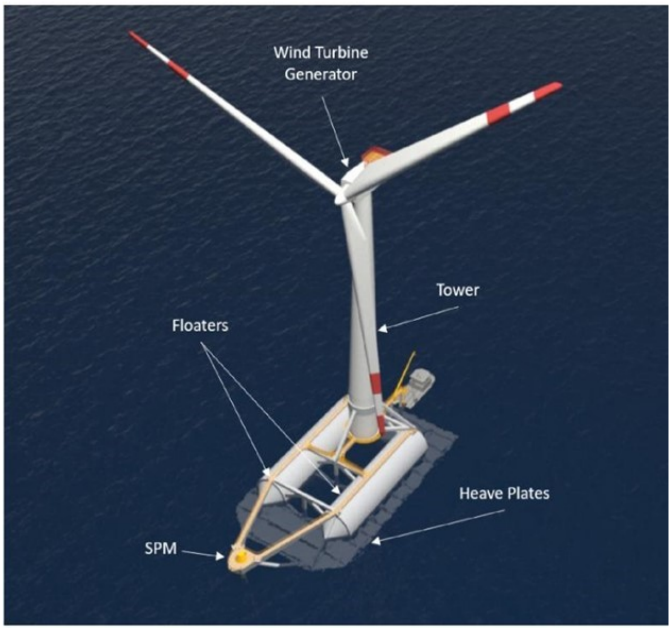
DRAFT

PRELIMINARY ENVIRONMENTAL ASSESSMENT

VANDENBERG OFFSHORE WIND ENERGY PROJECTS



July 2021

California State Lands Commission
100 Howe Avenue, Suite 100 South
Sacramento, CA 95825

The California State Lands Commission provides the people of California with effective stewardship of the lands, waterways, and resources entrusted to its care based on the principles of equity, sustainability, and resiliency, through preservation, restoration, enhancement, responsible economic development, and the promotion of public access.

DOCUMENT WEBSITE

https://www.slc.ca.gov/renewable-energy/offshore-wind-applications/

Geographic Location (center point of the offshore Project areas)

Latitude: N 34.59061535
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NAD83 Datum

Cover: Floating Wind Turbines - CADEMO SATH Floating Barge Technology (Left) and IDEOL Floating Wind Turbine courtesy of IDEOL V. Joncheray (Right)

EXECUTIVE SUMMARY

California State Lands Commission (CSLC) staff is currently in the early stages of information gathering for two lease applications for offshore wind energy projects in State waters, located in the Pacific Ocean offshore Vandenberg Space Force Base (VSFB), formerly named Vandenberg Air Force Base (VAFB), in western Santa Barbara County. The Preliminary Environmental Assessment (PEA) for the Vandenberg Offshore Wind Energy Projects (Project or Projects) is an early information document to assist with the upcoming formal California Environmental Quality Act (CEQA) process, including the Notice of Preparation and scoping for the Environmental Impact Report (EIR). The PEA is not intended to include the content and in-depth analysis of an Initial Study, but rather to serve as an early foundation of information to feed into the EIR process.

The PEA provides background information on offshore wind development in California as well as the purpose, goals, and site selection factors for the Projects provided by the Project proponents. The PEA also includes information on staff's early government consultation, tribal government outreach and consultation, and stakeholder outreach process and the feedback received during the process. CSLC staff determined that because floating offshore wind is a new technology that has not yet been deployed on the U.S. west coast, it should seek early engagement and input via a comprehensive public and tribal government consultation process, which included a series of virtual public outreach meetings with public agencies, tribal government representatives, and key stakeholder groups, to gather information about concerns, suggestions, and data sources for the preliminary environmental review of both Projects. CSLC staff used that information to prepare this PEA for the proposed Projects.

The two Project Applicants (or proponents) are CADEMO Corporation (CADEMO), a renewable energy development company, and IDEOL USA Inc. (IDEOL), a floating offshore wind technology company and project developer. CADEMO proposes to install and operate four offshore floating wind turbines (FWT) that would be moored and anchored to the seafloor. CADEMO proposes to examine the performance of two distinct floating foundation platforms (barge and tension-leg) with their FWTs. The boundary of the CADEMO's proposed lease area encompasses approximately 6.2 square miles. However, CADEMO estimates that with further site design and planning, a considerably smaller lease area could be possible, which would be evaluated further as part of an EIR process. According to the application, each wind turbine would be capable of producing 12 to 15 megawatts (MW) of renewable electricity. A combined maximum of 60 MW could be generated from the proposed four wind turbines, which would be connected in a series with electrical inter-array cables.

IDEOL proposes to engineer, construct, install, operate, and ultimately decommission a floating offshore wind electrical generation demonstration project. This proposed Project would consist of up to four floating Damping Pool ® barge concrete foundations moored to the seabed. Up to four offshore wind turbine generators would be installed on the floating foundations capable of producing up to 10 MW each. As proposed, the lease area would encompass approximately 5.2 square miles. Each FWT would be secured redundantly with six to eight mooring lines anchored to the seafloor. IDEOL is investigating two anchoring options for the proposed Project, including suction piles and drag embedment anchors. Medium-voltage electrical inter-array cables would connect the FWTs to one another.

Both Projects would have separate subsea static cables buried under the seafloor at a depth of approximately 5 feet from the southernmost wind turbine and connected to an onshore cable landing site connecting to proposed new electrical substations located south of Point Arguello within VSFB near the Vandenberg Dock. Each Project would have its own new substation. CADEMO proposes to construct a new onshore overhead transmission line for approximately 11 miles from the proposed new substation to the existing Surf Substation for connection to the California Independent System Operator (CAISO) power grid. IDEOL proposes constructing approximately 4.2 miles of new overhead transmission line connecting the proposed new substation to Substation N for electricity distribution to VSFB. IDEOL also proposes to connect to the CAISO power grid; additional information is required from IDEOL to determine the location and extent of additional infrastructure to connect to the CAISO system.

The PEA provides a preliminary description of both Projects with specific details of the wind turbine designs, sequencing of construction phases, operations and maintenance, and decommissioning. The PEA also includes a preliminary description of alternatives to the proposed Projects that are anticipated to be considered in an EIR for feasibility and further evaluation.

Based on the proposed descriptions of the Projects, CSLC conducted an initial assessment of potential environmental impacts to various affected resources in the Project areas, including the following:

- Aesthetics
- Air Quality and Greenhouse Gas Emissions
- Biological Resources – Marine
- Biological Resources – Terrestrial
- Cultural Resources
- Energy, Utilities, and Service Systems
- Geology, Soils, and Paleontological Resources
- Hazards and Hazardous Materials
- Hydrology, Water Quality, and Coastal Processes
- Land Use and Planning
- Noise
- Population and Housing
- Recreation
- Transportation

Each affected resource assessment includes a brief description of the environmental setting and identification of onshore and offshore Project components and potential impacts. These sections also provide a summary of the comments, suggestions, and concerns shared by participants in the focused outreach meetings and in written comments, information and data resources suggested by those participants, and a preliminary, qualitative assessment of the type and source of potential impacts on affected resources that would be analyzed in detail in an EIR.

CSLC staff believes that understanding how the proposed CADEMO and IDEOL Projects may affect communities and ocean users is a critical part of developing this early assessment. Further, the proposed Projects would be located within the geographic and cultural homelands of several California Native American Tribes who must be consulted pursuant to State law and the CSLC's adopted policy on Tribal Consultation. The final section of the PEA focuses on a preliminary assessment of considerations relating to communities and ocean users whose livelihoods and sense of social equity could be affected by the proposed Projects, including commercial and recreational fishermen, Tribes with cultural and geographic affiliation to the Project areas, and disadvantaged or vulnerable residents.

CSLC staff will continue to work with the Project proponents and engage with stakeholders and Tribes as evaluation of the Projects continues and through the CEQA process.

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TABLE OF CONTENTS

APPENDICES

LIST OF TABLES

LIST OF FIGURES

LIST OF ABBREVIATIONS AND ACRONYMS

A	ACSF	Alliance of Communities for Sustainable Fisheries
	AHTV	Anchor Handling Tug Vessel
	AHV	Anchor Handling Vessel
	APCD	Air Pollution Control District
B	BMP	Best Management Practices
	BOEM	Bureau of Ocean Energy Management
C	CARB	California Air Resources Board
	CAISO	California Independent Service Operator
	CAAQS	California Ambient Air Quality Standards
	CCC	California Coastal Commission
	CDFW	California Department of Fish and Wildlife
	CEQA	California Environmental Quality Act
	CES	Civil Engineering
	CHNMS	Chumash Heritage National Marine Sanctuary
	CLV	Cable Laying Vessel
	CSLC	California State Lands Commission
D	DoD	Department of Defense
E	EIR	Environmental Impact Report
	EFH	Essential Fish Habitat
	EJ	Environmental Justice
	EMF	Electromagnetic Field
	ENGO	Environmental and Non-Governmental Organizations
	FESA	Federal Endangered Species Act
F	FID	Final Investment Decision
	FSS	Floating Submersible Structure
	FWT	Floating Wind Turbine
G	GHG	Greenhouse Gas
	GW	Gigawatts
H	HDD	Horizontal Directional Drill
	HDPE	High Density Polyethylene
	HWMP	Hazardous Waste Management Plan
I	IAC	Inter-Array Cable
	IBAs	Important Bird Areas
K	kV	Kilovolt
M	m	Meter
	MMPA	Marine Mammal Protection Act

	MPA	Marine Protected Areas
	MW	Megawatts
	MVA	Megavolt Amperes
N	NAHC	Native American Heritage Commission
	NAAQS	National Ambient Air Quality Standards
	NCA	Noise Control Act
	NCTC	Northern Chumash Tribal Council
	NEPA	National Environmental Policy Act
	NGO	Non-Governmental Organizations
	nm	Nautical Mile
	NMFS	National Marine Fisheries Service
	NOAA	National Oceanic and Atmospheric Administration
	NREL	Non-Renewable Energy Laboratory
O	OCS	Outer Continental Shelf
P	PEA	Preliminary Environmental Assessment
	PG&E	Pacific Gas & Electric
R	ROV	Remotely Operated Vehicle
S	SATH	Swing Around Twin Hull
	SBM	Single Buoy Moorings
	SCADA	Supervisory Control and Data Acquisition
	SCHMMP	Spill Contingency and Hazardous Materials Management Plan
	SKS	Station Keeping System
	SPM	Single Point Mooring
T	TLP	Tension-Leg Platform
U	UPRR	Union Pacific Railroad
	USACE	U.S. Army Corps of Engineers
	USCG	U.S. Coast Guard
	USEPA	U.S. Environmental Protection Agency
	USFWS	U.S. Fish and Wildlife Service
V	VAFB	Vandenberg Air Force Base
	VSFB	Vandenberg Space Force Base
	VSMR	Vandenberg State Marine Reserve
W	WTG	Wind Turbine Generators

GLOSSARY OF TECHNICAL TERMS

Alternating current (AC): A type of electrical current, in which the direction of the flow of electrons switches back and forth at regular intervals or cycles.

Barge: A large, flat boat that can transport heavy goods over water.

Bollard Pull: A measure of the pulling power of a vessel, similar to the horsepower rating of conventional vehicle engines. The capacity of tugs is measured by their rated Bollard Pull.

Cable laying vessel: A seagoing vessel specially designed to lay underwater cables (telecommunications, electric power).

Capacity: The rated continuous load-carrying ability of generation, transmission or other electrical equipment, expressed in megawatts (MW) for active power or megavolt-amperes (MVA) for apparent power.

Direct current (DC): A type of electrical current which flows consistently in one direction.

Drag embedment anchor: An anchor that derive their holding capacity from being buried, or embedded, deep within the seabed with their anchoring capacity being directly related to embedment depth. Drag embedment anchors are a desirable option for moorings in deep waters due to their relatively low installation cost and high holding capacity even in soft clays.

Efficiency: The ratio of energy output to energy input in a device.

Final investment decisions (FID): The point in the capital project planning process when the decision to make major financial commitments is taken.

Floating foundation: A buoyant foundation structure anchored to the seabed via mooring lines. The term includes several foundation types including spar buoys, tension-leg platforms and semi-submersibles.

Floating wind turbine (FWT): An offshore wind turbine mounted on a floating structure moored to the seafloor. FWTs allows the turbine to generate electricity in deep water depths where fixed-foundation turbines are not feasible.

Fully post-tensioned: A method of reinforcing (strengthening) concrete or other materials with high-strength steel strands, typically referred to as rebar.

Gen-tie line (generator-tie-line): A component of a transmission system connecting one generator to a single point on the grid.

Heave plates: Structural components of a floating structure whose primary purpose is to increase damping and added mass in heave or pitch direction.

Horizontal directional drilling (HDD): Trenchless method of installing underground utilities such as pipe, conduit, or cables in a relatively shallow arc or radius along a prescribed underground path using a surface-launched drilling rig.

Hub: The rotating component of the wind turbine to which the rotor blades are fixed.

Hub height: The height of the rotor axis above the ground.

Inter-array cable: Electrical cables that connect to each floating wind turbine.

Interconnection: Transmission link (such as a tie line or transformer), which connects two control areas.

Lazy wave shape/configuration: The shape of a lazy wave riser is a combination of top angle, sag bend elevation, arch bend elevation and buoyancy length from the hang off point.

Monopile tower: A type of foundation with a cylindrical tube (normally steel) that is normally driven tens of meters into the seabed, although it can also be inserted into pre-drilled holes. This type of foundation does not use any mooring lines to anchor the tower.

Mooring systems: Equipment that hold floating wind turbines in place against the forces of waves, wind and currents. A mooring system is made up of a mooring line, anchor and connectors, and is used to hold a ship or floating platform in place in all water depths.

Nautical mile: A unit for measuring distance based on the circumference of the earth and equal to one minute of latitude. It is slightly more than a statute mile (1 nautical mile = 1.1508 statute miles). Nautical miles are used for charting and navigating.

Saitec offshore technologies (SATH): A concrete floating platform consisting of two cylindrical and horizontal hulls with conical edges link to each other through bar-frame structures.

Semi-submersible barge: A particular type of floating vessel that is supported primarily on large pontoon-like structures submerged below the sea surface.

Spar-buoy foundation: A cylinder with low water plane area, ballasted to keep the center of gravity below the center of buoyancy.

Static cable: The section of the electric cable laying on the seabed connecting and exporting electricity from the offshore wind farm to the onshore substation.

Station keeping system: A system keeping the floating offshore wind turbines stationary in their locations. The catenary shape (has a U-like shape) and the weight of ground chain provides the station-keeping function and keeps the floating offshore wind turbine at its location. The catenary mooring leg has the ground chain resting on the seafloor that provides the restoring forces when getting lifted by the vessel motion or offset.

Substation (offshore): An offshore structure used to transform and transfer the energy collected by the wind turbines to land in the most efficient manner.

Substation (onshore): An onshore structure which is a part of an electrical generation, transmission, and distribution system. The main task of onshore substation is to adjust electricity to the appropriate voltage before joining the power grid.

Suction pile/bucket/caisson/anchor: A form of fixed platform anchor in the form of an open bottomed tube embedded in the sediment and sealed at the top while in use so that lifting forces generate a pressure differential which holds the caisson down.

Tension-leg platform: A vertically moored floating structure used for the offshore wind turbines. The platform is permanently moored by means of tethers or tendons grouped at each of the structure's corners. A group of tethers is called a tension leg.

Transformer: Electrical equipment used to increase or decrease the voltage of an electrical signal. Most turbines have a dedicated transformer to step up their voltage output to the grid voltage.

Turbine lifetime: The expected total lifetime of the turbine (typically 25-30 years).

Utility: A company which supplies electricity to end users, such as residential, industrial, and commercial entities.

Vertical loaded anchor: A type of anchor, essentially a drag embedment anchor, which is free to rotate about the fluke-shank connection allowing the anchor to withstand both vertical and horizontal loading. Unlike drag embedment anchors, mooring lines may be in taut-moored configuration.

Wind turbine generator: A device that captures the force of the wind to provide rotational motion to produce power with an alternator or generator.

Wind turbine: A machine that captures the force of the wind. It is called a wind generator when it is used to produce electricity and is called a windmill when used to crush grain or pump water.

1.0 PURPOSE OF REPORT

California State Lands Commission (CSLC) staff is currently in the early stages of information gathering for two lease applications for offshore wind energy Projects in State waters, located in the Pacific Ocean offshore Vandenberg Space Force Base (VSFB), formerly named Vandenberg Air Force Base (VAFB),[1] in western Santa Barbara County. This Preliminary Environmental Assessment (PEA) for the Vandenberg Offshore Wind Energy Projects (Project or Projects) is an early information document to assist with the formal California Environmental Quality Act (CEQA) process, including the Notice of Preparation and scoping for an Environmental Impact Report (EIR). The PEA is not intended to include the content and in-depth analysis of an Initial Study, but rather to serve as an early foundation of information to feed into the EIR process. Given the conceptual similarities of the two proposed Projects, CSLC staff has prepared one PEA for both Projects. Staff also anticipates preparing one EIR for both Projects.

1.1 SCOPE OF REPORT

The PEA includes the following sections:

- **Section 2, Introduction,** provides background information on offshore wind development in California as well as purpose, goals and site selection factors for the Projects provided by the Project proponents. Section 2 also includes information on CSLC staff's early government consultation and stakeholder outreach process and the feedback received during this process and lists the required regulatory approvals for the Projects.
- **Section 3, Description of the Two Proposed Projects,** provides a preliminary description of the proposed Projects based on information provided by both Project proponents in their applications to CSLC and additional requested information. The description of both Projects includes sequencing of construction phases, operations and maintenance, and decommissioning. Section 3 also includes a preliminary description of alternatives to the proposed Projects that are anticipated to be considered in the EIR for feasibility and further evaluation.
- **Section 4, Assessment of Potential Environmental Impacts,** provides a summary of the comments, suggestions, and concerns shared by participants in the focused meetings and in submitted comments, information and data resources suggested by those participants, and a preliminary, qualitative assessment of the type and source of potential impacts on affected resources that would be analyzed in detail in the EIR. Each affected resource includes a brief description of the environmental setting and identification of onshore and offshore Project components and potential impacts.

[1] Because of this recent name change, this document uses both names interchangeably.

- **Section 5, Commercial and Recreational Fishing, Tribal Consultation and Tribal Cultural Resources, and Environmental Justice,** provides a description and preliminary assessment of considerations relating to communities and ocean users whose livelihoods and sense of social equity could be affected, including commercial and recreational fishermen,[2] Tribes with cultural and geographic affiliation to the Project areas, and disadvantaged or vulnerable residents subject to the CSLC Environmental Justice Policy. The EIR for both Projects would include a comprehensive description and analysis of these topics.

[2] During focused outreach, participants from the commercial fishing sector indicated their preference for the term "fishermen" rather than "fishers" or "fisherpersons." Additionally, this term is consistent with that used by federal agencies such as the National Oceanic and Atmospheric Administration (NOAA) as well as organizations including the Pacific Fisheries Management Council (PFMC) and the Responsible Offshore Development Alliance (RODA). The term "fishermen" as used in this document is intended to be inclusive of all genders.

2.0 INTRODUCTION

2.1 OFFSHORE WIND DEVELOPMENT IN CALIFORNIA

2.1.1 Climate Change and California's Renewable Energy Goals

California, along with the rest of the world, is in the midst of a climate crisis due to industrialization and a dependence on fossil fuels. This discussion provides an overview of the ever-increasing threats posed by climate change-driven effects along the coast and in the marine environment and the State's ambitious efforts to change how we generate, deliver, and consume energy.

Climate Change and Sea-Level Rise

Climate change and sea-level rise accelerate and exacerbate natural coastal processes, such as the intensity and frequency of storms, erosion and sediment transport, currents, wave action, and ocean chemistry. Sea-level rise is driven by the melting of polar ice caps and land ice, as well as thermal expansion of sea water. Sea-level rise projections vary regionally and are a function of different greenhouse gas emissions scenarios, rates of ice melt, and local vertical land movement. Along the Central Coast of California, there could be 0.7 foot of sea-level rise by 2030, 1.2 feet by 2040, 1.8 feet by 2050, and 6.7 feet by 2100 under a conservative projection approach based on both current emission trajectories and local information based on the Port San Luis tide gauge.[3] Along with higher sea levels, winter storms of greater intensity and frequency resulting from climate change will further affect coastal areas. Beaches, coastal landscapes, and near-coastal riverine areas exposed to increased wave force, run up, and total water levels potentially could erode more quickly than before. Recent projections by the U.S. Geological Survey indicate that without human intervention, up to two-thirds of the State's beaches could be lost to climate-related erosion by 2100 under a 3 to 6.5 feet sea-level rise scenario (Vitousek et al. 2017). In addition, bluff erosion and collapse threaten critical infrastructure including pipes and roads, cause homes to become uninhabitable, and could cause injury or death to users of the coast.

Renewable energy facilities such as the proposed offshore wind Projects discussed in this report may help the State reduce greenhouse gas emissions and achieve climate stabilization.

<u>State Renewable Energy Goals, Policy, and Law</u>

The State's landmark 2006 Global Warming Solutions Act required the State to reduce greenhouse gas emissions to 1990 levels by 2020 (Assembly Bill 32, Nunez). The State

[3] Based on approach to estimating scenarios in the State of California Sea-Level Rise Guidance (Ocean Protection Council 2018)

met this target in 2016, 4 years early, but the need for additional action was clear. The last 5 years has seen a flurry of legislative and policy activities, including an update to the Global Warming Solutions Act in 2016 that set a new emission reduction target of 40 percent below 1990 levels by 2030 (Senate Bill 32, Pavley). Along with the emissions reduction legislation, Senate Bill 100 (SB 100, De León), the 100 Percent Clean Energy Act of 2018, requires 100 percent of energy procured by the State to come from eligible renewable energy and zero-carbon resources by the end of 2045. It is estimated that the production of new solar and wind facilities in California must triple in order to meet SB 100 goals, and battery storage must increase by nearly eightfold (SB 100 Joint Agency Report). Achieving these ambitious but necessary climate stabilization goals will require focused action to move the State's energy system away from fossil fuels and towards a more expanded use of clean renewable energy resources. Advancements in wind and wave energy, solar power, and battery storage capabilities have made "green" and "blue" economic possibilities more viable and productive, but the pace of deployment and grid-connected installations must accelerate for the State to achieve the SB 100 requirement on time.

Offshore wind could provide a significant contribution to a clean, affordable, and secure energy mix in California. Studies by the National Renewable Energy Laboratory (NREL) estimate that California has the potential to provide 112 gigawatts (GW) of power (i.e., 150 percent of the State's electricity demand) from offshore wind sources. Offshore wind can complement solar technology, as wind power ramps up in the afternoon when solar ramps down. Additionally, offshore wind is generally stronger and more consistent than onshore wind. In addition to helping California reach its renewable energy goals, offshore wind could support more than 18,000 new jobs in California by 2050 (National Renewable Energy Laboratory 2016). As of June 2021, there are no offshore wind developments in California waters or federal waters off the U.S. West Coast, but it is clear that California will not meet its renewable energy goals without development of offshore wind capacity. By harnessing the power of offshore wind, California can work towards its goals of clean and reliable energy and can continue to be a global leader in addressing climate change.

2.1.2 Offshore Wind Development: Federal Call Areas and State Applications

Federal Call Areas

The Bureau of Ocean Energy Management (BOEM) manages the development of energy and mineral resources on the U.S. Outer Continental Shelf (OCS). BOEM's area of authority extends from 3 nautical miles (nm) offshore the nation's coastline to the outer boundary of the U.S. Exclusive Economic Zone 200 nm offshore. Boundaries of any National Park, National Marine Sanctuary, National Wildlife Refuge (or associated system), or National Monument are excluded from BOEM's jurisdiction. As of June 2021, Block Island Wind Farm, which became operational in 2016, is the only operating commercial offshore wind farm in the U.S. This project produces 30 megawatts (MW) of electricity from six turbines located off the coast of Rhode Island. In addition to the Block Island Wind Farm, a two-turbine pilot project, the Coastal Virginia Offshore Wind pilot project, went into operation in late 2020 generating 12 MW of electricity off the coast of Virginia Beach. BOEM currently has 16 additional OCS leases for offshore wind installations along the U.S. Atlantic Coast spanning from Massachusetts to North Carolina. These Projects are all in various stages of the permitting process. Thirteen are in the Construction and Operations planning stage and three are in the Site Assessment plan stage. BOEM currently has only one OCS lease along the U.S. Pacific Coast for a wave energy project offshore of Oregon (BOEM 2021).

To guide the development of offshore wind on the U.S. Pacific Coast, BOEM established the BOEM-California Intergovernmental Renewable Energy Task Force in October 2016. The Task Force is a partnership between members of State, local, and tribal governments, and federal agencies. The primary objective of this group is to facilitate decision-making and gather information for areas potentially suitable for offshore renewable energy (specifically offshore wind) in federal waters off California. In 2018, BOEM solicited interest (also known as a Call for Information and Nominations [Call]) from wind developers for commercial offshore wind development in three areas off the California coast. These "Call Areas" included locations offshore Morro Bay and Diablo Canyon in central California and an area off the coast of Humboldt in Northern California.

In May 2021, the Biden Administration announced plans to allow commercial offshore wind farms in the Morro Bay and Humboldt Call Areas. These sites have an estimated potential to produce 4.6 GW of electricity, enough to power 1.6 million homes. In the coming months, BOEM will identify specific locations within the Call Areas as potential Wind Energy Areas and will begin environmental analyses; potential leases could be available for auction as early as mid-2022 (Department of Interior Press Release, May 2021).

State Applications

California's process for leasing of State-owned (sovereign) lands for offshore wind Projects and installations is completely independent from BOEM's federal process for offshore wind solicitation and leasing. The CSLC manages approximately four million acres of tide and submerged lands, which includes the beds of natural and navigable rivers, streams, lakes, bays, estuaries, inlets, and straits from the mean high-tide line to 3 nm offshore (sovereign land). The CSLC manages these lands in trust for the people of California and has authority to issue leases or permits for uses of sovereign land that are consistent with the common law Public Trust Doctrine, including but not limited to water-related commerce, navigation, fishing, conservation, and recreation. Leasing sovereign land for offshore wind development falls under CSLC's jurisdiction.

In 2019, the CSLC received two lease applications for use of State sovereign land for offshore wind installations. The proposed lease areas are located in State waters within 3 nm of the coast and are for small-scale projects with low energy generation capacity. While the Applicants describe their proposals as “demonstration” and “pilot” type installations, these applications are not prerequisites to any future, larger-scale Projects and are unrelated to the BOEM federal leasing process, which is moving forward independently.

2.2 BACKGROUND

2.2.1 Proponents Purpose, Goals, and Objectives of the Projects

Applicant: CADEMO Corporation (CADEMO)

CADEMO, a renewable energy development company, has applied for a General Lease – Industrial Use of State sovereign land under CSLC’s jurisdiction to develop an offshore wind demonstration project known as the CADEMO Floating Wind Energy Demonstration Project (CADEMO Project).

The CADEMO Project, described in detail in Section 3, is proposed to be located in State waters approximately 2.5 nm off the coast of VSFB, Santa Barbara County. According to CADEMO’s application No. A2222 submitted on August 23, 2019, the CADEMO Project would install four floating wind turbines with individual capability of generating 12 to 15 MW of renewable electricity. The proposed four offshore wind platforms include two different floating foundation designs to help evaluate the performance of each design in State waters.

CADEMO’s Project goals and objectives, as described by the Applicant, are as follows:

- Provide a facility to demonstrate new models of floating offshore wind technology, which would be used to generate clean electricity from renewable wind energy. As the first of its kind, this demonstration project could prepare local industry for competitive readiness and launch the creation of new jobs. The Project would enable CADEMO to validate the following processes and components of the wind turbine technology:
  - Assembly processes
  - Turbine and floating foundation performance
  - Load simulation models
  - Offshore installation processes
  - Tooling and equipment specifically designed for turbines and foundations
  - Local supply chain development
  - Maintenance and servicing arrangements
- Optimize the design of floating wind arrays to reduce costs for large-scale floating offshore wind developments on the U.S. West Coast.

- Contribute to the accelerated development of the California offshore wind industry by being a pathfinder project in piloting the permitting and authorization process with the regulatory agencies for offshore wind development in the State. The Project would provide an opportunity for State policy makers and regulatory authorities to consider potential short- and long-term impacts to sensitive environmental habitats, historical and cultural landscapes, the commercial fishing industry, and existing maritime users.
- Contribute to the knowledge of how floating wind interacts with local interests—such as the U.S. Department of Defense (DoD), the local fishing industry, and other marine users—to understand the benefits and challenges of floating offshore wind in the California environment and potentially identify practical solutions to not only address these issues, but also to potentially enhance the local environment and maritime resources for other users.
- Provide a research platform to understand the interactions of floating offshore wind with the California natural environment.
- Identify and maximize the potential opportunities and benefits to the local California supply chain and employment opportunities, including port infrastructure, professional services, technology maintenance and operations, and maritime logistics.

The Applicant additionally states several benefits of the CADEMO Project, which cover four areas:

- **Technical benefits**, which include providing a facility to demonstrate new models of floating offshore wind at a scale greater than 12 MW, which has not been done anywhere else in the world to date.
- **Environmental benefits**, which include identifying, monitoring, and addressing environmental issues related to floating offshore wind that are of concern in California. This would create opportunities to: (1) document species interactions and behavior around floating wind turbines; and (2) deploy, test, and validate methodologies and equipment to undertake long-term monitoring and mitigate or eliminate impacts.
- **Economic benefits**, which include evaluating and preparing the California economy for commercial scale floating offshore wind. This would result in: (1) grid stability and resiliency through the delivery of 60 MW of energy; (2) work force development through job creation and training; (3) assessment of the local supply chain preparedness for future, large-scale BOEM offshore wind Projects; and (4) evaluation of floating offshore wind impacts on fishing through the identification of radar and navigation risks, exclusion or encroachment issues, and cable safety issues.
- **Social benefits**, which include identifying, understanding, and socializing the concept of floating offshore wind. This would: (1) enable the identification and validation of key stakeholder issues on the U.S. West Coast; (2) confirm the

potential for offshore wind to contribute to SB 100 goals; and (3) test the concept of decentralized supply in a vulnerable area.

A copy of CADEMO's research and demonstration goals are provided in Appendix A.

Applicant: IDEOL USA Inc. (IDEOL)

IDEOL, a floating offshore wind technology company and project developer, has applied for a General Lease – Commercial Use of sovereign land under CSLC jurisdiction to construct, operate, and ultimately decommission a floating offshore wind electrical generation pilot project (IDEOL Project).

The IDEOL Project, described in detail in Section 3, is proposed to be located in State waters approximately 2.5 nm off the coast of VSFB, Santa Barbara County. According to IDEOL's lease application No. A2181 submitted on July 23, 2019, the IDEOL Project would install four floating wind turbines capable of generating a net 40 MW of renewable electricity to serve a combination of VSFB and California ratepayers. According to IDEOL, it would also serve a research and development function for the State of California, the University of California and California State University systems, local community college systems, and non-governmental organizations (NGO).

IDEOL's Project goals and objectives, as described in its application, are as follows:

- Provide energy security and resiliency to VSFB in support of the missions of the 30th Space Wing and the Air Force Space Command to, respectively, "provide robust, relevant, and efficient spaceport and range capabilities for the nation," and to "provide resilient and affordable space capabilities for the Air Force, Joint Force, and the nation." According to IDEOL, 20 MW of renewable electricity could be provided to VSFB by the proposed Project.
- Serve as a test facility for multiple branches of the DoD in their evaluation of the potential impacts of future commercial-scale offshore wind facilities on their unique missions, and more broadly on military operations and readiness along the U.S. West Coast.[4]
- Assist the State of California in reaching its renewable energy generation mandate under SB 100 of 60 percent by 2030 and 100 percent by 2045, both by generating renewable electricity, and by serving as a proof-of-concept for future commercial-scale offshore wind facilities along the U.S. West Coast. According to IDEOL, 18-20 MW of renewable electricity could be provided to the California Independent Service Operator (CAISO) power grid with additional infrastructure for connection to the CAISO system.

[4] While IDEOL has stated this goal, DoD is currently working with IDEOL on finalizing an executed mitigation agreement and considers this goal to be premature but a potential future facility for possible studies.

- Help alleviate California's over-generation and ramping challenges posed by the solar energy generation profile. Daily solar generation decreases in the evening when electricity demand increases (known as the "duck curve"); however, winds are generally stable throughout the day and night offshore, so development of offshore wind facilities can complement solar generation and reduce the need for coal and natural gas derived electricity to fill the demand gap left by solar generation variability.
- Provide an opportunity for scientific and environmental data collection and research opportunities for public research institutions, including research to advance the fields of conservation biology, meteorology, oceanography, military operations, and renewable energy generation.
- Demonstrate the employment transition opportunity in developing floating wind for California's offshore oil and gas industry employees as well as employees from coastal power plant retirements.
- Create living-wage jobs for Californians, including:
  - Direct job creation with up to 150 temporary (during construction) and 12 permanent (long-term) jobs.
  - Indirect job creation with up to an estimated 445 indirect jobs, including turbine and supply chain jobs.
  - Use of up to 95 percent locally sourced materials, equipment, and service providers during Project construction and operation (excluding turbines).

2.2.2 Site Selection by the Project Proponents

CADEMO and IDEOL considered the following information in their site selection processes.

CADEMO

In June 2021, CADEMO provided staff with a comprehensive report titled "CADEMO Siting Factors Report" (Appendix A). In this report, CADEMO provides details on the analysis conducted to address the special requirements of a demonstration scale project in California. The report highlights the siting criteria and major constraints of potential locations along the California Coast. The proposed Project sites were based on the following objectives:

1. Consistent with the needs of a technology, environmental, and economic demonstration project
2. A minimum average wind speed of 7.5 meters/second at a height of 90 meters above sea level and minimum ocean depth of 50 meters
3. Located within feasible distance of an electrical grid connection substation
4. Avoids sensitive biological resource areas to the extent practicable
5. Avoids conflicts with other land and sea uses to the extent practicable

In the report, CADEMO concludes "that the identification of the CADEMO Project site off Point Arguello is most consistent with the siting criteria and project objective." In its siting analysis, CADEMO considers the aforementioned siting objectives, conducted regional suitability and siting suitability analysis, and evaluated five different areas along the entire California coastline. Upon reaching the conclusion that the Point Arguello site is the only suitable site, CADEMO conducted additional site selection within the Point Arguello region. Factors such as availability of areas around Platform Irene and VSFB outside of designated protected areas, offshore seabed profile, proximity to grid connection, and available environmental information gathered as part of the CalWave project (see Davy et al. 2017) were all important factors in the final site selection. The preferred location was selected on the following basis:

- The most favorable location for wind resource and yield (i.e., highest wind)
- Few environmental constraints (avoids activities within the Vandenberg State Marine Reserve)
- Favorable geotechnical and seabed conditions for mooring design
- Avoids areas of high coastal population and minimizes visual intrusion.

These assessments led to the selection of a lease area for the proposed demonstration Project which formed the basis for a lease and geotechnical survey permit application to the CSLC.

IDEOL

IDEOL states that "the project site encompasses an offshore location for a floating offshore wind electrical generation facility in consultation with VSFB and the DoD. Alternative sites are not being considered by VSFB or DoD." The layout of the offshore array included consideration of the following factors:

- The number of floating wind turbines to be installed
- The site-specific metocean (wind, wave, climate) data
- The site's water depth
- Other possible environmental considerations

According to IDEOL, the proposed location and layout of the floating wind turbines (FWTs) are based on current discussions with the DoD and the Federal Aviation Administration (see Section 2.4.2).

2.3 EARLY CONSULTATION/SCOPING PROCESS AND ASSESSMENT OF ENVIRONMENTAL IMPACTS

2.3.1 Process for California Environmental Quality Act and Early Consultation/ Scoping

Both offshore wind Project applications will require preparation of an EIR for compliance with the CEQA. The CSLC is the State lead agency for preparation of an EIR for the proposed Projects. Guided by Section 15083 of the State CEQA Guidelines, CSLC staff determined that because offshore wind is a new technology and has not been deployed on the west coast, it should seek meaningful early engagement and input via an early public consultation process, which included a series of virtual public outreach meetings with public agencies and key stakeholder groups, to gather information about concerns, suggestions, and data sources for the preliminary environmental review of both Projects. CSLC staff used that information to prepare this document, a Preliminary Environmental Assessment (PEA) of the proposed Projects, based on the preliminary descriptions of both Projects and initial stakeholder information gathered thus far. The PEA is intended to guide the Notice of Preparation scoping process for the EIR. Sections 2.3.2, 2.3.3, and 2.3.4 provide additional information on the stakeholder outreach process.

2.3.2 Stakeholder Outreach

As part of its review of the CADEMO and IDEOL lease applications, CSLC staff engaged in an early public consultation/scoping process. Staff conducted six virtual stakeholder outreach meetings between December 2020 and April 2021.

Staff held its first virtual "general" stakeholder outreach webinar on December 8, 2020. This session included a large and diverse group of stakeholders with an interest in the proposed offshore wind Projects. Over 170 individuals attended this webinar, representing elected officials, State and federal agencies, Tribes, environmental groups, academia, building industry and workforce, fisheries, and ports. The webinar was recorded and posted on CSLC's website for review by all interested parties. A copy of staff's PowerPoint presentation was also posted on the web site.

Staff held five additional "focused" stakeholder outreach meetings during February, March, and April 2021. These virtual meetings were held with four targeted groups:

- **Federal, State, and Regional Agencies** – This session was held on February 3, 2021. More than 20 representatives from federal and State agencies attended and provided valuable feedback for the PEA.
- **Local Agencies, Elected Officials, and Ports** – This session was held on March 2, 2021. More than 10 representatives were present. On May 27, 2020, a specific outreach meeting was held with representatives from the Port of Hueneme**.**

- **Environmental and Non-Governmental Organizations (ENGOs)** – This session was held on March 9, 2021. More than 27 participants from various environmental organizations attended this meeting.
- **Commercial and Recreational Fisheries** – Two separate sessions were held on March 24 and April 1, 2021, and altogether, 67 representatives attended these two sessions.

Appendix B lists the participating organizations in CSLC's outreach sessions. In addition to these representatives, many individual community members who did not identify with a particular organization or government agency attended the sessions but are not included in Appendix B. Staff continues to receive feedback, informational materials, and data from meeting attendees and other interested parties. Staff also continues to respond to questions raised by members of the public and attendees of the outreach sessions.

2.3.3 Tribal Outreach

In January 2021, CSLC staff sent letters to local culturally affiliated Tribal Nations notifying them of the applications and inviting them to engage in government-to-government Consultation. Three Tribes responded to these letters, and individual government-to-government Consultation meetings were held in April (see Section 5.2, *Tribal Consultation and Tribal Cultural Resources*). These Tribal Consultations were held individually and were not part of the "stakeholder outreach" meetings. Comments and concerns raised during Consultations include the sensitivity of the area to whales and other marine mammals, the significance of the Project area to cultural practice and spirituality, the presence of significant cultural resource sites in the onshore Project area, and potential conflict with the proposed Chumash Heritage National Marine Sanctuary. Consultation with these Tribes is expected to continue throughout the scoping and evaluation of the applications. In the coming months, additional outreach and engagement meetings will be scheduled for interested Tribes who did not request individual Consultation. Environmental Justice outreach is also currently underway (see Section 5.3, *Environmental Justice*, for further information).

2.3.4 Summary of Comments from Stakeholder Outreach Meetings

The following tables provide a summary of comments received during the stakeholder outreach meetings and other comments submitted. Appendix B provides all the written comments from various agencies, ENGOs, and fisheries groups. Table 2-1 includes a summary of comments from State, federal, regional, and local agencies, elected officials, and ports (collectively Agencies and Ports); Table 2-2 includes a summary of comments from ENGOs; and Table 2-3 includes a summary of comments from commercial and recreational fisheries groups. The tables are presented by major themes followed by specific comments.

Table 2-1. Summary of Comments from Agencies and Ports

Aesthetics	Some agencies are concerned about protecting visual resources and views of the ocean, which is an important component of California's coastal resources.
Impacts on marine resources and supported habitats	Several agencies express concerns about impacts on marine resources and their supported habitats, especially those protected under specific statutes: ○ Federal and State Endangered Species Acts ○ Marine Mammal Protection Act ○ Magnuson-Stevens Fisheries Conservation and Management Act ○ Fisheries Management Plans ○ Fish and Wildlife Coordination Act ○ Reorganization Plan No. 4 of 1970 **Collision and entanglement** ○ Agencies bring up concerns about collision and entanglement of species with Project vessels, floating wind turbines, mooring systems, or transmission lines. ○ There is also a concern about secondary entanglement resulting from fishing gear becoming entangled in mooring systems and transmission lines. ○ Additionally, concerns have been raised about sea bird and bat collisions with turbine rotor blades. **Noise impacts** ○ Agencies express concern over the impacts of noise from equipment and transmission lines on marine life—especially marine mammals—which could cause stress, hearing loss, or interfere with communication or predator/prey detection. **Impacts on Essential Fish Habitat** ○ Some agencies point out potential impacts on Essential Fish Habitat supporting managed species, such as alterations to sediment transport or currents, which could affect distribution and abundance of fish populations, and mooring devices dragging on the seafloor, which could potentially destroy benthic hard-bottom habitats.

Table 2-1. Summary of Comments from Agencies and Ports

	Impacts of electromagnetic fields ○ Some agencies point out potential impacts of electromagnetic fields on marine life, which could result in behavioral changes induced by attraction to or repulsion of electromagnetic fields. **Aquatic pollution** ○ Some agencies are concerned about potential aquatic pollution from spills and debris that may come from Project vessels. **Impacts on ocean circulation patterns and currents** ○ Some agencies point out the potential for these Projects to alter ocean circulation patterns and currents, which could affect sedimentation and larval transport in the area. **Acknowledgement that underwater infrastructure may act as fish aggregating devices** ○ Some agencies point out that floating foundations and mooring systems may act as artificial reefs where hard habitat is normally absent, recruiting invertebrates and attracting fish. ○ Fish aggregation around floating foundations could lead to altered fish migration routes and increased risk of capture by fishermen. ○ Hard substrate provided by floating foundations could also allow for invasive species to settle.
Impacts on onshore biological and water resources	**Impacts on vegetation and sensitive plant species** ○ There are concerns about the effects of floating wind turbines on downwind atmospheric conditions and weather patterns (e.g., temperature and fog), which are essential for coastal vegetation in the region. ○ Impacts on stream and riparian resources ○ Project construction could lead to changes in drainage patterns, runoff, and sedimentation, which could affect aquatic, riparian, and wetland habitats. **Impacts on the quantity and quality of water** ○ Some agencies would like to ensure that water pollution during construction is minimized and that water resources remain accessible to the public for enjoyment. ○ There is a concern about water availability if groundwater extraction will be needed for the Projects.
Impacts on commercial and recreational fisheries	○ Several agencies raise concerns about the environmental impacts on fisheries-dependent resources and ecosystems. ○ There are also concerns about the impacts of additional closed areas, which could further displace fishing activities and exacerbate fishing impacts on areas that remain open. ○ Some agencies raised concerns about navigational hazards for fishermen as they try to navigate around or in between floating wind turbines, and the loss of fishing gear from snagging on Project infrastructure.

Table 2-1. Summary of Comments from Agencies and Ports

	o Many of these direct impacts to fishermen could lead to indirect impacts on local fishing communities, who rely on the industry for economic stability. o All agencies emphasize the need to engage the fishing community early and often to minimize impacts to the fishing industry.
Potential impacts on port-dependent activities	With the construction of floating infrastructure slated to occur at one or more nearby ports, there are concerns about how construction activities may impact or displace port-dependent activities and industries, including commercial and recreational fisheries, the auto industry, and the fresh produce industry.
Cultural impacts	**Potential overlap with the proposed Chumash Heritage National Marine Sanctuary** o The Project area lies within the proposed Chumash Heritage National Marine Sanctuary, which was nominated in 2015 and may be designated as a sanctuary in the future. Coordination among agencies would be needed if the Projects were to move forward within the sanctuary area. **Support for Tribal Consultation** o Agencies emphasize the need for Consultation with local Tribal representatives to mitigate impacts on cultural sites.
Potential interactions with the DoD training area	There are concerns about the potential for these Projects to interact or interfere with military operations associated with VSFB.

Table 2-1. Summary of Comments from Agencies and Ports

Need for more detail on project specifics	**What will be done with the energy generated from the floating wind turbines** o Some agencies would like more clarity on how the generated electricity will be used and how it will be connected to the grid, which may require transmission upgrades to the system on VSFB. **Duration of the leases for the Projects** o There are some questions about how long the Projects would be operating. **Location and scope of port construction activities** o Some agencies would like more detail on where port construction activities will take place and which ports will be used for the construction of floating infrastructure. o Port Hueneme representatives identified concerns about port capacity and whether construction of floating infrastructure could take place entirely at the port, and potential for displacement of other port operators with senior rights at the port. Port representatives encouraged both Project proponents to consider other port locations in addition to Port Hueneme, including the adjacent U.S. Navy Base for additional workspace. o Port Hueneme requires more information about certain Project construction needs and questions whether (1) the geometry of the port can accommodate transport and assembly of materials, (2) the amount of available dock and laydown space is sufficient, (3) the lifting strength of available wharves is sufficient, and (4) the navigation channel within the port is deep enough to accommodate the drafting depth of the floating barge used for towing of a fully assembled floating wind turbine unit out of the port.
	Potential use of existing infrastructure from decommissioned oil platforms and power plants o There is an interest in whether these Projects will use existing power infrastructure from decommissioned offshore oil platforms and the soon-to-be decommissioned Diablo Canyon power plant. o Additionally, there are questions about how the energy generated from these Projects will compare to that of decommissioned operations.

Table 2-1. Summary of Comments from Agencies and Ports

Recommendation for conducting research to fill information gaps	Several agencies recommend conducting specific research and analyses prior to Project construction, including: o Commercial and recreational fisheries analysis o Habitat characterization of the Project site o Biological survey of species in the area o Inventory of protected species in the area o Baseline acoustic characterization of the Project area o Baseline study of ocean circulation patterns and currents in the area o Baseline survey of water quality in the area.
Encouragement of a monitoring and mitigation plan	Several agencies recommend rigorous long-term monitoring to mitigate environmental impacts. They recommend monitoring marine species, acoustics and noise, marine mammals, species responses to electromagnetic fields, bird and bat collisions, entanglements, invasive species, and fisheries impacts.

Table 2-2. Summary of Comments from ENGOs

Acknowledgement of the need to decarbonize the economy to address climate change	ENGOs express their support for building a low-carbon economy and recognize that offshore wind will play an important role in accelerating that process. There is an emphasis on responsibly developing offshore wind energy to create a planning process that minimizes environmental impacts.
Encouragement of a robust planning framework	o ENGOs propose that, instead of developing offshore wind on an ad hoc basis, California agencies should utilize long-term and large-scale seascape planning to identify priority areas for offshore wind development. This would ensure that the determined locations minimize impacts and conflicts, thus balancing California's goals of clean energy with wildlife habitat and productive fisheries. o They further encourage use of the California Offshore Wind Energy Gateway to identify and visualize data gaps—and recommend allowing sufficient time and resources for scientific studies to fill those gaps—before siting areas for offshore wind development. o In the siting of appropriate areas for offshore wind development, they recommend avoiding biologically/ecologically significant and protected areas.

Table 2-2. Summary of Comments from ENGOs

Specific concerns about the area of the proposed Projects	**High biodiversity and lack of development in the region** ○ ENGOs express concern for the location of the Projects in a biologically diverse and productive marine region. The region is known to have cold, nutrient-rich upwelling and serves as a nexus of many marine species whose geographic ranges overlap. Many of these species have a nearshore affinity, so development of offshore wind in the area would have a higher impact than sites farther offshore. ○ They additionally point out the relatively undeveloped nature of the onshore environment, due to the presence of Vandenberg Air Force Base, which has allowed the region to remain "wild." **Protected and important species in and around the region** ○ ENGOs convey concern for certain types of marine organisms, including marine mammals, sea turtles, sea birds, and bats. There is a heightened concern for protected species—leatherback sea turtles, humpback whales, gray whales, and blue whales. Additionally, hard-bottom habitats, home to deep sea corals, are mentioned. ○ They indicate the proximity of the Project area to six onshore Audubon Important Bird Areas, which cover over 20 bird species and are used by fisheries, aquaculture, and recreation. ○ They indicate that the Project area overlaps with federally designated critical habitat for humpback whales **High land-sea connectivity in the region** ○ ENGOs indicate the excellent land-sea connectivity in this region, due to the presence of the relatively undeveloped VSFB onshore and the Vandenberg State Marine Reserve in nearshore waters, facilitating nearshore-to-offshore migration of certain rockfish species throughout their life history. **High-use fishing area** ○ ENGOs assert that, as a result of the high biodiversity in the region, fisheries productivity is also high. **Loss of fishing grounds and "squeezing" of fishing grounds in the surrounding areas** ○ ENGOs express a concern for the economic livelihoods of recreational and commercial fishermen and reliant fishing communities as they lose access to more fishing grounds, pointing out that fewer and fewer areas in the region remain open to fishing. The concentration of fishing activities in the surrounding areas would exacerbate fishing impacts on the environment.
Marine mammal ship strikes, entanglements, and noise impacts	○ ENGOs express concerns about vessel traffic associated with Project construction increasing ship strikes with marine mammals. ○ Additionally, there are concerns about fishing gear getting caught in wind turbine support cables and creating entanglement risk for marine mammals and sea turtles.

Table 2-2. Summary of Comments from ENGOs

	○ ENGOs further point out that ocean noise, only to increase as a result of these Projects, is already a concern for marine mammals.
Electromagnetic fields in the water column	ENGOs point out that a number of marine species, such as sea turtles, fish, and crustaceans, can detect electromagnetic fields, which could alter their movement patterns.
Sea bird and bat collisions with wind turbines	ENGOs express concerns for sea bird and bat injury and mortality due to potential collisions with floating wind turbines. There is a specific concern for pelicans, which are most vulnerable to collisions due to the elevation of their flight zone being near rotor height.
Support for Tribal consultation	ENGOs emphasize that coastal areas are often culturally and archeologically significant and urge the CSLC to engage with local Tribal representatives and archeologists.

Table 2-3. Summary of Comments from Commercial and Recreational Fishermen

Acknowledgement of the need for renewable energy resources to address climate change	○ Fishermen recognize the need to transition to renewable energy resources to slow and reverse the effects of climate change. They emphasize that this should not come at the expense of other essential industries, such as the fishing industry. ○ Many fishermen believe solar energy to be a better renewable energy alternative than offshore wind energy.
Specific concerns about the area of the proposed Projects	**Not representative of potential future offshore wind Projects farther offshore** ○ Fishermen state that physical and biological conditions at the current location of the proposed Projects will not be representative of conditions in federally designated call areas for future, larger-scale offshore wind Projects. **High-use fishing area** ○ Fishermen indicate that the area of the proposed Projects has high fisheries productivity and hosts up to 10 different fisheries. They assert that the fishing opportunity in this area is too valuable to lose. **Loss of fishing grounds and "squeezing" of fishing grounds in the surrounding areas** ○ Commercial fishermen express a concern for their economic livelihood and for that of reliant fishing communities as fewer and fewer areas in the region remain open to fishing, due to existing protected

Table 2-3. Summary of Comments from Commercial and Recreational Fishermen

	areas and marine reserves. As commercial and recreational fishermen continue to lose access to fishing grounds, fishing activities will become increasingly concentrated in the surrounding areas.
Noise impacts on fish	Several fishermen are concerned about the impacts of noise on fish health and behavior.
Electromagnetic fields in the water column	Fishermen express concerns about the impacts that electromagnetic fields may have on fish behavior and movement patterns, potentially driving them away from the area.
Downwind impacts of FWTs on marine upwelling	Some fishermen are concerned about the reduction of wind speeds downwind of the floating wind turbines. Reduced wind speeds could potentially reduce upwelling, and in turn, fisheries productivity.
Request for economic compensation and benefits packages	Fishermen request that certain measures be taken to make sure their economic livelihoods are protected. This may involve a formal mitigation agreement with project developers, potentially modeled after other recent fishing agreements. An agreement would establish a dialogue between fishermen and project developers, enhancing communication and reducing conflict.
Request for access to the decision-making process	Fishermen request more involvement in the decision-making process for any future issues or operations that may be relevant to them, suggesting that working groups with fishing representatives be established to amplify the voice of the fishing community.

2.4 REGULATORY SETTING AND OTHER REQUIRED APPROVALS

2.4.1 California State Lands Commission

All tidelands and submerged lands—granted or ungranted—as well as navigable lakes and waterways are subject to the common law Public Trust Doctrine. The State of California acquired sovereign ownership of these lands upon its admission to the United States in 1850 and now manages them for the benefit of all people of the State for statewide Public Trust consistent uses. Uses of sovereign land that are consistent with the Public Trust generally include, but are not limited to, water-dependent commerce, navigation, fishing, recreation, and conservation.

The CSLC's jurisdiction extends along the State's entire coastline and offshore islands from the mean high-tide line (except for areas of fill or artificial accretion, or where the boundary has been fixed by agreement or a court) to 3 nm offshore. As set forth in Division 6 of the Public Resources Code, the CSLC has authority to issue leases or permits for the use of sovereign land consistent with the Public Trust and in the best interests of the State and retains broad oversight authority over Public Trust lands legislatively granted to local jurisdictions. (Pub. Resources Code, §§ 6005, 6009, subd. (c), 6009.1, 6301, 6306, 6501.1.)

When undertaking an activity defined by CEQA as a "project" that (1) must receive discretionary approval, and (2) may cause either a direct physical change or a reasonably foreseeable indirect change in the environment, the CSLC must comply with CEQA and has the authority to approve or deny the requested lease or permit. As discussed in Section 2.2, CADEMO and IDEOL have submitted applications for new leases for the offshore placement of FWTs and installation of power cables to shore. Because these lease applications could directly or indirectly impact the environment, the CSLC is required to review and assess potential environmental impacts through the CEQA process prior to authorizing a lease.

2.4.2 Department of Defense

The DoD has a structured process for developers to request a mission compatibility evaluation of a proposed energy project, as documented in Code of Federal Regulations, title 32, Part 211. In accordance with the Military Aviation and Installation Assurance Clearinghouse (Clearinghouse) (10 U.S.C. § 183a(c)(7)), if a proposed energy project is known to be inside a military operational area or in a radar surveillance area that the DoD owns or operates in, the project must be filed at least 1 year prior to construction.

The DoD Clearinghouse formal review process applies to projects filed with the Secretary of Transportation, under the Federal Aviation Administration obstruction evaluation process (49 U.S.C. § 44718), and addresses all energy projects both greater than 199 feet above ground level and within military training routes or special use airspace, whether on private, State, or federal property (see https://www.acq.osd.mil/dodsc/contact/dod-review-process.html).

The DoD Clearinghouse encourages all energy proponents to seek informal review as early as possible to identify potential compatibility concerns. Developers of an energy project; a landowner; a state, tribal, or local official; or other federal agency may request a preliminary determination from the DoD Clearinghouse in advance of filing an application with the Secretary of Transportation under 49 U.S.C. section 44718 or where a preliminary DoD determination is desired (10 U.S.C. § 183a(c)(6)). The Clearinghouse will work with all DoD stakeholders to identify potential impacts to military operations. If any are found, the response will include opportunities for further discussion.

Both IDEOL and CADEMO have concluded DoD's Clearinghouse informal review process and are now under the formal review process with DoD.

It is anticipated that the DoD would be the lead agency under the National Environmental Policy Act (NEPA) for approval of electrical service and construction of the proposed onshore substation improvements and transmission lines.

2.4.3 Other Agencies

In addition to CSLC and DoD, the proposed Projects would be subject to the review and approval of many other federal, State, and local entities with jurisdiction over various aspects of the Projects (Table 2-4). Appendix C provides a list of major federal, State, and local laws, regulations, and policies that would be potentially applicable to the Projects.

Table 2-4. Potential Agencies with Review/Approval over Project Activities

Agency		Potential Approvals/Regulatory Requirements
Local	Santa Barbara County	Coastal Development Permit
	Santa Barbara County Parks Division	Special Use Permit
	Santa Barbara County Air Pollution Control District	Authority to Construct and Permit to Operate
	The Port of Hueneme, Oxnard Harbor District	Approval to use the port for the construction of the floating platform and wind turbine
State	California State Lands Commission	Submerged Lands Lease and CEQA lead agency
	California Coastal Commission	Coastal Development Permit
	California Department of Fish and Wildlife	Section 2081 potential impacts to State-listed species

Agency		Potential Approvals/Regulatory Requirements
	Central Coast Regional Water Quality Control Board	Clean Water Act (CWA) Section 401 Water Quality Certification
	California Public Utility Commission	Modifications to Pacific Gas & Electric (PG&E) electrical lines or substation infrastructure
	State Historic Preservation Office	Section 106 Compliance
Federal	Department of Defense	Approval of electrical service and onshore infrastructure; NEPA lead agency
	U.S. Army Corps of Engineers	CWA Section 404 and Section 10 Permits
	U.S. Fish and Wildlife Service	Federal Endangered Species Act (FESA) Section 7 consultation with USACE regarding potential impacts to federally listed species
	National Marine Fisheries Service	FESA Section 7 Marine Mammal Protection Act and Essential Fish Habitat (EFH) assessment; Consultation with USACE regarding potential impacts to federally listed species, marine mammals, and EFH
	U.S. Coast Guard	Navigation Safety Risk Assessment; Navigational Chart Revisions; Notice to Mariners
	Bureau of Safety and Environmental Enforcement/ Bureau of Ocean Energy Management	Alternative Use Approval (potential use of Platform Irene power cable)
Tribal	Various Tribes	Project activities will be coordinated with local tribes consistent with the CSLC's Tribal Consultation Policy adopted in August 2016 (see https://www.slc.ca.gov/tribal-consultation/).
Other	Union Pacific Railroad	Encroachment

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3.0 DESCRIPTION OF THE TWO PROPOSED PROJECTS

The description of the two proposed Projects is based on the information gathered thus far from CADEMO and IDEOL. The Project descriptions are preliminary and represent the information provided in the lease applications and in follow-up discussions with the Applicants as of July 2021. The Project descriptions will be further defined as the Project proponents proceed with the planning process. Formal environmental impact analysis of the proposed Projects under CEQA would be included in an EIR, which would contain a more complete description of all proposed work and the specific locations of the various Project components.

3.1 PROJECT AREAS AND PROPOSED PROJECTS

3.1.1 Project Areas

The proposed Project areas are located along the coastline of the Pacific Ocean in western Santa Barbara County at VSFB, formerly named VAFB. Figure 3-1 illustrates the offshore and onshore Project area settings.

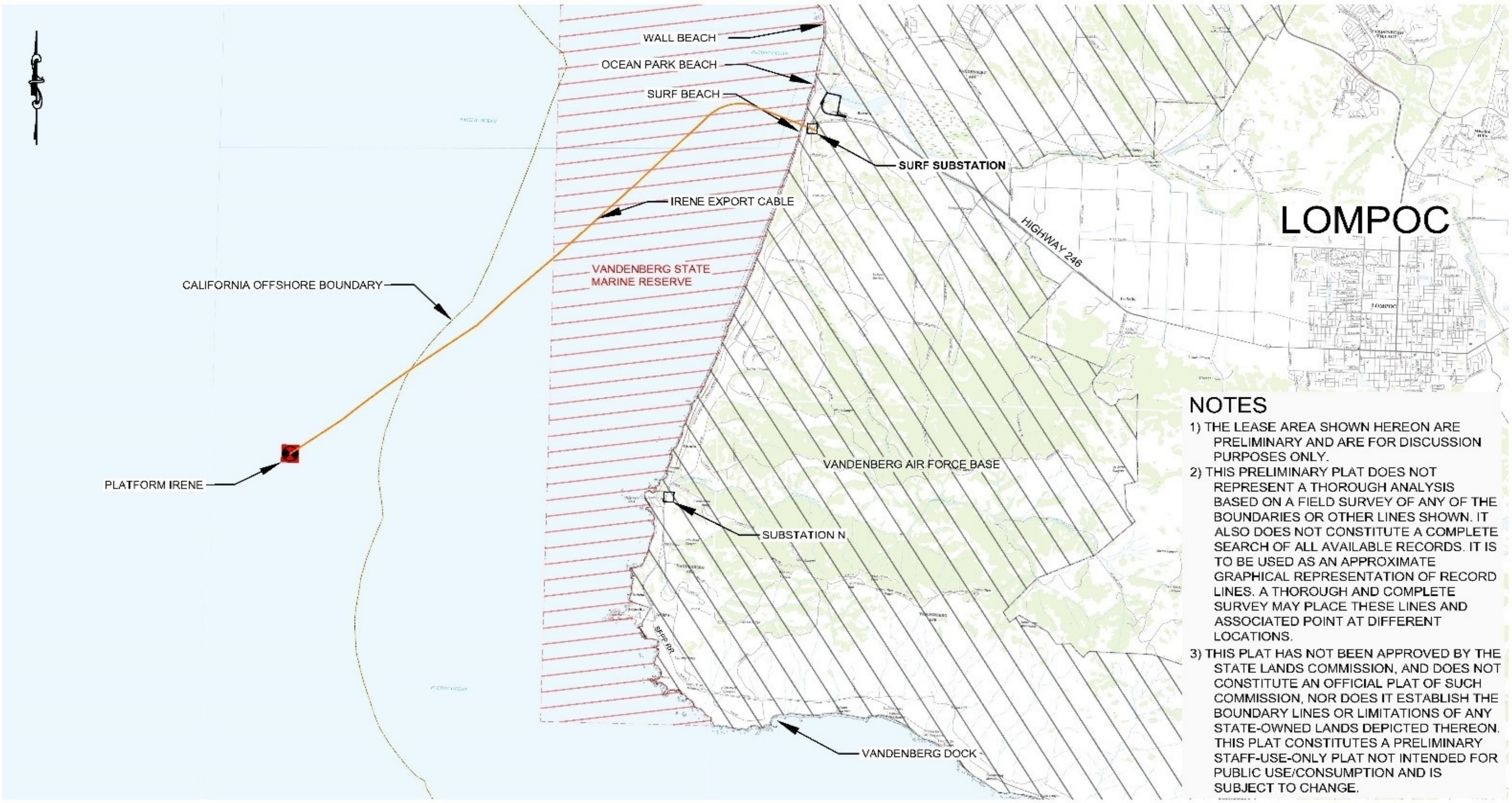
Offshore

The proposed lease areas for both Projects and all offshore Project facilities would be sited along the west side of the Vandenberg State Marine Reserve (VSMR) and within the 3 nm State boundary. All Project facilities would be located outside of the VSMR. Platform Irene is located in federal waters west of the proposed lease areas. The platform has an existing subsea pipeline landing onshore near the mouth of the Santa Ynez River and electric cable connecting to the Surf Substation south of the Santa Ynez River near Surf Beach.

Onshore

The proposed onshore Project areas are located parallel to the coastline within VSFB and are generally located between the Santa Ynez River and the south end of Point Arguello. West Ocean Avenue provides public coastal access south of the Santa Ynez River to Ocean Beach Park and Surf Beach. The Union Pacific Railroad (UPRR) is located parallel to the shoreline, and Coast Road is the main throughfare road parallel to the shoreline, among other service roads within VSFB. Surf Substation is located near Surf Beach and Substation N is located near the coast at Point Pedernales. The Vandenberg Boat Dock is located at the south end of Point Arguello.

Figure 3-1. Existing Project Area Map



CALIFORNIA STATE LANDS COMMISSION	USGS QUADRANGLE BASEMAP	DRAWING NAME: CIERCO TURBINE_ccs83Z5.DWG		COMPILATION PLAT EXISTING PROJECT AREA MAP PACIFIC OCEAN, SANTA BARBARA COUNTY	SHEET 1 1 OF 1
		DRAWN BY: JAK CHECKED BY: J. KOEPKE PLS 8487	FILE NO.: N/A		
		DATE: 4/5/2021	SCALE: 1"=7000'		

Proposed Port Locations

CADEMO and IDEOL have considered a range of different port locations for the construction and assembly of the floating platforms and wind turbines along the California coast. These ports include the Port of San Francisco, Port of Oakland, Port Hueneme, Port of Los Angeles, and Port of Long Beach. Both Project proponents have identified Port Hueneme as the preferred port location for their Projects; however, it is anticipated that more than one port location would likely be needed for Project construction activities. Although additional port locations have not been confirmed at this time, both Project proponents have identified the Port of Long Beach as a potential additional port location.

CADEMO and IDEOL are currently working with Port Hueneme (among other ports) to determine the scope of work that can be accommodated at the port, including the potential for any improvements for construction activities. Existing dock facilities may not be able to accommodate the weight capacity of proposed heavy equipment required for construction of the floating platforms and wind turbines. Therefore, reinforcement of dock facilities may be necessary to increase load capacity. In addition, the navigation channel at Port Hueneme may not be deep enough to accommodate the drafting depth of the fully assembled floating wind turbine units for towing out of the port. This may require an offshore construction site for the final assembly of constructed wind turbines.

Due to potential for more than one port location for the offshore construction services of the Projects, the description of proposed work at Port Hueneme in this section may occur at additional port locations; therefore, environmental analysis of the Projects under CEQA would include detailed descriptions of all proposed port locations and the scope of work at each port.

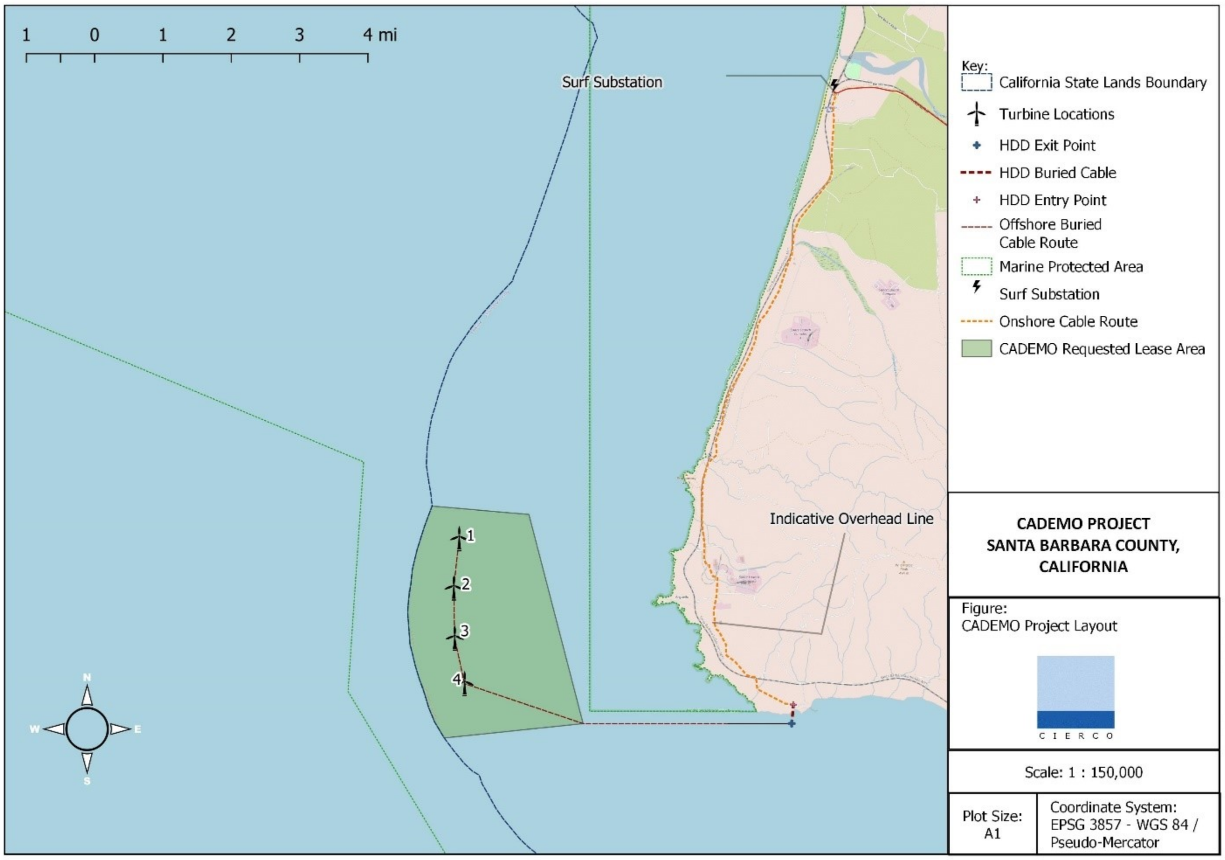
3.1.2 Summary of Proposed Projects

CADEMO

CADEMO proposes to install and operate four floating offshore wind turbines that would be moored and anchored to the seafloor. The boundary of the proposed FWT lease area is currently proposed at approximately 6.2 square miles. However, CADEMO estimates that with further site design and planning, a considerably smaller lease area could be possible, which would be evaluated further as part of an EIR process. Each wind turbine would be capable of producing 12 to 15 MW of renewable electricity. A combined maximum of 60 MW could be generated from the proposed four wind turbines, which would be connected in a series with inter-array cables. A subsea static cable would be buried under the seafloor at a depth of approximately 5 feet from the southernmost wind turbine and connected to an onshore cable landing site at a proposed new electrical substation located south of Point Arguello within VSFB. A high-density polyethylene (HDPE) cable duct would be installed at the cable landing site using a Horizontal

Directional Drilling (HDD) method. The static cable would be pulled in through the duct from offshore to onshore and connected to the proposed onshore substation within VSFB. A new onshore overhead transmission line would be constructed for approximately 11 miles from the proposed substation to the existing Surf Substation for connection to the CAISO power grid (see Figure 3-2). According to CADEMO, an application has been submitted to CAISO for proposed connection to the power grid.

Figure 3-2. Proposed CADEMO Project Area

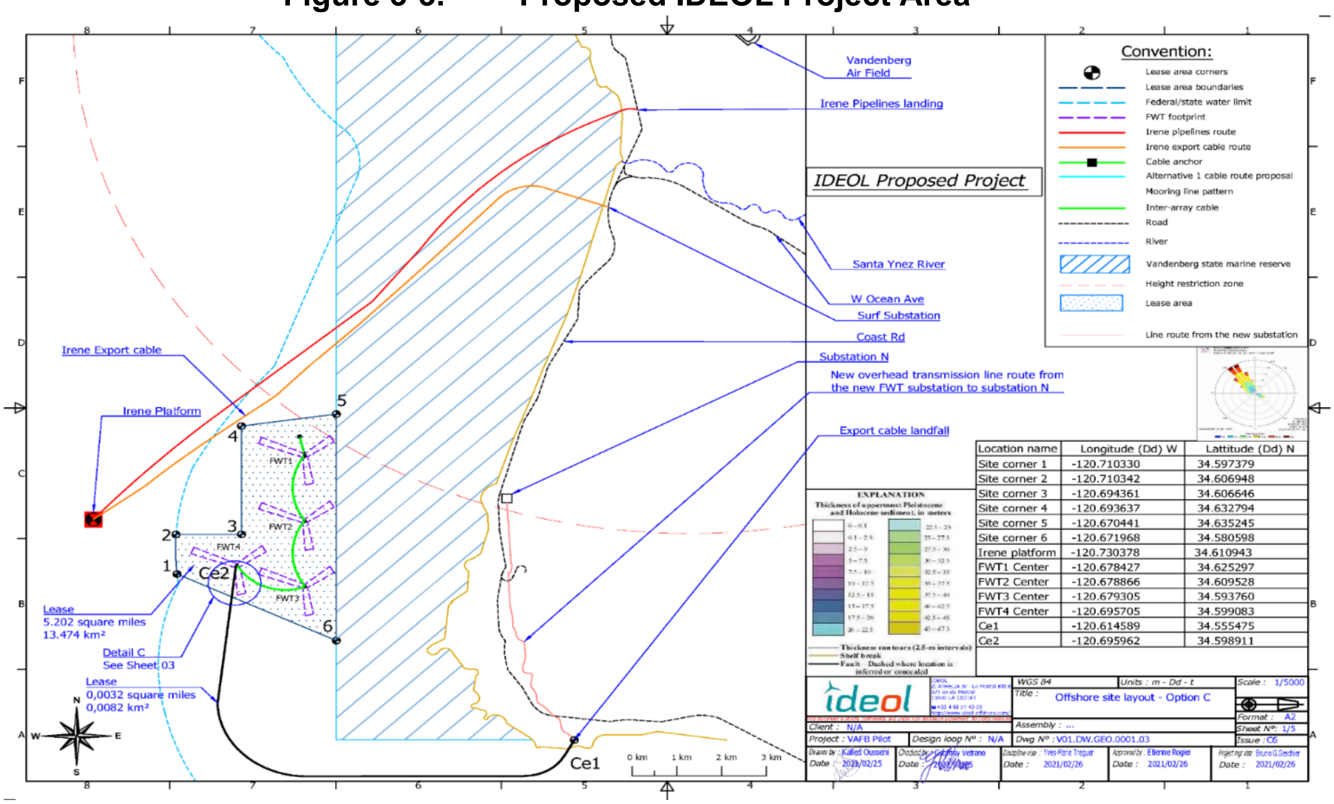


Turbine	Latitude	Longitude	Water Depth (feet)
Turbine 1	34.59061535	-120.70016552	279
Turbine 2	34.58022300	-120.70154258	302
Turbine 3	34.56964036	-120.70131307	303
Turbine 4	34.56000143	-120.69878845	315

IDEOL

IDEOL proposes to engineer, construct, install, operate, and ultimately decommission a floating offshore wind electrical generation demonstration project. The Project would consist of up to four floating Damping Pool ® barge concrete foundations, which would be moored to the seabed. Up to four offshore wind turbine generators (WTG) would be installed on the foundations capable of producing up to 10 MW each. Together, the floating foundation and WTG make up a FWT. As proposed, the FWT lease area would encompass approximately 5.2 square miles. Each FWT would be secured redundantly with six to eight mooring lines anchored to the seafloor. IDEOL is investigating two anchoring options for the proposed Project, including suction piles and drag embedment anchors. Medium-voltage electrical cables would connect the FWTs to one another. A submarine electrical cable would be laid and trenched to a target depth of 5 feet from the FWT lease area to the onshore cable landing site located south of Point Arguello. A HDPE cable duct would be installed at the cable landing site using the HDD method. The electrical static cable would be pulled in through the duct from offshore to onshore and connected to a proposed new onshore substation within VSFB. The proposed new onshore substation would transform the electricity from MW to kilovolt (kV). From the new substation, approximately 4.2 miles of new overhead transmission line would be installed and connected to Substation N for electricity distribution to VSFB (see Figure 3-3). IDEOL also proposes to connect to the CAISO power grid, which would require additional infrastructure (i.e., transmission line, etc.). Additional information is required from IDEOL to determine the location and extent of additional infrastructure to connect to the CAISO system.

Figure 3-3. Proposed IDEOL Project Area



3.1.3 Construction Summary of Proposed Projects

Construction activities at the proposed Project areas would start with the buildout of onshore infrastructure and then proceed with the buildout of the offshore infrastructure working toward the wind turbine field areas. Concurrently, while the offshore and onshore infrastructure is being constructed, the FWTs would be constructed at the designated port location. Port Hueneme is the preferred port location for both Projects; however, it is anticipated that more than one port location would likely be needed for the full construction services for both Projects. For example, the Port of Long Beach may also serve as a port location for both Projects; however, for purposes of this description both Projects are limited to Port Hueneme.

For all offshore work phases, the assembly of work vessels, construction equipment, and building materials would first occur at the designated port locations to prepare for deployment to the offshore Project area. The construction process would finish with towing the constructed FWTs to the offshore Project area for installation and connection with the onsite infrastructure (e.g., mooring lines, anchors). Final construction, assembly, and towing of the FWTs could occur over an approximate 23-month period, which would encompass the overall construction period for the Projects.

3.1.4 Offshore and Port Project Components and Construction

The following descriptions are intended to identify the proposed components and construction methods for offshore and port construction activities for the CADEMO and IDEOL Projects.

CADEMO

Wind Turbine Generators and Port Construction Activities

The CADEMO wind turbine design consists of a three-bladed upwind horizontal axis wind turbine with a rotor diameter of up to 738 feet and a rated power of at least 12 MW. The wind turbine rotor and nacelle are mounted on top of a tubular steel tower with a hub height of 451 feet above sea level. The wind turbine would employ an active yaw control (designed to steer the wind turbine with respect to the wind direction), active blade pitch control (to regulate turbine rotor speed), and a variable speed generator with a power electronic converter system (see Table 3-1 for description of proposed CADEMO wind turbines).

The wind turbines would be purchased from an established offshore wind turbine manufacturer. The turbine, nacelle, and blade components would be transported by sea to Port Hueneme. CADEMO assumes that the towers would be manufactured in Europe and transported by sea to California. However, there is potential that the capability to manufacture the towers on the East Coast of the U.S. would be available by the time the proposed Project requires the tower components. CADEMO would explore the practicalities of sourcing the towers from the U.S. prior to Project financial close. The assembly of the turbines would be carried out at Port Hueneme in a predetermined sequential manner by a suitably qualified and experienced contractor.

Table 3-1. Typical Key Data and Dimensions of the CADEMO Wind Turbines

Number of blades	3
Orientation	Upwind
Direction of Rotation	Clockwise
Rotor Diameter	738 feet
Length of blade	359 feet
Blade swept area	428,446 ft^2 or 9.8 acres
Hub height	451 feet
Tip height above sea level	820 feet
Blade Clearance to sea level	82 feet
Rated Capacity	12 - 15 MW
Voltage	66 kV
Converter	Full size
Structure	Tubular Steel Tower
Foundation	Floating Platform and Mooring system
Design Life	25 years
O&M Access	Primary: Boat Optional: Helicopter

Floating Foundations and Port Construction Activities

CADEMO has proposed to deploy two different floating platform technologies to support the wind turbines, which include: 1) a Swing Around Twin Hull (SATH) floating barge utilizing a single point mooring (SPM) arrangement and 2) a SBM Offshore Wind Floater using a tension-leg platform (TLP) technology. The use of the two design concepts would demonstrate different design principles with two different fabrication processes and mooring systems.

<u>*SATH Floating Barge*</u>

The SATH Floating Barge (a twin hull, ship-shaped floating barge composed of two cylindrical horizontal floating elements made of longitudinal reinforced concrete) uses a SPM arrangement. During installation, the barge platform would be connected to a SPM turret that would allow the floating platform to rotate 360 degrees around the fixed part of the turret until the platform is self-aligned to the wind direction (see Figure 3-4). The SPM turret also allows the platform to turn and adapt to the environmental conditions (waves, wind, current).

The SATH platform is constructed of reinforced concrete, so it is similar in construction complexity to conventional onshore infrastructure Projects (e.g., bridges or highways). As a result, CADEMO anticipates that the fabrication of the SATH can be undertaken locally without the need for major infrastructure upgrades. The SATH design is based on bringing together modular sections of the platform structure to enable the fabrication of individual pre-cast elements of the floating platform offsite before transport to Port Hueneme for

Figure 3-4. CADEMO SATH Floating Barge Technology General Layout

final assembly. Other elements are fabricated in situ at the assembly site. The proposed process at Port Hueneme would be as follows:

1. Pre-cast sections are transported to the assembly location. The sections are fabricated in a vertical position and then are rotated horizontally after transport.
2. The heave plates and the lower tower section are cast in place.
3. The transition piece is placed onto the platform.
4. After the SATH has been assembled, the elements are joined and fully post-tensioned.

Once the SATH platform has been fabricated, the tower and wind turbine are installed. This can be done either port side or offshore although currently CADEMO's preference would be for the tower and wind turbine to be installed port side. Once completed, the SATH platform and wind turbine would be transported onto a semi-submersible barge docked alongside the port pier for launching into the water. The semi-submersible barge would transport the SATH unit to a location with suitable depths where the barge would submerge, allowing the SATH unit to float freely.

In total, it is anticipated that each SATH unit would take approximately 15 months to fabricate, with both units being made ready for deployment in 18 months (the components of the second unit start fabrication 3 months after the work on the first unit begins).

SBM Offshore Wind Floater

The SBM Offshore Wind Floater, using the TLP technology, is a triangular lightweight floater made of steel. In operational conditions, most of the structure is submerged below the sea surface, thus avoiding the action of waves. The floating foundation is an assembly of four buoyancy modules and a bracing system that links them together and connects them to the transition piece, which serves as the interface with the wind turbine (see Figures 3-5 and 3-6).

The SBM Floater can be built dockside and launched in the water by barge. The technology is modular. As such, CADEMO could take advantage of the local supply chain to manufacture relevant subcomponents of the system. The sub-assemblies of the SBM Floater can be fabricated offsite and then transported to Port Hueneme. CADEMO's intent is to limit the proposed work at Port Hueneme to only final assembly work such as: lifting, scaffolding, fit-up, welding, and painting touch-up. The assembly of the SBM Floater would use standard construction techniques.

Once the SBM Floater has been assembled, it would be transported onto a semi-submersible barge docked alongside the Port for launching into the water. The SBM Floater would be moored to the dock to carry out the tower and wind turbine integration. This could be done either port side or offshore, although the best-case scenario for the CADEMO Project would be for the tower and wind turbine to be installed port side. The semi-submersible barge would then transport the SBM Floater unit to a location with suitable depths, where the barge would submerge allowing the SBM unit to float freely.

CADEMO's preliminary schedule assumes that the SBM Offshore Wind floaters would be assembled in sequence with the first platform stationed/stored at an approved location near the port until the second unit is completed. Both units would then proceed to WTG integration activities and be towed to the offshore Project area for installation. Table 3-2 compares CADEMO's proposed SATH and SBM Floater platform technologies.

Figure 3-5. CADEMO Offshore Wind Floater Using TLP Technology

Figure 3-6. CADEMO TLP General Layout

Table 3-2. General Dimensions of CADEMO Floating Platform Technologies

	SPM with SATH	SBM Floater with TLP
Material	Concrete / Steel	Steel
Length	289 feet (358 feet including cantilevered frame)	350 feet
Width	171 feet	400 feet
Height of platform without wind turbine	57.5 feet	200 feet
Draft during construction	34 feet	< 39 feet
Draft during operation	34 feet	131 feet

Floating Platform Mooring Arrangement and Installation

As previously explained, all offshore infrastructure (e.g., moorings, anchors) would be installed at the offshore Project area prior to the towing and installation of the constructed FWTs. Both the proposed SBM and SATH platform technologies would be installed to pre-laid mooring systems. Installation of the mooring lines would require an Anchor Handling Vessel (AHV) or an Anchor Handling Tug Vessel (AHTV). Anchors being considered include drag embedment anchors, suction bucket anchors, and vertical loaded anchors. Based on CADEMO's preliminary review of the site's seabed and environmental conditions, CADEMO anticipates that a drag-embedment anchor would be used. The anchor would use a drag and penetration arrangement, with a penetration depth of 8.2 feet anticipated (see Figures 3-7 and 3-8).

The SATH barge platform uses a SPM system, which is a turret assembly integrated into the vessel and permanently fixed to the seabed through six mooring lines (3 x 2) to provide redundancy (see Figures 3-7 and 3-8). This configuration would ensure that the system would resist the environmental conditions (wave, current, wind) within a 360-degree radius.

The SBM Offshore Wind Floater, using TLP design technology, would use a taut mooring line configuration to stabilize the platform for wind turbine operations. The TLP mooring arrangement is composed of a center arrangement connecting the wind turbine tower with three radial legs to a floatation bundle that forms a triangular shape around the center arrangement. Each bundle connects to two floatation buoys to form a "leg," where the leg is tied down under tension by mooring lines. As the platform is under mooring tension, the spread of the inclined mooring lines would not extend far beyond the base of the platform. The SBM Floater would allow up to a 1,968-foot radius from the center of the turbine out to the maximum extent of the mooring line. Figure 3-9 shows the mooring line configuration for the SBM Offshore Wind Floater.

Figure 3-7. CADEMO Single Point Mooring (SPM) Connection

Figure 3-8. CADEMO SPM Mooring System Layout

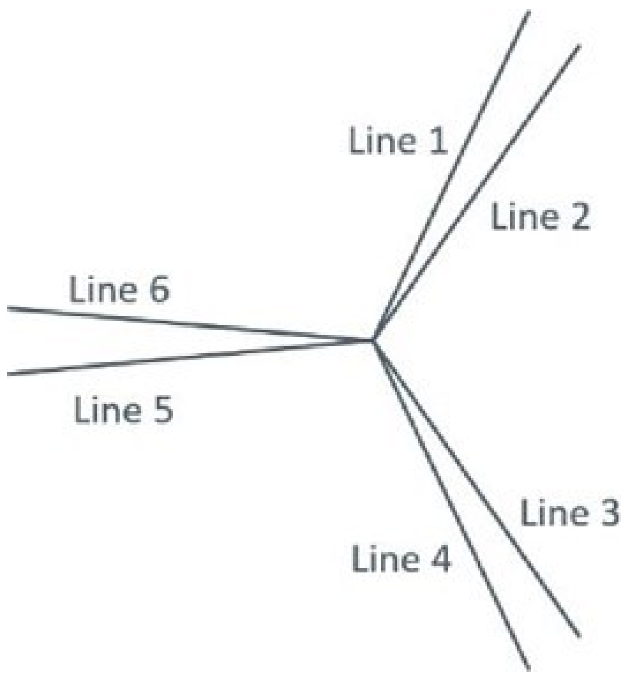


Figure 3-9. CADEMO SBM Offshore Wind Floater Mooring Configuration

Pre-Cable Lay Survey

A geophysical and unexploded ordinance survey along the cable routes would be undertaken prior to the installation of electric cables, which would be used for identifying sensitive habitats and avoiding potential obstructions along the cable routes, such as boulders and fishing debris. The survey would be used to help identify the best cable route and would aim to avoid sensitive habitats and other obstacles. Where boulders are present and unavoidable within the proposed cable route, a cable laying vessel or a support vessel would remove the boulders using a dedicated boulder grab to pick up larger boulders (greater than 1 foot) and move them approximately 50 feet perpendicular to the cable route. No boulders would be removed from site during this operation.

Inter-Array Cables

Inter-array cables (IAC), the cables linking the FWTs, would be installed to form a 'string' from each turbine to a central electrical collection turbine. CADEMO intends for the inter-array cables to be maintained within the anchor patterns proposed between turbines, and as such are not planned to be trenched/buried unless required for physical stabilization on the seabed. Outside the anchor/mooring line pattern diameter, the inter-array cables between each turbine would be buried to the target depth of 5 feet. See the following Static Cable section for description of the cable laying and trenching methods.

Each proposed turbine design has a different arrangement for the IAC cable, reflecting their differing mooring arrangements. As can be seen from Figure 3-9, the electrical cable from the SBM Offshore Wind Floater would be a "free hanging catenary" arrangement where the cable connects to the platform through an I-Tube bellmouth underneath the platform (to avoid damage) and "drops" under its own weight to the seafloor. The cable would be secured to the seabed (within the mooring spread) before being buried, trenched, or covered to the next turbine in the row.

For the SATH barge platform, the IAC cable would be a "lazy wave" configuration. The proposed lazy wave configuration, including a buoyant middle section, is shown in Figure 3-10. The lazy wave shape is made up of two double armored cable sections fixed at each end point (i.e., at the SPM and the seabed), with the intermediate portion of the cable (usually referred to as a "dynamic" or "umbilical" cable) exposed to the motion of the floating platform, waves, and currents as it traverses the water column. To reduce fatigue and stress on the cable, buoyancy elements would be placed in the intermediate portion of the cable (creating the wave shape).

Figure 3-10. CADEMO SATH "Lazy Wave" Cable Configuration

Static Cable

A static cable would be installed from the southernmost FWT to shore to convey energy from the wind turbine field to the onshore cable landing site. The voltage rating of the cable is anticipated to be 70 kV. The onshore cable landing would be drilled using the HDD method from an entry hole onshore to an offshore exit hole. From the HDD exit hole, the static cable would be laid and buried under the seafloor for a distance of approximately 4.8 miles to the southernmost FWT. The cable installation would be undertaken by a dedicated cable laying vessel (CLV) supported by a remotely operated vehicle (ROV). The cable would be installed by utilizing a cable plough or trenching tool (either mechanical cutting or jetting depending on the seabed material encountered). The cable would be laid within the trench and then buried to the required depth. The trench would be approximately 4.8 miles in length, 9.8 feet in width, and 5 feet in depth.

CADEMO indicates that jet trenching would be the preferred method for cable burying, where the soil conditions allow, as it offers the lowest risk of cable damage. Jet trenching burial would be carried out by a tracked trenching machine (a ROV) (see Figure 3-11), which would bury the cable to a target depth of 5 feet by use of water jetting. In areas where jet trenching may not be possible due to the presence of stiff sediments, a hybrid tool capable of both jet trenching and cutting with a chainsaw-like device would be used.

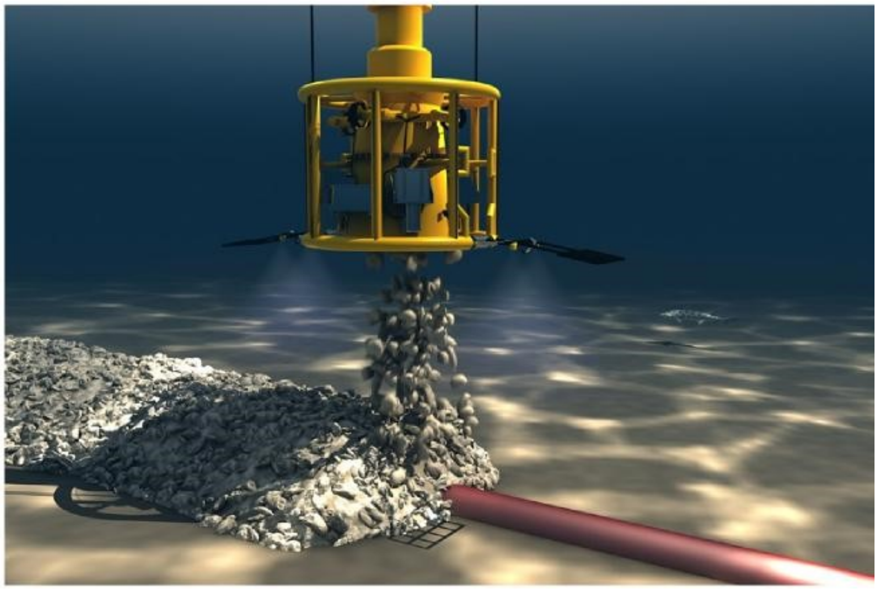
Figure 3-11. CADEMO Jet Trenching ROV (DEME Trenching Tool CBT1100)

Cable burial is the preferred method of cable protection as it largely protects against bottom-contact fishing activity as well as vessel anchorages. However, burial to 5 feet may not be achievable along the entire length of the cable route due to the sediment depth. If the minimum burial depth of the cable cannot be achieved, protection of the cables would be provided in the form of rock placement (see Figure 3-12). The proposed rock berm would be designed to minimize risk to fishing gear by specific selection of rock size and berm side slopes. There may be localized areas where consideration of the following cable protection measures may be appropriate instead of trenching:

- Articulated Ducting/Armored Cable: A manufactured product that provides a protection sleeve around the cable to protect it from abrasion, environmental conditions, and provides it with impact resistance.
- Grout Bags: Bags of hardened gravel, sand/cement grout, or concrete placed over the cable.
- Concrete Mattresses: Pre-formed articulate mattresses comprising a mesh of concrete block that are placed across cables.

CADEMO estimates that cable protection measures would be required from the HDD exit hole out to a distance of approximately 0.36 to 0.4 miles (645 to 704 yards) before a suitable sediment depth is reached to allow cable burial to 5 feet.

Figure 3-12. CADEMO Illustration of Rock Placement Over Cable



IDEOL

Wind Turbine Generators and Port Construction Activities

IDEOL's proposed WTGs would be composed of a monopole tower, a nacelle, and a rotor. The rotor would include three blades, each of which would be up to 279 feet long, for a total rotor diameter of up to 571 feet. The blades would be mounted vertically at the hub, which connects the rotor to the nacelle on a horizontal axis. The nacelle would house the electric generator and be mounted at the top of the tower. The nacelle would measure approximately 69 feet by 30 feet (2,070 square feet). The height from the rotor to sea level would be up to 361 feet. The maximum blade tip height would be up to 640 feet above sea level. The diameter at the base of the tower is 29.5 feet. Each WTG would weigh up to 1,273 U.S. tons and have a generation capacity of up to 10 MW. Each WTG would be mounted onto a floating foundation as shown in Figure 3-13.

The WTGs would be transported by vessels in multiple pieces to the construction port from an origin in Europe or Asia, as there is currently no U.S. domestic manufacturing of offshore WTGs. The WTG components would be assembled using large onshore cranes. Following construction of the WTG components, they would be installed atop the floating foundation at the dockside location, beginning with the base tower piece and ending with the rotors.

Figure 3-13. IDEOL Floating Wind Turbine

Table 3-3. Typical Key Data and Dimensions of a Proposed IDEOL Turbine

Number of blades	3
Orientation	Yaw system located in the nacelle
Direction of Rotation	N/A
Rotor Diameter	571 feet
Length of blade	279 feet
Blade swept area	256,144 feet^2 or 5.9 acres
Hub height	361 feet above sea level
Tip height above sea level	669 feet
Blade Clearance to sea level	98 feet
Rated Capacity	10 MW
Voltage	66 kV
Converter	N/A
Structure	Square ring shape barge
Foundation	IDEOL's Damping Pool ® technology
Design Life	30 years
O&M Access	Primary: Boat Optional: Helicopter

Floating Foundations and Port Construction Activities

IDEOL proposes to use a floating foundation composed primarily of prestressed, reinforced concrete. The foundations are square ring-shaped as shown in Figure 3-11. The foundations would measure approximately 190 feet by 167 feet (31,730 square feet) and be approximately 38 feet high. Once submerged, the foundation reveal height would be approximately 11 feet above sea level. Each submerged foundation would displace up to 15,708 U.S. tons of water. The reinforced concrete volume in each foundation would be up to 5,127 cubic yards and would weigh up to 9,845 U.S. tons.

Construction of IDEOL's floating foundations is flexible and can be done using several standard construction methods, depending on port infrastructure and availability. IDEOL's collaboration with KIEWIT construction company currently would include using a combination of cast-in-place and pre-fabrication for this specific Project.

The construction of foundations would be done onshore at a designated work site at Port Hueneme (or other nearby port if necessary), which could include several workstations for various phases of construction, such as for framing of the floors, walls, and other structural components of the floating foundation. See Figure 3-14 for example of port work site.

Figure 3-14. IDEOL Example Port Work Site

Once constructed a floating foundation is transferred onto a semi-submersible barge (see Figure 3-15 for example of semi-submersible barge construction site). This semi-submersible barge would be ballasted in order to progressively immerse the construction foundation up to the point that the foundation will float by itself. The foundation is then towed to the quayside (dockside) where the WTG assembly can start with components being erected on top of the foundation (see Figure 3-15).

Assembly of the WTG on the floating foundation would occur for each FWT one at a time. Full assembly of each FWT is expected to take approximately 2 weeks; approximately 2 months for all four FWTs.

The launching option from the designated port is to use a semi-submersible barge. The first FWT fully assembled would be towed on a cargo barge from the port to the offshore VSFB Project area. Following removal of the first FWT from the port, the same process would be repeated for assembly the remaining three FWTs. Infrastructure at the offshore VSFB Project area would already be installed (i.e., mooring anchors and lines) by the time the first FWT is towed to the Project area for installation.

Figure 3-15. IDEOL Semi-Submersible Barge Construction Site Example

IDEOL proposes to tow the FWTs one at a time from Port Hueneme to the offshore Project area. The first FWT would be positioned at its respective location within the mooring field and connected to the mooring lines. The same process would be repeated for the second, third, and fourth FWT.

Floating Platform Mooring Arrangement and Installation

To maintain the site positioning of the FWTs, IDEOL proposes a Station Keeping System (SKS) design composed of chain and synthetic rope. IDEOL's SKS system would be composed of 6 to 9 mooring lines arranged in 3 bundles, with a 120-degree angle between each cluster. The aim is to guarantee full redundancy of the SKS system. In case one line is damaged, the position would be maintained. The mooring radius (horizontal distance between the FWT and the anchor point) is typically between 1,640 to 3,280 feet depending on the bathymetry and sea conditions.

Two anchoring options are being investigated for the proposed Project:

- Suction Piles: This technology uses anchors that are sensitive to soil data. The typical mass of this type of anchor varies from 22 to 44 U.S. tons (see Figure 3-16).
- Drag Embedment Anchors: These anchors can be installed in a large range of soil types and are sensitive to mooring loads. Typical mass for FWT uses are in the range of 17 to 33 U.S. tons (see Figure 3-17).

Figure 3-16. IDEOL Suction pile installation

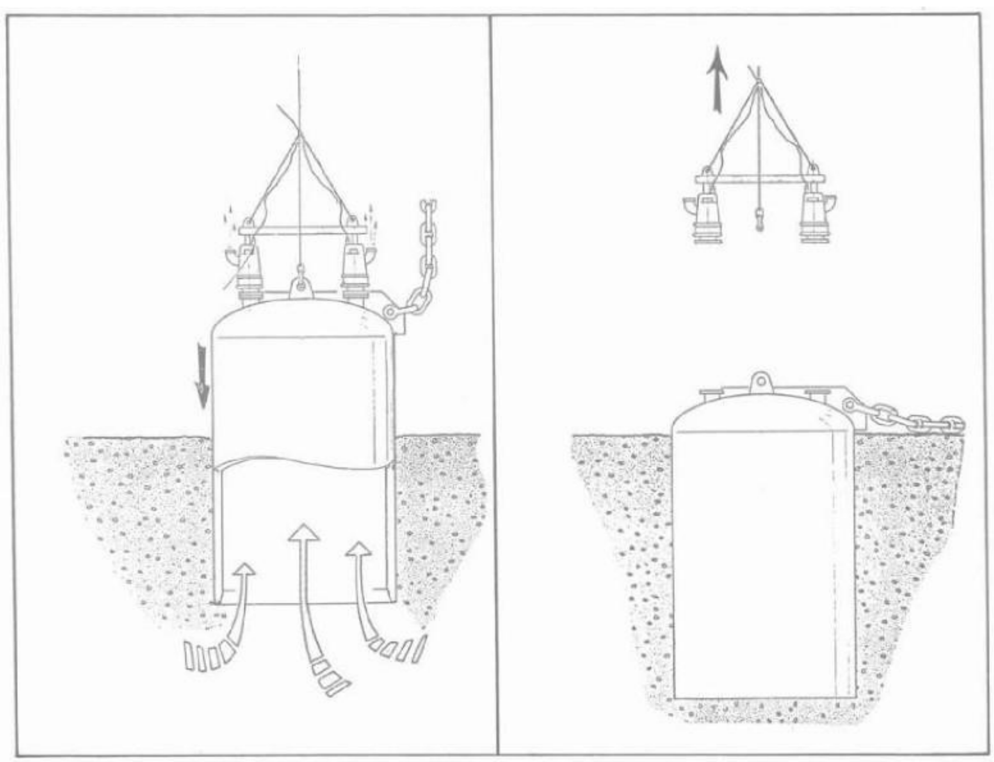
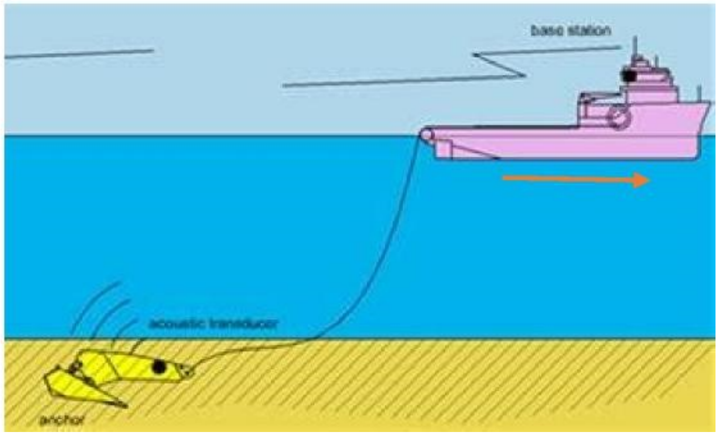


Figure 3-17. IDEOL Drag Embedment Anchor Installation

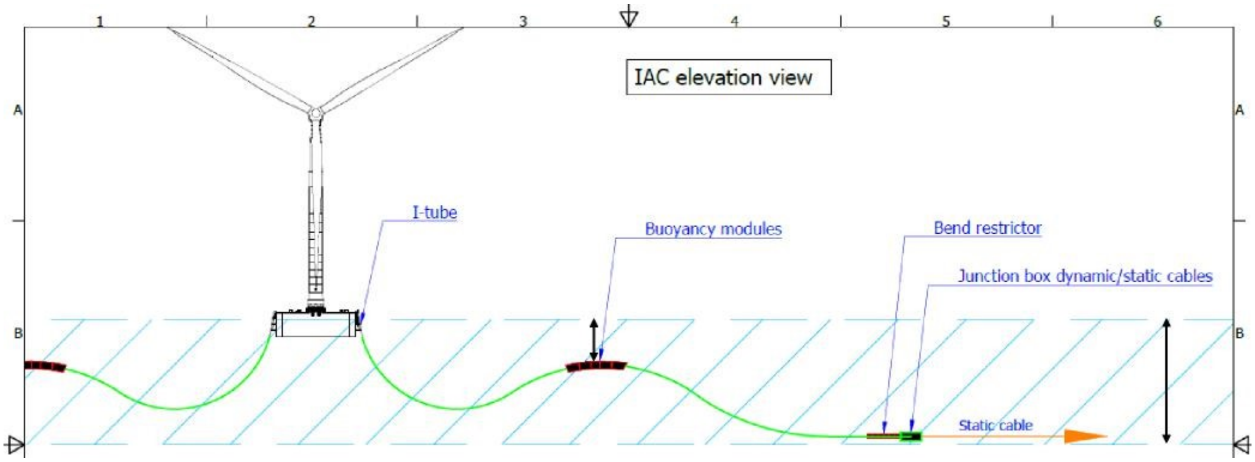


IDEOL's initial investigations show that the anchoring system design that would most likely be selected is the suction piles. The anchors and mooring lines would be pre-installed offshore prior to arrival and installation of the FWTs. IDEOL proposes to tow the FWTs one at a time from Port Hueneme to the offshore Project area. The first FWT would be positioned at its respective location within the mooring field and connected to the pre-laid mooring lines. The same process would be repeated for the second, third, and fourth FWT.

Inter-Array Cables (IAC)

The IACs connect the FWTs and serve as the electrical collection system. Each IAC is made of three copper conductors (three phases), one fiber optic cluster, filling elements, protective armor wires, and outer sheathing. The IAC must be able to accommodate all movements of the floating foundation and environmental loads (i.e., wind, waves, current, and other external forces), as well as its own weight. To reduce the loads on the IAC, the cables would be suspended mid-water by means of controlled buoyancy. A typical IAC configuration is composed of one buoyant section leading to a lazy wave shape (see Figure 3-18).

Figure 3-18. IDEOL Inter-Array Cable Elevation View



The IAC can also be fitted with protective shells (URADUCT® product or equivalent) or hard mattresses at the touch-down-point location in order to prevent excessive wear caused by constant friction with the seabed due to cable motion. The load of the IAC would be sustained by a small anchor, which would prevent the static cable from moving on the seafloor.

The IAC system would be connected once all the FWTs are installed. Upon arrival at one of the FWTs, the CLV would lay all the cable until its end at sea, including its buoyancy modules and protection jacket. From the seafloor, the trenched static cable would connect to an IAC connected to the most southwestern FWT.

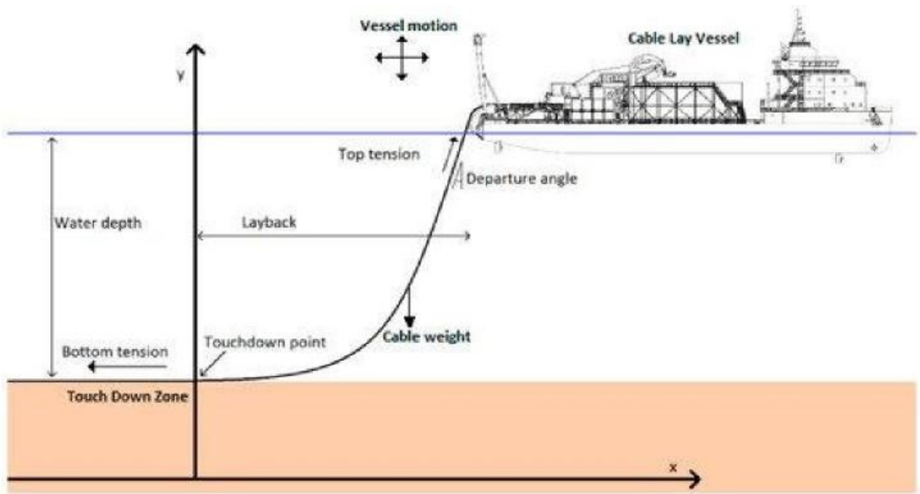
Static Cable

A static cable would be installed from the southwestern-most FWT to shore to convey energy from the wind turbine field to the onshore cable landing site. The voltage rating of the cable is anticipated to be 66 kV. The onshore cable landing would be drilled using the HDD method from an entry hole onshore to an offshore exit hole. From the offshore cable exit pit, installation of the static cable would start with laying of the cable on the seafloor from the CLV out to the offshore FWT field area. After the cable is laid on the seafloor, the process for trenching and burial of the cable would occur for this section of cable.

The CLV would progress slowly along the proposed cable route guided by the vessel survey/positioning system. The CLV would lay the cable into the laying corridor, up to the first lazy wave Mile Post signaling the suspended part of the cable (see Figure 3-19). The corridor width and shape would depend on the depth of water and shape of the cable route. IDEOL is currently considering a 100-foot in corridor width for the Project.

Burial is the primary method of protection for the installation of static cables. Potential burial methods being considered by IDEOL include cable burial ploughs, tracked cable burial machines, free swimming remotely operated vehicles (ROVs) with cable burial capability, and burial sleds. IDEOL indicates that cable ploughs would likely be the preferred method; however, further analysis would be undertaken to select the best cable burial method.

Figure 3-19. IDEOL Cable Lay Elevation View



If cable protection cannot be achieved by cable burial, or for operational reasons cable burial is not the preferred method for cable protection, there are a number of other alternative cable protection methodologies available to ensure subsea cables are protected, such as concrete mattresses, rock dumping, grout or sandbags, URADUCT® product, and articulated metal shell connectors.

Trenching on the seafloor is anticipated to be done with a towed plow. The machine would be equipped with a high pressurized water cutter to help open the trench. The water jet is optional and would be started if the soil condition is too hard for the plow. Depending on soil conditions, the trench dimensions will be as small as possible. For any section of the cable route that cannot be trenched with the plow, remedial work would be performed afterwards by placing rock over the cable or through the installation of concrete mattresses.

A fiber optic cable would be embedded in the proposed static cable to give setpoints to the machinery and read data onshore through SCADA (software that collects all sensors and monitoring results).

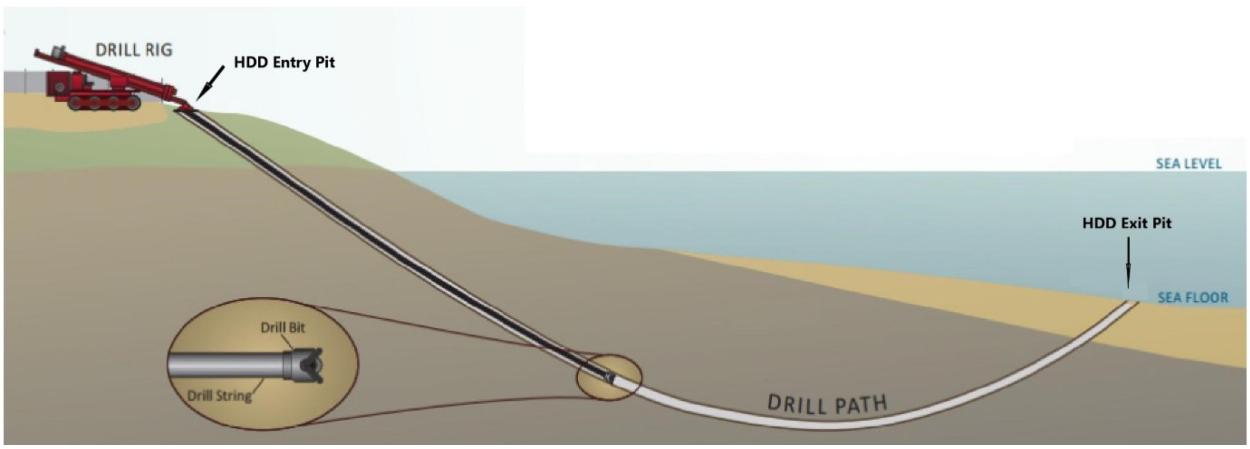
3.1.5 Onshore Project Components and Construction

CADEMO AND IDEOL

Onshore Cable Landing and New Substation

CADEMO and IDEOL propose to build new substations to serve as the onshore connection (i.e., landing) site for the offshore static cable. Figures 3-2 and 3-3 show the alignment of the cable landing site and location of the new substation for both Projects. Both Applicants propose to install their offshore cables at the cable landing site using the HDD method. The HDD method is used to create a long, subsurface hole from an onshore HDD entry pit located at the proposed substations to an offshore exit pit in the ocean along a pre-designed alignment and profile. A drill rig, adjacent to the onshore HDD entry pit, would use a drill bit and a drill string (a series of drill pipes) with drilling fluid to bore the hole. During drilling, a directional guidance system (survey equipment) would be used to navigate the borehole along its pre-designed alignment and profile. Figure 3-20 illustrates a conceptual profile of an HDD borehole.

Figure 3-20. Conceptual Profile of an HDD Borehole



Following the completion of the drilled hole, a HDPE duct (i.e., flexible pipe) would be installed. Later, the electrical static cable would be installed from offshore to onshore and connected to the new substations.

To facilitate transfer of the cable from land to the cable laying vessel, the cable would be supplied with suitable wire sock cable grips which would facilitate the pull-out operations from shore and to the vessel. After the onshore cable end is secured, the cable would be paid out on the seabed by the CLV After the onshore cable end is secured, the cable would be paid out on the seabed from the CLV. During the initial installation and shore-pull stage of the operation, the vessel would set-up as close to shore as feasible, ideally during highest tide to maximize the working depth. See Section 3.1.3, Static Cable, for CADEMO and IDEOL for description of trenching and laying methods of the static cable on the seafloor.

As previously explained, the new substation for both Projects would be the receiving site for the static cable. The station would serve to collect the static cable from the HDD borehole and transition the cable for connection to a new overhead transmission line; a

70kV line for CADEMO and 66kV line for IDEOL. CADEMO indicates that the proposed substation construction would include the following:

- Grading of the substation area
- Installation of a grounding mat and rods
- Excavation and construction of foundations for the transformers, power circuit breakers, and structures
- Erection and placement of the steel work and all outdoor equipment
- Electrical work for all the required terminations
- Chain link security fence enclosed around the entire substation

IDEOL indicates that the proposed substation construction would include the following:

- Dead-end structure for the 66 kV transmission line from Substation N
- Substation circuit breaker to provide protection for the electric static cable and the overhead 66 kV transmission line to Substation N
- Bi-directional metering for selling and purchasing of power
- Synchronizing equipment (if not located at the FWTs)
- Building (246 square feet) to house the substation controls, fiber termination, communications equipment, and a small space for an operations/maintenance office

CADEMO

Overhead Transmission Line

From the proposed new substation, a new overhead transmission line will run for approximately 11 miles to the existing Surf Substation. The proposed line has a design using 46, 70-foot-tall poles and two, 110-foot-tall poles for extra clearance. CADEMO expects that the overhead transmission line installation contractor would construct the power lines in the following order, using standard utility practices:

- Phase 1 – Support structure foundation installation
- Phase 2 – Erecting the support structures
- Phase 3 – Stringing the conductors

Additional information is needed to determine the location of pole work areas at proposed pole locations. Final design would determine power pole locations and foundation design for the wood poles and steel poles may vary based on the site-specific geotechnical studies to be conducted during the development of an EIR. Wood poles and light-duty steel poles would be direct buried in the ground and would not require foundations. The poles would be placed directly into augured holes. Tubular steel poles would have concrete pier foundations approximately 5 to 7 feet in diameter and would be set approximately 15 to 30 feet below ground. Pole work areas along the route would be parallel and adjacent to Coast Road. As such, work areas could be accessed from Coast Road. At least two staging areas on the VSFB would require approval from the DoD, one proposed at the new substation location and the other further north towards the Surf Substation location. CADEMO anticipates that these staging areas would also be used to store construction equipment and materials for the duration of construction. Pull and tension activities are expected to include guard structure installation, pull and tension equipment staging, temporary pole anchor installation, and pulling and tensioning of the conductor.

Improvements to Surf Substation

Upgrades to the Surf Substation would be required; however, the expansion would likely be marginal if CADEMO is allowed to replace and house equipment within the existing substation facility. If CADEMO is not allowed to use the existing substation facility, then an expansion would be required for a new transformer station that would double the size of the Surf Substation.

IDEOL

Overhead Transmission Line

The proposed new 66 kV overhead transmission line (gen-tie line) would leave the new substation and follow the existing 12 kV distribution line route up to Substation N for a distance of approximately 4.2 miles. From Substation N, the electricity would be distributed to VSFB (see Figure 3-21). When it is possible to travel along the same path, the new transmission line would be combined with the existing distribution line on new poles, replacing the existing 12 kV distribution line poles. Where the lines could be combined, and poles replaced, would be determined during the layout design of the transmission line. The proposed onshore transmission line would be approximately 100 feet in height to maintain clearances from line to ground and line to road. IDEOL also proposes to connect to the CAISO power grid, which would require additional infrastructure (i.e., transmission line, etc.). Additional information is required from IDEOL to determine the location and extent of additional infrastructure to connect to the CAISO system.

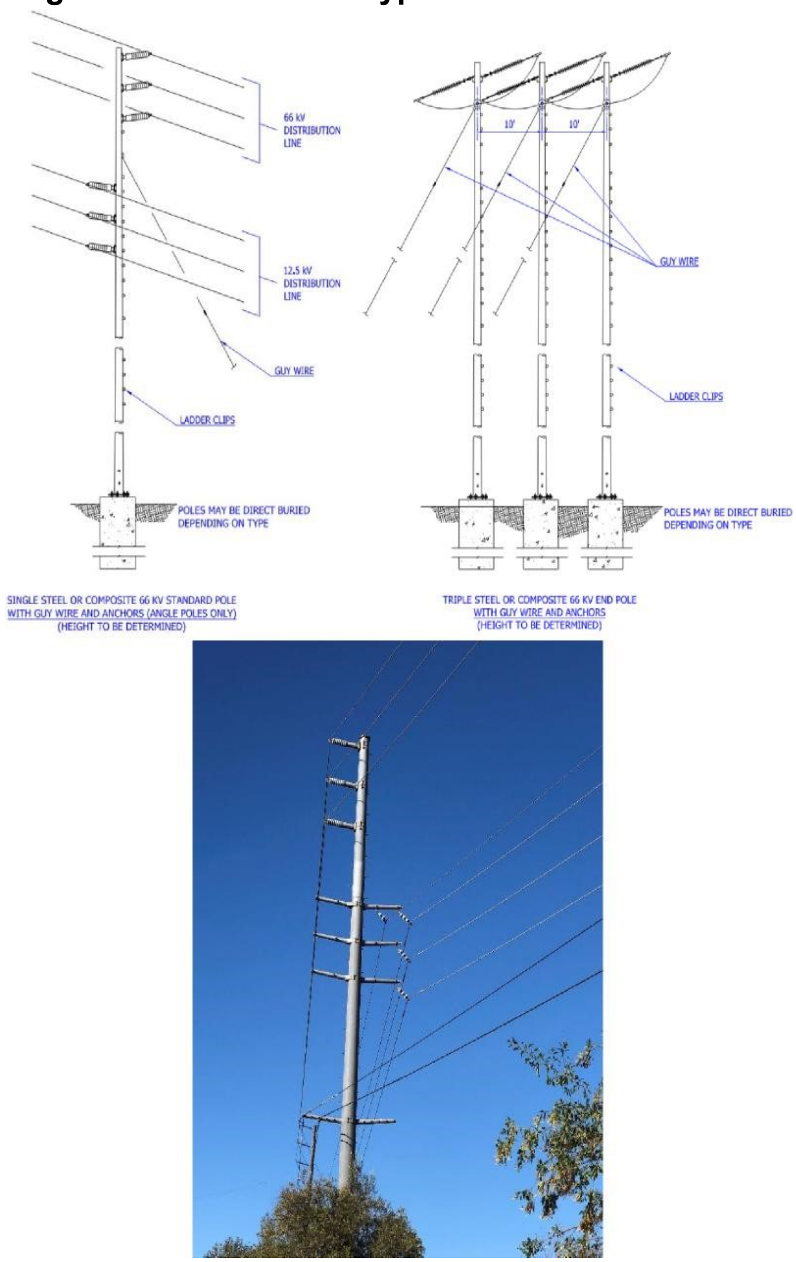
The proposed onshore transmission line would be constructed overhead on wood H-frame structures or poles up to approximately 100 feet in height to maintain clearances from line to ground and line to road. Foundations would be installed to a depth of up to 25 feet depending on site geotechnical conditions, and electrical cables would be strung via spool truck and crane. Cables would be tensioned to the appropriate sag height (see Figure 3-22). The transmission line would cross the railroad and all roads overhead to bring the power from the FWT Substation to VSFB’s Substation N. The crossings would be similar to the existing 12 kV distribution line crossings, but the 66 kV transmission line would run at the top of the pole, and the 12 kV distribution line would run beneath it. Once the proposed transmission line conductors are installed, the 12 kV line would be transferred to the new poles. The old poles would then be removed for recycling or disposal.

Figure 3-21. IDEOL FWT Substation and 66kV Transmission Line Route

Improvements to Substation N

The 66 kV transmission line from the proposed new substation would end at Substation N. Substation N would need to be expanded to provide a termination point for the transmission line. The proposed location of the expansion may change during the detailed design phase. According to IDEOL, 20 MW of renewable electricity would be provided to VSFB, and 20 MW of electricity could be provided to the CAISO. Additional information is required to determine the additional infrastructure improvements required for connection to the CAISO power grid.

Figure 3-22. IDEOL Typical Transmission Poles



3.2 OPERATIONS AND MAINTENANCE

3.2.1 CADEMO

Operations and Maintenance

The proposed FWTs and support structures may need periodic maintenance and repair during the operational life of the Project, which would include periodic visits to the FWTs for inspection activities. It is anticipated that approximately 10 to 12 personnel will be involved in operation and maintenance activities. Following initial commissioning and operation of the FWTs, the steady state operational vessel visits would be approximately four times a month by one dedicated support/maintenance vessel, similar in size to a medium-sized fishing boat. Port Hueneme would continue to be used as needed for work vessels, equipment, and materials to support maintenance repair activities for the FWTs. The new onshore substation and overhead transmission lines may also need periodic maintenance and repair work. The same construction access roads would be used to support maintenance repair activities for onshore facilities.

Operational Navigation Safety and Floating Wind Turbine Safety Devices

The CADEMO Project proposes to create a 1,968-foot radius exclusion area around each turbine. It is anticipated that this radius could be reduced following completion of the appropriate mooring and anchoring designs. Infrastructure outside of this exclusion area would be buried on the seafloor to a depth of 5 feet. However, CADEMO estimates that cable protection measures would be required from the HDD exit hole out to a distance of approximately 0.36 to 0.4 miles (645 to 704 yards) before a suitable sediment depth is reached to allow cable burial to 5 feet.

See Appendix D for further description of proposed wind turbine safety devices and navigation safety measures.

3.2.2 IDEOL

Operations and Maintenance

Proposed Project operations and maintenance activities would include electrical and mechanical testing, occasional repair work, and ongoing maintenance of the equipment. Up to 12 personnel and four vessels per month would be needed to complete system maintenance activities. Port Hueneme would continue to be used as needed for work vessels, equipment, and materials to support operations and maintenance activities for the FWTs. The proposed onshore substation and overhead transmission lines may also need periodic maintenance and repair work. The same construction access roads would be used to support maintenance repair activities for onshore facilities.

Operational Navigation Safety and Floating Wind Turbine Safety Devices

During the operations of the proposed Project, only the proposed lease area would be precluded from public navigation. See Appendix D for further information on wind turbine safety devices and navigation safety measures.

3.3 DECOMMISSIONING

3.3.1 CADEMO

The decommissioning process for the CADEMO turbines would essentially be a reversal of the installation process. The FWTs, electric cables, mooring lines, and anchors would be removed working from offshore towards onshore. Port Hueneme would be used for the staging of work vessels, equipment, and materials. For the buried sections of the electric cables, a Risk Assessment would be used to determine if removal would be more environmentally damaging than leaving the electric cables in place. For any sections of the cable with rock or hard armoring on the seafloor, the armoring material and cable would be removed. A suitably qualified and experienced offshore wind installation contractor would be used to perform and guide the overall decommissioning operations.

CADEMO Corporation's default position is that the onshore land facilities would be re-purposed for future use by VSFB. Best industry practice would be used to remove the overhead transmission lines if they are not required for an alternative use, with all materials being recycled or, where not practicable, appropriately disposed of at an approved facility. The same construction access roads would be used to support decommissioning activities for onshore facilities.

Any waste produced during decommissioning operations would be removed from the site on board a service vessel and disposed in accordance with all applicable regulatory requirements. A post-decommissioning seabed survey would be carried out and a decommissioning report would be provided to the CSLC for review and approval.

The EIR for the proposed Project would include further description of methods for deconstruction and disposal of Project facilities, including access to construction and staging areas. The environmental impacts of decommissioning activities would be analyzed and mitigation measures incorporated.

3.3.2 IDEOL

IDEOL's decommissioning process would include the disconnection and removal of all electrical cables, mooring lines, and anchors, as well as the tow back, dismantlement, and removal of the floating foundations and wind turbine components. The FWTs, electric cables, mooring lines, and anchors would be removed working from offshore towards onshore. A local port (potentially Port Hueneme) would be used for the staging of work vessels, equipment, and materials. The buried electric cables would be assessed to determine feasibility and environmental sensitivity regarding removal of the cables or leaving the cables in place if it could be demonstrated that there could be unacceptable environmental damage or safety risks associated with removal.

If the proposed onshore facilities could not be repurposed for DoD operations, then the substation, overhead transmission lines, and improvements at Substation N would be disconnected, dismantled, and removed for disposal and recycling. The same construction access roads could be used for removal of onshore facilities.

The EIR for the proposed Project would include further description of methods for deconstruction and disposal of Project facilities, including construction access and staging areas and the identified port location. The environmental impacts of decommissioning activities would be analyzed, and mitigation measures incorporated.

3.4 POTENTIAL ALTERNATIVES

The following is a preliminary description of alternatives to the proposed Projects that are anticipated to be considered for evaluation in an EIR. Description of the alternatives is primarily limited to the components of the alternatives that are different from the project descriptions for both Projects as previously described. Unless specified, all other components of the alternatives are consistent with the Project Description for both Projects. Other alternatives are anticipated to be developed with further Project scoping and public input.

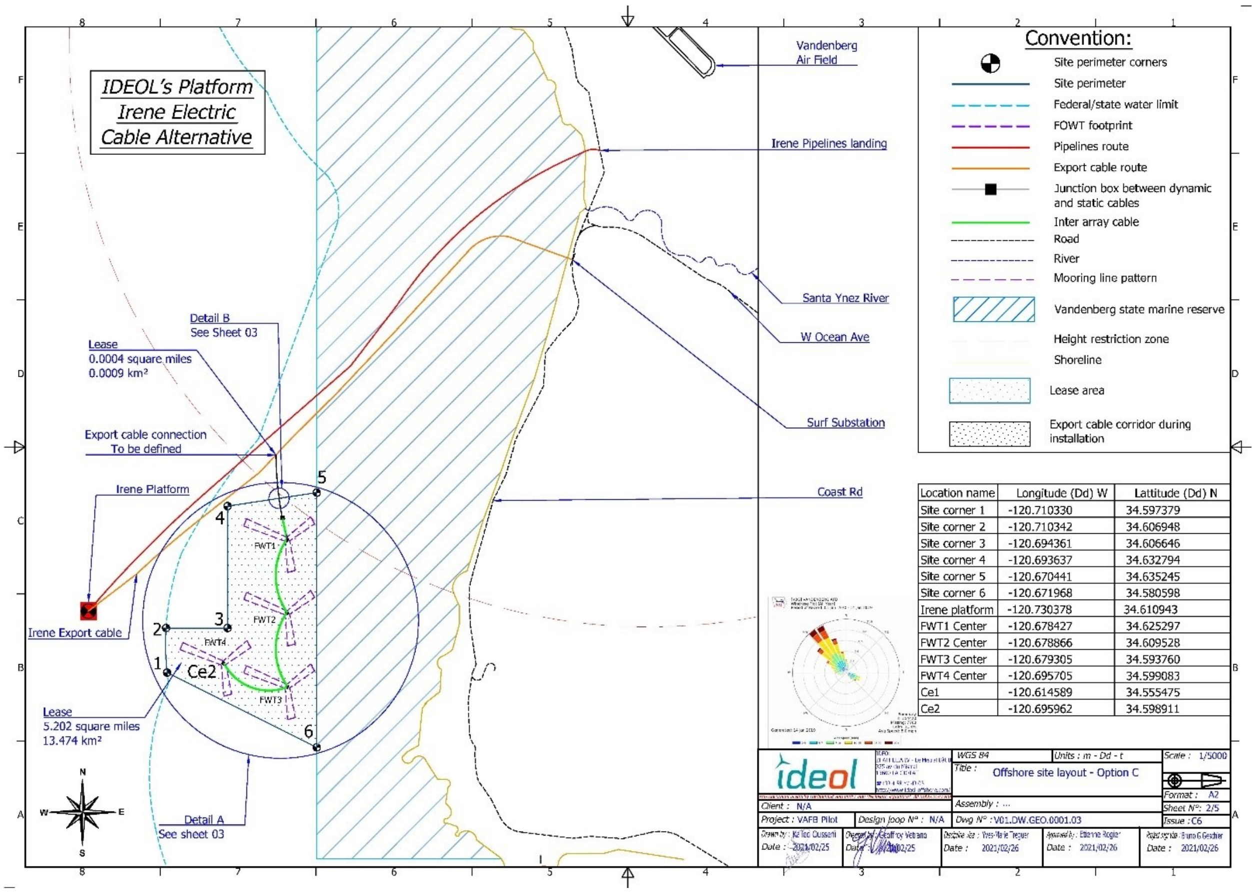
3.4.1 IDEOL

Platform Irene Cable Alternative

From the northernmost wind turbine, IDEOL proposes to connect the static cable to the existing Platform Irene electric cable (Figure 3-23). The static cable would be trenched below the seafloor (as described Section 3.1.4) at its connection with the Irene cable and spliced into the Irene cable. The Irene cable is currently described as buried under accumulated sediment and no further trenching or burial is currently proposed by IDEOL. The Irene cable connects onshore to the existing PG&E Surf Substation. According to IDEOL, the Irene cable has a maximum capacity of 25 megawatts.

Existing cable termination and metering equipment would be modified within the existing footprint of Surf Substation to comply with PG&E interconnection requirements. In comparison to the Project Description, this alternative would substantially minimize the extent of offshore cable laying and trenching and onshore infrastructure.

Figure 3-23. IDEOL Platform Irene Cable Alternative



Location name	Longitude (Dd) W	Lattitude (Dd) N
Site corner 1	-120.710330	34.597379
Site corner 2	-120.710342	34.606948
Site corner 3	-120.694361	34.606646
Site corner 4	-120.693637	34.632794
Site corner 5	-120.670441	34.635245
Site corner 6	-120.671968	34.580598
Irene platform	-120.730378	34.610943
FWT1 Center	-120.678427	34.625297
FWT2 Center	-120.678866	34.609528
FWT3 Center	-120.679305	34.593760
FWT4 Center	-120.695705	34.599083
Ce1	-120.614589	34.555475
Ce2	-120.695962	34.598911

Burial of Inter-Array Cables (IAC)

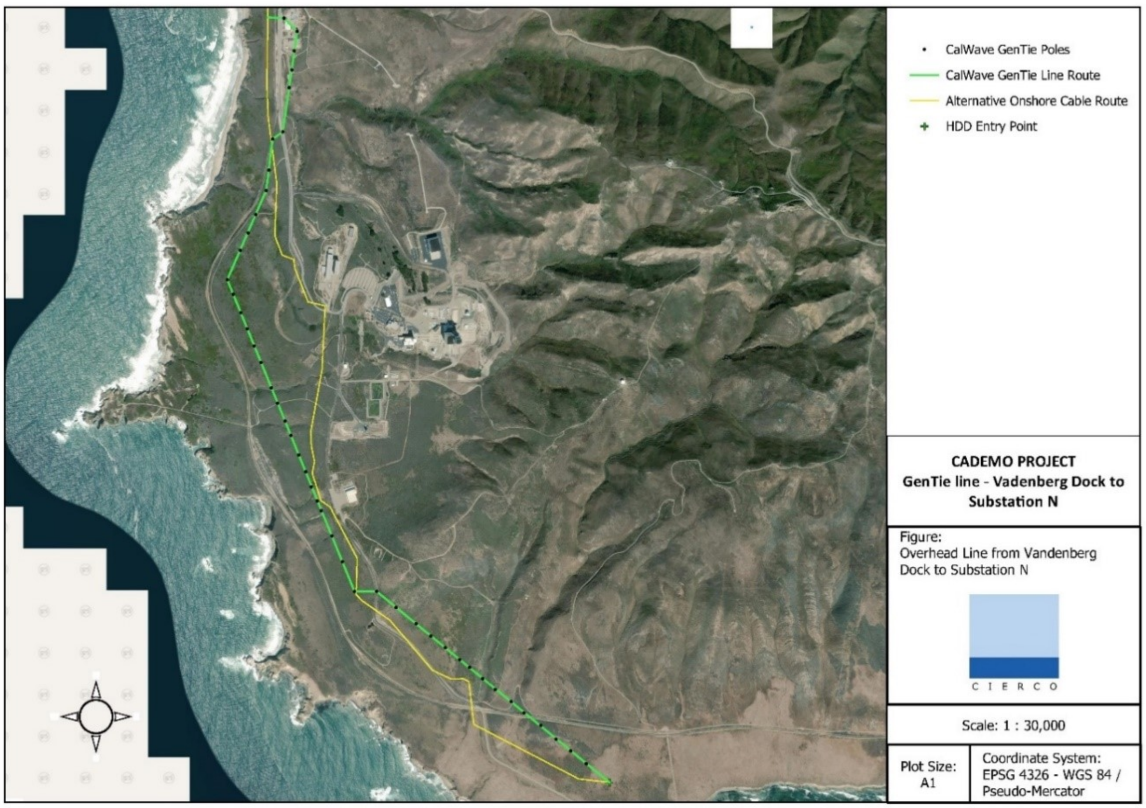
As an alternative to suspension of the IACs at a mid-water column depth (as shown in Figure 3-18) between the FWTs, IDEOL proposes burial of the IACs. The IACs would be buried 5 feet below the seafloor using the same cable laying and trenching methods described for the static cable in Section 3.1.4. All other components of the Project Description would remain the same.

3.4.2 CADEMO

Alternative Overhead Transmission Line Route

As an alternative to the overhead transmission line route from the new substation to Substation N (see Section 3.1.4), CADEMO is proposing an alternative transmission line route that more closely follows the alignments of Tow Road and Coast Road (Figure 3-24). The same construction methods are expected to be used for this alternative alignment as described in the Section 3.1.4.

Figure 3-24. CADEMO Alternative Overhead Transmission Line Route.



<u>Connection to Substation N</u>

Under this alternative, the proposed onshore overhead powerline would terminate at Substation N to provide some of the energy output to VSFB. Additional information would be needed to determine the additional infrastructure requirements for connecting to the CAISO power grid. CADEMO expects that work at Substation N would occur within the expanded substation footprint. The gen-tie line would terminate within the substation perimeter into a 70kV overhead switchgear arrangement with an interface design to the VSFB existing 70kV system. This design will require closer coordination with VSFB grid staff and likely PG&E to assure compliance with existing system design envelope and requirements. A temporary work area would likely be set up in the parking lot. This temporary work area would be used during the asphalt removal and finish grading, adjacent vegetation management, and new fence installation at the substation. Site preparation, removal of some existing structures, surface blading to achieve a final grade, and fence line relocation are proposed as part of construction. As such, the work area is not proposed for restoration, because the grading would be part of the final design.

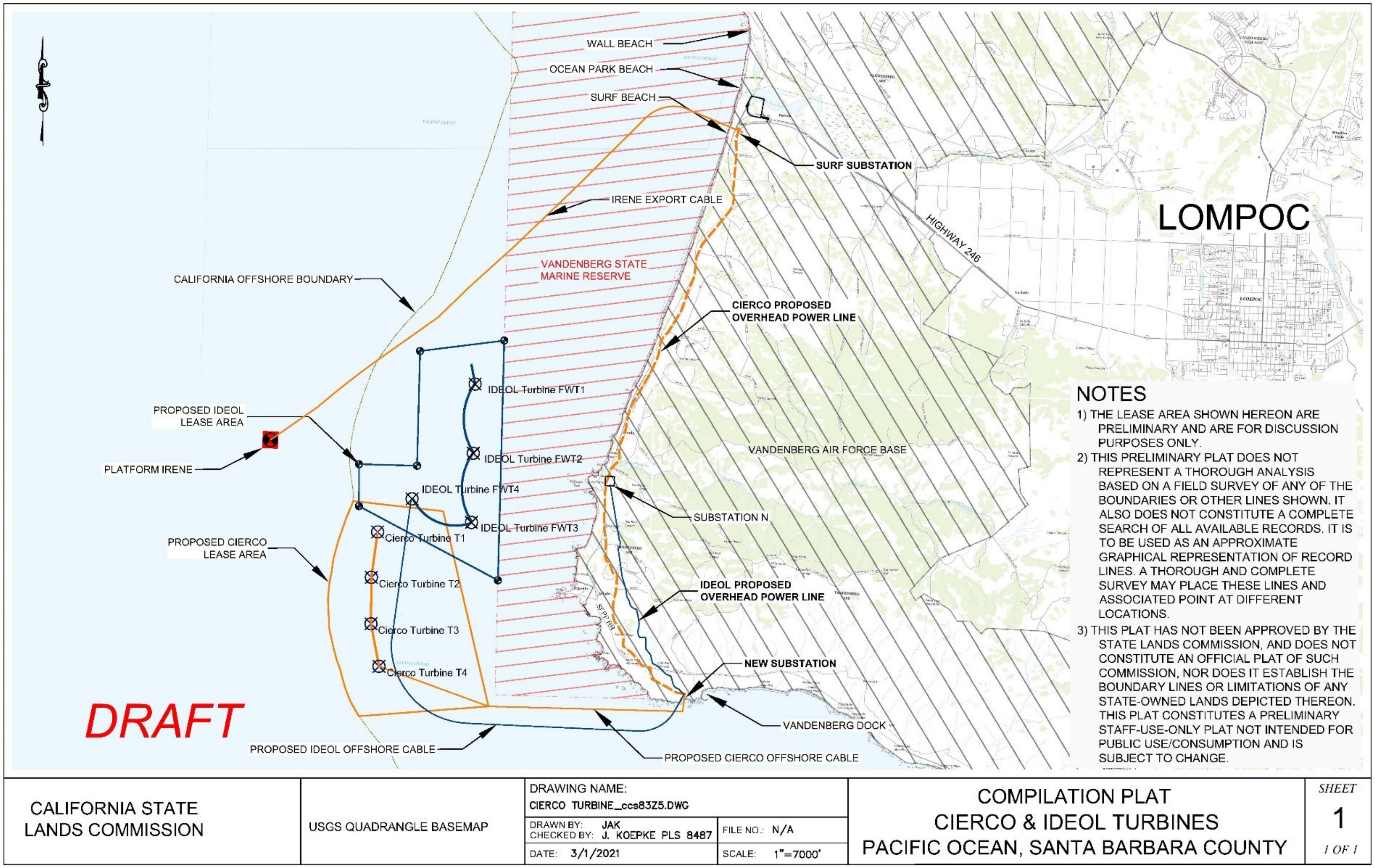
3.4.3 Alternatives Applicable to Both Projects

Implementation of Both Projects

While the CSLC retains absolute discretion on whether to approve or deny one or both lease applications, CSLC staff is obligated to process both lease applications. Therefore, CSLC staff must evaluate a potential scenario where both applications may be approved by the CSLC. This alternative describes implementation of both Projects concurrently. Figure 3-25 provides an overlay of both Projects as described with the Project Description. It is anticipated that multiple port locations would be needed to serve the construction needs of both Projects. There are many challenging factors to determine the feasibility of this alternative, including but not limited to:

- Feasibility of multiple ports to be used concurrently for construction of the floating foundations and wind turbine generators for both Projects.
- Feasibility of existing power grid transmission systems to transmit increased energy output from both Projects. Identification of any required improvements with existing transmission systems.
- Substations and local and regional transmission lines connecting to the California Independent System Operator grid.
- Potential need for realignment of the IDEOL static cable through the CADEMO lease area to avoid potential impacts with CADEMO Project mooring systems and cable layout.
- Feasibility of construction activities (offshore and onshore) to occur concurrently at the VSFB Project area.
- Feasibility of two separate new substations and HDD sites for each Project. Both Projects propose the same location for the new substation with different HDD routes.
- Feasibility of two different onshore transmission line routes as described with the Project Description for both Projects or one line serving both Projects. As explained above, CADEMO is proposing an alternative transmission line route very similar to the route proposed by IDEOL.
- Feasibility of two separate transmission line connections to Substation N and Surf Substation for each Project.

Figure 3-25. Combined CADEMO and IDEOL Projects



Consolidation of Project Description for Both Projects

This alternative considers the feasibility of consolidating components of the Project Description for both Projects to reduce the footprint and associated impacts of the Projects. Consolidation of Project components could include consideration of the following:

- Feasibility of multiple ports to be used concurrently for construction of the floating foundations and wind turbine generators for both Projects.
- Feasibility of merging the IDEOL static cable with the CADEMO static cable into one joined cable or co-locating the two separate cables into one cable corridor trench on the seafloor.
- Feasibility of one HDD site for the onshore landing of the static cable(s) as explained with the above bullet.
- Feasibility of one new substation for both Projects at the same proposed location.
- Feasibility of one new consolidated transmission line for both Projects or co-locating two separate transmission lines for both Projects on the same transmission line towers for one transmission line corridor, to transmit power from the new substation to Substation N and Surf Substation.
- Feasibility for all electrical components (i.e., offshore cables, new substation, transmission line(s), improvements with existing substations, etc.) to separate the energy output of both Projects.

Substation Co-Location on Floating Wind Turbine

With both Projects, there is potential that the new substation could occur on one of the FWTs instead of onshore near the Vandenberg Boat Dock. Additional information is needed to further describe this alternative, including the onshore landing of the static cable and connection to the onshore transmission line.

Other Offshore Site Locations

The EIR for the proposed Projects would consider the feasibility of other offshore locations for the FWTs, including locations in the outer continental shelf in federal waters. Locating the FWTs in a different location is anticipated to require a new or amended application process with the DoD.

4.0 ASSESSMENT OF POTENTIAL ENVIRONMENTAL IMPACTS

4.1 INTRODUCTION

4.1.1 Objectives and Scope of the Preliminary Environmental Assessment (PEA)

The PEA is an early information document to assist with the scoping process for a formal assessment of environmental impacts under the California Environmental Quality Act (CEQA). The PEA is not intended to include the content and in-depth analysis of an Initial Study or an Environmental Impact Report (EIR) but is intended to serve as a foundation of information for future analysis. Section 4.0 is streamlined to cover the proposed CADEMO and IDEOL Projects and identifies key differences between them.

Additional information is needed to determine if proposed Project activities at Port Hueneme and other potential port locations would be covered within existing permitted activities or if they would be subject to additional permitting authorization and CEQA review. The Project Description provides a general description of all proposed activities for both Projects at Port Hueneme. Due to these information gaps, potential impacts are not assessed at Port Hueneme and other port locations within Section 4.0.

Further scoping and information gathering is needed to identify and analyze cumulative impacts through the CEQA process; therefore, cumulative impacts are not assessed in this PEA.

Each affected resource will start with a brief description of existing Project setting information. The preliminary impact assessment for each resource will identify the Project components with potential to affect the resource and describe the potential impacts to the resource. The impact assessment will attempt to provide a general qualitative assessment of potential impacts from the Projects. At this early stage of information gathering, it is not the objective of this PEA to include an in-depth analysis of impacts with supporting information; specific impact determinations (level of impact severity) will not be identified.

Section 2.3.3 provides a summary of the comments received from the stakeholder outreach efforts. Input from stakeholder comments related to specific resources is also included, including recommended data sources to assist with analysis of impacts under CEQA. This information is included as applicable to the environmental setting and impact assessment for specific resources.

To guide assessment of onshore Project components and potential impacts for each affected resource, some of the key onshore differences between the two Projects include, but are not limited to:

- IDEOL's proposed overhead transmission line is limited to approximately 4.2 miles from the new substation to the existing VSFB Substation N.
- CADEMO's proposed overhead transmission line is approximately 11 miles from the new substation to the PG&E Surf Substation for connection to the CAISO grid.

The offshore assessment area is limited to the area adjacent to VSFB and vessel transit between the VSFB Project area and Port Hueneme. To guide assessment of offshore Project components and potential impacts for each affected resource, some of the key offshore differences between the two Projects include, but are not limited to:

- Different proposed total capacity (48 to 60 MW for CADEMO versus 40 MW for IDEOL).
- Different floating wind turbine lease areas.
- Different floating platform designs. CADEMO proposes to examine the performance of two distinct floating foundations (barge and tension-leg platform). IDEOL proposes to install 4 barge concrete foundations.
- Different floating wind turbine sizes (rotor diameter, length of blade, blade sweep area, and hub heights).
- Different floating wind turbine mooring line arrangements.
- Different static cable routes below the seafloor and trenching methods (jet trenching or traditional plough method).
- Different inter-array cable designs between the floating wind turbines (buried or weighted and suspended mid-water).
- Different turbine distances from the shoreline: the nearest turbine is approximately 2.5 nautical miles from shoreline for CADEMO whereas this distance is less for IDEOL (approximately 1.6 nm).
- Potential for transportation of wind turbine generators from Europe/Asia for IDEOL.

4.2 POTENTIALLY AFFECTED RESOURCES

4.2.1 Aesthetics

Santa Barbara County has a unique and diverse scenic landscape that is highly valued by visitors and County residents alike. There is great diversity in topography within the area, which includes coastal headlands, bluffs, dunes, terraces, inland valleys, foothills, and mountains. The most obvious features in the Project areas are the Santa Ynez Mountains and surrounding hills. North of Point Conception to Point Sal, the mountains along the coast are smaller and less angular than the Santa Ynez Mountains (Santa Barbara County 2008).

Coastal terraces from Point Conception to the Santa Ynez River range from 100 to 200 feet in elevation and vary considerably in width, from several thousand feet to 100 feet or less. North of the Santa Ynez River, wide sandy beaches and foredunes are prevalent up to where the Casmalia Hills abruptly drop 1,000 feet to the sea at Point Sal. Native vegetation is composed of shrub, oak, woodland, and modified grassland communities distributed unevenly across coastal bluffs, dunes, ravines, terraces, hills, and valleys (Santa Barbara County 2008).

The Pacific Ocean dominates views from the shore in the Project areas, which includes Surf Beach, Ocean Beach County Park, and Wall Beach. Platform Irene is visible from all of these beaches, including the UPRR. The negative visual impact of the platform was discussed in the 1985 Point Pedernales EIR/Environmental Impact Statement (EIS) and was characterized as significant and unavoidable (Santa Barbara County 2008). From points along the coast, occasional marine traffic is visible. Platform Irene is the only permanent, non-natural and clearly visible attribute in the offshore Project areas, as seen from the northern part of the onshore Project areas (see Figure 4-1 and Figure 4-2). Although Jalama Beach County Park is south of the Project areas, it is within an area for consideration of impacts to public viewsheds from shore. From Point Arguello to Point Conception, there are four large-scale oil platforms (Irene, Hidalgo, Harvest, and Hermosa) that can be seen on a clear day from shore.

The onshore Project areas lies within the VSFB boundaries. With the exception of power and communication lines and VSFB facilities, most of this land is undeveloped. The UPRR and numerous dirt and paved roads are prominent within the area. Transmission lines and utilities can be seen throughout the area (Santa Barbara County 2008).

Within the onshore Project areas, there are four rocket launch complexes sited on terraces approximately 1 mile to the east of the shoreline. At Point Arguello, which is near the southernmost rocket launch complex, there is a navigational light mounted on the top of a tall steel pole.

Figure 4-1. Platform Irene and Coastline from Surf Beach

(View west from Surf Beach with dunes in the foreground, Pacific Ocean and Platform Irene in the background) (Santa Barbara County 2008)

Figure 4-2. Platform Irene and Coastline from Amtrak

(View west from Amtrak train with Pacific Ocean and Platform Irene in the background)

Further south, where the new substation would be located, is the Vandenberg Dock. The dock consists of a landing and five circular mooring dolphins located in a small cove protected by a breakwater constructed of large granite boulders. On the top of the bluff that overlooks the cove is a two and a half story Colonial Revival structure that was built in 1935 as the headquarters and barracks building for the U.S. Coast Guard (USCG) rescue station that once operated at this location (Davy et al. 2017).

The 7.5-mile stretch of coast that extends from the Vandenberg Boathouse southward to Jalama Beach is relatively rural and undeveloped. The only structures in this area are at Sudden Ranch, located 4.6 miles south of the Vandenberg Boathouse, where there are several small ranch buildings and a small complex of bunkers that are no longer in use. Jalama Beach, located at the mouth of Jalama Creek just south of the southern boundary of VSFB, is a Santa Barbara County Park. Between Jalama Beach and Point Conception, the landscape on the coast is open and undeveloped. One of the few structures in this area is the Point Conception Lighthouse that was built in 1855 and is on the National Register of Historic Places. The lighthouse is 9.6 nm from the new substation and is in an area that is closed to the public (Davy et al. 2017).

The Amtrak Surfliner and Coast Starlight trains use the UPRR tracks that travel through this entire segment of coastline, and the Project landscape analysis should consider the potential visual impact of the Projects on passengers' views. Both trains are famous for the scenic appeal of their routes, which is emphasized in their marketing. One appeal of these trains is that they are the only way most people can see the coast within VSFB. The views through this section of the coast are dramatic due to the undeveloped nature of the coast and the proximity of the train tracks to the bluff edge (Davy et al. 2017).

Offshore Project Components and Potential Impacts

Onshore areas accessible to the public with offshore views of the Pacific Ocean include the UPRR (including the Amtrak Station at Surf Beach), Highway 246, a portion of Coast Road, Surf Beach, Wall Beach, Ocean Beach County Park, and Jalama Beach County Park. Several agency participants in the focused outreach meetings held February 3 and March 2, 2021, noted their interest and concern that the proximity of the proposed FWTs to shore would affect or degrade the visual quality of the coast. In particular, the California Coastal Commission participant commented on the scenic value of the California coastline to visitors and residents and stated that visual impacts would be a prominent component of their agency's evaluation of the proposed Projects. Similarly, tribal representatives expressed concern about the potential for the proposed Projects to negatively impact ocean views and spiritual practice.

The visual impact of the navigation safety lights on the FWTs would need to be evaluated. In addition, there would be a need to identify any lighting required at the new substation and parking lot and to establish measures to reduce their effects.

An EIR for the proposed Projects would further analyze the visual impact of the FWTs through field surveys, photo simulations, and other supporting information to determine impact significance. As a visual perspective, the Platform Irene structure stands 223 feet above the ocean surface. The tip height of the FWTs is 820 feet for CADEMO's FWTs and 669 feet for IDEOL's FWTs (see Tables 3-1 and 3-2). Specific Project considerations are as described below.

CADEMO FWTs

The northernmost FWTs (FWTs 1 and 2) from the proposed CADEMO lease area may not be visible from Surf Beach, Ocean Beach, and Wall Beach given their distances. Jalama Beach is located near the south coastal boundary of VSFB and has open views to Point Arguello to the north. Given the distance (approximately 17 or more miles), the southernmost FWT (FWT 4) may not be visible from Jalama Beach.

The towing of the FWTs from Port Hueneme to the Project areas could be visible from onshore public viewsheds along the FWT towing route (see Figure 4-8, Section 4.2.14, *Transportation*). All four CADEMO FWTs would be directly visible from Project vicinity viewsheds from UPRR passenger trains, such as Amtrak, particularly from onshore viewsheds in the Project area directly perpendicular to the four FWTs. During construction of proposed offshore infrastructure, work vessels may also be visible from public passenger trains in the Project area.

IDEOL FWTs

The northern most FWT from the proposed IDEOL lease area (FWT 1) would be approximately 7.5 miles from Surf Beach (see Figures 3-2 and 3-3). As illustrated with Figure 4-1, Platform Irene is visible in the distance on a clear day from the Surf Beach viewshed and the platform is approximately 2 miles further from Surf Beach than IDEOL's northern most FWT would be. Therefore, on a clear day, a distant view of FWT 1 would be expected from Surf Beach and, to a lesser degree, from Ocean Park Beach. FWT 2 may be minimally visible from Surf Beach and partially blocked from view by FWT 1. FWTs 3 and 4 may not be visible from Surf Beach given their distance from shore and being partially blocked from view by the other FWTs. The IDEOL FWTs may not be visible from Wall Beach, and only FWT 1 may be minimally visible from Ocean Beach given the distance from these beach locations to the proposed lease area. Similar to CADEMO's FWTs, all four IDEOL FWTs would be directly visible from UPRR public passenger trains. The towing of the FWTs from Port Hueneme to the Project areas could be visible from onshore public viewsheds along the FWT towing route (see Figure 4-8, Section 4.2.14, *Transportation*). During construction of proposed offshore infrastructure, work vessels could also be visible from the aforementioned onshore public viewsheds of the ocean.

Onshore Project Components and Potential Impacts

Onshore Project components include a new substation, expansion of Substation N and Surf Substation, and construction of an overhead transmission line. This infrastructure would contribute to onshore aesthetic landscape features in addition to the existing onshore transmission lines and utilities. IDEOL is proposing construction of a new overhead transmission line from the new substation near the Vandenberg boat dock to Substation N to the north, whereas the CADEMO Project would continue its transmission line an additional 6.8 miles north to the Surf Substation. The transmission lines of both Projects would be located along the east side of the UPRR, except for the section of transmission line along Tow Road, between the new substation and Coast Road, where the line would be west of the railroad with the potential to affect ocean views. The transmission line would parallel the east side of the railroad and would be directly visible from a close distance. These Project components would affect onshore public views from the Pacific Ocean, Surf Beach, and public passenger trains. During the construction of onshore Project components, the presence of construction vehicles, equipment, and building materials would be visible from these public use areas, including Highway 246, Coast Road, Surf Beach, and Ocean Park Beach.

4.2.2 Air Quality and Greenhouse Gas Emissions

Air Quality

Air quality at a given location can be described by the ambient air concentrations of specific pollutants that affect the health and welfare of the public. The significance of a pollutant concentration is determined by comparing the concentration to an appropriate national or State ambient air quality standard. Criteria air pollutants are defined as pollutants for which ambient air quality standards, or criteria, have been established for outdoor concentrations to protect public health.

Criteria air pollutants of concern are: ozone (O_3), carbon monoxide (CO), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), particulate matter 10 micrometers and smaller (PM_{10}), fine particulate matter 2.5 micrometers and smaller ($PM_{2.5}$), lead (Pb), sulfates, hydrogen sulfide (H_2S), vinyl chloride, and visibility reducing particles. The U.S. Environmental Protection Agency (USEPA) and California Air Resources Board (CARB) have established ambient air quality standards for many criteria air pollutants. These National Ambient Air Quality Standards (NAAQS) and California Ambient Air Quality Standards (CAAQS) are set at levels above concentrations (generally expressed in parts per million) that could be harmful to human health and welfare. The standards are designed to protect the most sensitive persons from illness or discomfort, with a margin of safety. Monitoring is performed to demonstrate attainment or nonattainment of the standards. Emissions within the proposed Project areas are estimated annually by the Santa Barbara County and Ventura County Air Pollution Control Districts (APCD). See below for the nonattainment designations for Santa Barbara and Ventura counties.

Onshore and Offshore Project Locations and Port Location

Onshore and offshore Project locations are in western Santa Barbara County. Santa Barbara County federal and State attainment statuses for criteria pollutants are provided in Table 4-1. Port Hueneme is located in Ventura County. Ventura County federal and State attainment status for criteria is provided in Table 4-2.

Table 4-1. Santa Barbara County Attainment Status

Pollutant	**State Standards**	**Federal Standards**
Ozone (O_3)	Nonattainment	Unclassified
Respirable Particulate Matter (PM_{10})	Nonattainment	Unclassified
Fine Particulate Matter ($PM_{2.5}$)	Attainment	Unclassified

Table 4-2. Ventura County Attainment Status

Pollutant	State Standards	Federal Standards
Ozone (O_3)	Nonattainment	Nonattainment
Respirable Particulate Matter (PM_{10})	Nonattainment	Unclassified
Fine Particulate Matter ($PM_{2.5}$)	Attainment	Unclassified

Offshore and Onshore Project Components and Potential Impacts

At this early stage of the Projects, the PEA does not include an analysis of potential emissions for criteria air pollutants. The Project proponents anticipate emissions coming from several sources, including the following:

- Port Hueneme where construction and assembly of the FWTs would occur
- Work vessels used for offshore construction of the mooring systems and electrical cable installation, including transits between Port Hueneme and the offshore Project area
- Vessels and support vessels for transporting the FWTs to the offshore Project area from Port Hueneme and connecting to the mooring systems and inter-array cables
- Onshore Project construction activities including the HDD, construction of the new substation, improvements to substations N and Surf, and construction of the 66 kV and 70 kV transmission lines

The largest source of emissions would likely come from the vessels associated with the offshore construction work. As Port Hueneme is the preferred port where the FWT assembly would occur, vessel transits to and from the port would transect Ventura County and Santa Barbara County APCDs.

As wind power is a clean energy source, emissions from operation of the FWTs are expected to be minimal and limited to support vessels for routine maintenance. At the time of decommissioning, emissions are expected to be similar to construction (e.g., vessel traffic to and from Port Hueneme).

Greenhouse Gases (GHGs)

Similar to air emissions, the PEA does not include an analysis of potential GHG emissions. GHG emissions are expected during all construction and decommissioning phases from the sources described above and would be minimal during operations. As a clean energy source during operations, both Projects propose to provide energy to the CAISO power grid, demonstrating offshore wind development as a renewable energy source and reducing California’s reliance on fossil fuels and resultant GHG emissions.

A 2019 report asserts that floating offshore wind produces 92 percent less GHG emissions per MW compared to natural gas (similar to nuclear and hydropower) (Bang et al. 2019). This study states that even though turbine manufacturing is the primary contributor to the life cycle GHG emissions, providing mitigation factors such as recycling, increasing the capacity factor and operational lifetime of the windfarm can heavily affect the overall lifecycle impact.

Moreover, a 2011 study referenced by University of Delaware conducted by PJM Interconnection & GE states that a 500 MW offshore wind project would reduce CO_2 emissions by 945,000 tons per year which is equivalent to removing 200,000 cars off the road. Considering the above estimates, the proposed 40-60 MW Projects could potentially reduce CO_2 emissions by about 151-227 million pounds, which is equivalent to removing 16,000 to 24,000 cars off the road.

A full environmental analysis of the proposed Projects under CEQA would consider air and GHG emissions for all phases (offshore and onshore) of the Projects. Public comments received during the development of the PEA recommend that staff consider information resources from the following website for evaluation of potential impacts to air quality: https://www.ourair.org/air-pollution-marine-shipping/.

4.2.3 Biological Resources – Marine

This section provides a preliminary assessment of the environmental setting and the potential short-term and long-term impacts of the proposed Projects on the biological resources in the ocean and nearshore habitats as a result of the construction, operation, and decommissioning of the proposed FWTs. This part of the coast and nearshore waters is also listed on the CSLC's "Significant Lands Inventory" pursuant to Public Resources Code section 6370 et seq. (Inventory of Unconveyed State School Lands and Tide and Submerged Lands Possessing Significant Environmental Values | CA State Lands Commission)(CSLC 1975). The parcel listed in the Inventory (parcel number 42-062-000), which includes a 1-mile strip of tidelands and submerged land in the Pacific Ocean immediately offshore of VSFB, is identified as possessing significant environmental values. Specifically, these lands are within the range of California brown pelican and California least tern, and the area is known to have large numbers of shorebirds. Nearly all of the parcel identified in the Inventory is within the VSMR.

The proposed Project areas are between the west boundary of the VSMR and the 3 nm State/Federal offshore boundary.

The offshore Project areas are part of an oceanographically complex and dynamic region, with strong seasonal upwelling and high primary production (i.e., phytoplankton blooms; Dugdale and Wilkerson 1989). Studies in this region have shown that these conditions support abundant and diverse habitats (e.g., Hardin et al. 1994).

The Point Arguello area lies inshore of the California Current system. It is an especially interesting part of the California Current system because it is characterized by a remarkable and systematic seasonal reversal in flow. Immediately shoreward of the California Current, along the central California continental slope and shelf, is the northward-flowing Davidson counter current that carries water out of the Santa Barbara Channel. A rapid spring transition to stronger southward winds occurs between March and June when the Davidson Current weakens and can even turn southward near the sea surface. These strong southward winds in the spring also induce intense upwelling near Point Arguello. During upwelling, surface water near the coast is transported offshore and is replaced by cool, nutrient-rich water from deep offshore (Santa Barbara County 2008).

Upwelling is an important feature of this coastal region and is largely responsible for its productive fisheries. The presence of nutrient-rich water near the sea surface significantly enhances primary productivity that is otherwise limited by the lack of nutrients within the photic zone (i.e., the ocean layer that receives sunlight). Phytoplankton are the foundation of the marine food web, and their increased abundance results in the great diversity and biomass of marine organisms along the central California coast (Santa Barbara County 2008).

The VSMR is a 32 square mile Marine Protected Area (MPA) within Santa Barbara County (see Figure 4-3). The area is characterized by its biological resources and diverse habitats, including rocky cliffs (critical nesting areas for seabirds), offshore reefs, hard and sandy bottoms, kelp beds, and tidal flats. A wide range of interactions among fish, invertebrates, seabirds, and marine mammals has been documented in the region, demonstrating the importance of this reserve as a component of the California network of MPAs.

Figure 4-3. Vandenberg State Marine Reserve

Marine Wildlife

Several species of concern inhabit California's coastal subtidal region including species protected under the Federal and State Endangered Species Acts (ESAs); the Marine Mammal Protection Act (MMPA); Migratory Birds Act; Magnuson-Stevens Fishery Conservation and Management Act; the California Department of Fish and Wildlife (CDFW) Fish and Game Codes; the National Oceanic and Atmospheric Administration (NOAA) species of concern lists; the U.S. Fish and Wildlife Service (USFWS) regulations; and the California Coastal Commission (CCC) that designate species as having a scientific, recreational, ecological, or commercial importance under the Coastal Act. See Appendix C for further description of environmental regulations applicable to the offshore Project areas.

Marine Mammals

The Project areas support many types of marine mammals, including cetaceans (whales, dolphins, porpoises), pinnipeds (sea lions, seals), and a single species of fissiped (sea otter). In total, approximately 40 species have the potential to occur off south-central California (Dohl et al. 1983, Bonnell and Dailey 1993, Takekawa et al. 2004). These include species that occur seasonally during migrations to or from calving or feeding areas; seasonal visitors foraging on a particular (usually abundant) food source; and year-round regional residents. For some species, the region represents the northernmost or southernmost extent of their range (Dohl et al. 1983, Bonnell and Dailey 1993) and their presence varies by season. Boreal marine mammals, those that typically occur in the cooler North Pacific waters, are usually observed in the Project areas from winter through early summer, whereas species typically found in warmer, subtropical waters to the south tend to occur in late summer and autumn. Boreal species include harbor porpoises (*Phoecoena phoecoena*), Dall's porpoises (*Phocoenoides dalli*), and the northern fur seal (*Callorhinus ursinus*). Warm-water species include bottlenose dolphins (*Tursiops truncatus*), Guadalupe fur seals (*Arctocephalus townsendi*), and pilot whales (*Globicephala* spp.). The most common baleen whale, the California gray whale (*Eschrichtius robustus),* migrates along the California coastline biannually. These migrations occur close to shore, with the majority of observed individuals during aircraft surveys occurring within 1.8 kilometers (km) of the coast (Herzhoucking and Mate 1984, Reilly 1984, Rice et al. 1984, Rugh 1984, Dohl et al. 1983, Sund and O'Connor 1974).

The Southern sea otter (*Enhydra lutris nereis),* a year-round resident of coastal south-central California, generally occurs in shallow coastal waters (Riedman and Estes 1990). Currently, sea otters occur from approximately Point Año Nuevo in the north to Coal Oil Point (Santa Barbara) in the south (USGS 2008). In a 2019 survey, 2,962 southern sea otters were counted in central California (Hatfield et al. 2019). During the breeding season (typically June to November) many members of the southernmost part of its population (in the Project vicinity) move northward towards the center of its range (Bonnell et al.

1983, Estes and Jameson 1983). The species is believed to be experiencing a range increase, including at the southern edge of its range (in the Point Arguello area).

The California sea lion (*Zalophus californianus),* harbor seal (*Phoca vitulina),* northern fur seal (*Callorhinus ursinus),* and northern elephant seal (*Mirounga angustirostris)* occur regularly off the coast and have breeding colonies in the region (Bonnell et al. 1983). Approximately half of the U.S. west coast California sea lion population (total population size estimated at more than 250,000 individuals) breed on the Channel Islands; San Miguel Island accounts for 45 percent of the total U.S. population (Laake et al. 2018).

Pacific harbor seals also breed on San Miguel Island, as well as Santa Rosa Island and at Carpinteria on the coast. Approximately 400 to 600 Pacific harbor seal haulout sites occur in California in a variety of habitats (Hanan 1996, Lowry et al. 2008). The majority of harbor seals in southern California (70 percent) have been observed at Santa Cruz, Santa Rosa, and San Miguel Islands (Lowry et al. 2008). In addition to these species, Steller sea lions (*Eumetopias jubatus)* and the Guadalupe fur seals (*Arctocephalus townsendi),* although extirpated as breeders in the region, are regular visitors. Marine mammal species with potential to occur in the proposed Project areas, including listed status as Threatened or Endangered are identified in Table 4-3.

Table 4-3. Marine Mammals with Potential Occurrence in Project Areas

Common Name	**Scientific Name**	**Abundance**	**Status**
		Cetaceans **Baleen Whales (Suborder Mysticeti)**	
Blue whale	*Balaeoptera musculus*	Population highest in summer due to northward migration from subtropics	FE
Fin whale	*B. physalus*	Population highest in summer due to northward migration from subtropics	FE
Sei whale	*B. borealis*	Rare. Seen only during summer months during migration	FE
Bryde's whale	*B. edeni*	Rare. Single sighting occurred near San Diego	NA
Minke whale	*B. acutorostrata*	Migratory population; common, peak abundance during spring and summer	NA
Humpback whale	*Megaptera novaeangliae*	Migratory population; common with peak abundance during summer and autumn	Central America DPS, FE, CH Mexico DPS FT, CH
Gray whale	*Eschrichtius robustus*	Common during migration in winter and spring	NA
Northern right whale	*Balaena glacialis (also Eubalaena glacialis)*	Rare. Only two sightings in southern California	FE

Table 4-3. Marine Mammals with Potential Occurrence in Project Areas

Common Name	Scientific Name	Abundance	Status
Northern Pacific right whale	*Eubalaena japonica*	Population is very small, likely in the low 100s.	FE
Order Cetacea Tooth Whales (Suborder Odontoceti)			
Sperm whale	*Physeter macrocephalus*	Rare on continental shelf but abundant in deeper waters. Occasional visitor.	FE
S. Resident killer whale	*Orcinus orca*	Occasional visitor to area from northern latitudes. Not common	FE
Common dolphin	*Delphinus delphis*	Common. Year-round resident	NA
Northern right-whale dolphin	*Lissodelphis borealis*	Common in the winter and spring	NA
Pacific white-sided dolphin	*Lagenorhynchus obliquidens*	Common. Year-round resident	NA
Risso's dolphin	*Grampus griseus*	Common. Year-round resident with peak population in summer and autumn	NA
Dall's porpoise	*Phocoenoides dalli*	Common. Year-round resident with peak population in autumn and winter	NA
Bottlenose dolphin	*Tursiops truncatus (also T. gilli)*	Common. Year-round resident	NA
Harbor porpoise	*Phocoena phocoena*	Common along the central California Coast, north of Point Conception	NA
Short-finned pilot whale	*Globicephala macrorhynchus (also G. scammonii)*	Small year-round population with increases during winter	NA
False killer whale	*Pseudorca crassidens*	Occurs primarily in tropical to warm temperate waters. Occasional visitor to area	NA
Cuvier's beaked whale	*Ziphius cavirostris*	Occurs in tropical and warm temperate waters. Have been recorded in area	NA
Baird' beaked whale	*Berardius bairdii*	Rare. Endemic to Arctic and cool temperate waters	NA
Hubb's beaked whale	*Mesoplodon carhubbsi*	Rare. Known primarily from stranding records	NA
Ginkgo-toothed beaked whale	*M. ginkgodens*	Rare. Known primarily from stranding records	NA
Hector's beaked whale	*M. hectori*	Rare. Known primarily from stranding records	NA
Blainville's beaked	*M. densirostris*	Rare. Possible visitor to area	NA
Stejneger's beaked whale	*M. stejnegeri*	Rare. Possible visitor to area	NA
Dwarf sperm whale	*Kogia simus*	Occurs in tropical and warm temperate waters. Sightings and strandings have occurred in California	NA

Table 4-3. Marine Mammals with Potential Occurrence in Project Areas

Common Name	Scientific Name	Abundance	Status
Pygmy sperm whale	*K. breviceps*	Occurs in tropical and warm temperate waters. Sightings and strandings have occurred in California	NA
Striped dolphin	*Stenella coeruleoalba*	Occasional visitor to area. Known from sightings and strandings	NA
Spinner dolphin	*S. longirostris*	Occurs in tropical waters; possible visitor to area	NA
Spotted dolphin	*S. attenuata*	Occurs in tropical waters; possible visitor to area	NA
Rough-toothed dolphin	*Steno bredanensis*	Occurs in tropical waters; possible visitor to area	NA
Pinnipeds of the Eastern North Pacific and Their Status Off California			
California sea lion	*Zalophus californianus*	Abundant, year-round resident	NA
Northern (Steller) sea lion (eastern stock)	*Eumetopias jubatus*	Occasional visitor to area from northern latitudes. Not common	FT
Northern fur seal	*Callorhinus ursinus*	Common, year-round resident	NA
Guadalupe fur seal	*Arctocephalus townsendi*	Occasional visitor to area from southern breeding grounds. Not common	CT, FT, CFP
Northern elephant seal	*Mirounga angustirostris*	Year-round resident. Common	CFP
Pacific harbor seal	*Phoca vitulina*	Year-round resident. Common	NA
Fissiped			
Southern Sea otter	*Enhydra lutris nereis*	Central California from Half Moon Bay to Point Conception	FT, CFP

CT- CA Threatened; FE- Federal Endangered; FT- Federal Threatened; CH – Critical Habitat; CFP- CA Fully Protected; DPS – Distinct Population Segment
Source: U.S. Dept. of Commerce, NOAA Fisheries 2021; https://wildlife.ca.gov/conservation/; AMS 2019; Adapted from Bonnel and Dailey, 1993

Sea Turtles

Five species of sea turtles occur in the area: Eastern Pacific green sea turtle (*Chelonia mydas*), Olive ridley sea turtle (*Lepidochelys olivacea*), Leatherback sea turtle, (*Dermochelys coriacea*), Northern Pacific loggerhead sea turtle (*Caretta caretta*), and Hawksbill turtle (*Eretmochelys imbricata*) (Hubbs 1977, Smith and Houck 1983). All five species are listed under the federal Endangered Species Act. Sea turtle species likely to occur in the proposed Projects area that are listed as Threatened or Endangered are identified in Table 4-4.

Table 4-4. Special Status Sea Turtle Species Likely to Occur

Common Name	Scientific Name	Abundance	Status
Eastern Pacific green sea turtle	*Chelonia mydas*	Not expected—most commonly from San Diego south.	FT
Olive ridley sea turtle	*Lepidochelys olivacea*	Not expected— from southern California to northern Chile.	FE
Leatherback turtle	*Dermochelys coriacea*	Low—Most commonly seen between July and October.	FE/CH
Northern Pacific Loggerhead sea turtle	*Caretta*	Low—Most recorded U.S. sightings are of juveniles off the CA coast	FE
Hawksbill turtle	*Eretmochelys imbricata*	Southern California and tropical oceans	FE

FT- Federally Threatened, FE- Federally Endangered, CH – Critical Habitat
Source: U.S. Dept. of Commerce, NOAA Fisheries 2021; https://wildlife.ca.gov/conservation/; AMS 2019

Marine Invertebrates

Invertebrate species likely to occur in the proposed Project areas that are listed as Threatened or Endangered are identified in Table 4-5.

Table 4-5. Special Status Invertebrate Species Likely to Occur

Common Name	Scientific Name	Abundance	Status
Black abalone	*Haliotis cracherodii*	Low-populations in south central California have been in decline in recent years.	FE/CH
White abalone	*Haliotis sorenseni*	Mainly distributed from Point Conception to Bahia Magdalena in Baja California.	FE/CH

FE- Endangered, CH – Critical Habitat
Source: U.S. Dept. of Commerce, NOAA Fisheries 2021; https://wildlife.ca.gov/conservation/; AMS 2019

Fish

At least 554 species of marine fishes inhabit California coastal waters, either as year-round residents or seasonal visitors (Miller and Lea 1972). The Point Conception area is a recognized biogeographic transition zone between the Oregonian Province (cool-temperature species) to the north and the Californian or San Diegan Province (warm-temperate species) to the south (Horn and Allen 1978). Thus, there is a wide variety of fish species and communities in the offshore areas surrounding the proposed Project areas (CH2M Hill 2017).

Epipelagic fish species occur in the wind-mixed surface waters up to a depth of approximately 150 m (Pearcy and Laurs 1966). In the region, Pacific mackerel (*Scomber japonicas),* Pacific herring (*Clupea pallasii),* northern anchovy (*Engraulis mordax),* rockfish (*Sebastes* spp.), medusafish (*Icichthys lockingtoni),* Pacific sardine (*Sardinops sagax),* Pacific saury (*Cololabis saira),* Pacific argentines (*Argentina sialis)* are common epipelagic fish species. Salmon (*Onchorhyncus* spp.) and albacore tuna (*Thunnus alalunga*) are epipelagic species that are fished commercially and recreationally. Epipelagic species such as albacore tuna (*Thunnus alalunga)* and salmon are important commercial and recreational fish species (CH2M Hill 2017). Benthic, soft-substrate fishes characterizing the continental shelf in this region are California halibut (*Paralichthys californicus),* English sole (*Parophrys vetulus),* Pacific sanddab (*Citharichthys sordidus),* speckled sanddab (*Citharichthys stigmaeus),* white croaker (*Genyonemus lineatus),* stripetail rockfish (*Sebastes saxicola),* queenfish (*Seriphus politus),* and several species of surfperch (*Embiotocidae*) (Love 1996, Allen et al. 2007).

Rocky substrate areas support sculpins (*Cottoidea),* black rockfish (*Sebastes melanops),* lingcod (*Ophiodon elongatus)* and numerous other species. Surfperches, wrasses (*Labridae),* greenlings (*Hexagrammos* spp.), seabasses (*Latidae),* and damselfish (*Pomacentridae)* are common species at shallower rock outcrops (Schroeder et al. 2000, Stephens et al. 2006, Love and Schroeder 2007). Rockfish are strongly associated with the presence of rock outcrops (Love et al. 2009) but species composition varies by depth and other habitat characteristics. Rockfish, as a group, have historically been extremely abundant on the continental shelf and at depths down to approximately 270 m (Bence et al. 1992).

The benthic area generally consists of sandy, muddy, or rocky substrates. A large variety of commercial and recreationally important fish are found beyond the tidal and shallow areas (Santa Barbara County 2008). Table 4-6 shows the distribution of fish by depth in area near the proposed Projects.

Table 4-6. Water Depth Distribution of Demersal Fish in Project Areas

160 to 650 feet	650 to 1,640 feet	1,640 to 3,940 feet	3,940 to 10,500 feet
Sand dabs *Citharichthys sordidus*	Sablefish *Anoplopoma fimbria*	Thornyheads *Sebastolobus* spp.	Rattails *Coryphaenoides filifer*
English sole *Pleuronectes vetulus*	Pacific hake *Merluccius productus*	Pacific hake *Merluccius productus*	Thornyheads *Sebastolobus* spp.
Rex sole *Errex zachirus*	Slickhead *Alepocephalus tenebrosus*	Slickhead *Alepocephalus tenebrosus*	Finescale codling *Antimora microlepis*
Rockfish *Sebastes* spp.	Eelpouts *Lycenchelys jordani*	Rattails *Coryphaenoides filifer*	Eelpouts *Lycenchelys jordani*
Pink surfperch *Zalembius rosaceus*	Rockfish *Sebastes* spp.		
Plainfin midshipman *Porichthys notatus*	Thornyheads *Sebastolobus* spp.		
White croakers *Genyonemus lineatus*			

Source: Santa Barbara County 2008

Pelagic fishes in the Project areas are a mix of year-round residents and migrants from several different habitats. Species include large predators (e.g., tunas, sharks, swordfish) and forage fish (e.g., northern anchovy, Pacific sardine, Pacific saury, Pacific whiting). The distributional ranges for pelagic fishes are generally quite extensive and cover much of the coastal California region. Many fish in the pelagic zone such as albacore tuna and Pacific salmons migrate over vast areas in the Pacific (Santa Barbara County 2008).

Fish species likely to occur in the proposed Projects area that are listed as Threatened or Endangered are identified in Table 4-7.

Table 4-7. Special Status Fish Species Likely to Occur

Fish	Abundance	Status
Steelhead (*Oncorhynchus mykiss*)	Coastal waters near stream confluences and coastal streams.	S. Central CA Coast DPS – FT, CH S. CA Coast DPS - FE, CH

Fish	Abundance	Status
Green sturgeon (*Acipenser medirostris*)	Low—Species may forage in or near the Project area.	FT
Oceanic Whitetip Shark (*Carcharhinus longimanus*)	Offshore in deep water in subtropical and tropical oceans; occurs in upper water column near surface.	FT
Eastern Pacific scalloped hammerhead DPS (*Sphyrna lewini*)	West coast from S. California to Ecuador.	FE

FT- Federally Threatened, FE- Federally Endangered, CH – Critical Habitat, DPS – Distinct population segment

Source: U.S. Dept. of Commerce, NOAA Fisheries 2021; https://wildlife.ca.gov/conservation/; AMS 2019

Marine Birds and Bats

Numerous waterbird species utilize shoreline and coastal offshore habitats in the proposed Project region. These include nearshore and pelagic seabirds, as well as shorebirds that occur along the coastal habitats. Mason et al. (2007) identified 54 species off southern California during coastal and at-sea surveys (from Cambria to the Mexican border), representing 12 different families. Nearshore seabirds tend to occur close to shore in relatively shallow waters. Common nearshore seabirds that can be observed in the region include western grebes (*Aechmophorus occidentalis),* Clark's grebes (*A. clarkii),* surf scoters (*Melanitta perspicillata),* cormorants (*Phalacrocorax* spp.), Pacific and common loons (*Gavia* spp.), California brown pelicans (*Pelecanus occidentalis californicus),* and several gull species (*Laridae;* Mason et al 2007). Pelagic species mainly occur in deeper habitats away from the shoreline. Nearshore species generally occur in higher numbers in winter and low numbers in summer, although there a wide degree of seasonal variation, with some species more common in spring or fall (Mason et al. 2007).

Pelagic seabirds occur in deeper waters, typically farther from shore than the nearshore species described above. Seabirds such as albatross (*Diomedeidae),* shearwaters (*Procellariidae),* storm-petrels (*Hydrobatidae),* phalaropes (*Phalaropus* spp.), jaegers (*Stercorarius* spp.), and alcids become common in the deeper offshore parts the region mid-May through early June (Lehman 1994), but seabirds are most numerous August through mid-October when large numbers of sooty shearwaters (*Puffinus griseus),* stormpetrels, and jaegers occur in the region (Mason et al. 2007). Fluctuations in numbers of several of California's most numerous seabirds off of central and southern California, including in the Point Conception/Vandenberg area, appears to be related to sea surface temperatures. When temperature are high, cold-water species generally are scarce and warm water species are abundant; whereas when temperature are low, warm-water species are more common (Ainley et al. 1995).

The coastal and offshore areas in the region are also important breeding areas for many seabirds. Although some birds nest on the mainland, many seabirds nest in the Channel

Islands. For instance, the Channel Islands support nearly half of the world's populations of ashy storm-petrels (*Oceanodroma homochroa)* and western gulls (*Larus occidentalis)* and approximately 80 percent of the U.S. breeding population of Scripps's murrelets (*Synthliboramphus scrippsi).* Additionally, the islands support the only major breeding population of California brown pelicans in the western U.S. and the largest concentration of double-crested cormorant (*Phalacrocorax auritus)* colonies in southern California. One of the largest breeding colonies of Cassin's auklets within California occurs in the Channel Islands as well (Lehman 1994, Whitworth et al. 2009).

Numerous ENGO representatives provided comments on the proposed Projects and stated that the location of the two proposed floating offshore wind Projects are adjacent to six onshore Audubon Important Bird Areas (IBAs) in an international program to identify high conservation areas for birds. Those IBAs include Point Conception 120W34N, Point Conception 121W34N, VSFB, and Santa Ynez Sanctuary IBA and include over 20 species of seabirds. Numerous ENGOs also stated that wind energy structures pose significant threats to bird and bat populations, and offshore wind in the locations proposed by IDEOL and CADEMO would invite these impacts to a greater degree than Projects in outer continental shelf waters.

CDFW, Region 5 provided comments on the PEA that wind turbines in marine areas can affect both waterbirds and terrestrial bird species crossing water during migration (Hoppop 2003). The risk of collision is particularly high in migratory pathways. Many terrestrial bird species cross ocean water at low altitudes. Hoppop (2003) determined that 20 to 30 percent of all birds crossing the ocean below 2,000 meters flew within 0 to 656 feet of the sea surface, this being the rotor blade impact zone. Species especially at risk include passerines during their nocturnal seasonal migrations, large-bodied slow fliers, and migrating shorebird species. The proposed Project sites are along the Pacific Flyway migration route (CDFW 2021).

CDFW, Region 5 also provided comments that bats regularly occur miles offshore, with records of several hundred miles logged by fishermen at sea. Pelletier et al. (2013) documents the presence of bats to at least 12 nanometers offshore using remote detectors. Levels of offshore bat activity are similar between migrating and resident bat species. Scientific literature (Pelletier et al. 2013) demonstrates a high potential for offshore wind facilities to impact bats. CDFW recommends that the environmental review include a comprehensive analysis of impacts to bats as well as design and siting alternatives to reduce or avoid impacts. Additionally, CDFW recommends a robust monitoring and avoidance system be developed for use during the operation phase of the Projects (CDFW 2021).

Special status marine bird species with potential to occur in the Project areas are identified in Table 4-8.

Table 4-8. Special Status Marine Bird Species with Potential Occurrence in Project Areas

Common Name	Scientific Name	Abundance	Status
Marbled murrelet	*Brachyramphus marmoratus*	Occurs in small numbers off the Southern California coast.	CE, FT
Scripps' murrelet	*Synthliboramphus scrippsi*	Occurs mostly offshore in Baja and Southern California. Nests on offshore islands.	CT
Guadalupe murrelet	*Synthliboramphus hypoleucus*	Nests on islands off the west coast of Baja; rarely wanders north into California waters.	CT
California brown pelican	*Pelecanus occidentalis californicus*	Breeding range is from Channel Islands south to central Mexico.	CFP

CE- CA Endangered; CT- CA Threatened; FT- Federally Threatened; CFP- CA Fully Protected
Source: https://wildlife.ca.gov/conservation; https://ucanr.edu; https://biologistshandbook.com; www.audubon.org; www.nps.gov

Offshore Project Components and Potential Impacts

Over the last few decades, the offshore wind energy industry has expanded its scope from turbines mounted on foundations driven into the seafloor and standing in less than 197 feet of water, to floating turbines moored in 394 feet of water, to prospecting the development of floating turbines moored in greater than 3,280 feet of water. Since there are few prototype turbines and mooring systems for floating offshore wind energy facilities currently deployed, their effects on the marine environment are speculative. Although the offshore Project areas for both Projects resides in relatively shallow waters of approximately 262 to 328 feet, Figure 4-4 provides guidance on potential effects of deep water floating offshore wind facilities based on available scientific literature (Farr et al. 2021).

U.S. Department of Commerce's, NOAA Fisheries, West Coast Region, provided the following comments on the Projects. The Project applications indicate that adverse impacts may occur to common visitors of the area as well as species listed as endangered or threatened in the area or to their habitat. These species may occur in the vicinity of the Projects when foraging for food, migrating, and engaged in other essential life functions. In addition, these species may collide with support vessels, FWTs, mooring systems, or transmission lines, and may become entangled, disoriented, or injured, and become more susceptible to predation.

Changes to Atmospheric and Oceanic Dynamics

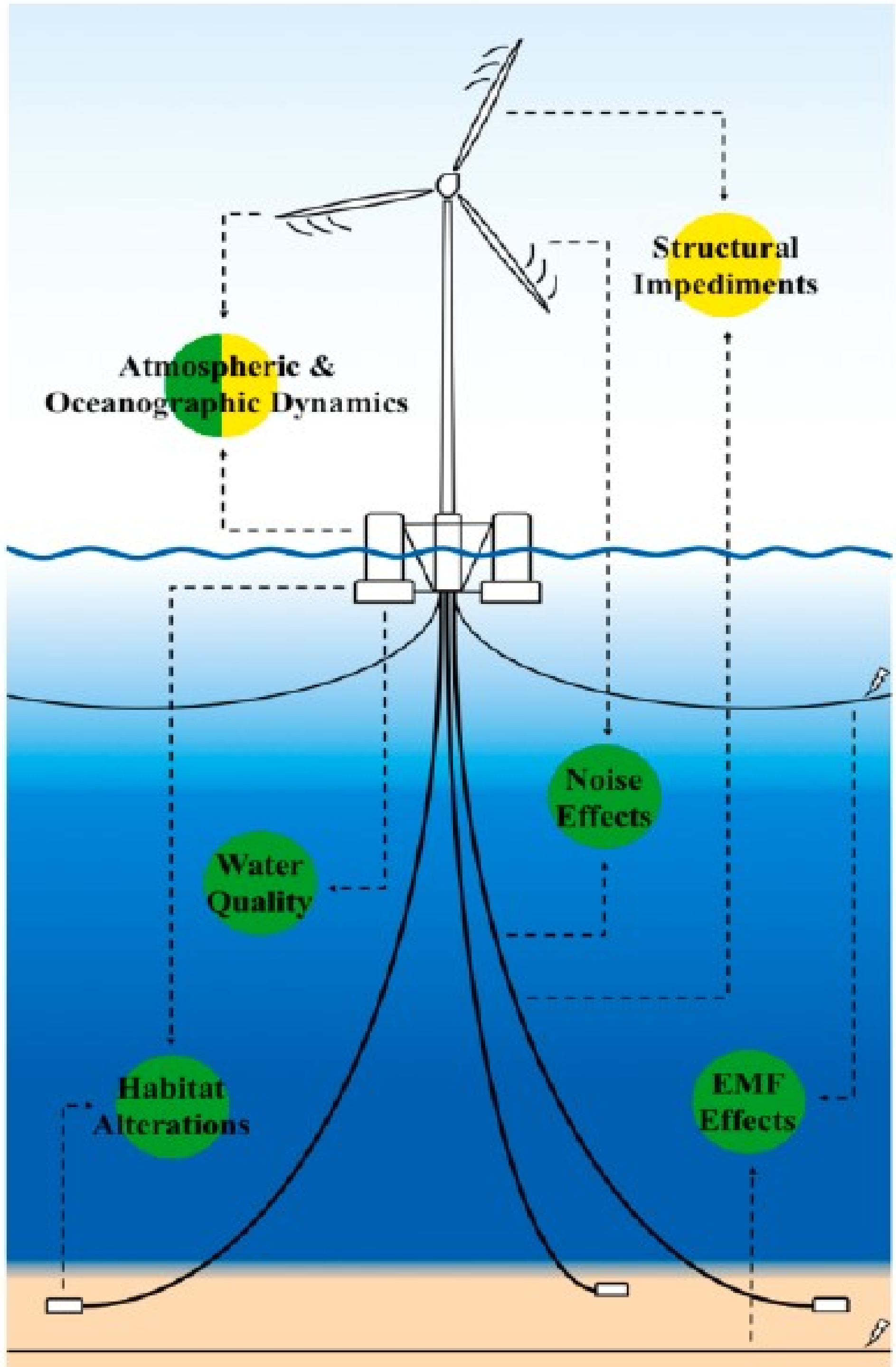
Wind turbines may affect localized wind patterns, currents, wave action, oceanic circulation, and temperature. Studies have demonstrated that turbines alter the air temperature and disrupt the atmospheric layer, reducing the wind speed and altering the regional climate including fog and other whether patterns (Miller and Keith 2018, Hasager et al. 2017, Farr et al. 2021). The coastal vegetation around VSFB relies on the specific weather conditions in that region to survive. Disturbance of the local microclimate in the area could have negative impacts on the coastal vegetation.

Water Quality Degradation and Pollution

Water quality may be affected during the construction phase and cable laying (see Section 4.2.9, *Hydrology, Water Quality, and Coastal Processes*, for more information). Sediment disturbance can create turbid waters which could have indirect effects on the ability of organisms to feed and their overall behavior (Taormina et al. 2018). In addition, vessels used during construction could have unintentional discharges of contaminants directly affecting all types of organisms (see Section 4.2.8, *Hazards and Hazardous Materials*).

Although the offshore Project areas for both Projects resides in relatively shallow waters of approximately 262 to 328 feet, Figure 4-4 and the corresponding Table 4-8 provides guidance on the type and magnitude of potential environmental effects of deep water, floating offshore wind energy facilities. Effect magnitudes were determined using the four-level classification scheme (negligible, minor, moderate, and major) used by the Bureau of Ocean Energy Management to characterize impact levels for biological and physical resources (MMS 2007).

Figure 4-4. Potential Effects of Floating Offshore Wind Facilities



Source: Farr et al. 2021

Table 4-8. Potential Magnitude of Environmental Effect

Potential Environmental Effect	Potential Impact	Magnitude of Environmental Effect
EMF Effects	Potential to affect animal behavior, but unlikely to substantially alter survival and reproduction.	Minimal
Habitat Alterations	Potential for structures along the seafloor to provide new habitat via the “reef effect”, though the installation of artificial substrates may also invite colonization by non-native species.	Minimal
	Potential for bottom, midwater, and surface structures to act as fish aggregation devices and for FWTs as a whole to act as a *de facto* marine protected areas.	Minimal
Noise Effects	Unlikely to pose risk to marine species as operational noise of FWTs is low frequency and at low levels.	Minimal
	Empirical measurements still needed for deep water, floating FWTs.	Minimal
Water Quality	Preemptive measures to prevent biofouling and corrosion may introduce toxins on a local scale, though adoption of environmentally-friendly alternatives can reduce risk to marine species.	Minimal
Atmospheric and Oceanographic Dynamics	Expected to reduce downstream wind speed, though existing literature rarely report concordant estimates.	Minimal
	Potential to alter local wave patterns, vertical mixing, and seasonal stratification, which could have cascading effects on carbon pump, biomass distribution, and sediment dynamics.	Moderate
Structural Impediments	Potential to increase avoidance, displacement, collision, and entanglement risk for many marine species.	Moderate
	Use of promising, albeit minimally tested, mitigation measures may substantially reduce impacts on species’ behavior, fitness, and survival.	Moderate

Source: Farr et al. 2021

<u>Underwater Acoustics</u>

Underwater acoustic levels will increase during the construction phase of the Projects due to vessel traffic and offshore construction activities. This noise disturbance could affect different types of marine fauna in a variety of ways. There is concern that sounds introduced into the sea by man-made devices could have a deleterious effect on marine mammals by causing temporary or permanent hearing loss, stress, interference with communication and predator/prey detection, and changing behavior (U.S. Dept. of Commerce, NOAA Fisheries 2021). Anthropogenic noise sources have the potential to displace, physically injure, and/or affect many marine organisms' ability to communicate, forage, and otherwise interact with their environment (Gotz ¨ et al. 2009). However, operational noise from existing, fixed-bottom offshore wind energy facilities typically occurs within regulatory thresholds, is low in frequency and level, and is likely to pose low risk (Madsen et al. 2006, Thomsen et al. 2015, NYSERDA 2017). Some of the potential sources of underwater noise that could be generated for Project activities with potential to affect the previously identified marine wildlife include, but are not limited to:

- Use of vessels and equipment for installation of FWTs, anchors, and mooring lines; cable laying, trenching, and rock placement
- Use of thrusters for dynamic positioning of vessels (if required)
- Operations of the FWTs and maintenance vessels

Artificial Lighting Effects

Artificial lighting from vessels and the floating platforms may attract and disorient some seabird species, which would increase the risks of grounding, collision with structures, and interference with night feeding. At sea, oil and gas platforms and fishing vessels, especially those that use lights to attract prey, are the main sources of artificial light. An estimated 63 to 89 percent of the world catch of squid is caught using intense artificial lighting and the practice is thought to be exerting a deleterious influence on several seabird species, including Scripps's (=Xantus's) Murrelet *Syntbliboramphus hypoleucus* (Pacific Seabird Group 2002, Montevecchi 2006).

Electromagnetic Fields

Electromagnetic Fields (EMFs) are generated by current flow passing through power cables during operation. Potential direct or indirect negative effects of EMF on marine organisms include behavioral changes such as avoidance or attraction, effects on species navigation or orientation, changes in predator/prey interactions, and physiological or developmental effects (Taormina et al. 2018). A study conducted by BOEM suggests that the effects differ among species and must be evaluated on a case-by-case basis. Several taxonomic groups including elasmobranchs, crustacea, cetacea, bony fish, and sea turtles are sensitive to EMFs (Gill et at. 2014). For local information on power cables, Ann Bull (PhD), Project Scientist at the Marine Science Institute, University of California Santa Barbara, recommended several science papers about EMF and the effects on fish and inverts and specifically on crab fishing harvest (see Appendix B, Fishing Organization Written Comments).

Sensitive Benthic Habitats

Sensitive habitats in the proposed Project areas and surroundings include soft and hard substrates and kelp beds. The construction of the proposed Projects would require trenching and burial of cables which would disturb these sensitive benthic habitats. Benthic communities are an integral part of the food web. Disturbance of the benthic invertebrate communities could include direct displacement or damage to the organisms, or indirect effects due to the dispersal and re-deposition of sediments in nearby areas (which could include sensitive habitats in the VSMR) (Taormina et al. 2018). Recovery time for benthic communities could take years, especially in hard substrates (Hemery 2020) which could have long-term impacts on ecosystem functions, adversely affecting fish populations and other animals that depend on benthic organisms as a source of food. Both commercial and recreational important species of fish and crustaceans including the Dungeness crab (*Matacarcinus magister*) depend on these benthic communities to survive (see Section 5.1, *Commercial and Recreational Fishing*).

Potential impacts to soft-sediment biota during cable installation, wind turbine operation, or decommissioning activities can be expected to be short-term and therefore temporary (Kraus and Carter 2018, Antrim et al. 2018, Kunhz et. al 2015, Kogan et. al 2006). The use of a cable plow to create a trench along the seafloor into which the electric cables are placed and buried can be expected to result in a temporary disturbance of benthic infauna (animals living in the sediments of the seafloor) and epifauna (animals living on the surface of the seafloor). Many motile epifaunal invertebrates and fish can be expected to avoid the plow and return to the area shortly after the plow has left and the trench has been refilled. Any benthic infauna inhabiting the upper sediment layers disturbed by the plow are assumed to be smothered and killed. This loss, however, would occur in a small area of the seafloor relative to the surrounding area. The infaunal community inhabiting the adjacent, undisturbed sediments would be expected to rapidly start recolonizing the affected area. Recolonization would occur both by migration from adjoining, undisturbed seafloor areas and by natural recruitment (Kunhz et. al 2015, Kraus and Carter 2018, Antrim 2018, Kogan et. al 2006).

<u>Vessel Collisions with Wildlife</u>

Vessels would be moving from Port Hueneme, or other potential ports, to the floating platforms creating new routes that are not commonly transited by vessels. Local marine mammals including baleen, toothed whales, and sea turtles, may be at an increased risk of getting hit by vessels during the construction. The probability of vessel collision with whales increases with ship speed.

<u>Artificial Structures and Entanglement</u>

The development of new offshore artificial structures has the potential to locally alter species composition and abundance by providing hard substrate that is susceptible to colonization by native and non-native organisms, changing the habitat and community structure of the area (Kramer et al. 2015, Farr et al. 2021). Surveys on nearby oil platforms have found sea stars (*Patiria miniata*, *Pisaster* spp., and *Stylasterias forreri*), sea anemones (*Metridium* spp.), sea slugs (*Pleurobranchaea californica*), rock crabs (*Cancer* spp.), spot prawns (*Pandalus platyceros*), and sea urchins (*Strongylocentrotus fragilis)* associated with these artificial structures. The non-native bryozoan (*Watersipora subtorquata*) has been reported in areas close to the Project area in large masses.

After artificial structures are colonized by sessile organisms, these structures act as aggregation devices attracting a variety of animals (Kramer et al. 2015). These effects may increase predation in protected areas altering the food web or could put species of concern at higher risk.

Artificial structures also pose potential impacts due to entanglement with mooring lines, hoses, anchor cables, lifting cables, and descending lines. This is very unlikely in the case of small cetaceans, pinnipeds, and sea otters (Howorth 2004). However, large whales can become entangled in such obstructions (Benjamins et al. 2014). Also, anthropogenic materials, such as fishing nets and lines tends to get tangled in these artificial structures, increasing the risk of entanglement for sea turtles and other marine wildlife (Benjamins et al. 2014).

<u>Marine Invasive Species</u>

Invasive species pose a significant threat to the environment, economy, and human health (Carlton 1999, Ruiz 1997). The proposed Projects have the potential to facilitate the introduction and establishment of marine invasive species in multiple ways. During the construction phase, an increase in vessels traffic will provide opportunities for nonindigenous species to be moved from one location to another, both through biofouling and potentially ballast water. Ports (e.g., Port Hueneme) are considered hot spots for already established non-native species; vessels moving from these ports to adjacent areas will likely facilitate the movement of some non-native species into new areas and expand their range (Zabin et al 2018). In addition, artificial structures will provide hard surfaces susceptible to colonization by both native and non-native species. Studies have demonstrated that invasive species will often take advantage over native species in colonizing new areas.

Public Comments

Public comments received during the development of the PEA recommended that any CEQA analysis for the Projects include:

- A robust and science-based collaborative planning process for site selection of the FWTs to avoid and minimize impacts to biological resources and habitats
- Consider information from offshore wind Projects and planning processes for the outer continental shelf

- Consideration of cumulative impacts for past, present, and future Projects and activities
- Consideration and protection of protected habitats and species
- Consideration of the abundant scientific literature for marine resources and ecosystems within the Project area

Section 2.3.3 provides a summary of stakeholder comments on marine biological resources and Appendix B includes written public comments received on the development of the PEA. Public comments received on the development of the PEA recommend that an EIR for the Projects consider information resources from the following websites for environmental setting and analysis of impacts to marine biological resources:

- https://caoffshorewind.databasin.org
- https://marinecadastre.gov/
- https://portal.westcoastoceans.org/
- https://tethys.pnnl.gov/technology/offshore-wind
- https://www.boem.gov/sites/default/files/documents/environment/PC-17-04_0.pdf
- https://www.boem.gov/site/default/files/environmental-stewardship/Environmental-Studies/Pacific-Region/Studies/BOEM-2016-043.pdf
- http://www.bto.org/science/wetland-andmarine/soss/ProjectsL
- https://www.opc.ca.gov/whale-entanglement-working-group/
- https://coastwatch.pfeg.noaa.gov/loggerheads/loggerhead_closure.html
- https://www2.gov.scot/Topics/marine/marineenergy/mre/current/StochasticCRM

4.2.4 Biological Resources – Terrestrial

VSFB covers 99,099 acres in western Santa Barbara County. With a wealth of ecological resources, the base includes 42 miles of coastline, 9,000 acres of sand dunes, and 5,000 acres of wetlands. Biological resources on VSFB are abundant and diverse compared to other areas of California, because VSFB is within an ecological transition zone where the northern and southern ranges of many species overlap, and because the majority of the land within the base's boundaries is undeveloped (VAFB 2021).

Vegetation and Habitat Communities

The onshore Project areas have topography and vegetative cover that provide habitat for many common wildlife species. Natural vegetation communities found in the onshore Project areas include central coast scrub/maritime scrub, coastal bluff/dune scrub, and floodplains, wetlands, riparian, and littoral habitats (VAFB 2011, 2012).

Central Coast Scrub/Maritime Scrub

Central coast scrub/maritime scrub occupies much of the narrow coastal strip along central California. Native species including California sagebrush (*Artemesia californica)* and coyote brush (*Baccharis pilularis)* dominate this vegetation type. Herbaceous (non-woody) species such as grassland tarplant (*Deinandra increscens)* may be present in clearings between shrubs. Seacliff buckwheat (*Eriogonum parvifolium),* the host plant for the federally endangered El Segundo blue butterfly (*Euphilotes battoides allyni),* occurs within this plant community in generally sparse distribution (Davy et al. 2017).

Coastal Bluff/Dune Scrub

Native species in this habitat include seacliff buckwheat, coyote brush, dune lupine (*Lupinus chamissonis),* species of *Dudleya,* giant coreopsis (*Coreopsis gigantea),* and species of *Croton.* Equally important to this ecosystem are the small sections of open sand. Beach layia (*Layia carnosa)* (listed as federally and State endangered) is located in this habitat within sandy openings in the central dune scrub vegetation community (Davy et al. 2017).

Floodplains, Wetlands, Riparian, and Littoral Habitat

Within the onshore Project areas, the Santa Ynez River represents the major drainage basin and Honda Creek and Bear Creek represent the minor drainage basins. Figure 4-5 shows the wetland area identified in the National Wetland Inventory within 0.5 mile of the transmission right of way.

Figure 4-5. Mouth of Honda Creek and UPRR Bridge

Source: VAFB 2021

The presence and significance of the floodplain, wetland, riparian and littoral habitats on the Project areas are well documented, as the shoreline and upland portions of the proposed Projects would generally be sited in an area of VSFB that already has electrical transmission facilities that have been the subject of NEPA environmental assessments. The onshore Project areas includes limited areas of freshwater forested and shrub wetland, and riverine wetland that are found along stream courses. No on-site, Project-specific wetland delineation studies have been conducted, but a review of aerial photography of the site and the National Wetlands Inventory wetland mapping provide a reliable initial assessment of the presence and location of wetland features on the site (Davy et al. 2017).

General Wildlife Resources

The Project areas are largely undeveloped open space that has limited access due to its designation as a military base. A variety of common bird species are associated with the onshore Project areas, including birds associated with riparian, scrub, and beach habitat. Amphibians that may occur include various species of lungless salamanders. Reptile species expected to occur include western fence lizard (*Sceloporus occidentalis*), southern alligator lizard (*Elgaria multicarinata*), San Diego gopher snake (*Pituophis catenifer annectens*), and southern pacific rattlesnake (*Crotalus oreganus helleri*). Various mammal species are also expected to occur within the Project areas, including brush rabbit (*Sylvilagus bachmani*), coyote (*Canis latrans*), and black-tailed deer (*Odocoileus hemionus hemionus*). Small mammals include various species of mice and pocket gopher (*Thomomys bottae*) (VAFB 2021). Table 4-9 lists some of the wildlife species likely to be present in the onshore Project areas and Table 4-10 lists species likely to occur in wetland habitat areas.

Table 4-9. Wildlife Species with Potential to Occur within the Project Areas

Common Name	Species
California treefrog	*Pseudacris cadaverina*
House finch	*Haemorhous mexicanus*
European starling	*Sturnus vulgaris*
Western scrub-jay	*Aphelocoma californica*
California towhee	*Melozone crissalis*
Wrentit	*Chamaea fasciata*
Western toad	*Anaxyrus boreas*
Western fence lizard	*Sceloporus occidentalis*
Southern alligator lizard	*Elgaria multicarinata*
Western skink	*Plestiodon skiltonianus*
San Diego gopher snake	*Pituophis catenifer annectens*
Southern pacific rattlesnake	*Crotalus oreganus helleri*
Coast horned lizard	*Phrynosoma coronatum*
Brush rabbit	*Sylvilagus bachmani*
Coyote	*Canis latrans*
Black-tailed deer black-tailed deer	*Odocoileus hemionus*
Black-tailed jackrabbit	*Lepus californicus*
Botta's pocket gopher	*Thomomys bottae*

Source: Davy et al. 2017

Table 4-10. Wildlife Species with Potential to Occur in the Wetland Habitats

Common Name	Scientific Name
American bullfrog	*Lithobates catesbeiana*
Arboreal salamander	*Aneides lugubris*
Arroyo toad	*Anaxyrus californicus*
Blackbelly slender salamander	*Batrachoseps nigriventris*
California red-legged frog	*Rana draytonii*
Western spadefoot	*Spea hammondii*
Western toad	*Anaxyrus borea*
Western pond turtle	*Actinemys marmorata*
Belted kingfisher	*Megaceryle alcyon*
Broad-footed mole	*Scapanus latimanus*
Two-striped garter snake	*Thamnophis hammondii*

Source: Davy et al. 2017

Most of the shorebird species in the region are those that are adapted to sandy shoreline habitats; these include sanderling (*Calidris alba),* willet (*Tringa semipalmata),* western snowy plover (*Charadrius nivosus nivosus),* black-bellied plover (*Pluvialis squatarola),* marbled godwit (*Limosa fedoa),* killdeer (*Charadrius vociferous),* and whimbrel (*Numenius phaeopus)* (Lehman 1994, McCrary and Pierson 2002). Black oystercatchers (*Haematopus bachmani),* however, are one of a few shorebirds that are associated with rocky shoreline and island habitats. Sanderlings, willets, and western snowy plovers account for most (78 percent) of shorebirds observed during a multi-year study of sandy beaches in Ventura County that are similar to those in the proposed Project areas (Rodriguez 2011).

Special Status Species

Table 4-11 lists special status species with potential occurrence within the onshore Project areas. Several special status terrestrial species with potential to occur in the Project areas have designated critical habitat, such the Tidewater goby, California red-legged frog, and Western snowy plover. However, critical habitat does not include VSFB, since it is controlled by the DoD and is exempted under sections 4(b)(2) and 4(a)(3) of the federal Endangered Species Act. Further, U.S. Fish and Wildlife Service has adopted VSFB's Integrated Natural Resources Management Plan (INRMP; Air Force 2011), prepared under section 101 of the Sikes Act (16 U.S.C. 670a). The onshore area between Point Sal and Point Conception is an important breeding site for the federally threatened Western snowy plover (Robinette et al. 2013). Western snowy plovers nest and overwinter along the coast of VSFB, and VSFB has consistently supported one of the largest populations of breeding Western snowy plover (Robinette et al. 2016). Since 1997, a management plan has been implemented at the VSFB beaches to protect this species and its habitat. During 2010, 255 nests and 409 chicks were counted hatched on VSFB lands. Western snowy plovers breed throughout the approximately 14 miles of coastal beaches at Vandenberg, with an average number of plover adults totaling approximately 240 individuals (Robinette et al. 2013).

Table 4-11. Special Status Terrestrial Species

Species	Status	
	Federal	**State**
Invertebrates		
Crotch Bumble Bee (*Bombus crotchii*)		SC
Fish		
Tidewater Goby (*Eucyclogobius newberryi*)	FE	
Amphibians		
California Red-Legged Frog (*Rana draytonii*)	FT	
Reptiles		
Western Pond Turtle (*Actinemys marmorata*)	UR	

Species	Status	
	Federal	State
Birds		
Allen's Hummingbird (*Selasphorus sasin*)	BCC	
Bald Eagle (*Haliaeetus leucocephalus*)	SE	SFP
Black Oystercatcher (*Haematopus bachmani*)	BCC	
Black Skimmer (*Rynchops niger*)	BCC	
California Condor (*Gymnogyps californianus*)	FE	SE, SFP
California least tern (Sternula antillarum browni)	FE	SE, SFP
Lawrence's Goldfinch (*Carduelis lawrencei*)	BCC	
Loggerhead Shrike (*Lanius ludovicianus*)	BCC	
Long-Billed Curlew (*Numenius americanus*)	BCC	
Marbled Godwit (*Limosa fedoa*)	BCC	
Nuttall's Woodpecker (*Dryobates nuttallii*)	BCC	
Peregrine Falcon (*Falco peregrinus anatum*)	BCC	SFP
Short-Billed Dowitcher (*Limnodromus griseus*)	BCC	
Whimbrel (*Numenius phaeopus*)	BCC	
Western Snowy Plover (*Charadrius nivosus*)	FT, BCC	
Willet (*Tringa semipalmata*)	BCC	

Notes: BCC = Federal Bird of Conservation Concern; FE = Federal Endangered Species; FT = Federal Threatened Species; SE = State Endangered Species; SC = State Candidate; SFP= State Fully Protected; UR= Under Review
Source: https://wildlife.ca.gov/conservation/; VAFB 2021; https://ecos.fws.gov

Onshore Project Components and Potential Impacts (Both Projects)

The onshore Project areas for all proposed activities with both Projects would occur in upland habitats primarily adjacent to Coast Road and east (landward) of UPRR. No land surface activities would occur in coastal bluff or beach habitats.

The proposed substation for both Projects would be located on an upland area in the same approximate area that has no wetland areas nearby. The substation would be located more than 500 feet from the estuarine and marine wetlands located along the ocean shoreline. The static cable would be installed underground via HDD from the substation to the offshore exit hole beyond any estuarine and marine wetlands and is anticipated to avoid potential impacts to those habitats (Davy et al. 2017).

From the substation, IDEOL is proposing a new overhead transmission line to Substation N, a distance of approximately 4.2 miles, that would be sited adjacent to existing roads, including Tow Road and Coast Road (Figure 3-21). IDEOL has also proposed to connect to the CAISO power grid, which would require additional infrastructure (i.e., transmission line, etc.) to connect to the CAISO system. Additional information is required for this information and to determine extent of impacts to terrestrial habitats and species.

From the substation, CADEMO is proposing a new overhead transmission line to Surf Substation, a distance of approximately 11 miles, that would be sited adjacent to existing roads, including Tow Road and Coast Road (Figure 3-2).

With both Projects, the transmission line would be a pole-supported overhead line. Depending on the final routing and engineering, the transmission line would cross existing riverine and freshwater forested/shrub wetlands associated with site topographic drainages. These wetlands could be considered jurisdictional by the U.S. Army Corps of Engineers or the State Water Resources Control Board under the Clean Water Act. Despite the fact that these drainages would be crossed by the transmission lines, impacts to the wetland habitats are expected to be avoided due to the ability to locate the support poles well outside of any potential jurisdictional areas. The transmission line would be designed to span the identified wetland areas without encroaching on them. Potential construction activities for the transmission line would be limited in both aerial extent and duration, such that the wildlife present would be expected to temporarily leave the area during the construction period (Davy et al. 2017).

With both Projects, onshore impacts to terrestrial habitats and species are anticipated to be primarily adjacent to existing roads and substations, including construction staging areas. An EIR for the Projects would provide a comprehensive analysis of impacts to terrestrial biological resources.

Public Comments

CDFW Region 5 provided comments on the proposed Projects and stated that, “turbines have been shown to alter the temperature, both locally, and up to 12 kilometers downwind. Offshore turbines disrupt the atmospheric boundary layer, altering fog and other weather patterns (Miller and Keith 2018, Hasager et al. 2017). The coastal vegetation communities around Vandenberg rely on fog drip as a crucial source of water. Dozens of rare, drought sensitive plant species endemic to this region rely on fog as the dominant summer moisture source (Fischer et al. 2009). CDFW recommends incorporating analysis of Project impacts to the onshore ecosystem by modeling Project induced changes to atmospheric conditions and weather. Vegetation surveys and rare plant surveys should be conducted for areas on the coast that will be affected by changes in atmospheric conditions and local weather pattern disruption.”

Public comments also recommended consideration of information resources from the following websites for evaluation of potential impacts to terrestrial biological resources:

- https://caoffshorewind.databasin.org
- https://marinecadastre.gov/
- https://portal.westcoastoceans.org/
- https://tethys.pnnl.gov/technology/offshore-wind

4.2.5 Cultural Resources

See Section 5.2 for Tribal Cultural Resources, including description of the proposed Northern Chumash National Marine Sanctuary. VSFB covers 99,099 acres in western Santa Barbara County. With a wealth of valuable cultural resources, the base includes more than 1,600 irreplaceable prehistoric archaeological resources, 14 rock art sites, a National Historic Landmark, five Native American villages, a National Historic Trail, and 42 Cold War-era complexes (https://www.vandenberg.spaceforce.mil/About-Us/Environmental/).

Offshore Setting

There is the potential for up to 24 historical and cultural resources to be found at least 2 miles from the Project areas. A total of 23 vessels were wrecked in the vicinity; the most notable including 7 destroyers that were lost in 1923 during the U.S. Navy's Honda Point Disaster. See Appendix E for further information on offshore cultural resource areas and shipwreck incidents in the vicinity of the proposed Project area (CADEMO Application 2020).

Onshore Setting

The pre-contact history of California's central coast spans the entire Holocene and may extend back to late Pleistocene times. Excavations on VSFB reveal occupations dating to the Pleistocene/ Holocene transition, around 11,000 years ago (Lebow et al. 2014; Lebow et al. 2015). Occupations during the earliest part of the Holocene (9,000 to 10,000 years) have been identified at several sites on the base (Glassow 1990, 1996, Lebow et al. 2001, 2006, 2007, Stevens 2011). These early occupants are thought to have lived in small groups that had a relatively egalitarian social organization and a forager-type land-use strategy (Erlandson 1994, Glassow 1996, Greenwood 1972, Moratto 1984). Human population density remained low throughout the early and middle Holocene (Lebow et al. 2007). Cultural complexity appears to have increased around 3,000 to 2,500 years ago (King 1981, 1990). At VSFB that interval also marks the beginning of increasing human population densities and appears to mark the shift from a foraging to a collecting land-use strategy (Lebow et al. 2006, 2007). Population densities reached their peak around 600 to 800 years ago, corresponding to the full emergence of Chumash cultural complexity (Arnold 1992) (see Section 5.2 for Tribal Cultural Resources).

VSFB history is divided into the Mission, Rancho, Anglo-Mexican, Americanization, Regional Culture, and Suburban periods. Beginning in the late 1890s, the railroad provided a more efficient means of shipping and receiving goods and supplies, which in turn increased economic activity. Ranching and farming continued during the early part of the period of Regional Culture (1915 to 1945), until the property was condemned for Camp Cooke in 1941. The Suburban Period (1945 to 1965) began with the end of World

War II. In 1956, the Army transferred 64,000 acres of North Camp Cooke to the Air Force, and it was renamed the Cooke Air Force Base. In 1958 the base had its first missile launch, the Thor, and was renamed VSFB (Palmer 1999).

The Vandenberg Coast Guard Station was constructed as the USCG Rescue Station and Lookout Tower at Point Arguello in 1936 and operated until 1941. The associated boathouse was removed in 1982 to allow for the expansion of the Vandenberg Dock facilities and the installation of a tow road for the Space Shuttle rocket motor fuel tanks. The administration and barracks buildings and a garage remain. The facility was designed in the residential Colonial Revival style, as were most USCG facilities during this time. The facility was found eligible for the National Register as part of the NEPA analysis for the Space Shuttle Program (United States Air Force 1978, 1982) (Davy et al. 2017).

On May 14, 2021, VSFB was renamed the Vandenberg Space Force Base and is used as part of the development and expansion of the U.S. Space Force. The Space and Missile Heritage Center, which is the only National Historic Landmark on the base open for tours.

Offshore Project Components and Potential Impacts

Project area surveys would include side-scan sonar images for shipwrecks not previously recorded in the CSLC's shipwreck database. The Projects would include offshore surveys over the proposed cable routes and turbine locations prior to installation to inform the final cable route. The side-scan sonar surveys would also profile the ocean bottom and use acoustic signatures to identify any assets buried in the sediment. A magnetometer survey, which measures variations in the earth's magnetic field to detect any manmade features underneath the seabed, would also be used to identify the presence of any potential archaeological or cultural resources.

Offshore Project activities with the potential to disturb the seafloor and affect archaeological resources include the HDD activities, seafloor cable laying and trenching, and installation of mooring anchors. The CADEMO Project includes trenching of inter-array cables connecting the individual floating turbines. To the extent possible, offshore Project infrastructure would be sited to avoid identified archaeological resources. The environmental impact assessment process under CEQA would provide a comprehensive analysis of potential impacts, avoidance and minimization measures, and mitigation measures pertaining to offshore archaeological resources.

Onshore Project Components and Potential Impacts

Ground disturbance associated with proposed onshore construction and infrastructure includes, but is not limited to, foundation grading for the new substation area, HDD at the substation for cable installation, excavation for installation of power poles, minor improvements for access roads and staging areas. The Projects would not affect the Vandenberg Dock facilities directly, but there is a potential effect on the historic setting of the property from the new substation, which would be located nearby (Davy et al. 2017). The same work areas could also be affected by decommissioning activities.

Further environmental impact analysis and mitigation measure development would include discovery measures for locating, identifying, and assessing the significance of land-based cultural resources in the Project area and would be coordinated closely with the U.S. Air Force, Space Command, 30th Civil Engineering Squadron (AFSC/30th CES) Environmental Office. VSFB holds the records of historic properties for the base and is a depository for reports of previous inventories and excavations. Discovery measures would include a pedestrian archaeological survey conducted by archaeologists meeting the Secretary of the Interior's Standards and Guidelines for Archaeology and Historic Preservation of areas not previously surveyed within the past 10 years. Previously recorded historic and prehistoric archaeological sites would be revisited, and surveys and their site forms would be updated (Davy et al. 2017).

The pedestrian archaeological survey would cover the new substation area including a 33-foot buffer. It would also cover the transmission line routes, including access roads to the right-of-way and a buffer of 65 feet on either side of the centerline. Other surveys areas and protocols may be investigated as acceptable to VSFB cultural resources staff. If historic or prehistoric archaeological resources are identified within the area of potential Project effects, the next step would be to implement test measures to determine the significance of the resources in question, including assessment of whether findings meet the criteria for listing in the National Register of Historic Places (Davy et al. 2017).

The CEQA process would include a comprehensive analysis of potential impacts to archaeological resources for all Project phases, including construction, operations, and decommissioning.

4.2.6 Energy, Utilities, and Service Systems

Existing onshore electric utilities in the proposed Project areas include the VSFB Substation N, which provides power to Vandenberg Dock through the existing 12 kV transmission line. The PG&E Surf Substation was constructed in 1985 to provide power to Platform Irene through a subsea cable.

Offshore Project Components and Energy Production

IDEOL proposes to build and install four new FWTs with capacity to produce 10 MW each for a total of 40 MW. CADEMO proposes to build and install four new FWTs with capacity to produce 12 to 15 MW each for a total of 60 MW. The wind turbines for both Projects would be powered through natural wind energy and would be equipped with an internal power source (battery) for emergency backup power to operate the FWTs. Although the wind turbines would not be reliant on an onshore energy source for power, they would have the ability to receive power from the onshore substation through the connecting static cable. See Section 3 for a full description of proposed components for both Projects.

Onshore Project Components and Potential Impacts

Both Projects would require construction of a new onshore substation to receive the offshore energy. From the new substation, electricity would be transmitted through a new overhead transmission line (gen-tie line) to an existing substation for output energy use. The IDEOL Project would connect to the VSFB Substation N to provide power to VSFB. IDEOL also proposes to connect to the CAISO power grid, which would require additional infrastructure (i.e., transmission line, etc.). Additional information is required from IDEOL to determine the location and extent of additional infrastructure to connect to the CAISO system. The CADEMO Project would connect to the PG&E Surf Substation to provide power to the CAISO grid. An EIR analysis for the Projects would identify if the Projects have potential for temporary disruptions of power with Substation N and Surf Substation during proposed improvements.

Power Grid Impacts

IDEOL has indicated that 20 MW is targeted for the Department of Defense (DoD), and 20 MW could be available to the CAISO power grid. Additional coordination is required with IDEOL, DoD, and potentially PG&E to determine which entity would be responsible for working with CAISO for the interconnection request process for connection to the CAISO system. This process is anticipated to include an interconnection study to assess impacts to the CAISO system. With a portion of the IDEOL energy supply going to VSFB, another potential impact on the CAISO grid could be reduced power use by VSFB.

CADEMO Corporation is currently in the process of working with CAISO for the interconnection request process for connection to the CAISO system. During Project operations, CADEMO Corporation reports that the Project could produce enough renewable electricity each year to meet the needs of the equivalent of 16,300 U.S. households (or more than sufficient to meet the household requirements of nearby Lompoc City[5]).

On the Central Coast, CAISO has indicated that 3 to 4 GW of offshore wind could interconnect to the CAISO grid[6]. In other conversations with industry, CAISO staff has indicated 5 to 7 GW of offshore wind could be interconnected. California Public Utility Commission staff, examining CAISO's white paper for the 2019-2020 Integrated Resource Plan cycle assumptions (for offshore wind resource cost assumptions), estimated 5 GW of deliverable capacity is available in the central coast for offshore wind (California Offshore Wind 2021).

An EIR for the Projects would include a more comprehensive analysis of impacts to the CAISO system. See Section 2.4, *Regulatory Setting and Other Approvals*, for agencies with discretion over the regulation and use of energy.

See Section 2.3.4 and Appendix B for public comments on proposed energy use and associated impacts. Public comments received during the development of the PEA recommend that an EIR for the Projects consider information resources from the following websites to further analyze impacts for energy, utilities, and service systems:

- https://caoffshorewind.databasin.org
- https://www.energy.ca.gov/data-reports/reports/integrated-energy-policy-report

[5] Number of households in Lompoc = 13,410 according to U.S. Census Bureau June 2019; data accessed from: http://worldpopulationreview.com/us-cities/lompoc-ca-population

[6] CAISO Presentation at 2019 Integrated Energy Policy Report Workshop: https://efiling.energy.ca.gov/GetDocument.aspx?tn=229915&DocumentContentId=61375

4.2.7 Geology, Soils, and Paleontological Resources

Regional Topography

The VSFB is located along 42 miles of the south-central California coastline and is approximately 275 miles south of San Francisco, within the Santa Maria basin. The Casmalia Hills are located to the north and the Santa Ynez Mountains and Sudden Flats to the south. The San Antonio Terrace, Burton Mesa, and Lompoc Terrace are located between the ranges. Moderate slopes of the Casmalia Hills to the north rise to over 1,300 feet; the much steeper canyon slopes of Tranquillion Mountain are to the south (USAF 2015).

Regional Geology

Surficial geology within the VSFB is mapped as older Quaternary alluvium (Qo), a late Pleistocene, poorly consolidated deposit of sand and pebble gravel. The near-surface geology includes the Orcutt formation (sandstone), which consists of middle- to upper-Pleistocene eolian nonmarine sand and gravel underlain by the Paso Robles and Monterey formations. The Orcutt formation ranges from less than 1 foot to 150 feet in thickness. Sand in the Orcutt formation is described as loose, medium-grained, massive, and light-buff in color. The basal portion of the Orcutt formation consists of well-rounded pebbles of quartzite, igneous rocks, and Monterey chert and shale. The Monterey Formation, a late-Miocene thinly bedded, siliceous shale with thin limestone strata constitutes the bedrock in this area (USAF 2019).

The Monterey Formation is pervasive beneath the terrace deposits and extending offshore. Water depths within the Project areas range from 0 foot at the shoreline to nearly 310 feet (52 fathoms) at the south and south by southeast corner. Apart from the shallow water areas, the seabed is relatively smooth with the Monterey Formation rock covered in soft marine sediments out to the OCS at about 328 feet (55 Fathoms). To the south-southeast, a large rock outcrop is found between the 164-foot and the 230-foot contour. The thickness of the unconsolidated sediment in the Project areas ranges from 0 foot (bedrock outcrop) to almost 164 feet off Point Arguello (Davy et al. 2017).

Soils

Coastal sand dunes and alluvium washed down from adjacent ridges and uplifted marine terraces characterize the soils along the VSFB coastal plain. The onshore site is underlain by sandy and gravely soils deposited on top of these ancient wave-cut terraces. Soils in the area are part of the Arguello series and consist mainly of Arguello shaly loam. These soils contain angular fragments of the underlying Monterey shale (Davy et al. 2017).

Table 4-12. Characteristics of the Arguello Shaly Loam Soils

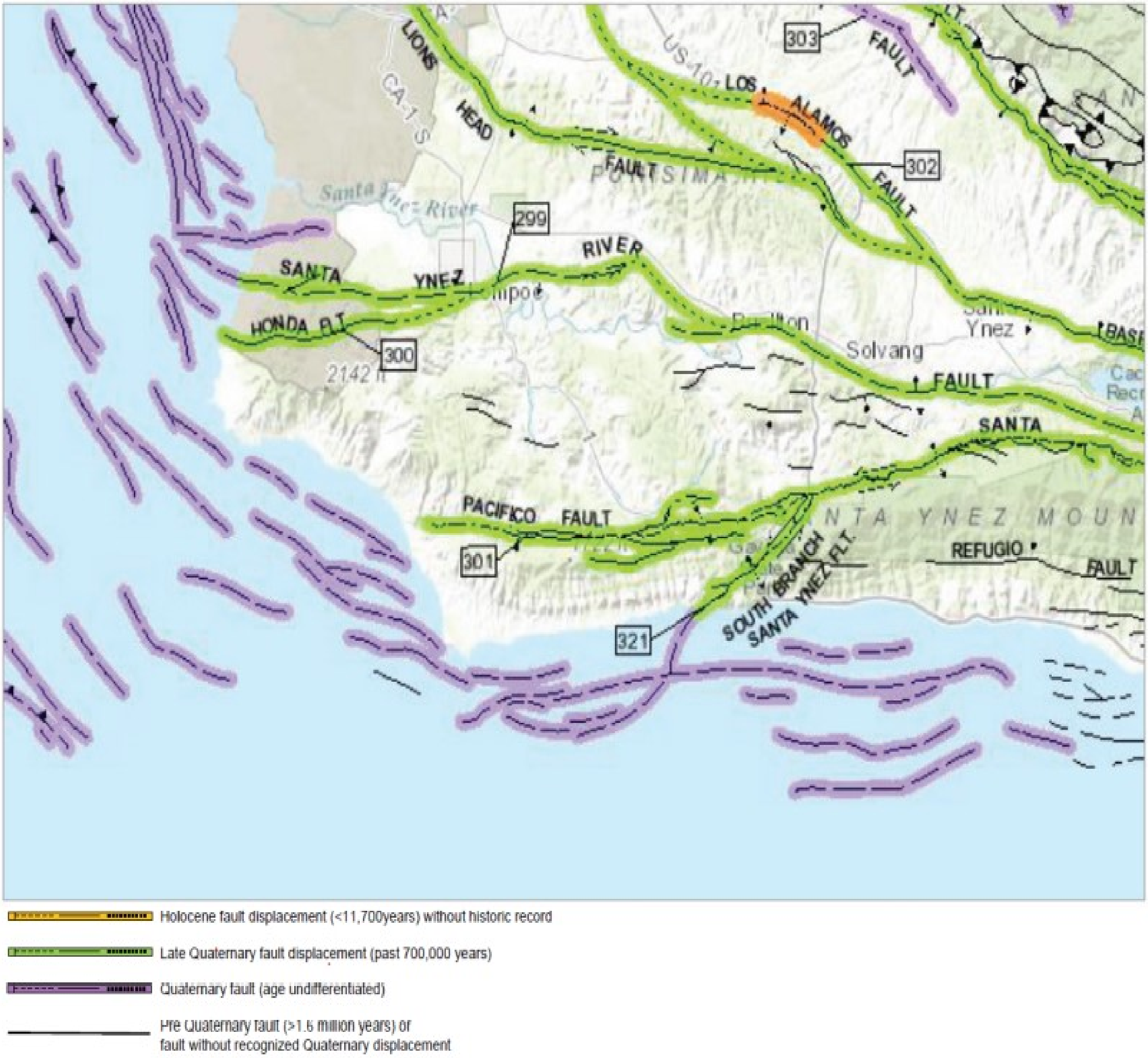
Characteristic	Value	Characteristic	Value
Surface soil	Dark gray, moderately compact, slightly to medium acid, with shale fragments	Percent sand	33-39
Subsoil	Dark gray, moderately compact, slightly to medium acid, with shale fragments	Percent silt	30-36
Parent material	Medium-textured stratified, slightly acid, gravelly older alluvium	Percent clay	29-32
Agricultural uses	Range, hay, lima beans, tomatoes	Capability Class	III

Source: Davy et al. 2017

Earthquakes and Seismicity

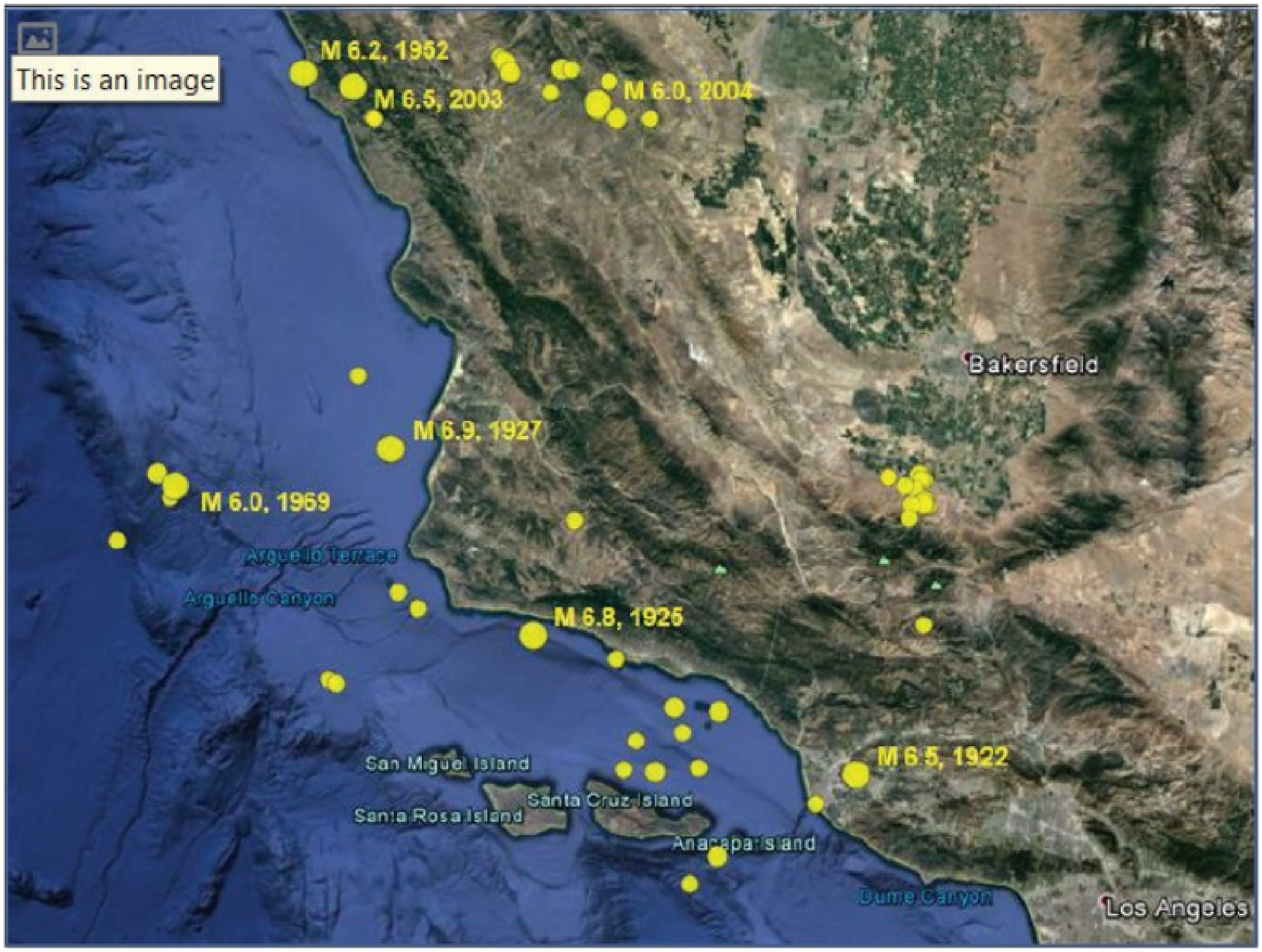
Major earthquakes occur in the Santa Barbara region about every 15 to 20 years. Three of the primary fault zones that run through the VSFB include the Santa Ynez-Pacifico Fault Zone, the Lompoc-Solvang (Santa Ynez River)-Honda Fault Zone, the Lions Head-Los Alamos-Baseline Fault Zones, and their potential offshore extensions. Moderate or major earthquakes along these systems could generate strong or intense ground motions in the area, and possibly result in surface ruptures of unmapped faults along the northern and southern boundaries, as well as the central part of VSFB (VAFB 2021). The historic earthquakes occurring within 93 miles of the Project sites with a magnitude of 4.5 or greater are mapped in Figure 4-6, and major regional earthquakes are shown on Figure 4-7.

Figure 4-6. Major Faults in Regional Area



Source: Davy et al. 2017. (California Geological Survey, Geologic Data Map No. 6, Compilation and Interpretation by: Charles W. Jennings and William A. Bryant)

Figure 4-7. Major Regional Earthquakes



Source: Davy et al. 2017

Paleontological Resources

Both the Monterey Formation and the older Quaternary alluvium in the region are considered high sensitivity areas due to the many recoveries of Pleistocene mammals and fossil fish. Fierstine et al. (2012) documented at least 47 species of fossil fish described from specimens found in quarries in the Monterey Formation that lie southwest of VSFB.

Evaluation of Potential Impacts

Installation, operation, maintenance, and decommissioning of floating offshore wind energy projects present many challenges. There would be impacts on geology, soils, and paleontological resources both onshore and offshore. Onshore impacts could result from proposed improvements to substations, installation of overhead transmission lines, and HDD activities. The Projects would also impact offshore geology, soil, and paleontological resources due to the mooring and anchoring systems, cable trenching and laying, and offshore HDD activities. Moreover, the seafloor may also be affected during decommissioning activities from removal of Projects' structures from the seafloor.

A comprehensive analysis of the impacts of the Projects components to geology, soil, and paleontological resources for the floating offshore wind Projects has not yet been conducted. This topic will be further evaluated in detail within the EIR process. However, the preliminary potential impacts are described below.

Onshore Project Components and Potential Impacts (Both Projects)

The onshore Project areas would be subject to extensive geotechnical surveys for all grading and drilling activities and foundation excavation work for proposed onshore structures, which include the new substations foundations and HDD sites, pole foundations for transmission lines, and improvements to Substation N and Surf Substation. Among other information, geotechnical surveys would guide the siting of structures and HDD boring to avoid hazards pertaining to expansive soils, liquefaction, hydric soils, ground water, floodplains, and other structural hazards. Structural foundations are anticipated to be constructed in accordance with DoD and Universal Building Code standards, including current seismic standards. All proposed onshore work would occur in an upland area east of the UPRR and is not anticipated to impact coastal bluff and beach areas. Conformance with BMPs and water quality standards with DoD and the Central Coast Regional Water Quality Control Board are expected to minimize impacts from soil erosion and runoff during grading activities.

Offshore Project Components and Potential Impacts (Both Projects)

Prior to installation of proposed offshore infrastructure (i.e., trenching/laying of electric cables, mooring anchors, etc.), both IDEOL and CADEMO would conduct geophysical surveys of the seafloor to assess geologic conditions and constraints, including sediment thickness, bedrock, boulders, and other seafloor anomalies (i.e., shipwrecks, fishing gear, etc.) This information would be used to determine the appropriate method of trenching, location of geologic constraints for potential cable protection measures, and appropriate type of anchoring for geologic conditions, among other considerations.

CADEMO estimates that cable protection measures on the seafloor would be required from the HDD exit hole out to a distance of approximately 0.36 to 0.4 miles (645 to 704 yards) before a suitable sediment depth is reached to allow cable burial to 5 feet, which is the preferred method of cable protection. Where boulders cannot be avoided, CADEMO has identified the potential for boulder relocation adjacent to the trench area. See Section 3.4 for a full description of offshore construction methods for both Projects. Due to strong seismic activities in the area, impact of seismic hazards such as earthquakes and tsunamis on the floating wind turbines and support structures should also be considered. See Section 4.2.9 for assessment of Project impacts on sediment transport.

Installation and presence of inter-array cables could also present additional impacts. Factors such as depth between the FWTs and bending and twisting of IACs caused by the currents all present potential impacts on the seafloor. Additional factors for further analysis include constant friction with the seabed due to cable motion as well as potential impacts from the use of buoyancy modules and clump weights. The mooring and anchoring systems could also present impacts and would be affected by the seabed data and the final uplift angle after optimization of the mooring system.

An EIR for the Projects would include a more comprehensive analysis of impacts to geology, soils, and paleontological resources.

4.2.8 Hazards and Hazardous Materials

Hazardous Waste Management

Management of hazardous waste at VSFB complies with the federal Resource Conservation and Recovery Act Subtitle C (40 C.F.R. §§ 240-299) and with California hazardous waste control laws under California Code of Regulations, title 22, division 4.5. These State and federal regulations require that hazardous wastes be handled, stored, transported, disposed of, or recycled according to defined procedures to avoid or limit exposure of hazardous waste to humans and the environment. The VSFB Hazardous Waste Management Plan (HWMP) outlines the procedures to be followed for hazardous waste management in accordance with these regulations.

The Project would involve routine transport, storage, use, and disposal of small quantities of hazardous materials during construction, such as gasoline, diesel, lubricants, and solvents. Safe handling of hazardous materials would be considered during all phases of Project construction (onshore and offshore) to protect the public, Project personnel, and the environment. Implementation of both the VSFB HWMP and a Spill Contingency and Hazardous Materials Management Plan (SCHMMP) would help avoid or reduce impacts associated with the accidental release of hazardous substances both onshore and offshore.

Onshore

VSFB has several hazard zones associated with past and present mission activities and operations on the base and include the following:

- Toxic Hazard Zones
- Missile/Space Launch Vehicle Flight Hazard Zones
- Explosive Safety Zones
- Radiofrequency Radiation Hazard Areas
- Airfield Clear Zones
- Lateral Clear Zones (LCZs)
- Accident Potential Zones (APZs)
- Air Installation Compatible Use Zones
- Unexploded Ordnance Closure Areas

These zones can constrain where projects can be sited on VSFB to ensure the health and safety of work crews (VAFB 2021). The EIR would address these zones in more detail and CADEMO and IDEOL would need to coordinate closely with DoD regarding these zones.

Measures to avoid or minimize impacts associated with accidental release of hazardous substances for onshore operations shall include, but not be limited to, identifying appropriate fueling and maintenance areas for equipment, equipment inspection schedules, and spill response procedures including maintaining spill response supplies onsite. The SCHMMP would identify Best Management Practices (BMPs) related to using hazardous substances and containing any spills. The Projects are not expected to emit any hazardous emissions or involve handling of hazardous or acutely hazardous materials, substances, or waste. Project work vehicles would be refueled offsite. The HDD machine would be refueled by a mobile fuel truck in a designated fueling area. At the end of construction, all disturbed areas would be returned to their natural state, leaving no potential health hazard.

Horizontal Directional Drilling

The first stage of the HDD work would involve the drilling of a pilot hole from the onshore "entry" point to the offshore "exit" point (see Section 3.1.5 for more information about the HDD method). There would be some drill fluid discharge at the emergence of the pilot drill at the proposed exit point. The drill fluid would be comprised of seawater and a non-oil-based drilling fluid such as bentonite. According to the material safety data sheet, bentonite is not considered toxic to aquatic organisms and is a biodegradable drilling fluid that does not pose a significant threat to them. A closed loop recycling system would separate drill cuttings from reusable drilling fluids, meaning that at the proposed breakthrough exit point offshore and at the proposed onshore entry point, there would be minimal seawater-based drill fluid and cuttings lost to the environment. Drill cuttings excavated offshore would be returned to shore, and all captured cuttings would be collected for disposal by licensed contractors.

In addition to the plans specified above, an Inadvertent Return Contingency Plan would be prepared as required by CSLC to establish procedures to be followed in the case of an inadvertent release of drilling fluids during the HDD operation. All HDD work would implement BMPs.

Wildfire

The onshore Project area is located within a Federal Responsibility Area of California Department of Forestry and Fire Protection (CAL FIRE 2007), which the DoD provides fire protection as well as various emergency services for VSFB. The onshore Project components are located within both non-fire hazard severity zones and very high fire hazard severity zones (CAL FIRE 2008). The electrical cable landing and new substation is located in a non-fire hazard severity zone. The proposed onshore transmission lines, 70 kV (CADEMO) and 66 kV (IDEOL), extending north to Substation N and the Surf Substation transects very high fire hazard severity zones within VSFB, which could increase the risk of wildland fires and would require further analysis in the EIR.

Offshore

Offshore work vessels may release hazardous materials from accidental petroleum spills, including diesel fuel. These spills would pose a risk to the health of the environment and people. All offshore work vessels would be required to carry a specified amount of sorbent boom and pads to immediately respond to a spill should one occur. Offshore work vessels may also likely be required to have a small, powered vessel (e.g., inflatable) onboard for rapid deployment to contain and clean up any small hazardous material spill or sheen on the water surface. The HWMP and SCHMM Plans shall provide for the immediate notification of the California Governor’s Office of Emergency Services and call out of additional spill containment and clean-up resources in the event of a spill that exceeds the rapid clean-up capability of the onsite work force. Discussion of the impacts of spills on Marine Biology are discussed in the Biological Resources Section.

Operations and Maintenance

Project operations and maintenance would include electrical and mechanical testing, occasional repair work, and ongoing maintenance of the equipment. The new onshore substation and overhead transmission lines may also need periodic maintenance and repair work. The same construction access roads would be used for these activities. The Hazard Waste Management/Spill Plans, in addition to all appropriate Mitigation Measures, would continue in effect for these activities.

Climate Change Hazards

Climate change related conditions in the ocean could affect the proposed Projects. For example, storms and wave action, made stronger and more frequent due to climate change, could affect the durability and longevity of the facility components. In addition, the stability of the floating foundations and strength of mooring systems would need to be sufficient to safely withstand these effects. Onshore, considerations include flooding or erosion impacts from severe storms on Project infrastructure, and fire risks related to the electrical lines.

Decommissioning

The decommissioning process would include the disconnection and removal of all electrical cables, mooring lines and anchors, as well as the tow back, dismantlement, and removal of the floating foundations and wind turbine components. If onshore facilities cannot be repurposed for DoD operations, then the substation, overhead powerlines, and improvements to Substation N and Surf Substation would be disconnected, dismantled, and removed for disposal and recycling.

An EIR for the Projects would include further discussion and analysis of construction, operation, and decommissioning impacts from hazardous materials.

4.2.9 Hydrology, Water Quality, and Coastal Processes

Currents

The Point Arguello area lies inshore of the California Current system. It is an especially interesting part of the California Current system because it is characterized by a remarkable and systematic seasonal reversal in flow. The surface currents near the coast vary with season: those waters within about 150 km of the coast flow northwestward along most of the coast in the period from October through February and southeastward during the rest of the year (Fugro Pelagos, Inc. 2016).

An abrupt change in coastline orientation occurs between Point Arguello and Point Conception. This large-scale change in coastal configuration induces much of the complexity in wind, wave, and oceanic flow fields for the offshore Project area. Along the central California coast to the north, physical processes are strongly influenced by seasonally varying winds that blow uniformly to the south over a wide geographic area (Santa Barbara County 2008).

Immediately shoreward of the California Current, along the central California continental slope and shelf, is a northward-flowing counter current that carries water out of the Santa Barbara Channel. This northward-flowing Davidson countercurrent exhibits strong seasonal variability in intensity but maintains a sustained northward flow. These southern waters are warmer, more saline, and less oxygenated than offshore waters (Chelton et al. 1988, Coats et al. 1991, Hendershott 2001). Seasonal variability in the Davidson Current coincides with large-scale fluctuations in coastal winds along the central California coast. On average, winds are directed toward the south, parallel to the coast (Dorman and Winant 1995). The northward-flowing Davidson Current is strongest when these southward winds relax between December and February. A rapid spring transition to stronger southward winds occurs between March and June when the Davidson Current weakens and can even turn southward near the sea surface. These strong southward winds in the spring also induce intense upwelling near Point Arguello. During upwelling, surface water near the coast is transported offshore and is replaced by cool, nutrient-rich water from deep offshore (Santa Barbara County 2008).

Upwelling is an important feature of this coastal region and is largely responsible for its productive fishery. The presence of nutrient-rich water near the sea surface significantly enhances primary productivity (phytoplanktonic blooms) that is otherwise limited by the lack of nutrients within the photic zone (i.e., the uppermost layer of the ocean that receives sunlight). Phytoplankton are the foundation of the marine food web and their increased abundance results in the great diversity and biomass of marine organisms along the central California coast (Santa Barbara County 2008).

The subsurface flow in the Project area is predominantly upcoast, regardless of the intensity of the southward-directed upwelling winds (Savoie et al. 1991; Hendershott 2001).

Sediment Transport Offshore Point Arguello

The long-shore transport of sediment in the Project areas is generally in a southward direction north of Point Arguello and in an eastward direction between Point Conception and Gaviota. Estimates of the net transport southward around Point Conception range from zero to 180,000 yd^3/year (Fugro Pelagos, Inc. 2016).

Hydrology and Onshore Runoff

The Project areas includes areas of estuarine and marine deep water, estuarine and marine wetlands, some limited areas of freshwater forested and shrub wetlands, and riverine wetlands that are found along stream courses (Santa Barbara County 2008). Within the Project area, the Santa Ynez River represents the major drainage basin and Honda Creek and Bear Creek represent the minor drainage basins (see Figure 4-5).

Marine Water Quality

Coastal seawater and sediment quality is determined by a number of factors, including oceanographic processes, contaminant discharge, and freshwater inflow. Petroleum development activities, commercial and recreational vessels, natural hydrocarbon seeps, river runoff, municipal wastewater outfalls, and minor industrial outfalls all contribute to increased nutrients, trace metals, synthetic organic contaminants, and pathogens in offshore waters and sediments (Santa Barbara County 2008).

Turbidity decreases the clarity of seawater and is largely determined by the concentration of suspended particulate matter. Turbidity dictates the depth of the photic zone. Turbidity is increased in coastal waters as a result of phytoplankton blooms, storm runoff, sediment resuspension, and discharge of wastewater (Santa Barbara County 2008).

Chemical analysis of seafloor sediments provides insight into the overall health of the marine environment because environmental contaminants tend to accumulate in the particulates that are deposited on the seafloor over long periods (Santa Barbara County 2008).

Offshore Project Components and Potential Impacts (Both Projects)

Some of the potential construction-related impacts to marine water quality include:

- Potential discharges at the HDD offshore exit pit (e.g., drilling muds and fluids)
- Site preparation work for the cable lay route (e.g., boulder relocation/clearance)

- Seafloor cable trenching and potential armoring methods (e.g., jet trenching, seafloor plough method, placement of rock or hard materials over cable)
- Installation of mooring anchors (e.g., suction pile installation, drag embedment method)
- Potential risk of spills/accidents from work vessels and equipment

Surface currents are more important in determining the fate of potential Project related pollutants on the ocean surface, such as potential accidents and spills from work vessels and equipment. Subsurface currents are more important in determining the impacts from seafloor disturbance activities.

During Project operations, the individual floating platforms may act as a localized breakwater and disrupt surface currents. Components of the FWTs within the water column, such as electric cables and mooring lines connecting the FWTs to the seafloor and mooring anchors on the seafloor, must also be analyzed for potential impact on currents and other physical processes. Further analysis is also needed to determine potential for operation of the wind turbine rotor blades to produce wind currents and alter ocean surface currents, including effects on fog and other weather patterns. CDFW provided comment that, "turbines have been shown to alter the temperature, both locally, and up to 7.5 miles downwind. Offshore turbines disrupt the atmospheric boundary layer, altering fog and other weather patterns (Miller and Keith 2018) (Hasager et al. 2017)."

The EIR for the Projects would need to analyze potential impacts associated with alteration of seafloor currents due to the mooring anchors, particularly suction pile anchors, with 6 to 8 anchors per FWT weighing 22 to 44 tons per anchor, and the movement and distribution of sediments due to the installation of mooring anchors and cable protection materials on the seafloor (see Figures 3-16 and 3-17). During Project operations, the individual floating platforms may act as a localized breakwater with potential to disrupt surface currents and sediment distribution. Components of the FWTs within the water column, such as electric cables and mooring lines connecting the FWTs to the seafloor must also be analyzed for potential impact on currents, sediment distribution, and other physical processes.

Decommissioning of the FWT components would require consideration of whether to remove or abandon buried electric cables for least environmental impact. Removal of the FWTs would require environmental analysis of the impacts of returning the offshore Project area to pre-Project conditions.

The EIR for the Projects will provide a comprehensive analysis of impacts to coastal and ocean processes. See Section 2.3.4 for information on public comments for ocean resources. Public comments received on the PEA recommend that the EIR process for the Projects include:

- A robust and science based collaborative planning process for site selection of the FWTs to avoid and minimize impacts to marine species and habitats
- Consider information from offshore wind Projects and planning processes for the outer continental shelf
- Consider cumulative impacts for past, present, and future Projects and activities
- Consideration and protection of protected marine habitats and species
- Consider the wealth of scientific literature for marine resources and ecosystems

Public comments received during the development of the PEA also recommended consideration of information resources from the following websites for information on environmental setting and evaluation of impacts:

- https://caoffshorewind.databasin.org
- https://marinecadastre.gov/
- https://portal.westcoastoceans.org/
- https://www.ipcc.ch/srocc/
- http://www.bto.org/science/wetland-andmarine/soss/projecrsL
- https://tethys.pnnl.gov/technology/offshore-wind

See Appendix B for written comments received for the PEA.

Onshore Project Components and Potential Impacts (Both Projects)

See Section 4.2.4 Terrestrial Biological Resources, Onshore Project Components and Potential Impacts for discussion of impacts to onshore hydrology. All onshore grading activities would be subject to BMPs with the DoD and requirements from the Central Coast Regional Water Quality Control Board.

The EIR would include baseline surveys for all onshore drainages and wetlands; avoidance and minimization measures would be developed for these resources, including incorporation of appropriate mitigation measures. This information will also be used to analyze impacts for decommissioning of onshore Project components, such as removal of power line poles and the new substation.

4.2.10 Land Use and Planning

This section pertains to land use jurisdictions for the Project areas and vicinity. The onshore Project areas are located in western Santa Barbara County and resides within VSFB property. VSFB is a federal military installation, and access to portions of the base is only permitted to authorized military personnel and their families, civilian employees of the base with approved identification, and visitors with preapproved authorization.

Lands surrounding VSFB are under the jurisdiction of Santa Barbara County and the City of Lompoc. VSFB is located approximately 5 miles west of the City of Lompoc. Local roadway access to the VSFB Project areas is provided by West Ocean Avenue (State Route 246) providing direct access to the Solvang Gate entrance to the base. Adjacent to the north end of the Project areas, State Route 246 provides access to Ocean Park County Beach, Surf Beach, and Wall Beach. Seasonal restrictions for these beaches are in place annually from March 1 to September 30 as part of the annual program to protect the threatened Western snowy plover and its nesting habitat under the Endangered Species Act. UPRR is also located near the shoreline of the VSFB Project areas.

VSFB is headquarters for the 30th Space Wing (30 SW). The 30 SW at VSFB is the Air Force Space Command organization responsible for DoD space and missile launch activities on the West Coast of the United States. Satellites destined for polar or near-polar orbit are launched from VSFB, and ballistic missiles are tested. The 30 SW supports West Coast launch activities for the Air Force, DoD, Missile Defense Agency, National Aeronautics and Space Administration, foreign nations, and various private industry contractors. To accommodate space and missile launches, roadways are required to access all portions of VSFB (VAFB 2021). Land uses within VSFB are managed for compatibility with base operations, including height and air space restrictions.

The DoD has a structured process for developers to request a mission compatibility evaluation of a proposed energy project, as documented in Code of Federal Regulations title 32, Part 211. In accordance with the Military Aviation and Installation Assurance Clearinghouse (Clearinghouse) (10 U.S.C. § 183a(c)(7)), if a proposed energy project is known to be inside a military operational area or in a radar surveillance area that the DoD owns or operates in, the project must be filed at least 1 year prior to construction. See Section 2.4 for further information on the DoD process.

Federal activity in, or affecting a coastal zone requires preparation of a Coastal Zone Consistency Determination or a Negative Determination, in accordance with the Coastal Zone Management Act of 1972. The California Coastal Zone Management Program was formed through the California Coastal Act of 1972. The California Coastal Commission reviews federally authorized Projects for consistency with the California Coastal Zone

Management Program. See Section 2.4 for further information on other agencies with jurisdiction and applicable regulations over the Project area (VAFB 2021).

According to the California Department of Conservation Farmland Mapping and Monitoring Program, the onshore Project areas are categorized as “Other Land” (California Department of Conservation 2007) and not considered agricultural. The Project areas located within VSFB are not in an area zoned for agricultural use or under a Williamson Act contract. According to the Santa Barbara County General Plan, there are no forest resources, agricultural preserves, or prime soils within the vicinity of the Project area; therefore, this resource area would not be further analyzed in an EIR.

Project Components and Potential Impacts

The IDEOL and CADEMO applications have both concluded DoD’s Clearinghouse informal review process and now are currently under the formal review process with DoD. See Section 2.4 for further information on applicable permitting requirements for the Projects.

IDEOL and CADEMO have submitted applications for new leases for the placement of the FWTs and installation of power cables to shore. The CSLC is the lead CEQA agency, and the Projects will require preparation of an EIR for evaluation of environmental impacts over the Project areas as a whole prior to consideration and issuance of any lease.

4.2.11 Noise

Noise is often defined as unwanted sound that can interfere with normal activities or otherwise diminish the quality of the environment. Depending on the noise level, it has the potential to disrupt sleep, interfere with speech communication, or cause temporary or permanent changes in hearing sensitivity in humans and wildlife. Noise sources can be continuous (e.g., constant noise from traffic or air conditioning units) or transient (e.g., a jet overflight or an explosion). Noise sources also have a broad range of frequency content (pitch) and can be nondescript, such as noise from traffic, or be specific and readily definable such as a whistle or a horn. The way the acoustic environment is perceived by a receptor (animal or person) is dependent on the hearing capabilities of the receptor at the frequency of the noise and their perception of the noise.

The Noise Control Act (NCA) (42 U.S.C. 4901 et seq.) sought to limit the exposure and disturbance that individuals and communities experience from noise. It focuses on surface transportation and construction sources, particularly near airport environments. The NCA also specifies that performance standards for transportation equipment be established with the assistance of the Department of Transportation. Section 7 of the NCA regulates sonic booms and gave the Federal Aviation Administration regulatory authority after consultation with the USEPA. In addition, the 1987 Quiet Community amendment gave State and local authorities greater involvement in controlling noise.

Existing noise levels on VSFB are generally quite low due to the large areas of undeveloped landscape and relatively sparse noise sources. Background noise levels are primarily driven by wind noise; however, louder noise levels can be found near industrial facilities and transportation routes along the UPRR and existing roads. Rocket launches and aircraft overflights create louder intermittent noise levels. On VSFB, general ambient noise measurements have been found to range from around 35 to 57 dB (Berg et al. 2002).

Offshore Project Components and Potential Impacts (Both Projects)

The Projects involves the use of marine vessels and equipment that would increase the level of noise above existing conditions. Marine-based activities would take place in the ocean, and equipment for installation of the wind turbines would not occur near any human noise-sensitive land uses that could be affected. The noise impacts of marine-based activities on aquatic species are discussed in Section 4.2.3, *Biological Resources - Marine*.

Onshore Project Components and Potential Impacts (Both Projects)

Onshore construction activities would generally occur during daytime hours and would require use of heavy equipment for onshore construction activities. The new substation would require grading, construction of foundations for the transformers, office building, and other equipment, and a chain link security fence. The onshore entry hole for the static cable would be located at the substation site and will require heavy equipment for HDD, duct installation, and cable pulling operations.

The installation of the transmission line would use standard utility construction methods and equipment for pole foundations, installation of towers, and transmission line installation and pulling operations. Staging areas would be along the transmission line route in parking lots, back roads, or on dirt areas.

Noise levels would be expected to increase during onshore construction activities above baseline noise levels. Decommissioning activities would likely generate similar onshore noise levels.

Port Hueneme has been identified by the Applicants as the main floating wind turbine construction port and marshalling harbor for offshore works. The assembly and fabrication of the wind turbines and platforms would occur at the port. Port Hueneme is considered an industrial facility.

The EIR for the Projects would include a comprehensive analysis of noise impacts both onshore at VSFB and Port Hueneme and offshore at the FWT locations.

4.2.12 Population and Housing

This section pertains to the potential impacts of both Projects with regard to population and housing.

Project Components and Potential Impacts

It is unknown at this time if energy output during the operations of the Projects will have potential to affect population and housing. Among other factors, this could perhaps be a measure of how much power the Projects contribute to the CAISO grid, marketing considerations for purchase of power, available infrastructure for transmission of energy, and supply and demand considerations for power use.

IDEOL would have four new FWTs with capacity to produce 10 MW each for a total of 40 MW. Energy output from the IDEOL Project would provide 20 MW of power to VSFB through Substation N, and IDEOL is proposing to provide 20 MW of power to the CAISO power grid.

CADEMO would have four new FWTs with capacity to produce 12 to 15 MW each, up to 60 MW total. The CADEMO Project would deliver a total of 60 MW of power to the PG&E Surf Substation for connection to the CAISO grid. During Project operations, CADEMO Corporation reports that the Project could produce enough renewable electricity each year to meet the needs of the equivalent of 16,300 U.S. households (or more than sufficient to meet the household requirements of nearby Lompoc City) (http://worldpopulationreview.com/us-cities/lompoc-ca-population). See the Energy, Utilities, and Service Systems Section for further information on these impacts for the Projects.

Although the Projects may have potential to contribute towards the early development of workforce and industry growth for the offshore wind industry in California, it is unknown if this growth would occur at a scale to affect population and housing.

Decommissioning of the Projects could result in a potential loss of power to the CAISO grid. The EIR for the Projects would further analyze the relevant factors to consider the potential population and housing impacts for the Projects as well as possible growth inducing impacts.

4.2.13 Recreation

See Section 5.1 for Recreational Fishing. Outdoor recreation resources include State, county, and locally managed parks along the shoreline. Recreational activities include boating, diving, surfing, swimming, sunbathing, nature observation, hiking, camping, biking, and off-road vehicle use. Within the Project area popular surfing locations west of Gaviota include the Hollister Ranch shoreline, which is generally limited to boat access, Jalama Beach, and Pismo Beach in San Luis Obispo County. Public access to the Hollister Ranch shoreline is currently generally limited to water/board access. Diving is popular all along the coastal kelp beds and reefs in depths of 60 feet or less. Access to diving areas west of Gaviota and north to Point Sal is by boat only, but shore entry is possible at any of the public beach or park locations.

This part of the coast and nearshore waters is also listed on the CSLC's "Significant Lands Inventory" pursuant to Public Resources Code section 6370 et seq. (Inventory of Unconveyed State School Lands and Tide and Submerged Lands Possessing Significant Environmental Values | CA State Lands Commission)(CSLC 1975). The parcel listed in the Inventory (parcel number 42-062-000), which includes a 1-mile strip of tidelands and submerged land in the Pacific Ocean immediately offshore of VSFB, is identified as possessing significant environmental values for recreation, including wildlife viewing. Nearly all of the parcel is now protected within the VSMR.

Table 4-13 provides a list of public beaches in western Santa Barbara County (Santa Barbara County 2008).

Table 4-13. Primary Public Beaches in Western Santa Barbara County

County Beach Name	Nearest City or Community
Guadalupe Dunes	Guadalupe
Point Sal State Beach	Guadalupe
Jalama Beach	Lompoc
Ocean Beach	Lompoc

Santa Barbara County 2008

Rancho Guadalupe Dunes County Park, located south of the boundary between Santa Barbara and San Luis Obispo counties, provides beach access, bike and equestrian trails, fishing, birdwatching, hiking, beachcombing, tidepooling, and beach exploration (Santa Barbara County 2008).

Point Sal State Beach is located north of VSFB, near the Guadalupe. It is made up of 140 acres, including 2 miles of ocean frontage; recreational activities include fishing, beachcombing, hiking, natural study, photography, picnicking, and sunbathing (Santa Barbara County 2008).

Jalama Beach lies north of Point Conception on 23.5 acres of coast and is a popular location for camping, surfing, and nature observation. Jalama Beach Park includes barbeque grills, benches and picnic tables, bike trails, bird watching, boating, fishing, horseshoe pits, a playground, concessionary stand, restaurants, surfing, swimming, and offers tent and recreational vehicle camping. Peak attendance occurs during the summer months and declines during the winter months (Santa Barbara County 2008).

Surf Beach lies west of Lompoc on VSFB property. Parking facilities were developed to serve the Amtrak station, but the site is also used for coastal access. Annual visitation data is not available but is estimated to be a fraction of the attendance at nearby Ocean Beach County Park, 0.5 mile to the north. Wall Beach is also on VSFB property with limited public access (Santa Barbara County 2008).

Ocean Beach County Park is located west of Lompoc on 36 acres adjacent to the coast. The park provides safe coastal access with a wheelchair accessible ramp that passes under a train trestle. The park contains a sand dune/wetland environment with the Santa Ynez River mouth as a northern boundary. The park features barbeque grills, benches and picnic tables, bike trails, birdwatching, and restrooms (Santa Barbara County 2008).

The nearest publicly accessible surfing spots are Surf Beach and Jalama Beach County Park. Additional locations on VSFB are used by surfers with a military identification and pass, but these areas are not open to the public. Table 4-14 lists the characteristics of known surfing spots within 12 air miles of the Vandenberg Boat Dock Station area (Davy et al. 2017).

Table 4-14. Surfing Spots within 10 Miles of the Vandenberg Boat Dock Station

Name	Miles/ Direction from Dock Station	Public Access	Break Condition	Experience Level	Comment
Surf Beach	8.8 mi. north	Yes - Surf train station parking lot	50 to 150 m normal break, sandy bottom, “hollow, fast, powerful”	Experienced, not for beginners	Use listed as “empty”; shark hazard
Boat House	0.5 mi. east	No – VSFB pass only	50 to 150 m normal break, sandy bottom with rock, “ordinary break”	All levels	Use listed as “few surfers”, shark hazard
Del Morida	3.7 mi. southeast	No – VSFB pass only	<50 m normal break, sandy bottom with rock, “hollow, ordinary, fun break”	All levels	Use listed as “empty”; undertow, rock, shark hazard

Name	Miles/ Direction from Dock Station	Public Access	Break Condition	Experience Level	Comment
Jalama	7.4 mi. southeast	Yes - Jalama Beach County Park, public access	50 to 150 m normal break, sandy bottom with rock, “ordinary break”	Experienced surfers	Crowded on weekends, otherwise “empty”; shower, bathroom, grill, parking
Tarantulas	7.9 mi. southeast	Yes – park at Jalama Beach and walk 30 minutes	50 to 150 m normal break, reef rock bottom, “hollow, fast, powerful break”	Experienced surfers	Crowded on weekends, otherwise “empty”; shower, bathroom, grill

Source: wannaSurf world surf spot atlas: http://www.wannasurf.com/.; Surfline: www.surfline.com

Offshore Project Components and Potential Impacts (Both Projects)

Because the areas around the FWTs would have restricted navigational access as explained in Sections 3.2.1 and 3.2.2, this would limit areas of offshore recreational boating. During Project operations, given the size and depth of the individual floating platforms for the wind turbines, there may be some potential for the platforms to act as a localized breakwater and disrupt surface currents. Components of the FWTs within the water column, such as electric cables and mooring lines connecting the FWTs to the seafloor and mooring anchors on the seafloor, must also be analyzed for potential impact on currents and other physical processes. Further analysis is also needed to determine potential for operation of the wind turbine rotor blades to produce wind currents and alter ocean surface currents. The EIR for the Projects would analyze potential impacts on surf conditions.

Onshore Project Components and Potential Impacts (Both Projects)

Highway 246 would serve as the onshore construction access route to the Project areas for work trucks, equipment, and building materials. Highway 246 also serves as the access route to the public beaches adjacent to the north end of the Project areas (Ocean Park, Surf, and Wall Beaches). Neither CADEMO or IDEOL has identified the potential for using beach parking lots for construction access and staging purposes.

The EIR for the Projects would analyze potential impacts for public access to these beaches during peak construction access periods, including any potential use of parking lot areas for construction related activities (i.e., parking, equipment storage, etc.) as well as potential impacts to offshore recreational activities.

4.2.14 Transportation

This section pertains to onshore and offshore transportation. The UPRR is located near the shoreline for the entire onshore Project areas and provides passenger rail transportation through the area. Local roadway access to VSFB is provided by West Ocean Avenue (Highway 246) providing direct access to the Solvang Gate entrance to VSFB. State Route 246 is mostly a two-lane undivided highway with four-lane rural expressway portions. Coast Road is the major, paved artery connecting 13 facilities along the western edge of VSFB.

Figure 4-8 depicts the offshore shipping routes through the Santa Barbara Channel. The blue line is the north bound traffic lane, and the brown line is the southbound traffic lane. These routes would be used to transport the FWTs out to the offshore Project areas.

Figure 4-8. Shipping Routes from Port Hueneme

Offshore Project Components and Potential Impacts (Both Projects)

The following is a description of the navigation exclusion areas proposed by IDEOL and CADEMO for both Projects. The lease areas proposed by IDEOL and CADEMO are subject to further review by CSLC and may be further reduced for the operations of the proposed Projects. During the offshore construction phases, CADEMO is proposing a rolling 1,640-foot construction safety zone to be implemented around each turbine and over the relevant portion of the cable route during active installation. Areas that are not under active installation or have been completed would be removed from the safety zone when appropriate. The active safety zone would be monitored by a guard vessel or other designated construction vessel.

For IDEOL, in addition to the proposed 5.2 square mile lease area for the wind turbines, a 1,640-foot corridor along the north and south edges of the proposed lease area would restrict public navigation during the wind turbine installation phase of construction. During cable laying, a safety distance of 1 nm would be maintained around the cable route at all times.

Sections 3.2.1 and 3.2.2 describes the navigation exclusion areas that would remain in effect during the operational life of both Projects. The CADEMO Project proposes to create a 1,968-foot radius exclusion area around each turbine (Figure 4-9), which would not encompass the entire lease area. According to CADEMO, it is anticipated that this radius could be reduced following completion of the appropriate mooring and anchoring designs. For IDEOL, the entire proposed 5.2 square mile lease area (Figure 3-3) would be precluded from public navigation during the operational life of the Project.

Offshore transportation impacts could include potential impacts from transporting the FWTs from Port Hueneme through the Santa Barbara Channel to the offshore Project areas and impacts from restricting offshore vessel traffic from the lease areas.

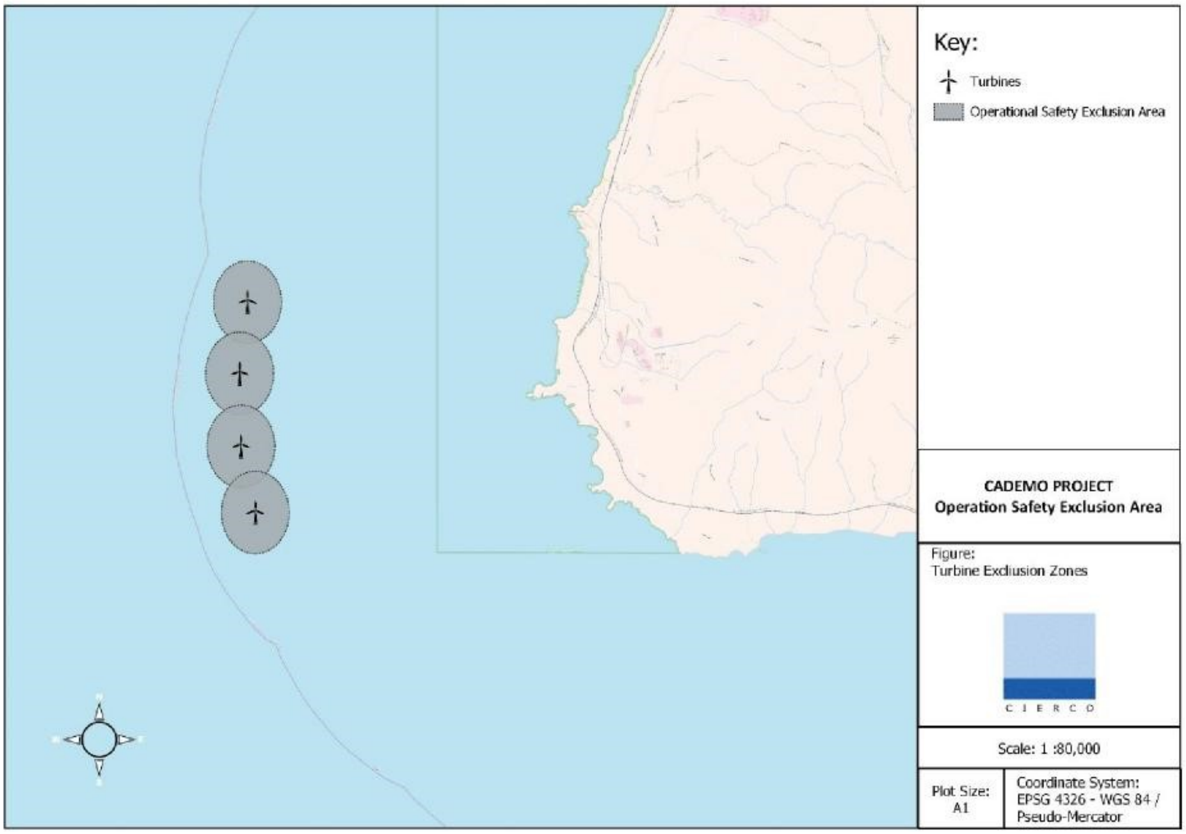
The EIR would provide a comprehensive analysis of impacts to offshore transportation and navigation.

Onshore Project Components and Potential Impacts (Both Projects)

For both Projects, Highway 246 would be the primary route for construction access to the Project area. It is anticipated, subject to agreement with Vandenberg officials, that the Projects would use the existing base road network, with access to the construction site provided via Arguello Boulevard and Mesa Road. From there, as the overhead power line route runs along the existing road network, access is provided by those roads, namely Lasalle Canyon Road, Coast Road, and Tow Road. Pole work areas would primarily be parallel and adjacent to Coast Road. As such, work areas are expected to be accessed from Coast Road.

Construction of the new overhead transmission lines and onshore infrastructure will be undertaken over a 6-month time frame. It is intended that construction be undertaken during daylight hours, although there may be occasion where there may be a requirement to work extended hours due to the VSFB operations, schedule constraints or other time sensitive matters, or to maintain the structural integrity of concrete placement.

Figure 4-9 CADEMO Operational Navigational Exclusion Area



Adjacent to the north end of the Project areas, Highway 246 provides access to Ocean Park Beach, Surf Beach, and Wall Beach, which allow limited seasonal public access. At this time, neither Project has identified the potential for using the Ocean Park Beach parking lot for construction staging related purposes.

The EIR would provide a comprehensive analysis of impacts to onshore transportation and would include impacts to local and regional roads surrounding the Project areas, including if there will be any potential disruption of service to UPRR and other roads in the Project areas for overhead power line crossings. The EIR would also analyze traffic related impacts from decommissioning activities, such as demolition and removal of the new substation building, and removal of power lines.

5.0 COMMERCIAL AND RECREATIONAL FISHING, TRIBAL CONSULTATION, AND ENVIRONMENTAL JUSTICE

CSLC staff believes that understanding how the proposed CADEMO and IDEOL Projects may affect communities and ocean users is a critical part of developing this early assessment. In addition, the proposed Projects would be located within the geographic and cultural homelands of several California Native American Tribes who must be consulted pursuant to State law and the CSLC's adopted policy on Tribal Consultation. This section presents information about commercial and recreational fishing in the proposed lease areas including primary species fished, the economic and social importance of these activities, and a discussion of the concerns, comments, and data suggestions CSLC received during the focused outreach meetings and individual follow-up interviews. Second, this section presents a summary of government-to-government Consultation, which is ongoing, and early learnings about how the proposed Projects may affect both physical tribal cultural resources and intangible heritage, spiritual practice, and care of ocean life. Third, in keeping with the CSLC's commitment to social and environmental equity and consistent with its Environmental Justice Policy, this section also presents early learning and feedback from staff's initial communications with local organizations that protect and advocate for fairness and equity for vulnerable and disadvantaged communities that could be affected if the proposed Projects were implemented.

5.1 COMMERCIAL AND RECREATIONAL FISHING

Commercial Fishing Overview

A wide variety of finfish and shellfish species are harvested commercially in the proposed Project areas offshore of VSFB, except within the VSMR where fishing is prohibited. Most fish commercially harvested in this area are landed in the ports/harbors of Santa Barbara and Ventura to the south and Morro Bay and Port San Luis/Avila to the north. Table 5-1 provides the top three landings for 2019 by poundage and value for each of the ports near the proposed Project areas. Market squid has the greatest commercial poundage and California spiny lobster has the greatest commercial value among the various ports. Chinook salmon also has a high commercial value for the San Luis Obispo County ports. Appendix F provides the complete list of commercial fisheries landings for each of the ports and harbors.

Table 5-1. Top Three Poundage and Value of Commercial Landings in 2019 by Port for Santa Barbara and Morro Bay Areas

Species	Pounds	Value
Port Hueneme		
Squid, market	3,214,710	$1,589,431
Prawn, spot	61,287	$918,671

Seabass, white	1,086	$4,344
Oxnard		
Lobster, California spiny	77,879	$1,086,038
Sea urchin, red	483,562	$772,170
Thornyhead, shortspine	39,048	$296,975
Ventura		
Squid, market	5,895,721	$2,849,714
Prawn, spot	108,553	$1,564,603
Lobster, California spiny	95,664	$1,294,667
Santa Barbara Harbor		
Lobster, California spiny	274,696	$3,847,676
Sea urchin, red	522,884	$1,262,798
Sablefish	436,327	$1,240,824
Gaviota Beach		
Rockfish, vermilion	3,448	$10,343
Halibut, California	2,000	$8,031
Whitefish, ocean	1,427	$4,167
Avila / Port San Luis		
Salmon, Chinook	126,738	$906,158
Hagfish, Pacific	280,529	$310,298
Crab, Dungeness	35,026	$160,762
Morro Bay		
Salmon, Chinook	212,449	$1,521,064
Sablefish	317,465	$666,775
Crab, Dungeness	87,852	$411,309

Source: Final California Commercial Landings for 2019 (CDFW 2020)

Commercial fishermen use several types of fishing gear in the Project area. Gear categories include trawls, pots and traps, gillnets, diving, trolling, and hook and line. Bottom trawls are designed to maintain contact with the seafloor. Species caught by bottom trawls include flatfish (e.g., Dover sole and rex sole), rockfish, prawns, and sablefish. Pots and traps come in a variety of shapes and sizes. In the proposed Project areas, pots and traps are used primarily to capture crabs, lobsters, and to a lesser extent prawns and certain fish species. Gill nets consist of a vertical wall of netting. Weights and anchors on the bottom horizontal line anchor the bottom portion of the net to the seafloor while a series of floats on the top lead line lift the upper portion of the net towards the ocean surface. Gill nets are used for a wide variety of fish including halibut, yellowtail, and rockfish.

Several fishing methods that use hooks attached to lines are used in the area for specific fisheries. Vertical longlines employ a series of hooks attached to a weighted line and are suspended vertically in the water column. Vertical longlining is commonly used to fish for rockfish over hard-bottom structures. Horizontal bottom longlines are similar to vertical longlines except that the hooks lay on the seafloor. Weighted ends keep the line on the seafloor. Horizontal longlines are used to catch bottom fish such as halibut.

Trolling consists of towing baited hooks or lures behind a boat in the water column high off the bottom. The primary catches for trollers in the Project area are pelagic fish such as salmon and albacore tuna (Santa Barbara County 2008).

In its April 9, 2021, comment letter, the Alliance of Communities for Sustainable Fisheries (ACSF) listed the following 11 important fisheries fished by its members that it believes would be affected if the proposed Projects were built:

- Halibut trawl
- Halibut hook and line
- Salmon
- Dungeness crab
- Rock crab
- Nearshore shallow live fishery
- Deeper nearshore fishery
- Spot prawn
- Market squid
- Hagfish
- Sea bass

Tom Hafer, President of the Morro Bay Commercial Fishermen's Organization (MBCFO), also stated that those fisheries were important to the local fishing industry and transient fishermen and added lobster to the list provided by the ACSF. This initial feedback is consistent with the landings and value data listed in the tables above. Mr. Hafer also referred CSLC staff to the Economic Impact Reports for Morro Bay and Port San Luis (www.mbcfo.org) for additional information about how important this area of the California coast is to the livelihoods of the fishermen themselves as well as to other local businesses that support the processing and marketing of the catch.

Recreational Fishing Overview

Recreational fishing activities in the proposed Project areas occur offshore, except within the VSMR where fishing is prohibited. Private or charter vessels are the most common way recreational fishermen access the proposed Project areas. Tables 5-2 and 5-3 provide catch data from the Recreational Fisheries Information Network (RecFIN) database for 2019 for southern (Ventura and Santa Barbara counties) and central California (San Luis Obispo, Monterey, and Santa Cruz counties). The data presented in these tables are from the RecFIN database screened for private/rental and party/charter boats.

Ocean whitefish and rockfish were the most common catch in Ventura and Santa Barbara counties. Several rockfish (brown, blue, gopher), white croaker, and jacksmelt were the most common catch for San Luis Obispo, Monterey, and Santa Cruz counties. While fishing occurs both within and beyond 3 nm, most of the recreational fish catch occurs within State waters (less than 3 nm).

Table 5-2. Top 10 Retained Fish for Southern California*

Less than 3 Miles from Shore		Greater than 3 Miles from Shore	
Species Name	**Retained (# fish)**	**Species Name**	**Retained (# fish)**
Ocean Whitefish	6,365	Ocean Whitefish	288
Copper Rockfish	1,877	Vermilion Rockfish	180
Blue Rockfish	1,345	Copper Rockfish	121
Pacific (Chub) Mackerel	1,290	Kelp Bass	108
California Sheephead	1,095	Starry Rockfish	66
Vermillion Rockfish	937	Barred Sandbass	66
Kelp Bass	735	Rockfish genus	62
Pacific Sanddab	661	Pacific Sanddab	55
Rockfish genus	611	Pacific Barracuda	38
Greenspotted Rockfish	386	Lingcod	17

* (Ventura and Santa Barbara counties) by Private/Rental and Party/Charter Boats in 2019

Table 5-3. Top 10 Retained Fish for Central California*

Less than 3 Miles from Shore

Species Name	Retained (# fish)
White Croaker	1,389
Blue Rockfish	954
Brown Rockfish	715
Gopher Rockfish	92
Pacific (Chub) Mackerel	553
Northern Anchovy	334
Jacksmelt	303
Pacific Sanddab	302
Olive Rockfish	250
Vermilion Rockfish	176

* (San Luis Obispo, Monterey, and Santa Cruz counties) by Private/Rental and Party/Charter Boats in 2019. No data were available for greater than 3 nm for central California.

Offshore Project Components and Potential Impacts

Navigation Impacts

During the focused outreach meetings and follow up interviews, commercial and recreational fishermen identified concerns related to safety and navigation. For example, Mr. Hafer stated that poor visibility conditions are common along this part of the coast, and fishing vessels rely on instrumentation for safe navigation. There is a concern that the instrumentation would fail to recognize the FWTs in poor visibility conditions or that the FWTs themselves may cause interference with telecommunications and radar equipment on the fishing vessels, as the facilities can cause “artifacts” to appear on radar making it difficult for vessels to decipher real from artifact for safe travel (pers. comm. Tom Hafer, March 27, 2021). Should CSLC staff proceed with preparing an EIR for the proposed Projects, the EIR would analyze the potential for FWTs to result in radar interference with vessels and discuss methods to reduce or eliminate that possibility.

Impacts to Fishing Areas

Both the IDEOL and CADEMO FWT areas would result in a loss of available fishing area due to the presence of the FWTs themselves, the mooring lines and inter-array cables, and the proposed exclusion buffers around the facilities. CADEMO proposes a 1,968-foot radius exclusion area around each turbine (see Figure 4-9), which would not encompass the entire lease area for CADEMO. It is anticipated that the radius of the exclusion area could be reduced following completion of the appropriate mooring and anchoring designs. All infrastructure outside of this exclusion area would be buried on the seafloor to a depth of 5 feet. However, CADEMO estimates that cable protection measures on the seafloor would be required from the HDD exit hole out to a distance of approximately 0.36 to 0.4 miles (645 to 704 yards) before a suitable sediment depth is reached to allow cable burial to 5 feet.

For IDEOL, the applicant has requested that the entire proposed 5.2 square mile lease area (Figure 3-3) be precluded from public navigation during the operational life of the Project. According to both Applicants, the exclusion areas surrounding their respective wind turbine fields would prohibit navigation, including fishing vessels. See Sections 3.2.1, 3.2.2, and Transportation within Section 4 for further information on navigation exclusion areas during construction and the operational life of both Projects.

During the focused stakeholder meetings and in follow-up interviews, participants from the commercial fishing community stated that loss of fishing grounds from the presence of the proposed Projects was their foremost concern. This stated concern included not only the direct impacts to their businesses resulting from not being able to fish in those areas, but also the potential for increased fishing pressure in the remaining open areas to negatively affect fished species. Meeting participants also emphasized the potential economic impacts to the seafood industry from loss of fishing grounds in the Project areas as an environmental justice issue for themselves and the market support businesses.

Some participants also expressed concern about entanglement and loss of gear, stating that the "actual" area of fishing exclusion could be larger than simply the boundaries of the buffers indicated by the Applicants because of the way lines and traps are deployed. For example, one fisherman described the process of deploying and retrieving sablefish traps, which are set on a "string" of about a mile in length. Because the traps take about an hour to reach the seafloor, ocean currents can take the traps over a mile from where they started at the surface. Thus, fishermen would have to deploy gear at least a mile away from the edge of the exclusion boundary or risk their gear drifting into a prohibited area and losing it. Similarly, based on the fishing gear types described earlier in this section, gear like trawls, pots, gillnets, and horizontal bottom longlines would not be compatible with fishing within or near the arrays due to the presence in the water column of mooring and inter-array cables.

<u>Other Concerns and Comments</u>

Upwelling and Biological Productivity

The proposed Projects would be located in a biologically rich area of the California Current Large Marine Ecosystem. One of the reasons this area supports such high levels and diversity of marine life is due to upwelling. Upwelling is a phenomenon wherein cold deep-water rich in plankton and other food organisms is brought up near the surface by ocean currents driven by multiple factors including seafloor geography, colliding ocean currents from different depths and directions, and surface factors including wind and wind-driven waves. In its April 9, 2021, letter, the ACSF suggested that there is not enough known about the potential for offshore wind facilities to affect/reduce the availability of surface winds that contribute to upwelling and whether that reduction would substantially affect the upwelling processes that drive ocean productivity. Similarly, Mike Conroy, President of the Pacific Coast Federation of Fishermen's Associations Institute for Fisheries Resources, stated that any project implemented in coastal waters should be required to monitor and track changes to surface wind speeds at set distances from the turbines, and expressed concern about the potential for facilities to interfere with ecological function and upwelling. It would be critical to explore and evaluate this potential impact in any EIR that may be prepared for the proposed Projects.

Electromagnetic Fields, Vibration, and Underwater Noise

Several meeting participants expressed concern about the potential for the proposed Project components to adversely affect valuable fish species as a result of electromagnetic fields (EMF), vibration, and underwater noise. Tom Hafer, President of MBCFO, provided a document to CSLC staff via email that discusses the interactions between EMFs and fish, noting that many fish species orient themselves and gather spatial information about their environment via magnetic material in their skulls and bodies. Commenters also noted that they believe more information is needed about whether turbine construction and operation could result in the transmission of vibrations and noise to the underwater environment and whether that may affect marine species. Dr. Ann Bull, Project Scientist at the Marine Science Institute at the University of California Santa Barbara, provided several published studies about EMFs and the effects on fish and invertebrates. These topics and questions would be analyzed in detail using the provided resources and any other relevant information in an EIR for the proposed Projects, if one is prepared.

Need for Compensation Agreements

One of the main topics shared by fishermen during focused outreach and follow up meetings is the need for the development of a mitigation agreement with the commercial fishing industry to mitigate impacts to their livelihoods. Participants pointed CSLC staff to a past agreement related to subsea cables that could be studied as a potential successful model for the proposed IDEOL and CADEMO Projects. In addition, several participants have had discussions with at least one offshore wind developer and believe they have developed a potential "template" mitigation agreement for commercial fishermen. Notwithstanding these examples, the fishermen expressed concern about how robust and fair an agreement on the proposed Projects could be, and how CSLC would ensure the Applicants would be required to engage in negotiations with the fishing community.

Section 2.3.3 provides a summary of stakeholder comments on commercial/recreational fishing and Appendix B includes written public comments received during focused outreach for the PEA.

5.2 TRIBAL CONSULTATION AND TRIBAL CULTURAL RESOURCES

Pursuant to Executive Order B-10-11, concerning coordination with Tribal governments in public decision making, the CSLC adopted a Tribal Consultation Policy in August 2016 to provide guidance and consistency in its interactions with California Native American Tribes (CSLC 2016). The Tribal Consultation Policy, which was developed in collaboration with Tribes, other State agencies and departments, and the Governor's Tribal Advisor, recognizes that Tribes have a connection to areas that may be affected by CSLC actions and "that these Tribes and their members have unique and valuable knowledge and practices for conserving and using these resources sustainably" (CSLC 2016). In addition, the CSLC's 2021-2025 Strategic Plan pledges to support Tribal self-governance and self-determination through continuous relationship tending and incorporation of Native American perspectives throughout its programs and activities. In addition, the Strategic Plan commits the CSLC to seeking opportunities for partnerships and co-stewardship with Native Nations whenever possible.

Ethnographic Context

The proposed Project areas lie within the ethnohistoric territory of the Barbareño Chumash. The Chumash at the time of European contact inhabited villages and towns in coastal and inland areas extending from the Santa Monica Mountains in the south to Paso Robles in the north, including the Northern Channel Islands. Early Spanish expeditions to the Santa Barbara Channel area encountered densely populated villages along the Santa Barbara/Goleta coast, some with as many as 800 to 1,000 residents (Munns and Haslouer 2013). Interior mainland areas were more sparsely populated, although several larger inland communities are known. Pre-contact Chumash society was sophisticated and complex, with important differences in subsistence practices, social and political organization, and other cultural features among the different zones within Chumash territory. Colonization of the central and southern coast of California was devastating to the Chumash people, as the European colonizers sought to wipe out their cultures and languages, committing murder, enslavement, and other atrocities, along with forced removal of the Chumash people from their traditional lands. Throughout the centuries, however, the Chumash survived and persisted, and continue to assert their rightful place on their lands and carry on their language and culture to this day. Today, Tribes asserting cultural affiliation or expressing interest in the proposed Project areas include the Santa Ynez Band of Mission Indians, Coastal Band of the Chumash Nations, and Barbareño / Ventureño Band of Mission Indians (Munns and Haslouer 2013).

Tribal Cultural Resources in the Project Area

Underwater Tribal cultural resources are defined as submerged sites having some cultural affiliation. These can take the form of submerged prehistoric sites or isolated prehistoric artifacts. Several submerged archaeological sites are located offshore of California's central coast, with most found in relatively shallow water. Bickel (1978) asserts that many of the shallow water sites may be a result of cliff erosion and are therefore associated with archaeological sites located on the cliffs above. Other submerged artifacts could be from random loss or purposefully discarded in association with ceremonial rituals or other events. Many of these submerged sites contain a variety of prehistoric artifacts, including manos, metates, choppers, and pestles (Bickel 1978, and URS Corporation 1986).

In more recent studies, researchers have begun to reconstruct the early coastline of California, which became inundated with rising sea levels in the Late Holocene. The sea level began dropping approximately 30,000 years ago from a level near or slightly below current conditions. At the climax of the Wisconsin glaciation, 18,000 to 24,000 years ago, the sea level was as much as 394 feet below present sea levels. About 18,000 years ago, a warming trend caused the sea level to rise again due to melting ice sheets until 11,000 years ago, during the earliest California coastal occupation, when the sea level was approximately 151 feet below present levels. Reconstructions use detailed bathymetric maps of the ocean bottom in conjunction with graphed curves representing sea-level rise during the Holocene and the chronology of land uplift or submergence (Glassow 1999).

This research has many implications for early coastal archaeological sites that have become submerged by modern sea levels and comprise a comparatively understudied area of archaeology due to their lack of visibility and accessibility. Although marine resources are not represented abundantly in archaeological sites until the Middle Holocene, Early Holocene Native Americans still recognized coastal habitats and littoral zones as regions that produced desirable resources, either for subsistence or for craft. Thus, pre-contact indigenous people would have settled these now-submerged coastal regions, and in fact, Tribal records have identified submerged village sites in several coastal areas. Submerged sacred sites in the vicinity of the proposed Projects range from villages to "solstice alignments" dating back at least 18,000 years.

Onshore, Chumash sacred sites located on and around VSFB and Point Conception show continuous habitation for over 9,000 years (pers. comm. Fred Collins, January 26, 2021). Previously recorded archaeological sites on VSFB include at least five sites deemed eligible for the National Register of Historic Places (NRHP). These sites contain dense middens with stone tools, beads, lithic debitage, marine shell, and vertebrate faunal remains. The sites also include burials/cemeteries, one of which was excavated due to erosion of the sea cliff (VAFB 2021).

Tribal Consultation Process

In order to ensure meaningful Tribal input prior to preparing the PEA, the CSLC contacted the NAHC, which maintains two databases (Sacred Lands File and Native American Contacts) to assist specialists in identifying cultural resources of concern to California Native Americans. A request was sent to the NAHC for a Sacred Lands File search of the proposed Project areas and a list of Native American representatives who may be able to provide information about resources of concern located within or adjacent to the proposed Project areas.

On October 27, 2020, the NAHC responded to CSLC with a list of seven Tribes with cultural and geographic affiliation to the Project site, as follows:

- Barbareño / Ventureño Band of Mission Indians
- Chumash Council of Bakersfield
- Coastal Band of the Chumash Nation
- Northern Chumash Tribal Council
- San Luis Obispo County Chumash Council
- Santa Ynez Band of Chumash Indians
- *yak tit^{y}u tiłhini* – Northern Chumash Tribe

The NAHC's reply from October 27, 2020, also stated that the Sacred Lands File record search for the proposed Projects areas was negative.

On January 5, 2021, CSLC staff provided a notice of the Project to all Tribes on the NAHC list. In response to the January 5, 2021, letter, CSLC staff received responses from the Northern Chumash Tribal Council (NCTC), the Barbareño / Ventureño Band of Mission Indians, and the Santa Ynez Band of Chumash Indians Tribal Elders' Council, requesting formal government to government Consultation on the proposed Projects. As of July 2021, CSLC staff has held initial Consultation meetings with the Barbareño / Ventureño Band of Mission Indians (April 7, 2021) and the NCTC (April 20, 2021); staff will continue to try to schedule Consultation with the Elders' Council.

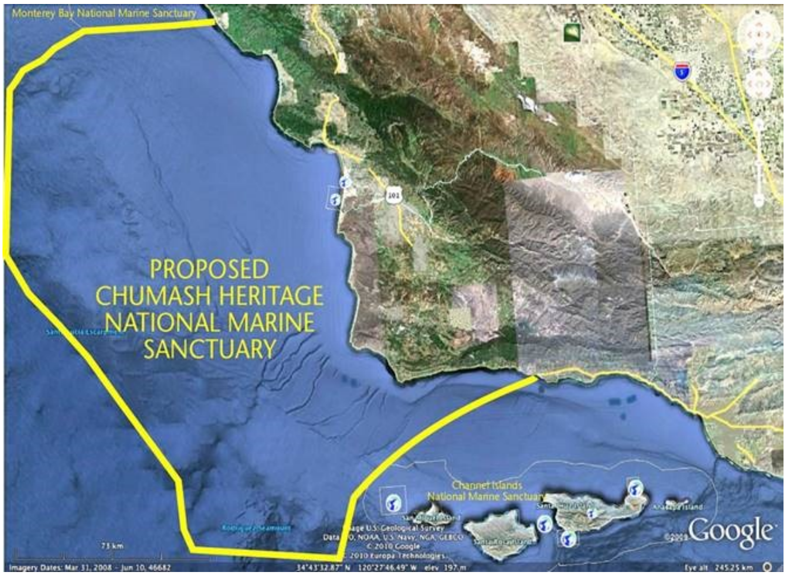
Summary of Consultation to Date

Generally, Consulting Tribes expressed strong opposition to the proposed Projects based on the cultural significance of this stretch of the coast, both on- and offshore. In addition to the potential physical disturbance or destruction of physical Tribal cultural resources including burials, villages, and other sites containing cultural materials, the Tribes noted that the proposed Project areas encompass a sacred spiritual area known as the Western Gate, where souls move from this realm to the land of the dead. Consulting Tribes also expressed concern that the proposed Projects would benefit private companies at the expense of the environment and the Chumash people.

Offshore Project Components and Potential Impacts

The Barbareño / Ventureño Band of Mission Indians Chairwoman noted her concern about the potential for the proposed Projects to generate underwater and ambient noise, as well as an overall concern about implementation of offshore wind facilities instead of distributed generation (e.g., rooftop solar) that would have less impact on the ocean. The NCTC Chair provided written information about the proposed Chumash Heritage National Marine Sanctuary (CHNMS), within which the proposed Projects would be located (Figure 5-1). While the CHNMS has not yet been formally designated at this time, detailed information and justification for the nomination exists, including information on the value of this area to marine biological resources, fisheries resources, and cultural heritage.

Figure 5-1. Proposed Chumash Heritage National Marine Sanctuary



The NCTC Chair expressed that marine life, notably seabirds, fish, and migrating whales, are considered sacred and that stewardship of these organisms is a duty of the Chumash people. Offshore components of the Projects could impact marine life and disrupt marine mammal migration or lead to entanglement, which would negatively impact the thrivability of the area. Thrivability is an indigenous model based on a balanced, complete, and connected understanding of nurturing the ocean's health beyond simple sustainability and into a 'complete ecosystem' way of seeing. The proposed CHNMS is based on this understanding, and the proposed Projects could impact successfully achieving these goals.

Onshore Project Components and Potential Impacts

Consulting Tribes expressed concern that the proposed onshore components would impact the sacred lands located on VSFB and stated their preference for avoidance in place. As noted above, at least five NRHP eligible sites have been recorded on VSFB, and potentially, additional sites have not yet been surveyed or recorded.

Should an EIR be prepared for the proposed Projects, it would provide complete Tribal cultural resources impact analyses of the various onshore and offshore Project components and document the government-to-government Consultation process and outcomes.

5.3 ENVIRONMENTAL JUSTICE

Environmental justice is defined by California law as "the fair treatment and meaningful involvement of people of all races, cultures, and incomes with respect to the development, adoption, implementation, and enforcement of environmental laws, regulations, and policies." (Gov. Code, § 65040.12, subd. (e)(1).) This definition is consistent with the Public Trust Doctrine's principle that management of trust lands is for the benefit of all people. The CSLC adopted an updated Environmental Justice Policy and Implementation Plan in December 2018 to ensure that environmental justice is an essential consideration in the agency's processes, decisions, and programs. Through its policy, the CSLC reaffirms its commitment to an informed and open process in which all people are treated equitably and with dignity, and in which its decisions are tempered by environmental justice considerations.

As part of the CSLC's Environmental Justice Policy, staff engaged in early outreach with environmental justice (EJ) groups. Staff identified EJ communities adjacent to the location of the proposed Projects in Santa Barbara County as well as the community of Oxnard in Ventura County. Additionally, staff solicited input from Port communities in Long Beach, Los Angeles, Oakland, and San Francisco. Outreach letters were sent to 46 EJ organizations on February 19, 2021. In addition, 28 emails were sent to EJ groups lacking a dedicated mailing address. Follow-up phone calls were made to all recipients of letters and emails in early March.

Summaries of the responses from the EJ outreach are outlined below:

- Santa Barbara County Action Network (SBCAN) – Representatives from SBCAN recommended that CSLC consider a Project Labor Agreement or Community Workforce Agreement for the Project. They expressed a strong desire to ensure that Project jobs go to the local labor force and ensure high wages and safe building standards.
- West Oakland Environmental Indicators Project (WOEIP) – Through a phone conversation with the Co-Director of WOEIP, staff were informed that the Project is not relevant to the West Oakland Community.
- California Workforce Development Board (CWDB) – CWDB informed CSLC staff that CADEMO was awarded a grant through the High Road Training Partnership grant program. They strongly recommended CSLC consider including a Project Labor Agreement. They also expressed interest in working with CSLC to ensure workforce and equity are considered as part of the application process.
- Tri-Counties Building and Construction Trades Council, Santa Barbara, San Luis Obispo, and Ventura Counties (TCBCTC) – CSLC staff met with representatives from TCBCTC in early May 2021. TCBCTC expressed support for the Projects. They have been in contact with the Applicant who was awarded the High Roads Training Partnership grant, and TCBCTC will be part of the grant program as well. The grant program will create pre-apprenticeship programs with hiring targets to local disadvantaged communities. TCBCTC believes this is a "just transition" to clean energy with good paying union jobs.

- Santa Barbara County Workforce Development Board (SBCWDB) – The Executive Director of the SBCWDB reached out to CSLC staff to express their support of the Projects. He stated that “Energy” is one of Board’s Designated Industry Sectors of Opportunity and an area they believe will produce middle-wage, skilled jobs.

Environmental justice will be further analyzed in the EIR that would include U.S. Census Bureau statistics, population and economic characteristics, and examination of the California Office of Environmental Health Hazard Assessment’s CalEnviroScreen database (https://oehha.ca.gov/calenviroscreen/report/calenviroscreen-30).

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6.0 DOCUMENT PREPARERS AND REFERENCES

This Preliminary Environmental Assessment (PEA) was prepared by the staff of the California State Lands Commission's Division of Environmental Planning and Management (DEPM), Mineral Resources Management Division (MRMD), Land Management Division (LMD), and Marine Environmental Protection Division (MEPD), Legal Division, and the Executive Office.

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