compounds that react to form secondary air pollutants are referred to as precursors. Ozone precursors fall into two broad groups of chemicals: nitrogen oxides (NO_X) and organic compounds. NO_X includes both nitric oxide (NO) and NO_2. Organic compound precursors of ozone are routinely described by a number of different terms, including volatile organic compounds (VOCs), reactive organic compounds, and reactive organic gases. $PM_{2.5}$ also can be formed through chemical reactions or by the condensation of gaseous pollutants into fine aerosols. NO_X and SO_2 are precursors of $PM_{2.5}$. Precursors generally are monitored and regulated to control atmospheric concentrations of the associated criteria pollutants.

General Conformity

The USEPA General Conformity Rule applies to federal actions occurring in federal nonattainment or maintenance areas when the total 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) vary by pollutant and depend on the severity of the nonattainment status.

A conformity applicability analysis is the first step in evaluating if a federal action must be supported by a conformity determination. This is typically accomplished by quantifying applicable emissions that are projected to result due to implementation of the federal action. If the results of the applicability analysis indicate total emissions would not exceed the *de minimis* emissions thresholds, then the conformity evaluation process is completed.

Regulatory Setting

Federal Regulations

Section 176(c) of the Clean Air Act, as articulated in the USEPA General Conformity Rule, states that a federal agency cannot issue a permit or support an activity unless the agency determines that it will conform to the most recent USEPA-approved State Implementation Plan. This means that projects using federal funds or requiring federal approval in nonattainment or maintenance areas must not: (1) cause or contribute to any new violation of a NAAQS, (2) increase the frequency or severity of any existing violation, or (3) delay timely attainment of any standard, interim emission reduction, or other milestone.

The General Conformity Rule applies to federal actions affecting areas that are in nonattainment of a NAAQS and to designated maintenance areas (attainment areas that have been reclassified from a previous nonattainment status and which are required to prepare an Air Quality Maintenance Plan).

Conformity determinations are required when the annual direct and indirect emissions from a federal action exceed an applicable *de minimis* threshold. The conformity *de minimis* thresholds vary by pollutant and the severity of nonattainment conditions in the region affected by the proposed project. Based upon these designations, the applicable annual conformity *de minimis* thresholds for the project area within the South Coast Air Basin are: (1) 10 tons of VOCs and NO_x; (2) 70 tons of PM_{10}; and, (3) 100 tons of CO, $PM_{2.5}$, and SO_2 (since it is a precursor emission of $PM_{2.5}$). South Coast Air Quality Management District Rule 1901 implements the USEPA General Conformity Rule.

The USEPA issued the Final Mandatory Reporting of Greenhouse Gases Rule on October 30, 2009. Under the rule, suppliers of fossil fuels or industrial GHG, 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 the USEPA. On a national scale, federal agencies are addressing emissions of GHGs by reductions mandated in federal laws and EOs. Most recently, EO 13423, Strengthening Federal Environmental, Energy, and Transportation Management, and EO 13514, Federal Leadership in Environmental, Energy, and Economic Performance, were enacted to address GHGs, including GHG emissions inventory, reduction, and reporting.

State Regulations

The CARB is responsible for the coordination and administration of both federal and state air pollution control programs within California and implementation of the California Clean Air Act.

Local Regulations

The South Coast Air Quality Management District has developed air quality plans that are designed to bring the region into attainment of the national and state ambient air quality standards. Air Quality Management District Rule 403, Fugitive Dust, would apply to earth-moving activities associated with site preparation for the proposed PV systems.

3.7.1 Affected Environment for Air Quality

NAVWPNSTA Seal Beach is located in Orange County, which is within the South Coast Air Basin. The South Coast Air Basin is comprised of a single air district, the South Coast Air Quality Management District, and consists of Orange County and the urban portions of Los Angeles, Riverside, and San Bernardino counties. Due to the combined air pollution sources from over 15 million people, and meteorological and geographical effects that limit the dispersion of these pollutants, the South Coast Air Basin can experience high air pollutant concentrations. The South Coast Air Basin has been characterized by the USEPA as extreme nonattainment for ozone, nonattainment for PM_{10}, nonattainment for $PM_{2.5}$, and attainment for SO_2. The portion of Los Angeles County within the South Coast Air Basin (not including the project site within Orange County) is also a nonattainment area for lead (USEPA 2013a). This

air basin is also a maintenance area for NO_2 and CO (USEPA 2013a). The California Environmental Protection Agency Air Resources Board (Cal/EPA ARB) has designated the South Coast Air Basin as extreme nonattainment for ozone, nonattainment for PM_{10}, $PM_{2.5}$, NO_2, and lead, and unclassified/attainment for all other criteria pollutants (Cal/EPA ARB 2013b).

The most recent emissions inventory for the South Coast Air Basin is shown in Table 3.7-2.

Table 3.7-2. South Coast Air Basin 2012 Estimated Average Emissions (tons per day)

TOG	ROG	CO	NO_X	SO_X	PM	PM_{10}	$PM_{2.5}$
1517.2	630.9	2572.9	516.5	20.0	248.1	183.7	94.0

Source: Cal/EPA ARB 2013b
Key:
CO = carbon monoxide
NO_X = oxides of nitrogen
PM = total particulate matter
$PM_{2.5}$ = fine particulate matter less than or equal to 2.5 microns in diameter
PM_{10} = suspended particulate matter less than or equal to 10 microns in diameter
ROG = reactive organic gases
SO_X = oxides of sulfur
TOG = total organic gases

Sensitive Air Quality Receptors

Sensitive receptors are those populations that are more susceptible to the effects of air pollution than the population at large. Sensitive receptors are defined as long-term health care facilities, rehabilitation centers, convalescent centers, retirement homes, residences, schools, playgrounds, childcare centers, and athletic facilities. For this air quality analysis, sensitive receptors within 0.25 mile (0.4 kilometer) of the project sites have been identified.

Sensitive off-station receptors within 0.25 mile (0.4 kilometer) of Site A (see Figure 2-1) would include:

- Residential areas along Bolsa Chica Street, between the intersections with Edinger Avenue and Tasman Avenue
- Residential areas along Edinger Avenue between the intersections with Bolsa Chica Street and Fantasia Lane
- A private school (preschool through 8th grade) and park near intersection of Bolsa Chica Street and West McFadden Avenue
- A private school (daycare through 3rd grade) and park near intersection of Edinger Avenue and Waikiki Lane

Sensitive off-station receptors within 0.25 mile (0.4 kilometer) of Site B (see Figure 2-2) would include:

- Residential areas along Bolsa Chica Road, between the intersections with Westminster Boulevard and Dartmouth Road

3.7.2 Environmental Consequences to Air Quality

This section discusses the effects on existing ambient air quality that may occur from implementation of alternatives using criteria specified under NEPA §1502.16. To compare effects, this analysis defines the duration, area, and intensity of the effects for each alternative.

Methodology

Potential impacts to air quality were assessed by developing emission estimates associated with proposed construction and operation of solar PV sites at NAVWPNSTA Seal Beach under each alternative. Temporary air emissions from construction were calculated based on estimates in terms of:

- Number and types of equipment used during construction of the solar PV systems
- Acreage of the disturbed sites during construction
- Duration of the construction work
- Total electrical output in MW-hours per year

These data were used as input for air emissions calculations from construction. For construction equipment vehicle exhaust, two sets of emission factors were used to determine construction emissions: (1) non-road equipment emission factors for equipment that is not licensed for on-road travel; and (2) on-road emission factors for vehicles used during the construction phase of the project. For the non-road emission factors, the USEPA NONROAD Model was used (USEPA 2005); for on-road emission factors, the California EMFAC v2011 emission factor database was used (Cal/EPA ARB 2011).

Fugitive dust emissions from site preparation work, which may include scraping, grading, loading, digging, compacting, light duty vehicle travel, and other operations, were estimated using emission factors from Cal/EPA ARB Section 7.7, Building Construction Dust (Cal/EPA ARB 2002; USEPA 1999). Per the emissions estimation methodology of Section 7.7 (Cal/EPA ARB 2002), the construction emission factors used are assumed to include the effects of typical control measures, such as routine watering for dust suppression.

It is assumed that construction emissions would occur between 2015 and 2017. The duration of project-related construction activities would be 9 to 11 months for all alternatives; therefore, all construction emissions were considered to occur in 1 year for the General Conformity analysis.

Under the proposed project, electrical energy production from the solar PV facilities would reduce emissions associated with existing non-renewable sources. Annual emissions reductions are assumed to begin between 2016 and 2018, and would be realized for each year the solar PV systems would be in operation. Year 2010 eGRID non-baseload output emission rates for the Western Electricity Coordinating Council California subregion (USEPA 2014) were used to estimate emission reductions.

3.7.2.1 Proposed Action/Alternative 1

Emissions would occur during construction as the result of combustion of fuel in off-road construction equipment and on-road vehicles. Construction-related traffic generation would

include equipment delivery, onsite and offsite vehicle and construction equipment, and automobile trips for construction workers in personal vehicles. Impact avoidance and minimization measures for dust abatement, as presented in Section 2.6.2, would be followed to minimize emissions, to the extent practicable.

Table 3.7-3 shows the estimated construction emissions generated under the Proposed Action/Alternative 1 and applicable General Conformity *de minimis* thresholds. Emissions of pollutants subject to General Conformity are below their respective *de minimis* values. Detailed construction equipment assumptions and emissions calculations are provided in Appendix B.

Table 3.7-3. Estimated Construction Emissions under Proposed Action/Alternative 1

	Emissions (tons per year)						
	NOx	**CO**	**VOCs**	**SO_2**	**PM_{10}**	**$PM_{2.5}$**	**CO_2**
Construction Emissions	3.14	1.38	0.25	0.12	38.23	4.06	785.43
General Conformity *de minimis* Threshold	100	N/A	50	N/A	70	100	N/A

Key:
CO = carbon monoxide
CO_2 = carbon dioxide
N/A = not applicable, *de minimis* thresholds need not be considered when the project area is in attainment for the criteria pollutant(s) in question.
NO_X = oxides of nitrogen
$PM_{2.5}$ = fine particulate matter less than or equal to 2.5 microns in diameter
PM_{10} = suspended particulate matter less than or equal to 10 microns in diameter
SO_2 = sulfur dioxide
VOCs = volatile organic compounds

Table 3.7-4 shows the estimated emissions avoided through use of solar PV systems and reduced consumption of existing non-renewable supplied electricity. Detailed construction equipment assumptions and emissions calculations are provided in Appendix B.

Table 3.7-4. Estimated Annual Emissions Avoided under Proposed Action/Alternative 1

Pollutant	Emissions (tons per year)
CO_2e	34,127
NO_X	14.77
SO_2	6.23

Key:
CO_2e = carbon dioxide equivalents
NO_X = oxides of nitrogen
SO_2 = sulfur dioxide

Implementation of the Proposed Action/Alternative 1 would result in localized, short-term effects on air quality at NAVWPNSTA Seal Beach. During operation, emissions of NO_X, SO_2, and CO_2e would be avoided by reduced consumption of grid-supplied electricity, and would more than offset the short-term construction emissions within the first year of operation. Subsequent years of operation would also avoid emissions produced from conventional non-renewable generating sources. As total construction emissions would be below the *de minimis* thresholds and operation emissions would result in beneficial effects to air quality, implementation of the Proposed Action/Alternative 1 would not result in significant adverse impacts to air quality.

A Record of Non-Applicability (RONA) has been completed for project development at NAVWPNSTA Seal Beach in accordance with the Clean Air Act (refer to Appendix B).

The decommissioning and restoration process would involve the removal of structures, restoration of topsoil, revegetation, and seeding. Temporary erosion and sedimentation control BMPs would be used during the decommissioning phase of the project. Because the site would be returned to previous conditions and the decommissioning phase would require a duration significantly shorter than that of construction, decommissioning at the close of the 37-year period would not result in significant adverse impacts to air quality.

Impact Avoidance and Minimization Measures

Impact avoidance and minimization measures for dust abatement, as presented in Section 2.6.2, would be followed to minimize emissions.

3.7.2.2 Alternative 2

Under Alternative 2, construction emissions would occur from the same activities described in the Proposed Action/Alternative 1, except only at Site A. The same impact avoidance and minimization measures would apply.

Table 3.7-5 shows estimated construction emissions generated under Alternative 2 and applicable General Conformity *de minimis* thresholds. Emissions of pollutants subject to General Conformity are below their respective *de minimis* values. Detailed construction equipment assumptions and emissions calculations are provided in Appendix B.

Table 3.7-5. Estimated Construction Emissions under Alternative 2

	Emissions (tons per year)						
	NOx	**CO**	**VOCs**	**SO_2**	**PM_{10}**	**$PM_{2.5}$**	**CO_2**
Construction Emissions	1.57	0.69	0.12	0.06	17.74	1.89	392.72
General Conformity *de minimis* Threshold	100	N/A	50	N/A	70	100	N/A

Key:
CO = carbon monoxide
CO_2 = carbon dioxide
N/A = not applicable, *de minimis* thresholds need not be considered when the project area is in attainment for the criteria pollutant(s) in question
NO_X = oxides of nitrogen
$PM_{2.5}$ = fine particulate matter less than or equal to 2.5 microns in diameter
PM_{10} = suspended particulate matter less than or equal to 10 microns in diameter
SO_2 = sulfur dioxide
VOCs = volatile organic compounds

Table 3.7-6 shows the estimated emissions avoided through use of solar PV systems and reduced consumption of existing non-renewable supplied electricity. Detailed construction equipment assumptions and emissions calculations are provided in Appendix B.

Table 3.7-6. Estimated Annual Emissions Avoided under Alternative 2

Pollutant	Emissions (tons per year)
CO_2e	13,651
NO_X	5.91
SO_2	2.49

Key:
CO_2e = carbon dioxide equivalents
NO_X = oxides of nitrogen
SO_2 = sulfur dioxide

Implementation of Alternative 2 would result in localized, short-term effects on air quality at NAVWPNSTA Seal Beach. During operation, emissions of NO_X, SO_2, and CO_2e would be avoided by reduced consumption of grid-supplied electricity, and would more than offset the short-term construction emissions within the first year of operation. Subsequent years of operation would also avoid emissions produced from conventional non-renewable generating sources. As total construction emissions would be below the *de minimis* thresholds and operation emissions would result in beneficial effects to air quality, implementation of Alternative 2 would not result in significant adverse impacts to air quality. A RONA has been completed for project development at NAVWPNSTA Seal Beach in accordance with the Clean Air Act (refer to Appendix B).

The decommissioning and restoration process would be the same as described for the Proposed Action/Alternative 1. Therefore, decommissioning at the close of the 37-year period would not result in significant adverse impacts to air quality.

Impact Avoidance and Minimization Measures

Implementation of Alternative 2 would employ the same impact avoidance and minimization measures as the Proposed Action/Alternative 1.

3.7.2.3 Alternative 3

Under Alternative 3, construction emissions would occur from the same activities described in the Proposed Action/Alternative 1, except only at Site B. The same impact avoidance and minimization measures would apply.

Table 3.7-7 shows estimated construction emissions generated under Alternative 3 and applicable General Conformity *de minimis* thresholds. Emissions of pollutants subject to General Conformity are below their respective *de minimis* values. Detailed construction equipment assumptions and emissions calculations are provided in Appendix B.

Table 3.7-7. Estimated Construction Emissions under Alternative 3

	Emissions (tons per year)						
	NOx	**CO**	**VOCs**	**SO_2**	**PM_{10}**	**$PM_{2.5}$**	**CO_2**
Construction Emissions	1.44	0.63	0.11	0.06	20.20	2.13	359.83
General Conformity *de minimis* Threshold	100	N/A	50	N/A	70	100	N/A

Key:
CO = carbon monoxide
CO_2 = carbon dioxide
N/A = not applicable, *de minimis* thresholds need not be considered when the project area is in attainment for the criteria pollutant(s) in question
NO_X = oxides of nitrogen
$PM_{2.5}$ = fine particulate matter less than or equal to 2.5 microns in diameter
PM_{10} = suspended particulate matter less than or equal to 10 microns in diameter
SO_2 = sulfur dioxide
VOCs = volatile organic compounds

Table 3.7-8 shows the estimated emissions avoided through use of solar PV systems and reduced consumption of existing non-renewable supplied electricity. Detailed construction equipment assumptions and emissions calculations are provided in Appendix B.

Table 3.7-8. Estimated Annual Emissions Avoided under Alternative 3

Pollutant	Emissions (tons per year)
CO_2e	20,476
NO_X	8.86
SO_2	3.74

Key:
CO_2e = carbon dioxide equivalents
NO_X = oxides of nitrogen
SO_2 = sulfur dioxide

Implementation of Alternative 3 would result in localized, short-term effects on air quality at NAVWPNSTA Seal Beach. During operation, emissions of NO_X, SO_2, and CO_2e would be avoided by reduced consumption of grid-supplied electricity, and would more than offset the short-term construction emissions within the first year of operation. Subsequent years of operation would also avoid emissions produced from conventional non-renewable generating sources. As total construction emissions would be below the *de minimis* thresholds and operation emissions would result in beneficial effects to air quality, implementation of Alternative 3 would not result in significant adverse impacts to air quality. A RONA has been completed for project development at NAVWPNSTA Seal Beach in accordance with the Clean Air Act (refer to Appendix B).

The decommissioning and restoration process would be the same as described for the Proposed Action/Alternative 1. Therefore, decommissioning at the close of the 37-year period would not result in significant adverse impacts to air quality.

Impact Avoidance and Minimization Measures

Implementation of Alternative 3 would employ the same impact avoidance and minimization measures as the Proposed Action/Alternative 1.

3.7.2.4 No Action Alternative

Under the No Action Alternative, no solar PV sites would be constructed, consumption of grid-supplied electricity would remain unchanged, and there would be no short-term air emissions associated with implementation of the proposed project. Air emissions would not change from current conditions; therefore, implementation of the No Action Alternative would not result in significant adverse impacts to air quality.

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3.8 Traffic and Circulation

Definition of Resource

This section describes existing conditions with respect to traffic and circulation for the regional roadway network surrounding NAVWPNSTA Seal Beach.

3.8.1 Affected Environment for Traffic and Circulation

The traffic circulation system that surrounds NAVWPNSTA Seal Beach is comprised of regional freeways, highways and arterial streets (see Figure 3.8-1). Regional access to NAVWPNSTA Seal Beach is provided by I-405 and SR-1 (Pacific Coast Highway). Arterial streets are major roads used for through traffic in the area. Seal Beach Boulevard, Bolsa Chica Road/Street, and Westminster Avenue/Boulevard are arterial streets from which NAVWPNSTA Seal Beach is accessed. Bolsa Chica Road/Street runs north-south on the eastern perimeter of NAVWPNSTA Seal Beach. In the City of Huntington Beach, it is designated as Bolsa Chica Street. When it crosses the boundary into the City of Westminster, that designation changes to Bolsa Chica Road. Between the east-west boundaries of the station, Westminster Boulevard is designated as Westminster Avenue.

Westminster Avenue/Boulevard and the Pacific Coast Highway are the only public roads that traverse the station. Primary access to NAVWPNSTA Seal Beach is through two gates: the Main Gate and the Westminster Gate. Traffic entering and exiting NAVWPNSTA Seal Beach generally flows well with the exception of short-term congestion occurring during the morning and evening rush hours when there is an increase in vehicles entering and exiting the station for work. On station, all roadways are within the Navy's jurisdiction.

Site A can be accessed from either Bolsa Chica Road or Perimeter Road on station (see Figure 2-1). It is bounded by the Orange County Flood Control Channel to the east and south. Site B can be accessed from either Westminster Avenue or Perimeter Road on station, and is bounded by the Orange County Flood Channel to the east (see Figure 2-2). Current traffic levels near Sites A and B are minimal.

Level of service (LOS) is a qualitative measure of roadway operations using a grading scale of A to F with A representing the best operating conditions and F representing the worst.

I-405 is a 14-lane, east-west freeway that runs along the northern boundary of the station. Access between NAVWPNSTA Seal Beach and I-405 is provided via the Seal Beach Boulevard interchange. The northbound Seal Beach Boulevard interchange operates at LOS B during Peak AM traffic and at a LOS of F during Peak PM traffic. The southbound interchange operates at LOS E during both Peak AM and PM traffic (City of Seal Beach 2003). Improvements to the I-405/Seal Beach interchange are currently in progress.

Figure 3.8-1. NAVWPNSTA Seal Beach Traffic Circulation Network

SR-1 (Pacific Coast Highway) is a four-lane, southeast-northwest divided highway that crosses the southwest corner of the station. The highway has a capacity of 37,500 Average Daily Traffic (ADT) south of Seal Beach Boulevard (City of Seal Beach 2003). The existing ADT on SR-1 south of Seal Beach Boulevard is 41,900 and the segment operates at a LOS F (City of Seal Beach 2003).

Bolsa Chica Street/Road is a six-lane, north-south divided roadway that runs the eastern perimeter of the station. It has a capacity of 35,000 ADT and operates at LOS A east of NAVWPNSTA Seal Beach (City of Seal Beach 2003).

Seal Beach Boulevard is a six-lane arterial highway that borders the station to the west with a capacity of 53,300 ADT. The road is divided between I-405 and SR-1. South of SR-1, it becomes an undivided two-lane road. The existing volumes along Seal Beach Boulevard between SR-1 and I-405 range from 40,000 to 21,000 ADT (City of Seal Beach 2003). The road segment between I-405 and Golden Rain Road operates at a LOS C and the segment between Golden Rain Road and St. Andrews Drive operates at a LOS C. All other roadway segments operate at a LOS A.

Westminster Avenue/Boulevard is a four-lane, east-west divided highway with a capacity of 37,000 ADT. Between the east-west boundaries of the station, the roadway is designated as Westminster Avenue and divides the station into two distinct areas. At the station boundary on the eastern perimeter, Westminster Avenue becomes Westminster Boulevard. The existing volume along Westminster Avenue east of Seal Beach Boulevard is 22,500 ADT and the segment operates at a LOS A (City of Seal Beach 2003).

3.8.2 Environmental Consequences to Traffic and Circulation

Changes to traffic and circulation with project implementation would result from construction of the PV systems at NAVWPNSTA Seal Beach. Operation and maintenance of the PV system would require very minimal on-station workers visiting the site only sporadically for maintenance. Eventual decommissioning of the PV systems and return of Sites A and B to pre-existing conditions would be considered at the close of the lease period (up to 37 years from construction and operation of the systems) when current conditions could be more accurately described at that time.

3.8.2.1 Proposed Action/Alternative 1

Under the Proposed Action/Alternative 1, construction vehicles using local roadways to travel through the Westminster Gate to NAVWPNSTA Seal Beach would contribute to overall traffic in the area. The Westminster Gate is also used by ordnance-laden trucks routinely for entrance to the station. Procedures for entrance of commercial trucks are well established. The construction contractor would coordinate entrance requirements as part of pre-construction planning to avoid delays or routine ingress of traffic. For purposes of analysis, type of vehicle, number, and number of trips to and from the station are estimated in Table 3.8-1.

Table 3.8-1. Construction-Related Traffic for the Proposed Action/Alternative 1

Vehicle Type	Number of	Number of	Trips to NAVWPNSTA	Trips from NAVWPNSTA	Total Trips

	Vehicles	days[1]	Seal Beach	Seal Beach	
Passenger truck (Ford F-150 or similar)[2]	4	120	480	480	960
Water truck (for dust suppression and other construction activities)	10	120	1,200	1,200	2,400
Tractor-trailer delivery truck (carrying PV panels, and other PV system infrastructure)	6	100	600	600	1,200
Tractor-trailer delivery truck (carrying heavy construction equipment such as bulldozers, scrapers, backhoes, forklifts, bobcats, etc.), tackifier truck (for soil adhesive), dump truck[3]	8	20	160	160	320
Total Trips					**4,880**

Notes:

1. Although construction is estimated to require 9 to 11 months for completion, 10 months with 20 working days per month (120 days) were used for trip estimates.
2. Construction workers would arrive on site using a combination of passenger trucks and dual-purpose construction vehicles.
3. It is assumed that heavy construction equipment would remain on site either for the duration of construction or for periods of time and that daily trips to and from the station would not occur. Eight tractor-trailers for 20 days is considered to be a conservative estimate of trips required.

Table 3.8-1 provides an estimated summary of traffic for the duration of the 9- to 11-month construction period. A representative full day of construction with a peak number of trips with all vehicles in operation was used to estimate a scenario bounded on the upper limit to assess the Proposed Action/Alternative 1 contributions to traffic and circulation. On the busiest day of construction, the maximum number of additional vehicles contributing to regional traffic is estimated to be 64 vehicles for that day. That number represents two round-trips to NAVWPNSTA Seal Beach for every vehicle estimated to support construction of the Proposed Action/Alternative 1 and an additional 8 trips for in/out trips mid-day.

With the exception of SR-1 (Pacific Coast Highway), which operates at LOS F, and I-405, which operates at LOS F during peak PM traffic hours, no other roadways are operating at above capacity. The addition of 64 vehicles per day contributing to local/regional traffic would have a negligible impact on the local traffic and circulation conditions and would not affect current LOSs for any of the principal roadways that serve NAVWPNSTA Seal Beach and the surrounding cities, including SR-1 and I-405. Additionally, prior to construction, the construction contractor would incorporate approved route considerations into the pre-construction planning. It is assumed that for the estimated 9- to 11-month construction period, heavy equipment would remain on site during construction activities requiring heavy equipment heavy equipment, resulting in negligible and temporary impacts. Implementation of the Proposed Action/ Alternative 1 would not result in significant adverse impacts to traffic and circulation due to construction. Implementation of the Proposed Action/Alternative 1 would result in negligible and temporary impacts to traffic and circulation due to construction of the Proposed Action/ Alternative 1.

The decommissioning and restoration process would involve the removal of structures, restoration of topsoil, revegetation, and seeding. Because the site would be returned to previous conditions and the decommissioning phase would require a duration significantly shorter than that of construction, decommissioning at the close of the 37-year period would not result in significant adverse impacts.

Impact Avoidance and Minimization Measures

As a BMP, the Private Partner's construction contractor could be required to prepare a traffic management plan to address construction-related traffic entering the Westminster Gate. The traffic management plan may include the following elements:

- The construction schedule, including duration, anticipated peak travel hours, and types of vehicles, including transport of heavy machinery;
- A description of the project work area, including a map of the routes to and from the Westminster Gate at NAVWPNSTA Seal Beach and the regional roadways directly affected by construction traffic; and
- Specific traffic restrictions implemented on roadways during construction, including potential shoulder closures, lane closures, lane shifts, roadway direction restrictions, use of temporary signs, arrow boards, and channeling devices.

3.8.2.2 Alternative 2

Impacts associated with Alternative 2 would be the same as described for the Proposed Action/Alternative 1, except that the PV system would only be constructed, operated, and maintained at Site A, an approximately 64-acre (26-hectare) parcel. Site A would experience short-term, negligible impacts due to construction. Implementation of Alternative 2 would not result in significant adverse impacts to traffic or circulation.

Impact Avoidance and Minimization Measures

Implementation of Alternative 2 would employ the same impact avoidance and minimization measures as the Proposed Action/Alternative 1.

3.8.2.3 Alternative 3

Impacts associates with Alternative 3 would be the same as described for the Proposed Action/Alternative 1, except that the PV system would only be constructed, operated, and maintained at Site B, an approximately 73-acre (29-hectare) parcel. Site B would experience short-term, negligible impacts due to construction. Implementation of Alternative 3 would not result in significant adverse impacts to traffic or circulation.

Impact Avoidance and Minimization Measures

Implementation of Alternative 3 would employ the same impact avoidance and minimization measures as the Proposed Action/Alternative 1.

3.8.2.4 No Action Alternative

Under the No Action Alternative, PV systems would not be constructed and there would be no new activities that would contribute to traffic and circulation under the proposed project. Implementation of the No Action Alternative would not result in significant adverse impacts to traffic and circulation.

3.9 Utilities

Definition of Resource

Utilities would typically encompass any wet or dry utility that currently serves the existing project area. This would include drinking water, wastewater, storm water, solid waste management, electrical energy, natural gas, and communication services. Due to the nature of the proposed project, there would be no increased demand for water, wastewater, solid waste management, and communication services. The proposed project sites at NAVWPNSTA Seal Beach do not have any utility services since they are currently used for agricultural purposes only. Therefore, this section will focus only on storm water and its conveyance and electrical energy.

Regulatory Setting

The following laws and regulations are applicable to utilities for implementation and management of federal projects and programs.

Energy Independence and Security Act of 2007

This Act established energy management goals and requirements in several areas, including energy reduction goals for federal buildings, performance and standards for new buildings and major renovations, high-performance buildings, energy-efficient product procurement, and reducing petroleum/increasing alternative fuel use. Under Section 348, Storm Water Runoff Requirements for Federal Development Projects, any development or redevelopment project involving a federal facility with a footprint exceeding 5,000 square feet (464.6 square meters) must use planning, design, construction, and maintenance strategies to 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.

Federal Low-Impact Development Guidance

In addition to identifying solutions to the existing storm drain conveyance system required of this study and complying with NPDES requirements, the following policies and criteria call for the integration of low impact development techniques into future systems:

- Department of the Navy Low Impact Development Policy for Stormwater Management Memorandum
- UFC: Low Impact Development (UFC 3-210-10; DoD 2010)

As stated by federal criteria (UFC 3-210-10; DoD 2010), storm water management solutions must be equivalent to any applicable state and local government-approved BMPs and meet technical performance criteria.

Other Federal Guidance

The Energy Policy Action of 1992, EO 12902, EO 13432, and Presidential Directives require federal agencies to meet specific energy and water management goals.

The Energy Policy Act of 2005 established a number of energy management goals for federal facilities and fleets, including metering and reporting, energy-efficient product procurement,

energy savings performance contracts, building performance standards, renewable energy requirements, and alternative fuel use.

CFR Title 42, Federal Energy Management, requires the coordination of federal agencies to develop mandatory standards with respect to energy conservation and energy efficiency.

Clean Water Act of 1972
A description of the CWA can be found in Section 3.6, Water Resources. The following sections apply to storm water.

CWA Section 319, State Non-point-Source Management Program
Although Section 319 includes no enforcement mechanism to ensure that states develop and implement programs, CWA Section 303 requires states to identify all activities causing a water body to be impaired, including non-point-source pollutants, and to develop mitigation plans.

CWA Section 402
CWA Section 402 sets forth regulations that prohibit the discharge of pollutants into waters of the United States from any point-source (military bases) without obtaining an NPDES permit. SWRCB implements the NPDES and the state's water quality programs by regulating point-source discharges of wastewater and agricultural runoff to land and surface waters to protect their beneficial uses.

CWA Section 403
CWA Section 403 provides that point-source discharges to the territorial seas, contiguous zones, and oceans are subject to regulatory requirements in addition to the technology- or water-quality-based requirements applicable to typical discharges.

Executive Order 11988, Floodplain Management
EO 11988 directs federal agencies to refrain from conducting, supporting, or allowing activities that would significantly encroach on a floodplain unless it is the only practicable alternative. If the only practicable alternative requires siting in a floodplain, the agency must design or modify its action to minimize the encroachment and explain why the proposed project must be located in a floodplain.

Federal Antidegradation Policy
The Federal Antidegradation Policy of 1968 protects existing uses, water quality, and national water resources, and directs state to adopt a policy that maintains and protects a standard of water quality for state water resources.

3.9.1 Affected Environment for Utilities

3.9.1.1 Water

Irrigation lines for crop watering run beneath the plowed agricultural fields within Site A. No other water infrastructure is located within Sites A and B.

3.9.1.2 Storm Water Conveyance

No storm water facilities are located within the vicinity of Sites A and B. Existing runoff sheet flows across both disturbed sites generally in a westward direction. Refer to Figures 1 and 2 in the Hydrologic Analysis for Seal Beach Solar Development Tech Memo dated January 19, 2015 for the existing conditions map (Appendix C).

Sites A and B are adjacent to the Orange County Flood Control Channel that runs southerly east of Perimeter Road, then turning westward towards Huntington Harbor. The flood control channel, approximately 100 feet (30 meters) wide, is fenced and has a fabricated rocky slope and bank. The channel is designed to handle water flow from storm drains and other runoff from within the entire watershed area and ultimately flows into Huntington Harbor, Anaheim Bay, and SBNWR, and then into the Pacific Ocean. Runoff from Sites A and B ultimately makes its way to either the Huntington Harbor or the Orange County Flood Control Channel via surface flow.

Pre-project runoff rates for the 100-year storm were calculated for Sites A and B using the 1986 Orange County Hydrology Manual and are presented in the table below (Table 3.9-1).

Table 3.9-1. Pre-Project Runoff Rates for the 100-Year Storm

	100-Year Storm Event
Project Site	**cubic feet per second**
South (A)	122.4
North (B)	123.8
TOTAL	**246.2**

See the Hydrologic Analysis for NAVWPNSTA Seal Beach Solar Development Tech Memo dated January 19, 2015 for a more detailed discussion of the existing conditions (Appendix C).

3.9.1.3 Energy

Power lines run along the east side of Sites A and B parallel with the Orange County Flood Control Channel. The existing small buildings within the center of Site A receive power from these power lines.

NAVWPNSTA Seal Beach purchases power from Southern California Edison, and the electrical distribution system for the installation consists of overhead lines that interconnect all of the major site operations. Southern California Edison maintains two 12-kilovolt feeder lines that supply the NAVWPNSTA Seal Beach site. The NAVWPNSTA Seal Beach distribution system contains about 6.7 megavolt amperes of transformer capacity and approximately 31 miles (49.9 kilometers) of Navy-owned distribution lines. NAVWPNSTA Seal Beach consumed 7,796 megawatt hours of electricity in fiscal year 2013 (Trinh 2015).

3.9.2 Environmental Consequences to Utilities

This section discusses the impacts of the alternatives on the existing utilities, as well as the impacts of any proposed utilities and PV systems. Due to the nature of the project, there would be no increased demand for water, wastewater, solid waste management, or communication

services. The proposed project sites at NAVWPNSTA Seal Beach do not have any current utility services since they are currently used for agricultural purposes only. Therefore, this section will focus on storm water and energy only.

3.9.2.1 Proposed Action/Alternative 1

Potential Impacts

Storm Water Conveyance

Since there are no existing storm water facilities within the Proposed Action/Alternative 1 area, there is no potential for impact on site. However, there are existing storm water facilities adjacent to the proposed project sites that would continue to receive runoff.

An analysis of the 100-year storm runoff from the proposed project sites for the post-project conditions was conducted per the 1986 Orange County Hydrology Manual in order to determine impacts, if any. Due to the method of installation of the PV system, additional impervious area would be negligible, no mass grading would be required, and the existing ground cover would be replaced in kind with minimal amounts of gravel for access roadways. With only a negligible increase in impervious area, no change in existing grades, and no change in ground cover, there would be no change in the runoff characteristics, patterns, or flow rates from implementation of the Proposed Action/Alternative 1. The runoff patterns would also continue to sheet flow to match existing conditions, potentially alleviating the need for on-site drainage facilities. Existing drainage structures outside of the project site would also not require modification since there would be no increase in runoff. The pre-project runoff amounts presented in Section 3.9.2.2 are the same for the post-project condition. Implementation of the Proposed Action/Alternative 1 would not result in significant impacts to storm water conveyance.

See the Hydrologic Analysis for Seal Beach Solar Development Tech Memo dated January 15, 2015 for a more detailed discussion of the proposed conditions (Appendix C).

Energy

The existing power lines on Site A would be removed, and the only new infrastructure needed for this Alternative would be electrical cable and associated infrastructure. The electrical wiring would be trenched to a depth of 4 to 6.5 feet (1.2 to 2 meters) below ground surface or installed overhead on existing utility poles. If trenched into the ground, the disturbed area would be revegetated; therefore, no significant impacts would occur. The Private Partner would acquire appropriate approvals to run overhead lines or conduct trenching to install lines or other improvements as necessary.

Required electricity demands during project construction would be supplied by existing electrical services at NAVWPNSTA Seal Beach. Direct energy requirements under the Proposed Action/Alternative 1 would be limited to those necessary to operate vehicles and equipment. Proposed new construction would comply with applicable local, state, and federal codes designed to promote energy efficiency and the use of renewable energy resources. In addition to no overall impact to existing energy facilities, the Proposed Action/Alternative 1 would have an overall beneficial impact of generating an estimated 25 MW of renewable energy. Thus, implementation of the Proposed Action/Alternative 1 would result in an indirect, long-term,

beneficial impact to electricity delivery at NAVWPNSTA Seal Beach. In addition, the Proposed Action/Alternative 1 would increase Navy installation energy security, operational capability, strategic flexibility and resource availability through the development of renewable energy generating assets.

Installation of a PV system at NAVWPNSTA Seal Beach signifies the Navy's shift towards more technologically advanced methods of delivering electricity and less reliance upon more conventional energy sources. Ground-mounted solar PV panels and associated electrical equipment (e.g., electrical feed meters, switchgear, inverters, circuit breakers, and transformers) would connect to the existing electrical grid. The Navy would enter into an agreement with a Private Partner, allowing the solar power Private Partners to construct, operate, maintain, and own PV systems at the installation, providing added long-term energy security. During construction, all equipment requiring sources of electricity would be operated using gas- or diesel-powered generators provided by construction contractors. Implementation of the Proposed Action/Alternative 1 would not result in significant adverse impacts to energy.

The decommissioning and restoration process would involve the removal of structures, restoration of topsoil, revegetation, and seeding. Because the site would be returned to previous conditions, there would not be an increase in utility demand from decommissioning; therefore, decommissioning at the close of the 37-year lease period would not result in significant adverse impacts.

3.9.2.2 Alternative 2

Potential Impacts

Impacts under Alternative 2 would be the same as described for the Proposed Action/ Alternative 1 except that Alternative 2 would only include the construction, operation, maintenance, and decommissioning of a PV system at Site A. However, implementation of Alternative 2 would produce an estimated 10 MW of renewable energy and would have a beneficial impact on future energy supply.

3.9.2.3 Alternative 3

Potential Impacts

Impacts under Alternative 3 would be the same as described for the Proposed Action/ Alternative 1 except that Alternative 3 would only include the construction, operation, maintenance, and decommissioning of a PV system at Site B. However, implementation of Alternative 3 would produce an estimated 15 MW of renewable energy instead of 25 MW of renewable energy and would have a beneficial impact on future energy supply.

3.9.2.4 No Action Alternative

Under the No Action Alternative, the proposed project would not occur and there would be no change to utilities. Without constructing the PV facilities, there would be no additional renewable energy resources to meet future energy demands. Additionally, this alternative does not provide a progression towards the nation's or the Navy's energy goals and would not meet the purpose and need of the proposed project as detailed in Chapter 1. Therefore, implementation of the No Action Alternative would not result in significant adverse impacts to utilities.

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3.10 Public Health and Safety

Definition of Resource

This section assesses elements of the project that could affect the health and safety of employees, families, temporary workers at NAVWPNSTA Seal Beach, and the public in surrounding communities and evaluates the potential hazards associated with the following:

- Installation Restoration Program (IRP) sites
- Ordnance
- Non-ordnance fire hazards
- Hazardous and toxic materials and waste generated by the project
- Electromagnetic fields and radio frequencies
- Explosives safety

Regulatory Setting

EM 385-1-1

This manual prescribes the safety and health requirements for all Naval Facilities Engineering Command activities and operations. The provisions of EM-385-1-1 implement and supplement safety and health standards and requirements contained in 29 CFR 1910, 29 CFR 1926, 29 CFR 1960, 30 CFR 56, EO 12196, Department of Defense Instruction (DODI) 6055.1, DODI 6055.3, Army Regulation (AR) 40-5, AR 385-10, AR 385-11, AR 385-40, and Federal Acquisition Regulation (FAR) Clause 52.236-13. Where more stringent safety and occupational health standards are set, the more stringent standards apply.

Other Federal Health and Safety Requirements

Occupational health, a key element of the overall Navy Occupational Safety and Health program, includes explosive, nuclear, aviation, industrial, and off-duty safety. All proposed construction and operation activities must meet the requirements of EO 13423 (Strengthening Federal Environmental, Energy, and Transportation Management), 64 FR 30851 (1999), and EO 13148 (Greening the Government through Leadership in Environmental Management), 65 FR 24595 (2000). These requirements address prevention and reduction at the source, and for pollution that cannot be prevented or recycled, treatment in an environmentally safe manner.

Resource Conservation and Recovery Act (RCRA)

RCRA was enacted in 1974 to provide a framework for the USEPA to regulate the generation, treatment, storage, and disposal of hazardous waste from “cradle to grave” by complying with the federal waste manifest system.

Hazardous Material Transportation Act (HMTA)

In 1990 and 1994, the HMTA was amended to improve the protection of life, property, and the environment from the inherent risks of transporting hazardous material in all major modes of commerce. The U.S. Department of Transportation developed hazardous materials regulations that govern the classification, packaging, communication, transportation, and handling of hazardous materials, as well as employee training and incident reporting (49 CFR Parts 171-180). The transportation of hazardous materials is subject to both RCRA and U.S. Department of Transportation regulations.

3.10.1 Affected Environment for Public Health and Safety

3.10.1.1 Public Services

Public services provided on NAVWPNSTA Seal Beach include police protection (security force), fire and emergency medical services, and hazardous materials response (NAVFAC 2009). Additional police protection and fire and emergency medical services at the station are provided, through mutual aid agreements, by the City of Seal Beach Police Department and the Orange County Fire Department along with the Orange County Sheriff's Department. The U.S. Coast Guard is responsible for emergency situations, including civilian emergencies, in Anaheim Bay.

Police Force (Security)

The NAVWPNSTA Seal Beach security force program provides security protection of ships, tenant commands and their facilities, materials, equipment, personnel, and documents. The security force is a combination of military and civilian personnel that respond to emergency calls received on the station. Security force protection personnel verify the authorization of personnel and vehicles at each entry point and inspect all commercial trucks entering the station. As all solar PV development sites would be securely fenced once complete, and subject to surveillance by NAVWPNSTA Seal Beach security personnel, potential safety hazards associated with unauthorized access to these locations are not analyzed in detail in this EA.

Fire, Emergency Medical, and Hazardous Materials Response Services

The Federal Fire Department provides fire, emergency medical services, and hazardous materials response services to NAVWPNSTA Seal Beach. The station supports one engine company with 16 personnel (NAVFAC 2009). The fire station is equipped with two water pumper trucks and a small utility truck. Fire hydrants and water supply trunk lines are located throughout the station and most administrative buildings and all inert storage/testing facilities are connected to the station's fire alarm system and equipped with fire sprinklers. In addition, a 300,000-gallon (1,135,500-liter) water storage tank is used for fire protection. Six civilian fire stations are located within approximately 2 miles (3.2 kilometers) of the station. These stations can provide additional support, if needed.

3.10.1.2 Ordnance

The Navy's primary mission at NAVWPNSTA Seal Beach is the receipt, segregation, storage, and issuance of ordnance, conventional ammunition, and missiles. The risk of explosion or detonation exists on the station from the handling and storage of explosives (e.g., ordnance). The Navy has established criteria (NAVSEA OP 5) that regulate separation of explosives from inhabited buildings not directly related to explosives operations, other storage or handling facilities, public traffic routes, the station boundary, and other locations containing explosives.

Explosive Safety Quantity Distance arcs (i.e., safety zone overlays) are the prescribed minimum distance between sites storing or handling hazard Class 1 explosive materials and specified exposures (i.e., inhabited buildings, public highways, public railways, other storage or handling facilities or ships, aircraft, etc.) to afford an acceptable degree of protection and safety to the specified exposure. The size of the arc is proportional to the net explosive weight. Site A is located outside of the 110 percent Explosive Safety Quantity Distance arcs. Site B is located

within the arc because of its proximity to Building 879. Building 879 is currently vacant and unused, but is under the control of the Navy Munitions Command tenant. The demolition of Building 879, along with Building 878, is currently under consideration by the Facilities Department.

Trucks carrying ordnance access NAVWPNSTA Seal Beach at entry points where they are inspected before entering and exiting the station. Ordnance is loaded on ships and barges at the wharf in Anaheim Bay and the Explosive Anchorage located in the Long Beach Outer Harbor. No other vessels may occupy the wharf or anchorage when a vessel is loading or unloading explosives.

3.10.1.3 Non-ordnance Fire Hazards

Non-ordnance fire hazards on NAVWPNSTA Seal Beach include flammable materials, storehouses, and fuel handling facilities. There are approximately 36 locations on the station that have the potential for non-ordnance fire hazards. There are no non-ordnance fire hazards near Sites A and B.

3.10.1.4 Hazardous and Toxic Materials and Waste

Sites A and B do not contain hazardous and toxic materials and waste. Agricultural use of the parcels does not include practices or processes that produce hazardous materials and wastes that require processing. One IRP site, Site 75, is located in the vicinity of Site A.

Installation Restoration Program

The Navy's IRP was established in 1986 to identify, assess, characterize, and clean up or control contamination from past hazardous waste-disposal operations and hazardous materials spills at Navy installations. The IRP is centrally managed throughout the Navy by NAVFAC and is carried out in accordance with all applicable federal, state, and local laws. The IRP at NAVWPNSTA Seal Beach is administered by NAVFAC Southwest with regulatory support provided by the Cal/EPA, specifically the Department of Toxic Substances Control and the California RWQCB, Santa Ana Region. There are currently seven active IRP sites at NAVWPNSTA Seal Beach. None of these sites poses an imminent concern for risk to human health.

IRP Site 75

In September 2004, the groundwater collected from an agricultural well, KAYO-SB, was found to be contaminated with chlorinated hydrocarbons. The access to this well was immediately terminated, and the well was subsequently decommissioned in November 2006. A total of 10 groundwater monitoring wells were installed and sampled in 2011. Based on the groundwater testing results from these wells, the source of the contamination is most likely one or multiple commercial industrial sites located east of the station. Portions of IRP Site 75 are located directly beneath Site A with monitoring wells located at the eastern perimeter of the site on the northern end. IRP Site 75 would not impact Site A due to the nature of the contamination and depth to groundwater.

3.10.1.5 Electromagnetic Radiation

There is concern that radar and other high-energy electromagnetic emissions could constitute a hazard to humans when they are exposed to such emissions/signals above a maximum power density. The U.S. government has not established regulations governing exposure to electromagnetic fields. However, the International Commission on Non-Ionizing Radiation Protection has published guidelines recommending the public be exposed to not more than 5,000 volts per meter in the 1 to 8 hertz frequency range (ICNIRP 2010). There are currently no sources of radar and other high-energy electromagnetic emissions in Sites A or B.

In addition, electromagnetic signals emanating from equipment can also interfere with and adversely affect ordnance. Two classes of Hazards of Electromagnetic Radiation to Ordnance (HERO) occur on the station, HERO SUSCEPTIBLE and HERO UNSAFE, depending on the degree of susceptibility to electromagnetic environments. NAVWPNSTA Seal Beach updates HERO Assessments approximately every 5 years to identify various HERO transmitter sources and their HERO UNSAFE and SUSCEPTIBLE separation distances. Neither Sites A or B contain any HERO classed buildings or other emission sources, and both sites are distant from any active ordnance storage, handling or transportation areas.

3.10.2 Environmental Consequences to Public Health and Safety

3.10.2.1 Proposed Action/Alternative 1

Because the Proposed Action/Alternative 1 would be sited on land currently or historically used for agriculture, and no fire-related structures are located in the vicinity, there would be no impacts to public health and safety from non-ordnance fire hazards. Public services, hazardous and toxic waste management, and electromagnetic radiation are discussed below.

Potential Impacts

Public Services

With implementation of the Proposed Action/Alternative 1, PV systems would be constructed, operated, maintained, and eventually decommissioned at Sites A and B on approximately 138 acres (55.8 hectares). It is possible that implementation of the Proposed Action/Alternative 1 would lead to some increased need for public services during the construction phase (e.g., related to construction accidents); however, any such increase would be relatively minimal given the scale of the project, as well as being temporary. There would be no increased need for public services during post-construction operations. Moreover, the construction would be coordinated with the NAVWPNSTA Seal Beach Fire Department and would be conducted in accordance with the impact avoidance and minimization measures outlined in Section 2.6.6. Therefore, implementation of the Proposed Action/Alternative 1 would not result in significant adverse impacts to public services.

The decommissioning and restoration process would involve the removal of structures, restoration of topsoil, revegetation, and seeding. Because the site would be returned to previous conditions (agricultural use), there would be not be an increased demand for public services; therefore, decommissioning at the close of the 37-year period would not result in significant adverse impacts.

Hazardous and Toxic Materials and Waste

The Proposed Action/Alternative 1 does not include building demolition activities that would cause on-station workers to encounter lead-based paint and asbestos. Construction of the Proposed Action/Alternative 1 would include the installation of PV panels that would be transported on station via trucks. The Private Partner would be responsible for the safe identification and disposal of any broken or unusable panels identified during construction, operations, maintenance, and eventual decommissioning in accordance with applicable laws and regulations. Therefore, implementation of the Proposed Action/Alternative 1 would not result in significant adverse impacts to public health and safety from hazardous and toxic materials and waste. All construction-related waste would be disposed of in accordance with the impact avoidance and minimization measures described in Section 2.6.6.

The decommissioning and restoration process would involve the removal of structures, restoration of topsoil, revegetation, and seeding. Because the site would be returned to previous conditions (agricultural use) and decommissioning would include the removal and disposal of PV system infrastructure in accordance with pertinent laws and regulations, decommissioning at the close of the 37-year lease period would not result in significant adverse impacts.

Electromagnetic Radiation

The Proposed Action/Alternative 1 would not introduce any hazardous levels of electromagnetic radiation. Direct electrical current flowing through solar panels and cables creates a very low frequency electric field. The International Commission on Non-Ionizing Radiation Protection guidelines recommend the public be exposed to not more than 5,000 volts per meter in the 1 to 8 hertz frequency range. Studies on existing PV facilities have shown that electric field levels within 10 feet (3 meters) of solar PV systems are not above background levels (less than 5 volts per meter) (Transportation Research Board 2011). No new sources of hazardous electromagnetic radiation would be introduced through construction, maintenance or decommissioning phases of the project. Due to the very low levels of electromagnetic radiation expected, and the physical separation of Sites A and B from ordnance areas, the Proposed Action/Alternative 1 would not create any additional HERO hazards. Therefore, implementation of the Proposed Action/Alternative 1 would not result in significant adverse impacts to public health and safety from electromagnetic radiation.

Impact Avoidance and Minimization Measures

With implementation of the Proposed Action/Alternative 1, the impact avoidance and minimization measures described in Section 2.6.6 are proposed.

3.10.2.2 Alternative 2

Potential Impacts

Potential impacts to public health and safety from implementation of Alternative 2 would be the same as for the Proposed Action/Alternative 1. Therefore, implementation of Alternative 2 would not result in significant adverse impacts to public health and safety.

Impact Avoidance and Minimization Measures

Impact avoidance and minimization measures proposed with implementation of Alternative 2 would be the same as described for the Proposed Action/Alternative 1 (see Section 2.6.6).

3.10.2.3 Alternative 3

Potential Impacts

Potential impacts to public health and safety from implementation of Alternative 3 would be the same as for the Proposed Action/Alternative 1. Therefore, implementation of Alternative 3 would not result in significant adverse impacts to public health and safety.

Impact Avoidance and Minimization Measures

Impact avoidance and minimization measures proposed with the implementation of Alternative 3 would be the same as described for the Proposed Action/Alternative 1 (see Section 2.6.6).

3.10.2.4 No Action Alternative

Under the No Action Alternative, construction and operation of PV systems at NAVWPNSTA Seal Beach would not occur. Existing conditions would remain as described in Section 3.10.1, Affected Environment. Therefore, implementation of the No Action Alternative would not result in a change to the nature or level of impacts to public health and safety and would not result in significant adverse impacts.

3.11 Visual Resources

The information in this section is largely summarized from a more detailed Viewshed Analysis study conducted for this project. The complete Viewshed Analysis is included as Appendix D of this EA.

Definition of Resource

Visual resources are the natural and man-made features that comprise the visual qualities of a given area or "viewshed." These features form the overall impression that an observer receives of an area or its landscape character. Topography, water, vegetation, man-made features, and the degree of panoramic views available are examples of visual characteristics of an area.

Regulatory Setting

National Environmental Policy Act

Sections 101-b and 102-2 of NEPA provide guidance on the federal government's responsibility to consider aesthetically and culturally pleasing surrounds and federal actions that significantly affect the quality of the visual landscape.

National Historic Preservation Act

The NHPA includes language on protecting the visual integrity of sites listed or eligible for the NRHP. Impacts to visual resources protected by NHPA are discussed in Section 3.2, Cultural Resources.

3.11.1 Affected Environment for Visual Resources

3.11.1.1 Existing Visual Character and Quality

The visual character of the area surrounding the proposed project sites is defined as a mosaic of widely varying land uses each contributing a distinct visual identity. Examples of these land uses are undeveloped or natural open spaces, including the SBNWR; densely developed residential neighborhoods along wide collector and arterial roadways; and visitor-serving commercial enterprises, hotels, light-industrial development, and corporate office buildings.

The most prominent cultural disturbances in the area are roadway corridors, surrounding commercial developments, and historical landform modifications adjacent to the proposed project sites as they contribute high-contrast surfaces, manufactured topography, moving objects, moving and fixed light sources, and urbanizing elements like large-scale signage and traffic signals.

Existing visual resources were assessed by evaluating vividness, intactness of the visual conditions, and unity as presently experienced. Vividness is the visual power or memorability of landscape components as they combine in distinctive patterns. Intactness is the visual integrity of the natural and man-built landscape and its freedom from encroaching elements. Unity is the visual coherence and compositional harmony of the landscape considered as a whole, which frequently attests to the careful design of individual manmade components in the landscape.

3.11.1.2 Viewer Sensitivity and Exposure Levels

The quality of a visual landscape is largely determined by the extent of the public's interest in, and concern for, a particular view. For purposes of evaluating this public concern, Viewer Response is composed of two elements: *viewer sensitivity* and *viewer exposure*. These elements combine to form a method of predicting how the public might react to visual changes brought about by an action.

Viewer sensitivity is defined as both the viewers' concern for scenic quality and the viewers' response to change in the visual resources that compose the view. To establish measurable degrees for these concerns, views are assigned a value of visual sensitivity. The public is generally concerned about areas possessing a high degree of visual character or quality, and these views typically contain highly visible or memorable landscape elements. Publicly accessible views from or within residential areas are generally considered to have greater visual sensitivity than views of, or from, more urbanized locations. *Viewer exposure* is assessed by measuring the number of viewers experiencing potential changes in a visual environment. Those viewers are sorted by activity, duration of view, speed at which the viewer is traveling, and the resulting positions of viewers relative to proposed changes.

Two general *Viewer Groups* were considered for the evaluation of viewer exposure, awareness, and response: vehicular viewers and recreational/pedestrian viewers. Very few direct foreground views exist of the proposed project sites. Vehicular viewers typically have a low to moderate awareness of the proposed project area, and their exposure is of short duration and consistent with their expectations of the site. Recreational/pedestrians on sidewalks immediately adjacent to the proposed sites as well as other recreational viewers at Haven View Park southeast of Site A have largely obstructed views of the site and proposed changes to existing visual setting.

3.11.1.3 Key Observation Points (KOPs)

Visual Resources were evaluated for the project viewshed, or the area from which the project could be visible. The methodology used to establish landscape scenery and an inventory of viewer sensitivity locations for the proposed project area included manual digitizing from detailed aerials, data download from USGS, GIS spatial analyses, and field verification. Land surface modeling was used to delineate viewsheds and identify locations of viewer sensitivity, including residences, recreation sites, trails, and roads. Project-specific visibility and distance zone analyses and mapping were conducted in GIS (ArcGIS).

Field investigations were conducted to discover and disclose the relationships of project elements with existing on-site landscape characteristics and locations of viewer sensitivity to establish a baseline visual condition to which potential changes could be compared. Because it was not feasible to analyze all views of the project area, eight KOPs were selected for their ability to simultaneously represent existing conditions and authentically depict the potential effects of implementation of the proposed project. These eight KOPs were selected based on a composite evaluation of the preceding project and corridor analyses as publicly accessible viewer concentration points such as street intersections serving as ingress/egress to adjacent neighborhoods. The locations of chosen KOPs are illustrated in Figures 3.11-1a and 3.11-1b in

Section 3.11.2. Current conditions and simulated views for each KOP are described in Section 3.11.2 and depicted in Figures 3.11-2a and 3.11-2b through 3.11-9a and 3.11-9b.

Site A

Site A is located in the southeastern portion of the installation, immediately north and west of Perimeter Road, the Orange County Flood Control Channel, and the intersection of public roads Bolsa Chica Street and Edinger Avenue in the City of Huntington Beach. Adjacent land uses include residential and commercial uses to the east of Bolsa Chica Street and primarily residential neighborhoods to the south of Edinger Avenue. Site A consists primarily of nonnative weed species and vegetation or bare dirt. More formal landscape treatments occur along the southern developed edge of Edinger Avenue and eastern frontage of Bolsa Chica Street. These treatments include landscaped medians, trees lining roadways, and community walls. Site A has been consistently and regularly planted with agricultural crops for decades. Motorists and pedestrians traveling along Bolsa Chica Street have intermittent and somewhat fleeting views of the site between fabric-covered fences and existing vegetation. Viewers traveling along Edinger Avenue also have occasional views of the site, particularly west of the project area; however, existing site grading and topographical features obstruct most of the project site along Edinger Avenue between Saybrook Lane to the west and Bolsa Chica Street to the east. Residences along the south side of Edinger Avenue and east side of Bolsa Chica Street are a mixture of one- and two-story structures often behind community walls or noise barriers.

For Site A, these locations are typified by views illustrated in KOP 2, KOP 4, and KOP 5. Views of the site from the commercial area at the southeast corner of Edinger Avenue and Bolsa Chica Street are largely obstructed by several lanes of traffic and existing topography and vegetation.

Site B

Site B is located in the northeastern portion of NAVWPNSTA Seal Beach, immediately west of Bolsa Chica Road and north of Westminster Avenue in the City of Westminster. To the east of Site B, a canal and fabric-covered fence separate Bolsa Chica Road from the site itself. Adjacent land uses include flat, largely vacant land to the north, west, and south that is used primarily for military purposes. Residential and commercial uses line the eastern frontage of Bolsa Chica Road. Westminster Avenue runs adjacent and parallel to Site B. Vegetation along Westminster Avenue consists primarily of nonnative weed species and sparsely clustered trees; however, vegetation along Bolsa Chica Road is more regular and varied due to landscaped medians and trees lining roadways. Site B is predominately bare dirt and weed species in a maintenance mow status meaning that it is regularly maintained, but unplanted.

Motorists and pedestrians traveling along Westminster Avenue have intermittent, direct views of the site through small openings between clusters of vegetation along the southern edge of Site B. Views of the site by motorists and pedestrians traveling along Bolsa Chica Road are largely obstructed by fabric-covered fencing (“scrim”) and vegetation. Northbound views of Site B from Bolsa Chica Road in particular are largely obstructed due to the presence of street trees and median plantings. Residences along the east side of Bolsa Chica Road include a mixture of one-story and two-story structures, many of which are partially or fully obstructed by community walls and/or noise barriers. Potential visual impacts to surrounding residents have been

considered from publicly accessible viewer concentration points chosen as KOPs, such as street intersections serving as ingress/egress to adjacent neighborhoods.

For Site B, these locations are typified by views illustrated in KOP 5 and KOP 7. Views of the site from the intersection of Westminster Avenue and Bolsa Chica Road are largely obstructed by existing fencing and vegetation. Site B is partially visible from the commercial area at the intersection of Westminster Avenue and Bolsa Chica Road, but experiences from this location are short-duration, middleground views.

3.11.2 Environmental Consequences to Visual Resources

3.11.2.1 Proposed Action/Alternative 1

Under the Proposed Action/Alternative 1, ground-mounted solar PV systems would be constructed and operated at Sites A and B on land historically used for agricultural production totaling approximately 138 acres (55.8 hectares).

Visual Resource Impacts

Viewer Groups and Viewer Response

Vehicular viewers would typically have a low to moderate awareness of the proposed project, and their exposure would be of short duration and consistent with existing expectations of activities and patterns of land use and built development on the station. Although viewer sensitivity within this group is generally low in urbanized environments due to the shorter durations of exposure and typically lower existing visual quality, vehicular viewers represent the largest population of potentially affected viewers.

Recreational/pedestrians on sidewalks immediately adjacent to the proposed sites as well as other recreational viewers at Haven View Park southeast of Site A would have partially obstructed views of the site and proposed changes to the existing visual setting. Viewer sensitivity within this group is generally considered moderate to high due to the longer duration of viewer exposure and view expectations within a park setting; however, the east-west orientation of passive-use park amenities and the majority of active-use programming (sports fields) is anticipated to reduce overall viewer sensitivity in this location.

Typically, viewer exposure would be characterized as low if a view were experienced by less than 100 viewers daily, moderate if experienced by between 100 and 1,000 viewers daily or high when experienced by greater than 1,000 viewers daily. For this project, viewer exposure would be considered to be "high" as the number of daily viewers of the proposed project sites would exceed 1,000. Currently, over 40,000 daily vehicle trips occur along Bolsa Chica Street/Road.

Key Observation Points

Project visibility and potential impacts to visual resources have been considered at each of the KOP locations illustrated in Figures 3.11-1a and 3.11-1b. For each KOP, existing conditions, or current views of the proposed project areas, and simulations of the views that would occur with implementation of the proposed project are depicted in Figures 3.11-2a and 3.11-2b through 3.11-9a and 3.11-9b.

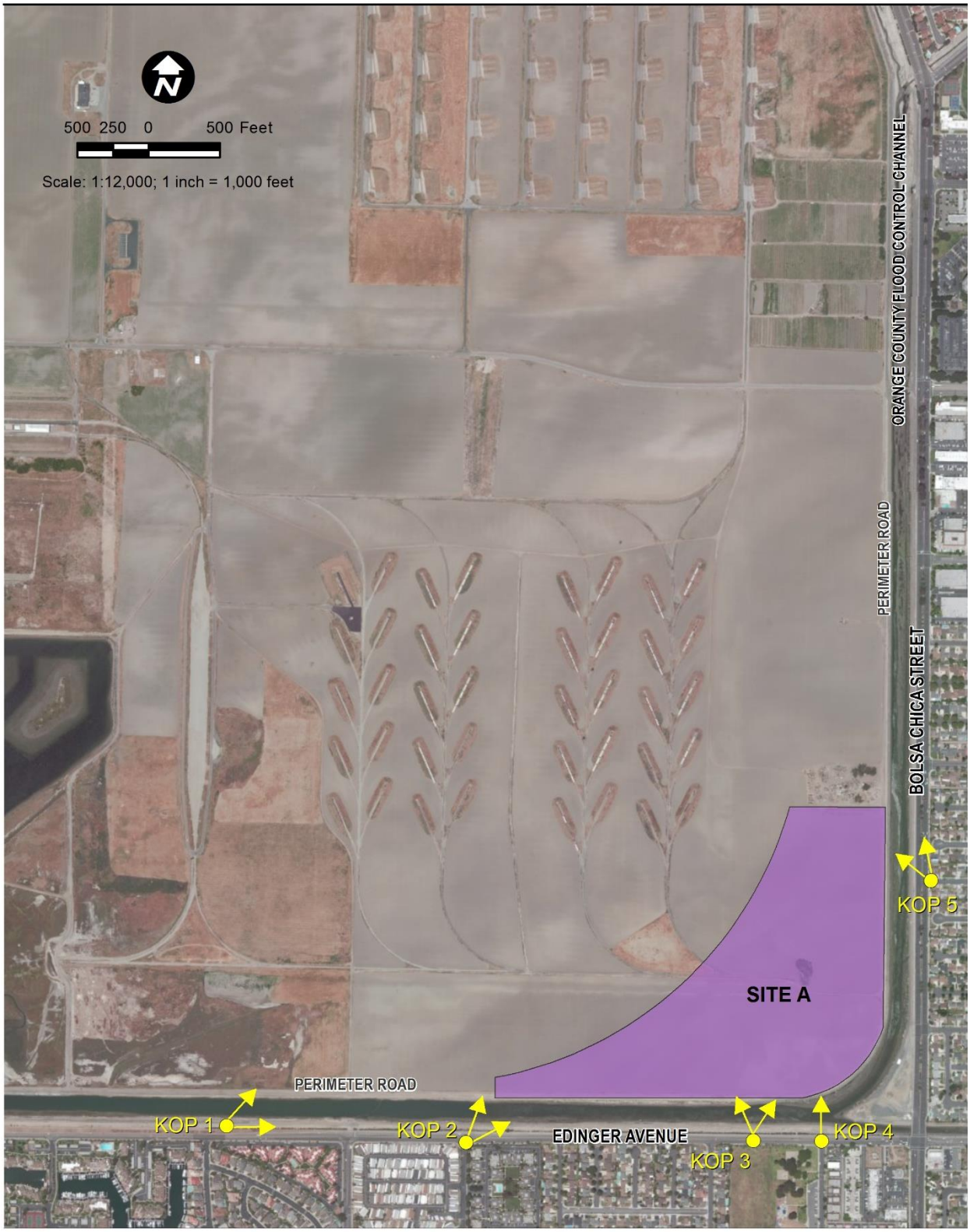

Figure 3.11-1a. KOP Location Map – Site A

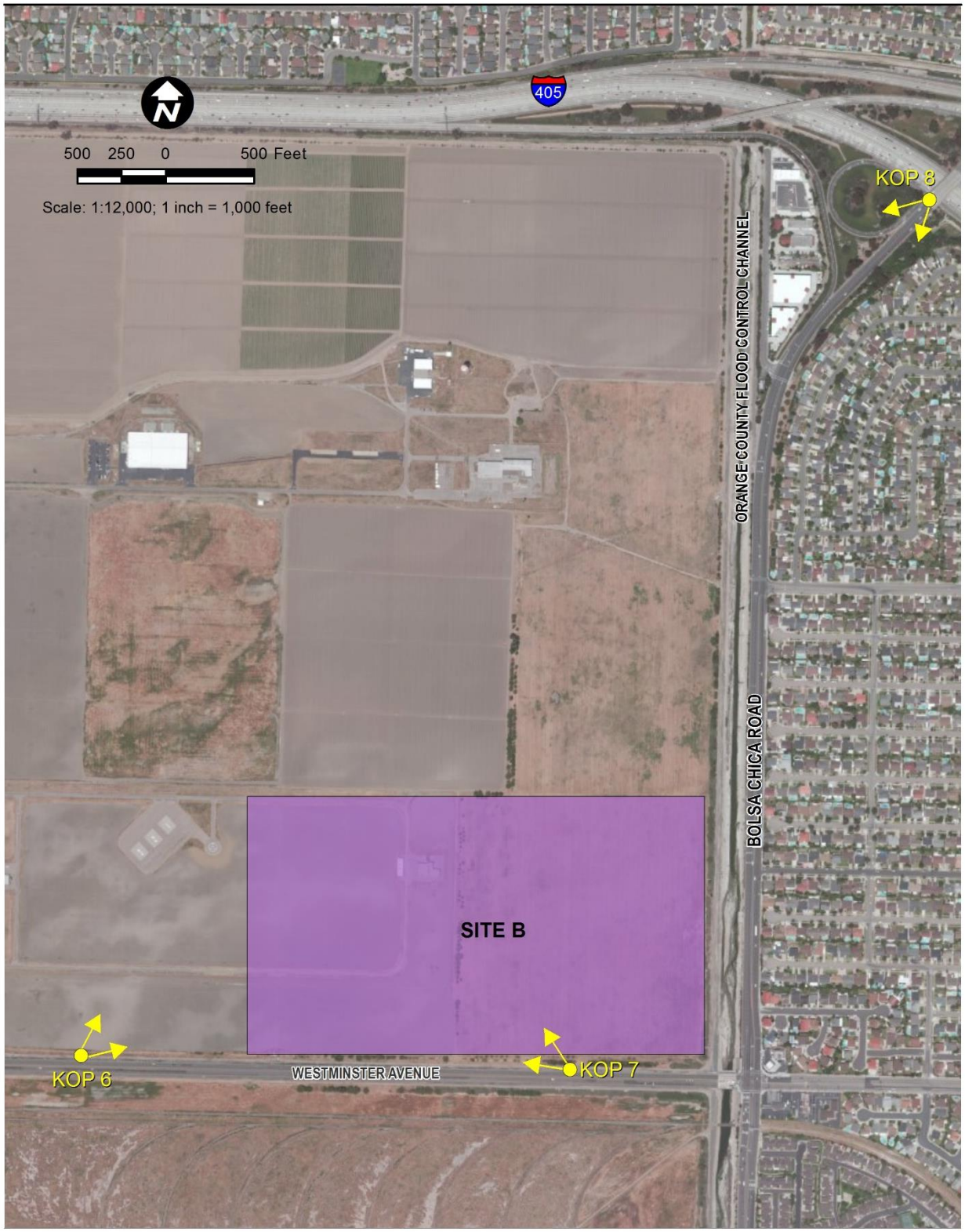

Figure 3.11-1b. KOP Location Map – Site B

Figure 3.11-2a. KOP 1, Existing Conditions Facing East Toward Site A along the southern edge of NAVWPNSTA Seal Beach from the eastern terminus of the bike path at Santa Barbara Lane and Edinger Avenue - Recreational viewers in this location would have middleground views of Site A from occasional points along the bike path.

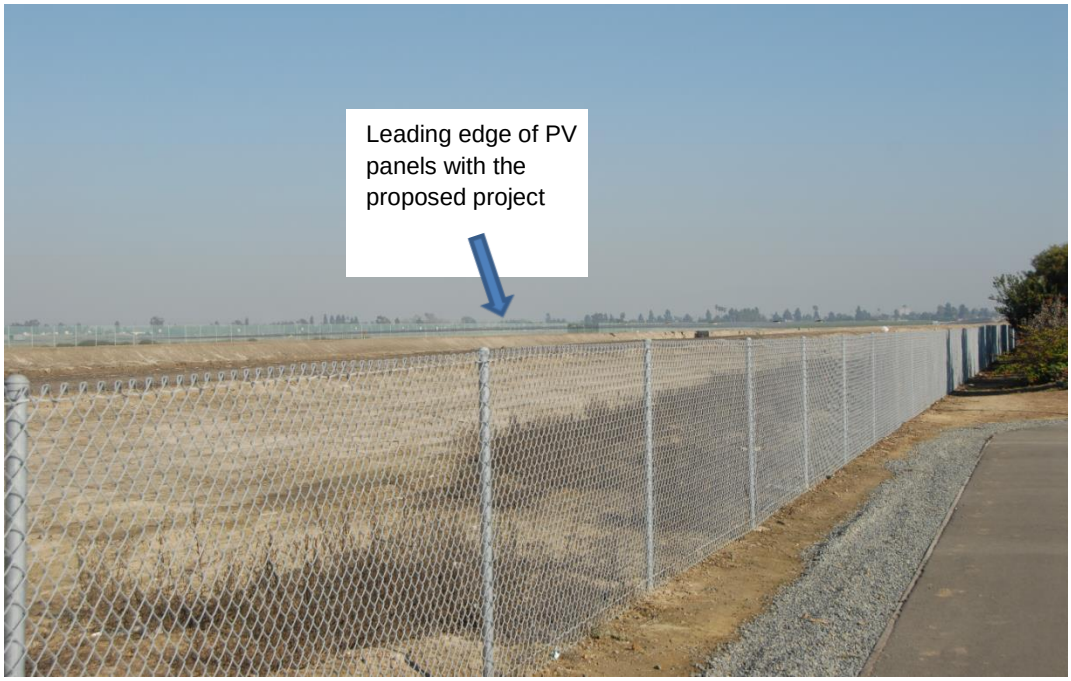

Figure 3.11-2b. KOP 1, Proposed Conditions (Simulation)

Viewers would experience short-duration, middleground views of Site A from this and other occasional points along the bike path, but views would not be noticeably or detrimentally affected due to viewing distance, relatively low panel height of no greater than 8 feet (2.4 meters), and limited removal of existing trees. As a result, implementation of Proposed Action/Alternative 1 or Alternative 2 would introduce a low degree of contrast within an area of low existing visual quality and moderate viewer response.

Figure 3.11-3a. KOP 2, Existing Conditions Facing Northeast Toward Site A from the intersection of Edinger Avenue and Monterey Lane - Viewers would experience short-duration foreground views of Site A from this location; however, as the viewer moves east, direct views become increasingly available as the earthen berm tapers back to existing grade.

Figure 3.11-3b. KOP 2, Proposed Conditions (Simulation)

Viewers would experience short-duration foreground views of Site A; however, as the viewer moves east, direct views become increasingly available as the earthen berm tapers to existing grade. Viewers would likely notice the temporary construction activities, but the proposed project would not be permanently visible from this location due to relatively low panel height of no greater than 8 feet (2.4 meters). The proposed project features would introduce a low contrast within an area of low existing visual quality and moderate viewer response.

Figure 3.11-4a. KOP 3, Existing Conditions Facing North Toward Site A from Haven View Park - Recreational viewers in this location are approximately 400 feet (122 meters) from the Site A boundary. Several opportunities exist for direct foreground views of Site A; however, shade trees present along the Edinger Avenue frontage and dual-lined chain-link fencing along the Orange County Flood Control Channel partially obstruct the views.

Figure 3.11-4b. KOP 3, Proposed Conditions (Simulation)

Viewers would experience direct foreground views of the proposed project; however, shade trees along the Edinger Avenue frontage and dual-lined chain-link fencing along the Orange County Flood Control Channel would partially obstruct views. Implementation of the Proposed Action/Alternative 1 or Alternative 2 would include a perimeter fence potentially with fabric screening around the PV system that would obstruct views and limit potential project visibility resulting in a low contrast change within an area of low existing visual quality and moderate viewer response.

Figure 3.11-5a. KOP 4, Existing Conditions Facing North Toward Site A from the intersection of Edinger Avenue and Waikiki Lane - Views from this location are largely unobstructed by existing topography; however, right-of-way fencing along Edinger Avenue and fencing along the Orange County Flood Control Channel exist within foreground-middleground views partially obstructing views at this location.

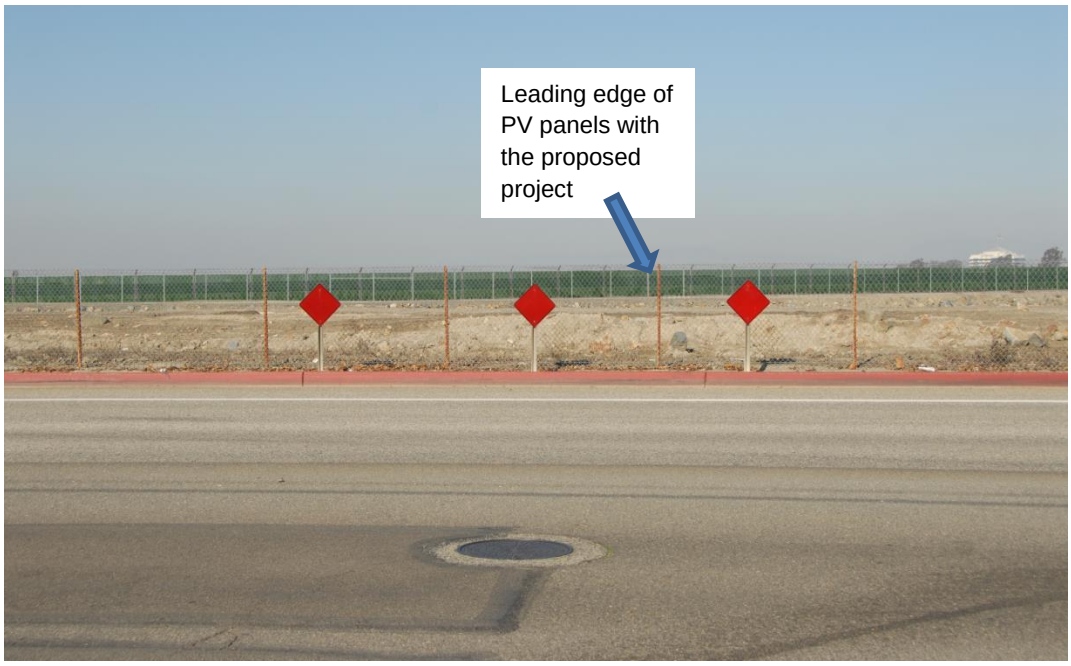

Figure 3.11-5b. KOP 4, Proposed Conditions (Simulation)

Viewers would experience short-duration, foreground views of the proposed project and may notice landscape changes from the removal of existing vegetation (stand of trees in the middleground view) and the addition of a perimeter screening fence; however, given the relatively low panel height (less than 8 feet [2.4 meters]), short duration of views, existing fencing, and proposed screening fence, implementation of the Proposed Action/Alternative 1 and Alternative 2 would introduce a low visual contrast within an area of low existing visual quality and moderate viewer response.

Figure 3.11-6a. KOP 5, Existing Conditions Facing Northwest along Bolsa Chica Street from Dovewood Drive - Views of Site A from this location range from unobstructed to fully obstructed by existing vegetation, fencing, and vehicular activity along the Bolsa Chica Street corridor. In this way, KOP 5 is illustrative of the visual experience along the entire Bolsa Chica corridor; including points adjacent to Site B.

Figure 3.11-6b. KOP 5, Proposed Conditions (Simulation)

Viewers would experience short-duration, foreground views along the entire Bolsa Chica corridor, including points adjacent to Site B. Given the limited exposure, preservation of existing mature trees, vegetative screening, and proposed screening fence, the Proposed Action/Alternative 1 and Alternative 2 would introduce a low visual contrast in an area of low existing visual quality and moderate viewer response.

Figure 3.11-7a. KOP 6, Existing Conditions Facing Northeast along Westminster Avenue toward Site B and the intersection of Westminster Avenue and Bolsa Chica Road - Viewers would have intermittent foreground and middleground views; however, much of Westminster Avenue is buffered by existing vegetation, which blocks most views of Site B.

Figure 3.11-7b. KOP 6, Proposed Conditions (Simulation)

Viewers would experience intermittent foreground and middleground views; however, much of the Westminster Avenue corridor is buffered by existing vegetation. Given the limited exposure, preservation of existing mature trees, vegetative screening, and proposed fencing, the Proposed Action/Alternative 1 and Alternative 3 would introduce a low visual contrast within an area of low existing visual quality and moderate viewer response.

Figure 3.11-8a. KOP 7, Existing Conditions Facing West toward Site B along Westminster Avenue - Views vary from this location from partially - to fully-obstructed by existing vegetation. Viewers have occasional, short-duration foreground views of Site B from this and other points along Westminster Avenue.

Figure 3.11-8b. KOP 7, Proposed Conditions (Simulation)

Viewers would experience occasional, short-duration foreground views of Site B from this and other points along Westminster Avenue. Given the limited exposure, preservation of existing mature trees, vegetative screening, and proposed screening fence, the Proposed Action/Alternative 1 and Alternative 3 would introduce a low visual contrast within an area of low existing visual quality and moderate viewer response.

Figure 3.11-9a. KOP 8, Existing Conditions Facing Southwest toward Site B from the eastern side of the I-405/Bolsa Chica Road overpass - Views from this area vary from partially to fully obstructed depending on viewer location, but when available along the roadway corridors, views are elevated higher than the proposed project and look over much of the proposed Site B area**.**

Figure 3.11-9b. KOP 8, Proposed Conditions (Simulation)

Viewers would experience limited views for several minutes while traffic cycles through traffic controls and as they approach the site from the northeast. Given the limited exposure, preservation of existing mature trees along the Orange County Flood Control Channel and proposed screening fence, implementation of Proposed Action/Alternative 1 and Alternative 3 would introduce a low visual contrast within an area of low existing visual quality and moderate viewer response.

Summary of Construction Impacts

The visual landscape surrounding Sites A and B would be temporarily affected by construction of the proposed PV system and ancillary features, including graded maintenance roads, perimeter fencing, and freestanding electrical equipment, such as the electrical current inverters and grid connection switchgear. Given the inherent visual aspects of construction activities, temporary viewshed disturbances would result from the staging, stockpiling, and placement of PV panels and inverter stations; construction-related traffic and equipment; temporary debris storage; and standard ground-clearing operations for construction.

Due to the presence of existing construction and farming equipment, existing bulk materials storage, and site grading operations unrelated to the Proposed Action/Alternative 1, the visual contrast of construction phase activities would range from weak to moderate depending on the distance of the observer from both Sites A and B. In all cases, construction activities occurring in the immediate foreground of the observer would cause greater, but still temporary impacts, to the visual landscape than those appearing at a farther distance.

During this temporary construction period, viewer response would be moderate to high due to the number of viewers, but intermittent because most viewers would be motorists traveling along the affected vehicular corridors. Project construction activities that are located within 0.5 mile (0.8 kilometer) of high or moderate viewer sensitivity areas and that have moderate viewer response to the visual landscape would be short term. Measures designed to avoid or minimize potential visual effects within 0.5 mile (0.8 kilometer) from stationary and linear KOPs, such as the use of fabric-covered fencing to obstruct or screen views, would reduce visual contrast from moderate to low. Even without incorporation of these measures into project designs, impacts from implementation of the Proposed Action/Alternative 1 would be less than significant.

Summary of Operation Impacts

As described in Section 3.11.1, the existing visual character and quality of the areas surrounding Sites A and B can be characterized as mixed development, open space, agricultural fields, and residential areas adjacent to the NAVWPNSTA Seal Beach perimeter. The Proposed Action/Alternative 1 would be contained within the station boundaries behind existing perimeter fencing, which would obstruct views of the proposed PV system. Additionally, the proposed PV system would be enclaved behind fencing that may include measures to minimize impacts to visual resources, such as a fabric covering or “scrim”, to further obstruct views. Because of the relatively low height (less than 8 feet [2.4 meters]) of proposed PV panels, incorporation of impact avoidance and minimization measures, including the use of fabric covered fencing or “scrim”, and resultant weak visual contrast, viewers passing through the project area are unlikely to notice a considerable change in visual character or to consider the visual character diminished under the Proposed Action/Alternative 1. Additionally, PV panels and support structures would be dull and drab in color and appearance and would not create a significant contrast with existing viewsheds. Visual changes would be more apparent to viewers near Site B due to a higher number of viewers and direct foreground viewing opportunities; however, these views would be fleeting as they would be seen from moving vehicles. As such, the resulting level of viewer response would be low to moderate at Sites A and B, respectively.

Indirect viewshed impacts would result from disturbance by occasional maintenance operations associated with the Proposed Action/Alternative 1. These maintenance operations would be conducted on an as needed basis and would be short-term (a day or several days). Therefore, operations impacts from implementation of the Proposed Action/Alternative 1 would be less than significant.

Summary of Decommissioning Impacts

Impacts to visual resources during the decommissioning phase of the Proposed Action/Alternative 1 would be temporary and would be similar to construction impacts, but reduced because of the shorter time period required to remove PV system infrastructure and restore the sites to pre-construction conditions. No visual impacts would remain following decommissioning. Therefore, impacts related to decommissioning would be less than significant.

Impact Avoidance and Minimization Measures

Although no significant impact to visual resources is anticipated, the potential for noticeable changes in the landscape would be minimized with incorporation of the following measure into the project design:

- Reduce visual contrast of vertical elements within the landscape by using the same or similar colors for surface coatings of site boundary fencing.

3.11.2.2 Alternative 2

Under Alternative 2, a ground-mounted solar PV system would be constructed and operated only on Site A, a topographically flat, approximately 64-acre (26-hectare) parcel of land.

Potential Impacts

Impacts to visual resources with implementation of Alternative 2 would be similar to those discussed under the Proposed Action/Alternative 1, except that impacts would be limited to temporary, construction-related viewshed disturbances at Site A only (depicted in KOPs 1 through 5). Viewer response would be low, as contrast would be weak in this location, and viewer sensitivity would be low to moderate due to limited site visibility. Implementation of Alternative 2 would not substantially alter existing visual character and resulting visual impacts would be less than significant.

Impact Avoidance and Minimization Measures

Although no significant impact to visual resources is anticipated, the potential for noticeable changes in the landscape would be minimized with incorporation of the following measure into the project design:

- Reduce visual contrast of vertical elements within the landscape by using the same or similar colors for surface coatings of site boundary fencing.

3.11.2.3 Alternative 3

Under Alternative 3, a ground-mounted solar PV system would be constructed and operated only on Site B, a topographically flat, approximately 73-acre (29-hectare) parcel of land.

Potential Impacts

Impacts to visual resources with implementation of Alternative 3 would be similar to those discussed under the Proposed Action/Alternative 1, except that impacts would be limited to temporary, construction-related viewshed disturbances at Site B only (depicted in KOPs 6 through 8). Viewer response would be moderate, as contrast would be weak in this location; however, viewer sensitivity would be considered moderate due to the daily number of viewers and frequency of direct foreground-middleground views of the project site. However, the daily viewers would experience intermittent and fleeting views from moving vehicles. Ultimately, implementation of Alternative 3 would not substantially alter existing visual character and resulting visual impacts would be less than significant.

Impact Avoidance and Minimization Measures

Although no significant impact to visual resources is anticipated, the potential for noticeable changes in the landscape would be minimized with incorporation of the following measure into the project design:

- Reduce visual contrast of vertical elements within the landscape by using the same or similar colors for surface coatings of site boundary fencing.

3.11.2.4 No Action Alternative

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

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4.0 Cumulative Impacts

4.1 Introduction

4.1.1 Definition of Cumulative Impacts

CEQ regulations implementing NEPA require that the cumulative impacts of a proposed project be assessed (40 CFR Parts 1500–1508). A cumulative impact is defined as the following: The impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time (40 CFR § 1508.7).

CEQ's guidance for considering cumulative effects states that NEPA documents "should compare the cumulative effects of multiple actions with appropriate national, regional, state, or community goals to determine whether the total effect is significant."

The first step in assessing cumulative effects, therefore, involves identifying and defining the scope of other actions and their interrelationship with the Proposed Action/Alternative 1 or alternatives. The scope must consider other projects that coincide with the location and timetable of the proposed project and other actions. Section 4.2 identifies relevant past, present, and reasonably foreseeable future actions, including both military actions in the region as well as other federal and non-federal actions. Projects were selected because they are either similar to the proposed project, large enough to have far reaching effects, or in proximity to the proposed project. Section 4.3 describes the methodology used for this analysis. Section 4.4 provides an analysis of cumulative impacts for relevant environmental resources, and further defines the geographic boundaries for relevant projects for each resource area.

4.2 Projects with Potential for Cumulative Impacts

Projects considered in the Cumulative Analysis Information on past, present, and reasonably foreseeable future projects and their associated anticipated impacts were gathered through a review of available environmental documentation conducted in April 2015 and in coordination with the Navy. A list of the cumulative projects, summary information, and their associated impacts are summarized in Table 4.2-1 and discussed in more detailed below.

Table 4.2-1. Cumulative Projects Analyzed in Relation to the Proposed Project

Project Name	Project Location	Project Type	Status
West County Connectors Project	Cities of Garden Grove, Westminster, Seal Beach, Los Alamitos, and Long Beach	Highway construction and Replacement Planting Project	Highway Construction – Past (2014) Replacement Planting – Future
San Diego Freeway (I-405) Improvement Project	Orange County	Highway construction	Future
Consolidated Operating Support Facility Project (FN13-2144)	NAVWPNSTA Seal Beach	Special	Future

Table 4.2-1. Cumulative Projects Analyzed in Relation to the Proposed Project

Project Name	Project Location	Project Type	Status
Standard Missile-6 All Up Round Test Facility Project	NAVWPNSTA Seal Beach	MILCON	Future
Construction and Operation of Solar PV Systems at Multiple Bases in California	NVWPNSTA Seal Beach	Special	Future
Westgate Residential Project	City of Westminster	Residential construction	Future
Case No. 2014-84 Maple Avenue Live/Work Project	City of Westminster	Residential construction	Future
Parkside Estates Project	City of Huntington Beach	Residential construction	Future
Harmony Cove Project	City of Huntington Beach	Rezoning and construction	Future
Monogram Apartments	City of Huntington Beach	Residential Construction	Future

4.2.1 West County Connectors Project

The West County Connectors Project was initiated by the Orange County Transportation Authority and the California Department of Transportation (Caltrans) to link high-occupancy vehicle lanes/carpool lanes on the San Diego Freeway (I-405) with those on the Garden Grove Freeway (State Route [SR]-22) and the San Gabriel River Freeway (I-605). The project would create a seamless high-occupancy vehicle connection amongst the three freeways. The project traverses the cities of Garden Grove, Westminster, Seal Beach, Los Alamitos, and Long Beach, and the community of Rossmoor. Construction of the project began in 2011 and was completed in November 2014 (Orange County Transportation Authority 2014). The project site is located approximately 2 miles (3.2 kilometers) north of Site A and 1.25 miles (2 kilometers) north of Site B at NAVWPNSTA Seal Beach.

The Orange County Transportation Authority, in concert with Caltrans, is currently coordinating plans for an upcoming Replacement Planting Project with construction estimated to begin in August 2015. The project would provide replacement planting to areas affected by the West Coast Connectors roadway construction. The project would use native, drought-resistant trees and vines selected from a list of species approved by Caltrans, which would oversee the replacement planting (Orange County Transportation Authority 2015). Resources considered in the cumulative impacts analysis include impacts to land use, biological resources, soils, water resources, air quality, and visual resources due to the land disturbance from this project.

4.2.2 San Diego Freeway (I-405) Improvement Project

Caltrans, in cooperation with the Orange County Transportation Authority, has proposed a project to widen the San Diego Freeway (I-405) between SR-73 and I-605. The purpose of the proposed project is to improve travel conditions by increasing freeway capacity, improving traffic and interchange operations, and enhancing road safety to meet state and federal standards. Caltrans made available a Final Environmental Impact Report/EIS in April 2015. The project is located approximately 2 miles (3.2 kilometers) north of Site A and 1.25 miles (2 kilometers) north of Site B at NAVWPNSTA Seal Beach. There is no published construction

commencement date as of April 2015. Resources considered in the cumulative impacts analysis include impacts to land use, biological resources, soils, water resources, air quality, and visual resources due to the land disturbance from this project.

4.2.3 Consolidated Operating Support Facility Project at NAVWPNSTA Seal Beach (NF13-2144)

The Navy proposed a project to construct and operate three buildings and support facilities at NAVWPNSTA Seal Beach. The three structures to be constructed as part of the project include a two-story administration building (approximately 29,600 square feet [2,750 square meters]), a single-story security facility (approximately 11,200 square feet [1,040 square meters]), and a single-story support facility (approximately 2,000 square feet [186 square meters]). Supporting facilities would include asphalt roads and a parking area with landscaping, storm drainage, and utilities. The project is located approximately 0.3 mile (0.5 kilometer) northwest of Site A and approximately 2.5 miles (4 kilometers) southwest of Site B at NAVWPNSTA Seal Beach. Resources considered in the cumulative impacts analysis include impacts to land use, biological resources, soils, water resources, air quality, and visual resources due to the land disturbance from this project, as well as utilities.

4.2.4 Standard Missile-6 All Up Round Test Facility Project at NAVWPNSTA Seal Beach (P-240)

The Navy has proposed a project to repair Building 915, a testing facility at NAVWPNSTA Seal Beach, for structural reinforcement. The project would also include the construction of a new earth barricade to mitigate the hazardous fragment distance and blast overpressure between Buildings 915 and 923, enclosure of the existing open loading dock, and repaving of the existing paved areas surrounding Building 915. The Navy evaluated the potential impacts to the environment and construction of the project. The project is located approximately 2.2 miles (3.5 kilometers) northeast of Site A and approximately 0.6 mile (0.9 kilometer) north of Site B at NAVWPNSTA Seal Beach. Construction is anticipated to begin in 2015 or 2016. Resources considered in the cumulative impacts analysis include impacts to land use, biological resources, soils, water resources, air quality, and visual resources due to the land disturbance from this project, as well as utilities.

4.2.5 U.S. Navy Construction and Operation Of Solar Photovoltaic Systems at Multiple Installations in California

The Navy has prepared a Draft EA evaluating the potential environmental impacts from the Navy allowing solar power Private Partners to construct, operate, and own solar PV systems on five Navy Region Southwest installations: Naval Air Facility El Centro; Naval Support Activity Monterey's Main Site and Navy Annex; NAVWPNSTA Seal Beach; NAVWPNSTA Seal Beach Detachment Norco; and Naval Base Ventura County Port Hueneme. This would include the installation of ground-mounted, carport-mounted, and rooftop-mounted PV systems. Specific installation details would vary slightly based on the project site and the solar power Private Partner's site design. Alternative 1 would build the solar PV system on 6.6 acres (2.7 hectares) in the western portion of the station west of Third Street. Alternative 2 includes a smaller (6.5-acre [2.6-hectare]) solar PV system within the same land space considered for Site B in

this EA. However, if Site B were ultimately selected for development pursuant to this EA (under either Alternative 1 or 3), and if any such decision occurred prior to any decision with respect to Site B as part of the proposed multi-installation PV project, then potential development of Site B would no longer be considered under the multi-installation EA. There is no published construction commencement date as of April 2015. The Alternative 1 parcel is located approximately 2.4 miles (3.9 kilometers) from Site A and approximately 2 miles (3.2 kilometers) from Site B. Resources considered in the cumulative impacts analysis include impacts to land use, biological resources, soils, water resources, air quality, and visual resources due to the land disturbance from this project, as well as utilities.

4.2.6 Westgate Residential Project

The Westgate Residential Project in the City of Westminster involves the demolition of the existing residential, institutional, and light industrial uses and the construction of 79 new single-family detached cluster homes on 7.2 acres (2.9 hectares) within a gated community with private streets and landscaping. Initial Study/Mitigated Negative Declaration was completed in February 2015, and construction is expected to begin in 2015. The project is located along the northeastern corner of Willow Lane and Maple Avenue, west of I-405 (approximately 1.4 miles [2.2 kilometers] east of NAVWPNSTA Seal Beach). Resources considered in the cumulative impacts analysis include impacts to land use, biological resources, soils, water resources, air quality, and visual resources due to the land disturbance from this project, as well as utilities.

4.2.7 Case No. 2014-84 Maple Avenue Live/Work Project

Case No. 2014-84 Maple Avenue Live/Work Project within the City of Westminster involves the change in the Tentative Tract Map to allow for the subdivision of an existing 1.8-acre (0.7-hectare) lot into two parcels and 37 condominium units and associated infrastructure. Initial Study/Mitigated Negative Declaration was completed in March 2015, and construction is expected to begin in 2015 or 2016. The project is located at the southeast corner of Willow Lane and Maple Avenue, west of I-405 (approximately 1.4 miles [2.2 kilometers] east of NAVWPNSTA Seal Beach). Resources considered in the cumulative impacts analysis include impacts to land use, biological resources, soils, water resources, air quality, and visual resources due to the land disturbance from this project, as well as utilities.

4.2.8 Parkside Estates

The Parkside Estates Project in the City of Huntington Beach includes the construction of 111 single family residences, 23 acres (9.3 hectares) of preserved, restored and enhanced open space, 1.6 acres (0.6 hectare) of neighborhood park, public trails, and creation of a water quality treatment system that would treat over 25 percent of the dry-weather flow from Slater watershed that currently flows untreated to the Bolsa Chica wetlands and Pacific Ocean. The project was approved by the Coastal Commission on October 11, 2012. As of April 2015, no construction date has been published. The project is located on the west side of Graham Street, south of Warner Avenue, along the East Garden Grove Wintersburg Flood Channel, approximately 1.5 miles (2.4 kilometers) southeast of NAVPWNSTA Seal Beach. Resources considered in the cumulative impacts analysis include impacts to land use, biological resources, soils, water resources, air quality, and visual resources due to the land disturbance from this project, as well as utilities.

4.2.9 Harmony Cove

The Harmony Cove Project in the City of Huntington Beach is a request to amend the city's Zoning Map on the project site to allow the development of a 23-boat slip marina, an eating and drinking establishment with outdoor dining area and alcoholic beverage sales, and ancillary uses to the marina (a marina office and retail/rental of water-related recreational equipment). The site consists of 2.3 acres (0.9 hectare), with 1 acre (0.4 hectare) on terra firma and the remaining 1.3 acres (0.5 hectare) submerged. The majority of the project site (1.9 acres [0.8 hectare]) is owned by Harmony Cove LLC, and the remainder (0.4 acre [0.2 hectare]) is owned by the California State Lands Commission. The project includes a Zoning Map Amendment, Conditional Use Permit, Coastal Development Permit, Variance, and Tentative Parcel Map. The City Council approved the Mitigated Negative Declaration, Zoning Map Amendment, Conditional Use Permit, Coastal Development Permit ("Approved in Concept") Variance, and denied the Tentative Parcel Map in November 2012. The Coastal Development Permit was forwarded to the California Coastal Commission for final review and approval in December 2014 and no construction date has been published as of April 2015. The project is located at 3901 Warner Avenue (north side of Warner Avenue, west of Weatherly Lane), approximately 1.3 miles (2 kilometers) south of NAVWPNSTA Seal Beach. Resources considered in the cumulative impacts analysis include impacts to land use, biological resources, soils, water resources, air quality, and visual resources due to the land disturbance from this project, as well as utilities.

4.2.10 Monogram Apartments

The Monogram Apartments Project in the City of Huntington Beach includes 5 parcels encompassing approximately 8.5 acres (3.4 hectares) of land. The project design is an apartment building consisting of 510 dwelling units, 25,800 square feet (2,397 square meters) of public open space, 55,400 square feet (5,147 square meters) of private open space, and approximately 5,100 square feet (474 square meters) of leasing office wrapped around a six-level 862-space parking structure. The project is in a Plan Check status as of December 2014 and no construction date has been published as of April 2015. The project is located at the southwest corner of Edinger Avenue and Gothard Street, approximately 2.5 miles (4 kilometers) east of NAVWPNSTA Seal Beach. Resources considered in the cumulative impacts analysis include impacts to land use, biological resources, soils, water resources, air quality, and visual resources due to the land disturbance from this project, as well as utilities.

4.3 Methodology

4.3.1 Geographic Scope of the Cumulative Effects

For this analysis, a geographic scope, or region of influence (ROI), for each cumulative effects issue was established. The ROI is generally based on the natural boundaries of the resources affected, rather than jurisdictional boundaries. The geographic scope may be different for each cumulative effects issue. The geographic scope of cumulative effects often extends beyond the scope of the direct effects, but not beyond the scope of the direct and indirect effects of the Proposed Action/Alternative 1 and alternatives. However, if the Proposed Action/Alternative 1 and alternatives are determined to have no direct or indirect effects on a resource, no future

cumulative effects analysis is necessary. ROIs are defined in Section 4.4 for each resource listed below. Because ROIs vary for different resources, not all of the projects listed in Table 4.2-1 would be located within the ROIs defined for a particular resource.

4.3.2 Time Frame of the Cumulative Effects Analysis

A time frame for each issue related to cumulative effects has been determined. The time frame is defined as the long-term and short-term duration of the effects anticipated. Long-term can be defined as the longest lasting effect. Time frames, like geographic scope, can vary by resource. Each project in a region has its own implementation schedule, which may or may not coincide or overlap with the schedule for implementing the Proposed Action/Alternative 1 or alternatives. This is a consideration for short-term impacts from the proposed project. However, to be conservative, the cumulative analysis assumes that all projects in the cumulative scenario are built and operating during the operating lifetime of the proposed project.

Past actions are projects that have been approved and/or permitted, and that have either very recently completed construction/implementation or have yet to complete construction/be implemented. Present actions are actions that are ongoing at the time of the analysis. Reasonably foreseeable future actions are those for which there are existing decisions, funding, or formal proposals, or which are highly probable based on known opportunities or trends. However, these are limited to within the designated geographic scope and time frame. Reasonably foreseeable future actions are not limited to those that are approved for funding. However, this analysis does not speculate about future actions that are not highly probable based on information available at the time of this analysis.

For this cumulative effects analysis, the time frame for cumulatively considered projects includes projects recently approved or completed that are not yet addressed as part of the existing conditions of the area, projects under construction, and projects that are in the environmental review or planning process and for which enough information is available to discern their potential impacts. Projects for which no or insufficient information is known, or for which substantial uncertainty exists regarding the project, are considered speculative and are not evaluated as part of this analysis.

4.4 Cumulative Impacts Analysis

This section addresses the potential cumulative impacts of the proposed project in conjunction with the aforementioned cumulative projects. These projects represent past, present, and reasonably foreseeable actions with the potential for cumulative impacts when considered in conjunction with the potential impacts from the proposed project. However, if a project would not result in direct or indirect impacts on a resource area, it would not contribute to a cumulative impact on that resource area and no further evaluation from a cumulative impact perspective is warranted. The resources that meet this criteria, i.e., do not result in impacts for the proposed action, are cultural resources (Section 3.2), noise (Section 3.4), traffic and circulation (Section 3.8), and public health and safety (Section 3.10). Therefore, the proposed project would not cumulatively contribute to impacts to these resources areas, and they are not evaluated further in this section.

Unless otherwise noted, the potential for cumulative impacts would be the same for all three alternatives, and therefore, are referred to as the "Proposed Action" in this section to eliminate redundancy.

4.4.1 Land Use and Coastal Resources

The geographic extent for cumulative effects on land use is defined as land within the boundaries of NAVWPNSTA Seal Beach. With the Proposed Action, ground-mounted solar PV systems would be constructed and operated in agricultural outlease areas; consequently, long-term land use changes would occur at the site from agricultural use to renewable energy development. Approximately 138 acres (55.8 hectares) would be discontinued from agricultural use under the Proposed Action, which could result in minor cumulative impacts when considered with losses of farmland regionally. However, NAVWPNSTA Seal Beach agricultural areas are not designated as federal, state, or local farmlands of importance. The other projects described in Section 4.2 are primarily residential construction projects located in developed areas, or regional transportation improvement projects located with existing transportation corridors, and would not affect land uses on or adjacent to NAVWPNSTA Seal Beach. The remaining projects are proposals for facilities and infrastructure within NAVWPNSTA Seal Beach that are consistent with existing land uses and mission needs. Therefore, the impacts identified for the Proposed Action, in conjunction with other projects on and in the regional vicinity, would not be cumulatively significant.

The geographic extent for cumulative effects on coastal resources is defined as land within the California Coastal Zone Region 9. However, NAVWPNSTA Seal Beach is categorically excluded from the Coastal Zone, and actions occurring within NAVWPNSTA Seal Beach would not result in impacts to coastal resources. Therefore, the impacts identified for the proposed project, in conjunction with other projects on and in the regional vicinity, would not be cumulatively significant.

4.4.2 Biological Resources

For biological resources, the geographic extent for cumulative impacts is generally defined as an approximately 138-acre (55.8-hectare) area, encompassing two noncontiguous parcels, referred to as Site A (approximately 64 acres [26 hectares]) and Site B (approximately 73 acres [29 hectares]), plus a 500-foot (150-meter) buffer surrounding each site. The geographic extent is conceptually expanded with respect to certain species that inhabit a larger regional area and may potentially occur at or around the project parcels only intermittently or in transit, such as migratory birds.

As described in 3.3.3, Sites A and B are surrounded by large areas of cultivated fields, disturbed habitat, and development.

No federally listed plant or animal species are likely to occur and no critical habitat has been designated within the direct impact footprint or surrounding areas. Thus, there would be no direct impacts to federally listed species or critical habitat from implementation of the proposed project, and no contribution to cumulative effects with the other projects described in Section 4.2. Potential cumulative impacts to "vegetation communities and land types" and "other special status species" are discussed in more detail below.

4.4.2.1 Vegetation Communities and Land Types

Construction of the PV solar facilities would result in the removal of approximately 138 acres (55.8 hectares) of agricultural and unplanted land, and some ruderal vegetation along the edges of the solar sites. These areas do not support habitat for federally listed or state-listed plant species. The other projects identified in Section 4.2 occurring on NAVWPNSTA Seal Beach would also occur in previously disturbed areas with limited or no vegetation communities. Several of the other projects described in Section 4.2 are off-station residential construction projects located in fully developed areas with limited or no vegetation communities. The remaining projects are regional transportation improvement projects that are geographically separated from the proposed project and include revegetation plans that would restore or offset impacts associated with construction. Therefore, the proposed project and these other projects would not create cumulatively significant impacts.

4.4.2.2 Special Status Wildlife Species

Implementation of the proposed project could result in impacts to other special status wildlife species such as; western burrowing owl and ferruginous hawk, as well as other migratory birds protected under the MBTA. Potential impacts to these species could be caused by construction activities such as clearing and grubbing, site grading, and trenching for electrical infrastructure, and through indirect impacts associated with bird strikes on the solar PV arrays, potentially induced by the “lake effect” (USFWS 2015). However, the proposed project would incorporate the impact avoidance and minimization measures described in Section 2.6.3. NAVWPNSTA Seal Beach is regionally located in a developed area that has experienced habitat loss over time for western burrowing owl, ferruginous hawk, and other migratory birds. However, as noted in Section 3.3.1, suitable habitat for all these bird species exists in the region, both in small parcels such as Sites A and B (i.e., foraging habitat) and larger parcels such as the SBNWR (i.e., nesting, foraging, and stop-over habitat).

The other projects identified in Section 4.2 occurring on NAVWPNSTA Seal Beach would occur in previously disturbed areas with limited habitat for special status species. Several of the other projects described in Section 4.2 are off-station residential construction projects located in fully developed areas with very limited potential for occurrence of special status species. The remaining projects are regional transportation improvement projects that are geographically separated from the proposed project and include impact minimization measures that would restore or offset impacts associated with construction. All of the reasonably foreseeable projects would be subject to similar impact avoidance and minimization measures because of the potential presence of MBTA and other special-status species in the vicinity. Therefore, implementation of the Proposed Action, in conjunction with other projects on and in the regional vicinity, would not result in cumulatively significant impacts to these special status wildlife species.

4.4.3 Soils

The geographic extent for potential cumulative effects to soils with respect to soil erosion (and the potential for soil loss and sediment delivery into nearby waterways) includes the waterways that receive surface water flows from the project site (i.e., Orange County Flood Control

Channel and Anaheim Bay). Orange County Flood Control Channel and Anaheim Bay have historically been drained by highly developed areas experiencing construction and varied residential, commercial, and industrial land uses. Section 3.6.1.1 describes existing conditions within the Orange County Flood Control Channel and Anaheim Bay. Cumulative projects at NAVWPNSTA Seal Beach and adjacent areas would include construction activities that would temporarily increase the potential for erosion-induced sedimentation of the surrounding waterways. However, not all cumulative project construction activities would occur within the same timeframe, thereby minimizing the potential for cumulative impacts.

The BMPs (e.g., silt fencing) would be followed, including development of grading plans, development of spill prevention plans, and adherence to erosion and storm water management practices outlined in the SWPPP for the project, as described in Section 2.6.5, to contain soil, construction-related contaminants (e.g., oils) and runoff on the project sites. Although other reasonable foreseeable projects on NAVWPNSTA Seal Beach and in adjacent areas/communities would have similar effects, it can reasonably be assumed that these projects would also comply with applicable federal, state, and local regulations and/or requirements, and would have to implement similar types of protection measures. This would minimize the majority of potential impacts from the proposed project and other projects in the regional vicinity. Therefore, implementation of the Proposed Action, in conjunction with other projects on and in the regional vicinity, would not result in cumulatively significant impacts to soils.

4.4.4 Water Resources

The geographic extent for cumulative effects on water resources is defined as the project sites at NAVWPNSTA Seal Beach and the water bodies that may receive surface water flows from the project sites (e.g., Orange County Flood Control Channel, Anaheim Bay). Orange County Flood Control Channel and Anaheim Bay have historically been drained by highly developed areas experiencing construction and varied residential, commercial, and industrial land uses. Section 3.6.1.1 describes existing conditions within the Orange County Flood Control Channel and Anaheim Bay. Potential impacts to water resources may include increases in sedimentation into local water bodies, the increase in impermeable surfaces that would alter volumes or patterns of surface flows or increase flooding potential, and the discharge of construction-related waste materials that could impact downstream water quality.

The proposed project would require surface disturbance (e.g., grading, localized excavation) during the construction of the solar PV systems. The inclusion of BMPs, and adherence to erosion and storm water management practices as described in Section 2.6.5, would make substantial transport of sediment and storm water runoff unlikely, and would not greatly contribute to the combined actions of other activities with the potential to transport sediment and runoff to waterways. The proposed project would result in a negligible increase in impervious surface area in the vicinity. In addition, compliance with other applicable DoD, federal, state, and local regulations; land use and resource management plans; and/or requirements would minimize the majority of long-term impacts from both the proposed project and other projects on and in the regional vicinity. Implementation of the Proposed Action, in conjunction with other projects on and in the regional vicinity, would not result in cumulatively significant impacts to water resources.

4.4.5 Air Quality and Climate Change

The geographic extent for cumulative effects on air quality is defined as areas within the South Coast Air Basin. The South Coast Air Basin is located in a highly developed portion of Southern California that has experienced attainment issues for multiple criteria pollutants. Section 3.7.2 describes existing conditions, to include most recent emissions inventory and attainment statuses within the South Coast Air Basin. As described in Section 3.7.3, activities associated with the construction, operation, and maintenance of the proposed project would produce emissions that would remain substantially below all emission significance thresholds. However, emissions from other projects potentially would contribute to ambient pollutant impacts generated from the proposed project.

Construction of the proposed project would generate emissions that would contribute to regional air quality impacts. However, these impacts would be temporary as construction is estimated to require 9 to 11 months. In addition to being temporary, the impacts associated with construction would be minor when compared to overall regional air quality. Post-construction, the proposed project would result in a beneficial reduction in regional air quality emissions resulting from the use of a renewable energy source instead of a non-renewable source. Operation and maintenance of the solar PV systems would avoid long-term emissions generated from conventional non-renewable generating sources, thereby resulting in beneficial effects to air quality throughout the air basins. Therefore, air quality impacts due to the minor amounts of emissions produced from the proposed project would not be substantial enough to contribute to an exceedance of an ambient air quality standard, or to exacerbate an already-existing exceedance.

Emissions from other projects potentially would contribute to ambient pollutant impacts generated from the proposed project, but they, like the proposed project would be subject to review by the South Coast Air Pollution Control District and would be required to comply with the SIP-approved Rules and Regulations adopted by the Ventura County Air Pollution Control District. Therefore, air quality impacts due to the minor amounts of emissions produced from the proposed project, in combination with emissions from cumulative projects, would not be substantial enough to contribute to an exceedance of an ambient air quality standard. As a result, operation and maintenance of the proposed project would result in less than significant cumulative air quality impacts.

4.4.5.1 Greenhouse Gases and Climate Change

The potential effects of proposed GHG emissions are by nature global and cumulative impacts, as individual sources of GHG emissions are not large enough to have an appreciable effect on climate change. Therefore, an appreciable impact to global climate change would only occur only if GHG emissions associated with the proposed project were to combine with such emissions from other man-made activities in such a way as to appreciably increase climate change impacts on a global scale.

Currently, there are no formally adopted or published NEPA thresholds of significance for GHG emissions. Therefore, in the absence of an adopted or science-based NEPA significance threshold for GHGs, this EA compares GHG emissions estimated for the proposed project to the

U.S. net GHG emissions inventory of 2011 (USEPA 2013b) to determine the relative increase in proposed GHG emissions.

As described in Section 3.7.3, the proposed project would produce nominal amounts of criteria pollutant emissions. The CO_2e emissions associated with the net U.S. sources in 2011 is approximately 6,390 U.S. tons (5,797 million metric tons). Emissions of GHGs from the proposed project would equate to very minimal amounts of the U.S. inventory. As a result, they would not substantially contribute to global climate change. Therefore, GHG emissions from proposed project would produce less than significant cumulative impacts to global climate change.

In addition, emissions of NO_x, SO_2, and CO_2e would be lessened (refer to Section 3.7.1, Tables 3.7-4, 3.7-6, and 3.7-8) at and/or in the vicinity of NAVWPNSTA Seal Beach by reduced consumptions of grid-supplied electricity, and would more than offset the short-term construction emissions within the first year of operation. Subsequent years of operation would also avoid emissions produced from conventional non-renewable generating sources.

Overall, the proposed project would produce only small amounts of GHGs during a short timeframe. Therefore, implementation of the proposed project, as wells as past and reasonably foreseeable future projects, would not result in significant cumulative impacts related to GHG emissions or climate change.

4.4.6 Utilities

The geographic region of analysis for potential cumulative impacts to utilities is defined as the Southern California Edison energy generation and distribution systems serving NAVWPNSTA Seal Beach and the communities surrounding the station.

There would be beneficial impacts to energy associated with implementation of the proposed project. Beneficial impacts include increased energy security for NAVWPNSTA Seal Beach and additional electrical generation capacity for Southern California Edison. However, projects under consideration within the Southern California Edison service area for cumulative effects would increase energy demand. This increase is currently unknown; however, the increase is not anticipated to significantly affect electricity delivery in the Southern California Edison service area based on current loads, and in any event the proposed project in and of itself would tend over time to lessen any increase in demand. Therefore, implementation of the Proposed Action, when considered with impacts resulting from the implementation of other regional projects described in Section 4.2, would result in negligible cumulative impacts to utilities.

4.4.7 Visual Resources

The geographic extent for cumulative effects on visual resources is defined as the viewshed boundary of Sites A and B on NAVWPNSTA Seal Beach or an approximate 2 mile (3.2 kilometer) corridor. With the Proposed Action, ground-mounted solar PV systems would be constructed and operated in agricultural outlease areas; consequently, permanent visual changes would occur at the site(s). Cumulative impacts on visual resources would consist of the aggregate effects of the proposed solar PV systems and other projects, actions, and processes

that could degrade the viewshed. The ROI for aesthetics consists of NAVWPNSTA Seal Beach and adjacent public areas. The NAVWPNSTA Seal Beach PV systems would change the existing sites, but visibility would be limited to public areas of Haven View Park and along Bolsa Chica Street/Road, Edinger Avenue, and Westminster Avenue. No structures would be taller than 8 feet (2.4 meters). Because of the relatively low height (less than 8 feet [2.4 meters]) of proposed PV panels and proposed screening measures and resultant weak visual contrast, viewers passing through the project area are unlikely to notice a considerable change in visual character or to consider the visual character substantially diminished. NAVWPNSTA Seal Beach is adjacent to an urban built-out area. The development of the PV systems, along with other past, present, or future development within the area, would not result in significant cumulative impacts to the visual environment.

5.0 NEPA and Other Considerations

This chapter addresses additional considerations required by NEPA, including:

- Possible conflicts between the alternatives and the objectives of federal, regional, state, and local plans, policies, and controls
- Energy requirements and the conservation potential of alternatives
- Irreversible and irretrievable commitment of natural or depletable resources
- Short-term versus long-term productivity
- Any probable significant environmental impacts that cannot be avoided and are not amenable to mitigation

5.1 Possible Conflicts Between the Action and the Objectives of Federal, Regional, State, and Local Plans, Policies, and Controls

Implementation of the proposed project would comply with existing federal regulations and state, regional, and local policies and programs, while maintaining the Navy's mission. The project would be completed in accordance with the MBTA, the ESA, the CAA, and the NHPA. The RONA has been completed for the project in accordance with the CAA (Appendix B).

5.2 Energy Requirements, Conservation Potential of Alternatives

Energy required to implement the project would include fuel and electricity to power vehicles and equipment during construction and periodic maintenance activities. Fuel for construction and maintenance vehicles and equipment is currently available in adequate supply from Navy-owned and other local sources. If selected, the No Action Alternative would not result in an increase of energy usage over existing usage.

Direct energy requirements under the proposed project would be limited to those necessary to operate vehicles and equipment. No superfluous use of energy has been identified, and proposed energy uses would be minimized to the greatest extent possible without compromising the integrity of the proposed facilities to be constructed. Proposed new construction would comply with applicable local, state, and federal codes designed to promote energy efficiency and the use of renewable energy resources. Further, operation of the proposed project would produce a renewable energy source that would supply electricity to the surrounding community, hereby conserving fossil fuels and reducing dependence on non-renewable energy sources.

5.3 Irreversible and Irretrievable Commitment of Natural or Depletable Resources

Resources that are irreversibly or irretrievably committed to a project are those that are used on a long-term or permanent basis. These include non-renewable resources, such as metal and fuel, and other natural or cultural resources. These resources are irretrievable in that they would be used for a project when they could have been used for other purposes or conserved. 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.

Implementation of the proposed project would involve an irreversible or irretrievable commitment of materials and environmental resources. Non-renewable resources, such as fuel, oil, and lubricants, would be consumed by construction and maintenance vehicles and equipment and would be irreversibly lost. A small amount of building materials, such as concrete, steel, and wood, would be irretrievably committed to construct the alternatives. Human labor would be required for project construction and engineering purposes. When considered at the regional level, the quantities of these resources expended for construction and operation of the alternatives would be relatively inconsequential. Additionally, operation of the proposed project would produce a renewable energy source that would counterbalance the minimal demands on non-renewable energy resources (i.e., fossil fuels) required to construct the solar PV systems. Therefore, implementation of the proposed project would not result in a significant commitment of irreversible or irretrievable resources.

5.4 Relationship Between Short-Term Environmental Impacts and Long-Term Productivity

NEPA requires an EA to address the relationship between short-term uses of the environment and the impact that such uses may have on the maintenance and enhancement of the long-term productivity of the environment. Impacts that would narrow the range of beneficial uses of the environment are of particular concern. This refers to the possibility that choosing a development option would lessen future flexibility in pursuing other options or that committing a parcel of land or other resource to a certain use would eliminate the possibility of other uses being implemented at that site.

The proposed project would include construction and operation of solar PV systems within areas at NAVWPNSTA Seal Beach already dedicated to exclusive Navy use. As part of the proposed project, land at NAVWPNSTA Seal Beach would be permanently removed from agricultural production for development of the proposed ground-mounted solar PV system. The short-term effects of the proposed improvements at the installations would include minor impacts to common vegetation. While the proposed project would permanently narrow the range of potential beneficial uses of the environment within the project area, this narrowing of potential uses would occur only within a relatively small portion of the area on the installation historically devoted to agricultural use, and would not represent a meaningful loss of beneficial use on a regional or even local scale (notwithstanding the project's beneficial effect on non-renewable energy consumption and local air quality). This loss of agricultural land would not necessarily be permanent, and in any event it should be noted that Sites A and B are not being actively used for agricultural purposes at this time. Further, the proposed project would not affect the long-term productivity of these resources at a regional level.

5.5 Probable Significant Environmental Effects that Cannot be Avoided and are Not Amenable to Mitigation

This EA has determined that the proposed project would not result in any significant impacts; therefore, there are no probable significant environmental effects that cannot be avoided.

6.0 Agencies and Persons Consulted

6.1 U.S. Government

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6.2 State Agencies

California Coastal Commission

California State Historic Preservation Office

City of Seal Beach

City of Westminster

City of Huntington Beach

Gabrielino/Tongva Nation

Gabrielino/Tongva Indians of California

Gabrielino/Tongva Band of Mission Indians of San Gabriel

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Appendix A – Public Participation

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Early Public Scoping Notice Submitted to News Media

The text of this notice of the Navy's intent to prepare an EA was printed was published in in local newspapers for 3 consecutive days beginning December 19, 2014 in the Orange County Register, a daily publication; on December 18, 2014 in the Huntingdon Beach Independent, a weekly publication; and on December 18, 2014 in the Seal Beach Sun, a weekly publication.

Environmental Assessment (EA) for the Proposed Construction and Operation of a Photovoltaic (PV) System at Naval Weapons Station (NAVWPNSTA) Seal Beach in Seal Beach, California

The Department of the Navy (Navy) is preparing an Environmental Assessment (EA) to evaluate the potential environmental impacts of the proposed construction, operation, and decommissioning of a solar photovoltaic (PV) system at one or more sites at Naval Weapons Station (NAVWPNSTA) Seal Beach, California.

The Navy proposes to lease land at NAVWPNSTA and enter into a Utility Partnership with a third-party developer who would construct, operate, own, and maintain a PV system at NAVWPNSTA Seal Beach. Land would be leased for a period of up to 37 years. After the terms of the lease are expired, the Navy and the third-party developer would either renew the lease or decommission the facility.

Two sites on NAVWPNSTA Seal Beach are being considered for the Proposed Action. Both sites are currently used for agricultural purposes. Site A is an 86-acre* parcel located adjacent to off-station Bolsa Chica and Edinger Roads and directly adjacent to Perimeter Road, which runs parallel to the station's security fence. Site B is a 74-acre area bounded by Bolsa Chica Street to the east and Westminster Boulevard to the south.

Please submit written comments by January 12, 2015 to:

Naval Facilities Engineering Command Southwest (NAVFAC SW)
ATTN: NAVWPNSTA Seal Beach PV EA
Ms. Hiphil S. Clemente
Project Manager
1220 Pacific Highway
San Diego, CA. 92132

*Note: Since publication of the early Public Scoping Notice, the size of Site A was reduced from 86 acres to 64 acres.

Early Public Scoping Postcard

In addition to the notice published in area media outlets, an early public scoping postcard was developed to inform the public, interested parties, members of established mailing lists, local and municipal officials, agencies, and organizations of the Navy's intent to prepare an environmental assessment evaluating the potential impacts of construction, operation, maintenance, and eventual decommissioning of PV systems at NAVWPNSTA Seal Beach.

The Department of the Navy *invites you* to participate in the Environmental Assessment (EA) for the Proposed Construction and Operation of a Photovoltaic (PV) System at Naval Weapons Station (NAVWPNSTA) Seal Beach in Seal Beach, California

The Department of the Navy (Navy) is preparing an Environmental Assessment (EA) to evaluate the potential environmental impacts of the proposed construction, operation, and decommissioning of a solar photovoltaic (PV) system at one or more sites at Naval Weapons Station (NAVWPNSTA) Seal Beach, California.

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Please submit written comments by January 12, 2015 to:
Naval Facilities Engineering Command, Attn: Ms. Hiphil S. Clemente,
1220 Pacific Highway, San Diego, California 92132

The Department of the Navy Wants Your Input!!

Naval Facilities Engineering Command
Southwest (NAVFAC SW)
ATTN: NAVWPNSTA Seal Beach PV EA
Ms. Hiphil S. Clemente
EA Project Manager
1220 Pacific Highway
San Diego, CA 92132

To have your comments considered during preparation of the EA, submit written comments by January 12, 2015.

Public Response to Early Public Scoping

Early Public Scoping was conducted from December 18, 2014 through January 12, 2015 to notify the public of the Navy's intent to prepare an environmental assessment to analyze the environmental consequences of constructing and operating PV systems at NAVWPNSTA Seal Beach. The Navy received 14 comments from the public. These comments are summarized in Table A-1 Early Public Scoping Comments.

In addition to the 14 comments received from members of the public, the Navy received two comments from the U.S. Department of the Interior, Fish and Wildlife Service regarding the Proposed Action. These comments were submitted by the Seal Beach National Wildlife Refuge, which is under the purview of the U.S. Fish and Wildlife Service, and the Ecological Services Department. The comments discuss the potential effects to the Seal Beach National Wildlife Refuge and species that occur on the Refuge from implementation of the Proposed Action. The comments also included several potential avoidance and minimization measures to reduce impacts that could result from implementation of the Proposed Action. In particular, for the "lake effect", a phenomenon where avian species mistake panel surfaces for water bodies, recommended measures include breaking up the reflection of the solar panels using spacing and visual cues or bands, as well as orienting the panels in a non-vertical fashion. Other recommended measures include the implementation of a Bird and Bat Conservation Strategy, and obtaining a Special Utility Permit from the Fish and Wildlife Migratory Birds Program to conduct activities that discourage scavenger populations in the areas of proposed Sites A and B. The Navy is coordinating with the U.S. Fish and Wildlife Service to address these concerns.

Table A-1. Early Public Scoping Comments

Resource/Concern	Summary of Comments
Land Use	• Loss of open space • Future land use planning, what would happen to the sites if the PV systems are not constructed and operated, and other future projects in planning stages • Questions regarding future projects
Biological Resources	• Potential impacts on birds that use the Seal Beach National Wildlife Refuge, including the California Least Tern, the light-footed Ridgeway's Rail, and Belding's Savannah Sparrow • Proximity of the sites to the Seal Beach National Wildlife Refuge • PV panels effects on avian mortality from the "lake effect", and the potential for including markings, visual cues, and other initiatives to minimize the impacts of the "lake effect" • The Proposed Action's location relative to Tsunami potential • Potential detrimental effects to the wildlife from use of herbicides • Effects on Canadian geese migration • Migration of coyotes and other wildlife into residential areas and relocating/controlling populations of unwanted wildlife in residential areas, including loss of pets
Noise	• Concerns regarding a constant 'buzzing' sound potentially emitted from panels
Traffic and Circulation	• Increase in traffic during construction
Economy	• The project is about financial gain rather than energy • Ground fog in the morning would make the panels inefficient so this is the wrong location for solar • PV systems would negatively affect quality of life and degrade property values
Construction	• Who will be the construction contractor and will care be taken to ensure that the materials used are safe • Increased dust during construction
Storm water	• Drainage during rainstorms and potential diversion of water re-entering the groundwater supply vs being diverted to the Ocean (where it becomes unusable without desalinization)
Climate	• Concern that heat generation from the solar panels or the underlying asphalt or concrete would affect the ocean breeze

Resource/Concern	Summary of Comments
Visual Quality	• Views of agricultural uses are pleasant • Potential for panels to create glare impacts and how those potential impacts would affect residential areas • Responsibility for maintaining the fence line with scrim to minimize the glare/view impacts • Views of PV panels would be less so • This project is about making money by selling electricity (greed). Put these eyesores in an unpopulated area such as the Mojave Desert • Include an aerial map to better illustrate locations of sites

Appendix B – Record of Non-Applicability and Air Quality Calculations

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CLEAN AIR ACT – GENERAL CONFORMITY RULE RECORD OF NON-APPLICABILITY (RONA)

FOR CONSTRUCTION AND OPERATION OF A SOLAR PHOTOVOLTAIC SYSTEM AT NAVAL WEAPONS STATION (NAVWPNSTA) SEAL BEACH, CALIFORNIA

MAY 2015

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PROPOSED ACTION

The proposed project falls under the Record of Non-Applicability (RONA) category and is documented with this RONA.

Action Proponent: Commanding Officer, NAVWPNSTA Seal Beach, California

Location: Northwestern Orange County, California

Proposed Action Name: Construction and operation of a solar photovoltaic system at NAVWPNSTA Seal Beach, California

PROPOSED ACTION AND EMISSIONS SUMMARY

PROPOSED ACTION

Under the proposed project, the Navy would install a ground-mounted solar photovoltaic (PV) system on one or more parcels of land at NAVWPNSTA Seal Beach. The project is needed to contribute towards the Navy's overall compliance with the Secretary of the Navy's renewable energy goals.

Under the Proposed Action, the solar PV system would have a generation capacity of 25 MW of alternating current, and would be located on two parcels (denoted as Sites A and B in the Environmental Assessment) totaling approximately 138 acres (55.8 hectares), with ground disturbance occurring throughout the 138 acres (55.8 hectares). The solar PV system under Alternative 2 would yield 10 MW and would be located on a single approximately 64-acre (26-hectare) parcel (Site A). The solar PV system under Alternative 3 would yield 15 MW and would be located on a single approximately 73-acre (29-hectare) parcel (Site B). Construction of the ground-mounted solar photovoltaic system would occur between 2015 and 2017. Due to external factors, the exact construction date cannot be determined at this time.

EMISSIONS SUMMARY

Air quality impacts associated with the proposed project are related to emissions that would occur during construction of the ground-mounted solar photovoltaic system at NAVWPNSTA Seal Beach. The principal sources of pollutants during construction would be the construction equipment, construction crew commuting vehicles, and earth-moving activities.

Construction

Construction for the installation of ground-mounted solar PV systems associated with the proposed project is estimated to take place over a 9-11 month period depending upon the alternative selected; therefore, all construction emissions will be considered to occur in 1 year for the General Conformity analysis. While construction emissions are assumed to occur between 2015 and 2017, due to external factors, the exact construction dates cannot be determined at this time.

Table B-1 compares the maximum estimated emissions for each of the alternatives at NAVWPNSTA Seal Beach with the *de minimis* annual emissions thresholds set forth for the

South Coast Air Basin (per EPA General Conformity Rule and OPNAVINST M-590.1, Clean Air Act General Conformity Guidance). Based on the air quality analysis, the maximum estimated emissions for the proposed project at NAVWPNSTA Seal Beach would be below general conformity *de minimis* levels for all criteria pollutants for the South Coast Air Basin. Therefore, implementation of the proposed project at NAVWPNSTA Seal Beach would result in minor, localized, short-term effects on air quality during construction, and impacts during construction would not be significant.

Table B-1 Estimated Construction Emissions at NAVWPNSTA Seal Beach Compared to *de minimis* Emissions for Criteria Pollutants in the South Coast Air Basin[1]

Alternative	County	Emissions (tons per year)						
		NOx	CO	VOCs	SO_2	PM_{10}	$PM_{2.5}$	CO_2
Proposed Action/Alternative 1 (25 MW, 138 acres [55.8 hectares])	Orange	3.14	1.38	0.25	0.12	38.23	4.06	785.43
Alternative 2 (10 MW, 64 acres [26 hectares])		1.57	0.69	0.12	0.06	17.74	1.89	392.72
Alternative 3 (15 MW, 73 acres [29 hectares])		1.44	0.63	0.11	0.06	20.20	2.13	359.83
General Conformity *de minimis* Threshold		10	N/A	10	N/A	70	100	N/A

Key:
CO = carbon monoxide
CO_2 = carbon dioxide
N/A = not applicable
NO_X = oxides of nitrogen
$PM_{2.5}$ = fine particulate matter less than or equal to 2.5 microns in diameter
PM_{10} = suspended particulate matter less than or equal to 10 microns in diameter
SO_2 = sulfur dioxide
VOCs = volatile organic compounds

Detailed construction equipment assumptions, fugitive dust emission calculations, and emissions calculations for NAVWPNSTA Seal Beach are provided in Appendix B of the Environmental Assessment.

Operations

Long-term operation of the proposed project at NAVWPNSTA Seal Beach would result in avoided emissions of CO_2e, NO_X, and SO_2 by reducing the consumption of grid-supplied electricity. Subsequent years of operation would also avoid emissions produced from conventional non-renewable generating sources. Table B-2 shows the estimated emissions avoided from the ground-mounted solar PV system at NAVWPNSTA Seal Beach that would be realized by reduced consumption of grid-supplied electricity. Detailed emissions calculations are provided in Appendix B of the EA.

Table B-2 Estimated Annual Emissions Avoided at NAVWPNSTA Seal Beach with Implementation of each Alternative

Alternative	County	Emissions Avoided (tons per year)		
		CO_2e	NO_X	SO_2
Proposed Action/Alternative 1 (25 MW, 138 acres [55.8 hectares])	Orange	34,127	14.77	6.23
Alternative 2 (10 MW, 64 acres [26 hectares])		13,651	5.91	2.49
Alternative 3 (15 MW, 73 acres [29 hectares])		20,476	8.86	3.74

Key:
CO_2e = carbon dioxide equivalents
NO_X = oxides of nitrogen
SO_2 = sulfur dioxide

Affected Air Basin: South Coast Air Basin, California

Date RONA Prepared: June 2015

Proposed Action Exemptions: The proposed project is exempt because the calculated total emissions are below the *de minimis* levels set forth in the Clean Air Act General Conformity Rule.

ATTAINMENT AREA STATUS AND EMISSIONS EVALUATION CONCLUSION

The project area at NAVWPNSTA Seal Beach is located within the South Coast Air Basin, which is federally designated as extreme nonattainment for ozone, nonattainment for PM_{10}, nonattainment for $PM_{2.5}$, and attainment for SO_2. This air basin is also a maintenance area for NO_2 and CO. Based on the data in Table F-1, it is concluded that the Clean Air Act General Conformity Rule *de minimis* thresholds for applicable criteria pollutants would not be exceeded as a result of implementation of the proposed project at NAVWPNSTA Seal Beach. Therefore, further formal Conformity Determination procedures are not required, resulting in this RONA.

RONA APPROVAL:

Date: _____

Signature: _____

Construction Assumptions for Alt 1 (both sites, 138 acres)

Equipment	Purpose	Usage			Miles per day	Total miles	Total Hrs	Additional Assumptions
		Quantity	Hr/day	Days				
								Construction duration is 11 months. Days based on 20 work days per month.
F-150 pickup	general use (personnel transport)	4	3	120	80	38400	na	Assumed 80 miles per day (3 hrs @ 45 mph). Pickups are used only to transport personnel to and from site.
forklift -piers	pier moving	4	4	65	na	na	1040	
forklift - motors	move pier motors & rebar	2	4	65	na	na	520	
forklift - metal	move frames & panels	6	4	90	na	na	2160	
Bobcat or small dozer	grading, stone/soil fill	4	8	90	na	na	2880	
trenching machine	4 ft x 3 ft deep trench	2	8	21	na	na	336	3 km of trenching for electrical lines
blade scraper	grading at site	2	8	90	na	na	1440	Scraper hp assumed to be between 600 hp and 750 hp
pile driver	driving posts into ground	8	8	65	na	na	4160	Pile driver hp assumed to be between 100 hp and 175 hp
Delivery truck	delivers panels/parts	6	3	100	80	48000	na	Assumed 135 miles per day (3hrs @ 45 mph). Assume 100 total days over project duration.
welding machine	small, for installing support fixtures	4	4	100	na	na	1600	
backhoe	dig excavate foundation for new sites	2	8	65	na	na	1040	
Tacifier Truck	Spray soil adhesive	2	8	6	32	384	na	Assume 8 hrs per day, 4 mph speed while spraying
Water Truck	dust suppression	10	4	120	16	19200	na	Assume 4 hrs per day, 4 mph speed while spraying

Nonroad Equipment	Forklift	Backhoe	Welder	Trencher	Bobcat	Scraper	Pile Driver
Total Hrs Used	3720	1040	1600	336	2880	1440	4160

Onroad Equipment	Light Pickups	Delivery/Water/Tacifier Trucks
	38400	67584

Construction Assumptions for Alt 2 (64 acre)

Equipment	Purpose	Usage			Miles per day	Total miles	Total Hrs	Additional Assumptions
		Quantity	Hr/day	Days				
								Construction duration is 10 months. Days based on 20 work days per month.
F-150 pickup	general use (personnel transport)	2	3	120	80	19200	na	Assumed 80 miles per day (3 hrs @ 45 mph). Pickups are used only to transport personnel to and from site.
forklift -piers	pier moving	2	4	65	na	na	520	
forklift - motors	move pier motors & rebar	1	4	65	na	na	260	
forklift - metal	move frames & panels	3	4	90	na	na	1080	
Bobcat or small dozer	grading, stone/soil fill	2	8	90	na	na	1440	
trenching machine	4 ft x 3 ft deep trench	1	8	21	na	na	168	3 km of trenching for electrical lines
blade scraper	grading at site	1	8	90	na	na	720	Scraper hp assumed to be between 600 hp and 750 hp
pile driver	driving posts into ground	4	8	65	na	na	2080	Pile driver hp assumed to be between 100 hp and 175 hp
Delivery truck	delivers panels/parts	3	3	100	80	24000	na	Assumed 135 miles per day (3hrs @ 45 mph). Assume 100 total days over project duration.
welding machine	small, for installing support fixtures	2	4	100	na	na	800	
backhoe	dig excavate foundation for new sites	1	8	65	na	na	520	
Tacifier Truck	Spray soil adhesive	1	8	6	32	192	na	Assume 8 hrs per day, 4 mph speed while spraying
Water Truck	dust suppression	5	4	120	16	9600	na	Assume 4 hrs per day, 4 mph speed while spraying

Nonroad Equipment	Forklift	Backhoe	Welder	Trencher	Bobcat	Scraper	Pile Driver
Total Hrs Used	1860	520	800	168	1440	720	2080

Onroad Equipment	Light Pickups	Delivery/Water/Tacifier Trucks
	19200	33792

Construction Assumptions for Alt 3 (73 acre)

Equipment	Purpose	Usage			Miles per day	Total miles	Total Hrs	Additional Assumptions
		Quantity	Hr/day	Days				
								Construction duration is 9 months. Days based on 20 work days per month.
F-150 pickup	general use (personnel transport)	2	3	120	80	19200	na	Assumed 80 miles per day (3 hrs @ 45 mph). Pickups are used only to transport personnel to and from site.
forklift -piers	pier moving	2	4	60	na	na	480	
forklift - motors	move pier motors & rebar	1	4	60	na	na	240	
forklift - metal	move frames & panels	3	4	80	na	na	960	
Bobcat or small dozer	grading, stone/soil fill	2	8	80	na	na	1280	
trenching machine	4 ft x 3 ft deep trench	1	8	21	na	na	168	3 km of trenching for electrical lines
blade scraper	grading at site	1	8	80	na	na	640	Scraper hp assumed to be between 600 hp and 750 hp
pile driver	driving posts into ground	4	8	60	na	na	1920	Pile driver hp assumed to be between 100 hp and 175 hp
Delivery truck	delivers panels/parts	3	3	100	80	24000	na	Assumed 135 miles per day (3hrs @ 45 mph). Assume 100 total days over project duration.
welding machine	small, for installing support fixtures	2	4	100	na	na	800	
backhoe	dig excavate foundation for new sites	1	8	60	na	na	480	
Tacifier Truck	Spray soil adhesive	1	8	5	32	160	na	Assume 8 hrs per day, 4 mph speed while spraying
Water Truck	dust suppression	5	4	120	16	9600	na	Assume 4 hrs per day, 4 mph speed while spraying

Nonroad Equipment	Forklift	Backhoe	Welder	Trencher	Bobcat	Scraper	Pile Driver
Total Hrs Used	1680	480	800	168	1280	640	1920

Onroad Equipment	Light Pickups	Delivery/Water/Tacifier Trucks
	19200	33760

Construction Emissions for Alt 1

Nonroad Equipment	Hours Of Operation	Fuel Type	Nonroad Emission Factor (gm/hour)							Emissions (tons per year)						
			NOx	CO	VOC	SO_2	PM_{10}	$PM_{2.5}$	CO_2	NOx	CO	VOC	SO_2	PM_{10}	$PM_{2.5}$	CO_2
Forklift	3720	Diesel	83.72	7.09	3.87	2.55	4.35	4.22	16526.74	0.343	0.029	0.016	0.010	0.018	0.017	67.769
Backhoe	1040	Diesel	72.13	89.60	14.63	2.47	14.03	13.61	12696.45	0.083	0.103	0.017	0.003	0.016	0.016	14.555
Welding machine	1600	Diesel	23.81	23.02	5.29	0.67	3.24	3.14	3095.71	0.042	0.041	0.009	0.001	0.006	0.006	5.460
Trenching machine	336	Diesel	73.38	16.73	4.03	2.11	4.35	4.22	11981.90	0.027	0.006	0.001	0.001	0.002	0.002	4.438
Bobcat or small dozer	2880	Diesel	69.07	12.03	3.57	2.03	3.82	3.70	12081.78	0.219	0.038	0.011	0.006	0.012	0.012	38.355
Scraper	1440	Diesel	806.51	476.54	65.79	39.66	78.33	75.98	217584.42	1.280	0.756	0.104	0.063	0.124	0.121	345.377
Pile Driver	4160	Diesel	178.51	72.30	17.89	8.14	21.29	20.65	43559.58	0.819	0.332	0.082	0.037	0.098	0.095	199.747

Onroad Equipment	Miles Driven	Fuel Type	Onroad Emission Factor (gm/mile)							Emissions (tons per year)						
Pickup and Delivery Trucks	38400	Gasoline	0.151	1.209	0.027	0.005	0.002	0.002	483.8	0.006	0.051	0.001	0.000	0.000	0.000	20.479
Dump, Delivery, Water Trucks	67584	Diesel	4.3	0.288	0.085	0.011	0.034	0.031	1198	0.320	0.021	0.006	0.001	0.003	0.002	89.249

Construction Fugitives	Acres Graded	Months of Grading/Prep	Emission Factors							Emissions (tons per year)						
	138	2.5					0.11	0.011						37.95	3.795	

	NOx	CO	VOC	SO_2	PM_{10}	$PM_{2.5}$	CO_2
Totals for Alternative 1:	**3.14**	**1.38**	**0.25**	**0.12**	**38.23**	**4.06**	**785.43**

Construction Emissions for Alt 2

Nonroad Equipment	Hours Of Operation	Fuel Type	Nonroad Emission Factor (gm/hour)							Emissions (tons per year)						
			NOx	CO	VOC	SO_2	PM_{10}	$PM_{2.5}$	CO_2	NOx	CO	VOC	SO_2	PM_{10}	$PM_{2.5}$	CO_2
Forklift	1860	Diesel	83.72	7.09	3.87	2.55	4.35	4.22	16526.74	0.172	0.015	0.008	0.005	0.009	0.009	33.885
Backhoe	520	Diesel	72.13	89.60	14.63	2.47	14.03	13.61	12696.45	0.041	0.051	0.008	0.001	0.008	0.008	7.278
Welding machine	800	Diesel	23.81	23.02	5.29	0.67	3.24	3.14	3095.71	0.021	0.020	0.005	0.001	0.003	0.003	2.730
Trenching machine	168	Diesel	73.38	16.73	4.03	2.11	4.35	4.22	11981.90	0.014	0.003	0.001	0.000	0.001	0.001	2.219
Bobcat or small dozer	1440	Diesel	69.07	12.03	3.57	2.03	3.82	3.70	12081.78	0.110	0.019	0.006	0.003	0.006	0.006	19.178
Scraper	720	Diesel	806.51	476.54	65.79	39.66	78.33	75.98	217584.42	0.640	0.378	0.052	0.031	0.062	0.060	172.689
Pile Driver	2080	Diesel	178.51	72.30	17.89	8.14	21.29	20.65	43559.58	0.409	0.166	0.041	0.019	0.049	0.047	99.874

Onroad Equipment	Miles Driven	Fuel Type	Onroad Emission Factor (gm/mile)							Emissions (tons per year)						
Pickup and Delivery Trucks	19200	Gasoline	0.151	1.209	0.027	0.005	0.002	0.002	483.8	0.003	0.026	0.001	0.000	0.000	0.000	10.239
Dump, Delivery, Water Trucks	33792	Diesel	4.3	0.288	0.085	0.011	0.034	0.031	1198	0.160	0.011	0.003	0.000	0.001	0.001	44.625

Construction Fugitives	Acres Graded	Months of Grading/Prep	Emission Factors							Emissions (tons per year)						
	64	2.5					0.11	0.011						17.6	1.76	

	NOx	CO	VOC	SO_2	PM_{10}	$PM_{2.5}$	CO_2
Totals for Alternative 2:	**1.57**	**0.69**	**0.12**	**0.06**	**17.74**	**1.89**	**392.72**

Construction Emissions for Alt 3

Nonroad Equipment	Hours Of Operation	Fuel Type	Nonroad Emission Factor (gm/hour)							Emissions (tons per year)						
			NOx	CO	VOC	SO_2	PM_{10}	$PM_{2.5}$	CO_2	NOx	CO	VOC	SO_2	PM_{10}	$PM_{2.5}$	CO_2
Forklift	1680	Diesel	83.72	7.09	3.87	2.55	4.35	4.22	16526.74	0.155	0.013	0.007	0.005	0.008	0.008	30.606
Backhoe	480	Diesel	72.13	89.60	14.63	2.47	14.03	13.61	12696.45	0.038	0.047	0.008	0.001	0.007	0.007	6.718
Welding machine	800	Diesel	23.81	23.02	5.29	0.67	3.24	3.14	3095.71	0.021	0.020	0.005	0.001	0.003	0.003	2.730
Trenching machine	168	Diesel	73.38	16.73	4.03	2.11	4.35	4.22	11981.90	0.014	0.003	0.001	0.000	0.001	0.001	2.219
Bobcat or small dozer	1280	Diesel	69.07	12.03	3.57	2.03	3.82	3.70	12081.78	0.097	0.017	0.005	0.003	0.005	0.005	17.047
Scraper	640	Diesel	806.51	476.54	65.79	39.66	78.33	75.98	217584.42	0.569	0.336	0.046	0.028	0.055	0.054	153.501
Pile Driver	1920	Diesel	178.51	72.30	17.89	8.14	21.29	20.65	43559.58	0.378	0.153	0.038	0.017	0.045	0.044	92.191

Onroad Equipment	Miles Driven	Fuel Type	Onroad Emission Factor (gm/mile)							Emissions (tons per year)						
Pickup and Delivery Trucks	19200	Gasoline	0.151	1.209	0.027	0.005	0.002	0.002	483.8	0.003	0.026	0.001	0.000	0.000	0.000	10.239
Dump, Delivery, Water Trucks	33760	Diesel	4.3	0.288	0.085	0.011	0.034	0.031	1198	0.160	0.011	0.003	0.000	0.001	0.001	44.582

Construction Fugitives	Acres Graded	Months of Grading/Prep	Emission Factors							Emissions (tons per year)						
	73	2.5					0.11	0.011						20.075	2.0075	

								Totals for Alternative 3:		1.44	0.63	0.11	0.06	20.20	2.13	359.83

Air Emissions Avoided under Alt 1

Greenhouse Gases, Expressed as CO2e

	Emission Factors			Emissions Avoided		
Power Supplied (MWh)*	CO2 (lb/MWh)	CH4 (lb/GWh)	N2O (lb/GWh)	CO2 (tons)	CH4 (tons)	N2O (tons)
73000	932.82	35.91	4.55	34048	1.31	0.17
*Assumes 8 hrs/day direct sunlight			CO2e	34048	28	51
		Total (tons CO2e):			**34127**	

Criteria Pollutants

	Emission Factors		Emissions Avoided	
Power Supplied (MWh)	NOx (lb/MWh)	SO2 (lb/MWh)	NOx (tons)	SO2 (tons)
43800	0.4047	0.1708	8.86	3.74

Air Emissions Avoided under Alt 2

Greenhouse Gases, Expressed as CO2e

	Emission Factors			Emissions Avoided		
Power Supplied (MWh)*	CO2 (lb/MWh)	CH4 (lb/GWh)	N2O (lb/GWh)	CO2 (tons)	CH4 (tons)	N2O (tons)
29200	932.82	35.91	4.55	13619	0.52	0.07
*Assumes 8 hrs/day direct sunlight			CO2e	13619	11	21
		Total (tons CO2e):			**13651**	

Criteria Pollutants

	Emission Factors		Emissions Avoided	
Power Supplied (MWh)	NOx (lb/MWh)	SO2 (lb/MWh)	NOx (tons)	SO2 (tons)
29200	0.4047	0.1708	5.91	2.49

Air Emissions Avoided under Alt 3

Greenhouse Gases, Expressed as CO2e

	Emission Factors			Emissions Avoided		
Power Supplied (MWh)*	CO2 (lb/MWh)	CH4 (lb/GWh)	N2O (lb/GWh)	CO2 (tons)	CH4 (tons)	N2O (tons)
43800	932.82	35.91	4.55	20429	0.79	0.10
*Assumes 8 hrs/day direct sunlight			CO2e	20429	17	31
		Total (tons CO2e):			**20476**	

Criteria Pollutants

	Emission Factors		Emissions Avoided	
Power Supplied (MWh)	NOx (lb/MWh)	SO2 (lb/MWh)	NOx (tons)	SO2 (tons)
43800	0.4047	0.1708	8.86	3.74

Air Emissions Avoided under Alt 3

Greenhouse Gases, Expressed as CO2e

	Emission Factors			Emissions Avoided		
Power Supplied (MWh)*	CO2 (lb/MWh)	CH4 (lb/GWh)	N2O (lb/GWh)	CO2 (tons)	CH4 (tons)	N2O (tons)
43800	932.82	35.91	4.55	20429	0.79	0.10
*Assumes 8 hrs/day direct sunlight			CO2e	20429	17	31
		Total (tons CO2e):			**20476**	

Criteria Pollutants

	Emission Factors		Emissions Avoided	
Power Supplied (MWh)	NOx (lb/MWh)	SO2 (lb/MWh)	NOx (tons)	SO2 (tons)
43800	0.4047	0.1708	8.86	3.74

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Appendix C – Hydrogeologic Analysis for Solar Development Memo

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619 610 7600 tel

January 19, 2015

Kelly Finn
Project Manager
Naval Facilities Engineering Command Southwest
1220 Pacific Highway
San Diego, California 92132

Dear Ms. Finn,

Subject: Hydrologic Analysis for Seal Beach Solar Development

The following hydrologic analysis for the Seal Beach Solar Development project in Orange County demonstrates that the photovoltaic (PV) system installation will have a negligible impact on the existing surface, drainage patterns, and runoff amounts for the project site. Since the impacts are negligible, any existing drainage facilities downstream will experience no change in hydraulic capacity.

1.0 Introduction

This letter report presents the existing and proposed runoff rates for the Seal Beach Solar Development site. This analysis will utilize the Rational Method in accordance with the 1986 Orange County Hydrology Manual. An Orange County Rational Method hydrology module, in the Advanced Engineering Software (AES) hydrology package, was used to develop the runoff rates.

2.0 Existing Conditions

The project site consists of two separate undeveloped sites of 73.4 acres and 86.4 acres.

The smaller southern site (A) is irregularly shaped and is bound to the east and south by Perimeter Road, and approximately to the north by a private road (Bolsa Avenue) alignment. To the east of Perimeter Road is the Orange County Flood Control Channel (OCFC Channel), a large natural drainage channel that conveys flow from the entire watershed, southerly and then westerly towards Huntington Harbor. The flood control channel is fenced, approximately 100 feet wide, and has a fabricated rocky slope and bank. The channel is designed to handle water flow from storm drains and other runoff and "channel" the water into the OCFC Channel, which flows into Huntington Harbor, Anaheim Bay, and Seal Beach National Wildlife Refuge, and then into the Pacific Ocean.

The general runoff pattern for site A is in the form of sheet flow from the high point at the northern edge of the site towards the west. The runoff is split into two areas. The northern portion flows westerly off the site and the remainder towards the southwest. The runoff continues to sheet westerly after leaving the site boundary and ultimately flows to Huntington Harbor.

The larger northern site (B) is rectangular and is bound to the east by Perimeter Road, to the south by Westminster Boulevard, and to the north by a private road (Alfa Road) alignment. To the east of Perimeter Road is the OCFC Channel, running southerly towards site A.

The current runoff pattern for site B is in the form of sheet flow from the high point at the center of the site. The runoff is split; a portion flows easterly towards Perimeter Road and the remainder towards the west. The runoff continues to sheet westerly after leaving the site boundary.

According to the Hydrologic Soils Groups definitions in the City of Seal Beach Water Master Plan Update, Figure 3-3, the soils on both site locations are classified as a Soil Type C. The existing vegetation on top of the site is sparse; therefore, the ground cover assumed in the hydrologic analysis is *undeveloped with poor or barren ground cover*.

Refer to Figures 1 and 2, Existing Hydrology Map, for the existing watershed maps for sites A and B.

3.0 Pre-project Results

Characteristics for each watershed for sites A and B were developed. The AES program was then used to develop the runoff for the 100-year storms from each existing watershed. The Excel spreadsheet for the Existing Watershed Characteristics and the AES output for the 100-year storm runoff rates are attached to this report.

Tables 1 and 2 summarize the pre-project runoff rates calculated for the two project sites. The calculations for both sites use the 1986 Orange County Hydrology Manual and have the same rainfall intensities and soil type. The difference lies in the time of concentration calculations, as well as different watershed areas.

Table 1 – South Site (A) Flow Rates

AES Watershed Designation	Outfall Point	Q_{100} (cfs)
100	1	25.7
200	2	96.7
TOTAL	**N/A**	**122.4**

Table 2 – North Site (B) Flow Rates

AES Watershed Designation	Outfall Point	Q_{100} (cfs)
300	3	67.8
400	4	56.0
TOTAL	**N/A**	**123.8**

4.0 Proposed Project Conditions

The proposed Seal Beach Solar Development project will install PV panels on the entire site area for both sites A and B. Refer to Figure 3 and Figure 4 for the proposed panel layout in relation to the watershed locations and outfall points for sites A and B.

In areas with surface vegetation, ground-mounted solar PV systems may require the site to be cleared and grubbed; however, ground cover will be reestablished using native vegetation, mimicking existing conditions. Gravel may also be placed for all-weather roads between the rows of solar panels and around the site perimeter for maintenance access.

All of the installation will be completed with minimal new impervious surfaces created. See the attached Mounting System Details. A typical configuration for a ground-mounted type of system is to install vertical members into the ground, with panel mounting hardware, frames, motors, and/or the solar panels themselves affixed atop the

constructed mounting structure. Pole footings (or similar) will be used, and each footing will consist of a 4-inch cross-sectional area and will require a depth of 4 feet to 6.5 feet below ground surface. The mounting poles are new impervious area within the project site; however, since their diameter is so small and the project sites are so large, the impervious areas from the poles amount to less than 1% of the total project area. This impact is negligible in the 100-year runoff storm calculations.

Ground-mounted panels will be approximately 5 feet (1.5 meters) wide and 3 feet (0.9 meter) long. The number of panels in each array, the type of ground-mounted system used, and the array configuration will depend on the third-party developer's site design, but in this memo we are assuming the attached panel layout. The PV panels are impervious, but the runoff will still make its way to the surface by running off the sides of the panels. Even though the flow is concentrated more than with the existing conditions, the flow is minor (0.004 cubic feet per second per foot) and will not cause erosion of the existing surface, and is therefore deemed to be insignificant. See the Array Runoff Calculations attached to this letter.

Since very minimal increase in impervious surfaces will occur as a result of the project and the land cover will remain the same, except for the negligible addition of gravel as roadway surface, there will be no change in the runoff characteristics, patterns, or flow rates due to the project. The runoff patterns will also continue to sheet flow to match existing conditions.

5.0 Post Project Results

Because there is a negligible increase in impervious area, no changes in soil type, and minimal changes in ground cover, the hydrologic results presented in the tables above will remain the same in the post-project conditions. Ultimately, no changes in the project runoff will occur due to construction of the PV system.

6.0 Hydraulic Analysis

There was no hydraulic analysis performed for this project since there were no existing pipes, culverts, or channels affected by the construction of the project. The current drainage pattern of sheet flow to the west will remain for both sites A and B.

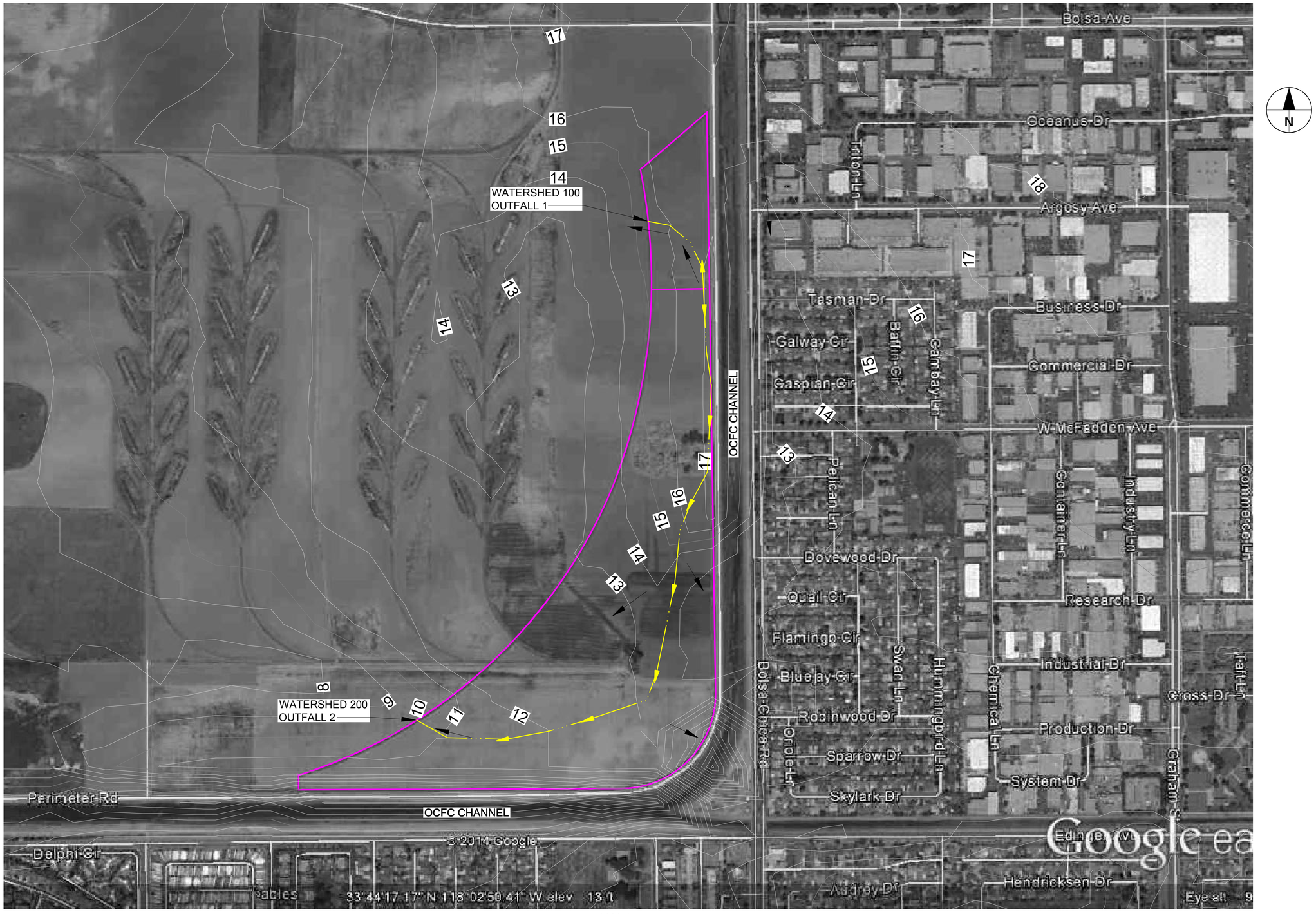
7.0 Conclusions

A hydrological analysis of a 100-year storm event for project sites A and B was performed and pre- and post-project flow rates were determined. There is no change in the pre- and post-project flow rates and patterns due to installation of the PV System. Therefore, the project will not impact the current on-site or off-site drainage and any existing drainage structures outside of the project site will not require modification.

Michael W. Brüning, P.E.
Senior Engineer/Technical Lead

cc: Becky Oldham: Potomac-Hudson Engineering, Inc., Project File

Attachments: Figures 1 through 4
Figure 3-3
Existing Watershed Characteristics Table
AES Output
Proposed Solar PV Mounting
Assumed Panel Layout
Array Calculations



SCALE:
1" = 300'

LEGEND:

FLOW PATH

WATERSHED BOUNDARY

FLOW DIRECTION

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SEAL BEACH	AECOM PROJECT NO.	FIGURE
EXISTING HYDROLOGY MAP SITE A (SOUTH)	60334249	1

DWG: \\usea61pc001.na.aecomnet.com\DATA\projects\2015\60334249_Seal_Beach\900-CAD-GIS\910 CAD\05-MODELS\Exhibits - Exist.dwg Layout Name: EXISTING HYDROLOGY - A (SOUTH) - Plotted by: L'Ecluse, Ron Date: 1/15/2015 - 10:08 AM
XREFS: G-BD24x36h IMAGES: GEIB6FF.jpg - GEIB4A.jpg -

LEGEND:

FLOW PATH

WATERSHED BOUNDARY

FLOW DIRECTION

SCALE:
1" = 300'

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SEAL BEACH

EXISTING HYDROLOGY MAP
SITE B (NORTH)

AECOM PROJECT NO.
60334249

FIGURE
2

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XREFS: G-B02ex36h IMAGES: GEIB6FF.jpg GEIBF4A.jpg

SCALE:
1" = 300'

LEGEND:
FLOW PATH
WATERSHED BOUNDARY
FLOW DIRECTION

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SEAL BEACH

PROPOSED HYDROLOGY MAP
SITE A (SOUTH)

AECOM PROJECT NO.
60334249

FIGURE
3

DWG: \\uses4p1p001.na.aecomnet.com\DATA\projects\2015\60334249_Seal_Beach\900-CAD-GIS\910 CAD\05-MODELS\Exhibits - Proposed.dwg Layout Name: PROPOSED HYDROLOGY - A (SOUTH) - Plotted by: L'Ecluse, Rion Date: 1/15/2015 - 10:06 AM
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LEGEND:

FLOW PATH

WATERSHED BOUNDARY

FLOW DIRECTION

SCALE:
1" = 300'

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SEAL BEACH	AECOM PROJECT NO.	FIGURE
PROPOSED HYDROLOGY MAP SITE B (NORTH)	60334249	4

DWG: \\usadc1fs001.no.aecomnet.com\DATA\projects\2015\60334249_Seal_Beach\900-CAD-GIS\910 CAD\05-MODELS\Exhibits - Proposed.dwg Layout Name: PROPOSED HYDROLOGY - B (NOTH) - Plotted by: L'Eclise, Rion Date: 1/15/2015 - 10:06 AM
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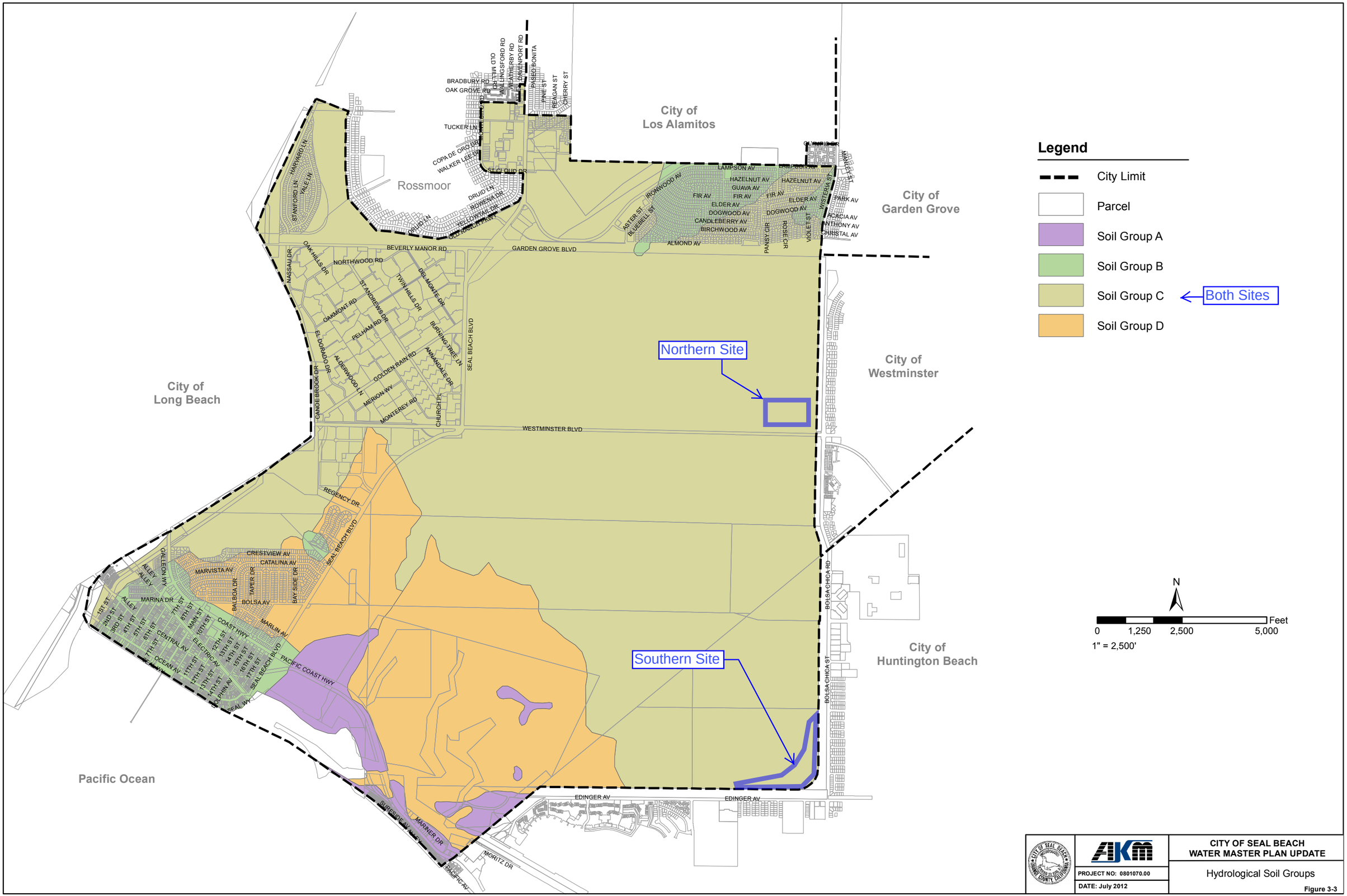
City of Los Alamitos
Rossmoor
City of Garden Grove
City of Westminster
City of Long Beach
City of Huntington Beach
Pacific Ocean
Northern Site
Southern Site
Legend
City Limit
Parcel
Soil Group A
Soil Group B
Soil Group C
Both Sites
Soil Group D
N
Feet
0
1,250
2,500
5,000
1" = 2,500'
BRADBURY RD
OAK GROVE RD
TUCKER LN
COPA DE ORO DR
WALKER LEE DR
ST CLUB DR
DRUID LN
ROWENA DR
YELLOWTAIL DR
OLD RANCH WAY
BEVERLY MANOR RD
GARDEN GROVE BLVD
NORTHWOOD RD
WESTMINSTER BLVD
SEAL BEACH BLVD
REGENCY DR
PACIFIC COAST HWY
EDINGER AV
MARINER DR
MORITZ DR
PACIFIC AV
SURFSIDE AV
BOLSA CHICA RD
BOLSA CHICA ST
LAMPSON AV
HAZELNUT AV
GUAVA AV
FIR AV
ELDER AV
DOGWOOD AV
CANDLEBERRY AV
BIRCHWOOD AV
ALMOND AV
IRONWOOD AV
ASTER ST
BLUEBELL ST
PANSY CIR
ROSE CIR
VIOLET ST
WISTERIA ST
PARK AV
ACACIA AV
ANTHONY AV
CRISTAL AV
MANUEL ST
HARVARD LN
STANFORD LN
YALE LN
NASSAU DR
OAK HILLS DR
TWIN HILLS DR
DEL MONTE DR
ST ANDREWS DR
OAKMONT RD
PELHAM RD
BURNING TREE LN
EL DORADO DR
ALDERWOOD LN
GOLDEN RAIN RD
ANNANDALE DR
CANDLEBROOK DR
MERION WY
MONTEREY RD
CHURCH PL
CREST VIEW AV
CATALINA AV
MARVISTA AV
TAPER DR
BAY SIDE DR
BALBOA DR
BOLSA AV
MARLIN AV
GALLEON WY
ALLEY
MARINA DR
1ST ST
2ND ST
3RD ST
4TH ST
5TH ST
6TH ST
7TH ST
8TH ST
MAIN ST
10TH ST
COAST HWY
CENTRAL AV
ELECTRIC AV
OCEAN AV
11TH ST
12TH ST
13TH ST
14TH ST
15TH ST
16TH ST
17TH ST
DOLPHIN AV
SEAL WY
PACIFICA AV
CITY OF SEAL BEACH
WATER MASTER PLAN UPDATE
Hydrological Soil Groups
PROJECT NO: 0801070.00
DATE: July 2012
Figure 3-3

Existing Watershed Characteristics Table

Watershed	Watershed Area (sf)	Watershed Area (ac)	Initial Flow Length (ft)	Initial Sub Area (sf)	Initial Sub Area (ac)	Initial Elevation (ft)	'Channel' Invert (ft)	Difference	Final Flow Length (ft)	Final Sub Area (ac)	Downstream Channel Invert (ft)	Slope
100	637500	14.63	300	36000	0.83	17.5	17.0	0.50	964	13.81	15.5	0.0016
200	3125900	71.76	300	50000	1.15	17.5	16.5	1.00	3384	70.61	10.0	0.0019
TOTAL	**3763400.00**	**86.40**										

Watershed	Watershed Area (sf)	Watershed Area (ac)	Initial Flow Length (ft)	Initial Sub Area (sf)	Initial Sub Area (ac)	Initial Elevation (ft)	'Channel' Invert (ft)	Difference	Final Flow Length (ft)	Final Sub Area (ac)	Downstream Channel Invert (ft)	Slope
300	1723500	39.57	300	93500	2.15	20.5	19.8	0.70	1364	37.42	17.8	0.001
400	1474000	33.84	300	85500	1.96	20.5	19.8	0.70	1575	31.88	17.0	0.002
TOTAL	**3197500.00**	**73.40**										

AES File Name:	**SealBch.dat**
AMC = 2	**2**
SubAreaGradient Slope	**0.85**

[ORANGE COUNTY]

FILE NAME:SEALBCH.DAT *ENGLISH UNITS* CALCULATED BY:
TIME/DATE OF STUDY: 11:45 12/23/2014 CHECKED BY:
100.0-YEAR STORM RATIONAL METHOD STUDY (AMC II LOSSES) PAGE NUMBER 1 OF

[(c) 1983-2003 ADVANCED ENGINEERING SOFTWARE]

CONCENTRATION POINT NUMBER	AREA (ACRES) SUBAREA	SUM	SOIL TYPE	DEV. TYPE	Tt MIN.	Tc MIN.	I (in/hr)	Fm	Fm (Avg)	Q-SUM (cfs)	PATH (ft)	SLOPE ft/ft	V FPS.	HYDRAULICS AND NOTES
					..						300	.0017	..	INITIAL SUBAREA
101.00	0.8	0.8	C	Barren		18.5	2.93	0.25	0.250	2.0				
											964	.0016	2.3	Qest = 14.78
	13.8	14.64	C	Barren		30.4	2.20	0.25	0.250	25.7				
														n=.0300 D= 1.0
102.00					12.0									B= 1.0 Z=10.0
					..						300	.0033	..	INITIAL SUBAREA
201.00	1.1	1.1	C	Barren		16.1	3.17	0.25	0.250	3.0				
											3384	.0019	2.3	Qest = 54.09
	70.6	71.76	C	Barren		45.4	1.75	0.25	0.250	96.7				
														n=.0300 D= 2.0
202.00					29.3									B= 1.0 Z=10.0
					..						300	.0023	..	INITIAL SUBAREA
301.00	2.2	2.2	C	Barren		17.3	3.04	0.25	0.250	5.4				
											1364	.0015	1.8	Qest = 38.16
	37.4	39.57	C	Barren		31.5	2.15	0.25	0.250	67.8				
														n=.0300 D= 1.9
302.00					14.3									B= 1.0 Z=10.0
					..						300	.0023	..	INITIAL SUBAREA
401.00	2.0	2.0	C	Barren		17.3	3.04	0.25	0.250	4.9				
											1575	.0018	1.9	Qest = 31.98
	31.9	33.84	C	Barren		33.3	2.09	0.25	0.250	56.0				
														n=.0300 D= 1.7
402.00					16.0									B= 1.0 Z=10.0
402.00		33.8			----	33.3				56.0	----	----	----	STREAM SUMMARY

EFFECTIVE AREA = 33.84 Acres TOTAL AREA = 33.84 Acres PEAK FLOW RATE = 55.98 cfs
TIME OF CONCENTRATION(MIN.)= 33.28 MEAN VALUES: Fp = 0.250 (in/hr); Ap = 1.000; Fm = 0.250 (in/hr)

```
****************************************************************************
             RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
           (Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
        (c) Copyright 1983-2012 Advanced Engineering Software (aes)
             Ver. 18.4  Release Date: 07/05/2012  License ID 1395

                           Analysis prepared by:




----------------------------------------------------------------------------
  FILE NAME: SEALBCH.DAT
  TIME/DATE OF STUDY: 11:29 12/23/2014
============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
============================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =  100.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.85
  *DATA BANK RAINFALL USED*
  *ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0312 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

****************************************************************************
  FLOW PROCESS FROM NODE    100.00 TO NODE    101.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =     17.50  DOWNSTREAM(FEET) =     17.00
```


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```
  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   18.477
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.926
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  NATURAL POOR COVER
  "BARREN"                   C        0.83      0.25     1.000    91   18.48
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =      2.00
  TOTAL AREA(ACRES) =      0.83   PEAK FLOW RATE(CFS) =      2.00

****************************************************************************
  FLOW PROCESS FROM NODE    101.00 TO NODE    102.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =     17.00  DOWNSTREAM(FEET) =     15.50
  CHANNEL LENGTH THRU SUBAREA(FEET) =   964.00   CHANNEL SLOPE =  0.0016
  CHANNEL BASE(FEET) =    1.00   "Z" FACTOR =  10.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   1.00

         ==>>WARNING: FLOW IN CHANNEL EXCEEDS CHANNEL
             CAPACITY( NORMAL DEPTH EQUAL TO SPECIFIED MAXIMUM
             ALLOWABLE DEPTH).
             AS AN APPROXIMATION, FLOWDEPTH IS SET AT MAXIMUM
             ALLOWABLE DEPTH AND IS USED FOR TRAVELTIME CALCULATIONS.

  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.198
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL POOR COVER
  "BARREN"                   C       13.81      0.25     1.000    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      14.78
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.34
  AVERAGE FLOW DEPTH(FEET) =   1.00   TRAVEL TIME(MIN.) =  11.95
  Tc(MIN.) =   30.43
  SUBAREA AREA(ACRES) =    13.81       SUBAREA RUNOFF(CFS) =   24.21
  EFFECTIVE AREA(ACRES) =     14.64     AREA-AVERAGED Fm(INCH/HR) =   0.25
  AREA-AVERAGED Fp(INCH/HR) =   0.25  AREA-AVERAGED Ap =   1.00
  TOTAL AREA(ACRES) =       14.6         PEAK FLOW RATE(CFS) =      25.67

         ==>>WARNING: FLOW IN CHANNEL EXCEEDS CHANNEL
             CAPACITY( NORMAL DEPTH EQUAL TO SPECIFIED MAXIMUM
             ALLOWABLE DEPTH).
```


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```
            AS AN APPROXIMATION, FLOWDEPTH IS SET AT MAXIMUM
            ALLOWABLE DEPTH AND IS USED FOR TRAVELTIME CALCULATIONS.


  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  1.00   FLOW VELOCITY(FEET/SEC.) =   2.33

  ==>FLOWDEPTH EXCEEDS MAXIMUM ALLOWABLE DEPTH

  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    102.00 =    1264.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    200.00 TO NODE    201.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =     17.50  DOWNSTREAM(FEET) =     16.50

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   16.085
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.168
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  NATURAL POOR COVER
  "BARREN"                   C        1.15      0.25     1.000    91   16.09
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =      3.02
  TOTAL AREA(ACRES) =      1.15   PEAK FLOW RATE(CFS) =      3.02

****************************************************************************
  FLOW PROCESS FROM NODE    201.00 TO NODE    202.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =     16.50  DOWNSTREAM(FEET) =     10.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =  3384.00   CHANNEL SLOPE =  0.0019
  CHANNEL BASE(FEET) =    1.00   "Z" FACTOR =  10.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   2.00

         ==>>WARNING: FLOW IN CHANNEL EXCEEDS CHANNEL
             CAPACITY( NORMAL DEPTH EQUAL TO SPECIFIED MAXIMUM
             ALLOWABLE DEPTH).
             AS AN APPROXIMATION, FLOWDEPTH IS SET AT MAXIMUM
             ALLOWABLE DEPTH AND IS USED FOR TRAVELTIME CALCULATIONS.

  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  1.748
```


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```
SUBAREA LOSS RATE DATA(AMC  II):
 DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
     LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
NATURAL POOR COVER
"BARREN"                   C       70.61      0.25     1.000    91
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      54.09
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.92
AVERAGE FLOW DEPTH(FEET) =   1.63   TRAVEL TIME(MIN.) =  29.33
Tc(MIN.) =   45.41
SUBAREA AREA(ACRES) =    70.61       SUBAREA RUNOFF(CFS) =   95.17
EFFECTIVE AREA(ACRES) =     71.76     AREA-AVERAGED Fm(INCH/HR) =   0.25
AREA-AVERAGED Fp(INCH/HR) =   0.25  AREA-AVERAGED Ap =   1.00
TOTAL AREA(ACRES) =       71.8         PEAK FLOW RATE(CFS) =      96.72

       ==>>WARNING: FLOW IN CHANNEL EXCEEDS CHANNEL
           CAPACITY( NORMAL DEPTH EQUAL TO SPECIFIED MAXIMUM
           ALLOWABLE DEPTH).
           AS AN APPROXIMATION, FLOWDEPTH IS SET AT MAXIMUM
           ALLOWABLE DEPTH AND IS USED FOR TRAVELTIME CALCULATIONS.


END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) =  2.00   FLOW VELOCITY(FEET/SEC.) =   2.30

==>FLOWDEPTH EXCEEDS MAXIMUM ALLOWABLE DEPTH

LONGEST FLOWPATH FROM NODE    200.00 TO NODE    202.00 =    3684.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE    300.00 TO NODE    301.00 IS CODE =  21
----------------------------------------------------------------------------
>>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
ELEVATION DATA: UPSTREAM(FEET) =     20.50  DOWNSTREAM(FEET) =     19.80

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   17.275
* 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.041
SUBAREA Tc AND LOSS RATE DATA(AMC  II):
 DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
     LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
NATURAL POOR COVER
"BARREN"                   C        2.15      0.25     1.000    91   17.27
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
SUBAREA RUNOFF(CFS) =      5.40
TOTAL AREA(ACRES) =      2.15   PEAK FLOW RATE(CFS) =      5.40
```


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```
****************************************************************************
  FLOW PROCESS FROM NODE    301.00 TO NODE    302.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =     19.80  DOWNSTREAM(FEET) =     17.80
  CHANNEL LENGTH THRU SUBAREA(FEET) =  1364.00   CHANNEL SLOPE =  0.0015
  CHANNEL BASE(FEET) =    1.00   "Z" FACTOR =  10.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   2.00
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.154
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL POOR COVER
  "BARREN"                   C       37.42      0.25     1.000    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      38.16
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.59
  AVERAGE FLOW DEPTH(FEET) =   1.50   TRAVEL TIME(MIN.) =  14.27
  Tc(MIN.) =   31.54
  SUBAREA AREA(ACRES) =    37.42       SUBAREA RUNOFF(CFS) =   64.11
  EFFECTIVE AREA(ACRES) =     39.57     AREA-AVERAGED Fm(INCH/HR) =   0.25
  AREA-AVERAGED Fp(INCH/HR) =   0.25  AREA-AVERAGED Ap =   1.00
  TOTAL AREA(ACRES) =       39.6         PEAK FLOW RATE(CFS) =      67.79

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  1.87   FLOW VELOCITY(FEET/SEC.) =   1.84
  LONGEST FLOWPATH FROM NODE    300.00 TO NODE    302.00 =    1664.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    400.00 TO NODE    401.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =     20.50  DOWNSTREAM(FEET) =     19.80

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   17.275
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.041
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  NATURAL POOR COVER
  "BARREN"                   C        1.96      0.25     1.000    91   17.27
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
```


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```
  SUBAREA RUNOFF(CFS) =      4.92
  TOTAL AREA(ACRES) =      1.96   PEAK FLOW RATE(CFS) =      4.92

****************************************************************************
  FLOW PROCESS FROM NODE    401.00 TO NODE    402.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =     19.80  DOWNSTREAM(FEET) =     17.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =  1575.00   CHANNEL SLOPE =  0.0018
  CHANNEL BASE(FEET) =    1.00   "Z" FACTOR =  10.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   2.00
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.088
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL POOR COVER
  "BARREN"                   C       31.88      0.25     1.000    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      31.98
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.64
  AVERAGE FLOW DEPTH(FEET) =   1.35   TRAVEL TIME(MIN.) =  16.01
  Tc(MIN.) =   33.28
  SUBAREA AREA(ACRES) =    31.88       SUBAREA RUNOFF(CFS) =   52.74
  EFFECTIVE AREA(ACRES) =     33.84     AREA-AVERAGED Fm(INCH/HR) =   0.25
  AREA-AVERAGED Fp(INCH/HR) =   0.25  AREA-AVERAGED Ap =   1.00
  TOTAL AREA(ACRES) =       33.8         PEAK FLOW RATE(CFS) =      55.98

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  1.67   FLOW VELOCITY(FEET/SEC.) =   1.89
  LONGEST FLOWPATH FROM NODE    400.00 TO NODE    402.00 =    1875.00 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =       33.8  TC(MIN.) =     33.28
  EFFECTIVE AREA(ACRES) =     33.84  AREA-AVERAGED Fm(INCH/HR)=  0.25
  AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap = 1.000
  PEAK FLOW RATE(CFS)   =      55.98
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

♀

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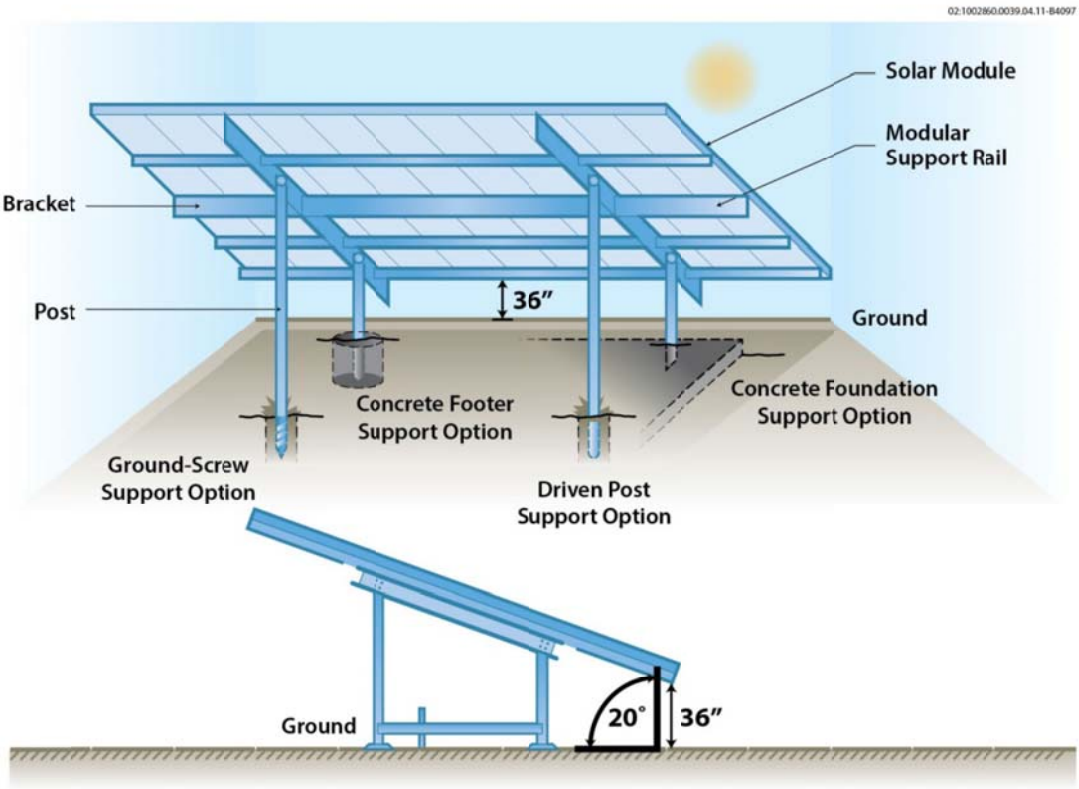
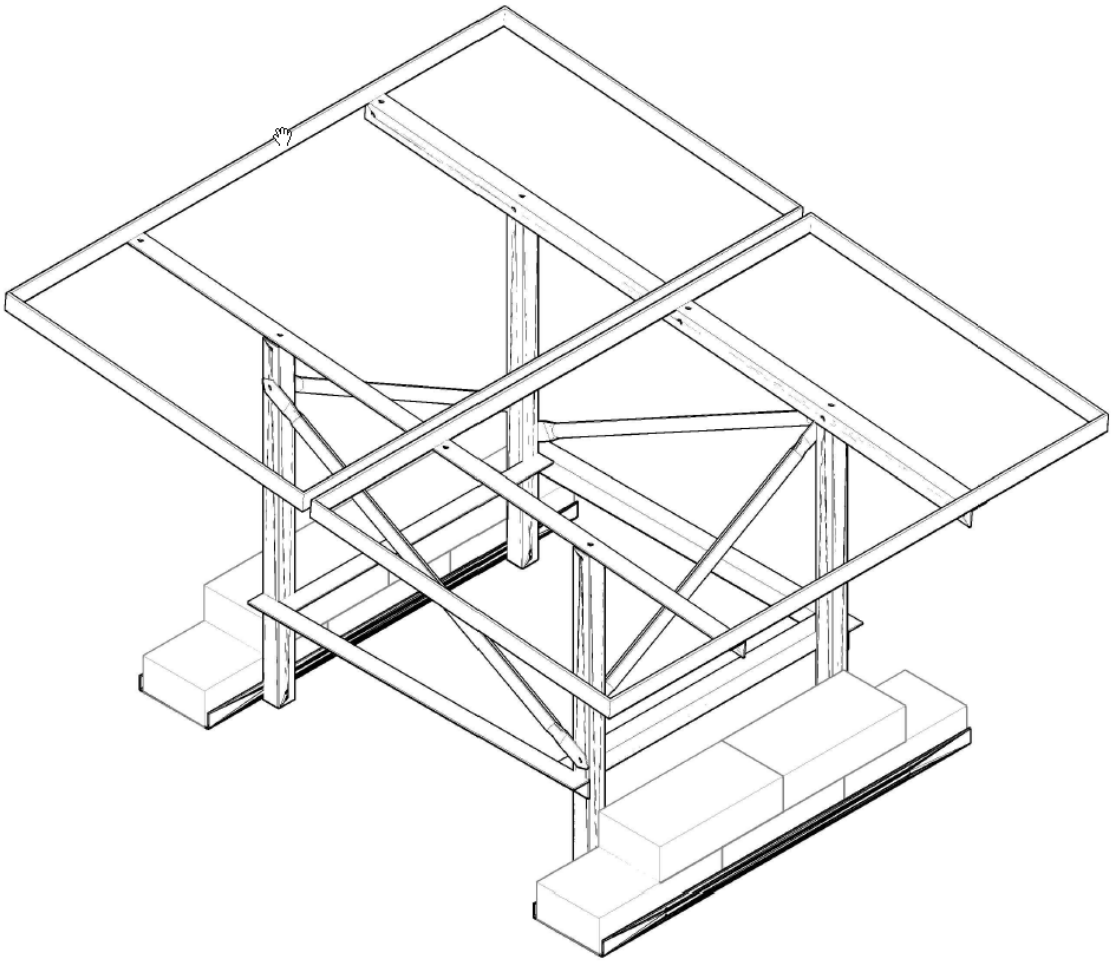
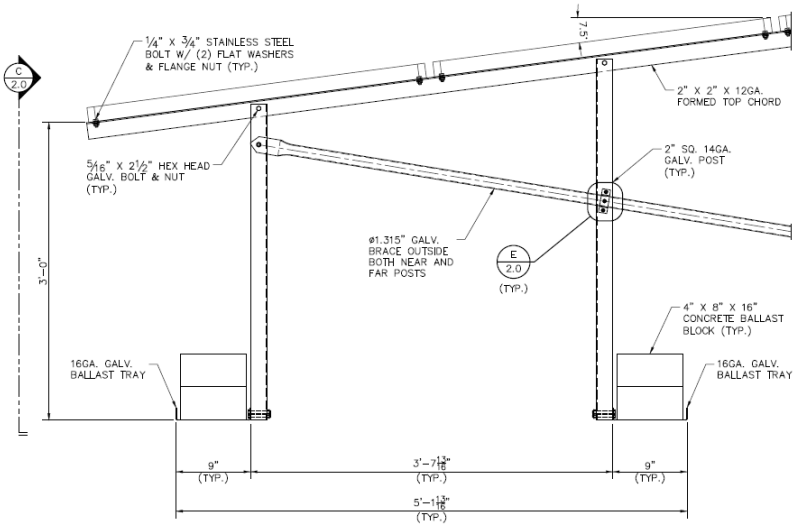
Proposed Solar PV Mounting

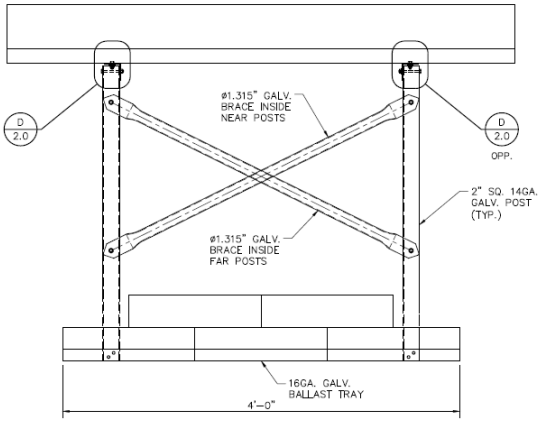


Fixed-Tilt Ground-Mounted Solar PV Array

SINGLE STRUCTURE ISOMETRIC VIEW, Model GM-L

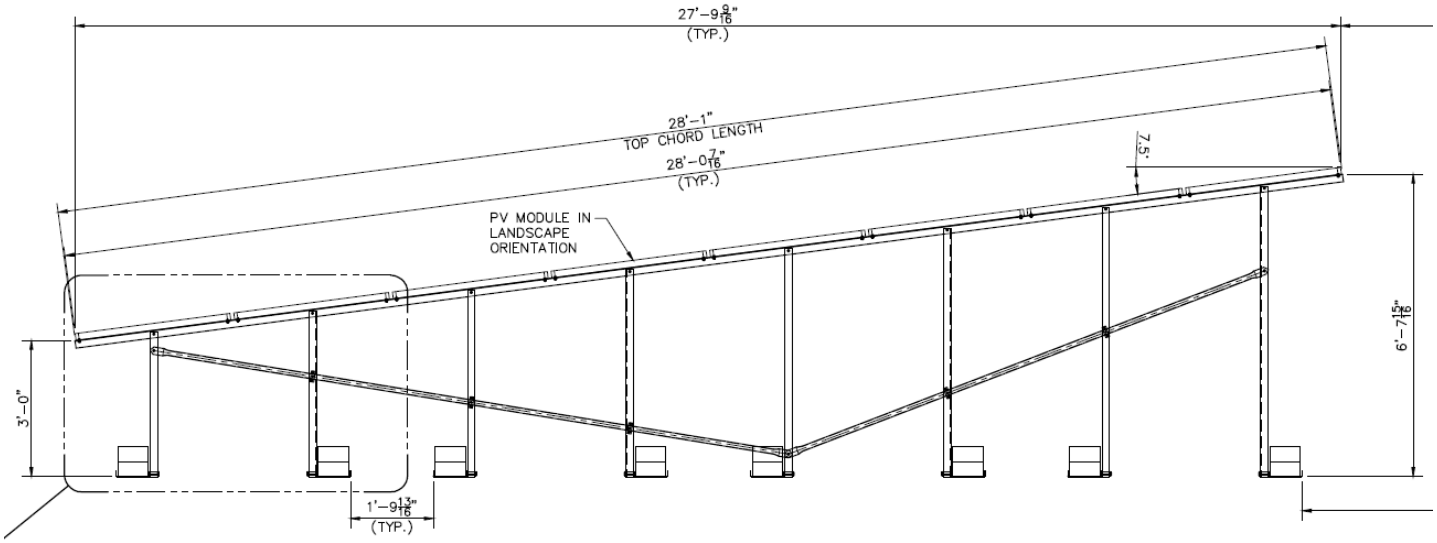




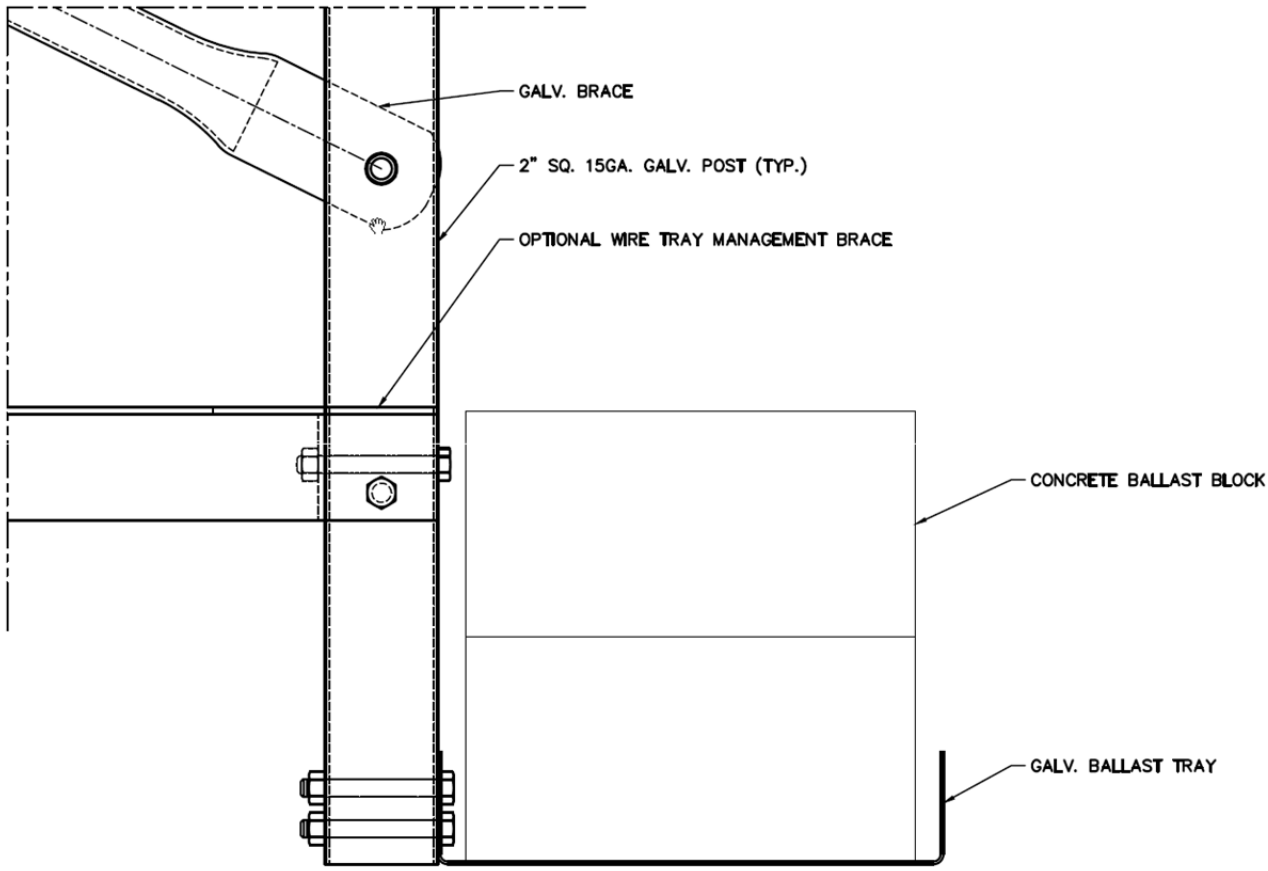


ASSUMED PANEL LAYOUT

ELEVATION VIEW



BALLAST DETAIL



ASSUMED PANEL LAYOUT

Array Runoff Calculation - From PV Tracker

	Frequency
	100 Year
Width (ft)	1.00
Length (ft)	27.80
Area (sf)	27.80
Area (ac)	0.0006
C	1.0
t_c (min)*	5.0
I (in/hr)	6.02
Total Q per Foot (cfs)	0.004

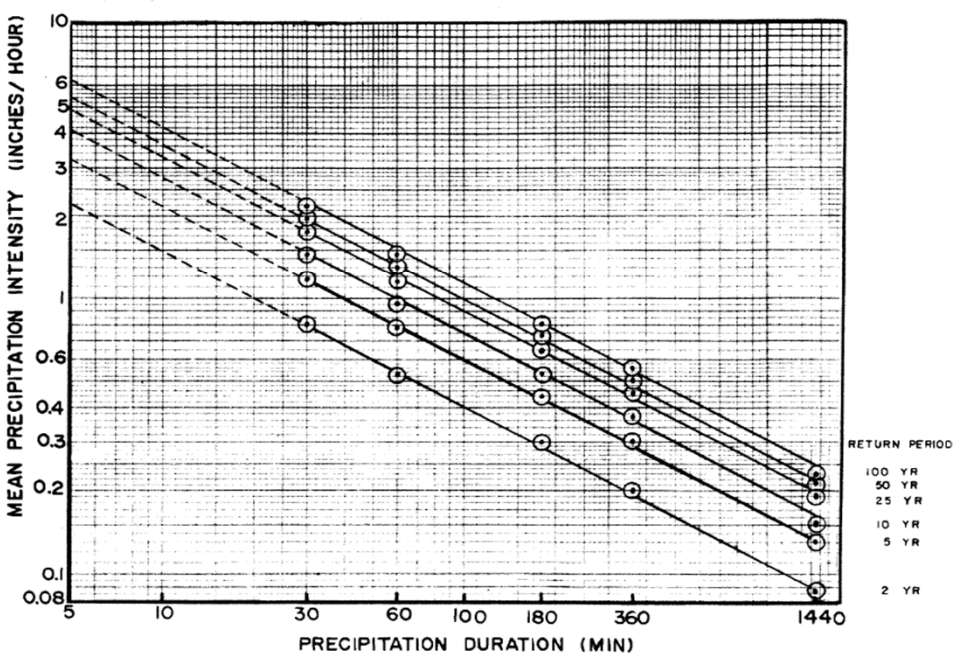
* Shortest Time of Concentration that can be used per Figure B-3

Mean Precipitation Intensiteis for nonMountanous Areas of the Orange County Hydrology Manual

Regression Equations: $I(t) = at^b$

(I= Intensity in inches/hour, t= duration in minutes)

Return Frequency (years)	a	b
2	5.702	-0.574
5	7.870	-0.562
10	10.209	-0.573
25	11.995	-0.566
50	13.521	-0.566
100	15.560	-0.573



ORANGE COUNTY
HYDROLOGY MANUAL

MEAN PRECIPITATION INTENSITIES FOR NONMOUNTAINOUS AREAS

B-7

Figure B-3

Appendix D – Viewshed Analysis

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Errata Sheet

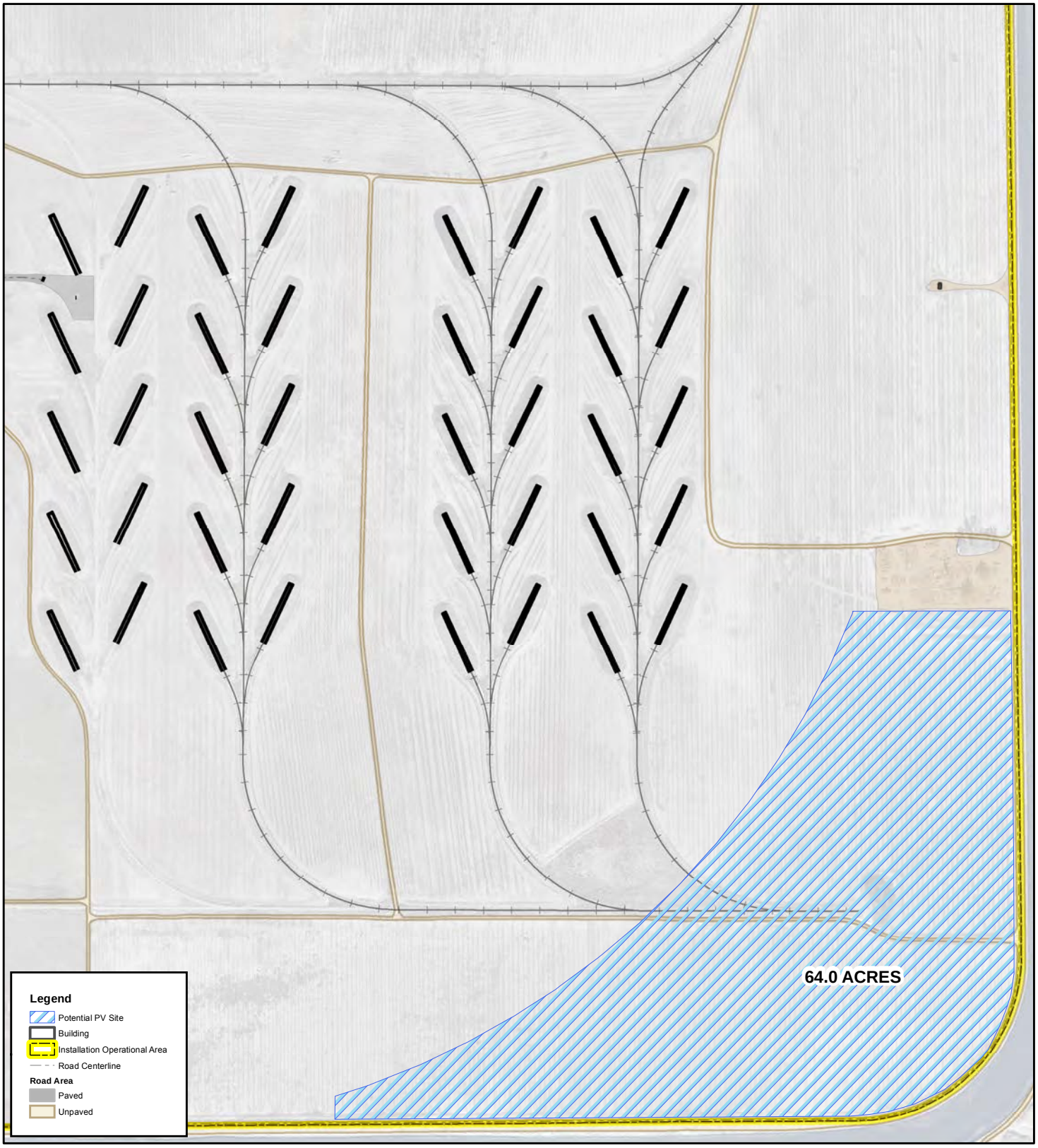
DATE: April 2015

SUBJECT: Final Viewshed Analysis for Construction and Operation of Solar Photovoltaic Systems at Naval Weapons Station Seal Beach, California

Subsequent to finalizing the subject report, the Navy reduced the footprint of proposed Site A (see attached figure) from 86 acres (34.8 hectares) to 64 acres (25.9 hectares). Potential impacts identified with the construction and operation of a solar photovoltaic system at Site A would be less than as stated in the document because of the reduction in footprint. Key observation points (KOPs) were selected to simultaneously represent existing conditions and authentically depict the effects of implementation. Particularly, impacts described for KOP 5 would be reduced because the northern portion of the site removed from the footprint would not be developed (attached figure).

This errata sheet describes revisions not present in the subject final document.

Section	Page No.	Revision
Executive Summary	ES-1	86 acres (34.8 hectares) to 64 acres (25.9 hectares)
Executive Summary	ES-2	86 acres (34.8 hectares) to 64 acres (25.9 hectares)
1.2.2	2	86 acres (34.8 hectares) to 64 acres (25.9 hectares)
1.2.2	2	86 acres (34.8 hectares) to 64 acres (25.9 hectares)
Figure 2	3	Site A shape
1.2.4.1 and 1.2.4.2	7	86 acres (34.8 hectares) to 64 acres (25.9 hectares)
4.3, KOP 5	30	**Text: KOP 5** faces northwest along Bolsa Chica Street from Dovewood Drive (Figure 19). Views from this location range from unobstructed to fully obstructed by existing vegetation and vehicular activity through the corridor. Viewers are anticipated to experience short-duration, foreground views of the Proposed Action from points along Bolsa Chica Street; however, viewers would experience a noticeable change with the removal of a large stand of mature eucalyptus trees and surplus machinery. **Revision:** Very little change, if any, from KOP 5 would result with the new footprint. Viewers would not experience foreground views described from points along Bolsa Chica Street. The large stand of mature eucalyptus trees and surplus machinery would not be removed.
Figure 6	11	Site A shape
Figure 7	12	Site A shape
Figure 10	24	Site A shape
Figure 11	25	Site A shape
Figure 12	26	Site A shape
Figure 13	27	Site A shape
Figure 14	28	Site A shape
Figure 19	32	Site A shape
Figure 27	41	Simulation: With the reduced footprint, the large stand of mature eucalyptus and surplus machinery would not be removed. Viewers would not experience foreground views described with implementation. Resulting impacts would be reduced from those stated in the subject document.



NWSSB PHOTOVOLTAIC SYSTEM AREA "A"

NWSSB GIS
800 Seal Beach Blvd., Seal Beach, CA 90740
Bldg. # 230
andrea.baratie@navy.mil
562.626.7112
Map Published: 03/31/2015

0 250 500 1,000
Feet

ELLIPSOID . . . . . GEODETIC REFERENCE SYSTEM 1980
PROJECTION . . . . . CA STATE PLANE ZONE VI
HORIZONTAL DATUM . . . . . NAD 83/WGS 1984

SCALE 1 inch = 545 feet

NAD 83/WGS 84
THE NORTH AMERICAN DATUM 1983 (NAD83) AND THE WORLD GEODETIC SYSTEM 1984 DATUM (WGS 1984) ARE EQUIVALENT FOR MAPPING, CHARTING, AND NAVIGATION AT THIS SCALE.

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Viewshed Analysis for Construction and Operation of Solar Photovoltaic Systems at Naval Weapons Station Seal Beach, California

Prepared for:

NAVFAC SOUTHWEST
1220 Pacific Highway
San Diego, California 92132

April 2015

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ACRONYM LIST

BLM	Bureau of Land Management
GIS	geographic information system
GW	gigawatt
I	Interstate
KOP	Key Observation Point
MW	megawatt
NAVWPNSTA	Naval Weapons Station
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
PV	photovoltaic
VRM	Visual Resource Management

EXECUTIVE SUMMARY

The following document has been prepared to assess the potential visual effects related to the construction, operation, maintenance, and possible decommission of a solar photovoltaic (PV) system at one or more sites on Naval Weapons Station (NAVWPNSTA) Seal Beach, California.

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 a solar PV system. The Proposed Action is required to meet the renewable energy standards put forth by the 1 Gigawatt (GW) Initiative; Executive Order 13514, Federal Leadership in Environmental, Energy, and Economic Performance; and the Secretary of the Navy's Energy Goals.

NAVWPNSTA Seal Beach is located in the City of Seal Beach in Southern California. It is in northern Orange County between Huntington Beach and Long Beach approximately 25 miles (40 kilometers) south of the Los Angeles urban center. The Navy has identified two sites on NAVWPNSTA Seal Beach for the installation of the potential PV system. The sites, identified as Sites A and B, are topographically flat and currently used for agricultural purposes. Site A is 86 acres (34.8 hectares) in size and Site B is 73 acres (29.5 hectares) in size.

The Navy and a third-party developer would enter into a lease agreement of up to 37 years to allow the third-party developer to use Navy land to construct, operate, maintain, and own the PV system. The Proposed Action would include the construction, operation, maintenance, and possible decommission of a ground-mounted PV system.

One of two types of ground-mounted system may be constructed at the Proposed Action sites, depending on the third-party developer's site design: a fixed-tilt panel system or a tracker-mounted panel system. Fixed-tilt solar arrays would remain stationary, whereas tracker-mounted arrays would be mounted on an axis and would be free to move throughout the day to maintain the best sun angle and maximize power output. The estimated highest point of the solar array for a ground-mounted solar PV system would not exceed 8 feet (2.4 meters) above the ground surface and would depend on the solar PV system type (i.e., fixed-tilt or tracker-mounted) and tilt of the arrays. Fixed-tilt panels would maintain a fixed height, whereas the maximum height of tracker-mounted arrays would vary as the arrays move to track the sun. Ground-mounted panels would be approximately 5 feet (1.5 meters) wide and 3 feet (0.9 meter) long. The number of panels in each array, the type of ground-mounted system used, and the array configuration would depend on the third-party developer's site design.

The facilities to be constructed include solar PV panels, steel tracking structure, inverters, combiner boxes, and electrical switchgear, as well as associated electrical wiring, connections, and other items required for the PV system. Each ground-mounted system would be enclosed by 8-foot-high (2.4-meter-high) chain-link panels with barbed-wire outriggers installed by the third-party developer in accordance with force protection standards. The fencing would include privacy slats (i.e. "scrim") and three strand barb wire along all Proposed Action development

boundary lines. The scrim would likely be green, consistent with common industry practice and matching existing privacy screening on the current fencing along Bolsa Chica Street (owned by the Orange County Flood Control District) and Robinette Drive in the Proposed Action vicinity. The purpose of the fencing would be to provide a safety barrier for unintended access to the site and equipment and as a security measure to protect from vandalism and theft.

Proposed Alternatives

Alternative 1: Construction, Operation, and Maintenance of a Ground-Mounted Photovoltaic System on Sites A and B

Alternative 1 consists of the installation of a ground-mounted PV system as described under the Proposed Action at Sites A and B. The total acreage of the combined two sites would be approximately 160 acres (64.7 hectares) with Site A comprising approximately 86 acres (34.8 hectares) and Site B comprising approximately 73 acres (29.5 hectares). Alternative 1 includes the construction phase, operation of the PV system, and maintenance. Implementation of Alternative 1 would result in the generation of an estimated 25 megawatts (MW) of renewable energy toward the Navy's goal of having 1 GW on contract by the end of Year 2015.

Alternative 2: Construction, Operation, and Maintenance of a Photovoltaic System at Site A (Only)

Alternative 2 would be the same as Alternative 1 at Site A. A PV system would not be constructed, operated, and maintained at Site B, the 73-acre (29.5-hectare) parcel. This alternative would contribute an estimated 10 MW of renewable energy toward the Navy's goal of having 1 GW on contract by the end of Year 2015.

Alternative 3: Construction, Operation, and Maintenance of a Photovoltaic System at Site B (Only)

Alternative 3 would be the same as Alternative 1 at Site B. A PV system would not be constructed, operated, and maintained at Site A, the 86-acre (34.8-hectare) parcel. This alternative would contribute an estimated 15 MW of renewable energy toward the Navy's goal of having 1 GW on contract by the end of Year 2015.

Alternative 4: No Action Alternative

With selection of the No Action Alternative, a PV system would not be constructed, operated, and maintained at NAVWPNSTA Seal Beach, and NAVWPNSTA Seal Beach would not contribute toward the Navy's goal of producing 1 GW of renewable energy on contract by the end of Year 2015.

Visual Impacts

Performance of this Viewshed Analysis determined that the Proposed Action would result in a visual change in the landscape; however, the change would be most noticeable during the

construction phase of the Proposed Action. While this change would be common to all three build alternatives, it would be temporary in nature, and would not result in permanent adverse effects to visual resources. Specific visual effects are described below in greater detail.

Alternative 1: Construction, Operation, and Maintenance of a Ground-Mounted Photovoltaic System on Sites A and B

Construction Impacts: The visual landscape surrounding proposed Sites A and B would be temporarily affected by construction of the proposed solar facilities and ancillary features including graded maintenance roads, perimeter fencing, and free-standing electrical equipment including the current inverters and grid connection switchgear.

Due to the presence of existing construction and farming equipment, existing bulk materials storage, and site grading operations unrelated to the Proposed Action, the anticipated visual contrast of construction phase activities would range from weak to moderate depending on distance of the observer from both Sites A and B, respectively. During this temporary construction period, direct impacts to sensitive viewers are anticipated to be moderate to high, due primarily to the number of viewers along the affected vehicular corridors. Measures to avoid and/or minimize potential temporary visual impacts, such as the use of visual screening, would reduce the overall visual contrast that would occur during construction.

Operation Impacts: Due to the low vertical profile of proposed facilities and proposed screening measures and resultant weak visual contrast, viewers passing through the project area are unlikely to notice a considerable change in visual character or to consider the visual character substantially diminished under Alternative 1; however; visual change would be more apparent to viewers in the vicinity of Site B due to a higher number of viewers and direct foreground viewing opportunities. As such, the resulting level of impact would be low to moderate at Sites A and B.

Decommissioning Impacts: Impacts to visual resources during the decommissioning phase of the Proposed Action would be temporary, and would be similar in nature to construction impacts. No visual impacts would remain following decommissioning.

Alternative 2: Construction of a Photovoltaic System at Site A

Impacts to visual resources with implementation of Alternative 2 would be similar to those discussed under Alternative 1 but would be limited to temporary, construction-related viewshed disturbances at Site A only. Direct impacts to viewers and existing resources would be low, as contrast would be weak in this location, and viewer sensitivity would be low to moderate due to limited existing site visibility. Implementation of Alternative 2 would not substantially alter existing visual character and resulting visual impacts would be minor.

Operation Impacts: Visual impacts from operation would be similar to Alternative 1 but would be limited to Site A only.

Decommissioning Impacts: Impacts to visual resources during the decommissioning phase of the Proposed Action would be temporary and similar in nature to construction impacts. No visual impacts would remain following decommissioning.

Alternative 3: Construction of a Photovoltaic System at Site B

Impacts to visual resources with implementation of Alternative 3 would be similar to those discussed under Alternative 1 but would be limited to temporary, construction-related viewshed disturbances at Site B only. Direct impacts to viewers and existing resources would be moderate, as contrast would be weak in this location, but viewer sensitivity would be moderate due to daily number of viewers and frequency of direct foreground-middleground views of the project site. Ultimately, implementation of Alternative 3 would not substantially alter existing visual character and resulting visual impacts would be minor.

Operation Impacts: Visual impacts from operation would be similar to Alternative 1 but would be limited to Site B only.

Decommissioning Impacts: Impacts to visual resources during the decommissioning phase of the Proposed Action would be temporary and similar in nature to construction impacts. No visual impacts would remain following decommissioning.

Alternative 4: No Action Alternative

Since a PV system would not be constructed, there would be no change to the visual setting. No visual impacts would occur.

1.0 INTRODUCTION

1.1 Purpose of the Visual Resources Report

This Viewshed Analysis was prepared to assess the potential aesthetic effects of the Construction and Operation of Photovoltaic (PV) Systems at Naval Weapons Station (NAVWPNSTA) Seal Beach (Proposed Action). The methodology used for this assessment was based primarily on the Federal Highway Administration's Visual Impact Assessment approach assessing existing visual conditions while also relying on the Bureau of Land Management (BLM) Visual Resource Management (VRM) system to determine the level of change in the landscape. The Viewshed Analysis was completed through analysis of field-based photography, a review of a geographic information system (GIS)-based viewshed analysis of proposed features, view corridors, and Key View locations, and through simulated depictions of the Proposed Action alternative sites with PV systems constructed. This document also includes proposed measures to avoid, minimize, or mitigate adverse visual impacts associated with construction and operation of the Proposed Action.

1.2 Proposed Action and Alternatives

1.2.1 Purpose and Need

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 a solar PV system. The Proposed Action is required to meet the renewable energy standards put forth by the 1 Gigawatt (GW) Initiative; Executive Order 13514, Federal Leadership in Environmental, Energy, and Economic Performance; and the Secretary of the Navy's Energy Goals. The policy requirements for energy security and increased production of energy from alternative sources by 2020 are addressed in part by including, in any potential agreement (or real estate outgrant) entered into by the Navy and a private partner, 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.

1.2.2 Proposed Action Locations

NAVWPNSTA Seal Beach is located in the City of Seal Beach in southern California. It is in northern Orange County between Huntington Beach and Long Beach approximately 25 miles (40 kilometers) south of the Los Angeles urban center (**Figure 1**). NAVWPNSTA Seal Beach is bordered by developments associated with the City of Seal Beach to the west, southwest, and north. The City of Westminster borders NAVWPNSTA Seal Beach on the northeast and the City of Huntington Beach borders it to the south-southeast.

Sources: Esri, DeLorme, NAVTEQ, USGS, Intermap, iPC, NRCAN, Esri Japan, METI, Esri China (Hong Kong), Esri (Thailand), TomTom, 2013

3 1.5 0 3 Miles

Scale: 1:190,080; 1 inch = 3 miles

Figure 1
Regional Map

Interstate (I)-405 parallels the northern boundary of NAVWPNSTA Seal Beach. Westminster Avenue bisects NAVWPNSTA Seal Beach from east to west between I-405 and the Pacific Ocean. Pacific Coast Highway (State Route 1) is elevated across the southwestern portion of NAVWPNSTA Seal Beach via a bridge over Anaheim Bay. Bolsa Chica Street (City of Huntington Beach) and Bolsa Chica Road (City of Westminster) form the eastern boundary of NAVWPNSTA Seal Beach, and Seal Beach Boulevard forms its western boundary.

The Navy has identified two sites on NAVWPNSTA Seal Beach for the installation of the potential PV system, designated as Sites A and B.

Site A

Site A is a topographically flat, 86-acre (34.8-hectare) parcel currently used for agricultural purposes (**Figure 2**). It is located adjacent to Bolsa Chica Street and Edinger Avenue in the City of Huntington Beach, which are off-station, and directly adjacent to Perimeter Road, which is located directly next to NAVWPNSTA Seal Beach's security fence. Site A is considered disturbed as it is regularly planted and harvested, but when not in use during post-harvest, dirt and weeds are present. It is bounded by the Orange County Flood Control Channel, which owns and maintains a separate fence surrounding the channel, on two sides.

The fenced flood control channel is adjacent to Bolsa Chica Street and Edinger Avenue, is approximately 100 feet (30.5 meters) wide, and has a fabricated rocky slope and bank. The channel is designed to handle water flow from storm drains and other runoff and conveys the water into the Orange County Flood Channel, which flows into Huntington Harbor, Anaheim Bay, and Seal Beach National Wildlife Refuge, and then into the Pacific Ocean. Maintenance, regular inspections, and cleaning are performed as needed.

Site B

Site B is a topographically flat, 73-acre (29.5-hectare) parcel of land currently used for agricultural purposes (**Figure 3**). Approximately half of the site is regularly planted and harvested and the other half was historically farmed but is currently in a maintenance/mow status. Hence, the site is considered disturbed. It is bounded by the Orange County Flood Channel, which is adjacent to Bolsa Chica Road in the City of Westminster, to the east and Westminster Boulevard to the south.

1.2.3 Proposed Action

The Navy and a third-party developer would enter into a lease agreement to allow the third-party developer to use Navy land to construct, operate, and own the PV system. The Proposed Action would include the construction, operation, maintenance, and possible decommission (upon completion of the 37-year agreement) of a ground-mounted PV system.

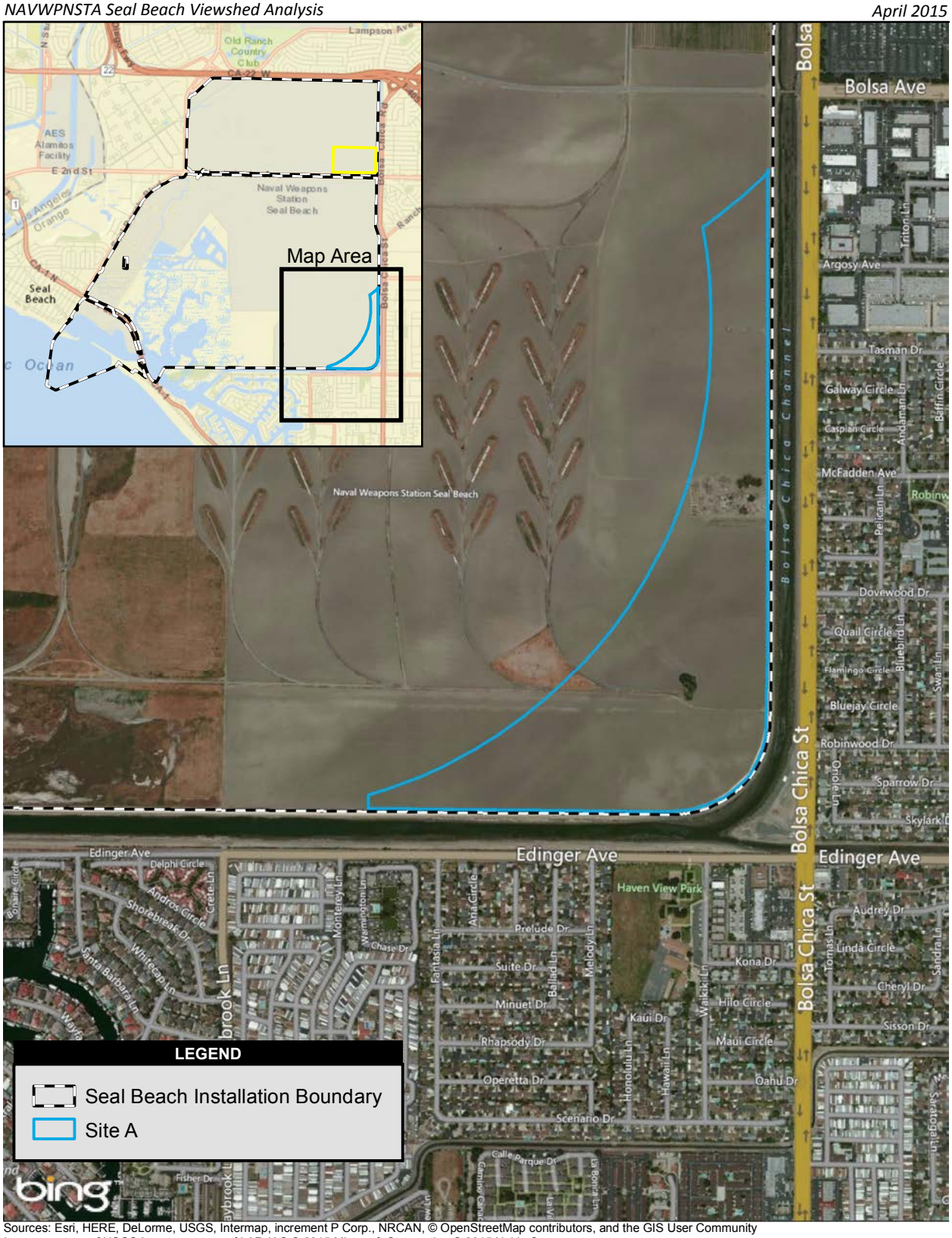

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Image courtesy of USGS Image courtesy of LAR-IAC © 2015 Microsoft Corporation © 2015 Nokia ©

1,000 500 0 1,000 Feet

Scale: 1:12,000; 1 inch = 1,000 feet

Figure 2
Project Site A Location Map

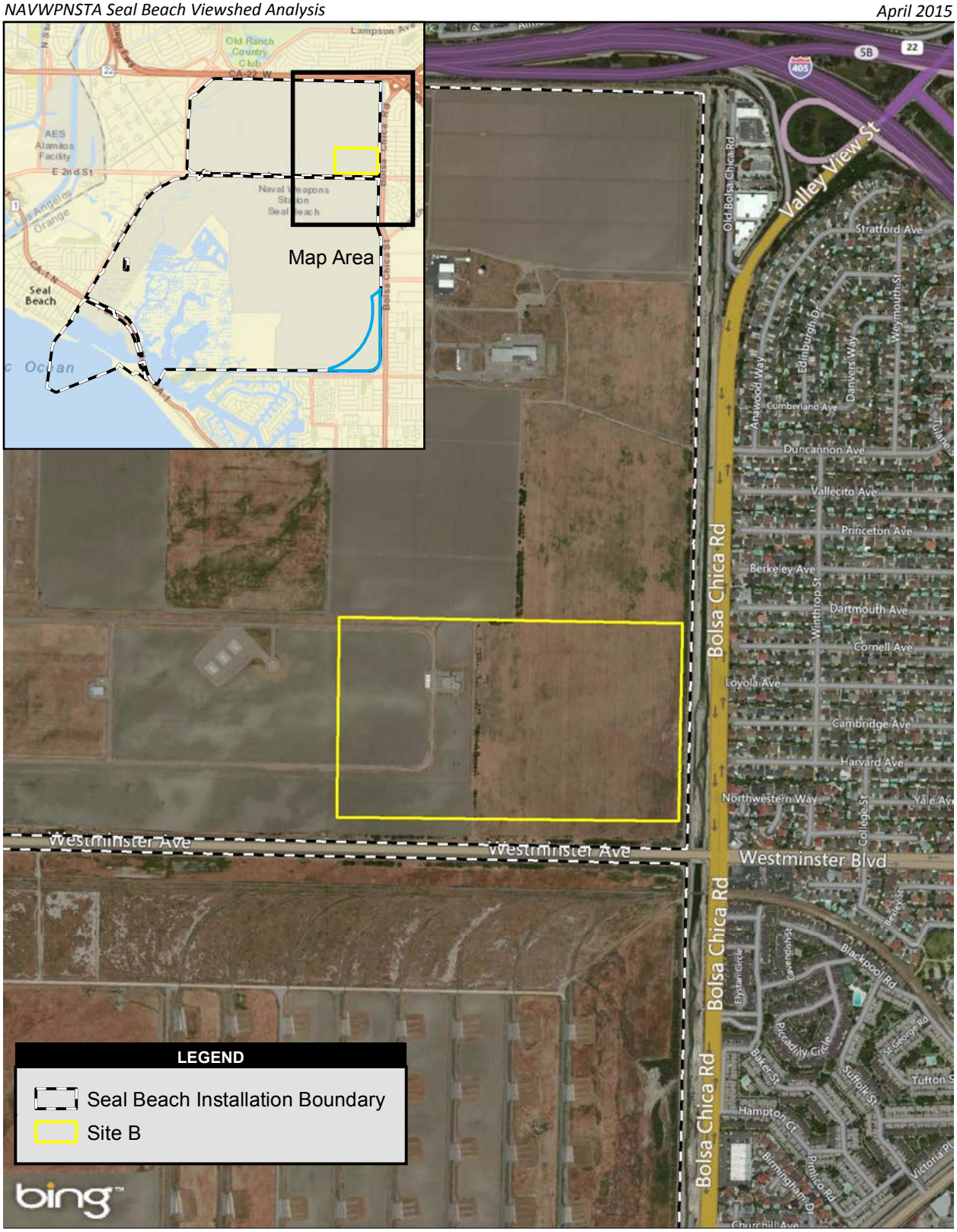

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Image courtesy of USGS Image courtesy of LAR-IAC © 2015 Microsoft Corporation © 2015 Nokia ©

1,000 500 0 1,000 Feet

Scale: 1:12,000; 1 inch = 1,000 feet

Figure 3
Project Site B Location Map

A typical configuration for this type of system is to install vertical members into the ground, with panel mounting hardware, frames, motors, and/or the solar panels themselves affixed atop the constructed mounting structure. Pole footings (or similar) would be used, and each footing would consist of a 4-inch (10-centimeter) cross-sectional area and would require a depth of 4 to 6.5 feet (1.2 to 2 meters) below ground surface (**Figure 4**). Note that pole footings and pile depth indicated are typical approximations. The actual pile depth would depend on the site geotechnical data and final structure design. Pile spacing would depend on the final design configuration determined by the installer.

One of two types of ground-mounted systems may be constructed at the project sites, depending on the third-party developer's site design: a fixed-tilt panel system or a tracker-mounted panel system. Fixed-tilt solar arrays would remain stationary, whereas tracker-mounted arrays would be mounted on an axis and would be free to move throughout the day to maintain the best sun angle and maximize power output (**Figure 5**). The estimated highest point of the solar array for a ground-mounted solar PV system would not exceed 8 feet (2.4 meters) above the ground surface and would depend on the solar PV system type (i.e., fixed-tilt or tracker-mounted) and tilt of the arrays. Fixed-tilt panels would maintain a fixed height, whereas the maximum height of tracker-mounted arrays would vary as the arrays move to track the sun. Ground-mounted panels would be approximately 5 feet (1.5 meters) wide and 3 feet (0.9 meter) long. The number of panels in each array, the type of ground-mounted system used, and the array configuration would depend on the third-party developer's site design.

The third-party developer would create a conceptual design to allow for the most efficient placement and configuration of PV panels on the property. The third-party developer would also be responsible for the decommissioning and disposal of the facilities and to restore the sites to existing conditions at the end of the 37-year agreement period.

The facilities to be constructed include solar PV panels, steel tracking structure, inverters, combiner boxes, and electrical switchgear, as well as associated electrical wiring, connections, and other items required for the PV system. Each ground-mounted system would be enclosed by 8-foot-high (2.4-meter-high) chain-link panels with barbed-wire outriggers installed by the third-party developer in accordance with force protection standards. The fencing would include privacy slats (i.e. "scrim") and three strand barb wire along all Proposed Action development boundary lines. The scrim would likely be green, consistent with common industry practice and matching existing privacy screening on NAVWPNSTA Seal Beach fencing along Bolsa Chica Street and Robinette Drive in the Proposed Action vicinity. The purpose of the fencing would be to provide a safety barrier against unintended access to the site and equipment and as a security measure to protect from vandalism and theft.

Figure 4. Panel Mounting Methods

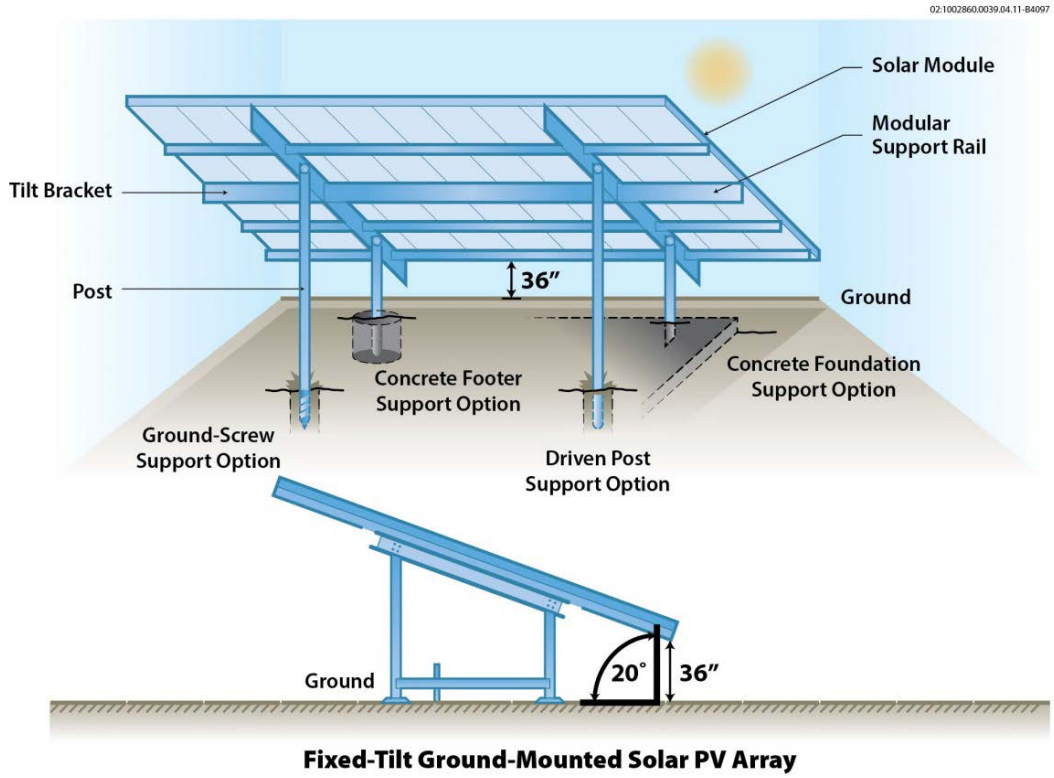
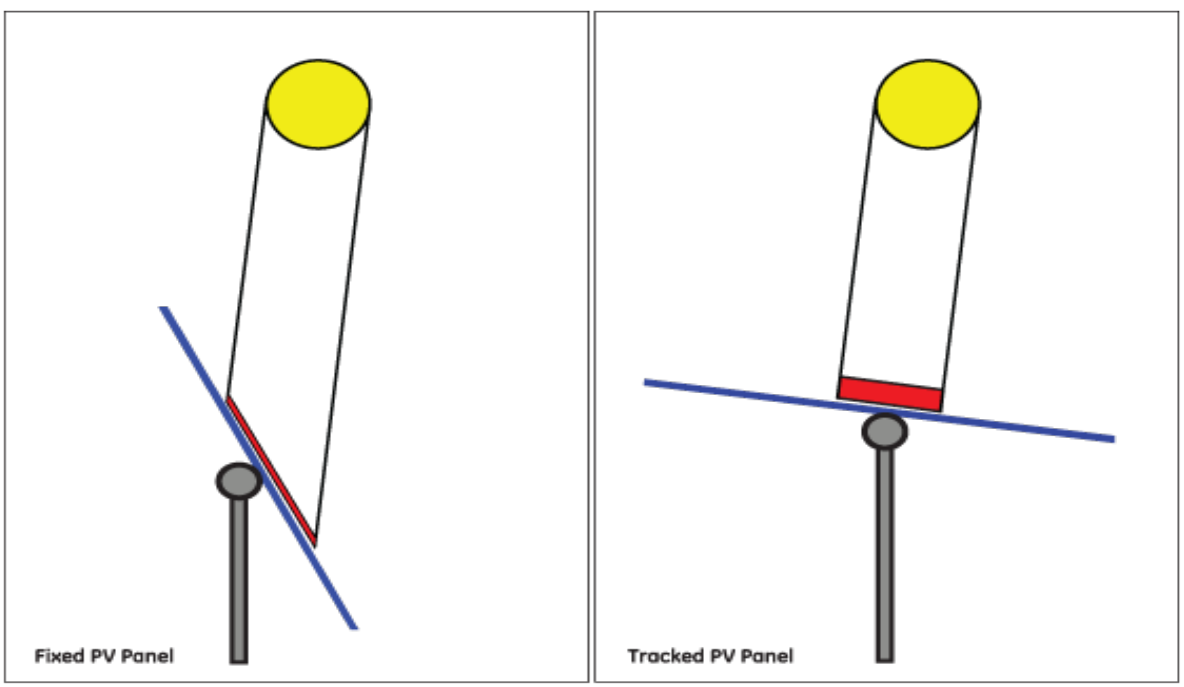


Figure 5. Panel Typologies: Fixed-Tilt versus Single-Axis Tracking



Construction and installation of ground-mounted PV panels may involve the following site preparations:

- Grading to remove vegetation
- Installation of underground electrical lines (3 feet [0.9 meter] deep)
- Trenching between panels for installation of electrical circuits
- Placement of 6 to 8 inches (15 to 20 centimeters) of gravel where necessary in accordance with final project design
- Installation of fencing around the perimeter of the project

Equipment used to install the PV arrays may include bulldozers, scrapers, backhoes, pile drivers, water trucks, trenchers, and truck-mounted mobile cranes.

1.2.4 Proposed Alternatives

1.2.4.1 Alternative 1: Construction, Operation, and Maintenance of a Ground-Mounted Photovoltaic System on Sites A and B

Alternative 1 consists of the installation of a ground-mounted PV system as described under the Proposed Action at Sites A and B. The total acreage of the combined two sites would be 160 acres (64.7 hectares) with Site A comprising 86 acres (34.8 hectares) and Site B comprising 73 acres (29.5 hectares). Alternative 1 includes the construction phase, operation of the PV system, and maintenance of the PV system, followed by the decommissioning at the conclusion of the 37-year period. Implementation of Alternative 1 would result in the generation of an estimated 25 megawatts (MW) of renewable energy toward the Navy's renewable energy goal of having 1 GW on contract by the end of Year 2015.

1.2.4.2 Alternative 2: Construction of a Photovoltaic System at Site A

Alternative 2 would be the same as Alternative 1, except that the PV system would only be constructed, operated, and maintained at Site A, the 86-acre (34.8-hectare) parcel. This alternative would contribute an estimated 10 MW of renewable energy toward the Navy's renewable energy goal of having 1 GW on contract by the end of Year 2015.

1.2.4.3 Alternative 3: Construction of a Photovoltaic System at Site B

Alternative 3 would be the same as Alternative 1, except that the PV system would only be constructed, operated, and maintained at Site B, the 73-acre (29.5-hectare) parcel. This alternative would contribute an estimated 15 MW of renewable energy toward the Navy's renewable energy goal of having 1 GW on contract by the end of Year 2015.

1.2.4.4 Alternative 4: No Action Alternative

With selection of the No Action Alternative, a PV system would not be constructed, operated, and maintained at NAVWPNSTA Seal Beach, and NAVWPNSTA Seal Beach would not contribute toward the Navy's goal of having 1 GW of renewable energy on contract by the end of Year 2015. Land use for Sites A and B would continue to be active agriculture. The No Action Alternative provides a measure of the existing conditions (baseline) against which the impacts of the alternatives can be compared. No further assessment was performed on the No Action Alternative based on the assumption that operations would be maintained at the status quo (no new land use would occur on Site A or Site B).

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2.0 REGULATORY FRAMEWORK

2.1 Federal Regulations

The following federal statutes and regulations are pertinent to visual landscapes and aesthetics.

National Environmental Policy Act

The National Environmental Policy Act (NEPA) of 1969, as amended (Public Law 91-190), 42 United States Code (U.S.C.) 4321 and 4331–4335) states its purposes are "To declare a national policy which will encourage productive and enjoyable harmony between man and his environment; to promote efforts which will prevent or eliminate damage to the environment and biosphere and stimulate the health and welfare of man; to enrich the understanding of the ecological systems and natural resources important to the Nation; and to establish a Council on Environmental Quality" (U.S.C. 1970). The following sections of NEPA relate to the visual landscape and to aesthetics:

> (Section 101-b) "In order to carry out the policy set forth in this Act, it is the continuing responsibility of the Federal Government to use all practicable means, consistent with other essential considerations of national policy, to improve and coordinate Federal plans, functions, programs, and resources to the end that the Nation may—
>
> (2) "assure for all Americans safe, healthful, productive, and esthetically and culturally pleasing surroundings;"
>
> (Section 102-2) "all agencies of the Federal Government shall…
>
> (A) utilize a systematic, interdisciplinary approach which will insure the integrated use of the natural and social sciences and the environmental design arts in planning and in decision making which may have an impact on man's environment;"
>
> (B) include in every recommendation or report on proposals for legislation and other major Federal actions significantly affecting the quality of the visual landscape, a detailed statement by the responsible official on—
>
> (i) the environmental impact of the proposed action,
>
> (ii) any adverse environmental effects which cannot be avoided should the proposal be implemented…"This viewshed analysis has been prepared by the Navy to support the Environmental Assessment process and ensure that the relevant provisions of NEPA identified above are met. This technical analysis is intended to serve as the primary analytical tool for assessing and addressing impacts to visual quality.

National Historic Preservation Act

The National Historic Preservation Act (NHPA) includes language protecting the visual integrity of sites listed or eligible for the National Register of Historic Places: "Examples of adverse effects…include…introduction of visual, atmospheric, or audible elements that diminish the integrity of the property's significant historic features…" (36 Code of Federal Regulations Part 800.5). Impacts to visual resources protected by the NHPA are discussed in the *Environmental Assessment for Construction and Operation of Solar Photovoltaic Systems at Naval Weapons Station Seal Beach, California* Cultural Resources sections.

3.0 VIEWSHED ANALYSIS METHODOLOGY

3.1 Existing Resource Inventory

This assessment was completed through field observations; desktop analyses of photography; geographic information system (GIS) viewshed analyses conducted for Proposed Action features, surrounding corridors, and Key Observation Points [KOPs]); a review of relevant literature and adopted plans; and the preparation and analysis of visual simulations.

To begin the viewshed analysis, the visual limit of the study area or the physical extent of areas from which the Proposed Action could be viewed must be identified. This boundary was determined in the field and through analysis of existing development, topography, and aerial photographs. Once delineated, viewer groups and key view locations were determined through field observations and corridor-specific viewshed modeling. Key views were then verified for efficacy through view-specific visibility modeling, and were determined to represent the most sensitive viewpoints or those most frequently encountered by viewers in the landscape.

3.1.1 Determining Project Viewshed

A project viewshed boundary, or limit of visibility, was then defined as the visual limit a project could be visible. The viewshed boundary is also synonymous with the limits of viewers likely to be affected by visual changes from implementation of the Proposed Action. Given the locations of the two parcels (Sites A and B) being considered under the Proposed Action and alternatives, the viewshed is generally constrained by the surrounding roadway corridors, Seal Beach National Wildlife Refuge, and existing development. The longest views tend to be at positions along the road corridors, with an approximately 2-mile (3.2-kilometer) view (east-west) along the Westminster Avenue corridor. **Figures 6** through **8** illustrate the visible extent of each Proposed Action Alternative depicted in color from least to most visible.

Based on the analysis shown in these project viewsheds, the highest potential for adverse effects would occur within 1 mile (1.6 kilometers) of the proposed sites. Therefore, the assessment of existing visual character, quality, viewer response, and potential key view locations was focused in the area immediately surrounding Sites A and B.

<u>Determining Existing Character</u>

Visual character is defined by descriptive attributes in the landscape. Natural and artificial landscape features contribute to the visual character of both regional areas and specific viewpoints. Visual character is influenced by geologic, hydrologic, botanical, wildlife, recreational, and urban features. Urban features include those associated with development such as structures, roads, utilities, earthworks, and the results of other human activities. The perception of visual character can vary significantly seasonally, even hourly, as weather, light, shadow, and elements that compose the viewshed change. The basic elements used to describe visual character for most visual assessments are the form, line, color, and texture of

landscape features. The appearance of the landscape is described in terms of the dominance of these components. **Table 1** includes the range of visual quality characteristics.

Table 1. Viewer Expectations

High Visual Character/Quality	Objective is to preserve existing character of the landscape. Changes in the landscape may attract attention but should not be evident to the viewer and should not alter existing visual character.
Moderately-High Visual Character/Quality	Objective is to retain existing character of the landscape. Changes in the landscape may begin to attract attention but should remain subordinate to the overall viewshed and should be visually congruous with existing visual character.
Moderate Visual Character/Quality	Objective is to partially retain the existing character of the landscape. Changes in the landscape may attract attention of the viewer, and may be tolerated, but should not dominate the visual setting or substantially alter existing visual character.
Low Visual Character/Quality	Objective is to allow for activities that modify the existing character of the landscape. Changes in the landscape may attract attention of the viewer and dominate the visual setting. However, these activities should be minimized in all cases where conclusion does not result in net-positive visual changes to visual character.

3.1.2 Determining Viewer Response

Viewer response to changes in the visual landscape is based on a combination of factors:

- individual viewers or groups affected by exposure to a project (viewer groups);
- viewer concern about noticeable changes to the view (viewer sensitivity); and,
- frequency and duration of views (viewer exposure).

<u>Existing Viewer Groups</u>

To determine the potential number and sensitivity of anticipated viewers, lands surrounding the project area are evaluated for factors including land use designations, population density, part or full-time use/occupancy, and nature of the use or opportunity. Residential neighborhoods typically yield pedestrian and vehicular viewers, while commercial developments more often yield only vehicular viewers. With the limited number of non-vehicular public viewing points, and limited regulatory protection for private views; the primary viewer groups are most often Vehicular and Recreational/Pedestrian Viewers. As such, the viewshed assessment considers motorists most likely to also a member of other potential viewer groups, including a resident; a tourist or a patron.

<u>Existing Viewer Sensitivity</u>

Viewer sensitivity is used as an evaluation term to discuss viewer concern for, and response to, changes in the visual landscape. The viewer's individual association with the environment can help determine their sensitivity to change as can their activity while viewing, so it is important to determine whether their views are incidental or sought-after. Activities such as commuting in

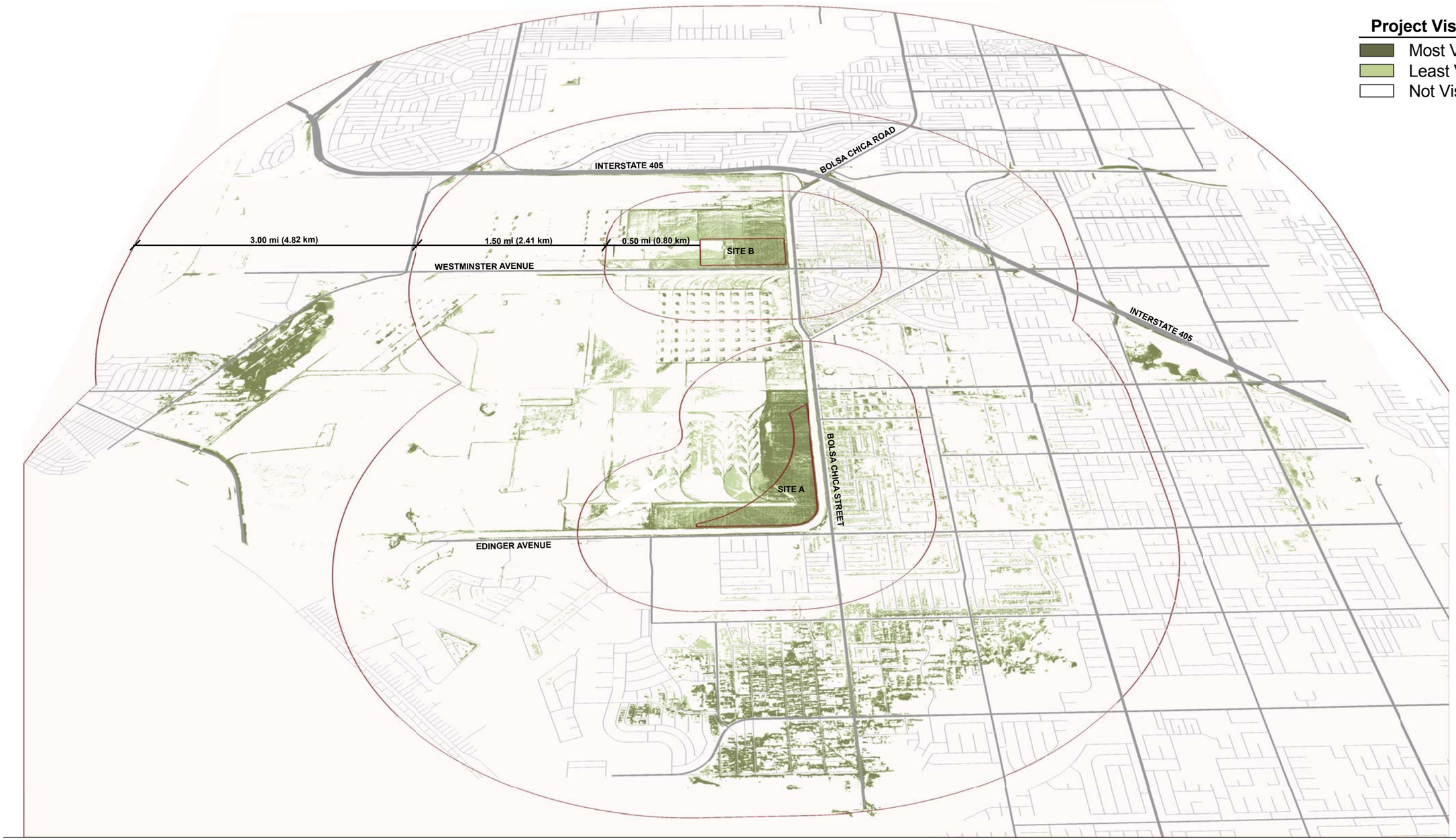

Figure 6
Project Viewshed Map - Alternative 1

Figure 7
Project Viewshed Map - Alternative 2

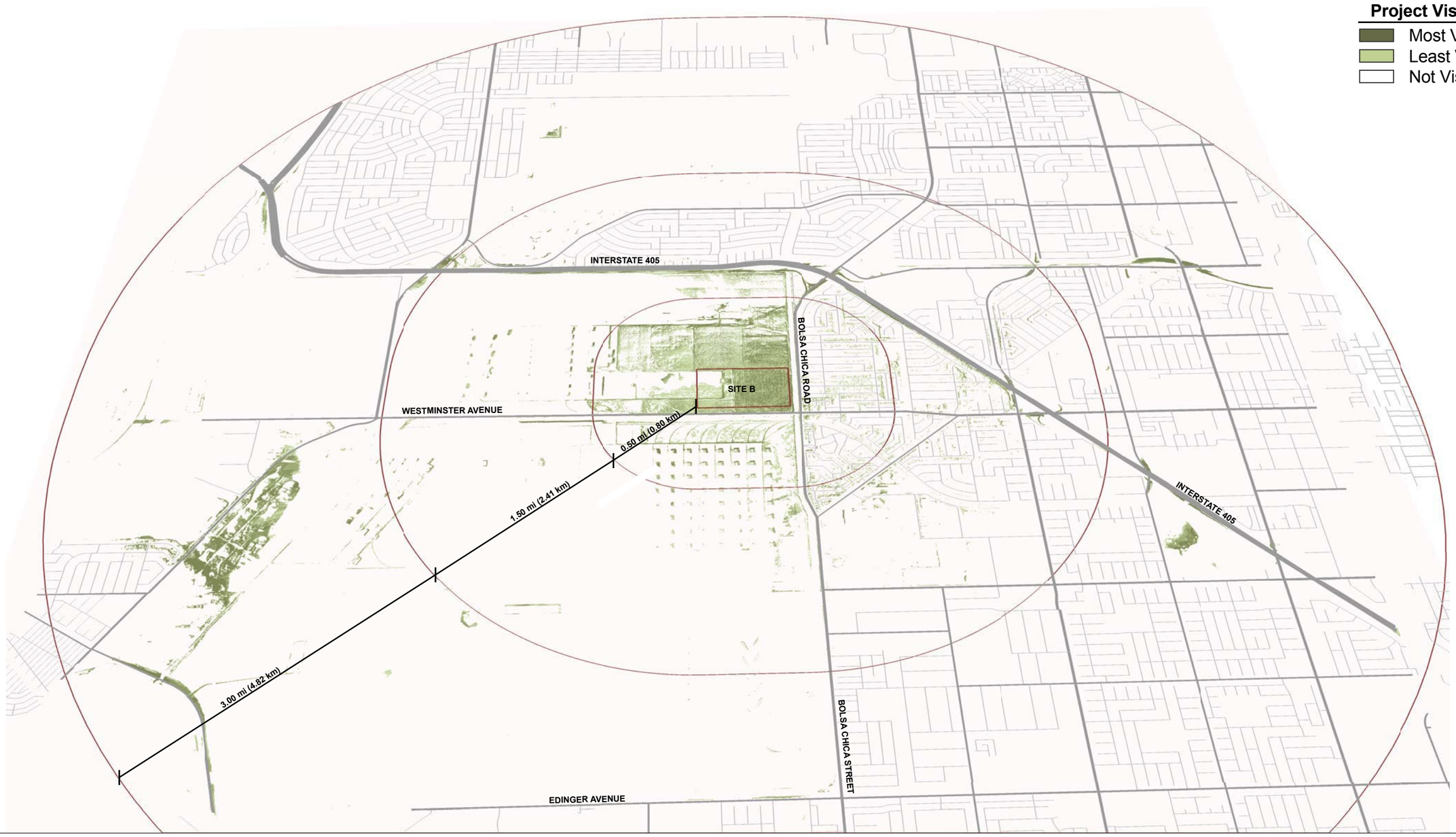

Figure 8
Project Viewshed Map - Alternative 3

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heavy traffic can distract an observer from many aspects of the visual environment. On the other hand, recreational driving can encourage the examination of a landscape at greater length, thereby increasing the observer's attention to detail. For the purposes of this evaluation, sensitivity ratings have been based on viewer group activity and the levels of awareness typically associated with that group.

Existing Viewer Exposure

Viewer exposure is assessed by measuring the number of viewers experiencing potential changes in their visual environment. Those viewers are sorted by type of activity, duration of view, speed at which the viewer is traveling, and the resulting positions of the viewer relative to the proposed changes. As defined traditionally by analysis methodology, viewer exposure is characterized as *low* for less than 100 viewers daily; *moderate* for between 100 and 1,000 viewers daily; or *high* for greater than 1,000 viewers daily. Applied to the highest frequency viewers, as detailed previously (motorists), viewer exposure to the Proposed Action would be **high**, as the number would exceed 1,000 daily viewers.

3.2 Contrast Rating Analysis

The visual resource contrast rating is a systematic process used to analyze the potential visual impact of the Proposed Action. The degree to which an activity affects the visual quality of a landscape depends on the visual contrast created between a project due to a project's alteration to, or visual incompatibility (color, texture, scale, etc.) with, the existing landscape.

3.3 Considerations for Determining Visual Impact

Potential impacts to visual resources would typically result should any of the following occur from construction or operation of the Proposed Action:

- Visually obvious degradation of the foreground character or quality of a visually important landscape.
- Dominant visual changes in the landscape that are seen from highly sensitive viewer locations such as community enhancement areas (e.g., community gateways, roadside parks, viewpoints, and historic markers) or locations with special scenic, historic, recreation, cultural, archaeological, and/or natural qualities that have been recognized as such through legislation or some other official declaration.

Overall analysis considerations for Visual Resources are described in **Table 2**. The analysis of visual resources impacts to the visual landscape (water, people, and exposures) is based on the assumptions that degradation of public views and degradation in the scenic landscape are impact parameters that would affect how the public engages or interacts with a visual resource.

Table 2. Analysis Considerations for Visual Resources

Topic	Analysis Considerations and Relevant Assumptions
Impacts to Viewers (viewing public)	Measure the extent of and describe the effects of the Proposed Action's vertical structures and site disturbances on people through spatial analysis of baseline visual resources, sensitivity levels, and distance zones.
Proposed Visual Quality/Character	Measure the extent of and describe the effects of the Proposed Action's structures, site disturbances, and physical changes to the landscape through spatial and viewshed analysis (including visual simulations).
Consistency with Existing Visual Resources	Determine level of visual contrast from Key Observation Points to describe the form, line, color, and texture of existing structures and those of the Proposed Action. Compare the Proposed Action against baseline conditions to determine degree of visual contrast between existing and proposed conditions.

The 10 most common criteria used to determine viewer exposure and the attention afforded to visual contrasts were interpreted for applicability for the types of solar development and ancillary facilities associated with the Proposed Action. Those criteria include: (1) the distance between observer and Proposed Action; (2) length of time the project is in view (linear or stationary viewers –KOPs); (3) the angle of observation; (4) whether the structures are sun lit (brighter, lighter blues/grays) or in shade (darker, less apparent blues/grays); (5) the presence of new vertical structures (including transmission support, buildings, tracking structures); (6) type of structures in view; (7) relative size or scale of development; (8) location within a scenic viewshed; (9) presence of residential (fixed, longer duration) viewers; and (10) reclamation recovery time.

Visual Quality/Character impacts (**Table 3**) are determined based on the level of change caused by the project with the existing conditions within an affected environment. The results are based on consideration of existing visual quality rating, existing landscape character, presence or absence of similar existing industrial development (building structures, transmission lines, fencing, etc.), and the effect of the Proposed Action on the landscape as either a new or an additional cultural modification.

Table 3. Visual Quality/Character Impacts

Existing Visual Quality	Proposed Action's Visual Change		
	Strong	Moderate	Weak
High	High	High	Moderate
Moderate	High	Moderate	Low
Low	Moderate	Low	Low

Impacts to viewer sensitivity were determined based on the comparison of change caused by the Proposed Action with sensitivity/user concern levels, distance zones (0 to 0.5 mile [0 to 0.8 kilometer], 0.5 to 1.5 miles [0.8 to 2.4 kilometers], 1.5 to 5 miles [2.4 to 8 kilometers], and greater than 5 miles [8 kilometers) (**Table 4**), and visibility of the Proposed Action (**Table 5**).

Table 4. Sensitivity Level Impacts

Project Visibility	Proposed Action's Visual Change		
	Strong	**Moderate**	**Weak**
High Viewer Sensitivity Impacts			
0 – 0.5 mile (0 - 0.8 kilometer)	High	Moderate	Moderate
>0.5 – 1.5 miles (>0.8 – 2.4 kilometers)	Moderate	Moderate	Low
>1.5 – 5 miles (>2.4 - 8 kilometers)	Moderate	Low	Low
Medium Viewer Sensitivity Impacts			
0 – 0.5 mile (0 to 0.8 kilometer)	High	Moderate	Moderate
>0.5 – 1.5 miles (>0.8 – 2.4 kilometers)	Moderate	Low	Low
>1.5 – 5 miles (>2.4 - 8 kilometers)	Low	Low	Low

Table 5. Viewing Distances

Distance Zones	Distance from Proposed Action
Immediate Foreground	0 – 0.5 mile (0 - 0.8 kilometer)
Foreground-Middleground	>0.5 – 1.5 miles (>0.8 - 2.4 kilometers)
Background	>1.5 – 5 miles (>2.4 - 8 kilometers)
Seldom Seen	Greater than 5 miles (8 kilometers)

General visual impact levels are outlined in **Table 6**. Impacts to existing visual quality were determined by measuring the extent of effects of the Proposed Action's overall visibility, including structures, access roads, and newly disturbed rights-of-way through comparative spatial analysis of proposed project features.

Table 6. Visual Impact Level Criteria

Impact	Criteria
High	The Proposed Action would be dominant within an area of High Existing Visual Quality. The Proposed Action would introduce strong contrast within 0.5 mile (0.8 kilometer) of high sensitivity viewers.
Moderate	The Proposed Action would be co-dominant within an area of Moderate Existing Visual Quality. The Proposed Action would introduce moderate contrast within 0 to 1.5 miles (0 to 2.4 kilometers) of medium sensitivity viewers.
Low	The Proposed Action would be co-dominant within an area of Low Existing Visual Quality. The Proposed Action would introduce weak contrast within 0 to 1.5 miles (0 to 2.4 kilometers) of medium sensitivity viewers.

Impacts to viewers were determined by measuring the extent of effects introduced by the Proposed Action, including structures, access roads, and vegetation removal through spatial analysis; the existing visual resource inventory; sensitivity levels; and viewing distance zones.

Typically, mitigation measures would be considered as certain criteria were encountered. These commonly applied criteria are summarized below in **Table 7.**

Table 7. Mitigation Consideration Criteria

Mitigation Considered	Criteria
Yes	The Proposed Action would have a strong or moderate contrast within High Visual Quality. The Proposed Action would have a strong contrast within Moderate Visual Quality.
No	The Proposed Action would have a moderate contrast within Moderate Visual Quality. The Proposed Action would have a weak contrast in areas with Low Visual Quality.

4.0 VISUAL RESOURCES INVENTORY

4.1 Existing Visual Character and Quality

Per the methodology outlined in Section 3.0, Viewshed Analyses Methodology, the description of visual character is based on defined attributes characterized as neither positive nor negative. As such, a change in visual character cannot be described as being positive or negative until it is compared against anticipated viewer response to that change.

In this context, the surrounding visual character would be defined as a mosaic of widely varying land uses with each possessing distinct visual identity and contribution to character. Examples of these defining elements include undeveloped or natural open spaces, including the Seal Beach National Wildlife Refuge; densely developed residential neighborhoods along wide collector and arterial roadways; and visitor-serving commercial buildings, hotels, light-industrial development, and corporate office buildings.

The most prominent cultural disturbances in the project area are roadway corridors, surrounding commercial developments, and historical landform modifications adjacent to the proposed sites as they contribute high-contrast surfaces, manufactured topography, moving objects, both moving and fixed light sources, and urbanizing elements such as large-scale signage and traffic signals. Examples of surrounding visual context are illustrated in **Figure 9.**

The level of existing quality was assessed by evaluating the vividness, unity, and intactness of the visual conditions as presently experienced. Vividness is the visual power or memorability of landscape components as they combine in distinctive visual patterns. Intactness is the visual integrity of the natural and man-built landscape and its freedom from encroaching elements. Unity is the visual coherence and compositional harmony of the landscape considered as a whole. It frequently attests to the careful design of individual manmade components in the landscape.

4.1.1 Site A

Site A is located in the southeastern portion of the installation, immediately north and west of Perimeter Road, an existing canal and the intersection of public roads Bolsa Chica Street and Edinger Avenue in the City of Huntington Beach. Adjacent land uses include residential and commercial uses to the east of Bolsa Chica Street and primarily residential neighborhoods to the south of Edinger Avenue. Site A is considered disturbed as it is regularly planted and harvested, but when not in use during post-harvest, dirt and weeds are present; however, the more formal landscape treatments occur along the southern developed edge of Edinger Avenue and eastern frontage of Bolsa Chica Street. These treatments include landscaped medians, street trees, and community walls.

Motorists and pedestrians traveling along Bolsa Chica Street have intermittent views of the site between fabric-covered fences and existing vegetation. Viewers traveling along Edinger Avenue also have occasional views of the site, particularly west of the project area; however, existing

site grading and topographical features obscure most of the project site along Edinger Avenue between Saybrook Lane to the west, and Bolsa Chica Street to the east. Residences along the south side of Edinger Avenue and east side of Bolsa Chica Street are a mixture of one- and two-story structures often behind community walls or noise barriers. Views of the site from the commercial area at the southeast corner of Edinger Avenue and Bolsa Chica Street are largely obstructed by several lanes of traffic activity and the existing topography and vegetation.

4.1.2 Site B

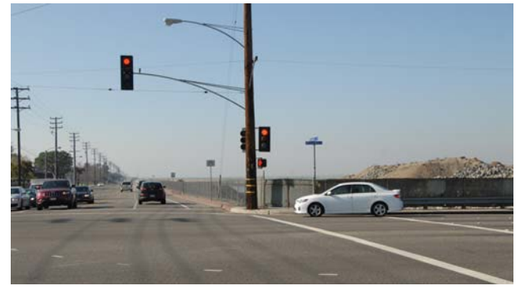
Site B is located in the northeastern portion of NAVWPNSTA Seal Beach, immediately west of Bolsa Chica Road and north of Westminster Avenue in the City of Westminster. To the east of Site B, a canal and green, fabric-covered fence separate Bolsa Chica Road from the site itself. Adjacent land uses include flat, largely vacant land to the north, west, and south that is used primarily for military purposes. Residential and commercial land uses line the eastern frontage of Bolsa Chica Road. Westminster Avenue runs adjacent with and parallel to Site B. Vegetation along Westminster Avenue consists primarily of nonnative weed species and sparsely clustered trees; however, vegetation along Bolsa Chica Road is more regularly distributed and varies in species due to landscaped medians and street trees. Site B is predominately bare dirt and weed species.

Motorists and pedestrians traveling along Westminster Avenue have intermittent, direct views of the site through small openings between clusters of vegetation along the southern edge of Site B. Views of the site by motorists and pedestrians traveling along Bolsa Chica Road are largely obstructed by green, fabric-covered fencing and vegetation. Northbound viewers on Bolsa Chica Road in particular are largely obstructed due to the presence of street trees and median plantings. Residences along the east side of Bolsa Chica Road are a mixture of one-story and two-story structures, many of which are partially or fully obscured by community walls and/or noise barriers. Views of the site from the intersection of Westminster Avenue and Bolsa Chica Road are largely obscured by existing fencing and vegetation. Site B is partially visible from the commercial area at the intersection of Westminster Avenue and Bolsa Chica Road, but experiences from this location would be of short-duration, middleground views.

4.2 Viewer Response

4.2.1 Viewer Groups

Two general viewer groups were considered for the evaluation of viewer exposure, sensitivity, and response: vehicular viewers and recreational/pedestrian viewers. Generally speaking, very few direct foreground views exist of the project sites. Vehicular viewers would typically have a low to moderate awareness of the proposed project, and their exposure would be of short duration and consistent with their expectations of the site. Although viewer sensitivity within this group is generally low to moderate due to the shorter durations of exposure, vehicular viewers represent the largest population of affected viewers.



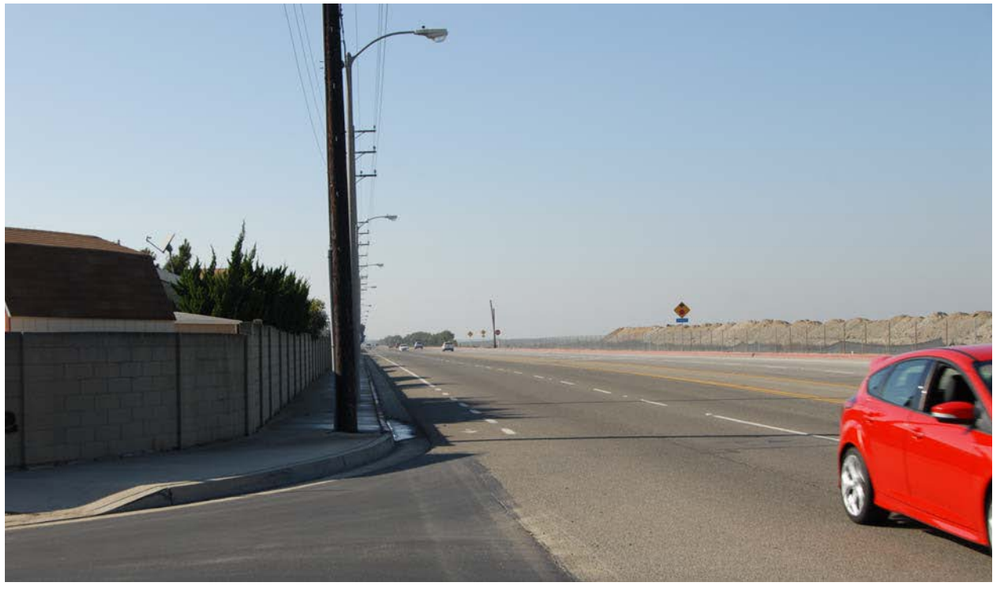


Figure 9
Surrounding Visual Context

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Recreational/pedestrians on the sidewalks immediately adjacent to the proposed sites as well as other recreational viewers at Haven View Park to the southeast of Site A would have largely obstructed views of the site and proposed changes to existing visual setting. Viewer sensitivity within this group is generally considered moderate to high due to the long duration of viewer exposure and expectations of a park setting.

4.2.2 Viewer Sensitivity

The quality of a visual landscape is largely determined by the extent of the public's interest in, and concern for, a particular view. For purposes of evaluating this public concern, Viewer Response is composed of two elements: *Viewer Sensitivity* and *Viewer Exposure*. These elements combine to form a method of predicting how the public might react to visual changes brought about by the Proposed Action.

Viewer sensitivity is defined as both the viewers' concern for scenic quality and the viewers' response to change in the visual resources that compose the view. To establish a measurable threshold for this concern, views are assigned a value of visual sensitivity. The public is generally concerned about areas possessing a high degree of visual character or quality, and these views typically contain highly visible or memorable landscape elements. Publicly accessible views from or within residential areas are generally considered to have greater visual sensitivity than views of, or from, more urbanized locations.

4.2.3 Corridor Viewsheds and Viewer Exposure

Viewer exposure is assessed as defined in Section 3.1.2 of this document. Viewer exposure would be high, as the number would exceed 1,000 daily viewers. Currently, over 40,000 daily vehicle trips occur along Bolsa Chica Street and Bolsa Chica Road.

The analysis considered the viewing corridors as well as viewer position, duration of exposure, and the rate of travel to more accurately define the most sensitive viewpoints. **Table 8** below outlines this specific viewer data for each of the corridors considered in this analysis.

Table 8. Calculated Viewer Exposure

View Corridor	Posted Speed mph (kph)	Viewing Distance feet (meters)	Rate of Travel feet per second (meters per second)	Time of Exposure seconds
Bolsa Chica Street/Road	50 (80.5)	6,897 (2,102)	73.3 (22.3)	94
Edinger Avenue	45 (72.4)	4,195 (1,279)	66.0 (20.1)	63.5
Westminster Avenue	60 (96.5)	4,878 (1,487)	88.0 (26.8)	55

mph – miles per hour
kph – kilometers per hour

These corridor viewsheds and viewing distances were integral to forming a well-nuanced viewer sensitivity and exposure determination, and conclusions were determined through detailed evaluation of nearby travel routes as experienced at the posted speed limit:

- Bolsa Chica Street/Road
- Edinger Avenue
- Westminster Avenue

Combined, these corridors compose the largest proportions of daily viewers. Vehicular corridor viewsheds are depicted in **Figure 10** through **Figure 12**.

4.3 Key Observation Points

To better understand existing conditions and potential viewer response, KOPs were selected based on a composite evaluation of project and corridor analyses. Because it was not feasible to analyze all views of the project, eight KOPs were selected for their ability to simultaneously represent existing conditions and authentically depict the effects of implementation. These views established a visual condition baseline to which potential change was compared. The chosen KOP locations are identified in **Figure 13**. The anticipated viewshed of each KOP has been illustrated in **Figure 14**.

KOP 1 faces east toward Site A along the southern edge of NAVWPNSTA Seal Beach from the eastern terminus of the bike path at Santa Barbara Lane and Edinger Avenue (**Figure 15**). Recreational viewers in this location are anticipated to experience short-duration, foreground-middleground views of the Proposed Action from occasional points along the bike path.

KOP 2 faces northeast toward Site A from the intersection of Edinger Avenue and Monterey Lane (**Figure 16**). Viewers are anticipated to experience short-duration foreground views of the Proposed Action from this location; however; as the viewer moves east, direct views become increasingly available as the earthen berm tapers back to existing grade.

KOP 3 faces north toward Site A from Haven View Park. Recreational viewers in this location are approximately 400 feet (121.9 meters) from the proposed Site A boundary (**Figure 17**). Several opportunities exist for direct foreground views of the Proposed Action; however, given the existence of shade trees present along the Edinger Avenue frontage and dual-lined chain-link fencing along Orange County Flood Control Channel. Implementation of the project as proposed would introduce a third fence around the perimeter of the solar array. For these reasons, limited visibility of the Proposed Action from within Haven View Park is anticipated, and resulting visual contrast would be low.

KOP 4 faces north toward Site A from the intersection of Edinger Avenue and Waikiki Lane (**Figure 18**). Views from this location are largely unobstructed by existing site topography, however; existing right-of-way fencing along Edinger Avenue, and fencing along the Orange County Flood Control Channel exists within foreground-middleground views at this location. Viewers are anticipated to experience short-duration, foreground views of the Proposed Action and would likely notice changes in the landscape due to removal of existing vegetation and addition of a fourth perimeter screening fence.

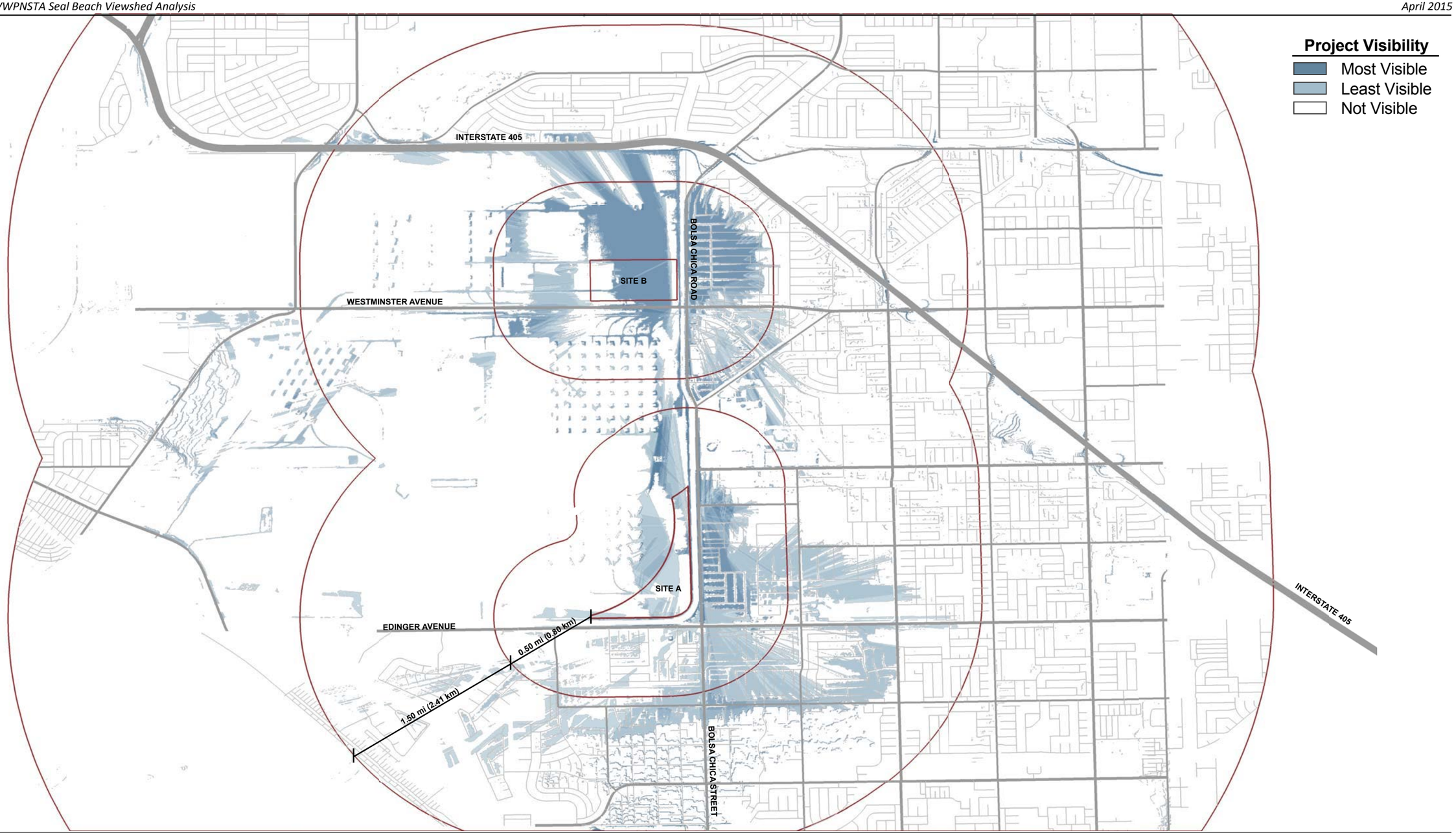


Figure 10
Corridor Viewshed Map - Bolsa Chica Road / Bolsa Chica Street

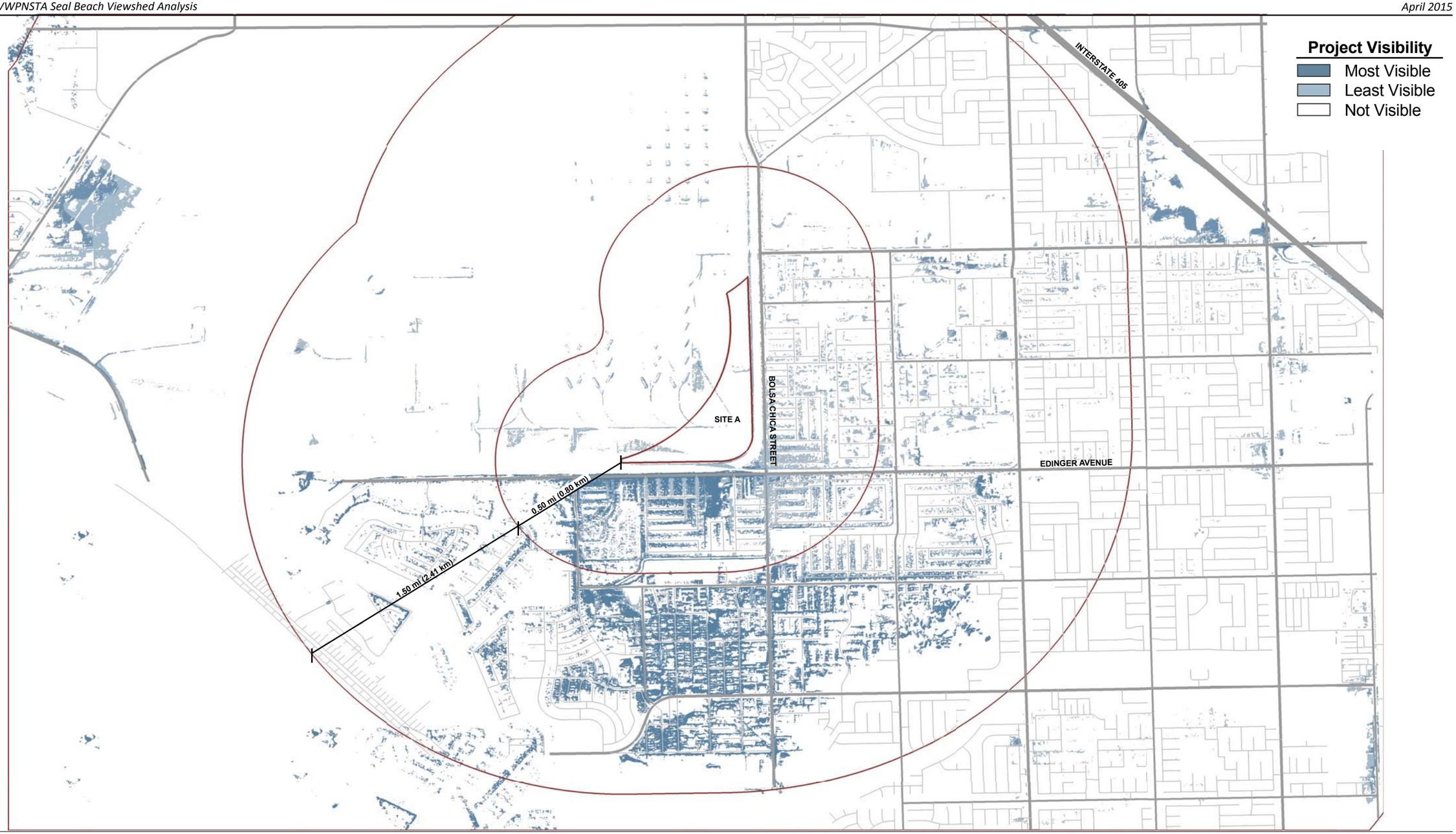


Figure 11
Corridor Viewshed Map - Edinger Avenue

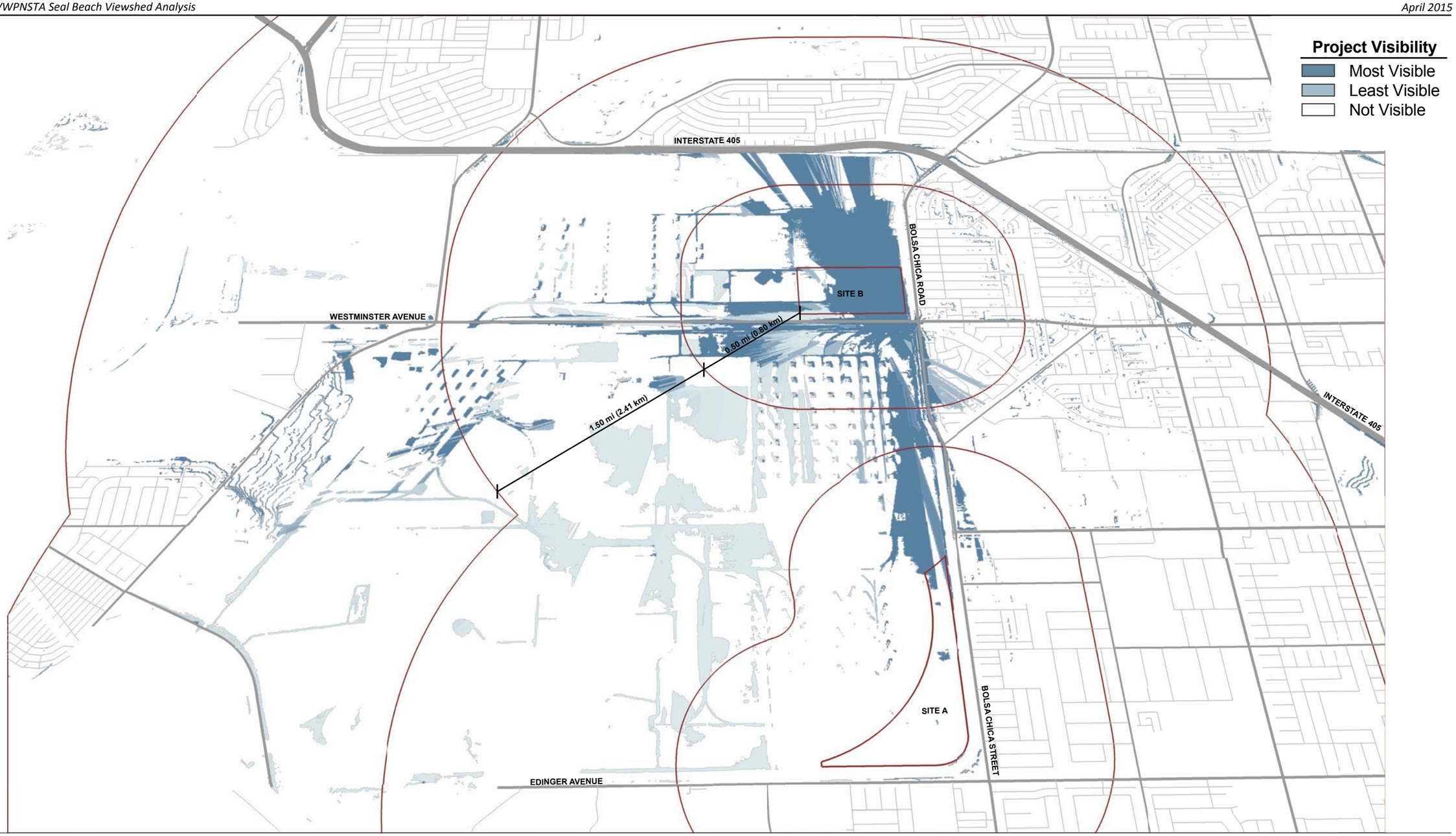
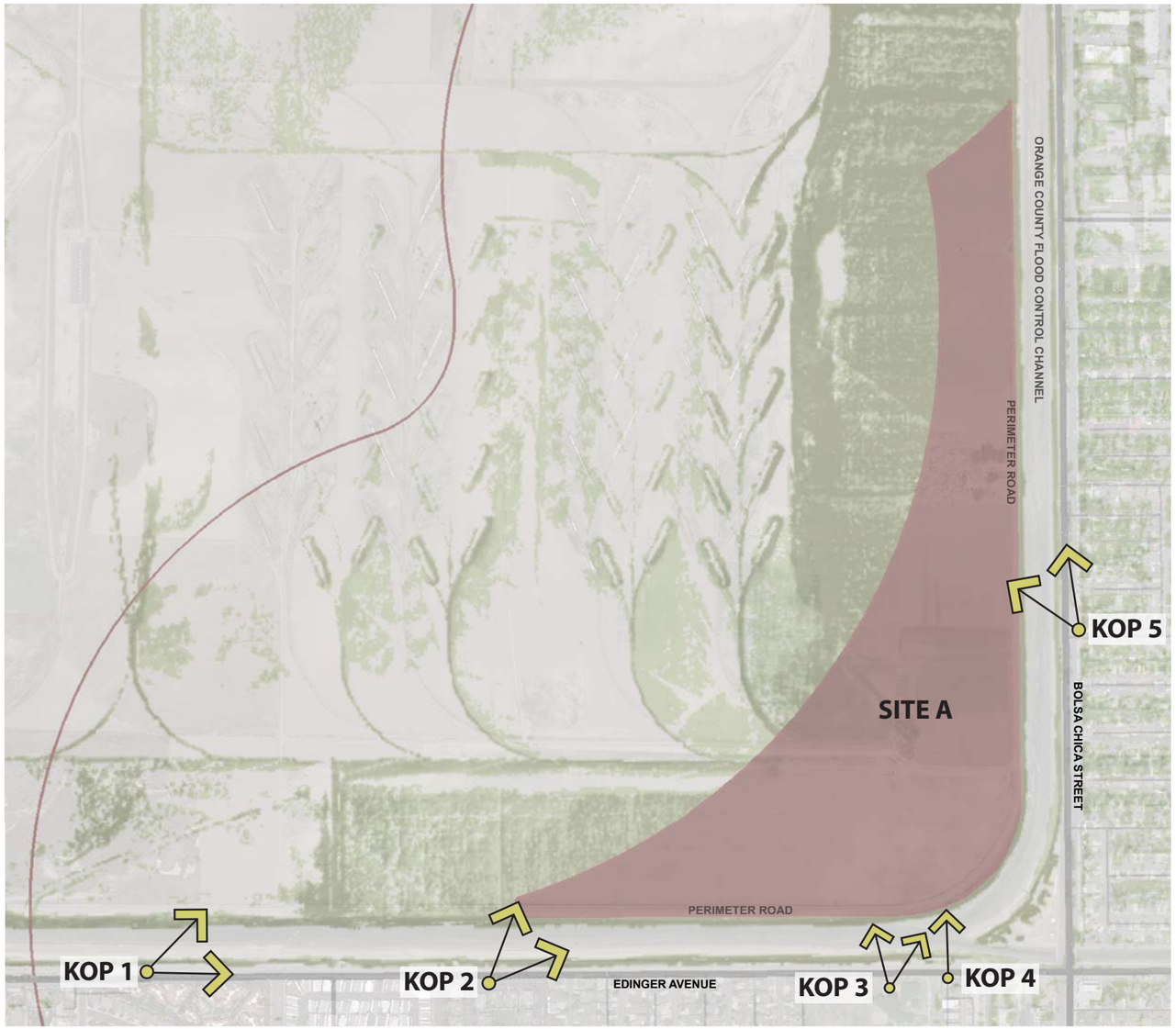


Figure 12
Corridor Viewshed Map - Westminster Avenue



Site A - KOPs 1, 2, 3, and 4

Site B - KOPs 6, 7, and 8

Source: AECOMDigitalGlobe, 2015

Figure 13
KOP Location Map

Figure 14
KOP Viewshed Map

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Figure 15. KOP 1 – Existing Conditions

Figure 16. KOP 2 – Existing Conditions

Figure 17. KOP 3 – Existing Conditions

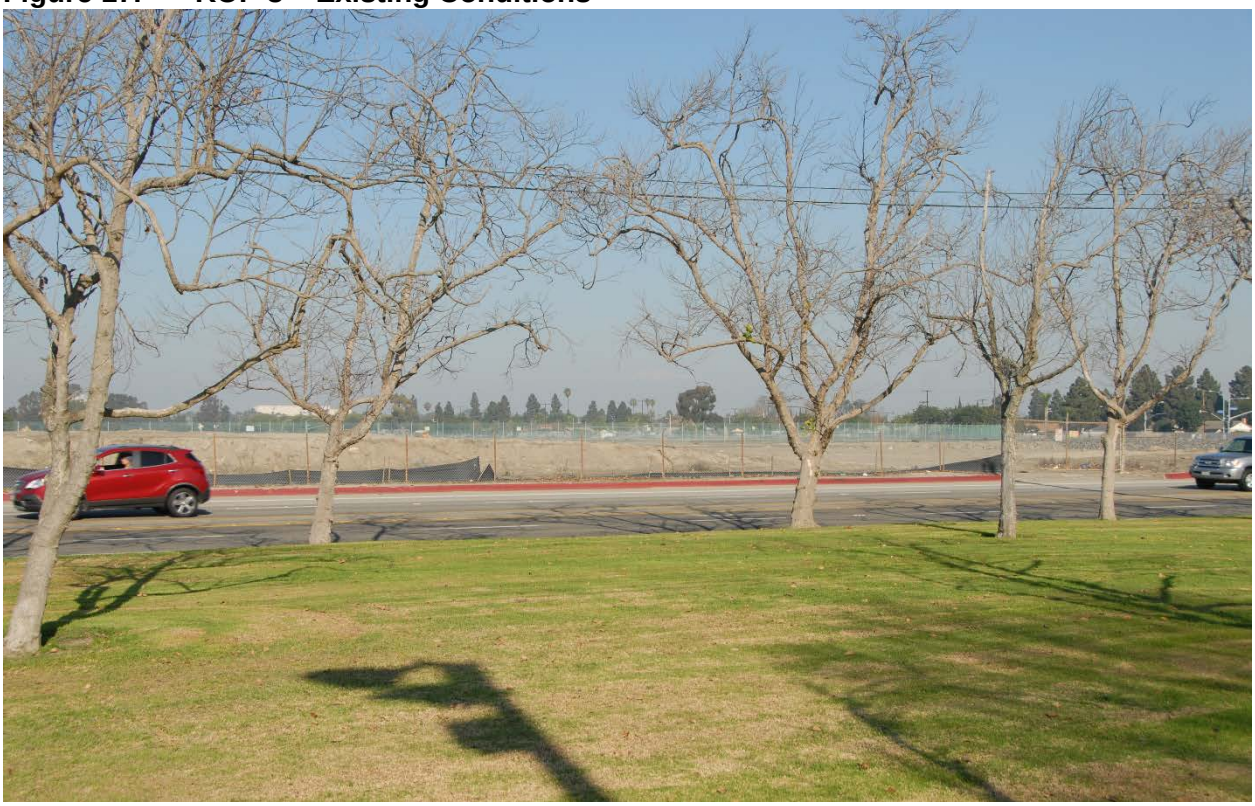


Figure 18. KOP 4 – Existing Conditions

KOP 5 faces northwest along Bolsa Chica Street from Dovewood Drive (**Figure 19**). Views from this location range from unobstructed to fully-obstructed by existing vegetation and vehicular activity through the corridor. Viewers are anticipated to experience short-duration, foreground views of the Proposed Action from points along Bolsa Chica Street; however, viewers would experience a noticeable change with the removal of a large stand of mature eucalyptus trees and surplus machinery.

KOP 6 faces northeast along Westminster Avenue toward Site B and the intersection of Westminster Avenue and Bolsa Chica Road (**Figure 20**). Viewers in this location would experience intermittent foreground and middleground views of the Proposed Action; however, much of the corridor is buffered by existing vegetation.

KOP 7 faces west toward Site B along Westminster Avenue (**Figure 21**). Much like KOP 6, views from this location vary from partially to fully-obstructed by existing vegetation. Viewers are anticipated to experience occasional, short-duration foreground views of the Proposed Action from this and other points along Westminster Avenue.

KOP 8 faces southwest toward Site B from the eastern side of the I-405/Bolsa Chica Road overpass (**Figure 22**). Views in this area vary from partially to fully-obstructed depending on viewer location, but, when available, views are elevated and look over much of the proposed Site B area. Viewers are anticipated to experience limited views of the proposed project but would be visually exposed to the project for several minutes.

4.4 Additional View Locations Considered

Robinwood Park

Robinwood Park is located 0.25 mile (0.4-kilometer) from the nearest boundary and would include Pedestrian/Recreational Viewers. Limited opportunity exists for direct foreground/middleground views of the Proposed Action when facing west along West McFadden Avenue from the northern edge of Robinwood Park, and from sidewalks along the northern and southern edges of West McFadden Avenue. As described under Haven View Park, existing street trees along West McFadden Avenue, double chain-link fencing along Orange County Flood Control Channel, and additional fencing proposed as part of the project are anticipated to substantially limit potential visibility of the Proposed Action within and immediately surrounding Robinwood Park.

Seal Beach National Wildlife Refuge

The Seal Beach National Wildlife Refuge is located 0.50 mile (0.8-kilometer) from the nearest boundary of the Proposed Action and would include Pedestrian/Recreational Viewers**.** Extremely limited viewing opportunities exist of the Proposed Action from the Seal Beach National Wildlife Refuge as no visitor-serving facilities are present within 1 mile (1.6 kilometers)

Figure 19. KOP 5 – Existing Conditions

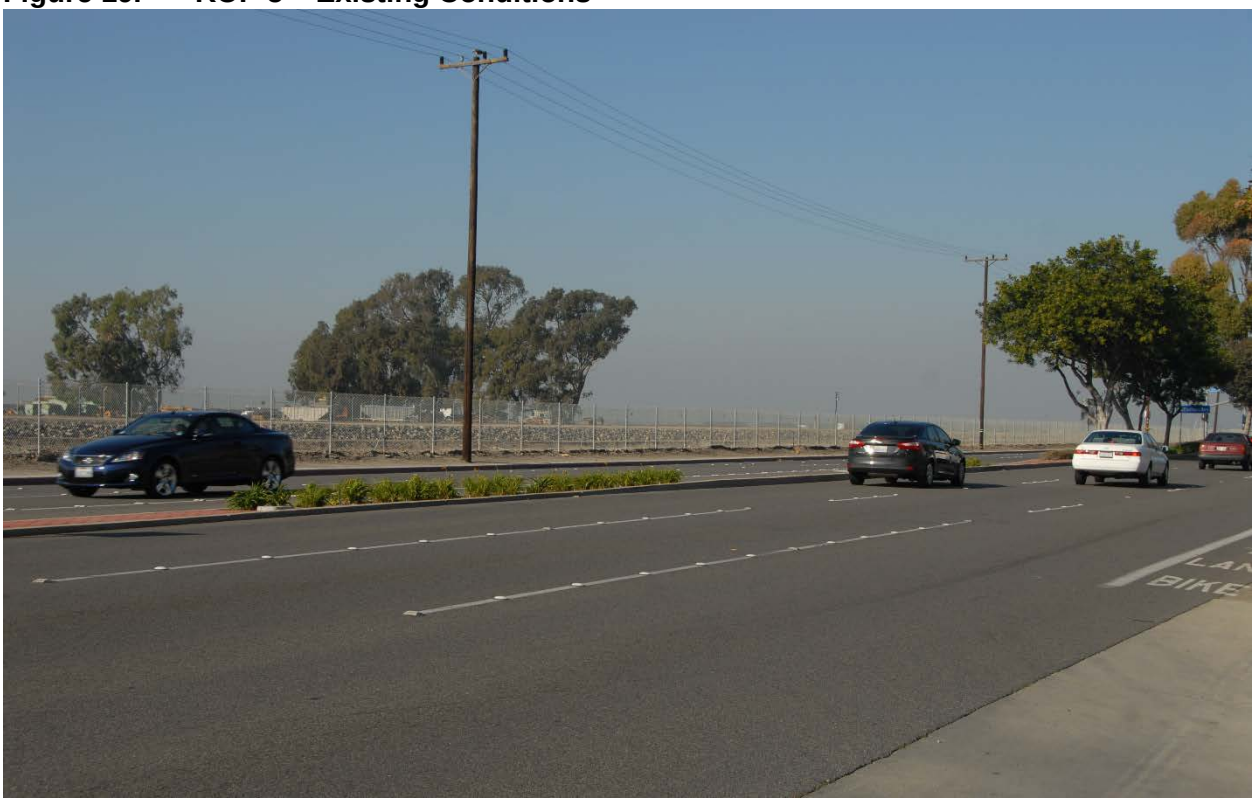


Figure 20. KOP 6 – Existing Conditions

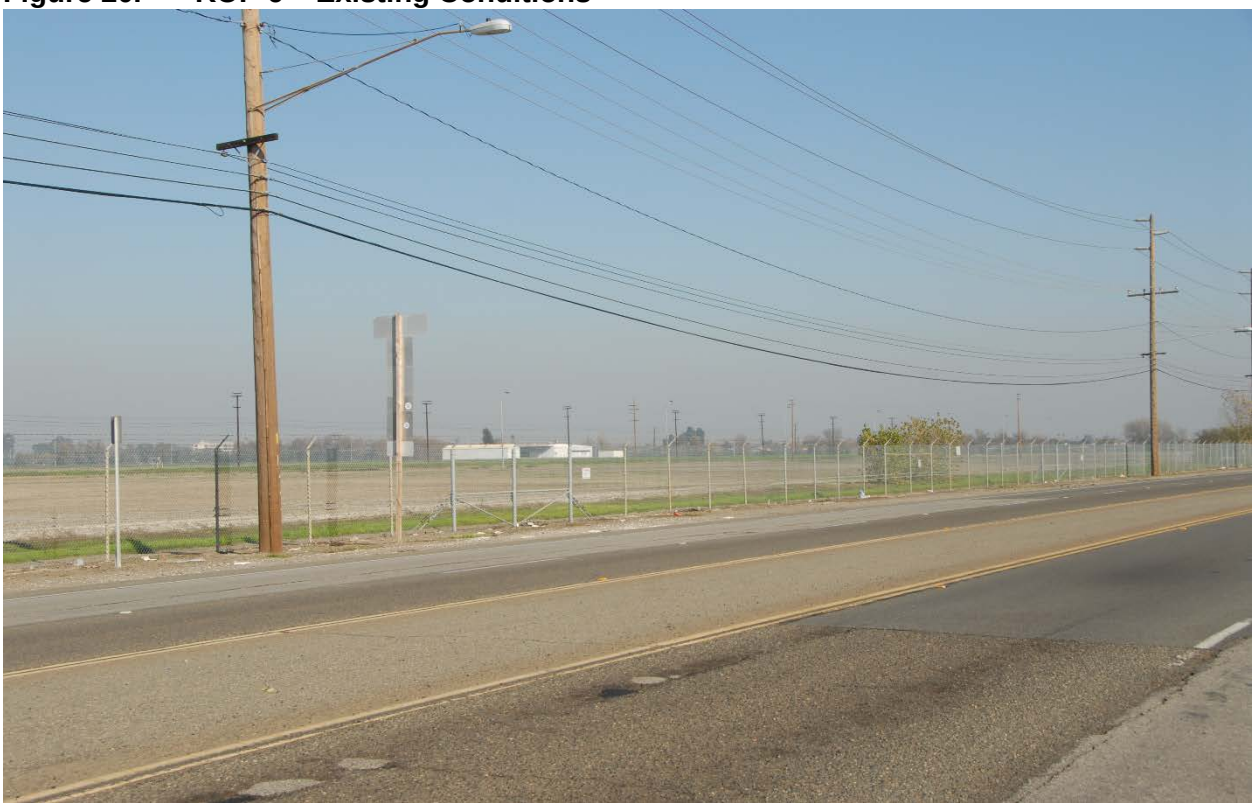
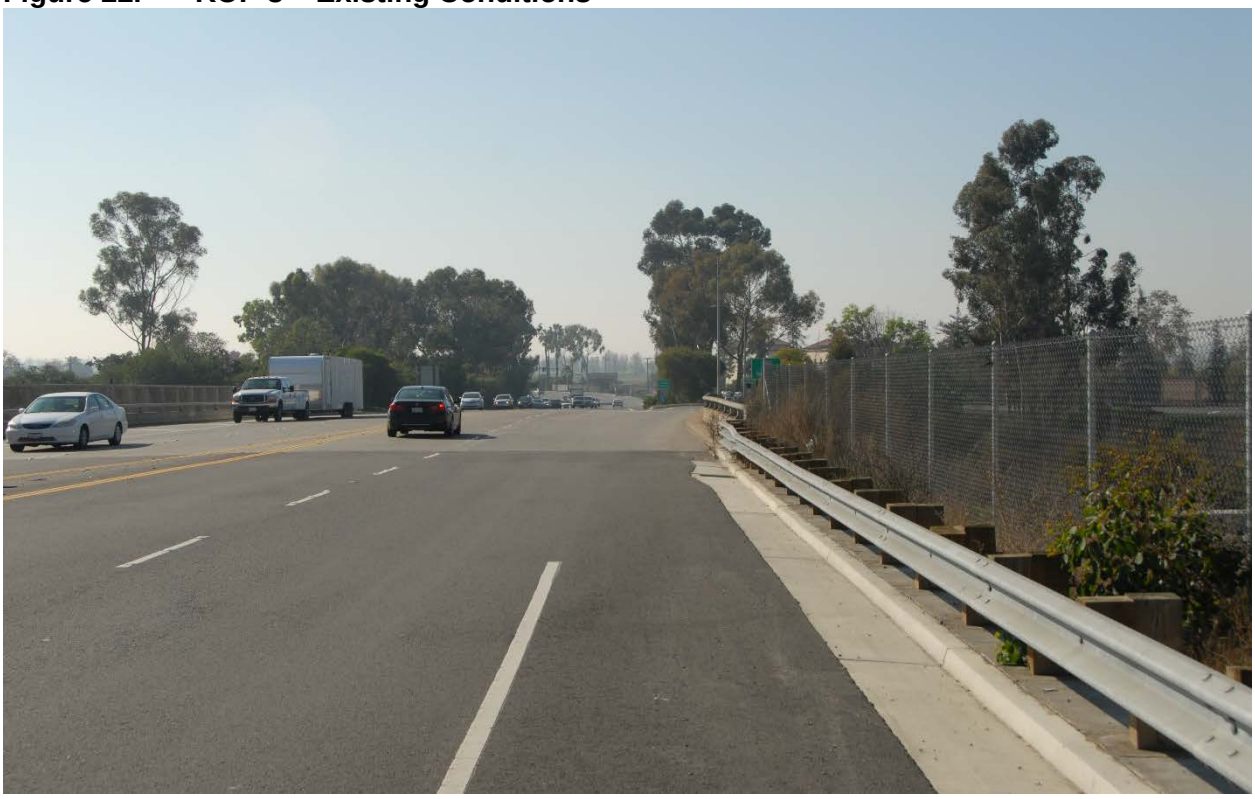


Figure 21. KOP 7 – Existing Conditions

Figure 22. KOP 8 – Existing Conditions



of the proposed Site A boundary. The nearest publicly accessible location is roughly 1.16 miles (2.6 kilometers) to the west of Site A at the termination of Edinger Avenue into the Sunset Aquatic Park facilities.

Sunset Aquatic Park

Sunset Aquatic Park is located approximately 1.3 miles (2.1 kilometers) from the nearest boundary of the Proposed Action and would include Recreational/Vehicular Viewers. The opportunity for direct foreground/middleground views of the Proposed Action would be limited to viewers traveling to or from the northern edge of Huntington Harbor along Edinger Avenue.

Huntington Harbor

Huntington Harbor is located 0.25-mile (0.4-kilometer) from the nearest boundary and would include Recreational/Pedestrian/Vehicular Viewers. The opportunity for direct foreground/ middleground views of the Proposed Action would be limited to viewers traveling to or from the northern edge of Huntington Harbor along Edinger Avenue. Within Huntington Harbor, views would be fully obstructed by high-density marina operations, multi-story residential development, and existing mature vegetation. As represented by KOP 1, views of the Proposed Action from the northern edge of the harbor would be limited to those from 0.25 mile (0.4 kilometer) to 0.95 mile (1.5 kilometers) in distance.

5.0 CONTRAST RATING AND IMPACT RESULTS

A number of factors inform the overall degree of contrast (see Section 3.2), change to visual quality or character, and potential impacts resulting from project implementation. The composite analysis includes the following elements:

- proposed visual character/visual quality
- level of viewer response
- level of change to visual quality/character
- resulting visual impact

The resulting level of change was determined by comparatively evaluating proposed visual quality/character against existing conditions and considered factors such as: landform alteration, vegetation removal, and built project features that would alter existing conditions in a noticeable way.

To evaluate the proposed conditions, visual simulations were prepared to illustrate the visual effects of the Proposed Action. The visual simulations were created by: photographing the site and surroundings with a global positioning system-enabled, high-resolution digital single-lens reflex camera; verifying the three-dimensional model of Proposed Action features provided by the Applicant; matching digital camera metadata to in-model cameras, and preparing a digital rendering of the final results at each key view location. The project features depicted in the simulations have been provided for evaluation of conceptual solar development arrays within the chosen visual setting.

5.1 Impacts from Alternative 1

<u>Construction Impacts</u>

The visual landscape surrounding proposed Sites A and B would be temporarily affected by construction of the proposed solar facilities and ancillary features including graded maintenance roads, perimeter fencing, and free-standing electrical equipment including the current inverters and grid connection switchgear. Given the inherent visual aspects of construction activities, temporary viewshed disturbances would result from the staging, stockpiling, and placement of PV panels and inverter stations; construction-related traffic and equipment; temporary debris storage; and standard ground-clearing operations for construction.

Due to the presence of existing construction and farming equipment, existing bulk materials storage, and site grading operations unrelated to the Proposed Action, the anticipated visual contrast of construction phase activities would range from **weak** to **moderate** depending on distance of the observer from both Sites A and B, respectively. In all cases, construction activities occurring in the immediate foreground of the observer, particularly along Edinger Avenue, would cause greater temporary impacts to the visual landscape than those appearing at a farther distance, as with the majority of the project area.

During this temporary construction period, direct impacts to viewer sensitivity are anticipated to be moderate to high, due primarily to the number of viewers along the affected vehicular corridors. Project construction activities, as discussed previously, that are located within 0.5 mile (0.8 kilometer) of high or moderate viewer sensitivity and that have moderate contrasts and/or impacts to the visual landscape would be short term. Measures to avoid and /or minimize potential temporary visual impacts, such as the use of visual screening, would reduce the overall visual contrast that would occur during construction.

Operation Impacts

Direct impacts to affected viewsheds are anticipated to decline in degree of contrast and memorability from levels described under construction impacts. Because of the low vertical profile of proposed facilities and proposed screening measures, viewers passing through the project area are unlikely to notice a considerable change in visual character or to consider the visual character substantially diminished under Alternative 1. However; visual change would be more apparent to viewers in the vicinity of Site B due to a higher number of viewers and direct foreground viewing opportunities. As such, the resulting level of impact would be low to moderate at Sites A and B, respectively. **Figures 23** through **30** illustrate the proposed visual effects. Potential new permanent night-time lighting would be confined to the switchgear area of both Site A and Site B and minimized to the extent permitted by the Occupational Safety and Health Administration (OSHA) and force protection standards and, further, that down shield lights would be used to reduce night glare and light pollution. In addition, switchgear lighting would only be on when use is required for personnel to conduct work or during an inspection. Lighting would be off when use is not required. Lighting at inverters would be task-type lighting where a convenience outlet would be provided to plug in a work light. Lighting would not be continuous and would be only as needed. As a result, in combination with proposed screening measures, no adverse visual effects during night hours are anticipated.

Indirect viewshed impacts would result from disturbance by occasional maintenance operations and as-needed equipment replacement associated with the Proposed Action.

Decommissioning Impacts

Impacts to visual resources during the decommissioning phase of the Proposed Action would be temporary and similar in nature to construction impacts. No visual impacts would remain following decommissioning.

5.2 Impacts from Alternative 2 (Site A Only)

Impacts to visual resources with implementation of Alternative 2 would be similar to those discussed under Alternative 1 but would be limited to temporary, construction-related viewshed disturbances at Site A only. Direct impacts to viewers and existing resources would be low, as contrast would be weak within low existing visual quality. Viewer response would be moderate

Existing Conditions - view facing east toward Site A from the bike path along Edinger Avenue.

Simulation - view of Proposed Action from KOP 1

Figure 23
KOP 1 - Existing and Proposed Conditions

Existing Conditions - view facing northeast toward Site A from the intersection of Edinger Avenue and Monterey Lane

Simulation - view of Proposed Action from KOP 2

Figure 24
KOP 2 - Existing and Proposed Conditions

Existing Conditions - view facing north toward Site A from Haven View Park

Simulation - view of Proposed Action from KOP 3

Figure 25
KOP 3 - Existing and Proposed Conditions

Existing Conditions - view facing north toward Site A from the intersection of Edinger Avenue and Waikiki Lane

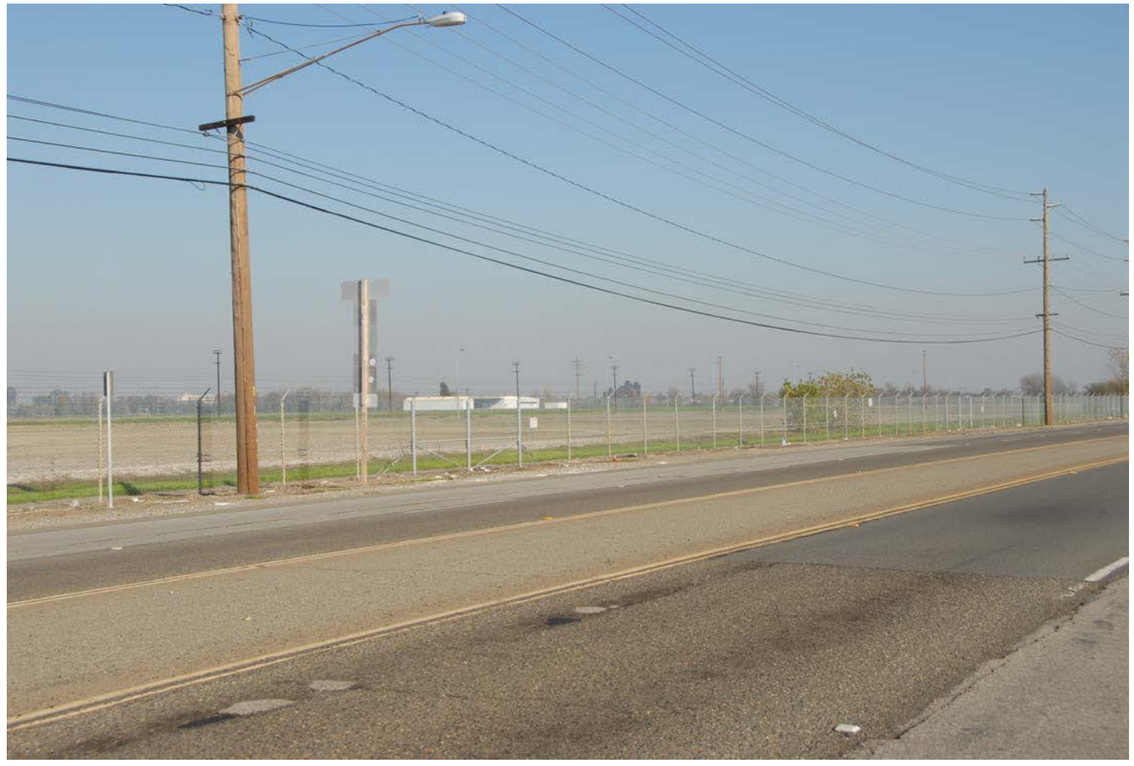
Simulation - view of Proposed Action from KOP 4

Figure 26
KOP 4 - Existing and Proposed Conditions

Existing Conditions - view facing northwest along Bolsa Chica Street from Dovewood Drive

Simulation - view of Proposed Action from KOP 5

Figure 27
KOP 5 - Existing and Proposed Conditions



Existing Conditions - view facing northeast along Westminster Avenue toward Site B and intersection at Bolsa Chica Road

Simulation - view of Proposed Action from KOP 6

Figure 28
KOP 6 - Existing and Proposed Conditions

Existing Conditions - view facing west toward Site B along Westminster Avenue

Simulation - view of Proposed Action from KOP 7

Figure 29
KOP 7 - Existing and Proposed Conditions

Existing Conditions - view facing southwest toward Site B from the eastern side of the I-405/ Bolsa Chica Road overpass

Simulation - view of Proposed Action from KOP 8

Figure 30
KOP 8 - Existing and Proposed Conditions

due to the combined moderate impacts to recreational/pedestrian viewer sensitivity and low impact to vehicular viewer sensitivity. Implementation of Alternative 2 would not substantially alter existing visual character and resulting visual impacts would be minor.

5.3 Impacts from Alternative 3 (Site B Only)

Impacts to visual resources with implementation of Alternative 3 would be similar to those discussed under Alternative 1 but would be limited to temporary, construction-related viewshed disturbances at Site B only. Direct impacts to viewers and existing resources would be moderate, as contrast would be weak in this location; however, viewer sensitivity would be moderate due to the daily number of viewers and frequency of direct foreground-middleground views of the project site. Ultimately, implementation of Alternative 3 would not substantially alter existing visual character and resulting visual impacts would be minor.

5.4 Summary of Impacts

Results are summarized in **Table 9** through **Table 14**, with relevant impact determinations indicated in bold text. Impacts to visual quality and character (**Table 9**) were determined based on the comparison of change caused by the Proposed Action with the existing visual resources inventory of the affected environment. The results are based in consideration of quality rating, existing landscape character, presence or absence of existing industrial development (transmission lines, fencing, structures, etc.), and the Proposed Action's contribution to the landscape as only an additional cultural modification.

Table 9. Summary of Visual Quality/Character Impacts

Alternative	Existing Visual Quality Rating	Proposed Action's Visual Change		
		Strong	Moderate	Weak
1	Low	Moderate	**Low**	Low
2	Low	Moderate	Low	**Low**
3	Low	Moderate	**Low**	Low

Table 10 presents a summary of Viewer Sensitivity Impacts determined based on the comparison of change caused by the Proposed Action. Viewer sensitivity was determined to be **high** for the recreational/pedestrian viewer group (concentrated around Site A); while the higher-frequency vehicular viewer group was determined to be **medium** (over 1,000 daily viewers of Site A and Site B, solely and aggregate). Visibility of the Proposed Action was determined to be concentrated within 0 to 1.5 miles (0 to 2.4 kilometers) as shown in **Table 11**.

Visual impact levels are outlined by alternative in **Table 12**. Impacts to existing visual quality were determined by measuring the extent of effects of the Proposed Action's structures, access roads, and site disturbances through comparative spatial analysis of the existing visual resource inventory, anticipated viewer response, and visual quality ratings.

Table 10. Summary of Viewer Sensitivity Impacts

Alternative	Project Visibility	Proposed Action's Visual Change		
		Strong	Moderate	Weak
High Viewer Sensitivity Impacts (Recreational/Pedestrian Viewers)				
1, 2	0 – 0.5 miles (0 – 0.8 kilometer)	High	Moderate	**Moderate**
1, 2	>0.5 – 1.5 miles (0.8 – 2.4 kilometers)	Moderate	Moderate	**Low**
1, 2	>1.5 – 5 miles (4 to 8 kilometers)	Moderate	Low	**Low**
Medium Viewer Sensitivity Impacts (Vehicular Viewers)				
1, 3	0 – 0.5 miles (0-0.8 kilometer)	High	**Moderate**	Moderate
2	0 – 0.5 miles (0-0.8 kilometer)	Moderate	Low	**Low**
1, 2, 3	>0.5 – 1.5 miles (>0.8 to 2.4 kilometers)	Low	**Low**	Low

Table 11. Summary of Viewing Distances

Alternative	Distances	Distance from Proposed Action
1, 2, 3	**Immediate Foreground**	**0 – 0.5 miles** (0 – 0.8 kilometer)
1, 2, 3	**Foreground-Middleground**	**>0.5 – 1.5 miles** (>0.8 – 4 kilometers)

Table 12. Summary of Impact Levels

Alternative	Impact	Criteria
1, 3	**Moderate**	• The Proposed Action would be co-dominant within an area of Moderate Existing Visual Quality. • **The Proposed Action would introduce moderate contrast within 0 to 1.5 miles (0 to 2.4 kilometers) of medium viewer sensitivity.**
2	**Low**	• The Proposed Action would be co-dominant within an area of Low Existing Visual Quality. • **The Proposed Action would introduce weak contrast within 0 to 1.5 miles (0 to 2.4 kilometers) of medium viewer sensitivity.**

Conformance with typical viewer expectations were determined through comparison of visual contrast ratings from eight KOPs, evaluating three build alternatives. **Table 13** outlines typical viewer expectations and conformance of the Proposed Action. Criteria for consideration of mitigation are summarized by alternative in **Table 14.**

Table 13. Typical Viewer Expectation Benchmarks

Existing Visual Quality	Typical Viewer Expectations
Low	• Objective is to allow for activities that modify the existing character of the landscape. Changes in the landscape may attract attention of the viewer and dominate the visual setting. However, these activities should be minimized in all cases where conclusion does not result in net-positive visual changes to visual character. **As outlined in Section 5.0, implementation of the Proposed Action would introduce low to moderate contrasts within viewsheds possessing low existing visual quality. Visual changes, including the removal of existing buildings and mature vegetation, may attract attention but would not dominate the surrounding visual setting.**

Table 14. Summary of Mitigation Consideration Criteria

Alternative	Mitigation Considered	Criteria
1, 2, 3	**No**	• **The Proposed Action would have a moderate contrast within Low Existing Visual Quality** • **The Proposed Action would have a low contrast with Low Existing Visual Quality**

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6.0 MITIGATION MEASURES AND AVOIDANCE AND MINIMIZATION MEASURES

6.1 Mitigation Measures

Because implementation of the Proposed Action would not result in adverse impacts to visual resources, no mitigation measures are currently proposed. However, recommendations to help avoid and minimize potential visual effects are included in Section 6.2, Recommended Project Design Considerations.

6.2 Recommended Project Design Considerations

The following recommended project design considerations would further reduce the potential for adverse effects to viewers and existing visual resources. In assessing the potential impacts to nearby viewsheds, it was determined that all alternatives of the Proposed Action would have at least a "low" level of impact. **Table 15** summarizes these recommended design considerations.

Table 15. Recommended Visual Resource (VR) Project Design Considerations

VR-1	**Use BLM or equivalent environmental colors (Standard Environmental Colors, Color Chart CC-001, 2008) for surface coatings of permanent buildings, fences, gates, and other vertical structures to the extent practicable. Paint grouped structures the same color to reduce visual complexity and color contrast. This Project Design Consideration does not apply to PV surfaces.**
Effectiveness	This design consideration would reduce the visual contrast of vertical elements and site boundary fencing within the landscape.
VR-2	**Locate structures, roads, and other project elements as far from crossing roads, bike trails, and public gathering locations (linear KOPs) as possible. Where feasible, continue existing employment of landform alteration (berming) and vegetated screening to obstruct views along these view corridors.**
Effectiveness	This design consideration would reduce visual contrast by decreasing the apparent size and extent of structures, if not eliminating view accessibility.
VR-3	**Feather hard fence-line edges in the immediate foreground and foreground-middleground view distance zones from linear (roadway) and stationary (park) KOPs.**
Effectiveness	This design consideration would substantially reduce the visual contrast between hard edges and straight site boundary lines.
VR-4	**Materials and surface treatments of structures and land disturbances, including fencing, should repeat and/or blend with the existing form, line, color, and texture of the landscape and have little or no reflectivity (nonspecular). This measure does not apply to PV surfaces.**
Effectiveness	This design consideration would reduce line and form structure contrasts by blending structures with existing structures.
VR-5	**Minimize lighting at switchgear and inverters to the extent permitted by OSHA and force protection standards and down shield lights to reduce night glare and light pollution.**
Effectiveness	This design consideration would substantially reduce night-time visual contrasts by diminishing the effects of lighting on the night landscape.

BLM = Bureau of Land Management; KOP= Key Observation Point; OSHA = Occupational Safety and Health Administration; PV = photovoltaic.

7.0 REFERENCES

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