DRAFT

CITY OF SEAL BEACH LOCAL COASTAL PROGRAM

LAND USE PLAN

Prepared By

Seal Beach Department of Community Development
211 8th Street
Seal Beach, California 90740

Michael Baker International
5 Hutton Centre Drive, Suite 500
Santa Ana, California 92707

May 2023

TABLE OF CONTENTS

Figures

Tables

CHAPTER 1 INTRODUCTION

1.1 PURPOSE

The California Coastal Act of 1976 requires jurisdictions within the Coastal Zone (as defined by Coastal Act Public Resources Code Section 30103) to prepare a Local Coastal Program (LCP). LCPs consist of two essential components, the Land Use Plan (LUP) and LCP Implementation Plan (IP). This document consists of the LUP and serves to set forth goals, objectives and policies that govern land use within the Coastal Zone; refer to Exhibit 1.1, *Regional Vicinity* and Exhibit 1.2, *Seal Beach Coastal Zone*. The following sections address public access, coastal recreation, resource protection and coastal hazards, in accordance with the provisions detailed in the California Coastal Act.

1.2 ORGANIZATION

1.2.1 Plan Components

The LCP – LUP is organized by chapters that topically follow the sections of the Coastal Act, as follows:

Chapter 1, Introduction: This chapter provides a summary of the plan's purpose, background, relationships to other plans, plan organization and requirements for administration.

Chapter 2, Land Use and Development: This chapter describes land development in the Seal Beach Coastal Zone, along with visitor-serving development, coastal dependent development, tidelands and submerged lands, and transportation. Policies provide guidance for future development.

Chapter 3, Public Access and Recreation: This chapter discusses public shoreline access and recreation facilities, along with policies to protect and expand where feasible.

Chapter 4, Coastal Environmental Resources: This chapter describes natural resources found in Seal Beach Coastal Zone, which include environmentally sensitive habitat areas, scenic resources, water quality and cultural resources. Policies guide the City in protection of the above resources.

Chapter 5, Coastal Hazards: This chapter identifies potential hazards in the Seal Beach Coastal Zone (sea level rise, floods, tsunamis, storm surge, rogue waves, erosion, geologic/seismic, and fire), and provides policies to guide new development and protect resources.

Chapter 6, Glossary: This chapter defines terms and acronyms used in the LUP that are technical, specialized, or otherwise not in common usage.

Chapter 7, Resources: This chapter cites sources used during the LCP preparation process.

Each chapter of the LUP includes concise background information to establish context for policies. This background material is not a comprehensive statement of existing conditions, nor is it considered adopted policy. Immediately following applicable background material, policies are listed. Policies are specific statements that guide decision making and may refer to existing programs or development standards. The policies in this plan were developed in alignment with the Seal Beach General Plan and the California Coastal Act. Generally, policies apply to the entire Coastal Zone within the City.

1.2.2 Relationship of Land Use Plan to Other Plans and Regulations

Local Coastal Program Land Use Plan and Implementation Plan

The Seal Beach Local Coastal Program consists of two components:

- Seal Beach Local Coastal Program – Land Use Plan (this document);
- Seal Beach Local Coastal Program – Implementation Plan, zoning ordinance, zoning map, and other regulatory provisions.

The Implementation Plan (IP) includes relevant portions of the local land use zoning code and other implementing ordinances that conform with and carry out the LUP policies. The ultimate purpose of the IP is to ensure that the objectives and policies of the LUP are achieved. An effective IP specifically addresses both development standards and procedures including if projects require a Coastal Permit, how a Coastal Permit can be obtained, and procedural requirements for public participation in Coastal Permit review.

Once the LCP is finalized, including the LCP and IP, it will be formally adopted by City Council. The LCP will then be submitted to Coastal Commission for a consistency review with the Coastal Act requirements. Coastal Commission will then certify the LCP. Once the LCP is certified, permitting authority is transferred to the local government, and the City is responsible for implementing the LCP as specified in the certified IP.

Local Coastal Program Land Use Plan and the General Plan

The Seal Beach LCP LUP and General Plan both provide policies that guide the physical development of the Coastal Zone, and the LCP LUP was specifically designed to be consistent with the existing General Plan. If there is a conflict between a provision of the Seal Beach LCP and a provision of the General Plan, or any other City-adopted plan, resolution, or ordinance not included in the LCP, and it is not possible for the development to comply with both the LCP and such other plan, resolution or ordinance, the LCP shall take precedence. Detailed discussion of Coastal Act requirements is included in this LUP, while issues that are not directly relevant to the Coastal Act are covered only in the General Plan.

1.3 THE COASTAL ACT

In 1972, the United States passed the Coastal Zone Management Act (CZMA) (Title 16 U.S.C. 1451 – 1464). The CZMA declared a national policy to "preserve, protect, develop, and where feasible, to restore or enhance the resources of the Nation's Coastal Zone for this and succeeding generations." The CZMA sought to encourage and assist states to develop and implement management programs for the use of coastal land and water resources, "giving full consideration to ecological, cultural, historic, and aesthetics values, as well as the needs for compatible economic development."

The Coastal Zone Conservation Act (Proposition 20) was approved by voters in the 1972, which prohibited development 1,000 yards inland from California's mean high tide without a permit from a state coastal commission. Prop 20 created the temporary California Coastal Zone Conservation Commission and six regional commissions to develop a statewide plan for coastal protection. The California Coastal Plan was submitted to the State Legislature in 1975 and lead to the passage of the California Coastal Act in 1976, codified in Division 20 of the California Public Resources Code (Sections 30000 through 30900). On January 1, 1977, the Coastal Act went into effect, establishing a permanent coastal management program for California.

The Coastal Act established the permanent California Coastal Commission to protect and enhance resources of the Coastal Zone. The Coastal Act requires that each city and county within the Coastal Zone prepare an LCP. The LCP is defined by the Coastal Act as the local government's land use plan, zoning ordinances, and zoning districting maps designed to implement the policies and provisions of state coastal law. After LCP certification by the California Coastal Commission, primary authority for issuance of Coastal Development Permits (CDP) will be transferred to the local government. In authorizing CDPs, the local government must make the finding that the development conforms to the certified LCP.

After LCP certification, the Coastal Commission retains permitting authority in specific areas under certain circumstances. For example, the Coastal Commission retains permanent coastal permit jurisdiction over development proposed on tidelands, submerged lands, and public trust lands. Coastal Act Section 30601.3 allows Coastal Commission to process permits where a proposed project straddles the jurisdiction of Coastal Commission and the local government provided that all parties agree to consolidate permit action. In addition, the Coastal Commission retains jurisdiction over all Coastal Development Permits issued prior to the LCP certification if new development results in any change to the approved Special Conditions of the previously issued permit. Finally, the Commission retains jurisdiction under the Coastal Zone Management Act (CZMA) to review federal projects and non-federal projects on federal land for consistency with the Coastal Act. Areas and situations where the Coastal Commission retains permit jurisdiction are further discussed in the IP.

1.4 HISTORY OF THE CITY OF SEAL BEACH

Prehistoric occupation of Seal Beach primarily consisted of the Gabrielino Tribe of Native Americans, who inhabited much of northern Orange County. The Gabrielino Tribe was known for high population densities, social organization, and maritime economies, while maintaining a common language, material culture, and ceremonial/political system. A coastal Gabrielino community named Motuuchey was located at the former Anaheim Landing area. In addition, the Juaneño Native Americans also frequented the Seal Beach area for natural resources, but primarily resided in south Orange County.

The historic settlement of Seal Beach began in 1780s, with the assignment of the 300,000-acre Los Alamitos Rancho land grant. Due to the presence of the San Gabriel and Santa Ana Rivers, the land was suitable for cattle grazing and agriculture. After the Mexican-American War, much of the original land grant was purchased by Jotham Bixby and a group of German immigrants. The German immigrants formed an agricultural colony called Anaheim and created the Anaheim Landing port to ship their produce to market. This was the first port in Orange County, and eventually developed into downtown Seal Beach.

In the early 1900s, the area transitioned from a port community to a resort community. In the 1903, the community was subdivided and named "Bay City". The next year, the Pacific Electric Railroad Red Cars arrived, connecting Bay City to Los Angeles for tourism purposes. The pier, rollercoaster, dancing pavilion, billiards and bowling facilities further attracted visitors. In 1915, Bay City was incorporated with a population of 250 individuals and became known as Seal Beach. During the 1920s, additional construction continued until the Great Depression. During World War II, Orange County became a hub of military activity and the Seal Beach Naval Weapons Station was constructed. With the influx of military personnel, a second major construction boom occurred. Seal Beach continued to grow and expand in the 1950s, including the development of Leisure World toward the end of the decade.

Today, Seal Beach has a population of 24,077 individuals (2010 US Census), covering 11.51 square miles with an additional 1.72 square miles of bay and ocean waters. The City has over two miles of ocean

waterfront, and approximately 60% of the City is within the Coastal Zone. Seal Beach is also a key tourist destination, receiving approximately 2 million visitors per year.

1.5 SEAL BEACH COMMUNITY VISION

The City of Seal Beach initiated community visioning exercises during the community outreach process for this LCP. Several reoccurring themes were identified for the future vision of the Seal Beach Coastal Zone, as outlined below:

- Small Town Feel
- Connection to the Past
- Service and Volunteerism
- Open Space and the Natural Environment

1.6 PLAN ADMINISTRATION

The City is responsible for implementing the LCP, including the LUP and IP, consistent with the Coastal Act. The LUP details the types, locations and intensity of land uses, and resource protection and development policies in the coastal zone, and the IP includes land use zoning and other implementing ordinances that carry out the LUP. Together the LUP and IP comprise the LCP. Following Coastal Commission certification of the LCP, local implementation will take effect as specified in the IP. The LCP is intended to be dynamic and may be amended over time to address site-specific or comprehensive needs, to respond to changes in state or federal law, or to modify policies that may become obsolete or unrealistic over time. Amendments to the LCP require approval by the City and Coastal Commission, or the Executive Director of the Coastal Commission, as specified in Coastal Act Section 30514.

1.7 COASTAL ACT REGULATORY FRAMEWORK

Coastal land uses are subject to the provisions of the Coastal Act, including but not limited to, the following provisions:

Section 30001.5, Legislative findings and declarations; goals

The Legislature further finds and declares that the basic goals of the state for the coastal zone are to:

(a) Protect, maintain, and where feasible, enhance and restore the overall quality of the coastal zone environment and its natural and artificial resources.

(b) Ensure orderly, balanced utilization and conservation of coastal zone resources taking into account the social and economic needs of the people of the state.

(c) Maximize public access to and along the coast and maximize public recreational opportunities in the coastal zone consistent with sound resources conservation principles and constitutionally protected rights of private property owners.

(d) Ensure priority for coastal-dependent and coastal-related development over other development on the coast.

(e) Encourage state and local initiatives and cooperation in preparing procedures to implement coordinated planning and development for mutually beneficial uses, including educational uses, in the coastal zone.

(f) Anticipate, assess, plan for, and, to the extent feasible, avoid, minimize, and mitigate the adverse environmental and economic effects of sea level rise within the coastal zone.

Section 30107.5, Environmentally sensitive area
"Environmentally sensitive area" means any area in which plant or animal life or their habitats are either rare or especially valuable because of their special nature or role in an ecosystem and which could be easily disturbed or degraded by human activities and developments.

Section 30210, Access; recreational opportunities; posting
In carrying out the requirement of Section 4 of Article X of the California Constitution, maximum access, which shall be conspicuously posted, and recreational opportunities shall be provided for all the people consistent with public safety needs and the need to protect public rights, rights of private property owners, and natural resource areas from overuse.

Section 30211, Development not to interfere with access
Development shall not interfere with the public's right of access to the sea where acquired through use or legislative authorization, including, but not limited to, the use of dry sand and rocky coastal beaches to the first line of terrestrial vegetation.

Section 30212, New development projects
(a) Public access from the nearest public roadway to the shoreline and along the coast shall be provided in new development projects except where: (1) it is inconsistent with public safety, military security needs, or the protection of fragile coastal resources, (2) adequate access exists nearby, or, (3) agriculture would be adversely affected. Dedicated accessway shall not be required to be opened to public use until a public agency or private association agrees to accept responsibility for maintenance and liability of the accessway.
(b) For purposes of this section, "new development" does not include:
    (1) Replacement of any structure pursuant to the provisions of subdivision (g) of Section 30610.
    (2) The demolition and reconstruction of a single-family residence; provided, that the reconstructed residence shall not exceed either the floor area, height or bulk of the former structure by more than 10 percent, and that the reconstructed residence shall be sited in the same location on the affected property as the former structure.
    (3) Improvements to any structure which do not change the intensity of its use, which do not increase either the floor area, height, or bulk of the structure by more than 10 percent, which do not block or impede public access, and which do not result in a seaward encroachment by the structure.
    (4) The reconstruction or repair of any seawall; provided, however, that the reconstructed or repaired seawall is not a seaward of the location of the former structure.
    (5) Any repair or maintenance activity for which the commission has determined, pursuant to Section 30610, that a coastal development permit will be required unless the commission determines that the activity will have an adverse impact on lateral public access along the beach. As used in this subdivision "bulk" means total interior cubic volume as measured from the exterior surface of the structure.
(c) Nothing in this division shall restrict public access nor shall it excuse the performance of duties and responsibilities of public agencies which are required by Sections 66478.1 to 66478.14, inclusive, of the Government Code and by Section 4 of Article X of the California Constitution.

Section 30212.5, Public facilities; distribution
Wherever appropriate and feasible, public facilities, including parking areas or facilities, shall be distributed throughout an area so as to mitigate against the impacts, social and otherwise, of overcrowding or overuse by the public of any single area.

Section 30213, Lower cost visitor and recreational facilities; encouragement and provision; overnight room rentals
Lower cost visitor and recreational facilities shall be protected, encouraged, and, where feasible, provided. Developments providing public recreational opportunities are preferred. The commission shall not: (1) require that overnight room rentals be fixed at an amount certain for any privately owned and operated hotel, motel, or other similar visitor-serving facility located on either public or private lands; or (2) establish or approve any method for the identification of low or moderate income persons for the purpose of determining eligibility for overnight room rentals in any such facilities.

Section 30220, Protection of certain water-oriented activities
Coastal areas suited for water-oriented recreational activities that cannot readily be provided at inland water areas shall be protected for such uses.

Section 30221, Oceanfront land; protection for recreational use and development
Oceanfront land suitable for recreational use shall be protected for recreational use and development unless present and foreseeable future demand for public or commercial recreational activities that could be accommodated on the property is already adequately provided for in the area.

Section 30222, Private lands; priority of development purposes
The use of private lands suitable for visitor-serving commercial recreational facilities designed to enhance public opportunities for coastal recreation shall have priority over private residential, general industrial, or general commercial development, but not over agriculture or coastal-dependent industry.

Section 30230, Marine resources; maintenance
Marine resources shall be maintained, enhanced, and where feasible, restored. Special protection shall be given to areas and species of special biological or economic significance. Uses of the marine environment shall be carried out in a manner that will sustain the biological productivity of coastal waters and that will maintain healthy populations of all species of marine organisms adequate for long-term commercial, recreational, scientific, and educational purposes.

Section 30231, Biological productivity; water quality
The biological productivity and the quality of coastal waters, streams, wetlands, estuaries, and lakes appropriate to maintain optimum populations of marine organisms and for the protection of human health shall be maintained and, where feasible, restored through, among other means, minimizing adverse effects of waste water discharges and entrainment, controlling runoff, preventing depletion of ground water supplies and substantial interference with surface waterflow, encouraging waste water reclamation, maintaining natural vegetation buffer areas that protect riparian habitats, and minimizing alteration of natural streams.

Section 30232, Oil and hazardous substance spills
Protection against the spillage of crude oil, gas, petroleum products, or hazardous substances shall be provided in relation to any development or transportation of such materials. Effective containment and cleanup facilities and procedures shall be provided for accidental spills that do occur.

Section 30233, Diking, filling or dredging; continued movement of sediment and nutrients
(a) The diking, filling, or dredging of open coastal waters, wetlands, estuaries, and lakes shall be permitted in accordance with other applicable provisions of this division, where there is no feasible less environmentally damaging alternative, and where feasible mitigation measures have been provided to minimize adverse environmental effects, and shall be limited to the following:
    (1) New or expanded port, energy, and coastal-dependent industrial facilities, including commercial fishing facilities.

(2) Maintaining existing, or restoring previously dredged, depths in existing navigational channels, turning basins, vessel berthing and mooring areas, and boat launching ramps.
(3) In open coastal waters, other than wetlands, including streams, estuaries, and lakes, new or expanded boating facilities and the placement of structural pilings for public recreational piers that provide public access and recreational opportunities.
(4) Incidental public service purposes, including but not limited to, burying cables and pipes or inspection of piers and maintenance of existing intake and outfall lines.
(5) Mineral extraction, including sand for restoring beaches, except in environmentally sensitive areas.
(6) Restoration purposes.
(7) Nature study, aquaculture, or similar resource dependent activities.

(b) Dredging and spoils disposal shall be planned and carried out to avoid significant disruption to marine and wildlife habitats and water circulation. Dredge spoils suitable for beach replenishment should be transported for these purposes to appropriate beaches or into suitable longshore current systems.

(c) In addition to the other provisions of this section, diking, filling, or dredging in existing estuaries and wetlands shall maintain or enhance the functional capacity of the wetland or estuary. Any alteration of coastal wetlands identified by the Department of Fish and Game, including, but not limited to, the 19 coastal wetlands identified in its report entitled, "Acquisition Priorities for the Coastal Wetlands of California", shall be limited to very minor incidental public facilities, restorative measures, nature study, commercial fishing facilities in Bodega Bay, and development in already developed parts of south San Diego Bay, if otherwise in accordance with this division. For the purposes of this section, "commercial fishing facilities in Bodega Bay" means that not less than 80 percent of all boating facilities proposed to be developed or improved, where the improvement would create additional berths in Bodega Bay, shall be designed and used for commercial fishing activities.

(d) Erosion control and flood control facilities constructed on watercourses can impede the movement of sediment and nutrients that would otherwise be carried by storm runoff into coastal waters. To facilitate the continued delivery of these sediments to the littoral zone, whenever feasible, the material removed from these facilities may be placed at appropriate points on the shoreline in accordance with other applicable provisions of this division, where feasible mitigation measures have been provided to minimize adverse environmental effects. Aspects that shall be considered before issuing a coastal development permit for these purposes are the method of placement, time of year of placement, and sensitivity of the placement area.

Section 30235, Construction altering natural shoreline

Revetments, breakwaters, groins, harbor channels, seawalls, cliff retaining walls, and other such construction that alters natural shoreline processes shall be permitted when required to serve coastal-dependent uses or to protect existing structures or public beaches in danger from erosion, and when designed to eliminate or mitigate adverse impacts on local shoreline sand supply. Existing marine structures causing water stagnation contributing to pollution problems and fishkills should be phased out or upgraded where feasible.

Section 30236, Water supply and flood control

Channelizations, dams, or other substantial alterations of rivers and streams shall incorporate the best mitigation measures feasible, and be limited to (l) necessary water supply projects, (2) flood control projects where no other method for protecting existing structures in the flood plain is feasible and where such protection is necessary for public safety or to protect existing development, or (3) developments where the primary function is the improvement of fish and wildlife habitat.

Section 30240, Environmentally sensitive habitat areas; adjacent developments

(a) Environmentally sensitive habitat areas shall be protected against any significant disruption of habitat values, and only uses dependent on those resources shall be allowed within those areas.

(b) Development in areas adjacent to environmentally sensitive habitat areas and parks and recreation areas shall be sited and designed to prevent impacts which would significantly degrade those areas, and shall be compatible with the continuance of those habitat and recreation areas.

Section 30244, Archaeological or paleontological resources
Where development would adversely impact archaeological or paleontological resources as identified by the State Historic Preservation Officer, reasonable mitigation measures shall be required.

Section 30250, Location; existing developed area
(a) New residential, commercial, or industrial development, except as otherwise provided in this division, shall be located within, contiguous with, or in close proximity to, existing developed areas able to accommodate it or, where such areas are not able to accommodate it, in other areas with adequate public services and where it will not have significant adverse effects, either individually or cumulatively, on coastal resources. In addition, land divisions, other than leases for agricultural uses, outside existing developed areas shall be permitted only where 50 percent of the usable parcels in the area have been developed and the created parcels would be no smaller than the average size of surrounding parcels.
(b) Where feasible, new hazardous industrial development shall be located away from existing developed areas.
(c) Visitor-serving facilities that cannot feasibly be located in existing developed areas shall be located in existing isolated developments or at selected points of attraction for visitors.

Section 30251, Scenic and visual qualities
The scenic and visual qualities of coastal areas shall be considered and protected as a resource of public importance. Permitted development shall be sited and designed to protect views to and along the ocean and scenic coastal areas, to minimize the alteration of natural land forms, to be visually compatible with the character of surrounding areas, and, where feasible, to restore and enhance visual quality in visually degraded areas. New development in highly scenic areas such as those designated in the California Coastline Preservation and Recreation Plan prepared by the Department of Parks and Recreation and by local government shall be subordinate to the character of its setting.

Section 30252, Maintenance and enhancement of public access
The location and amount of new development should maintain and enhance public access to the coast by (1) facilitating the provision or extension of transit service, (2) providing commercial facilities within or adjoining residential development or in other areas that will minimize the use of coastal access roads, (3) providing nonautomobile circulation within the development, (4) providing adequate parking facilities or providing substitute means of serving the development with public transportation, (5) assuring the potential for public transit for high intensity uses such as high-rise office buildings, and by (6) assuring that the recreational needs of new residents will not overload nearby coastal recreation areas by correlating the amount of development with local park acquisition and development plans with the provision of onsite recreational facilities to serve the new development.

Section 30253, Minimization of adverse impacts
New development shall do all of the following:
(a) Minimize risks to life and property in areas of high geologic, flood, and fire hazard.
(b) Assure stability and structural integrity, and neither create nor contribute significantly to erosion, geologic instability, or destruction of the site or surrounding area or in any way require the construction of protective devices that would substantially alter natural landforms along bluffs and cliffs.
(c) Be consistent with requirements imposed by an air pollution control district or the State Air Resources Board as to each particular development.
(d) Minimize energy consumption and vehicle miles traveled.

(e) Where appropriate, protect special communities and neighborhoods that, because of their unique characteristics, are popular visitor destination points for recreational uses.

Section 30254, Public works facilities
New or expanded public works facilities shall be designed and limited to accommodate needs generated by development or uses permitted consistent with the provisions of this division; provided, however, that it is the intent of the Legislature that State Highway Route 1 in rural areas of the coastal zone remain a scenic two-lane road. Special districts shall not be formed or expanded except where assessment for, and provision of, the service would not induce new development inconsistent with this division. Where existing or planned public works facilities can accommodate only a limited amount of new development, services to coastal dependent land use, essential public services and basic industries vital to the economic health of the region, state, or nation, public recreation, commercial recreation, and visitor-serving land uses shall not be precluded by other development.

Section 30255, Priority of coastal-dependent developments
Coastal-dependent developments shall have priority over other developments on or near the shoreline. Except as provided elsewhere in this division, coastal-dependent developments shall not be sited in a wetland. When appropriate, coastal-related developments should be accommodated within reasonable proximity to the coastal-dependent uses they support.

Section 30260, Location or expansion
Coastal-dependent industrial facilities shall be encouraged to locate or expand within existing sites and shall be permitted reasonable long-term growth where consistent with this division. However, where new or expanded coastal-dependent industrial facilities cannot feasibly be accommodated consistent with other policies of this division, they may nonetheless be permitted in accordance with this section and Sections 30261 and 30262 if (1) alternative locations are infeasible or more environmentally damaging; (2) to do otherwise would adversely affect the public welfare; and (3) adverse environmental effects are mitigated to the maximum extent feasible.

Section 30530, Legislative intent
It is the intent of the Legislature, consistent with the provisions of Chapter 9 (commencing with Section 31400) of Division 21, that a program to maximize public access to and along the coastline be prepared and implemented in a manner that ensures coordination among and the most efficient use of limited fiscal resources by federal, state, and local agencies responsible for acquisition, development, and maintenance of public coastal accessways. There is a need to coordinate public access programs so as to minimize costly duplication and conflicts and to assure that, to the extent practicable, different access programs complement one another and are incorporated within an integrated system of public accessways to and along the state's coastline. The Legislature recognizes that different public agencies are currently implementing public access programs and encourages such agencies to strengthen those programs in order to provide yet greater public benefits.

Section 30607.1, Wetlands dike and fill development; mitigation measures
Where any dike and fill development is permitted in wetlands in conformity with Section 30233 or other applicable policies set forth in this division, mitigation measures shall include, at a minimum, either acquisition of equivalent areas of equal or greater biological productivity or opening up equivalent areas to tidal action; provided, however, that if no appropriate restoration site is available, an in-lieu fee sufficient to provide an area of equivalent productive value or surface areas shall be dedicated to an appropriate public agency, or the replacement site shall be purchased before the dike or fill development may proceed. The mitigation measures shall not be required for temporary or short-term fill or diking if a bond or other evidence of financial responsibility is provided to assure that restoration will be accomplished in the shortest feasible time.

Section 30610(e), Developments authorized without permit

(a) Any category of development, or any category of development within a specifically defined geographic area, that the commission, after public hearing, and by two-thirds vote of its appointed members, has described or identified and with respect to which the commission has found that there is no potential for any significant adverse effect, either individually or cumulatively, on coastal resources or on public access to, or along, the coast and, where the exclusion precedes certification of the applicable local coastal program, that the exclusion will not impair the ability of local government to prepare a local coastal program.

Section 30610.5, Urban land areas; exclusion from permit provisions; conditions

Urban land areas shall, pursuant to the provisions of this section, be excluded from the permit provisions of this chapter.

(a) Upon the request of a local government, an urban land area, as specifically identified by such local government, shall, after public hearing, be excluded by the commission from the permit provisions of this chapter where both of the following conditions are met:
   (1) The area to be excluded is either a residential area zoned and developed to a density of four or more dwelling units per acre on or before January 1, 1977, or a commercial or industrial area zoned and developed for such use on or before January 1, 1977.
   (2) The commission finds both of the following:
      (i) Locally permitted development will be infilling or replacement and will be in conformity with the scale, size, and character of the surrounding community.
      (ii) There is no potential for significant adverse effects, either individually or cumulatively, on public access to the coast or on coastal resources from any locally permitted development; provided, however, that no area may be excluded unless more than 50 percent of the lots are built upon, to the same general density or intensity of use.

(b) Every exclusion granted under subdivision (a) of this section and subdivision of (e) Section 30610 shall be subject to terms and conditions to assure that no significant change in density, height, or nature of uses will occur without further proceedings under this division, and an order granting an exclusion under subdivision (e) of Section 30610, but not under subdivision (a) of this section may be revoked at any time by the commission, if the conditions of exclusion are violated. Tide and submerged land, beaches, and lots immediately adjacent to the inland extent of any beach, or of the mean high tide line of the sea where there is no beach, and all lands and waters subject to the public trust shall not be excluded under either subdivision (a) of this section or subdivision (e) of Section 30610.

The policies of the LUP are implemented by the IP, which consists of the following regulations:

- [TBD: will be updated once the IP is developed.]

1.8 General LCP Policies

Policy 1.8.1-1 The policies of the Coastal Act (PRC Sections 30210 through 30263) are adopted herein as policies with full force and effect as part of the certified Local Coastal Program (LCP).

Policy 1.8.1-2 If conflicts occur between requirements of the LCP, the policies most protective of coastal resources shall control. Protection of environmentally sensitive habitat areas (ESHA) and public access shall take priority over other provisions. Where there is any conflict between general development standards (e.g., property setbacks and lot coverage) and ESHA or public access protection, the standards that are most protective of ESHA and public access shall have precedence.

Policy 1.8.1-3 If there is a conflict between a provision of the LCP and any other City-adopted plan, resolution, ordinance, or program that is not certified as part of the LCP, and it is not possible for the development to comply with both the LCP and such other plan, the LCP shall take precedence.

Policy 1.8.1-4 Where the LCP references applicable provisions of State Law (e.g., the California Government Code or Public Resources Code) the reference shall be construed to be the applicable State law provisions effective on the date of the original certification, or the certification date of the applicable amendment. Where provisions of the State Law are amended in such a way that they are inconsistent with the LCP, such changes require an LCP amendment.

Policy 1.8.1-5 Memorandums of Agreement, development agreements, and other similar City-authorized agreements shall be consistent with the LCP. Where an agreement is inconsistent with the LCP or would alter any policy or provision of the LCP, an LCP Amendment shall be required prior to implementation.

Policy 1.8.1-6 Prior to the issuance of a Coastal Development Permit, the City shall make the finding that the development reasonably meets the standards set forth in all applicable land use plan policies.

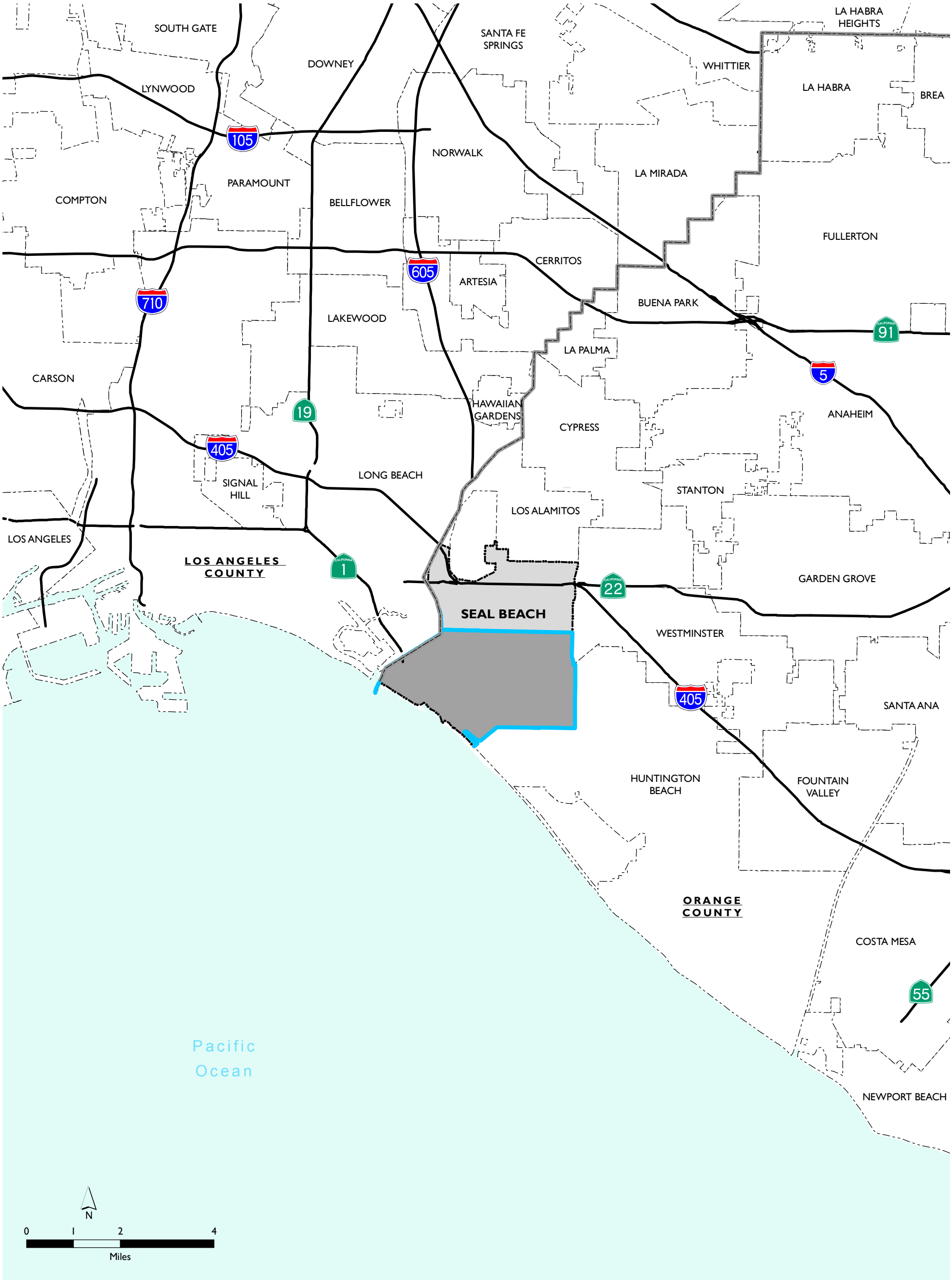
Policy 1.8.1-7 New development shall be scaled, sited, and designed to protect coastal resources and to respect site constraints such as hazard areas. Regulatory measures to ensure compliance with LCP provisions may include, but are not limited to, setbacks, buffers, runoff controls, or restrictions on development including the following: amount and location of grading; color of structures; configuration and size of development envelopes; length of roads and driveways; night lighting; number of accessory structures; reflectivity and height of structures; roofs and other architectural features; size of structures; and vegetation removal.

Policy 1.8.1-8 Where full adherence to all LCP policies, including for setbacks and other hazard avoidance measures, would preclude a reasonable economic use of the property as a whole, the City shall allow the minimum economic use and/or development of

the property necessary to avoid an unconstitutional taking of private property without just compensation. There is no taking that needs to be avoided if the proposed development constitutes a nuisance or is otherwise prohibited pursuant to other background principles of property law (e.g., public trust doctrine). Continued use of an existing structure, including with any permissible repair and maintenance (which may be exempt from permitting requirements), may provide a reasonable economic use. If development is allowed pursuant to this policy, it must be consistent with all LCP policies to the maximum extent feasible.

CITY OF SEAL BEACH

LOCAL COASTAL PLAN



Source: County of Orange, California Coastal Commission

11/25/2019 JN H:\pdata\158624\GIS\MXD\10_19\Exhibit 1.1 RegionalVicinity 11x17.mxd

LEGEND

- Coastal Zone within the City of Seal Beach
- Seal Beach City Limit
- County Boundary
- Freeways

REGIONAL VICINITY

EXHIBIT 1.1

CITY OF SEAL BEACH
LOCAL COASTAL PLAN

Source: County of Orange, California Coastal Commission

2/3/2022 JN H:\pdata\158624\GIS\MXD\02_22\Exhibit 1.2 Seal Beach Coastal Zone 11x17.mxd

LEGEND

Coastal Zone within the City of Seal Beach

Seal Beach City Limit

Refer to Exhibit 2.4 for a delineation of federal jurisdiction within the City of Seal Beach Coastal Zone

SEAL BEACH COASTAL ZONE
EXHIBIT 1.2

CHAPTER 2 LAND USE AND DEVELOPMENT

2.1 LAND USE

2.1.1 Land Use/Zoning Designations

The Seal Beach General Plan Land Use Element contains 17 land use designations under the overarching land use categories of: Residential, Commercial, Mixed Use, Industrial, Public/Open Space, Specific Plan Regulation, Military, and Beach. The zoning designations within the Coastal Zone are outlined in Table 2-1 and Exhibit 2.1.

2.1.2 Coastal Planning Areas

The Seal Beach General Plan divides the City into five planning areas for land use planning purposes. The planning area for the Seal Beach LCP encompasses all land within the City's Coastal Zone, which includes the following General Plan designated planning areas:

Planning Area 1 – Old Town/Surfside: Planning Area 1 encompasses approximately 331 acres of the waterfront neighborhoods of downtown Seal Beach, Main Street, Surfside and Sunset Marina Park. The boundaries of Planning Area 1 are as follows: north of the Pacific Ocean, south of Pacific Coast Highway, east of the San Gabriel River, and west of Huntington Beach. This area also encompasses the Main Street Specific Plan, DWP Specific Plan and Pacific-Electric Right of Way Specific Plan.

Planning Area 2 – Hellman Ranch/Marina Hill/Boeing: Planning Area 2 encompasses approximately 485 acres north of Planning Area 1. The boundaries of Planning Area 2 as follows: north of Pacific Coast Highway, south of Westminster Avenue, east of the Los Angeles County and Orange County jurisdictional boundary line, and west of Seal Beach Boulevard. Marina Hill and Hellman Ranch neighborhoods (including the Hellman Ranch Specific Plan area) consist of single-family residences and open space uses. The Boeing IDS Specific Plan area includes a business park, combined with hotel and commercial uses.

Planning Area 5 – Naval Weapons Station: Planning Area 5 encompasses the bulk of the City's land mass, with 5,256 acres owned and operated by the Department of the Navy. Known as the Seal Beach Naval Weapons Station, this facility is the largest naval ordnance storage, maintenance, production, and supply facility in the Western United States.

Refer to Exhibit 2.3, *Coastal Zone Planning Areas*, for the boundaries of each Seal Beach General Plan designated planning area.

Specific Plans

The City also considers the following specific plan regulations for land use decisions within the Coastal Zone. The Coastal Commission also retains permit jurisdiction for amendments to specific plans previously permitted by the Coastal Commission. This LCP will be the standard of review for future new development within these five specific plan areas, and information regarding each specific plan is included below for informational purposes only. Specific Plan boundaries are depicted on Exhibit 2.2, *Coastal Zone Specific Plans*, for illustrative purposes.

Boeing Integrated Defense Systems Specific Plan: The Boeing Integrated Defense System (Boeing IDS) Specific Plan is a comprehensive land use plan for the development of a business park, combined with hotel and commercial uses, with the framework of the existing Boeing Systems operations. This Specific Plan

encompasses approximately 107 acres within the central western portion of the City, within Planning Area 2.

Department of Water and Power Specific Plan: The Department of Water and Power Specific Plan (DWP Specific Plan) is a coordinated comprehensive planned development for detached single family dwellings, public open space, and a limited amount of visitor-serving commercial uses. The DWP, as amended, establishes the type, location, intensity, and character of future development, while providing community amenities to serve present and future Seal Beach residents and visitors. The DWP Specific Plan encompasses 10.86 acres within the southwestern portion of the City, within Planning Area 1.

Hellman Ranch Specific Plan: The Hellman Ranch Specific Plan aims to provide a balance of land uses that will serve the nearby neighborhoods, while restoring degraded wetlands and preserving accessible open space in the specific plan area. The Hellman Ranch Specific Plan provides for the development of single-family houses and wetland conservation areas. This Specific Plan encompasses approximately 231 acres within the western portion of the City, within Planning Area 2.

Main Street Specific Plan: The Main Street Specific Plan outlines a plan for the desired mix of businesses and office space that supports the surrounding residences and maintains the desired balance of local-serving and visitor-serving uses. The Main Street Specific Plan encompasses approximately 21 acres within the southwestern portion of the City, within Planning Area 1.

Pacific-Electric Right of Way Specific Plan: The intent of the Pacific-Electric Right of Way Specific Plan is to develop the abandoned Pacific Electric ROW as a linear greenbelt park with public facilities and parking. This Specific Plan encompasses approximately 8 acres within the southwestern portion of the City, within Planning Area 1.

2.2 GENERAL DEVELOPMENT POLICIES

This section describes general development policies applicable to the entirety of the Seal Beach Coastal Zone, by outlining the location of new development, coastal development review, exclusion areas, federal jurisdiction area, nonconforming uses/structures, public works projects, bulk and height limitations, and lighting. The policies are drawn from the Coastal Act (Public Resources Code, Section 30000 et seq.), the General Plan, Specific Plans, and from other plans and regulations adopted by the City that reflect local conditions and address local issues. Policies are to be considered and interpreted as the standard of review for development within the City's Coastal Zone, except for development proposed or undertaken on any tidelands, submerged lands, or on public trust lands, whether filled or unfilled, lying within the Coastal Zone. In those areas, the Coastal Commission retains original jurisdiction and will review applications for development using Chapter 3 of the Coastal Act (Public Resources Code, Sections 30200 – 30265.5) as the standard of review.

Table 2-1, Seal Beach Land Use Designations

Zoning Designations	INTENSITY	ACRES	% OF COASTAL ZONE	Maximum Lot Coverage/FAR	Allowable Uses	Conditionally Allowable Uses
Residential						
Low-Density Residential					Single-Unit Residential, Second Unit, Small Family Day Care, Senior Citizen Housing, Limited Residential Care, Satellite Dishes less than 39" in Diameter, Minor Utilities, Home Occupations	Large Family Day Care, Community Centers, Religious Facilities, Antennae and Transmission Towers, Marijuana – Indoor Cultivation at Private Residence, Park and Recreation Facilities, Public Safety Facilities, Schools – Public or Private
Residential Low Density – 9	1 unit/5,000 SF	3,190.71	43.86%	45 – 60%		
Residential Low Density – 15	1 unit/3,000 SF	14.10	0.19%	67%		
High-Density Residential					Single-Unit Residential, Second Unit, Two-Unit Residential, Multiple-Unit Residential, Small Family Day Care, Senior Citizen Housing, Limited Residential Care, Satellite Dishes less than 39" in Diameter, Minor Utilities, Home Occupations	Large Family Day Care, Group Housing, Singe Room Occupancy, Marijuana – Indoor Cultivation at Private Residence, Clubs and Lodges, Community Centers, Community Social Service Facilities, Day Care Centers, Park and Recreation Facilities, Public Safety Facilities, General Residential Care, Senior Residential Care, Schools – Public or Private, Bed and Breakfasts, Home Improvement Sales and Services, General Market, Personal Services, Retail Sales, Antennae and Transmission Towers
Residential High Density – 20	1 unit/2,178 SF	111.2	1.53%	75%		
Residential High Density – 33	1 unit/1,350 SF	23.18	0.32%	60%		
Residential High Density – PD	N/A	2.86				
Commercial						
Service Commercial	N/A	8.77	0.12%		Government Offices, Park and Recreation Facilities, Public Safety Facilities, Animal Sales and Services, Artists' Studios, Automobile Rentals, Automobile Washing, Banks and Other Financial Institutions, Automated Teller Machines, Business Services, Small-scale Commercial Recreation, Coffee House/Dessert Shop, Full Service Restaurants, Restaurants – Take Out Only, Limited Service Restaurants, Convenience Market, General Market, Kiosks, Laboratories, Maintenance and Repair Services, Massage Establishment, Offices, Personal Services, Retail Services, Large Format Retail Sales, Handicraft/Custom Manufacturing, Satellite Dishes less than 79" in diameter, Reverse Vending Machines, Minor Utilities, Nurseries	Two-Unit Residential, Large Family Day Care, Marijuana – Indoor Cultivation at Private Residence, Clubs and Lodges, Community Center, Community Social Service Facilities, Cultural Institutions, Day Care Center, Hospitals, Clinics, Public Parking Facilities, Religious Facilities, Residential Care Facilities, Private Schools, Major/Minor Automobile/Vehicle Service and Repair, Bakery, Banks with Drive-Through Facilities, Large-scale Commercial Recreation, Bars, Fast Food Restaurants with Drive Through Facilities/ Outdoor Eating Areas, Extended Hour Business, Convenience Market, General Market, Liquor Stores, Kennel, Smoke Shop, Antennae and Transmission Towers, Recycling Collection Point
General Commercial	N/A	20.19	0.28%		Government Offices, Park and Recreation Facilities, Public Safety Facilities, Adult Business Establishments, Animal Sales and Services, Artists' Studios, Automobile sales and Services, Automobile Rentals, Automobile/Vehicle Sales and Leasing, Automobile Washing, Large Vehicle Sales, Services and Rentals, Banks and Other Financial Institutions, Automated Teller Machines, Business Services, Small-scale Commercial Recreation, Coffee House/Dessert Shop, Full Service Restaurants, Limited Service Restaurants, Take Out Only Restaurants, Convenience Market, General Market, Funeral Parlors and Mortuaries, Kiosks, Laboratories, Maintenance and Repair Services, Massage Establishment, Offices, Personal Services, Large Format Retail Sales, Handicraft/Custom Manufacturing, Satellite Dishes less than 79" in diameter, Reverse Vending Machines, Minor Utilities, Nurseries	Large Family Day Care, Marijuana – Indoor Cultivation at Private Residence, Clubs and Lodges, Community Center, Community Social Service Facilities, Cultural Institutions, Day Care Center, Hospitals, Clinics, Public Parking Facilities, Religious Facilities, Residential Care Facilities, Private Schools, Major/Minor Automobile/Vehicle Service and Repair, Bakery, Banks with Drive-Through Facilities, Large-scale Commercial Recreation, Bars, Fast Food Restaurants with Drive Through Facilities/ Outdoor Eating Areas, Extended Hour Business, Convenience Market, General Market, Liquor Stores, Home Improvement Sales and Services, Hotels and Motels, Kennel, Commercial Parking Facilities, Smoke Shop, Tattoo Establishments, Theatres, Antennae and Transmission Towers, Recycling Collection Point, Recycling Processing Facility
Main Street Specific Plan	N/A	13.41	0.18%		Government Offices, Park and Recreation Facilities, Public Safety Facilities, Animal Sales and Services, Artists' Studios, Banks and Other Financial Institutions, Automated Teller Machines, Coffee House/Dessert Shop, Restaurants: Full Service, Limited Service and Take Out Only, General Market, Personal Services, Retail Sales, Handicraft/Custom Manufacturing, Satellite Dishes less than 79" in diameter, Reverse Vending Machines, Minor Utilities, Nurseries	Single-unit Residential, Multiple-unit Residential, Marijuana – Indoor Cultivation at Private Residence, Public Parking Facilities, Bakery, Banks/Other Financial Institutions with Drive-Through Facilities, Business Services, Bars, Coffee House/ Dessert Shop, Full Service Restaurants with Outdoor Eating Areas, General Market, Liquor Stores, Laboratories, Massage Establishment, Offices: Business and Professional and Medical and Dental, Commercial Parking Facilities, Theatres, Antennae and Transmission Towers
Mixed Use						
Limited Commercial/Residential Medium Density	0.90 FAR	3.38	0.05%	FAR: 0.90	Government Offices, Single Unit Residential, Two-Unit Residential, Multiple Unit Residential, Family Day Care: Small Family, Park and Recreation Facilities, Public Safety Facilities, Limited Residential Care, Artists' Studios, Business Services, Maintenance and Repair Services, Massage Establishments, Offices: Business and Professional and Medical and Dental, Personal Services, Retail Services, Handicraft/Custom Manufacturing, Satellite Dishes less than 79" in diameter, Reverse Vending Machines, Minor Utilities	Family Daycare: Large Family, Marijuana – Indoor Cultivation at Private Residence, Community Center, Day Care Center. Public Parking Facilities, Private Schools, Bakery, Extended Hour Business, Antennae and Transmission Towers,

Table 2-1, Seal Beach Land Use Designations (Continued)

Zoning Designations	INTENSITY	ACRES	% OF COASTAL ZONE	Maximum Lot Coverage	Allowable Uses	Conditionally Allowable Uses
Industrial						
Light Manufacturing	5.0 FAR	98.80	1.36%	FAR: 5.0	Handicraft/Custom Manufacturing, Light/Medium Manufacturing, Warehousing and Storage, Indoor Commercial Storage, Satellite dishes less than 79" in diameter, Reverse Vending Machines, Nurseries	Contractors' Yards, Outside Maintenance Yards, Storage Tanks, Veterinary Hospitals, Outdoor Storage, Personal Storage, Antennae and Transmission Towers, Recycling Collection Point, Recycling Processing Facility, Major Utilities, Hazardous Waste Facility
Oil Extraction	N/A	65.80	0.90%		Satellite dishes less than 79" in diameter	Drilling Operations, Outside Maintenance Yards, Separation Facilities, Storage Tanks, Antennae and Transmission Towers, Major/Minor Utilities
Public/Open Space						
Open Space – Parks and Recreation	N/A	11.69	0.16%		Park and Recreation Facilities	Cemeteries, Community Center, Cultural Institutions, Day Care Centers, Public Parking Facilities, Large-scale/Small-scale Commercial Recreation, Restaurants, Convenience Market, General Market, Communication Facilities, Major Utilities, Minor Utilities, Crop Raising, Nurseries
Open Space – Natural	N/A	146.09	2.01%			Park and Recreation Facilities, Public Parking Facilities, Public Safety Facilities, Major Utilities, Minor Utilities, Crop Raising, Nurseries
Public/Semi-Public Facilities	N/A	66.70	0.92%		Park and Recreation Facilities	Cemeteries, Clubs and Lodges, Community Center, Cultural Institutions, Day Care Centers, Government Offices, Public Parking Facilities, Public Maintenance and Service Facilities, Public Safety Facilities, Full Service, Limited Service, and Take Out Only Restaurants, Major/Minor Utilities,
Specific Plan Regulation	N/A	14.52	0.20%			
Military	N/A	3,474.84	47.77%			
Beach	N/A	8.15	0.11%			
TOTAL	***7,274.39 acres***					

Refer to Seal Beach Municipal Code Chapter 11.2 (Base District Regulations) for a comprehensive inventory of allowable and conditionally allowable uses on Residential, Commercial and Mixed Use, Light Manufacturing and Oil Extraction, Public and Semi-Public Facilities, and Open Space, Parks, and Recreation Districts.
Maximum lot coverages and Floor Area Ratios (FAR) can be found by referencing the Development Standards section for each base district in Seal Beach Municipal Code Chapter 11.2

In addition, actions the City takes on Coastal Development Permit applications or exemption determinations are appealable to the Coastal Commission, per Section 30603 of the Coastal Act, for:

(i) Developments approved by the City between the sea and the first public road paralleling the sea or within 300 feet of the inland extent of any beach or the mean high tideline of the sea where there is no beach, whichever is the greater distance;

(ii) Developments approved by the City not included in paragraph (1) that are located on tidelands, submerged lands, public trust lands, within 100 feet of any wetland, estuary, or stream, or within 300 feet of the top of the seaward face of any coastal bluff;

(iii) Developments approved by the City not included with paragraph (1) or (2) that are located in a sensitive coastal resource area;

(iv) Any development which constitutes a major public works project or major energy facility. The phrase "major public works" or a "major energy facility: as used in Public Resources Code Sec. 30603(a)(5) means any proposed public works project or energy facility, as defined by Section 13012 of Title 14 of the California Code of Regulations, the implementing regulations of the Coastal Act.

The California Coastal Act defines "development" in Section 30106 as:

- On land, in or under water, the placement or erection of any solid material or structure;
- Discharge or disposal of any dredged material or of any gaseous, liquid, solid, or thermal waste;
- Grading, removing, dredging, mining, or extraction of any materials;
- Change in the density or intensity of use of land, including, but not limited to, subdivision pursuant to the Subdivision Map Act (commencing with Section 66410 of the Government Code), and any other division of land, including lot splits, except where the land division is brought about in connection with the purchase of such land by a public agency for public recreational use;
- Change in the intensity of use of water, or of access thereto;
- Construction, reconstruction, demolition, or alteration of the size of any structure, including any facility of any private, public, or municipal utility;
- And, the removal or harvesting of major vegetation other than for agricultural purposes, kelp harvesting, and timber operations which are in accordance with a timber harvesting plan submitted pursuant to the provisions of the Z'berg-Nejedly Forest Practice Act of 1973 (commencing with Section 4511).

Per Coastal Act Section 30212, the term "new development" **does not** include:

- Replacement of any structure pursuant to the provisions of subsection (g) of Section 30610 of the Coastal Act.
- The demolition and reconstruction of a single-family residence; provided, that the reconstructed residence shall not exceed either the floor area, height, or bulk of the former structure by more than 10 percent, and the reconstructed residence shall be sited in the same location as the former structure.
- Improvements to any structure which do not change the intensity of its use, which do not increase either the floor area, height, or bulk of the structure by more than 10 percent, which do not block or impede public access, and which do not result in a seaward encroachment by the structure.

- The reconstruction or repair of any seawall; provided that the reconstructed or repaired sea wall is not seaward of the location of the former structure.
- Any repair or maintenance activity for which the commission has determined, pursuant to Section 30610 of the Coastal Act, that a Coastal Development Permit will be required unless the commission determines that the activity will have an adverse impact on lateral public access along the beach.

As used in this LCP, the term "structure" includes any building, road, pipe, flume, conduit, siphon, aqueduct, and telephone, internet, or electrical power transmission infrastructure.

The City of Seal Beach is largely built out within the Coastal Zone, and the majority of future proposals will entail alterations to developed properties. As such, proposals to alter a property may be defined as redevelopment, which consists of alterations to an existing structure such as significant exterior renovations, and/or demolition or replacement of an existing principal structure. The specific criteria required to meet the definition of redevelopment is provided below:

For projects proposing alterations on structures constructed after January 1, 1977:

- Replacement of 50% or more of any major structural component (such as exterior walls, roof structure or foundation) as calculated by linear feet, surface area, or volume; or,
- Replacement of any major structural component that results in a 50% increase in gross floor area.

For projects proposing alterations on structures constructed before January 1, 1977:

- Replacement of less than 50% of a major structural component; where the proposed replacement would result in cumulative alterations exceeding 50% or more of that major structural component, taking into consideration previous replacement work undertaken on or after January 1, 1977; or,
- Replacement that constitutes less than 50% increase in floor area where the proposed alteration would result in a cumulative addition of 50% or greater of the floor area, taking into consideration previous additions undertaken on or after January 1, 1977.

Redevelopment proposals must not propose "piecemeal" alterations to avoid meeting or exceeding thresholds outlined above.

2.2.1 Location of New Development

Most areas within the Seal Beach Coastal Zone were developed during the first half of the 20th Century. Exceptions to this development pattern included the Hellman Ranch Specific Plan, DWP Specific Plan, Boeing Integrated Defense Systems Specific Plan area, and the Seal Beach Center renovation project, all of which received Coastal Development Permits. As the City is largely built out, new development or redevelopment would be located in close proximity to existing development to minimize impacts. Thus, areas for new development and redevelopment have adequate public services or are capable of having public services extended/expanded without significant adverse effects on coastal resources.

As used in this LUP, "bulk" means total interior cubic volume as measured from the exterior surface of the structure. Nothing in this policy shall restrict public access nor shall it excuse the performance of duties and responsibilities of public agencies which are required by Sections 66478.1 to 66478.14, inclusive, of the Government Code and by Section 4 of Article X of the California Constitution.

Location of New Development Policies

Policy 2.2.1-1 Allow redevelopment and infill development within and adjacent to existing developed areas in the Coastal Zone, subject to the density and intensity limits and resource protection policies of the LCP.

Policy 2.2.1-2 Require new development be located in areas with adequate public services or in areas that are capable of having public services extended or expanded without significant adverse effects, either individually or cumulatively, on coastal resources.

Policy 2.2.1-3 Administer development regulations for Hellman Ranch Specific Plan, DWP Specific Plan, and Boeing Integrated Defense System (Boeing IDS) Specific Plan consistent with the applicable approved Coastal Development Permits.

Policy 2.2.1-4 New development shall, where appropriate, be properly integrated within existing communities and neighborhoods.

Policy 2.2.1-5 Land divisions, including subdivisions, lot splits, lot line adjustments, and certificates of compliance which create new beachfront lots, shall only be permitted if the subdivision can create lots which can be developed without requiring a current or future shoreline protection structure. No new lots shall be created that could require shoreline protection or bluff stabilization structures at any time during the full anticipated lifespan of the development.

Policy 2.2.1-6 Land divisions, including subdivisions, lot splits, lot line adjustments, and certificates of compliance, shall be approved through a Coastal Development Permit where they are designed to avoid impacts to coastal resources to the maximum extent feasible, including public access and recreation, environmentally sensitive habitat areas ("ESHA"), and visual resources. If impacts cannot be avoided, minimization to the greatest extent feasible shall be required. Land divisions must demonstrate safety from natural hazards such as flooding, fire, erosion, and geologic hazards.

Policy 2.2.1-7 Comply with the provisions of the California Housing Opportunity and More Efficiency (HOME) Act, so long as the measures do not supersede or in any way alter or lessen the effect or application of the California Coastal Act.

2.2.2 Coastal Development Review

In order to ensure development within the Coastal Zone is consistent with the LCP, the City will require a Coastal Development Permit prior to commencement of any development in the Coastal Zone, with the following exceptions: areas where Coastal Commission retains permit jurisdiction; developments determined to be categorically excluded; and developments determined to be excluded from the Coastal Development Permit requirements pursuant to Coastal Act Section 30610.

This requirement is part of the retained jurisdiction of the Coastal Commission in the post-certification environment and is to be distinguished from Section 30603 wherein the Coastal Act sets forth the types of developments that may be appealed to the Coastal Commission after certification. In addition, Coastal Commission retains jurisdiction over all Coastal Development Permits issued prior to the LCP certification

if new development results in any change to the approved Special Conditions of the previously issued permit.

Coastal Development Review Policies

Policy 2.2.2-1 Require a Coastal Development Permit for all development projects within the City's Coastal Zone, subject to exceptions as to be specified in the City's Local Coastal Implementation Plan.

Policy 2.2.2-2 Incorporate Coastal Development Permit procedures into the Local Coastal Implementation Plan to ensure all development in the City's Coastal Zone is consistent with the coastal resource protection policies of the City's Local Coastal Program.

Policy 2.2.2-3 Prior to approval of any Coastal Development Permit, the City shall make findings that the proposed development conforms to the policies and regulations contained in the certified Local Coastal Program, including the Coastal Land Use Plan and Implementation Plan.

Policy 2.2.2-4 Implement building design and siting regulations via height, setback, floor area, lot coverage, building massing, and other property development standards of the Zoning Code intended to control building placement, height, and bulk.

2.2.3 Federal Jurisdiction Area

The Seal Beach Naval Weapons Station is located within Planning Area 5 and is governed by the US Navy and Department of Defense. Due to federal ownership and operation of the land, the City of Seal Beach does not have permitting authority or jurisdiction over the Naval Weapons Station. Therefore, the policies contained herein shall be considered for advisory purposes only. The City shall continue coordination with the Seal Beach Naval Weapons Station to the maximum extent feasible for purposes of coastal resource protection. Additionally, projects within the Seal Beach Naval Weapons Station may be subject to consistency review by applicable state programs (including the California Coastal Commission in specific circumstances). Refer to Exhibit 2.4, *Federal Jurisdiction Area*, where the Seal Beach Naval Weapons Station is depicted as federal jurisdiction. This designation is depicted on LCP exhibits as applicable.

Federal Jurisdiction Area Policies

Policy 2.2.3-1 Implement coastal resource protection policies of the LCP in the Seal Beach Naval Weapons Station to the maximum extent feasible in coordination with relevant federal entities until military uses cease and the property is no longer under federal jurisdiction. If military uses cease and the property is no longer under federal jurisdiction, the City will pursue certification of the Seal Beach Naval Weapons Station area and update all required City planning mechanisms accordingly.

2.2.4 Nonconforming Structures and Uses

As an older coastal community, Seal Beach has land uses and improvements that do not conform to the standards of the LCP, or other municipal policies and regulations adopted over the years. This section establishes policies to limit the expansion of nonconforming structures and uses to the maximum extent feasible. The reconstruction or renovation of 50% or more of existing structures shall be considered redevelopment.

For the purposes of this LCP, the identification of non-conforming structures by the City will only include those elements of non-conformity that raise Coastal Act issues. For example, off-street parking is a nonconforming use related to public access and thus the Coastal Act. However, building encroachment into a rear-yard setback is not considered a coastal related concern in this LCP. Therefore, the policies below are tailored to address non-conformities in the context of the Coastal Act and applicable coastal resources, rather than all potential nonconforming structures and uses within the City.

Nonconforming Structures and Uses Policies

Policy 2.2.4-1 Identification of non-conforming structures by the City for purposes of this LCP will only include those elements of nonconformity that raise Coastal Act issues. Policies address non-conformities in the context of the Coastal Act and applicable coastal resources, rather than all potential nonconforming structures and uses within the City.

Policy 2.2.4-2 Nonconforming structures may be maintained or repaired so long as maintenance and repairs do not increase the size or degree of nonconformity of the structure and does not adversely affect a coastal resource or violate the LCP. Nonconforming structures may be added to or improved, provided that the addition or improvement does not increase the size or degree of nonconformity and does not adversely affect a coastal resource or violate the LCP. New components to legal, nonconforming uses should be in conformance with the LCP and other relevant codes and requirements.

Policy 2.2.4-3 Structures legally built prior to the effective date of this LCP that do not conform to the LCP shall be considered legal nonconforming structures. Alterations to lawfully established and maintained nonconforming structures shall be governed by the Municipal Code and shall not increase the size or the degree of the nonconformity that relates to a coastal resource. Alterations that reduce existing nonconformities shall be encouraged.

Policy 2.2.4-4 In older commercial and residential districts within Old Town Seal Beach, allow existing buildings that exceed current intensity limits to be renovated, upgraded, or reconstructed to no more than their existing intensity, only where a finding can be made that the development will not perpetuate or establish a physical impediment to public access to coastal resources, nor adversely impact coastal views or biological resources. Where development cannot meet current parking standards, approval may be granted if the proposed development includes at least as much off-street parking as the existing development.

Policy 2.2.4-5 In compliance with Government Code Section 658522.150, the City shall not require, as a condition of ministerial approval of permit application for the creation of an Accessory Dwelling Unit (ADU) or Junior Accessory Dwelling Unity (JADU), the correction of nonconforming zoning conditions. ADUs and JADUs shall not be considered to be redevelopment for the purposes of this LCP.

2.2.5 Public Works

The Seal Beach five-year Capital Improvement Program (CIP) identifies several capital improvement projects within the Coastal Zone. The City utilizes a variety of funding sources to implement the projects including federal, state, and local programs, grants or designated general funds. It is intended that the City may proceed with the maintenance and regular repair CIP projects as long as such projects conform to the LCP without the issuance of a CDP unless located within an area subject to Coastal Commission permitting authority as defined in Section 2.2 and the California Coastal Act (namely, tidelands, submerged lands, and public trust lands). Example CIP projects could include, but are not limited to, beach grooming, street maintenance, drainage/pump station maintenance, and pier structural repair and inspection.

Public Works Policies

Policy 2.2.5-1 Update plans regularly that define and provide public works program mechanisms and are consistent with Local Coastal Program policies.

Policy 2.2.5-2 Coordinate with appropriate federal, state and county agencies and relevant stakeholders to support public works programs and secure funding to implement public works plans.

Policy 2.2.5-3 New, expanded, or redeveloped public works projects shall be subject to Coastal Development Permit requirements.

Policy 2.2.5-4 New, expanded, or redeveloped public works projects shall be sited and designed to avoid coastal hazards (consistent with coastal resource protection and all other policies and provisions of the LCP) to the extent possible to protect life, safety, and property.

2.3 VISITOR-SERVING AND RECREATIONAL DEVELOPMENT

The Coastal Zone contains several visitor-serving commercial corridors, along with recreational facilities that also serve visitor-uses. Both types of visitor-serving uses are outlined in detail below.

2.3.1 Commercial

The Seal Beach Coastal Zone includes several distinct commercial areas that provide for a mix of visitor and local serving uses, as outlined in Exhibit 2.5, *Visitor Serving Commercial Facilities*. A description for each distinct commercial area is included below.

Main Street: The Main Street commercial district is governed by the Main Street Specific Plan and includes a mix of businesses and office space for both visitor-serving and local users. The Main Street commercial district serves as the downtown of Seal Beach, with many shops, restaurants/bars, and personal services (including hair salons and nail salons). Small offices are interspersed throughout Main Street, including legal, realty and other small businesses. Most office and some residential uses are located on the second floor of Main Street buildings. Main Street is pedestrian-friendly and connected to recreational

opportunities at the Seal Beach Municipal Pier, Eisenhower Park, and the beach. The Main Street Specific Plan determines specific priority uses to retain the small-town village character, including but not limited to: grocery store, financial institution, hardware store, post office, drug store, movie theater, nursery, bookstores, cafes, doctors' offices, barbershops, and similar uses.

Pacific Coast Highway Commercial: The Pacific Coast Highway commercial corridor runs along Pacific Coast Highway (PCH) and consists of strip development and two defined shopping centers (including the Seal Beach Center at the intersection of Bolsa/PCH, and the Bay City Center at Marina/PCH). This commercial stretch includes a mix of businesses for visitor-serving uses, including gas stations, a grocery store, restaurants, and personal services, along with some coastal-related businesses such as fishing supplies and surf equipment rentals. Smaller offices are interspersed throughout the corridor. The Pacific Coast Highway is a main thoroughfare through the City and connects Seal Beach to Long Beach and Huntington Beach.

Pacific Gateway Plaza: The Pacific Gateway Plaza commercial center is located at the at the southwest corner of the intersection of Seal Beach Boulevard and Westminster Boulevard. The plaza consists of one hotel, gas station, quick service restaurants, and personal services to primarily serve visitor uses. Westminster Boulevard is heavily traveled thoroughfare connecting Seal Beach to Westminster and Long Beach, and Seal Beach Boulevard connects travelers from I-405 to the Seal Beach Coastal Zone.

Commercial Policies

Policy 2.3.1-1	Encourage new and preserve existing visitor-serving uses, including retail, recreational equipment rental, and restaurant establishments in commercially-designated areas, particularly adjacent to beaches and around Seal Beach Municipal Pier.
Policy 2.3.1-2	Prioritize visitor-serving commercial, water-oriented commercial, and other recreational uses over other commercial uses along the coastline
Policy 2.3.1-3	Discourage expansion or establishment of non-priority commercial uses on ground floor properties within the Main Street Specific Plan area.

2.3.2 Open Space

The Seal Beach Coastal Zone contains two major open space areas, along with several public beaches and parks for recreational purposes; refer to Exhibit 2.6, *Coastal Zone Open Space*. The open space areas include Hellman Ranch, with limited access through Gum Grove Nature Park, and the Seal Beach National Wildlife Refuge, with limited access through docent-led tours on specific weekend days. Both open space areas, along with access opportunities, are described in Section 4.1, *Environmentally Sensitive Habitat Areas*. Additionally, several public parks, beaches, and recreational facilities are available for visitor-serving uses. Refer to Section 3.2, *Recreation and Support Facilities* and Exhibit 3.4, *Coastal Zone Parks* and Recreation, for specific details regarding public beaches and parks.

Open Space Policies

Policy 2.3.2-1	Cooperate and communicate with the Seal Beach Naval Weapons Station and the U.S. Fish and Wildlife Service for the continued protection of the National Wildlife Refuge.

2.3.3 Lower-Cost Visitor and Recreational Facilities

The small-town coastal charm of Seal Beach attracts visitors throughout the year. Visitors are drawn to several attractions, including approximately two miles of beach, a variety of passive and active recreation facilities, and the National Wildlife Refuge (open on a limited basis at no charge). Refer to Section 2.3.1, *Commercial*, for discussion regarding visitor serving commercial uses in the Seal Beach Coastal Zone; Section 2.3.2, *Open Space*, for discussion regarding open space in the Seal Beach Coastal Zone; and, Section 3.2, *Recreation and Support Facilities*, for discussion regarding publicly accessible recreational facilities within the Seal Beach Coastal Zone.

To ensure Seal Beach continues to provide lower-cost accommodations and recreational facilities, the policies of this section protect the existing hotel inventory, encourage future overnight accommodations and mitigate potential negative effects of luxury hotel development.

Overnight Accommodations

Overnight accommodations in the City include three hotels (two within the Coastal Zone and one outside of the Coastal Zone) and one RV Park (within the Seal Beach Naval Weapons Station, federal jurisdiction area). In total, there are 376 existing overnight accommodations available for visitors; refer to Table 2-2, *Seal Beach Overnight Accommodation Inventory*. However, the Ayres Hotel Seal Beach is located outside of the Coastal Zone and the Seabreeze RV Park is located within a federal jurisdiction area. Thus, a total of 179 overnight accommodations are located within the jurisdiction of this LCP.

Table 2-2, Seal Beach Overnight Accommodation Inventory

NAME	TYPE	ADDRESS	ROOM/SITE COUNT	LOCATION	COST SCALE
Pacific Inn	Hotel	600 Marine Drive	70	Within the Coastal Zone	Moderate
Hampton Inn and Suites	Hotel	2401 Seal Beach Blvd.	109	Within the Coastal Zone	Moderate
Ayres Hotel Seal Beach	Hotel	12850 Seal Beach Blvd.	112	Outside of the Coastal Zone	Moderate
Seabreeze RV Park	RV Park	800 Seal Beach Blvd.	85	Within the Coastal Zone (Federal Jurisdiction Area)	Economy
		TOTAL	***376***		

In addition to traditional hotels, Seal Beach has 14 existing legal short-term rentals, and is currently expanding the number of permits available to operate short term rentals in the Coastal Zone.

Lower-Cost Overnight Accommodations

While the Seabreeze RV Park is considered a lower-cost overnight accommodation, this facility is located within a federal jurisdiction area and is not subject to the regulations and policies of the LCP. No other lower-cost overnight accommodations are currently located within the City (using the definition of low-cost visitor serving accommodations as rooms or campsites that fall below 75 percent of the statewide average); however, it should be noted that several economy accommodations are located within neighboring cities of Huntington Beach and Long Beach. The three hotels located within the City fall within the moderate cost range (above the lower-cost accommodation threshold of 75 percent below the statewide average and below the high-cost accommodation threshold of 125 percent above the statewide average). Additionally, the City does not contain any "luxury" or timeshare limited use hotel accommodations that would exclude lower-income individuals from visiting.

Future Lower-Cost Overnight Accommodations

In September of 2015, the Coastal Commission approved Coastal Development Permit (CDP) No 5-13-1233 which includes requirements for visitor serving uses at the 10.9-acre subdivision on the former power plant site described in the DWP Specific Plan. The subdivision under this CDP would include passive open space land uses, single family residential lots and a 0.4-acre parcel for visitor serving uses. It was determined the site could not support a hotel as the primary use, however, the Commission found that a high priority lower cost visitor-serving use could be supported on a portion of the site. Coastal Commission found that the open space land uses along with the land reserved for visitor- serving uses, including lower-cost overnight accommodations will meet the requirement for visitor-serving commercial and recreational facilities on the subject property. The parcel has not yet been developed but the ultimate proposal and use will comply with permit requirements under CDP 5-13-1233.

Lower-Cost Visitor and Recreational Facilities Policies

Policy 2.3.3-1 Protect, encourage, and where feasible, provide lower-cost visitor-serving and recreational facilities. [Coastal Act Section 30213]

Policy 2.3.3-2 Encourage and support developments that provide public recreational opportunities within the Coastal Zone. [Coastal Act Section 30213]

Policy 2.3.3-3 Maintain and protect public beaches and parks, as a means of providing free and lower-cost recreational opportunities.

Policy 2.3.3-4 Encourage development of lower-cost overnight accommodations, in close proximity to the shoreline where feasible, provided coastal resource protection is assured, consistent with the Local Coastal Program.

Policy 2.3.3-5 Encourage new overnight visitor accommodation developments to provide a range of rooms and room prices to serve all income ranges. The City shall in no event (1) require that overnight room rental be fixed at a certain price for any privately owned and operated hotel, motel or similar visitor-serving public or private land; or (2) establish or approve any method for identification of low- or moderate-income persons for the purpose of determining eligibility for overnight room rentals in any such facilities. [Coastal Act 30213]

Policy 2.3.3-6 Require new development and redevelopment proposals that result in any loss of existing lower-cost accommodations, or that fail to provide lower-cost visitor serving accommodations where new higher or moderate-cost accommodations are proposed (including timeshares, fractional ownership, and condominium-hotels) to mitigate impacts on lower-cost accommodations as follows:

1. Where new development or redevelopment proposes to remove existing lower-cost accommodation or replace existing lower cost accommodation with moderate or high-cost accommodations, replacement of the lost lower cost rooms shall be provided at a one-to-one ratio either on site or on a suitable off-site location within the City. Replacement shall prioritize providing for lower cost accommodations on-site where feasible; where on-site provision is not feasible, off-site provision shall be completed and ready for use prior to occupancy of the new development, as feasible.

2. Where new development or redevelopment proposes to remove existing lower-cost accommodation or replace existing lower cost accommodation with moderate or high cost accommodations, unless they are replaced with comparable facilities, require in-lieu fees be provided to fund other lower-cost overnight visitor accommodations in the City or the greater Southern California coastal zone area.
3. Where new development or redevelopment proposes to provide for new higher cost accommodations, establish a percentage of accommodations to be offered at a lower cost.

Policy 2.3.3-7 Develop and Incorporate a method to define whether an existing or new facility that provides overnight accommodations is low, moderate, or high cost for the City of Seal Beach Coastal Zone and incorporate this method in the implementing regulations for this land use plan (where such regulations are certified) and through the Coastal Development Permit process.

Policy 2.3.3-8 Require an analysis of the feasibility of providing lower cost visitor accommodations for any application involving the expansion, reduction, redevelopment, demolition, conversion, closure, cessation, or new development of any project involving visitor overnight accommodations, with the exception of short-term rental lodging that is within residential units. If the proposed rates are not lower cost, the feasibility study shall explain why providing lower cost accommodations as part of the project is not feasible. This explanation shall address the land value; development costs; a breakdown of the estimated annual revenues (including average daily rate and occupancy rates); a breakdown of the estimated operating costs; and any other information necessary to address the feasibility of providing lower cost accommodations on site. The feasibility analysis shall be prepared at the applicant's expense.

Policy 2.3.3-9 Continue regulating and monitoring existing legal nonconforming short term vacation rentals, pursuant to Ordinance No. 1701. Explore opportunities to expand the existing short-term rental program in accordance with Coastal Act, Chapter 3, Article 2.

Policy 2.3.3-10 Ensure permit conditions and requirements from CDP No. 5-13-1233 are fulfilled in compliance with the special conditions of the CDP and Coastal Commission requirements for visitor serving uses on the dedicated parcel.

Policy 2.3.3-11 Establish an in-lieu fee program and/or an alternative method in the implementing regulations for this land use plan to mitigate potential impacts of new higher cost overnight accommodations on lower cost visitor-serving accommodations to ensure that a balance of overnight accommodations types at various price points continue to be provided. Mitigation includes the creation of new lower cost overnight accommodations, or contribution to an account used to fund the creation of lower cost accommodations within the Seal Beach coastal area may also be allowed. Priority shall be given to mitigation proposals providing lower cost overnight accommodations.

2.4 COASTAL DEPENDENT AND RELATED DEVELOPMENT

The City supports a range of coastal dependent uses, including commercial and public facilities, as described below. No coastal dependent industrial uses are located within the City.

2.4.1 Coastal Dependent Commercial Development

The City supports a limited range of coastal-dependent and coastal-related commercial uses, primarily recreational equipment rentals in close proximity to the oceanfront. Additionally, Sunset Marina provides private marina slip rentals and boating launching facilities within City jurisdiction. No other coastal dependent commercial facilities are located within Seal Beach.

Coastal Dependent Commercial Development Policies

Policy 2.4.1-1 Prioritize coastal-dependent commercial developments over other developments on or near the shoreline. When appropriate, coastal-related commercial developments should be accommodated within reasonable proximity to the coastal-dependent uses they support. [Coastal Act Section 30255]

2.4.2 Coastal Dependent Public Facility Development

The City has designated coastal dependent public facilities on and adjacent to the shoreline, primarily focused on public safety and parking facilities. Coastal dependent public facilities include lifeguard stands, water safety facilities, the Orange County Sherriff Department Harbor Control office, and all public parking lots.

Coastal Dependent Public Facility Development Policies

Policy 2.4.2-1 Prioritize coastal-dependent public facilities over other developments on or near the shoreline. When appropriate, coastal-related public facilities should be accommodated within reasonable proximity to the coastal-dependent uses they support. [Coastal Act Section 30255]

2.5 TIDELANDS AND SUBMERGED LANDS

2.5.1 The Public Trust

Tidelands and submerged lands are subject to the public trust that, among other things, limits their use to navigation, fishing, commerce, public access, water-oriented recreation, open space, and environmental protection. Tidelands and submerged lands within the City (with the exception of the Seal Beach Naval Weapons Station) are owned by the State Lands Commission. The vast majority of tidelands and submerged lands in Seal Beach have been granted to either the City or County of Orange (in the case of Sunset Marina) to administer in a manner consistent with the public trust limitations relative to the use of property and revenue derived from that use. The Seal Beach tidelands also include large portions of the City's ocean beaches, including the public beaches adjacent to Surfside, and land covered by the Pacific Ocean from the shoreline three miles out to sea and between the Los Angeles/Orange County boundary on the north and the southerly City limit at Anderson Street.

2.5.2 Tidelands Leases

Tidelands Lease PRC 3792.9 was recorded in August 1967. This lease encompasses approximately 238 acres of tidelands, including sandy beach and nearshore waters of the Pacific Ocean. The lease area is generally located between the San Gabriel River and Anaheim Bay jetties, extending from generally Seal Way into the waters of the Pacific Ocean for a distance of approximately 2,150 feet. This lease area also encompasses all of the Seal Beach Pier.

Tidelands Leases Policies

Policy 2.5.2-1 Administer the use of tidelands and submerged lands consistent with the Public Trust Doctrine and all applicable laws and leases.

Policy 2.5.2-2 Promote and protect the public's right of access to the ocean and beach, and to the provision of coastal-dependent uses adjacent to the water in the leasing or re-leasing of publicly owned land.

Policy 2.5.2-3 Evaluate and ensure the consistency of a proposed use of tidelands or submerged lands with the public trust restrictions and the public interest at the time a tideland lease is renegotiated or renewed.

Policy 2.5.2-4 Negotiate or renegotiate tideland leases at the fair market value based on the uses authorized in the lease and use the funds as required by law or the public trust.

Policy 2.5.2-5 Require public access in a manner consistent with the policies of the Coastal Act and this LCP, when the City issues new leases of public land or renews existing leases.

2.6 OTHER DEVELOPMENT USES

Other development uses in the Seal Beach Coastal Zone include industrial and residential uses. Limited industrial development exists within the City, including oil extraction operations. Residential development dominates the Coastal Zone, primarily consisting of small lot single family or multi-family residential homes. Further descriptions of industrial and residential development are outlined below.

2.6.1 Industrial Development

Industrial uses are primarily located in the northwest portion of the Coastal Zone, south of Westminster Boulevard within the Boeing IDS Specific Plan area. Permitted uses within this Specific Plan area include point-of-sale industrial and manufacturing, offices, commercial, and hotel uses. The Boeing Campus specifically includes office, research and development, manufacturing, warehouse and distribution, and support operation activities. Industrial designated land is a major employment center within the City.

Additionally, oil extraction operations at within the Hellman Ranch Specific Plan area have occurred since the early 1920s and are expected to continue indefinitely. The cessation of oil production at this site will result in a dedication easement allowing for wetland restoration pursuant to the approved Coastal Development Permit. Oil extraction operations also occur within the Seal Beach NWS at two locations; however, the City has no land use authority over federal facilities.

Off-shore oil operations occur at Platform Esther, located in State waters. Platform Esther was constructed as an island in 1965 and rebuilt as a platform in 1986 in accordance with CDP 85-005. Platform Esther contains 64 well slots and is located in waters approximately 35 feet deep.

No coastal dependent industrial uses are located within the City.

Industrial Development Policies

Policy 2.6.1-1 Prioritize coastal-dependent and coastal-related industrial uses over other types of industrial uses, within areas designated for industrial development in the Coastal Zone.

Policy 2.6.1-2 Prohibit new onshore oil and gas development facilities, except as necessary in conjunction with existing oil production facilities including Hellman Ranch and Platform Esther (provided facilities are consistent with coastal resource protection policies to the maximum extent feasible).

Policy 2.6.1-3 Ensure future wireless telecommunications antennas and related facilities ("wireless communications facilities" or WCFs) are sited and designed in compliance with the Seal Beach Municipal Code, Federal Communications Commission (FCC) rules and regulations located in Title 47 of the Code of Federal Regulations (CFR), and related provisions of this LUP including considerations of visual resources.

Policy 2.6.1-4 Continue to coordinate with the US Navy at the Seal Beach Naval Weapons Station to review the location and strength of the radio frequency of wireless communications facilities.

2.6.2 Residential Development

Residential development within the Seal Beach Coastal Zone includes a variety of types, ranging from low to high density. With the exception of Heron Pointe (Hellman Ranch Specific Plan) and Ocean Place (DWP Specific Plan) projects, the residential areas in the Coastal Zone were originally subdivided prior to adoption of the Coastal Act. Coastal Zone residential areas are largely built out, and development mostly consists of remodels and renovations of existing homes. People have long been attracted to Seal Beach due to the unique geographical location, attractive beaches, ideal climate, and small-town character.

Residential Development Policies

Policy 2.6.2-1 Maintain setbacks, density, floor area and height limits for residential development that align with the character of established neighborhoods coastal access, and coastal resources. Accommodate development of a variety of housing types, styles, tenure and densities that are accessible and meet preferences for different neighborhood types.

Policy 2.6.2-2 Administer provisions of state law relative to demolition, conversion, and construction of low- and moderate-income dwellings in the Coastal Zone, through an LCP Amendment, as necessary.

2.7 TRANSPORTATION

Transportation within the Seal Beach Coastal Zone is primarily provided through the system of local streets, regional streets, and freeways. Major north/south facilities in the Coastal Zone include: Seal Beach Boulevard, First Street, Main Street, and Ocean Avenue. Major east/west facilities in the Coastal Zone include Westminster Boulevard, Pacific Coast Highway, Bolsa Avenue, Marina Drive, and Electric Avenue. While the Interstate-405 freeway is outside of the Coastal Zone, it is a major regional access route within the City of Seal Beach that connects to Seal Beach Boulevard, and thus to the coast. Active transportation, including walking and bicycling, and public transportation opportunities are available in the Coastal Zone as outlined below.

2.7.1 Public Transit

The City of Seal Beach is served by two key transit agencies, Orange County Transit Authority and Long Beach Transit. Additionally, Seal Beach Leisure World provides local access for residents of the community. Refer to Exhibit 2.7, *OCTA and Long Beach Transit*, showing transit routes and stops within the Seal Beach Coastal Zone. Additionally, two other limited use public transit options exist for qualified individuals within Seal Beach, including the Seal Beach Senior Transportation Services and Seal Beach Leisure World. All public transit opportunities are described in detail below.

Orange County Transit Authority

The Orange County Transit Authority (OCTA) operates OCbus within the county. Route 1 provides access to the Seal Beach Coastal Zone and connects to other coastal cities along Pacific Coastal Highway from Long Beach to San Clemente. OCbus Routes 42 and 60 provide access to Leisure World Seal Beach, but do not connect to the Coastal Zone.

Long Beach Transit

Long Beach Transit (LB Transit) operates in the City of Long Beach, City of Lakewood, City of Signal Hill, and City of Seal Beach. LB Transit has 34 bus routes and nearly 2,000 bus stops that operate seven days a week. Two routes connect to the Coastal Zone in Seal Beach, Route 131, and Route 171.

Route 131 provides transit access to the Seal Beach Coastal Zone at Main Street and Electric Avenue. This route connects to the Alamitos Bay Landing, Market Place, Belmont Shore, Long Beach Airport, and the Metro Blue Line Station, all within the City of Long Beach. Additionally, Route 171 also provides transit access to the Seal Beach Coastal Zone at Main Street and Electric Avenue. Route 171 connects to California State University Long Beach, VA Hospital, Poly High School, Long Beach Community College, Long Beach Metro Station, and the Villages at Cabrillo, all within the City of Long Beach.

Seal Beach Senior Transportation Services

The Senior Transportation Services offered by the City include both the Senior Shuttle and the Dial-A-Ride Program. The Senior Shuttle assists residents age 60 and older in accessing commercial centers within the City, including Old Town, and is available Monday through Friday.

The Dial-A-Ride program offers to drive a senior resident to any location within City limits, or for medical visits outside of the City up to three miles. Rides can be scheduled Monday through Thursday between 8:00 AM and 4:30 PM, with no service on Friday. Ride reservations are recommended at least 24 hours in advance to schedule the date, time, and location.

Public Transit Policies

Policy 2.7.1-1 Coordinate with Orange County Transit Authority (OCTA) and other appropriate entities to improve bus service to and within the Coastal Zone.

Policy 2.7.1-2 Encourage the Orange County Transit Authority (OCTA) to continue and expand summer bus service to recreational areas within the Coastal Zone.

Policy 2.7.1-3 Encourage the provision of safe, aesthetically pleasing, and clearly identifiable public transit stops within the Coastal Zone.

Policy 2.7.1-4 Implement and expand, wherever feasible, programs aimed at enhancing mobility of senior citizens and disabled persons within the Coastal Zone.

Policy 2.7.1-5 Require growth inducing or other major new residential or commercial development within the Coastal Zone to incorporate public transit service and facilities (such as park-and-ride sites, bus benches, shelters, pads, or turnouts), where appropriate, in improvement plans or as needed in proximity to the development. If new developments are located within close proximity to existing transit facilities, encourage cohesiveness through site planning and design, while maintaining and enhancing public access to the coast. [Coastal Act Section 30252]

2.7.2 Bikeways and Trails

There are several trails and greenways in the Seal Beach Coastal Zone that offer places for recreation and exercise, while connecting the community's circulation system. Refer to Exhibit 2.8, *Coastal Zone Bicycle Paths* and Exhibit 2.9, *Coastal Zone Trails*.

City Maintained Trails

Electric Avenue Greenbelt: Electric Avenue follows the abandoned Pacific Electric right-of-way and includes a walking pathway approximately 3,600 feet long through Old Town Seal Beach. The greenbelt provides active transportation connectivity between Marina Drive and Seal Beach Boulevard.

Boardwalk: The Seal Beach boardwalk stretches for approximately half a mile from 10th Street to Electric Avenue, behind the homes on East Seal Way. The boardwalk provides a concrete pedestrian pathway that is frequented by runners and walkers and is an access pathway to the Seal Beach Pier and Main Street.

Regional Trails

San Gabriel River Trail: The San Gabriel River Trail is a 35-mile multi-purpose trail along the San Gabriel River beginning in the City of Azusa and ends in Seal Beach. The trail travels through an urban environment, adjacent parks, and natural features. In Seal Beach, the trail runs along the flood control channel and is multi-use (hiking, cycling, equestrian, and dog-friendly). Access is provided at most major east-west connector streets crossing the river.

Hellman Ranch Trail: Hellman Ranch Trailhead is located on Seal Beach Boulevard and continues northward behind the Heron Pointe neighborhood. As part of the Heron Point Cultural Education Center, along the trail include educational markers educating visitors about the history of the area and indigenous inhabitants. Additionally, there is a circular staging area toward the end of the trail that provides an outdoor classroom facility.

On-Street Bicycle Facilities

In addition to the trails discussed above, designated bikeways are present on major streets within the Seal Beach Coastal Zone. Class II Bikeways (bike lanes) provide a delineated right-of-way assigned to bicyclists to enable more predictable movements, accommodating bicyclists through corridors where insufficient room exists for side-by-side sharing of existing streets by motorists and bicyclists. Class II bike lanes can be found on the following City streets: Electric Avenue, Marina Drive, Pacific Coast Highway, Seal Beach Boulevard, and Bolsa Avenue.

In addition to the designated bikeways described above, a number of local streets without designated bikeways also provide for safe and efficient bicycle travel in the Coastal Zone. These streets typically do not have a bikeway designation; however, the entire street system may be fully adequate for safe and efficient bicycle travel, where signing and pavement marking for bicycle use are unnecessary. These are most commonly found along residential streets where vehicle speeds are relatively low, which enables bicycle travel to be accommodated with vehicle travel.

Bikeways and Trails Policies

Policy 2.7.2-1	Require new developments to incorporate non-automobile circulation to the greatest extent feasible.
Policy 2.7.2-2	Ensure the design, location, construction, and operation of trails and bikeways to avoid adverse impacts to coastal resources, including sensitive habitats and species. Where avoidance of adverse impacts to coastal resources is infeasible, such impacts shall be minimized to the maximum extent feasible.
Policy 2.7.2-3	Consider and implement opportunities for future trails and bikeways to enhance public access to the coast, including opportunities to expand bicycle parking facilities at public parks and recreation facilities.
Policy 2.7.2-4	Maintain safe, convenient paths for pedestrians and bicyclists and encourage construction and operation of additional pathways as feasible.
Policy 2.7.2-5	Ensure accessibility of trails and bikeway facilities to the elderly and disabled.
Policy 2.7.2-6	Require new commercial or industrial development within the Coastal Zone to provide bike racks for employees to encourage active transportation.
Policy 2.7.2-7	Cooperate with federal, state, county, and local jurisdictions to coordinate regional bikeways and trail expansions.
Policy 2.7.2-8	Monitor and implement solutions to improve bicycle safety at crossings along Pacific Coast Highway (SR-1), and other locations as applicable.
Policy 2.7.2-9	Coordinate the completion of the coastal trail, connecting the regional San Gabriel River Trail to the existing Boardwalk, seaward of the residences.

CITY OF SEAL BEACH
LOCAL COASTAL PLAN

Source: County of Orange, California Coastal Commission, City of Seal Beach

2/3/2022 JN H:\pdata\158624\GIS\MXD\02_22\Exhibit 2.1 Coastal Zone Zoning Designations.mxd

LEGEND

- Coastal Zone within the City of Seal Beach
- Seal Beach City Limit

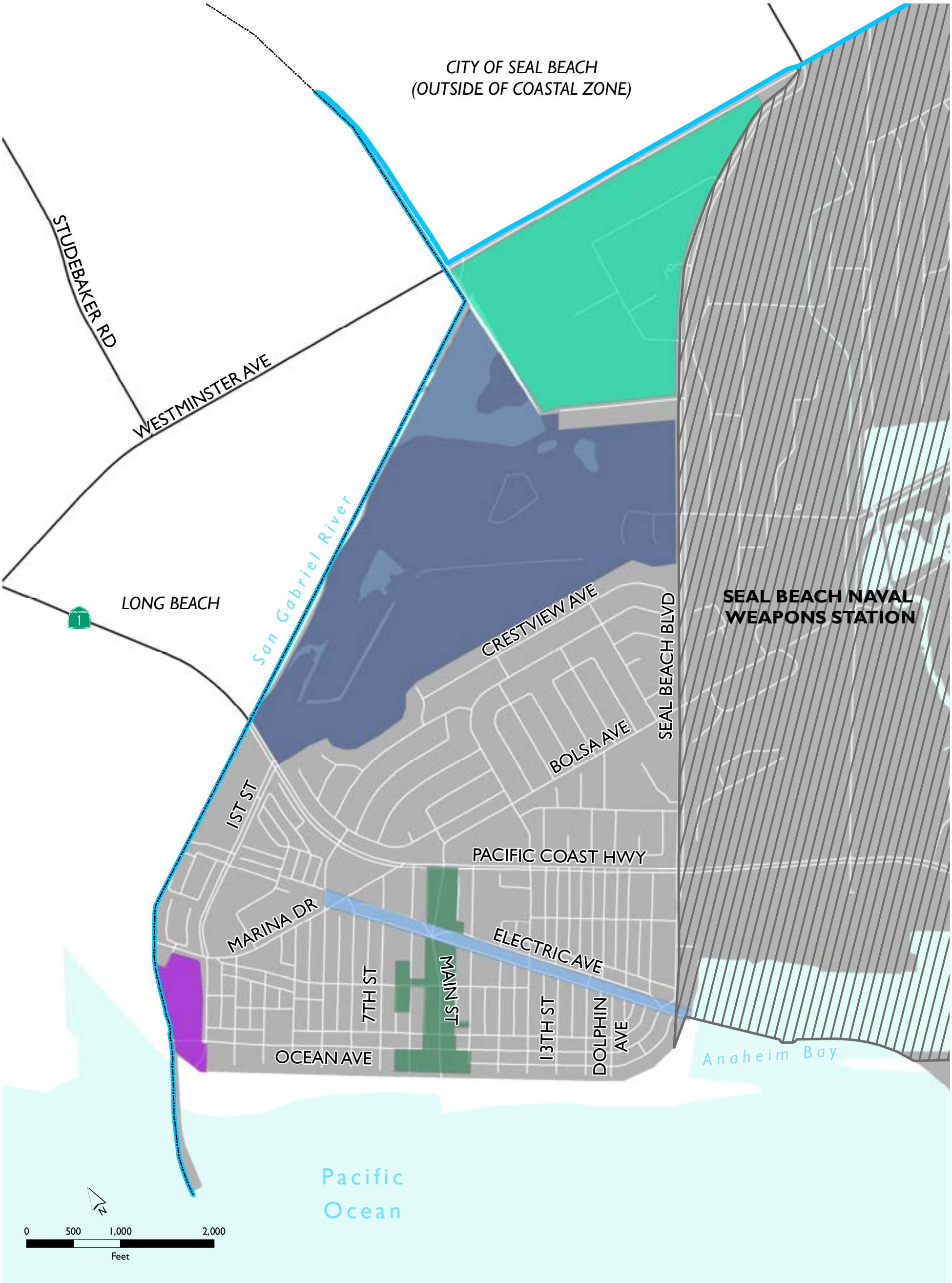
Zoning Designations

- Beach
- Public Beach (Public Resource)
- General Commercial
- Limited Commercial/Residential Medium Density
- Light Manufacturing
- Military
- Main Street Specific Plan
- Oil Extraction
- Open-Space Natural
- Open Space Parks and Recreation
- Public and Semipublic Facilities
- Residential High Density-20
- Residential High Density-33
- Residential High Density-Planned Development
- Residential Low Density-15
- Residential Low Density-9
- Service Commercial
- Specific Plan Regulation

COASTAL ZONE ZONING DESIGNATIONS

EXHIBIT 2.1

CITY OF SEAL BEACH
LOCAL COASTAL PLAN



Source: County of Orange, California Coastal Commission

2/3/2022 JN H:\pdata\I 58624\GIS\MXD\02_22\Exhibit 2.2 Coastal Zone Specific Plans.mxd

LEGEND

- Coastal Zone within the City of Seal Beach
- Seal Beach City Limit
- Seal Beach Naval Weapons Station (Federal Jurisdiction)

Specific Plans

- Boeing Specific Plan
- DWP Specific Plan Area
- Hellman Ranch Specific Plan
- Main Street Specific Plan
- Pacific Electric ROW Specific Plan

COASTAL ZONE SPECIFIC PLANS

EXHIBIT 2.2

CITY OF SEAL BEACH
LOCAL COASTAL PLAN

Source: County of Orange, California Coastal Commission

2/3/2022 J:\N:\Hdata\158624\GIS\MXD\02_22\Exhibit 2.3 Coastal Zone Planning Areas.mxd

LEGEND

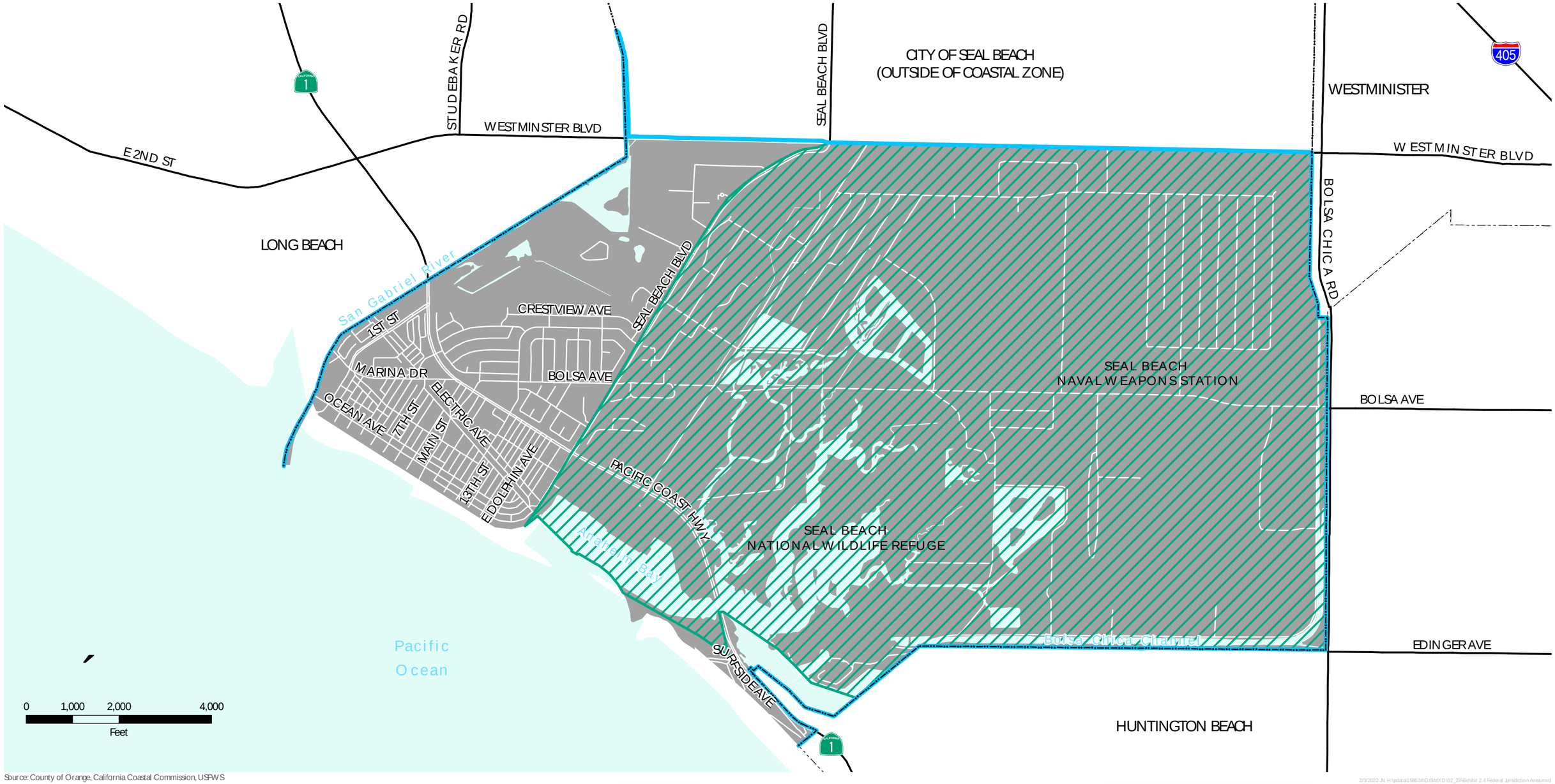
- Coastal Zone within the City of Seal Beach
- Seal Beach City Limit

Planning Areas

- PA 1
- PA 2
- PA 5

COASTAL ZONE PLANNING AREAS
EXHIBIT 2.3

CITY OF SEAL BEACH
LOCAL COASTAL PLAN



Source: County of Orange, California Coastal Commission, USFWS

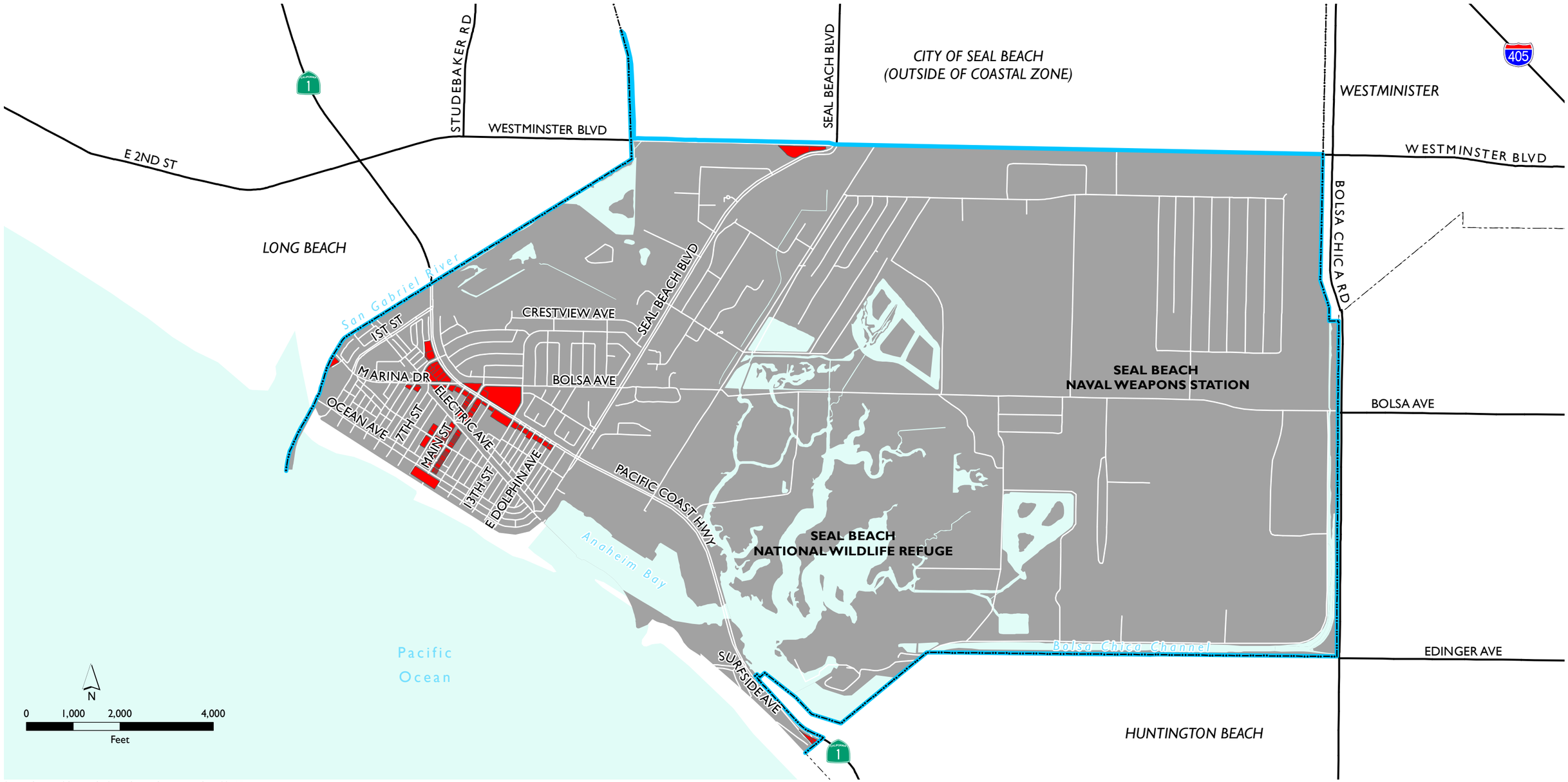
2/3/2022 JN: H:\pdata\158624\GIS\MXD\02_22\Exhibit 2.4 Federal Jurisdiction Area.mxd

LEGEND

- Coastal Zone within the City of Seal Beach
- Seal Beach City Limit
- Federal Jurisdiction

FEDERAL JURISDICTION AREA
EXHIBIT 2.4

CITY OF SEAL BEACH
LOCAL COASTAL PLAN



Source: County of Orange, California Coastal Commission, City of Seal Beach

2/3/2022 JN H:\pdata\158624\GIS\MXD\02_22\Exhibit 2.5 Visitor Serving Commercial Facilities 11x17.mxd

LEGEND

- Coastal Zone within the City of Seal Beach
- Seal Beach City Limit
- Visitor Serving Commercial

VISITOR SERVING COMMERCIAL FACILITIES
EXHIBIT 2.5

CITY OF SEAL BEACH
LOCAL COASTAL PLAN

Source: County of Orange, California Coastal Commission, USFWS, City of Seal Beach

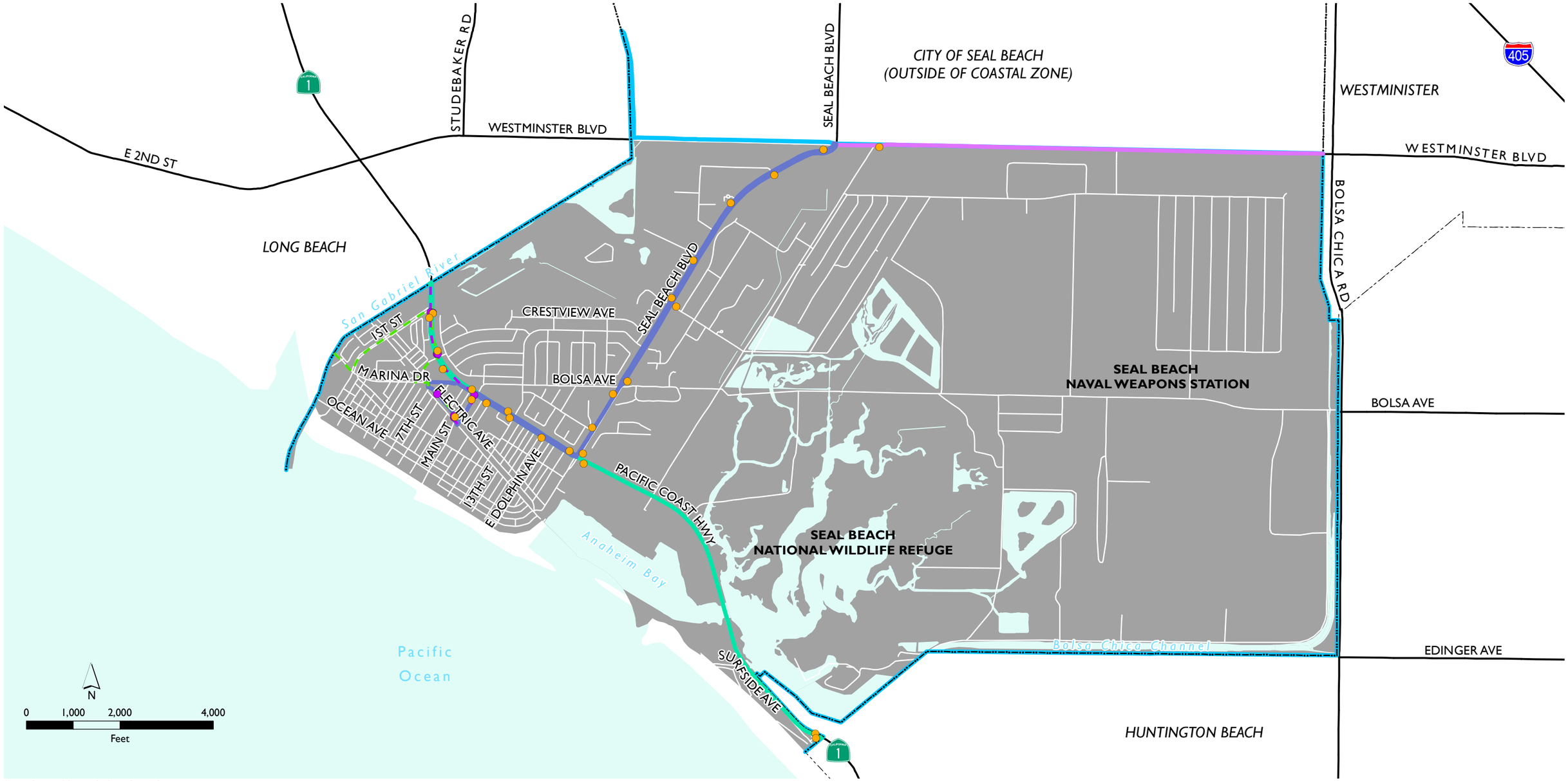
4/13/2023 JN H:\pdata\158624\GIS\MXD\02_22\Exhibit 2.6 Coastal Zone Open Space.mxd

LEGEND

- Coastal Zone within the City of Seal Beach
- Seal Beach City Limit
- City Parks
- Open Space

COASTAL ZONE OPEN SPACE
EXHIBIT 2.6

CITY OF SEAL BEACH
LOCAL COASTAL PLAN



Source: County of Orange, California Coastal Commission

2/3/2022 JN H:\pdata\158624\GIS\MXD\02_22\Exhibit 2.7 OCTA and Long Beach Transit 11x17.mxd

LEGEND

- Coastal Zone within the City of Seal Beach
- Seal Beach City Limit
- OCTA Bus Stops
- Long Beach Transit Bus Stops

OCTA Bus Routes

- Route 1
- Route 42
- Route 60

Long Beach Transit Bus Routes

- Route 131
- Route 171

OCTA AND LONG BEACH TRANSIT
EXHIBIT 2.7

CITY OF SEAL BEACH
LOCAL COASTAL PLAN

Source: County of Orange, California Coastal Commission, City of Seal Beach

2/3/2022 JN H:\pdata\158624\GIS\MXD\02_22\Exhibit 2.8 Coastal Zone Bicycle Paths 11x17.mxd

LEGEND

- Coastal Zone within the City of Seal Beach
- Seal Beach City Limit

Existing Bicycle Paths

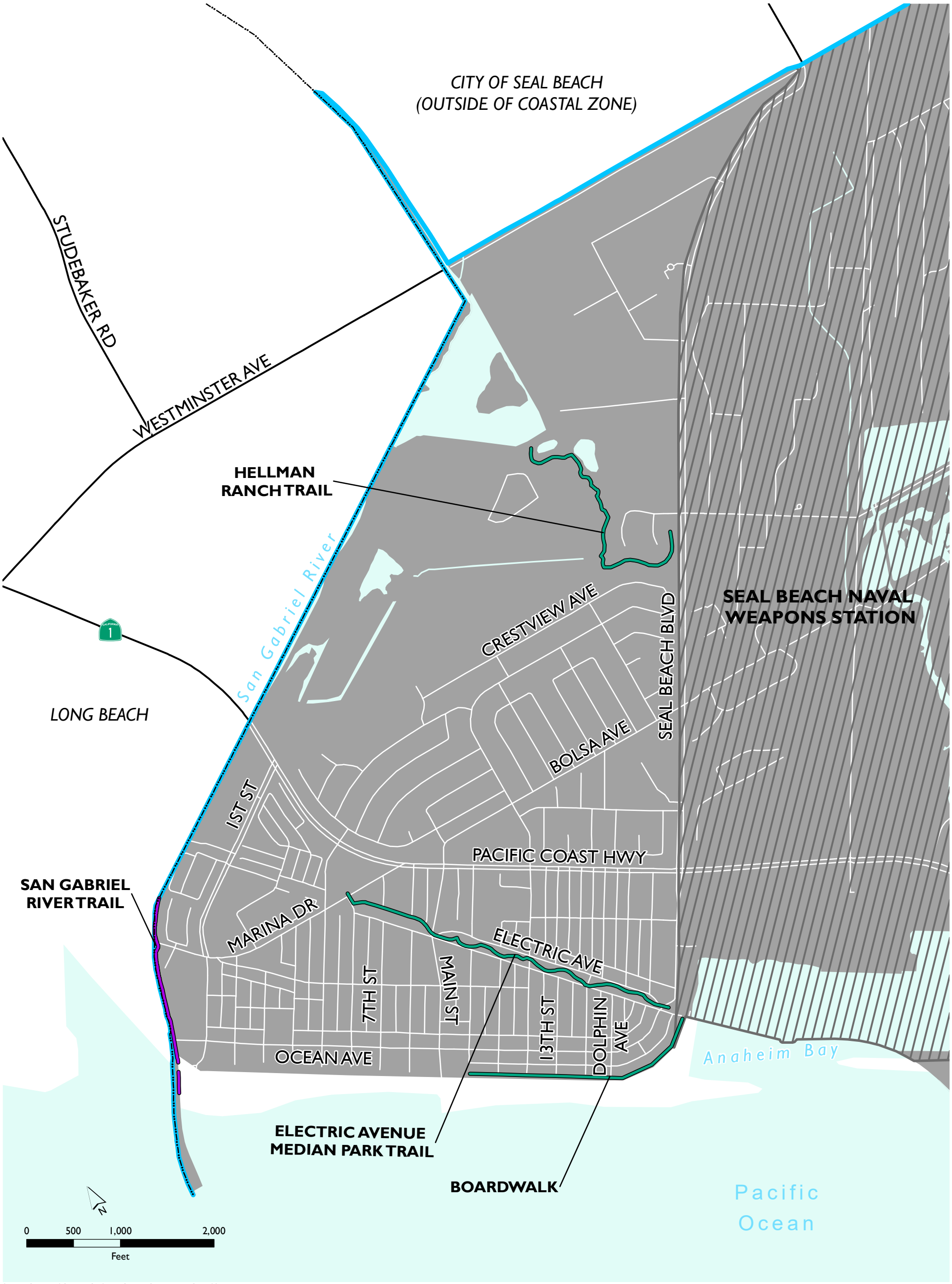
- Bike Path - Class I
- Bike Lane - Class II

Proposed Bicycle Paths

- Bike Lane - Class II

COASTAL ZONE BICYCLE PATHS
EXHIBIT 2.8

CITY OF SEAL BEACH
LOCAL COASTAL PLAN



Source: County of Orange, California Coastal Commission, City of Seal Beach

2/3/2022 JN: H:\pdata\158624\GIS\MXD\02_22\Exhibit 2.9 Coastal Zone Trails 11x17.mxd

LEGEND

- Coastal Zone within the City of Seal Beach
- Seal Beach City Limit
- Seal Beach Naval Weapons Station (Federal Jurisdiction)

Trails

- City Maintained Trails
- Regional Trails

COASTAL ZONE TRAILS
EXHIBIT 2.9

This page is intentionally left blank.

CHAPTER 3 PUBLIC ACCESS AND RECREATION

3.1 PUBLIC SHORELINE ACCESS

Public access to the coast is provided via pedestrian, active transportation, and vehicular facilities, as outlined in the sections below. Additionally, parking, private/gated communities and special events have the capacity to alter public shoreline access, and applicable policies are also included in this section.

3.1.1 Vertical and Lateral Pedestrian Access

The City has approximately 1.75 miles of publicly accessible sandy beach divided into two main sections: Seal Beach/Main Beach and Surfside Beach. Along the Seal Beach coastline, from north to south, the City maintains public pedestrian beach access at the following locations: 2nd Street, 3rd Street, 4th Street, 5th Street, 6th Street, 7th Street, Seal Beach Pier/Eisenhower Park area, 11th Street, 12th Street, 13th Street, 14th Street, East Dolphin Avenue, Neptune Avenue, and Anderson Street. Pedestrian access is also provided via surface parking lots at 1st Street, 8th Street and 10th Street. Additionally, pedestrian access is also provided to the Sunset Aquatic Marina via Park Circle Drive. Access is restricted at Phillips Street. Refer to Exhibit 3.1, *Pedestrian Access Points*. Other trails that offer pedestrian access within the Coastal Zone are discussed in Section 2.7.2, *Bikeways and Trails*.

Vertical and Lateral Pedestrian Access Policies

Policy 3.1.1-1 Protect, and where feasible, expand and enhance public access (including vertical and lateral access) to the shoreline, beaches, municipal pier, coastal parks, and trails. [Coastal Act Section 30210]

Policy 3.1.1-2 Provide, to the maximum extent feasible and consistent with Policy 3.1.1-1, adequate buffer area and landscaping along public accessways to minimize conflicts with adjacent private uses.

Policy 3.1.1-3 Pursue public acquisition of accessways through easements or dedications and require access easements as part of the Coastal Development Permit process for new development along the shoreline or where substantial evidence of prescriptive access rights exist. Dedicated accessways shall not be required to be open for public use until a public agency or private association agrees to accept responsibility for maintenance and liability of said accessway.

Policy 3.1.1-4 Maintain, and enhance where feasible, existing pedestrian walkways within the Coastal Zone; require new development to provide pedestrian walkways between existing and new development, including schools and public facilities.

Policy 3.1.1-5 Require the installation of sidewalks with all new roadway construction within the Coastal Zone and significant reconstruction of existing roadways.

Policy 3.1.1-6 Coordinate with the California Department of Transportation to monitor and implement solutions to improve pedestrian safety at crossings along Pacific Coast Highway (SR-1).

Policy 3.1.1-7 Require new development that is located between the shoreline and the first public roadway to dedicate or provide direct dedication or irrevocable offers to dedicate vertical and lateral public access to the shoreline, except when:

A. Providing public access would be inconsistent with the need to protect public safety, public rights, the rights of property owners, and natural resources; or,
B. Adequate public access exists nearby.

Dedications or offers of dedication shall be made to the City of Seal Beach, another public agency or other suitable agency. Offers to the City shall be accepted, where feasible. Where the City cannot accept dedications or offers of dedication, dedications or offers of dedication shall be extended to another public agency or organization, such as a land trust. [Coastal Act Section 30210 and 30212]

Policy 3.1.1-8 Ensure development does not interfere with the public right to access the coast where acquired through use or legislative authorization. [Coastal Act Section 30211]

Policy 3.1.1-9 Identify and remove all unauthorized structures, including signs and fences, that inhibit or restrict public access to the coast.

Policy 3.1.1-10 A. Wherever appropriate and feasible, public facilities, including parking areas or facilities, shall be distributed throughout an area to mitigate against the impacts of overcrowding or overuse by the public of any single area.

B. The public access policies shall be implemented in a manner that considers the need to regulate the time, place, and manner of public access depending on the facts and circumstances in each case including, but not limited to, the following:

1. Topographic and geologic site characteristics.
2. The capacity of the site to sustain use and at what level of intensity.
3. The appropriateness of limiting public access to the right to pass and repass depending on such factors as the fragility of the natural resources in the area and the proximity of the access area to adjacent residential uses.
4. The need to provide for the management of access areas so as to protect the privacy of adjacent property owners and to protect the aesthetic values of the area by providing for the collection of litter.

C. It is the intent that the public access policies be carried out in a reasonable manner that considers the equities and that balances the rights of the individual property owner with the public's constitutional right of access pursuant to Section 4 of Article X of the California Constitution. Nothing in this section or any amendment thereto shall be construed as a limitation on the rights guaranteed to the public under Section 4 of Article X of the California Constitution.

D. In carrying out the public access policies of this article, the City and any other responsible public agency shall consider and encourage the utilization of innovative access management techniques, including, but not limited to,

agreements with private organizations which would minimize management costs and encourage the use of volunteer programs.

Policy 3.1.1-11 Open space easements and dedications shall be utilized, where required, to facilitate the objectives of the City's recreational and/or public access program.

Policy 3.1.1-12 Evaluate future opportunities with the U.S. Navy to enhance vertical and lateral public access to the coast at the Naval Weapons Station Seal Beach, and for potential expansion of the Navy owned parking lot on Phillips Street.

3.1.2 Parking Demand and Management

Residents and visitors can find numerous opportunities to park a vehicle within the Seal Beach Coastal Zone. Refer to Exhibit 3.2, *Coastal Zone Parking*, showing both on- and off-street public parking lots within the Coastal Zone. Metered parking is provided, primarily in the Old Town District. Metered parking is available along Main Street and at Electric Avenue. Other free on-street public parking can be found along most numbered streets in the Coastal Zone. No public on-street parking is located within the Surfside Colony.

Additionally, the City maintains several public parking lots within the Coastal Zone. Parking Lot 1 (P1) offers public parking at the intersection of Central Avenue and 8th Street and provides free parking from 5 PM to 10 PM. Parking Lot 2 and 3 are located at Eisenhower Park at Main and Ocean Avenue, and Parking Lot 4 is located at the end of 1st Street. Parking Lots 2, 3 and 4 all offer paid parking for beach goers in Seal Beach. Parking Lot 5 provides free parking at Marina Park. Metered off-street parking can be found in three parking lots off of Main Street at Electric Avenue and south of Central Avenue. It is noted that there is no public off-street parking located within the Surfside Colony.

Parking Demand and Management Policies

Policy 3.1.2-1 Provide sufficient, well-designed, and convenient on-street and off-street parking facilities throughout the Coastal Zone, consistent with protection of coastal access. [Coastal Act Section 30252]

Policy 3.1.2-2 Consolidate parking, where appropriate in the Coastal Zone, to eliminate the number of ingress and egress points onto arterials. [Coastal Act Section 30212.5]

Policy 3.1.2-3 Ensure applications for parking modifications or wavier of off-street parking standards require findings of no adverse impacts to public access, including available parking for coastal access.

Policy 3.1.2-4 Encourage the use of commercial office and institutional parking areas for public parking use during weekends, holidays, and special events in conjunction with public transit or shuttles to serve coastal recreational areas.

Policy 3.1.2-5 Develop parking management programs for Coastal Zone areas to minimize parking use conflicts between commercial uses, residential uses, and Coastal Zone visitors during the summer months.

Policy 3.1.2-6 Provide, where feasible, free or paid hourly parking facilities within close proximity to visitor-serving commercial and recreational facilities. Discourage flat rate parking fees that impose a fixed daily parking rate that is not commensurate

with the amount of time a vehicle occupies the parking facility. Instead, advocate for parking facilities that employ hourly rates with a maximum daily fee.

3.1.3 Private/Gated Communities

Throughout southern California, access to portions of the shoreline is restricted to the public due to private residential communities. Exclusive gated communities in some cases completely circumvent public access to the shoreline, and present a major issue in terms of protecting, expanding, and enhancing coastal access.

Surfside Colony is a private residential neighborhood, subdivided in the early 1900s into three blocks of small lots (25 foot by 35 foot on average) in a gated community. Approximately 250 single-family residences are located within this neighborhood. The Surfside Colony is a long-established neighborhood, and redevelopment is generally the type and scale in a similar nature to existing development. Vehicular access at Phillips is limited to residents and guests only, and the U.S. Navy owns a small parking lot near the Surfside Colony residential access gate. Public access to Surfside Beach for pedestrians is provided on Anderson Street, and pedestrians can access from the southern side of the beach and laterally travel north toward the Anaheim Bay jetty. Public access to Surfside Beach is not available on the northern end, as this property is owned by the U.S. Navy and contains infrastructure associated with Naval Weapons Station activities.

Private/Gated Communities Policies

Policy 3.1.3-1 For new development located between the first public road and the coast, prohibit gates, guard houses, barriers, and other structures designed to regulate or restrict access.

Policy 3.1.3-2 Prohibit new private streets, or the conversion of public streets to private streets, where those streets provide public access to and along the shoreline, including beaches, coastal parks, or trails.

Policy 3.1.3-3 Require appropriate public access consistent with policies provided in Section 3.1.1, for any new development or modifications to existing development in private or gated communities causing or contributing to adverse public access impacts.

3.1.4 Special Events

The City and other organizations hold several annual special events throughout the Coastal Zone. Special events are required to go through a permitting process through the City in accordance with Municipal Code Chapter 7.50, Special Events, to minimize disruption to the affected areas, and to ensure adequate access, circulation, and emergency services are provided. Due to the high attendance on the beach during the summer months and several City hosted beach events, events proposed at Eisenhower Park or on the beach during peak season are not guaranteed (peak season begins the Friday of Memorial Day weekend and ends on the Tuesday after Labor Day).

Special Events Policies

Policy 3.1.4-1 Ensure that temporary special events within the Coastal Zone do not significantly impact public access, recreation, and visual resources. Special events, including temporary activities and structures, shall not adversely impact sensitive natural

resources, such as wetlands or ESHA, including through indirect effects from the use of outdoor lighting and noise. Where transportation services to the shoreline are impacted, alternate routes and modes of transportation (e.g., carpool, third party vendors) shall be provided and encouraged to the maximum extent feasible.

Policy 3.1.4-2 Require a Coastal Development Permit for special/temporary events within the Coastal Zone that meet all of the following criteria:

A. Hosted between Memorial Day weekend and Labor Day weekend; and,
B. Occupies any portion of the public sandy beach area; and,
C. Involves a charge for general public admission or seating where no fee is currently charged for use of the same area (not including booth or entry areas).

For areas in the City's permitting jurisdiction, the Community Development Director shall make this determination based on the Coastal Commission's 1993 Exclusion of Temporary Events Guidelines. For areas in the Coastal Commission's jurisdiction, the Commission's Executive Director shall make this determination pursuant to Public Resources Code Section 30610(i) and the 1993 Exclusion of Temporary Events Guidelines. An application for a CDP shall include information on the proposed event, including but not limited to, proposed duration, space or facilities needed for set up and break down, number of days, estimated attendance, parking arrangements, traffic control, noise control, waste removal, insurance, equipment to be used, sales of food or products, food service, entertainment, sponsorships, and advertising and marketing plans. Any CDP shall include conditions as appropriate to ensure that public access and coastal resource impacts are avoided to the extent feasible, and thereafter minimized.

The City reserves the right to exclude from permit requirements temporary events that previously received a Coastal Development Permit, will be held in the same location, at a similar season, for the same duration, with operating and environmental conditions substantially the same as those associated with the previous event. Additionally, the City may exclude from permit requirements temporary events meeting the above criteria when:

A. The fee is for preferred seating only and more than 75% of the provided seating capacity is available free of charge for general public use; or,
B. The event is held on sandy beach area in a remote location with minimal demand for public use, and there is no potential for adverse effect on sensitive coastal resources; or
C. The event is less than one day in duration.

Temporary or special events hosted outside of the period between Memorial Day and Labor Day may be allowed by the City without a CDP. Other permitting requirements may be applicable, according to Seal Beach Municipal Code Chapter 7.50.

Policy 3.1.4-3 The City may adopt rules and regulations in accordance with the California Vehicle Code regarding the temporary closing of portions of any public street for

celebrations, parades, special events, or other purposes as required when necessary for public safety. [California Vehicle Code Section 21101]

Policy 3.1.4-4 Temporary events taking place on the sandy beach area but not directly involving use of the ocean shall be a minimum of 50 feet inland of the Mean High Tide Line for the protection of marine resources and to allow public use of the beach, seaward of the event area. Temporary events taking place in the water shall protect marine resources to the maximum extent feasible. In all Temporary Event cases, lateral public access across the beach shall be maintained at all times.

Policy 3.1.4-5 Ensure existing special and temporary events within the Coastal Zone meet the requirements included Seal Beach Municipal Code Chapter 7.50 with respect to permit requirements, procedures, and standard regulations. In accordance with the Municipal Code, the following types of events do not require a CDP or Special Use permit: parades, political rallies or similar constitutionally protected expressive activities; filming activities subject to Title 5 of the code; or adult-supervised, child-oriented parties conducted at a residential property and involving no live music.

3.2 RECREATION AND SUPPORT FACILITIES

3.2.1 Recreational Opportunities

Recreational opportunities within the Coastal Zone include public beaches and parks, containing open space, picnic areas, multi-purpose playfields, swimming pools, and tennis courts. The City maintains approximately 1.75 miles of public beaches and 28-acres of public parks within the Coastal Zone; refer to Exhibit 3.3, *Coastal Zone Parks and Recreation*. Beaches, public parks, and other recreational facilities located within the Coastal Zone are described below.

Public Beaches

Seal Beach/Main Beach: Seal Beach/Main Beach stretches from the mouth of the San Gabriel River to the Anaheim Bay, for approximately one mile. This is the most popular beach in Seal Beach and provides wide sandy areas for a variety of passive and active uses. Public sand volleyball courts are available for recreational use. The shoreline of Seal Beach is considered to be of regional significance.

Surfside Beach: Surfside Beach is in front of the private gated community of Surfside Colony, south of the entrance to Anaheim Bay and north of the fence at Anderson Street. A surfing area known as the Surfside Bowl is located where water hits the jetty and waves refract and make a right-hand break. Surfside Beach is a popular windsurfing location as well. This beach is subject to coastal erosion, specifically during winter months.

Public Park Facilities

Eisenhower Park: Eisenhower Park is a 1.5-acre grassy park located at the base of the Seal Beach Pier, at the intersection of Main Street and Ocean Avenue. The Seal Beach General Plan designates this park as a Neighborhood Park. Eisenhower Park hosts many events including Concerts on the Park, Movies on the Beach, and the Annual Christmas Parade. This park includes public restrooms and a tot lot playground.

Electric Avenue Greenbelt: Electric Avenue once served as a rail line for Red Car trains that transported people from Los Angeles to the Beach. Now, Electric Avenue is an 8.4-acre greenbelt park through Old Town Seal Beach that provides shaded walking paths in the City. The Seal Beach General Plan designated this park as a Special Use Greenbelt. Electric Avenue Greenbelt is also home to the Red Car Museum and Mary Wilson Library. This park includes picnic table facilities.

Zoeter Field: Zoeter Field a 1.8-acre park located at 12th Street and Landing Avenue, south of Pacific Coast Highway. This park includes a dog park; softball fields with public restrooms; and hosts youth and adult softball leagues. The Seal Beach General Plan designated this park as Special Use.

Marina Community Park: The Marina Community Park is located at 1st Street and Marina Drive, and consists of several recreational facilities, including basketball courts, tennis courts, softball fields and a tot lot playground over 1.5-acres. The Seal Beach General Plan designates this park as a Neighborhood Park – Recreational Facility/Community Center. The Marina Community Center includes two rooms available as rentals, with a capacity for 150 people, and offers regular classes through the City's Recreation Program. This park also includes picnic table facilities.

Gum Gove Nature Park: Gum Grove Park buffers the Los Cerritos Wetlands and the residential neighborhood on Crestview Avenue and contains several popular walking and dog walking trails. Additionally, the park offers picnic table facilities for passive recreation activities. The Seal Beach General Plan designates this 10.5-acre park as a Special Use Park.

Windsurf Park: Windsurf Park is located south of the San Gabriel River opening and consists of 0.4-acres of passive recreational area on the beach. The park contains a grassy area with picnic table facilities and is adjacent to restaurants and other commercial structures. The Seal Beach General Plan designates this park as a Regional Beach/Park.

Other Public Recreational Facilities

Pier: The Seal Beach Pier is the second longest wooden pier in California and was built in 1906. The pier has been previously damaged over the past 100-years by storms, electrical fires and earthquakes and was rebuilt by private donations. In 2016, a fire destroyed the abandoned restaurant at the end of the pier, again requiring substantial reconstruction work. The decision was ultimately made not to rebuild commercial building space on the pier. The Seal Beach Pier is a heavily used tourist attraction, a central meeting place for community events, and a favorite local fishing spot.

Sunset Marina Park: A small portion Sunset Marina Park (formerly Sunset Aquatic Park) lies within City limits of Seal Beach and is operated by the County of Orange. The remainder of Sunset Marina Park is located within the neighboring City of Huntington Beach. The marina contains 276 boat slips, as well as dry boat storage facilities, and comprises 19.2 acres for passive recreation uses.

Limited Use Recreational Facilities

Seal Beach Naval Weapons Station – National Wildlife Refuge: The National Wildlife Refuge is open on a limited basis to American citizen visitors at no charge for certain passive recreational opportunities. Due to the sensitive nature of the habitat, along with the on-site military operations, this recreational opportunity only allows visitors during specified tour times or other volunteer opportunities. The National Wildlife Refuge is discussed further in Section 4.1, *Environmentally Sensitive Habitat Areas*.

Recreational Opportunities Policies

Policy 3.2.1-1 Protect, and where feasible, expand and enhance existing recreational uses and opportunities in the Coastal Zone, including coastal areas suited for water-oriented recreation activities that cannot readily be provided at inland water areas, as well as inland areas along the shore that are suitable for coastal recreation.

Policy 3.2.1-2 Development in areas adjacent to recreational areas shall be sited and designed to prevent impacts which would significantly degrade those areas; development shall be compatible with continued use of recreational facilities. [Coastal Act Section 30240]

Policy 3.2.1-3 Development in oceanfront land suitable for recreational use shall be protected for recreational use and development unless present and foreseeable future demand for public or commercial recreational activities that could be accommodated on the property is already adequately provided for in the area. [Coastal Act Section 30221]

Policy 3.2.1-4 The development of commercial recreational facilities (specifically those designed to enhance public opportunities for coastal recreation) shall have priority in protection over private residential, general industrial, or general commercial development, but not over agriculture or coastal-dependent industry. [Coastal Act Section 30222].

Policy 3.2.1-5 Upland areas necessary to support coastal recreational uses shall be reserved for such uses, where feasible. [Coastal Act Section 30223].

Policy 3.2.1-6 Ensure that new development has access to adequate parks and recreational facilities. Where inadequate park facilities are identified, require new development to include park and recreational facilities, to accommodate the needs of new residents introduced by the development. Correlate the amount of development with local park acquisition and development plans with the provision of onsite recreational facilities to serve the new development.

Policy 3.2.1-7 Cooperate with the California Department of Parks and Recreation, the State Department of Fish and Game, the State Coastal Conservancy, Orange County, and private organizations to protect, expand and enhance public access, recreation and visitor-serving facilities and uses to and along the shoreline and to beaches, coastal parks, and trails.

Policy 3.2.1-8 Establish a uniform coastal signage program, to provide information directing the public to coastal access points and recreational opportunities along the shoreline and wider Coastal Zone, including the wildlife refuge, parks and open spaces, beaches, coastal trails, bicycle, and other visitor-serving amenities.

Policy 3.2.1-9 Restrict development on sandy beach areas to those structures directly supportive of visitor-serving recreational uses, access uses and public safety uses, such as lifeguard towers, improved trails, recreational equipment, restrooms, and showers. Design and site such structures to minimize impacts to public coastal views and avoid adverse impacts to natural resources to the maximum extent feasible and

consistent with the coastal resource protection policies of the LCP. Development authorized on sandy beach areas shall be easily removable for dismantling and/or relocation, consistent with the hazards policies of the LCP.

3.2.2 Access for Persons with Disabilities

Seal Beach works to ensure individuals with disabilities have access to the Coastal Zone through improvements to existing public facilities during renovation or construction of new facilities. To that end, curb cuts, wheelchair ramps, and handicapped parking spaces have been provided on Main Street, Electric Avenue, Ocean Avenue and public parking lots. Wheelchairs and beach wheelchairs are available at Lifeguard Headquarters for use on the Pier and sandy beach.

Access for Persons with Disabilities Policies

Policy 3.2.2-1 Ensure that planned public facilities are designed, and include provisions, for adequate access for persons with disabilities and that existing facilities are appropriately retrofitted to include such access as required by the Americans with Disabilities Act (ADA), in a manner consistent with the protection of coastal resources.

Policy 3.2.2-2 Design guardrails on piers, trails, and other public viewing areas to take into consideration the views at the eye level of persons in wheelchairs.

Policy 3.2.2-3 Encourage the County of Orange to provide accessible facilities at County owned or maintained beaches and parks.

3.2.3 Vessel Launching, Berthing, and Storage

The City supports a limited number of vessel-related activities within the Sunset Marina Park operated by the County of Orange. No other civilian harbor or boating facilities are located within the City's jurisdiction.

Vessel Launching, Berthing, and Storage Policies

Policy 3.2.3-1 Protect, and where feasible, expand and enhance public and low-cost recreational boating uses of coastal waters, including: recreational boating facilities such as trailer launch ramps, boat hoists, commercial landing facilities, and organized recreational boating launch facilities, as well as by limiting non-water-dependent land uses that congest access corridors and preclude boating support facilities. Recreational boating facilities serving the recreational boating industries shall be protected and where feasible upgraded. Existing recreational boating marina and/or dock space shall not be reduced unless the demand for those facilities no longer exists or adequate substitute space has been provided.

Policy 3.2.3-2 Develop and implement a uniform signage program to assist the public in locating public launching facilities.

3.3 ENVIRONMENTAL JUSTICE

3.3.1 Coastal Environmental Justice

The California Coastal Commission defines environmental justice as "the fair treatment of people of all races, cultures, and incomes with respect to the development, adoption, implementation, and enforcement of environmental laws, regulations, and policies" [Government Code Section 65040.12]. This includes, but is not limited to, the following:

- The availability of a healthy environment for all people.
- The deterrence, reduction, and elimination of pollution burdens for populations and communities experiencing the adverse effects of that pollution, so that the effects of the pollution are not disproportionally borne by those populations and communities.
- Governmental entities engaging and providing technical assistance to populations and communities most impacted by pollution to promote their meaningful participation in all phases of the environmental and land use decision making process.
- At a minimum, the meaningful consideration of recommendations from populations and communities most impacted by pollution and land use decisions.

Seal Beach is home to a diverse population. CalEnviroScreen is a mapping tool that helps identify California communities that are most affected by pollution and where people are often especially vulnerable to pollution's effects. CalEnviroScreen was used to identify environmental justice indicators for census tracts within the Seal Beach Coastal Zone in Table 3-1, *Seal Beach CalEnviroScreen Profile*, below. One of the central goals of environmental justice, as defined above, is the elimination of pollution burdens that disproportionately impact populations and communities; environmental justice policies will aim to accomplish this goal.

Table 3-1, Seal Beach CalEnviroScreen Profile

CENSUS TRACT NUMBER	CalEnviroScreen 3.0 PERCENTILE	POLLUTION BURDEN PERCENTILE	POPULATION	RACE/ETHNICITY PROFILE	AGE PROFILE
6059099502	35-40%	97	598	47% White 25% Hispanic 13% African American 8% Asian American 8% Other	Elderly > 65: 2% Children < 10: 24%
6059099504	20-25%	95	2,746	82% White 9% Hispanic 6% Asian American 3% Other	Elderly > 65: 19% Children < 10: 12%
6059099506	1-5% (lowest scores)	47	1,253	84% White 9% Hispanic 4% Asian American 3% Other	Elderly > 65: 15% Children < 10: 7%
6059099511	10-15%	49	3,182	81% White 10% Hispanic 5% Asian American 3% Other	Elderly > 65: 12% Children < 10: 7%
6059099512	20-25%	67	2,868	75% White 12% Hispanic 1% African American 8% Asian American 4% Other	Elderly > 65: 15% Children < 10: 7%

Source: California Office of Environmental Health Hazard Assessment, *CalEnviroScreen 3.0 (June 2018 Update)*, https://oehha.ca.gov/calenviroscreen/report/calenviroscreen-30, accessed September 29, 2021.

Coastal Access

Environmental justice includes protecting every person's equal rights and privileges to enjoy the coastal resources of Seal Beach and to be provided equal access to the coast. Environmental Justice policies will ensure that people of all races, cultures, and incomes will have the same access to coastal resources and will not disproportionately impinge the coastal access of any racial or cultural population, or any population based on income-level. Public access policies to the coast are discussed in Section 3.1, *Public Shoreline Access*.

Participation in the Decision-Making Process

Public participation is a critical component to many projects and processes. Additionally, public participation should be encouraged from all populations of people in Seal Beach. As such, environmental justice policies should aim to promote an equal opportunity for the meaningful participation of all populations throughout the environmental and land use decision making process. Additionally, policies will prohibit any action that would impede the participation of any population based on race, culture, or income.

Environmental Justice Policies

Policy 3.3.1-1 Incorporate criteria for environmental justice issue identification, research, and analysis into the land development process for each project that includes

identifying potential environmental justice impacts and affected communities associated with a proposed project.

Policy 3.3.1-2 Monitor and implement solutions to improve pollution burdens that disproportionately affect populations of a particular race, culture, or income.

Policy 3.3.1-3 Ensure development does not contribute to pollution or environmental impacts that would disproportionately affect populations of a particular race, culture, or income.

Policy 3.3.1-4 Ensure that people of all races, cultures, and incomes have the same access to coastal resources and ensure that no development shall disproportionately impinge the coastal access of any racial or cultural population, or any population based on income-level.

Policy 3.3.1-5 Explore ways to mitigate for historical forces that excluded people of low-income or minority populations from the coast by undertaking new measures to encourage coastal access.

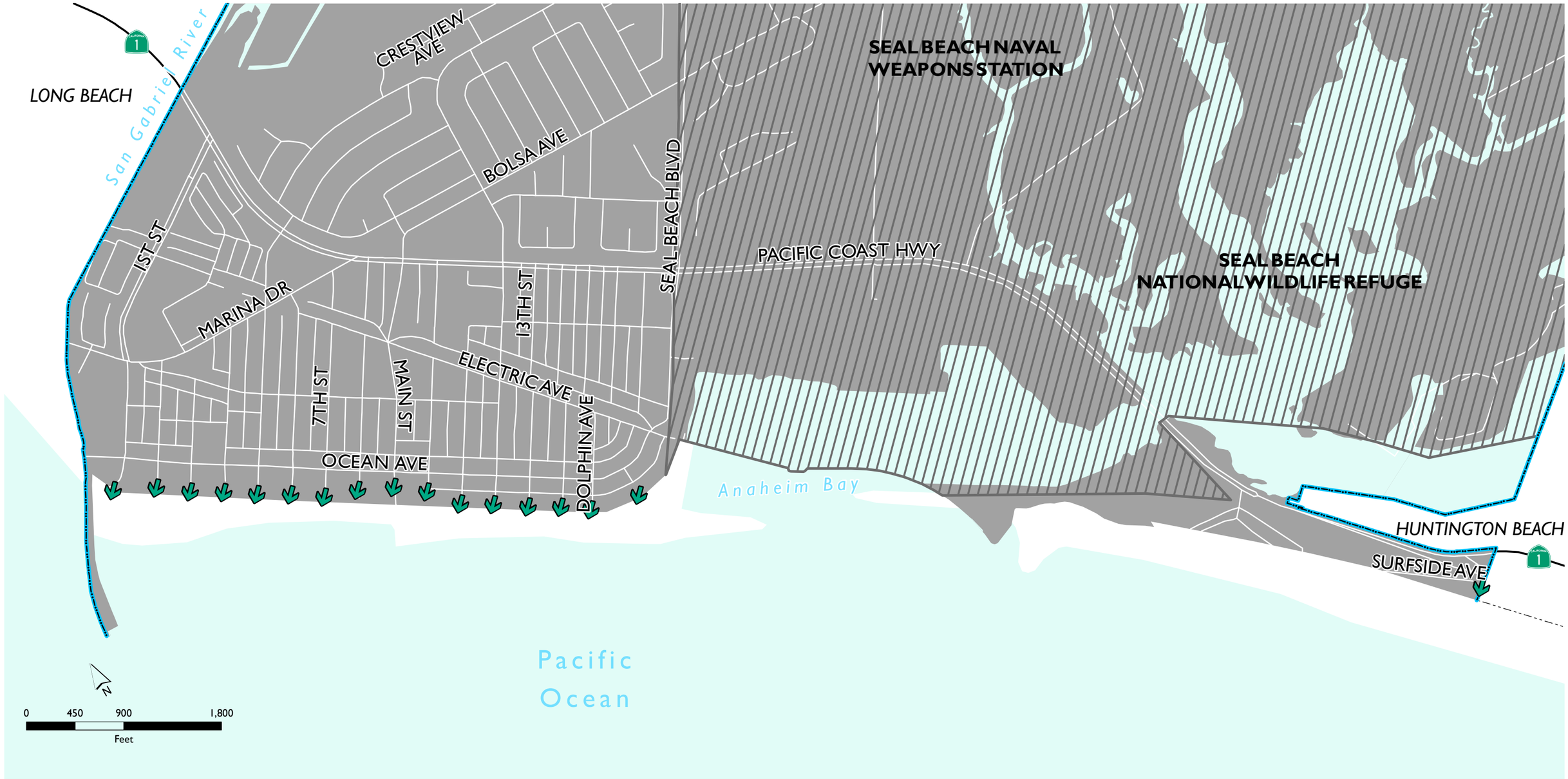
Policy 3.3.1-6 Work collaboratively with California Native American Tribes to understand the significance of environmental justice concerns and seek historical, cultural, and ecological knowledge of California's land and resources.

Policy 3.3.1.7 Work with environmental justice leaders, stakeholders and affected communities to analyze barriers to meaningful participation of all populations in the planning process and identify and implement measures to overcome those barriers.

Policy 3.3.1-8 Encourage broader participation by creating outreach materials and supporting community workshops that outline ways to participate to residents of underserved, underrepresented, minority, or low-income communities.

Policy 3.3.1-9 Evaluate impacts and ensure that no project or action would have a disproportionately high or adverse effect on low-income or minority populations, or any population of a particular race or culture, by virtue of their location.

CITY OF SEAL BEACH
LOCAL COASTAL PLAN



Source: County of Orange, California Coastal Commission, USFWS

2/3/2022 JN H:\pdata\158624\GIS\MXD\02_22\Exhibit 3.1 Pedestrian Access Points 11x17_Rotated.mxd

LEGEND

- Coastal Zone within the City of Seal Beach
- Seal Beach City Limit
- Seal Beach Naval Weapons Station (Federal Jurisdiction)
- Pedestrian Access Points

PEDESTRIAN ACCESS POINTS
EXHIBIT 3.1

CITY OF SEAL BEACH
LOCAL COASTAL PLAN

Source: County of Orange, California Coastal Commission, City of Seal Beach

2/3/2022 JN H:\pdata\158624\GIS\MXD\02_22\Exhibit 3.2 Coastal Zone Parking 11x17_portrait.mxd

LEGEND

- Coastal Zone within the City of Seal Beach
- Seal Beach City Limit
- Seal Beach Naval Weapons Station (Federal Jurisdiction)

Public Parking

- Metered Parking 1
- Metered Parking 2
- Metered Parking 3
- Metered Parking, Street
- Parking Lot 1
- Parking Lot 2
- Parking Lot 3
- Parking Lot 4
- Parking Lot 5

COASTAL ZONE PARKING
EXHIBIT 3.2

CITY OF SEAL BEACH
LOCAL COASTAL PLAN

Source: County of Orange, California Coastal Commission, City of Seal Beach

4/13/2023 JN H:\pdata\158624\GIS\MXD\02_22\Exhibit 3.3 Coastal Zone Parks and Recreation 11x17.mxd

LEGEND

- Coastal Zone within the City of Seal Beach
- Seal Beach City Limit
- City Parks

COASTAL ZONE PARKS AND RECREATION

EXHIBIT 3.3

This page is intentionally left blank.

CHAPTER 4 COASTAL ENVIRONMENTAL RESOURCES

4.1 ENVIRONMENTALLY SENSITIVE HABITAT AREAS

While the City is largely urbanized, there are two significant open space areas that are environmentally sensitive in nature – the Los Cerritos Wetlands, Hellman Ranch, and Gum Grove Nature Park area, collectively referred to here as the Hellman Ranch ESHA, and the Seal Beach National Wildlife Refuge; refer to Exhibit 4.1, *Coastal Zone ESHA*. Coastal Act Section 30240(a) requires environmentally sensitive habitat areas (ESHA) to be protected against significant disruption of habitat values. Both open space areas are described in detail, below.

Hellman Ranch and Gum Grove Nature Park

The Hellman Ranch ESHA is located north of Crestview Avenue, east of the San Gabriel river, and west of Seal Beach Boulevard. Vegetation on the site can be grouped into five plant communities: ruderal fields, pickleweed marsh, alkaline flats, eucalyptus grove, and brackish water channel. According to the Hellman Ranch Specific Plan there is approximately 27 acres of State jurisdictional wetlands and 23.2 acres of federal jurisdictional wetlands. Based on 1996 surveys, the saltwater marsh and drainage on the site are degraded and contain a low diversity of plant and wildlife species. In 1995, the site was assessed for the potential to support endangered species. Due to the degraded condition of the saltwater marsh and tidal channel, the site does not provide important habitat for federal or state listed species. The Hellman Ranch ESHA boundaries were established though Coastal Commission in Coastal Development Permit (CDP) 5-97-367 (dated 2000). This ESHA boundary is reflected in Exhibit 4.1, utilizing a digitized polygon created from documentation in CDP 5-97-367.

Gum Grove Nature Park is an urban forest and linear wilderness park consisting primarily of blue gum eucalyptus trees (nonnative). The park provides habitat for the Monarch Butterfly that uses the eucalyptus trees. Other wildlife frequently uses the park including Tiger Swallowtails, Mourning Cloaks, Red Shoulder Hawks, Black Phoebes, White Tailed Kites, doves, lizards, and frogs. The general public uses the park as a walking and hiking nature area. Gum Grove Nature Park is a central component of a wildlife corridor that connects eastward with the Seal Beach National Wildlife Refuge located on the Seal Beach Naval Weapons Station and westward with the Los Cerritos Wetlands. The majority of Gum Grove Nature Park is located within Hellman Ranch ESHA buffer zones. Small portions of the park exist within the eastern portion of mapped ESHA.

A 100-acre portion of the Hellman Ranch Specific Plan area was deed restricted for 25 years for sale at fair market value to a public agency for the purposes of wetland restoration, open space, and environmental education purposes. The adjacent oil production property (approximately 50 acres) has been similarly restricted, although the 25-year deed restricted time period does not commence until cessation of the oil production activities. Both properties are considered ESHA as part of the larger Hellman Ranch area, as shown on Exhibit 4.1.

It is noted that historically the Coastal Commission has required the maintenance of 100-foot buffers around all designated ESHA, except where buffer establishment is prevented by existing maintenance. The ESHA boundaries established by the Coastal Commission in CDP 5-97-367 generally allow for the 100-foot buffer requirement, with some exceptions as described and illustrated below.

On the southern Hellman Ranch ESHA boundary, mapped ESHA follows the property lines of single-family residences within the Hill neighborhood on the following streets: Avalon Drive, Catalina Avenue,

Surf Place and Coastline Drive. The buffer zone of 100 feet would entirely extend into the backyards and principal structures. Additionally, the 100-foot buffer zone would extend into the intersection at 1st Street and Pacific Highway. Both the Hill neighborhood and the intersection at 1st/Pacific Coast Highway were constructed and developed prior to approval of CDP 5-97-36; thus, it is acknowledged that reduced buffer zones are permissible in at these locations based on this previous Coastal Commission decision.

A reduced buffer zone is also permissible on the eastern portion of the Hellman Ranch ESHA boundary. A buffer zone of 100 feet would extend approximately 10 to 30 feet into the backyards and principal structures of seven single-family residences on Blue Heron Street. CDP 5-97-367 included the configuration for the Heron Pointe housing development and designed the residential subdivision to include the 100-foot buffer from mapped ESHA. The subdivision configuration required alterations during development, as significant cultural resources (including Native American burial sites) were discovered during the rough grading process. To accommodate protection of cultural resources on site, the lot layouts were adjusted resulting in a reduced buffer zone varying from 60 to 90 feet in width. The reduced buffer zone in this area follows the existing property boundaries on the western side of the seven single family residences.

Thus, reduced buffer zones are allowable in the specific areas within the Hill and Heron Pointe neighborhoods as discussed above as the full 100-foot buffer zone is prevented by existing development. Reduced buffer zones are illustrated in the figures below, utilizing the digitized ESHA zone mapped in CDP 5-97-367 and mapping the reduced buffer zone against existing property lines.

Figure 4.1, Heron Pointe Neighborhood Reduced EHSA Buffer

Figure 4.2, Hill Neighborhood Reduced ESHA Buffer

Seal Beach National Wildlife Refuge

The Seal Beach National Wildlife Refuge is located at the base of Anaheim Bay within the Naval Weapons Station property; refer to Exhibit 4.2, *Seal Beach National Wildlife Refuge*. The refuge contains approximately 920 acres and provides habitat for several species of fish and fowl, including several endangered species of birds. The marshlands serve as a nesting place for birds on their migrations and a spawning area for fish. The refuge contains large quantities of open space and provides variety within the predominantly urban setting. Currently, commercial agricultural activities restricted to the Seal Beach Naval Weapons Station. Approximately 2,000 acres of the base are currently used to produce staple vegetable crops, such as carrots, beets, and corn. It appears that agricultural production will continue on the base for an indefinite period of time, since it has been determined that agriculture production is a compatible secondary use for a portion of the base.

The Naval Weapons Station has developed a wildlife management program that includes the development and implementation of a wildlife management and conservation plan. The plan relies on available Navy and non-Navy resources, as well as close coordination with resources agencies and the public. This will allow seamless management across jurisdictions for the benefit of healthy and sustainable land use, habitat conservation and improvement, and the protection of populations of endangered, threatened and "management focus" species, consistent with long-term sustainability of the Base's military mission. This will be accomplished by employing an ecosystem management approach that considers the station's natural and cultural resources, surrounding community issues, current and emerging technology, and military readiness. Specific goals and objectives are established based on this ecosystem management approach that consider how the Weapons Station's natural resources fit into the larger area of regional ecosystem management. Goals and objectives are developed and improved upon by working groups comprised of a broad range of regulatory agencies, technical professionals, and local community representation.

Under the Federal Coastal Zone Management Act, all federal lands within the Coastal Zone are exempted from LCPs and local government permit authority. Projects on federal lands are required to only be consistent to the maximum extent feasible with state programs. Therefore, projects located within the Naval

Weapons Station site are not subjected to local or state coastal development requirements. The California Coastal Commission serves in an advisory and review role for projects proposed on federal lands within the Coastal Zone boundary. Federal projects within the designated coastal boundaries would require submittal of an application to the Coastal Commission for preliminary Coastal Consistency Determination on an individual project basis. However, final project approval resides solely with the U.S. Department of Navy.

The National Wildlife Refuge is acknowledged as ESHA within the Coastal Zone but owned and operated by the federal government. Similarly, the 100-foot buffer zone around the National Wildlife Refuge is also on federally owned property. As the City and Coastal Commission do not have permit authority on federally owned property, this ESHA is located within a deferred certification area. Details included above are provided for informational purposes only.

4.1.1 ESHA Considerations

The following policies provide additional direction to ensure that development in the Coastal Zone is consistent with Coastal Act requirements related to protection of natural coastal resources. The descriptions and exhibits are not intended to be an exhaustive compilation of the habitat areas within the Coastal Zone that meet the ESHA definition; therefore, requirements for conducting site-specific biological evaluations and field observations to identify ESHA and other sensitive biological resources are required to prior to project development approval.

ESHA Consideration Policies

Policy 4.1.1-1 Protect environmentally sensitive habitat areas against significant disruption of habitat values, and only uses dependent on those resources shall be allowed. Where multiple ESHA policies apply, the most protective policy for ESHA shall apply. [Coastal Act Section 30240]

Policy 4.1.1-2 Define Environmentally Sensitive Habitat Area (ESHA) as any area in which plant or animal life, or their habitats are either rare or especially valuable because of their special nature or role in an ecosystem and could be easily disturbed or degraded by human activities and developments. ESHA shall be determined by the City independently using site specific survey and analysis provided by a qualified biologist, in accordance with Policy 4.1.1-3. The findings of the staff report shall explain why the area in question rises to the level of ESHA and meets the defining characteristics of policy 4.1.1-2. Where ESHA determinations are made, the boundaries and appropriate buffers shall be delineated and adopted by the City's decision-making body.

Policy 4.1.1-3 Require a site-specific biological survey and analysis by a qualified biologist, as a filing requirement for Coastal Development Permit applications for any development proposed within existing EHSA or wetland, areas identified as ESHA in Policy 4.1.1-15. The site-specific specific biological survey shall include at a minimum the following components:

A. Analysis of available literature and biological databases to determine if any sensitive biological resources have been reported as historically occurring in the proposed development project vicinity. At a minimum,

the California Department of Fish and Wildlife's Natural Diversity Database (CNDDB) must be used to determine if the site of the proposed project is known to support or has the potential to support sensitive habitat, vegetation communities, plants, and/or animals.

B. Assessment and mapping of vegetation communities present within the proposed development project vicinity.
C. General assessment of potential federal and state jurisdictional areas, including wetlands and riparian habitats.
D. A base map that delineates topographic lines, parcel boundaries, and adjacent roads.
E. A vegetation map.
F. A description of the vegetation, including an estimate of the ground cover of the major species and a species inventory.
G. A soils map that delineates hydric and non-hydric soils, if applicable.
H. An inventory of plant and animal species, including a nesting survey and a foraging/use survey, if applicable, that indicates the potential existence of sensitive species.
I. A detailed map that shows the conclusions regarding the boundary, precise location and extent, or current status of ESHA based on substantial evidence provided in the biological study.

Policy 4.1.1-4 Require development in areas adjacent to environmentally sensitive habitat areas to be sited and designed to prevent impacts that would significantly degrade those areas; development within and adjacent to ESHA must be compatible with the continuance of those habitat and recreation areas. [Coastal Act Section 30240]

Policy 4.1.1-5 Uses in terrestrial ESHAs are limited to the following development, including routine maintenance where applicable: habitat creation, restoration, and/or enhancement activities; public accessways, permeable trails, and limited public access improvements; ESHA-related educational, interpretative and research activities, including nature studies; directional, educational, and interpretive signs to protect public safety, manage open space areas, educate, and direct public access; wildlife-safe and wildlife-permeable fences or natural barriers necessary for safety, restoration, protection of habitat, or water quality improvements provided that they are minimized to the maximum extent feasible; and mosquito abatement. These uses that are allowed in ESHA shall be designed to avoid adverse impacts to sensitive species and habitats, including, but not limited to, by minimizing light spillage, maximizing light shielding, landscaping with non-invasive, drought-tolerant plants, and utilizing construction materials that minimize bird strikes (e.g., frosted or partially frosted glass).

Policy 4.1.1-6 Maintain a 100-foot buffer around all ESHA, except in cases where establishment of a buffer is prevented by existing development. In such cases, the largest feasible buffer will be established. Reduced ESHA buffer areas mapped in Figures 4.1 and 4.2 are considered allowable, as 100-foot buffers are prevented by existing development. Wherever buffers are discussed in this Chapter, the Reduced ESHA buffers described here shall be the applicable buffer.

Buffers in other parts of the Coastal Zone less than 100 feet wide may be permitted where it can be demonstrated that (1) the maximum buffer size is infeasible due to site specific constraints; and (2) the narrower buffer would prevent impacts that would significantly degrade and/or disrupt biological integrity and habitat values of the ESHA. The required buffer areas shall be measured from the following points:

- The upland edge of a wetland.
- The outer edge of the plants that comprise a rare plant community ESHA. For annual species and perennial species that periodically lie dormant, the rare plant community ESHA shall be determined as the maximum convex polygon that connects the known current and historical locations of that species in order to capture the maximum habitat area, including dormant seed banks, bulbs, or rhizomes of rare plant species. The boundaries of rare plant communities shall include historic locations, within the past 20 years, of the subject habitat/species that are pertinent to the habitat under consideration.
- The outer edge of any habitat used by mobile or difficult to survey sensitive species (such as ground nesting habitat or rare insects, seasonal upland refuges of certain amphibians, etc.) within or adjacent to the lands under consideration based on the best available data.
- The outer drip line of trees designated ESHA.

Policy 4.1.1-7 Existing development that was legally permitted and constructed prior to certification of the LCP and is located in the required ESHA buffers areas is allowed to be maintained, repaired, or remodeled, so long as the maintenance, repair, or remodel does not increase encroachment into the ESHA or cause adverse impacts to ESHA.

Policy 4.1.1-8 Require mitigation, based on the minimum ratios specified in Policy 4.1.1-9, in the form of habitat creation or substantial restoration/enhancement for ESHA impacts that cannot be avoided through the implementation of siting and design alternatives. Priority shall be given to on-site mitigation, and off-site mitigation shall only be approved when it is not feasible to mitigate impacts on-site. Mitigation shall not substitute for implementation of a project alternative that would avoid ESHA impacts. All habitat creation and habitat restoration created through mitigation activities shall be considered and protected as ESHA, subject to the ESHA protection policies of the Local Coastal Program.

Policy 4.1.1-9 Apply the following mitigation ratios for adverse environmental impacts, defined as a change or effect brought on by an action or land use which has a negative or degrading effect on the surrounding environment, to ESHA and wetlands:

A. Terrestrial ESHA, at a minimum of 3:1 ratio.
B. Wetlands, at a minimum of 4:1 ratio.

Where a wetland is found to also be ESHA (such as a vernal pool), the greater mitigation ratio may apply. The ratios represent the acreage of area to be restored

or created, to the acreage impacted (mitigation area, impact area). The above listed ratios are the minimum mitigation required. Additional mitigation may be required for impacts found to be especially rare or sensitive but shall not exceed 8:1. Ratios included in this policy are consistent with Coastal Commission precedent.

Policy 4.1.1-10 Development that would result in adverse impacts to ESHA or wetlands and would require mitigation shall include a Mitigation and Monitoring Plan as a filing requirement for a Coastal Development Permit application. Mitigation Monitoring Plans shall include a minimum of monitoring for five years by a qualified biologist to ensure successful implementation of the mitigation activities, though additional monitoring may be required. Mid-course corrections shall be implemented if necessary to meet objectives or performance standards and may require an amended CDP.

Policy 4.1.1-11 In conjunction with new development or redevelopment, require that all identified ESHA or wetlands, ESHA buffers or wetland buffers, and all mitigation areas (on-site and off-site), be conserved/dedicated in such a manner that the land is conserved in perpetuity.

Policy 4.1.1-12 Permit the routine maintenance of drainage facilities, sedimentation basins, public infrastructure, and other related facilities, provided the maintenance is conducted in such a manner that adverse impacts are avoided to the maximum extent feasible. When adverse impacts are unavoidable, the least damaging alternative shall be pursued.

A. Channelization or other substantial alterations of streams shall be prohibited except for: (1) necessary water supply projects where no feasible alternative exists; (2) flood protection for existing development where there is no other feasible alternative, or (3) the improvement of fish and wildlife habitat. Any channelization or stream alteration permitted for one of these three purposes shall minimize impacts to coastal resources, including the depletion of groundwater, and shall include maximum feasible mitigation measures to mitigate unavoidable impacts. Bioengineering alternatives shall be preferred for flood protection or bank stabilization over "hard" solutions such as concrete or riprap channels.
B. Flood management activities, only where allowed pursuant to subsection “A” above may include desilting, obstruction clearance, minor vegetation removal, and similar flood management methods. To facilitate the continued delivery of these sediments to the littoral zone, whenever feasible, the material removed from these activities should be placed at appropriate points on the shoreline/swash zone, provided that the material is uncontaminated and appropriate for such use and in accordance with all other applicable provisions of the Local Coastal Program.

Policy 4.1.1-13 Cooperate in the identification, preservation and protection of ESHA and wetlands in the National Wildlife Refuge, in coordination with the Seal Beach Naval Weapons Station and the U.S. Fish and Wildlife Service.

Policy 4.1.1-14 The following habitat areas and types are considered ESHA, unless site specific evidence shows otherwise, and shall be protected in the City consistent with Coastal Act Section 30240 and the City's coastal resource protection policies:

- Seal Beach National Wildlife Refuge (within the Seal Beach Naval Weapons Station)
- Los Cerritos Wetlands and associated upland within the Hellman Ranch Specific Plan area
- Sand Dunes and sandy beach that provide foraging or nesting habitat for Western Snowy Plovers and Least Terns
- Freshwater/Estuarine Wetlands and Riparian Habitat
- Grassland habitats for the California Burrowing Owl

In addition, any other habitats that meet the definition of Environmentally Sensitive Habitat Areas, including habitats supporting sensitive species, shall be afforded all of the protections provided for ESHAs, whether or not they have been previously identified or mapped.

Policy 4.1.1-15 Designated buffer areas from ESHA and wetlands shall be maintained in a natural condition, except for the following potential uses:

A. Habitat restoration;
B. Bio-swales or other bioengineered water quality features;
C. Discharge of clean water;
D. Erosion control measures (e.g., energy dissipaters before water is dispersed);
E. Public access trails;
F. Repair and maintenance of existing roads, trails, and utilities;
G. Flood control or sediment management activities.

The potential uses listed above shall only be undertaken within buffer areas where it is demonstrated, as part of the Coastal Development Permit application, that:

1. No other less environmentally damaging alternative exists that would avoid the need to undertake the proposed development within a buffer area;
2. The intrusion of the development into the buffer is the minimum necessary; and
3. A qualified biologist has determined that:
   - The development will not adversely impact habitat values and that the remaining buffer will be sufficient to protect the adjacent coastal resources; and
   - The specific measures to be undertaken to mitigate the impacts of the development are sufficient to enhance the protective features of the remaining buffer area (such as, but not limited to, removal of non-native species, plantings of locally native species, removal or replacement of nearby outdoor lighting contributing to light pollution).

Policy 4.1.1-16 Illegally removed ESHA or illegally degraded ESHA shall be afforded full protection and restoration shall be required consistent with Coastal Act Section 30240 and the coastal resource protection policies of this LCP.

Policy 4.1.1-17 New development shall be sited and designed to preserve native trees and to prevent any encroachment into the Protected Zone of mature individual native trees to the maximum extent feasible. Protected Zone means that area within the dripline of the tree and extending at least 5- feet beyond the dripline, or 15-feet from the trunk of the tree, whichever is greater. If there is no feasible alternative that can prevent tree removal or encroachment, then the alternative that would result in the fewest or least significant impacts shall be selected. Adverse impacts to, and or removal of mature native trees for new development in a highly developed area shall be fully mitigated at a 1:1 ratio (unless a greater mitigation ratio is required by other regulation); removal of mature native trees in a natural habitat area shall be fully mitigated at a 2:1 ratio (unless a greater mitigation ratio is required by other regulation). Mitigation shall take place in a proximal location with priority given to on-site mitigation. Mitigation shall not substitute for implementation of a feasible project alternative that would avoid impacts to native trees or native habitat.

New development on sites containing native trees shall incorporate the following native tree protection measures:

a. Protective fencing shall be used around the outermost limits of the protected zones of the native trees within or adjacent to the construction area that may be disturbed during construction or grading activities. Before the commencement of any clearing, grading, or other construction activities, protective fencing shall be placed around each applicable tree. Fencing shall be maintained in place for the duration of all construction. No construction, grading, staging, or materials storage shall be allowed within the fenced exclusion areas, or within the protected zones of any onsite native trees.

b. Any approved development, including grading or excavation, that encroaches into the protected zone of a native tree shall be undertaken using only hand-held tools.

c. Applicants shall retain the services of a qualified independent biological consultant or arborist, approved by the City, to monitor native trees that are within or adjacent to the construction area. Public agencies may utilize their own staff who have the appropriate classification. If any breach in the protective fencing occurs, all work shall be suspended until the fence is repaired or replaced.

Policy 4.1.1-18 Nesting and Foraging Habitat. Potentially, any tree can provide important habitat which should be protected. The City shall ensure the protection of bird nesting habitat protected by the Migratory Bird Treaty Act (MBTA) and the long term protection of breeding, roosting, and nesting habitat of bird species listed pursuant to the federal or California Endangered Species Acts, California bird species of special concern, and wading birds (herons or egrets) as well as owls or raptors. The

trimming and/or removal of any trees that have been used for breeding and nesting by the above identified species within the past five (5) years, as determined by a qualified biologist or ornithologist shall be undertaken in compliance with all applicable codes and regulations of the California Department of Fish and Game, the U.S. Fish and Wildlife Service and the U.S. Migratory Bird Treaty Act, and shall be conducted under the parameters of a Tree Maintenance Program which shall be prepared and included as part of the LCP's Implementation Plan.

Policy 4.1.1-19 Tree Trimming and Removal. The City shall prepare Tree Maintenance Procedures for the trimming and/or removal of trees consistent with LCP policies above. The procedures shall include, but not be limited to, the following provisions:

a. Tree trimming, or tree removal on public property when necessary due to a health and safety danger, shall be conducted only during time periods of the year that does not disturb roosting/nesting birds (October through December). A health and safety danger shall be considered to exist if a qualified arborist determines that a tree or branch is dead, diseased, dying or injured and said tree or branch is in imminent danger of collapse or breaking away. In instances where a health and safety danger exists, and tree removal or trimming is not feasible between October and December, a qualified biologist shall conduct a nesting bird survey of the subject tree to determine if active nests are present. If an active nest is not present, removal or trimming may proceed. If an active nest is present, tree removal or trimming shall be delayed until the biologist confirms the nest is no longer active. However, if an eminent health and safety danger exists and removal or trimming is urgent, coordination with U.S. Fish and Wildlife Service regarding authorization of take of an active nest shall be obtained prior to removal or trimming. The City shall be proactive in identifying and addressing diseased, dying, or injured trees on public property as soon as possible in order to avoid habitat disturbances during the nesting season. The City shall encourage private property landowners to be proactive in identifying and addressing diseased, dying, or injured trees on private property and when new development is under review for a CDP.

b. Trees or branches with a nest of a state or federal listed species, a California bird species of special concern, or a wading bird (heron or egret) as well as owls or raptors that has been active anytime within the last five years shall not be removed or disturbed unless a health and safety danger exist.

c. Make every effort to preserve mature trees before considering tree removal. Preferred approaches, where possible, include modifying street improvements to preserve trees or using best horticultural practices such as watering and fertilizing, pest control, pruning, staking and guying. The removal of any tree or branches that fall within section(b) above, shall require mitigation at a 2:1 ratio. If the tree to be removed is non-native, replacement trees shall consist of native or non-native, non-invasive tree species. A tree replacement planting plan for each tree replacement shall be developed to specify replacement tree location, tree type, tree size (no less than 36 inch box size), planting

specifications, and a five-year monitoring program with specific performance standards.

Policy 4.1.1-20 The City shall maintain a healthy stock of park, public area and street trees and encourage the planting of trees with significant canopies that provide numerous benefits, including reduced urban heat gain, natural shading and wind screening, air filtration, and oxygen production. Encourage the planting of Native California trees where their use is aesthetically, horticulturally and ecologically appropriate. Examples of potentially appropriate species include Coast Live Oak, California Sycamore and White Alder.

Policy 4.1.1-21 The City shall evaluate species and habitat impacts and potential improvements when implementing beach maintenance activities for the purposes of avoiding adverse impacts to such species and habitat. Beach maintenance activities or grooming shall be designed to avoid impacts to any Snowy Plovers, Least Terns, Grunions, Dune habitat, or other sensitive species and habitats (including restored or enhanced habitats) present through timing of implementation, biological surveys, wildlife-friendly fencing and/or avoidance measures recommended by a qualified biologist. Disturbance activities on the beach shall be implemented in a manner to avoid the removal or disturbance of wrack to the maximum extent feasible. Wrack should not be removed seaward of the predominant wrack line or the ordinary high tide line unless debris is entangled in the wrack which poses a threat to public safety or if the wrack is found to otherwise pose an immediate threat to public health and safety.

Policy 4.1-1-22 Access to beach areas by motorized vehicles, including off-road vehicles, shall be prohibited, except for permitted beach maintenance and research or emergency response vehicles of public agencies. Emergency services shall not include routine vehicular patrolling by private security forces. All vehicular uses on beach areas shall avoid ESHAs to the maximum extent feasible.

Policy 4.1.1-23 Prohibit the placement of walls, fences, decks, patio furniture, and other encroachments onto the public beach to avoid visual degradation, a perception of a private beach, and potential negative impacts on ESHA that may be present on the beach.

Policy 4.1.1-24 Ensure diking, filling, or dredging of open coastal waters, wetlands, estuaries, and other aquatic resources, are permitted in accordance with Coastal Act Section 30233.

Policy 4.1.1-25 The City will map newly discovered ESHA within the coastal zone through an LCP Amendment.

4.2 SCENIC AND VISUAL RESOURCES

Scenic resources include the public viewpoints and viewing areas from which coastal scenic vistas can be observed. Generally speaking, Seal Beach is defined by relatively flat topography, and does not feature cliffs, bluffs, or canyons. Thus, coastal, riverfront or other natural feature views can primarily be accessed

at coastal access points (refer to Exhibit 3.1) or City parks and open space (refer to Exhibit 2.6). In addition, the visual features of the Municipal Pier are also considered scenic resources.

Coastal or riverfront views from local roadways such as Ocean Avenue, Seal Beach Boulevard, or 1st Street tend to be constrained due to existing development. Pacific Coast Highway is set back from the coastline in the Main Street/Downtown Seal Beach neighborhood and does not offer views. Pacific Coast Highway right of way within the Naval Weapons Station Seal Beach does offer coastal, bay and wetland views; however, this highway is located within a deferred certification program area. Land uses on Naval Weapons Station Seal Beach are strictly within the purview of the federal government, and the City does not have permitting or land use decision-making authority on federal property.

Identification of such scenic resources above does not preclude the evaluation of additional, unidentified scenic and visual resources during the Coastal Development Permit application filing process.

4.2.1 Coastal Views

Topographically, the Seal Beach Coastal Zone is relatively flat. The Coastal Zone does not feature cliffs, bluffs, or canyons. Ocean views are provided from the beaches, streets that parallel the coastline (Ocean Avenue, Pacific Coast Highway, and First Street), and the pier. The City will continue to prioritize the protection of public coastal views

Coastal View Policies

Policy 4.2.1-1 Protect, and where feasible, enhance the scenic and visual qualities of the Coastal Zone, including public views to and along the coast, beaches, municipal pier, and San Gabriel River. Designated public viewsheds within the City are listed as follows:

- San Gabriel River Bike Trail, Rivers End Park, and Ocean Place/1st Street Park
- Seal Beach Municipal Pier and Eisenhower Park
- Anaheim Landing Historical Landmark at Seal Beach Boulevard

Policy 4.2.1-2 Require development to be sited and designed in such a manner that: (1) protects the designated public viewshed from a substantial obstruction; (2) minimizes alteration of natural landforms; (3) maintains visual compatibility with the character of surrounding areas; and, (4) where feasible, restores and enhances visual quality. Where protection of visual character and aesthetic resources is not feasible, impacts should be mitigated. [Coastal Act Section 30251]

Policy 4.2.1-3 Design and maintain median and sidewalk landscape improvements in the public right of way so as not to block public coastal views at maturity.

Policy 4.2.1-4 Provide public trails, recreation areas, and viewing areas adjacent to public coastal view corridors, where feasible.

Policy 4.2.1-5 New development and redevelopment shall be sited and designed to avoid adverse impacts to designated public viewsheds of scenic and visual resources to the maximum extent feasible. The feasible alternative with the least significant impact to public visual resources shall be required if no feasible alternative can avoid

adverse impacts. Development and redevelopment should consider the aesthetics and bulk of the existing neighborhood and shall not expand beyond the character of the community. Protection of private views is excluded from this policy.

Policy 4.2.1-6 Landscape design shall protect or enhance scenic and visual resources while ensuring protection of public access and coastal resources.

4.2.2 Bulk and Height Limitations

Within the Coastal Zone, the height limitation for most land use designations is between 25 – 35 feet, with the exception of light manufacturing in the northwest portion of the Coastal Zone; refer to Table 4-1, below. Bulk limitations are outlined in Table 2-1, based on zoning designation. Height and bulk limits will continue to be regulated to ensure the provisions of the Coastal Act are incorporated.

Table 4-1, Seal Beach Zoning Height Limitations

ZONING DESIGNATION	HEIGHT LIMITATION
Residential	
Residential Low Density - 9	25 feet
Residential Low Density - 15	25 feet
Residential High Density – 20	25 feet
Residential High Density – 33	35 feet
Commercial	
Service Commercial	35 feet
General Commercial	35 feet
Main Street Specific Plan	25 feet
Mixed Use	
Limited Commercial/Residential Medium Density	35 feet
Industrial	
Light Manufacturing	35 – 75 feet

Bulk and Height Limitation Policies

Policy 4.2.2-1 Regulate the visual and physical mass of structures to be compatible with the unique character and visual scale of Seal Beach.

4.2.3 Signs and Utilities

The City municipal code incorporates sign regulations that pertain to the Coastal Zone. These sign regulations include limitations on free-standing and roof signs, which have the greatest potential to impact coastal scenic and visual resources. The City does not allow new billboard signs within the community. In some older neighborhoods, electrical, telephone, cable television, and other utility lines are located aboveground. The City requires utilities to be placed underground in all new developments and has ongoing programs to remove and underground overhead utilities. This requirement is to maintain coastal visual resources and to promote safety.

Signs and Utilities Policies

Policy 4.2.3-1 Design and site signs and utilities within the Coastal Zone to avoid adverse impacts to scenic and visual resources to the maximum extent feasible. Where such impacts cannot be avoided, they shall be minimized to the maximum extent feasible.

Policy 4.2.3-2 Prohibit billboards and other large, intrusive signs within the Coastal Zone. Encourage signage, infrastructure and utilities that do not block or detract from views of scenic vistas. Placement of permanent signs other than coastal access signs, traffic or public safety signs, utilities, or other accessory equipment that degrades views to the ocean, beaches, parks, or other scenic areas, from public viewing areas and scenic roads shall be prohibited.

Policy 4.2.3-3 Require new development to underground utilities and encourage the removal of existing overhead utilities.

4.3 WATER QUALITY

Seal Beach's greatest resources is the coastline, a pre-eminent factor in the community's founding and development. The coast continues to provide the community with employment, recreation, natural habitat, and a beautiful physical setting. Seal Beach has traditionally cared greatly about the water quality offshore and has embarked on a number of programs to improve water quality. General water quality, Total Maximum Daily Load (TMDL), National Pollutant Discharge Elimination System (NPDES), and sanitary sewer system policies are outlined below.

4.3.1 General Water Quality

As the City of Seal Beach is located within a developed urban area, water quality and marine resources are impacted by pollutants associated with urban land uses. Runoff is the main source of pollutants discharged into the ocean, including both stormwater runoff and dry weather urban runoff. Potential pollutants include fertilizers, pesticides, hydrocarbons, grease/oil, plastics, and other garbage. The San Gabriel River is a major source of water quality degradation in Seal Beach and brings a substantial amount of trash to the Coastal Zone after heavy rains. The San Gabriel River and associated tributaries travel through urban environments within San Bernardino, Los Angeles, and Orange Counties. Upper reaches of the river, although undeveloped, are subjected to heavy recreational use and are also impacted by trash and other debris. As the San Gabriel River flows 58 miles before discharging into the Pacific Ocean in Seal Beach, there are many threats to water quality degradation prior to arriving in Seal Beach.

General Water Quality Policies

Policy 4.3.1-1 Maintain, enhance, and where feasible, restore the quality and biological productivity of coastal waters and marine resources to implement Coastal Act policies. [Consistent with Coastal Act Section 30230 and 30231]

Policy 4.3.1-2 Protection against spills of crude oil, gas, petroleum products, or hazardous substances shall be provided in relation to any development or transportation of such materials. Effective containment and cleanup facilities and procedures shall be provided for accidental spills that do occur. [Coastal Act Section 30232]

4.3.2 Other Water Quality Initiatives

This section outlines other water quality initiatives undertaken by the City of Seal Beach, tailored to specific issues focused within the City and the City's Coastal Zone. Seal Beach receives urban runoff from the San Gabriel River Watershed, which encompasses nearly 690 square miles with headwaters in the San Gabriel Mountains and discharging into the Pacific Ocean at Seal Beach and Long Beach. With the rapid development and urbanization of the San Gabriel Watershed, pollution enters the San Gabriel River at several points.

In 1972, the U.S. Congress passed the Federal Water Pollution Control Act known as the Clean Water Act (CWA). Federal regulations require that a Total Maximum Daily Load (TMDL) is established for each CWA listed water body for each of the pollutants causing impairment. The TMDL is the total amount of the pollutant that can be discharged while water quality standards in the receiving waters are attained. According to the US EPA, the San Gabriel River is listed as impaired and was assessed in 2010, with the following pollution categories were identified: acidity; bacteria and other microbes; dioxins; low oxygen; and metals. Several TMDLs are in place to limit pollution for the San Gabriel River, and the City continues to implement applicable standards.

Other Water Quality Initiatives Policies

Policy 4.3.2-1	Cooperate with all applicable federal, state, and local regulatory agencies to preserve, enhance, restore, and monitor water resources and provide infrastructure improvements as needed.
Policy 4.3.2-2	Continue to implement the Total Maximum Daily Load (TMDLs) established by the State Water Resources Control Board or the Santa Ana Regional Water Quality Control Board for impaired water bodies.
Policy 4.3.2-3	Seek to secure federal and state funding where available for water quality programs within the Coastal Zone.
Policy 4.3.2-4	Support and participate in watershed-based runoff reduction and other planning efforts with the Regional Water Quality Control Board, County of Orange, and upstream cities.
Policy 4.3.2-5	Enforce the Seal Beach Water Management Plan consistent with the Local Coastal Program and the MS4 Permit and update the Management Plan as required. If water quality protection requirements are imposed by other agencies in addition to those in the LCP, the requirements most protective of coastal resources shall be followed.
Policy 4.3.2-6	Continue to implement and improve upon Best Management Practices (BMPs) for residences, businesses, new development, significant redevelopment, and City operations.
Policy 4.3.2-7	Continue implementation of the Sewer System Master Plan and enforcement of Chapter 9.25, Fats, Oils and Grease Management and Discharge Control.

Policy 4.3.2-8 Comply with all of the Regional Water Quality Control Board's Waste Discharge Requirements (WDRs) associated with the operation and maintenance of a sewage collection system.

Policy 4.3.2-9 Renovate older sewer pump stations as necessary and install new plumbing according to the most recent standards.

Policy 4.3.2-10 Encourage residential and commercial trash reduction programs and public beach clean ups, to reduce litter and debris on sandy beaches.

Policy 4.3.2-11 Educate the public regarding water quality issues and concerns, through outreach activities, pamphlets and storm drain inlet stenciling.

Policy 4.3.2-12 In addition to adhering to the Industrial Development Policies of this LCP, ensure that oil extraction, production, refinement, and related development including drilling and transportation via pipeline, outline specific measures via a Water Quality Management Plan to protect water resources within the City, including the San Gabriel River. Additionally, consider any proposed oil extraction, production, refinement, or related development within the Coastal Zone to be a development of water quality concern and adhere to the policies identified in Section 4.3.3 and 4.3.4 of this LCP.

4.3.3 Water Quality Requirements for Development

The City operates a municipal separate storm sewer system (MS4), permitted by the Regional Water Quality Control Board under the National Pollutant Discharge Elimination System (NPDES). The City's MS4 permit is extensive in its obligation to keep waterways clean by reducing or eliminating contaminants from storm water and dry weather runoff. Any discharge of water/wastewater into waters of the United States must be regulated under NPDES permits. In order to ensure compliance with NPDES requirements, the City enforces regulations as part of the Municipal Code in Title 9: Public Property, Public Works, and Building Regulations including: Storm Water Management; Fats, Oil and Grease Management and Discharge Control; Sewerage; and Water. The City also conducts extensive public education outreach efforts regarding the requirements of the NPDES permit with the general public, building contractors, and specialized services and business operations that are subject to the NPDES permit requirements.

Water Quality Requirements for Development Policies

Policy 4.3.3-1 Site, design, and manage development to minimize adverse post-development changes in the site's stormwater runoff flow regime (i.e., volume, rate, timing, and duration), to preserve, or where feasible, restore natural hydrologic conditions (such as downstream erosion rate, sedimentation rate, surface water flows, and groundwater recharge function).

Policy 4.3.3-2 Give precedence to a Low Impact Development (LID) approach to stormwater management in all development, to replicate the site's pre-development hydrologic balance through infiltration, evapotranspiration, harvesting for later on-site use, detention, or retention of stormwater close to the source. LID emphasizes preventive Site Design strategies such as minimizing impervious surface area, supplemented with small-scale, distributed Best Management Practices (BMPs), including bioretention facilities or rain gardens, grass swales and channels,

vegetated rooftops, rain barrels, cisterns, vegetated filter strips and permeable pavements.

Policy 4.3.3-3 Site, design, and manage development to minimize the transport of pollutants in runoff from the development into coastal waters, as well as the generation and impacts of dry weather runoff.

Policy 4.3.3-4 To the maximum extent practicable, runoff shall be retained on-site to prevent the transport of pollutants (such as bacteria, pesticides, fertilizers, pet waste, oil, engine coolant, gasoline, hydrocarbons, brake dust, and tire residue) into coastal waters, and to minimize post-development changes in the runoff flow regime (i.e., volume, rate, timing, and duration) that may adversely impact coastal resources.

Policy 4.3.3-5 Site, design, and manage development where appropriate and feasible, to maintain or enhance on-site infiltration of runoff, to reduce runoff and recharge groundwater.

Policy 4.3.3-6 Site, design, and manage development where appropriate and feasible, to preserve or enhance non-invasive vegetation to achieve water quality benefits such as transpiration, interception of rainfall, pollutant uptake, shading of waterways to maintain water temperature, and erosion control.

Policy 4.3.3-7 In areas in or adjacent to an Environmentally Sensitive Habitat Area (ESHA), site, design, and manage development to protect the ESHA from any significant disruption of habitat values resulting from the discharge of stormwater or dry weather runoff flows.

Policy 4.3.3-8 Where feasible, avoid construction of new stormwater outfalls, and direct stormwater to existing facilities with appropriate treatment. Where new stormwater outfalls cannot be avoided, site, design, and manage outfalls to minimize adverse impacts to coastal resources from outfall discharges.

Policy 4.3.3-9 Minimize water quality impacts during construction by minimizing erosion, the discharge of sediment and other pollutants, stormwater and non-stormwater runoff, land disturbance, and soil compaction.

Policy 4.3.3-10 Develop and maintain a water quality checklist to be used in the permit review process to assess potential water quality impacts.

Policy 4.3.3-11 Applications for new development or redevelopment requiring a Coastal Development Permit with potential impacts to water quality shall include a Water Quality Management Plan (WQMP) that describes the runoff management Site Design strategies, pollutant Source Control BMPs, and if needed, Treatment Control BMPs that will be implemented to protect coastal resources throughout the life of the development. Additionally, proposed development and redevelopment required to submit a WQMP shall comply with Chapter 9.20 of the Municipal Code and the Orange County Drainage Area Management Plan (DAMP). Include Site Design strategies and Source Control BMPs in all developments. When the combination of Site Design strategies and Source Control BMPs are not sufficient

to protect water quality as required by the LCP or Coastal Act, structural Treatment Control shall also be implemented.

Policy 4.3.3-12 Development shall address runoff management early in site design planning and alternatives analysis and shall implement appropriate and feasible Site Design strategies to minimize adverse post-development changes in the runoff flow regime, control pollutant sources, and, where necessary, remove pollutants. Examples of Site Design strategies include minimizing the footprint of impervious pavement; installing a permeable pavement system; directing runoff from impervious pavement into distributed permeable areas such as turf, recreational areas, medians, parking islands, and planter boxes; minimizing unnecessary soil compaction; minimizing removal of natural non-invasive vegetation; and protecting hydrologic features that provide stormwater infiltration, treatment, storage, or conveyance.

Policy 4.3.3-13 Development shall implement appropriate and feasible long-term, post-development pollutant Source Control BMPs to minimize the transport of pollutants in runoff from the development. Source Control BMPs are structural features or operational practices that control pollutant sources and keep pollutants segregated from runoff. Examples of Source Control BMPs include covering outdoor storage areas; using efficient irrigation; proper application and clean-up of potentially harmful chemicals and fertilizers; and proper disposal of waste.

Policy 4.3.3-14 Development shall implement a structural Treatment Control BMP (or suite of BMPs) to remove pollutants of concern as necessary to protect coastal water quality as required by the LCP or Coastal Act. Treatment Control BMPs are structural systems designed to remove pollutants from runoff by processes such as gravity settling of particulate pollutants, filtration, biological uptake, media adsorption, or other physical, biological, or chemical process. Examples include vegetated swales, detention basins, and storm drain inlet filters.

Policy 4.3.3-15 Require structural BMPs to be inspected, cleaned, and repaired as necessary to ensure their proper function for the life of the development. Condition Coastal Development Permits to require ongoing operation, application, and maintenance of BMPs as long as is necessary for effective operation of all BMPs (including Site Design, Source Control, Treatment Control and Runoff Hydromodification Control BMPs).

Policy 4.3.3-16 Provide storm drain stenciling and signage for new storm drain construction, to discourage dumping into drains.

Policy 4.3.3-17 Site, design, and manage development to protect and, where feasible, restore hydrologic features such as stream corridors, drainage swales, topographical depressions, groundwater recharge areas, floodplains, and wetlands.

Policy 4.3.3-18 Site and design development to minimize the installation of impervious surfaces, especially impervious areas directly connected to the storm drain system, and, where feasible, increase the area of pervious surfaces in redevelopment, in order to reduce runoff.

4.3.4 Requirements for Developments of Water Quality Concern

The Seal Beach Public Works Division provides sewage collection service to approximately 5,000 customers in the northeast and southwest portions of the City and Sunset Aquatic Park, including the following areas: College Park East and the Old Ranch Golf Course/Shopping Center; Old Town/Bridgeport neighborhoods; and the entirety of Planning Area 2 (Marina Hill, Hellman Ranch, and the Boeing Integrated Defense System). The existing wastewater system consists of approximately 181,000 feet of gravity sewers, 780 manholes, and six sewer pumps and force mains. The City does not maintain sewers serving the Naval Weapons Station but accepts some flows at Pump Station No. 35. The remainder of the City is served by either the Orange County Sanitation District (Leisure World), Rossmoor/Los Alamitos Area Sewer District (College Park West), or Sunset Beach Sanitary District (Surfside Community).

Until 1972, Seal Beach treated and disposed of sewage through a local wastewater treatment plant; in 1972, the plant was demolished and routed waste to be treated and disposed by the Orange County Sanitation District.

Various "hot spots" in the wastewater collection system exist throughout the City. The Municipal Code regulates disposal of grease from commercial food preparation facilities, to prevent blockages in the sewer system. A regular inspection program with commercial food preparation facilities ensure NPDES requirements are met. Additionally, Seal Beach's flat topography creates a velocity deficiency, where lines have inadequate slopes. This deficiency requires continual maintenance/cleaning to flush out excess materials and further prevent blockages.

Due to the age of the Seal Beach sewage system, retrofits and improvements are required to keep the system operational. The City's Public Works Department follows an adopted Sewer System Master Plan to implement capital improvement projects to replace or reline sewer lines and pump facilities. The Public Works Department also utilizes remote cameras in sewer lines to identify pipe cracks, root intrusion, and grease buildup to prioritize the line replacement program. The Master Plan identifies needed improvements to the various pump stations, including spill warning systems.

Public education plays an important role in maintaining the sewage system and preventing sanitary sewer overflows. The City should encourage public awareness methods to protect overall water quality goals.

Developments of Water Quality Concern Policies

Policy 4.3.4-1 Certain categories of development have a greater potential for adverse impacts to water quality and hydrology due to the extent of impervious surface area, type of land use, and/or proximity to coastal waters. These categories of Developments of Water Quality Concern shall be identified in the LCP. All applications for a Coastal Development Permit for a Development of Water Quality Concern shall comply with the policies in this section. The applicant shall submit a Water Quality Management Plan (WQMP) prepared by a qualified licensed professional. The WQMP shall include a characterization of the potential pollutants and a hydrologic characterization of runoff flows resulting from the proposed development, specify the BMPs that will be implemented to minimize post-construction water quality and hydrologic impacts, and document the expected effectiveness of the proposed BMPs.

(a) Size LID, Treatment Control, and Runoff Hydromodification Control BMPs to infiltrate, retain, or treat, at a minimum, the runoff produced by the 85th percentile 24-hour storm event for volume-based BMPs, or two times the 85th percentile 1-hour storm event for flow-based BMPs.

(b) Use an LID approach to stormwater management that gives priority to preventive Site Design strategies to minimize post-development changes in the site's stormwater flow regime, supplemented by structural BMPs to retain on-site (by means of infiltration, evapotranspiration, or harvesting for later on-site use), at a minimum, the runoff produced by the 85th percentile 24-hour design storm, to the extent appropriate and feasible.

(c) Conduct an alternatives analysis to demonstrate that there are no appropriate and feasible alternative project designs that would substantially improve on-site runoff retention, if a proposed development will not retain on-site the runoff produced by the 85th percentile 24-hour design storm using a LID approach.

(d) Use a Treatment Control BMP (or suite of BMPs) to remove pollutants of concern from any portion of the runoff produced by the 85th percentile 24-hour design storm that will not be retained on-site, or if additional pollutant removal is necessary to protect coastal waters.

(e) If a proposed development will add a net total of more than 15,000 ft^2 of impervious surface area, and any portion of the runoff produced by the 85th percentile 24-hour design storm will not be retained on-site, use a structural Runoff Hydromodification Control BMP to minimize adverse post-development changes in the runoff flow regime.

4.4 PALEONTOLOGICAL, ARCHAEOLOGICAL, AND HISTORICAL RESOURCES

The Seal Beach Coastal Zone contains valuable cultural resources, that demand conservation and protection. Paleontological resources are any fossilized remains, traces, or imprints of organisms, preserved in Earth's crust that provide information about the history of life. Archeological resources are defined as the material remains of the prehistorical or historical human activity. Prehistoric sites date from the time of early human occupation to the arrival of Juan Cabrillo in 1542. Historic sites postdate Cabrillo, and include the periods of Spanish, Mexican, and American settlement. The paleontological, archeological, and historical resources in Seal Beach are outlined in the sections below.

4.4.1 Paleontological and Archeological Resources

Paleontological Resources

For the majority of the geologic history (beginning 175 to 145 million years ago) Orange County was underwater. The oldest rocks in Orange County are located in the central Santa Ana Mountains and contain fossils such as radiolarians, ammonites, and bivalves. During the Miocene Epoch (26 to 7 million years ago), tectonic forces produced mountain uplifts, initiated movement on the nascent San Andres fault system, and formed numerous coastal basins, including the Los Angeles Basin. Orange County became a shallow

bay as the sea retreated, and landforms developed into jungles and savannas. Miocene fossils are from marine and land organisms.

Tectonic forces began to uplift the land during the Pliocene (7 to 2.5 million years ago). The sea receded from the coast and continued to regress during the cooler Pleistocene (2.5 million to 15,000 years ago). Although the Pleistocene was known as the Ice Age, glacial ice never reached Southern California. A heavily vegetated, marshy area extended inland, and a variety of vertebrate animals lived in the area.

Archeological Resources

The first generally accepted period of human occupation of Southern California began around the end of the Pleistocene Epoch, about 10,000 to 12,000 years ago. Archeological sites in Seal Beach indicate that a highly mobile tribe seasonally migrated to the area to collect a variety of plant resources. Later inhabitants became more sedentary, hunting sea mammals, terrestrial mammals, fish, birds, and shellfish. A Gabrielino coastal village was located around the former Anaheim Landing area, and the Juaneño tribe was known to frequent the Seal Beach area. Identified archeological resources within the Coastal Zone are primarily located within the Naval Weapons Station/National Wildlife Refuge, Hellman Ranch property, and potentially within the Boeing Business Park.

Paleontological and Archeological Resource Policies

Policy 4.4.1-1 Require all new development and redevelopment to protect and preserve paleontological and archeological resources from destruction and avoid adverse impacts to such resources. If there is no feasible alternative that eliminates all impacts to these resources, then the alternative that would result in the fewest or least significant impacts to archeological and/or paleontological resources shall be selected. Preservation in-situ is the preferred alternative. Where development would adversely impact archaeological or paleontological resources, reasonable mitigation measures shall be required.

Policy 4.4.1-2 Notify appropriate Native American tribal representatives of proposed developments (in accordance with AB 52) that have the potential to adversely impact cultural resources as early in the development review process as practical, preferably during the environmental review process. When impacts to archeological or paleontological resources cannot be avoided, mitigation shall be required that includes procedures for monitoring grading and handling fossil discoveries that may occur during development. Monitoring procedures should be conducted onsite by a professional archeological monitor. For development sites identified as having potentially adverse impacts to cultural or tribal resources, a certified Native American Tribal monitor shall be given the opportunity to monitor the grading and excavation process.

Policy 4.4.1-3 Evaluate development proposals for potential significant impacts to paleontological and archaeological resources, including human remains, within the Coastal Zone. For projects with potential paleontological and archaeological resources, require a professional archeologist to submit an Archeological Research Plan determining if significant resources are present and/or if significant impacts would occur. Additionally, a monitoring plan shall be required identifying methods

and procedures if archaeological and/or paleontological resources are encountered. Procedures may include, but are not limited to:

- Provisions for grading and construction cessation in the vicinity of the discovery;
- Provisions for a significance determination of the discovery; and,
- Monitoring requirements by a qualified archeologist/paleontologist and a Native American monitor from each tribe with documented ties to the area.

If these resources are determined to be impacted, require submittal of a mitigation plan. Mitigation measures considered may range from in-situ preservation to recovery and ceremonial reburial. Mitigation plans shall include a good faith effort to avoid impacts to archeological and/or paleontological resources through methods such as, but not limited to, project redesign, in-situ preservation/capping, and placing archeological and/or paleontological resource areas in open space.

Policy 4.4.1-4 Provide for the deposit of valuable paleontological and archeological resources with responsible public or private institutions, where in-situ preservation or reburial is determined not feasible or undesired by the Most Likely Descendant. Archeological materials, where possible, shall be provided to the Most Likely Descendant, in accordance with federal and state law.

Policy 4.4.1-5 The unauthorized collection of archaeological or paleontological resources is prohibited.

4.4.2 Historical Resources

Seal Beach has a number of buildings and sites in the Coastal Zone that are representative of the community history. Two of these resources have been recognized as being of statewide or national importance.

- Anaheim Landing: Anaheim Landing was an early port facility used in the late 1800s to early 1900s by Anaheim farmers to ship produce and livestock. Anaheim Landing has been designated by the State as a California Historical Landmark.
- Old City Hall: The former City Hall was established in 1929 and is located along Eighth Street. This building is listed on the National Register of Historic Places.

The City does not maintain a local listing of properties with historical or architectural significance.

Historical Resource Policies

Policy 4.4.2-1 Identify, designate, and protect sites and buildings of historic importance within the Coastal Zone.

Policy 4.4.2-2 Identify funding programs to assist private and public property owners in the preservation of buildings and sites of historic importance within the Coastal Zone and consider adaptive reuse incentives in the Implementation Plan.

Policy 4.4.2-3 Evaluate development proposals for potential significant impacts to historic resources within the Coastal Zone pursuant to the California Environmental Quality Act. For structures with potentially historic significance, require a study

conducted by an architectural historian to determine the actual significance and potential impacts.

4.5 ENVIRONMENTAL REVIEW

The protection of coastal resources and protection from coastal hazards requires that applications for new development undergo appropriate environmental review. In most cases, the City conducts this review through implementation of the California Environmental Quality Act (CEQA).

CEQA requires the state to review the environmental impacts of the projects that require state or local government approval. CEQA requires appropriate mitigation of projects that could result in significant environmental impacts. Specifically, CEQA states that agencies must identify potential environmental impacts, alter projects to avoid significant impacts where feasible, seek alternatives that will minimize unavoidable impacts, and require mitigation for any unavoidable impacts. It is mandated that responsible agencies consider a range of project alternatives that offer environmental advantages over the project proposal. CEQA adds that the agency responsible for the project's approval must deny approval if there would be significant adverse effects when feasible alternatives or mitigation measures could substantially lessen such efforts.

Applications for new development and redevelopment will be reviewed by qualified City staff and/or contracted employees to ensure consistency with the LCP.

4.5.1 Environmental Review Considerations

Environmental Review Policies

Policy 4.5.1-1 New development and redevelopment in the Coastal Zone shall be reviewed for consistency with the Local Coastal Program. New development and redevelopment shall also be subject to the California Environmental Quality Act (CEQA) review in accordance with the principles, objectives, and criteria contained in CEQA, the State CEQA Guidelines, the Local Coastal Program, and any environmental review guidelines adopted by the City and certified through an LCP Amendment. Policies 1.1.1-2 and 1.1.1-3 provide guidance on LCP implementation in the Coastal Zone where the application or interpretation of these reviews has the potential to conflict.

Policy 4.5.1-2 Require a qualified City staff member, advisory committee designated by the City, or consultant approved by and under the supervision of the City, to review all environmental review documents submitted as part of an application for new development or redevelopment and provide recommendations to the appropriate decision-making official or body before issuing any discretionary use permit, including Coastal Development Permits.

Policy 4.5.1-3 Require the City staff member(s) and/or contracted employee(s) responsible for reviewing site specific surveys and analyses to be a qualified professional and have technical expertise as appropriate for the resource issues of concern (e.g., biological resources, marine/coastal habitats, wetland/riparian protection and restoration, upland habitats and wildlife connectivity, cultural resources, geological conditions, etc.) and be knowledgeable about the City of Seal Beach.

Policy 4.5.1-4 Where development or redevelopment is proposed within or adjacent to ESHA, wetlands or other sensitive resources, require the City staff member(s) and/or contracted employee(s) to consider the individual and cumulative impacts of the proposed development on ESHA and other coastal resources, define the least environmentally damaging alternative, and recommend modifications or alternatives to avoid adverse impacts to ESHA, wetlands or other sensitive resources. The reviewing City staff member or contracted employee shall only recommend mitigation measures to ESHA, wetlands or other sensitive resources where avoidance is infeasible, consistent with the coastal resource protection policies of the LCP. The City may impose a fee on applicants to recover the costs associated with the technical review of a proposed project when required by this policy.

Policy 4.5.1-5 Where development or redevelopment is proposed within or adjacent to ESHA, wetlands or other sensitive resources, require the City staff member(s) and/or contracted consultant(s) to include the following in any recommendations of approval: an identification of all adverse impacts to ESHA, wetlands, or other sensitive resources, the preferred project alternative, required modifications, and mitigation measures necessary to ensure conformance with the LCP. The decision-making body (Director of Development Services, Planning Commission, or City Council) shall make findings relative to the project's conformance to the recommendations of the City staff member(s) and/or contracted consultant(s) reviewing the project.

Policy 4.5.1-6 Coordinate with the California Department of Fish and Game, the U.S. Fish and Wildlife Service, the National Marine Fisheries Service, and other resource management agencies, as applicable, in the review of development proposals and CDP applications in order to ensure that impacts to ESHA and marine resources, including rare, threatened, or endangered species, are avoided, or minimized where impacts are unavoidable, such that ESHA is not significantly degraded, habitat values are not significantly disrupted, and the biological productivity and quality of coastal waters is preserved, and where feasible enhanced, consistent with the coastal resource protection policies of the LCP.

Policy 4.5.1-7 Require applications for new development and redevelopment, where applicable, to include a geologic/soils/geotechnical study that identifies any geologic hazards affecting the proposed project site, any necessary mitigation measures to avoid or minimize identified hazards where feasible, and analysis determining whether the project site is suitable for the proposed development, including whether the development will be safe from geologic and coastal hazard for its anticipated economic lifespan. Reports are to be signed by an appropriately licensed professional and subject to review and approval by qualified city staff member(s) and/or contracted consultant(s).

CITY OF SEAL BEACH
LOCAL COASTAL PLAN

Source: County of Orange, California Coastal Commission, USFWS

2/3/2022 JN H:\pdata\158624\GIS\MXD\02_22\Exhibit 4.1 Coastal Zone ESHA 11x17.mxd

LEGEND

- Coastal Zone within the City of Seal Beach
- Seal Beach City Limit
- ESHA

COASTAL ZONE ESHA

EXHIBIT 4.1

CITY OF SEAL BEACH
LOCAL COASTAL PLAN

Source: County of Orange, California Coastal Commission, USFWS

11/25/2019 JN: H:\pdata\158624\GIS\MXD\10_19\Exhibit 4.2 Seal Beach National Wildlife Refuge 11x17.mxd

LEGEND

- Coastal Zone within the City of Seal Beach
- Seal Beach City Limit
- Seal Beach Naval Weapons Station
- Seal Beach National Wildlife Refuge

SEAL BEACH NATIONAL WILDLIFE REFUGE
EXHIBIT 4.2

CHAPTER 5 COASTAL HAZARDS

5.1 SEA LEVEL RISE

5.1.1 Sea Level Rise Hazards

Sea level rise is the raising elevation of the ocean surface caused by Earth's changing climate. The increase in global temperatures is causing glaciers to melt, and the melted water eventually reaches the ocean. Additionally, warmer temperatures also cause water to expand in volume, which further exacerbates sea level rise. Sea level rise is a global issue but affects various jurisdictions differently due to variations in topography and geography. Sea level rise models are created based on the best scientific understanding of these processes on global and local scales and therefore, are dynamic and periodically updated to reflect these changes. At the state level, the Coastal Commission recommends using the best available science to predict sea level rise, which is expected to be updated every five years. Refer to Appendix A, *City of Seal Beach Sea Level Rise Vulnerability Assessment*, for further details.

Sea Level Rise Adaptation

Sea level rise adaptation involves taking appropriate actions to prevent or minimize adverse effects of sea level rise. Four categories are used to describe adaptation measures: do nothing, protect, accommodate, and retreat. The categories are outlined in Table 5.1, below.

Table 5-1, Adaptation Strategy Categories

STRATEGY	DESCRIPTION
Do Nothing	The "Do Nothing" strategy is also known as a non-intervention approach to sea level rise adaptation, thus requiring emergency response to episodic storm events and sea level rise impacts. Attempts to maintain the status quo often fail to anticipate, prevent, or mitigate the long-term consequences of sea level rise. This approach may result in significant financial costs, as well as adverse impacts to coastal resources, development, and the City's economy.
Protect	The Protection strategy employs an engineered structure or measure to defend or "floodproof" development and other coastal resources. Protection strategies can be further divided into "hard" and "soft" defensive measures. Hard strategies include seawalls or revetments, and soft strategies include beach nourishment or sand dunes. Protection strategies are generally most effective at mitigating periodic hazards or to reinforce specific points of vulnerability to prevent flooding. Given these limitations, protective structures alone are unlikely to form an effective long-term adaptation strategy for all vulnerable areas. Protection strategies may be employed as a potential first step to address current and near-term risk while long-term adaptation measures are developed and implemented.
Accommodate	Accommodation strategies employ methods that modify existing or design new developments or infrastructure that decreases hazard risks and increases resiliency. Strategies based on structural modifications include elevation, flood retrofit and flood resistant materials. Strategies based on design include potential relocation, redesign, or setbacks. Effective implementation can occur on an individual basis or on a community-wide scale through specific land-use designations, zoning ordinances, or other measures.
Retreat	Retreat strategies relocate or remove existing development out of hazard areas and limit the construction of new development in vulnerable areas.

For the purposes of this LCP, no individual adaptation strategy or category is considered to be a categorical "best" option for sea level rise planning within the Seal Beach Coastal Zone. A variety of adaptation strategies will be necessary to account for the different hazard vulnerabilities and coastal resources present

within the City. Additionally, adaptation strategies will require adjustment over time as relative effectiveness changes.

Sea Level Rise Hazards Policies

Policy 5.1.1-1 Incorporate the City of Seal Beach Sea Level Rise Vulnerability Assessment as Appendix A of this Local Coastal Program. The Vulnerability Assessment shall be updated every ten years, or sooner if needed to address significant coastal resource impacts, changing hazard conditions, or updates to the best available science. All updates to the Vulnerability Assessment shall utilize the best available science and state guidance applicable at the time of the update. An LCP update will also be initiated if warranted.

Policy 5.1.1-2 Continue to monitor sea level rise and related coastal hazards, in both the short-term and long-term, to address adverse impacts to the shoreline. The City sea level rise hazard monitoring program will incorporate the following metrics:

- **Regional and Local Sea Level**: tracking hazards not tied to storm events, such as king tides. Utilize regional trends via National Oceanic and Atmospheric Administration (NOAA) tide stations.
- **Storm Impact Frequency and Magnitude:** tracking incidents such as wave runup. Impact reports should include date, location, hazard description, and observable changes to infrastructure. Once collected, information can be associated with storm data (water levels, wind speed, wind direction, wave period, and wave height).
- **Condition of Shoreline Protection**: ongoing documentation of the condition of current and future shoreline protection. Beach width should be considered as an indicator when additional adaptation measures require implementation. Results should be summarized and published on a regular cycle and after significant storm events or major adaptation efforts are implemented.

Policy 5.1.1-3 Encourage on-going coordination with neighboring jurisdictions and local, state, and federal agencies, and foster a collaborative approach to sea level rise and coastal hazard adaptation. Encourage multi-jurisdictional funding opportunities where appreciate.

Policy 5.1.1-4 Development shall be sited and designed to avoid hazards associated with projected sea level rise over the anticipated duration of the proposed development, considering the best available science. If complete avoidance is infeasible, the project shall be sited and designed to minimize hazards to the extent feasible; mitigation may include increasing the elevation of the structure and floodproofing. Project applications shall be assessed for vulnerability including but not limited to, tidal action, waves, storm surge, and erosion, considering sea level rise. If a project is determined to be vulnerable to coastal hazards, require an adaptation strategy that ensures the safety and stability of the structure and does not exclusively rely on hard armoring shoreline protective devices.

When establishing safety, new development and redevelopment shall not rely on existing shoreline protective devices that substantially alter natural landforms or otherwise harm coastal resources in a manner inconsistent with LCP policies or Coastal Act public access policies, and not contribute significantly to erosion, geologic instability, or destruction of the site or surrounding area.

Policy 5.1.1-5 For projects located within a coastal hazard area (i.e., where mapped coastal hazards in the most current Vulnerability Assessment overlap with the proposed project site) within the anticipated lifespan of development, applicants must submit a site-specific analysis of coastal hazards and sea level rise within a technical report outlining the impacts to the project for various potential sea level rise scenarios. The purpose of the site-specific analysis technical report is to demonstrate site stability, structural integrity, and resiliency within the development lifetime. Best available scientific information regarding sea level rise projections shall be used in the preparation of findings and recommendations for all geologic, geotechnical, hydrologic, coastal hazards, and engineering investigations. Temporary structures are specifically exempt from this requirement, and do not need to submit a technical report.

Policy 5.1.1-6 Soft or natural shoreline protection methods, such as beach nourishment, dune restoration, living shorelines, horizontal levees, and other natural alternatives shall be prioritized instead of hard shoreline protective devices, if feasible. Non-structural shoreline protection options, prior to issuing permits, shall be prioritized. Non-structural shoreline protection options may include soft protection (beach nourishment, landscape improvements, etc.) or temporary protection such as sandbags.

Policy 5.1.1-7 Build community awareness about sea level rise and future vulnerabilities.

Policy 5.1.1-8 Encourage dialogue with other local cities and agencies to explore opportunities for funding and mutually beneficial techniques for coastal protection.

Policy 5.1.1-9 For properties shown to potentially be at risk to sea level rise hazards by the Vulnerability Assessment (Appendix A), assumptions of risk shall be recorded through a real estate disclosure statement on the property deed. Disclosure statements will ensure that any future property owners are noticed of potential sea level rise hazards, and the disclosure runs with the land. Terms and conditions of any applicable Coastal Development Permits shall also be disclosed in real estate transactions.

Policy 5.1.1-10 Shoreline protective devices shall only be authorized and permitted for allowable principal structures or critical infrastructure. If the principal structure or critical infrastructure is no longer present or no longer requires armoring, the shoreline protective device shall be removed. If a principal structure or critical infrastructure is redeveloped, the shoreline protective device must also be re-evaluated for authorization and permitting purposes.

Policy 5.1.1-11 Impacts associated with permitted shoreline protective devices (revetments, breakwaters, groins, harbor channels, seawalls, retaining walls, and other

construction that alters natural shoreline processes) must be mitigated. Unavoidable coastal resource impacts could include impacts to beach area, recreation, biological resources, visual resources, archeological resources, and public trust resources. Mitigation should be proportional to impacts of the shoreline protective device. Periodic mitigation monitoring shall also be required.

Policy 5.1.1-12 The anticipated lifespan of development in the Coastal Zone is determined for the purpose of identifying the appropriate sea level rise scenario to evaluate. Each type of development is generally defined by the following timeframes listed in Table 5-2 unless a project-specific analysis determines otherwise. The anticipated lifespan of development is not an entitlement to retain the structure, nor does it guarantee safety over the period.

Table 5-2, Estimated Development Lifespan

Structure Type	Estimated Lifespan
Temporary structures, movable or expendable construction	5 years
Ancillary development or amenity structures	25 years
Residential or commercial structures	75 – 100 years
Critical infrastructure	25 – 100 years

Policy 5.1.1-13 Based on the anticipated lifespan of development and level of risk assumed in Table 5-3, the following sea level rise scenarios and projections shall be utilized for the site-specific sea level rise vulnerability analysis. Refer to Appendix A, *City of Seal Beach Sea Level Rise Vulnerability Assessment*. Projections outlined below are based on the best available scientific data and in accordance with the California Coastal Commission Sea Level Rise Policy Guidance.

Table 5-3, Sea Level Rise Projections Based on Development Lifetime

Sea Level Rise Projection	Estimated Time Range (Low Risk Aversion 17% probability)	Estimated Time Range (Medium-High Risk Aversion, 0.5% probability)
1.6 ft/50 cm	2080	2060
3.3 ft/100 cm	2100+	2070
4.9 ft/150 cm	2100+	2080 – 2090
6.6 ft/200 cm	2100+	2100

5.1.2 Sea Level Rise Adaptation Considerations

Changing coastal hazards due to sea level rise can be addressed through adaptation measures and considerations. Adaptation measures will ultimately depend on the severity and timing of sea level rise impacts, as well as resources available for implementation. Future implementation of any adaptation measure should be based on project-specific evaluations that account for the feasibility and impacts of proposed alternatives, any prior or planed adaptation actions, and any updates to sea level rise science or projections.

Table 5-4, Adaptation Measures and Triggers

	Seal Beach Main Beach/Old Town		Surfside Community		Inland Low-Lying Areas	
SLR Scenario	**Adaptation Trigger**	**Adaptation Measures**	**Adaptation Trigger**	**Adaptation Measures**	**Adaptation Trigger**	**Adaptation Measures**
0 ft	• N/A	• Evaluate flood protection capacity of East San Gabriel River level in the Windsurf Park area. • Develop a beach width monitoring program • Explore regional sediment management opportunities	• N/A	• Develop beach width monitoring program. • Continue winter berm construction along open coast. • Conduct supplementary hazard analyses that account for an eroded shoreline at the end of each nourishment cycle. • Coordinate with USACE to explore options for more regular nourishment to mitigate SLR impacts.	• N/A	• Evaluate the hydraulic connectivity of the San Gabriel River and Anaheim Bay to verify critical connections to City development and interior flood patterns shown in CoSMoS model results. • Explore opportunities for drainage improvements in low-lying areas exposed to flooding.
1.6 ft	• Loss of sandy beach width at south of the pier • Storm flooding in Windsurf park, Municipal Pier	• Enhance sediment management practices to maintain sandy beach width south of the pier • Distribute floodproofing information to waterfront residents and businesses • Implement floodproofing measures in Windsurf Park • Implement floodproofing at Municipal Pier facilities and encourage implementation in south of the pier residential area.	• Reduction in beach width along open coast. • Inundation of habitat along interior shoreline.	• Support increased nourishment as feasible to maintain beach width along open coast shoreline. • Support nature-based protection approaches along interior shorelines. • Structural accommodation through floodproofing.	• Storm flooding along low-lying portion of Electric Avenue. • Inundation of wetland habitat within Seal Beach National Wildlife Refuge.	• Increase flood protection capacity of San Gabriel River and Anaheim Bay levees surrounding Electric Avenue. • Support thin-layer placement programs within Seal Beach National Wildlife Refuge as feasible. • Implement drainage infrastructure improvements along the low-lying portion of Electric Avenue.
3.3 ft	• Non-storm flooding in Windsurf Park, north of the pier. • Loss of beach width necessary for seasonal berm construction at south of the pier	• Increase flood protection capacity of East Gabriel River levee in Windsurf Park area • Implement nature based measures to increase elevation at far western portion of West Beach as necessary • Maintain beach width south of the pier through enhanced sediment management augmented with additional nourishment as is feasible • Utilize deployable flood barriers along south of the pier during extreme storm events • Improve flood storage and conveyance within south of the pier residential area	• Storm flooding from interior shoreline in limited areas. • Extended periods of minimal beach width.	• Utilize deployable flood barriers to prevent flooding from interior areas. • Implement nature-based shoreline stabilization measures along open coast. • Structural accommodation through elevation.	• Storm flooding within Los Cerritos Wetlands, Leisure World. • Storm flooding west of Kitts Highway.	• Increase flood protection capacity of San Gabriel River levee in vicinity of Los Cerritos Wetlands. • Implement nature-based flood protection strategies within critical areas bordering the Los Cerritos Wetlands and Seal Beach Boulevard. • Implement structural interior flood barriers at critical areas bordering the Los Cerritos Wetlands and Seal Beach Boulevard.
4.9 ft	• Minimal each width fronting Pier facilities at north of the pier • Increased frequency and extent of storm flooding at south of the pier	• Implement nature-based shoreline protection measures across West Beach • Employ a combination of permanent and temporary flood barriers within the south of the pier residential area	• Widespread storm flooding from interior shoreline.	• Implement combination of permanent and temporary flood barriers along interior areas. • Support improvement of hard interior shoreline protection infrastructure.	• Hazard conditions outside previous design standards.	• Evaluate and adjust previously implemented adaptation strategies as appropriate.
6.6 ft	• Complete loss of beach area at south of the pier • Non-storm flooding of residential area south of the pier or Pier facilities	• Implement hard shoreline protection in critical areas of south of the pier Beach • Elevate coastal recreation and access facilities serving the Municipal Pier • Elevate residential area along south of the pier	• Extended periods of complete beach loss.	• Implement hard shoreline protection infrastructure as necessary to prevent loss of structures along open coast.	• Hazard conditions outside previous design standards.	• Evaluate and adjust previously implemented adaptation strategies as appropriate.
1. Measures listed for each progressive sea level rise scenario may be necessary only if previously implemented measures become insufficient based on performance and hazard monitoring						

Sea Level Rise Adaptation Considerations Policies

Policy 5.1.2-1 Development in hazardous areas shall acknowledge that the development may need to be removed and the site restored in the future if: any government agency with relevant authority and jurisdiction has not overturned through any appeal or writ proceedings, determining that the structures are currently and permanently unsafe for occupancy or use due to damage or destruction from waves, flooding, erosion, bluff retreat, landslides, or other hazards related to coastal processes, and that there are no feasible measures that could make the structures suitable for habitation or use without the use of bluff or shoreline protective devices; essential services to the site can no longer feasibly be maintained (e.g., utilities, roads); removal is required pursuant to LCP policies for sea level rise adaptation planning; or the development requires new and/or augmented shoreline protective devices that conflict with LCP or relevant Coastal Act policies. These acknowledgements shall be recorded on a document that runs with the land so that potential future property owners are aware of the restrictions.

Policy 5.1.2-2 Proposed development may be required to waive rights to future shoreline protection as a condition of approval. If applicable, the waiver should be recorded on a document that runs with the land, such as a deed restriction, so that future owners of the property are aware of the restriction.

Policy 5.1.2-3 The City shall explore the feasibility of adaptation measures in areas vulnerable to sea level rise, as listed in Table 5-4, *Adaptation Measures and Triggers*. Potential mechanisms may include but are not limited to:

- Enhanced sediment management;
- Nature-based shoreline protection, living shorelines, dune restoration;
- Nature based interior flood protection (Los Cerritos Wetlands, Seal Beach National Wildlife Refuge)
- Structural accommodations, floodproofing retrofits, and facility elevation;
- Deployable barriers for use during storm surges;
- Interior drainage improvements

Policy 5.1.2-4 The City shall consult with the California Department of Transportation to protect access through the Seal Beach Coastal Zone and minimize impacts of sea level rise. Consultation shall include identifying areas at risk of regular or periodic inundation, and coordination on mutually beneficial adaptation measures as required.

Policy 5.1.2-5 Investigate grant funding opportunities to address sea level rise and coastal resiliency infrastructure improvements through federal agencies (such as the Federal Emergency Management Agency and the National Oceanic and Atmospheric Administration), state agencies (the California Coastal Commission, California Governor's Office of Emergency Services, Ocean Protection Council, and the California Coastal Conservancy), or other nonprofit/private entities.

Policy 5.1.2-6 Prioritize adaptation measures and projects that improve public beach access, walkability, and recreational opportunities for both residents and visitors.

5.2 OTHER COASTAL HAZARDS

The Seal Beach Coastal Zone faces a myriad of hazards outside of sea level rise including: flood, tsunami, storm surge, seiche, rogue waves, erosion, geologic/seismic, and fire. Some of these hazards are interrelated with sea level rise and will be exacerbated as a result of climate change as a whole. Hazards outside of sea level rise are discussed below, including applicable policies.

5.2.1 Floods

The majority of storm systems that pass over Seal Beach occur during the winter months, primarily December to March. Storms often bring strong winds and heavy rainfall, and occasionally lightning or hail. A meteorological phenomenon called an "atmospheric river" is the driving power behind storms that lead to coastal flooding. An atmospheric river is a path of moist air traveling from one global region to another and are responsible for nearly half of all precipitation in California. Additionally, the El Niño Southern Oscillation also causes coastal flooding and storms in Seal Beach. El Niño is a natural cycle of winds and fluctuating ocean temperatures in southeastern tropical areas of the Pacific Ocean that influences weather patterns across the globe. El Niño consists of three phases: a warm phase, neutral phase, and cool phase. The warm phase tends to increase precipitation in southern California, which leads to coastal flooding in Seal Beach.

Coastal flooding caused by storms most recently impacted Seal Beach during the winter of 2016 – 2017. Multiple strong storms overwhelmed the City's pumps in Old Town, and the strong storms uprooted trees and caused power outages in town. Other severe winter storms occurred during the winter of 2022-23, which led to significant damage to the Pier, some flooding in Surfside and City beach parking lots, as well as uprooted trees. In December 2010, storms caused significant erosion in Main Beach, and Fall 2004, causing flooding three feet deep at homes near Anaheim Landing. Powerful El Niño storms in 1982 – 1983 caused substantial flooding in Seal Beach along with major damage to the Seal Beach municipal pier. Storms and coastal flooding are anticipated to continue affecting the Seal Beach Coastal Zone into the future, and climate change will likely enhance the intensity of storms and flooding. Refer to Exhibit 5.1, *Flood Hazards* for flood hazard zones within the Seal Beach Coastal Zone.

Flood Policies

Policy 5.2.1-1 Pursue a regional approach to watershed management, particularly in regard to the San Gabriel River, and coordinate improvements within the Coastal Zone with local, state, federal and community-based organizations, and agencies, including all jurisdictions located upstream on the San Gabriel River.

Policy 5.2.1-2 Practice preventative maintenance within the Coastal Zone, including storm tracking and proactive street and storm drain maintenance.

Policy 5.2.1-3 Utilize the most recent Flood Insurance Rate Maps in the implementation and enforcement of the City's "Floodplain Overlay District" requirements.

Policy 5.2.1-4 Ensure stormwater flows within the Coastal Zone are contained, controlled, and discharged in an appropriate manner.

5.2.2 Tsunamis, Seiche, Storm Surge, Rogue Waves

Tsunamis

A tsunami is a series of waves generated by the displacement of a large volume of water, usually caused by seismic activity. In the open ocean, a tsunami travels 500 to 600 miles per hour, but is only a few feet in height and usually undetectable by ships. Once the wave nears the shore, the shallow depth pushes against the motion of the wave, causing it to decelerate and increase in height. When the tsunami makes landfall, the wave can violently disperse inland, causing immense damage and risk of injury or death. Most tsunamis consist of multiple waves of varying height. The tsunami inundation zone in the Coastal Zone is located within the Old Town/Main Beach and the Naval Weapons Station facility; refer to Exhibit 5.2, *Maximum Tsunami Projected Run-Up*.

The City has not suffered direct damage from tsunamis in the past, but they have affected the Coastal Zone in Seal Beach. Tsunamis made landfall as a result of the 2015 Chile earthquake, 2011 Tōhoku earthquake in Japan, 2004 Indian Ocean earthquake, 1964 Alaskan earthquake, and 1960 Chile earthquake. While the City has not suffered direct damage from tsunamis, past events from the above listed earthquakes have caused damage elsewhere in California. The historical tsunami record suggests the tsunami hazard in the southern California region, from the Palos Verdes Peninsula south to San Diego, is moderate. There are several active faults immediately offshore of the Southern California area, any of which could generate an earthquake that triggers a tsunami. Additionally, submarine landslides and landslide-susceptible areas have been mapped offshore, that also have the potential to trigger a tsunami. Near-shore tsunamis should be considered worst-case scenarios with the potential to cause high runups with shorter warning periods.

Seiche

A seiche is defined as a standing wave oscillation in an enclosed or semi-enclosed, shallow to moderately shallow water body or basin, such as lake, reservoir, bay, or harbor. Seiches continue in a pendulum fashion after the cessation of the originating force, which can be tidal action, wind action, or a seismic event. Seiches are often described by the period of the waves (how quickly the waves repeat themselves), since the period will often determine whether adjoining structures will be damaged. The period of a seiche varies depending on the dimensions of the basin. Whether the earthquake will create seiches depends upon a number of earthquake-specific parameters, including the earthquake location (a distant earthquake is more likely to generate a seiche than a local earthquake), the style of fault rupture (e.g., dip-slip or strike-slip) and the configuration (length, width, and depth) of the basin.

Storm Surge

A storm surge is an abnormal rise in sea water level associated with hurricanes or other storms over the open ocean. Surges result from strong on-shore winds and/or low-pressure cells associated with ocean storms. Water level is controlled by wind, atmospheric pressure, existing astronomical tie, waves, and swell, local coastal topography and bathymetry, and the storm's proximity to the coast. Destruction by storm surge is attributable to:

- Direct impact of waves on fixed structures. This tends to cause most of the damage.
- Wave impact and the physical shock on objects associated with the passing of the wave front.
- Indirect impacts such as flooding or undermining of major infrastructure.

Low-lying areas experience the highest risk during storm surge, often compounded with intense rainfall and strong winds. Storm surges during high tide events can cause flooding to be significant. In an ongoing effort to reduce risk from storm surges, the City has undertaken beach nourishment projects and constructed seasonal sand berms to protect inland property.

Rogue Waves

Rogue waves (also called extreme storm waves) are unusually large waves that arise in the open ocean, and often come unexpectedly from directions other than prevailing wind and waves. Rogue waves are rare and unpredictable but appear suddenly and may impact with tremendous force. The generating mechanism for rogue waves is unknown, but theories include:

- Strong currents that interact with existing swells, making the swells much higher;
- A statistical aberration that occurs when a number of waves just happen to be in the same place at the same time, combining to create one large wave; or,
- The result of a storm in the ocean where the wind causes the water surface to be rough and choppy, creating large waves.

Rogue waves are unpredictable, and therefore nearly impossible to plan for. Sand replenishment minimizes and repairs the damaging effects of tsunamis and rogue waves. The City maintains programs and budgets to accomplish this objective, including a continuing redistribution program during the winter months to provide protection and a five-year replenishment program.

Tsunamis, Seiche, Storm Surge, and Rogue Wave Policies

Policy 5.2.2-1	Review and adopt tsunami inundation maps for the City of Seal Beach and adjacent coastal communities as applicable maps are developed.
Policy 5.2.2-2	Review and periodically update tsunami preparation and response policies and practices to be consistent with current inundation maps and design standards.
Policy 5.2.2-3	Maintain wide sandy beaches through sand replenishment programs to provide critical protection against tsunami, storm surge and rogue waves.
Policy 5.2.2-4	Provide tsunami educational programs and information for residents, employees, and visitors within susceptible areas.
Policy 5.2.2-5	Require overnight visitor-serving facilities in susceptible areas to provide tsunami information and evacuation plans.
Policy 5.2.2-6	Support regional efforts for tsunami education and detection/early warning systems.
Policy 5.2.2-7	Utilize and permit temporary sand berms in shoreline areas to protect buildings and infrastructure from wave runup, while minimizing the impacts to coastal access and resources.

5.2.3 Coastal Erosion

Coastal erosion is the gradual or sudden removal of sand and beaches by wind, rain, high surf, tides, and other events. Buildings and facilities situated on beaches with poor drainage can lead to runoff or ponding, that also may exacerbate erosion. Overtime, erosion makes sandy beaches narrower, which reduces capacity

for recreational uses and restricts coastal access. Erosion is episodic, site-specific, and directly related to wave climate and rainfall.

Erosion is also highly impacted by coastal armoring and the alteration of littoral sediment transfer through structures such as groins and jetties. Specifically, the littoral process within the Seal Beach Coastal Zone is heavily influenced by the groins, jetties, and the Seal Beach Municipal Pier. The combination of large jetty structures at the mouth of the San Gabriel River and the western boarder of Anaheim Bay isolates Seal Beach from common upcoast and downcoast sand transport patterns, creating a pocket beach along the waterfront. The natural primary source of sediment is the San Gabriel River, which has shown a decrease in sediment supply as development increased in the region. Downcast sand transport along the Seal Beach waterfront is limited by the Long Beach offshore breakwater and San Gabriel River jetties, as these structures shelter the Coastal Zone from westerly wave action. Upcoast sand transport is increased by the Anaheim Bay west jetty, due to the reflection of wave energy. This combination of restricted sand supply, reduced downcoast transport, and increased upcoast transport creates localized erosion in the vicinity of 13th Street and Dolphin Street, where wave action is amplified. The concrete sheet pile groin along the Seal Beach Municipal Pier was originally constructed in 1959 to offset this erosion. It is estimated that 1.75 to 3.25 feet of sandy beach is lost on an annual basis as a result of transport over the Municipal Pier groin and offshore over the Anaheim Bay west jetty.

A sand management program is conducted along the shoreline to address chronic beach loss and reduce the potential for flood damage due to strong winter storm events or large tropical swell events in the summer. Sediment management activities include backpassing, berm building and nourishment, dating back to the 1950s.

Backpassing refers to the movement of sediment from a downdrift location to an updrift location. Seal Beach is unique, as longshore sediment transport occurs south to north (as opposed the more common pattern of north to south). Thus, the City backpasses sediment from north of the municipal pier to the south of the municipal pier on an annual basis, to construct the winter berm. The berm is typically constructed in October and removed before May, located approximately 100 feet seaward of residential development along the boardwalk. The berm crest elevation ranges from 20 to 23 feet in height, and 12 feet in width. This strategy has generally been effective in the past, although there are historical instances when the berm is overtopped or flanked by large waves during high tides.

Past nourishment events are sporadic and are generally supplied by dredge material from nearby projects, offshore sources, or inland sources on an opportunistic basis. The placement of nourished material typically occurs along the southern beach portion to widen the berm and provide a larger buffer.

The Surfside neighborhood has suffered considerably from erosion and requires regular sand nourishment programs to maintain sandy beaches. As the community is located downcoast of a littoral barrier formed by the Anaheim Bay jetties, the sandy beach is cut off from the natural sediment supply from beaches and rivers upcoast. The US Army Corps of Engineers (Corps) began regular beach nourishment cycles at Surfside-Sunset Beach in 1964 as mitigation for the downcoast shoreline impacts of the Anaheim Bay jetties and to provide a feeder beach for the 13 miles of downdrift shoreline. Over 17 million cubic yards of sand has been placed since 1964. Recent nourishments typically occur every 5 – 7 years. Downcoast sand transport is also exacerbated by wave energy reflected off the East Jetty resulting in an erosion signature. The highest risk of coastal flooding occurs at the end of each nourishment cycle due to the reduced beach width fronting the west end of the Surfside community.

Coastal Erosion Policies

Policy 5.2.3-1 Monitor beach widths and elevations annually.

Policy 5.2.3-2 Maintain and enforce protection measures that address runoff control, erosion, control of access and site planning for new development and major remodels.

Policy 5.2.3-3 Require drought-resistant vegetation with deep root systems where appropriate within new development projects, to reduce erosion and minimize irrigation water loss.

Policy 5.2.3-4 Permit structural shoreline protection methods (such as revetments, breakwaters, groins, harbor channels, seawalls, retaining walls and similar) that alter natural shoreline processes when required to serve coastal-dependent uses or protect existing structures or public beaches in danger from erosion, and when designed to eliminate or mitigate adverse impacts on local shoreline sand supply, and when no waiver of future shoreline protective devices applies to the property. [Coastal Act Section 30235]

Policy 5.2.3-5 Design and site protective devices or structures, where feasible, to minimize impacts to coastal resources, minimize alteration of natural shoreline processes, provide for coastal access, minimize visual impacts, and eliminate or mitigate adverse impacts on local shoreline sand supply. Place protective devices or structures in the most landward feasible alignment. Encourage the use of alternative shoreline erosion prevention such as sand nourishment, berm restoration and siting and design of new development.

Policy 5.2.3-6 Limit the use of protective devices to the minimum extent required to protect existing development and avoid their use to enlarge or expand areas for new development. "Existing development" for purposes of this policy shall consist only of a principal structure - e.g., residential building, required garage, or second residential unit - and shall not include accessory or ancillary structures such as decks, patios, pools, tennis courts, cabanas, stairs, or landscaping.

Policy 5.2.3-7 Prohibit the use of shoreline protective devices to protect newly authorized development and redevelopment. As a condition of approval of such development, applicants may also be required waive any rights to construct such devices that may exist under applicable law. Waivers to construct future shoreline protective devices must be recorded on the property deed and disclosed during future real estate transactions.

Policy 5.2.3-8 Incorporate best management practices for all beach nourishment projects, including but not limited to: measures to protect water quality; minimize and mitigate potential adverse biological resource impacts from deposition of material; sand compatibility specifications; restrictions on volume of deposition, timing, or seasonal strictions; and identification of environmentally preferred locations for deposits.

5.2.4 Geologic and Seismic Hazards

The US Geological Survey (USGS) defines an earthquake as a sudden slip on a fault line and the resulting ground shaking and radiated seismic energy caused by the slip (or any other sudden stress changes in the earth). Faults are fractures along the earth's crust between two blocks of earth, and can be defined as a strike slip, normal, or thrust faults. Fault ruptures can cause a physical displacement of land at the surface, which can be dangerous for people in the vicinity. Fault movement can occur rapidly, in the form of an earthquake, or may occur slowly, in the form of creep. Seismic shaking is the shaking of the ground when seismic energy from an earthquake reaches the surface of the earth, and can damage or completely destroy buildings, structures, and pieces of infrastructure.

Two fault lines pass through Seal Beach, the Reservoir Hill fault, and the Seal Beach fault line, as part of the regional Newport-Inglewood Fault system. The most recent significant rupture of this fault (the 1933 Long Beach earthquake) did not cause any surface rupture. Any seismic shaking from local or regional faults will likely affect Seal Beach. Past examples of regional earthquake seismic shaking include the 1994 Northridge earthquake and the 1987 Whittier Narrows earthquake. Recently, minor shaking was experienced during the July 2019 Ridgecrest earthquakes. Although these historical earthquakes caused extensive regional damage, none of them caused substantive damage in Seal Beach in recent history. Shake potentials are depicted in Exhibit 5.3, *Shake Potential*.

Along with seismic shaking, the majority of Seal Beach is at risk of liquefaction; refer to Exhibit 5.4, *Liquefaction Hazards*. Liquefaction is the result of seismic energy released into water-saturated soil or into loosely-packed geologic material such as sand or silt. When seismic ground shaking occurs, the underlying soils behave like liquids and lose integrity, damaging structures or harming people in the zones of liquefaction. Due to the presence of coastal water features (including wetlands), the majority of the Seal Beach Coastal Zone is at risk of liquefaction.

Geologic and Seismic Hazard Policies

Policy 5.2.4-1 Prohibit development and redevelopment projects within the Coastal Zone that would cause hazardous geologic conditions or would expose existing developments to unacceptable risk levels, as determined by a geotechnical report required under Policy 5.2.4-2, until contributing factors are mitigated. New development and redevelopment shall assure stability and structural integrity, and neither create nor contribute significantly to erosion, geologic instability, or destruction of the site or surrounding area or in any way require the construction of protective devices that would substantially alter natural landforms.

Policy 5.2.4-2 Require development and redevelopment projects in areas of known or potential geologic or seismic hazards as defined by the Alquist-Priolo Earthquake Fault Zoning Act to include a geotechnical report prepared by a licensed engineer or geologist that describes known and potential geologic, seismic, and other related hazards, as well as potential mitigation measures, as part of the Coastal Development Permit process. Reports will be independently reviewed, as appropriate.

Policy 5.2.4-3 Ensure critical facilities are located outside of geologic hazard zones when feasible unless there is no feasible alternative and such hazards are adequately mitigated, consistent with the coastal resource protection policies of the LCP.

Policy 5.2.4-4 Determine liquefaction potential prior to development and redevelopment activities within the Coastal Zone, and ensure mitigation is incorporated to reduce adverse impacts and resulting damage during an earthquake, consistent with Policy 5.2.4-1.

Policy 5.2.4-5 Implement the most recent California Building Standards code to ensure structures are constructed, redeveloped, or remodeled in compliance with the most up-to-date seismic safety standards.

Policy 5.2.4-6 Regularly update building and fire codes, including through LCP amendments where necessary, to reflect best available standards for seismic safety design.

Policy 5.2.4-7 Encourage the Los Alamitos School District to include Seal Beach-specific hazards in the earthquake preparedness curriculum, such as tsunami preparedness.

5.2.5 Fire

The Seal Beach Coastal Zone is at risk to both wildfires and urban fire incidents. Wildfires emerge in the undeveloped and natural landscaped wildlands, and pose a risk when incidents occur in the wildland-urban interface. As urban sprawl continues into wildland areas, the occurrence of wildfire becomes more dangerous. Wildfires have a number of sources, including arson, accidents, and lightening. Urban fires burn in developed parts of the City, affecting or destroying private homes, commercial properties, parks, or other public facilities. Causes of urban fires can include downed power lines, broken gas mains, arson, poor disposal or management of toxic substances, or a lack of maintenance. Wildfires have the potential to turn into urban fires if the trajectory brings fire close to urban areas.

Seal Beach does not have a history of wildfires, but experienced small brush fires in undeveloped areas over the years. Seal Beach has experienced a number of small urban fires within the Coastal Zone, with limited scope and damage. The Seal Beach Municipal Pier has caught file on numerous occasions. In 1992 and 1994, electrical problems sparked fires around the pier midsection. In 2016 the closed restaurant at the end of the pier was destroyed in an electrical fire. Refer to Exhibit 5.5, *Fire Hazards* for the mapped moderate and high hazard classes within the Coastal Zone.

The majority of the Seal Beach Coastal Zone is developed, with the exception of Hellman Ranch/Gum Grove Nature Park and the Naval Weapons Station property. Thus, the Coastal Zone, typifying more urban conditions throughout California, does not face a serious wildfire risk. Development patterns, however, can affect structural fire ignition and the rate of spread. Building design and material, small lots, and the resulting proximity of adjacent structures compound potential impacts of structural fire. The Surfside neighborhood and Seal Beach Shores (mobile home park) both exhibit development patterns of higher risk, including high density structures, small setbacks, and narrow roads. To mitigate this risk, certain types of development in these neighborhoods is required to have automatic sprinkler systems.

Fire Policies

Policy 5.2.5-1 Regularly update building and fire code to reflect best available standards for fire safety design, subject to an LCP amendment where necessary.

Policy 5.2.5-2 Enhance the ability of all structures within the Coastal Zone to resist wildland and structural fires through ongoing and cost-effective updates to the City's Zoning,

Building and Fire Codes and standards, subject to an LCP amendment where necessary.

Policy 5.2.5-3 Educate and inform the public on fire safety to protect the community and environment from unnecessary fire hazards.

Policy 5.2.5-4 Require the construction and maintenance of necessary fire flow waterlines and hydrants in the Coastal Zone, in accordance with Orange County Fire Authority recommendations, and consistent with the coastal resource protection policies of the LCP.

Policy 5.2.5-5 Encourage "fire-wise" landscaping and use of fire-resistant building materials within the Coastal Zone, especially in areas adjacent to Gum Grove Park.

Policy 5.2.5-6 New development, including redevelopment as feasible, shall minimize risks to life and property in areas of high fire hazard, consistent with Policy 2.2.1-6 of the LCP.

CITY OF SEAL BEACH
LOCAL COASTAL PLAN

Source: County of Orange, California Coastal Commission, USFWS

3/3/2023 JN H:\pdata\158624\GIS\MXD\02_32\Exhibit 5.1 Flood Hazards 11x17.mxd

LEGEND

- Coastal Zone within the City of Seal Beach
- Seal Beach City Limit

Annual Flood Hazard

- 0.2% Annual Chance Flood Hazard
- 1% Annual Chance Flood Hazard
- Area of Undetermined Flood
- Regulatory Floodway

FLOOD HAZARDS
EXHIBIT 5.1

CITY OF SEAL BEACH
LOCAL COASTAL PLAN

Source: County of Orange, California Coastal Commission, City of Seal Beach

2/3/2022 JN: H:\pdata\158624\GIS\MXD\02_22\Exhibit 5.2 Maximum Tsunami Projected Run-Up_11x17.mxd

LEGEND

- Coastal Zone within the City of Seal Beach
- Seal Beach City Limit
- Tsunami Inundation Zone

MAXIMUM TSUNAMI PROJECTED RUN-UP

EXHIBIT 5.2

CITY OF SEAL BEACH
LOCAL COASTAL PLAN

Source: County of Orange, California Coastal Commission, City of Seal Beach

2/3/2022 JN: H:\pdata\158624\GIS\MXD\02_22\Exhibit 5.3 Shake Potential 11x17.mxd

LEGEND

- Coastal Zone within the City of Seal Beach
- Seal Beach City Limit

Shake Potential (% g)

- 100 - 110%
- 90 - 100%
- 80 - 90%
- 50 - 70%

SHAKE POTENTIAL

EXHIBIT 5.3

CITY OF SEAL BEACH
LOCAL COASTAL PLAN

Source: County of Orange, California Coastal Commission, City of Seal Beach

2/3/2022 JN H:\pdata\l 58624\GIS\MXD\02_22\Exhibit 5.4 Liquefaction Hazards.mxd

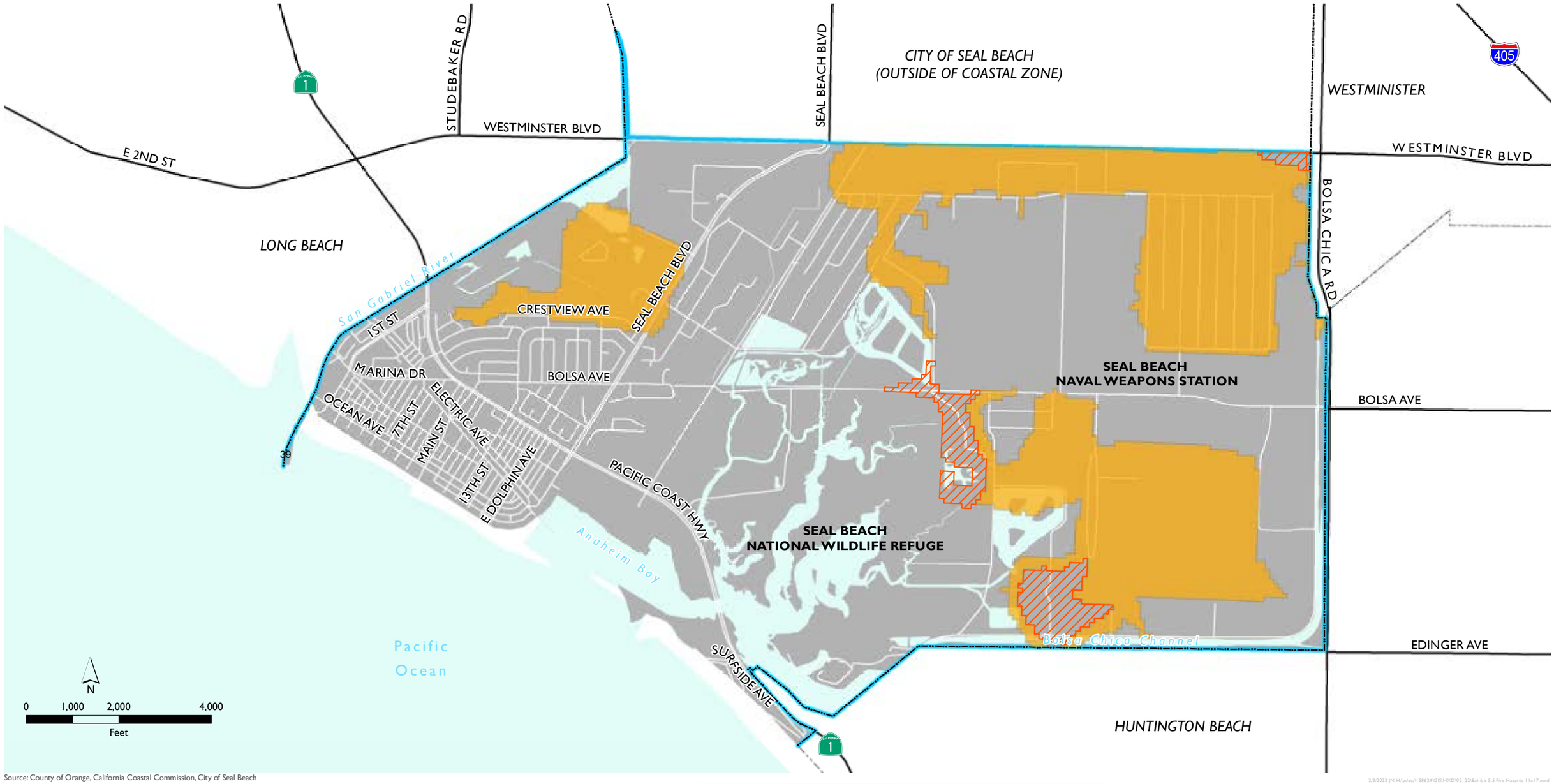
LEGEND

- Coastal Zone within the City of Seal Beach
- Seal Beach City Limit
- Liquefaction Zone

LIQUEFACTION HAZARDS

EXHIBIT 5.4

CITY OF SEAL BEACH
LOCAL COASTAL PLAN



Source: County of Orange, California Coastal Commission, City of Seal Beach

2/3/2022 J:\N_H\pdata\158624\GIS\MXD\02_22\Exhibit 5.5 Fire Hazards 11x17.mxd

LEGEND

- Coastal Zone within the City of Seal Beach
- Seal Beach City Limit

Hazard Class

- Moderate
- High

FIRE HAZARDS
EXHIBIT 5.5

This page is intentionally left blank.

CHAPTER 6 GLOSSARY

6.1 ACRONYMS

Boeing IDS Specific Plan: Boeing Integrated Defense Systems Specific Plan

CDP: Coastal Development Permit

CEQA: California Environmental Quality Act

CIP: Capital Improvement Program

Corps: U.S Army Corps of Engineers

CWA: Clean Water Act

DCA: Deferred Certification Area

DWP Specific Plan: Department of Water and Power Specific Plan

ESHA: Environmentally Sensitive Habitat Area

IP: Implementation Plan

LB Transit: Long Beach Transit

LCP: Local Coastal Program

LUP: Land Use Plan

MHHW: Mean Higher High Water

MLLW: Mean Lower Low Water

MS4: Municipal Separate Storm Sewer System

NPDES: National Pollutant Discharge Elimination System

NWS: Naval Weapons Station

OCTA: Orange County Transit Authority

PA: Planning Area

PCH: Pacific Coast Highway

ROW: Right of Way

SLR: Sea Level Rise

TMDL: Total Maximum Daily Load

6.2 DEFINITIONS

Coastal Development Permit: Per Coastal Act Section 30101.5, defined as "permit for any development within the coastal zone that is required pursuant to subdivision (a) of Section 30600."

Coastal Resources: A general term used to refer to resources addressed in Coastal Act Chapter 3, including public access to and along the shoreline (including facilities that accommodate visitors), recreation facilities, marine environment, and land resources (environmentally sensitive habitat, agriculture, and archeological and paleontological resources).

Coastal Zone: Per Coastal Act Section 30103, the coastal zone is the land area in California "extending seaward to the state's outer limit of jurisdiction, including all offshore islands, and extending inland generally 1,000 yards from the mean high tide line of the sea. In significant coastal estuarine, habitat, and recreational areas it extends inland to the first major ridgeline paralleling the sea or five miles from the mean high tide line of the sea, whichever is less, and in developed urban areas the zone generally extends inland less than 1,000 yards." The LCP governs the portion of the Coastal Zone within the City of Seal Beach jurisdiction."

Demolish: To remove fifty percent (50%) or more of one or more major structural components including exterior walls, structural floor systems, roof framing systems, and foundation systems; to remove less than 50% of one or more major structural components where the proposed demolition of the component(s) would result in cumulative demolition meeting or exceeding 50% of the entire structure since January 1, 1977; or to remove a structure or a portion of a structure, the cost of which equals or exceeds 50% of the market value of the structure before the start of construction based on the documented construction bid costs and either an appraisal by a professional property appraiser or County assessor data, if it is based on current market values.

Development: Per Coastal Act Section 30106, defined as "on land, in or under water, the placement or erection of any solid material or structure; discharge or disposal of any dredged material or of any gaseous, liquid, solid, or thermal waste; grading, removing, dredging, mining, or extraction of any materials; change in the density or intensity of use of land, including, but not limited to, subdivision pursuant to the Subdivision Map Act (commencing with Section 66410 of the Government Code), and any other division of land, including lot splits, except where the land division is brought about in connection with the purchase of such land by a public agency for public recreational use; change in the intensity of use of water, or of access thereto; construction, reconstruction, demolition, or alteration of the size of any structure, including any facility of any private, public, or municipal utility; and the removal or harvesting of major vegetation other than for agricultural purposes, kelp harvesting, and timber operations which are in accordance with a timber harvesting plan submitted pursuant to the provisions of the Z'berg-Nejedly Forest Practice Act of 1973 (commencing with Section 4511)."

Environmentally Sensitive Habitat Area: Per Coastal Act Section 30107.5, defined as "any area in which plant or animal life or their habitats are either rare or especially valuable because of their special nature or role in an ecosystem and which could be easily disturbed or degraded by human activities and developments."

Environmental Justice: Per Coastal Act Section 30107.3, defined as "the fair treatment of people of all races, cultures, and incomes with respect to the development, adoption, implementation, and enforcement of environmental laws, regulations, and policies."

Feasible: Per Coastal Act Section 30108, defined as "capable of being accomplished in a successful manner within a reasonable period of time, taking into account economic, environmental, social, and technological factors."

Implementation Plan: Also known as "Implementing Actions" as defined by the Coastal Act Section 30108.4 as "the ordinances, regulations, or programs which implement either the provisions of the certified local coastal program or the policies of this division and which are submitted pursuant to Section 30502." The Implementation Plan is a component of the LCP consisting of zoning ordinances and other ordinances/regulations that implement the policies of the Land Use Plan.

Land Use Plan: Per Coastal Act Section 30108.5, defined as "the relevant portion of a local government's general plan, or local coastal element which are sufficiently detailed to indicate the kinds, location, and intensity of land uses, the applicable resource protection and development policies and, where necessary, a listing of implementing actions." The Land Use Plan is a component of the LCP consisting of the City's policies for development and protection of coastal resources, consistent with the California Coastal Act.

Local Coastal Program: Per Coastal Act Section 30108.6, defined as "a local government's (a) land use plans,(b) zoning ordinances, (c) zoning district maps, and (d) within sensitive coastal resources areas, other implementing actions, which, when taken together, meet the requirements of, and implement the provisions and policies of, this division at the local level.

Low Cost Visitor Serving Accommodation: Accommodations available at an annual average daily rate that is equal or less than 75 percent of the California statewide average accommodation rate.

Mean High Tide Line: The intersection of the mean high water tidal plane and the shore. Mean high water is the average height of high waters that occur during the most recent National Tidal Datum Epoch, a 19-year period.

Non-Confirming Structure/Use: A structure or use that was lawfully established and maintained, but because of the application of current Local Coastal Program policies and standards, the structure or use does not conform to current policies and standards.

Public Facilities: Uses or Structures that provide public services such as a library, city hall, fire station, police station park, trail, sidewalk, traffic signal or major street.

Public Trust Boundary/Doctrine: A legal tool for adapting the use of California's coastal lands to ongoing changes.

Public Works: Per Coastal Act Section 30114, defined as:

- All production, storage, transmission, and recovery facilities for water, sewerage, telephone, and other similar utilities owned or operated by any public agency or by any utility subject to the jurisdiction of the Public Utilities Commission, except for energy facilities.
- All public transportation facilities, including streets, roads, highways, public parking lots and structures, ports, harbors, airports, railroads, and mass transit facilities and stations, bridges, trolley wires, and other related facilities. For purposes of this division, neither the Ports of Hueneme, Long Beach, Los Angeles, nor San Diego Unified Port District nor any of the developments within these ports shall be considered public works.
- All publicly financed recreational facilities, all projects of the State Coastal Conservancy, and any development by a special district.

- All community college facilities.

Rebuild: To modify fifty percent (50%) or more of one or more major structural components including exterior walls, structural floor systems, roof framing systems, and foundation systems; to modify less than 50% of one or more major structural components where the proposed demolition of the component(s) would result in cumulative demolition meeting or exceeding 50% of the entire structure since January 1, 1977; or to modify a structure or a portion of a structure, the cost of which equals or exceeds 50% of the market value of the structure before the start of construction based on the documented construction bid costs and either an appraisal by a professional property appraiser or County assessor data, if it is based on current market values.

Redevelopment: Generally, redevelopment consists of alterations to an existing structure such as significant exterior renovations, and/or demolition or replacement of an existing principal structure. The specific criteria required to meet the definition of redevelopment is provided below:

For projects proposing alterations on structures constructed after January 1, 1977:

- Replacement of 50% or more of any major structural component (such as exterior walls, floor, roof structure or foundation) as calculated by linear feet, surface area, volume, or weight; or,
- Replacement of any major structural component that results in a 50% increase in gross floor area.

For projects proposing alterations on structures constructed before January 1, 1977:

- Replacement of less than 50% of a major structural component; where the proposed replacement would result in cumulative alterations exceeding 50% or more of that major structural component, taking into consideration previous replacement work undertaken on or after January 1, 1977; or,
- Replacement that constitutes less than 50% increase in floor area where the proposed alteration would result in a cumulative addition of 50% or greater of the floor area, taking into consideration previous additions undertaken on or after January 1, 1977.

Remodel: Limited to redecorating, redesigning, or reconstructing the interior structures of existing development. Demolition and reconstruction of exterior structures would not be acceptable.

Scenic Resources: Pertaining to coastal views, public viewpoints and viewing areas from which coastal scenic vistas can be observed.

Sea: Per Coastal Act Section 30115, defined as "the Pacific Ocean and all harbors, bays, channels, estuaries, salt marshes, sloughs, and other areas subject to tidal action through any connection with the Pacific Ocean, excluding nonestuarine rivers, streams, tributaries, creeks, and flood control and drainage channels."

Submerged Lands: Per California Code of Regulations Section 13577(e), lands which lie below the line of the mean low tide.

Tidelands: Per California Code of Regulations Section 13577(d), lands that ware located between the lines of the mean high tide and the mean low tide.

Water Quality Management Plan: The purpose of Water Quality Management Plan (WQMP) is to reduce discharge of pollutants into urban runoff from development projects by reducing or eliminating sources of pollutants and managing site runoff volumes and flow rates through application of appropriate Best Management Practices (BMP's).

Wetlands: Per Coastal Act Section 30122, defined as "lands within the coastal zone which may be covered periodically or permanently with shallow water and include saltwater marshes, freshwater marshes, open or closed brackish water marshes, swamps, mudflats, and fens."

This page is intentionally left blank.

CHAPTER 7 RESOURCES

Boeing Realty Corporation, *Boeing Integrated Defense Systems Specific Plan – Seal Beach Site*, August 2003.

California Coastal Act, *Public Resources Code Division 20*, 2019.

California Coastal Commission, *Local Coastal Program (LCP) Update Guide, Part I – Updating LCP Land Use Plan (LUP) Policies*, published April 2007, revised July 2013.

California Coastal Commission, *Public Workshop: Lower Cost Visitor Serving Accommodations*, http://documents.coastal.ca.gov/reports/2014/12/W3-12-2014.pdf, accessed October 30, 2018.

California Coastal Commission, *Public Workshop: Lower Cost Visitor Serving Accommodations*, http://documents.coastal.ca.gov/reports/2015/3/f9-3-2015.pdf, accessed October 30, 2018.

California Coastal Commission, *Sea Level Rise Policy Guidance – Interpretative Guidelines for Addressing Sea Level Rise in Local Coastal Programs and Coastal Development Permits*, adopted August 12, 2015, revised November 7, 2018.

California Department of Fish and Wildlife, *BIOS Viewer*, https://map.dfg.ca.gov/bios/, accessed January 23, 2019.

California Department of Fish and Wildlife, *California Essential Habitat Connectivity Project*, https://www.wildlife.ca.gov/conservation/planning/connectivity/CEHC, accessed January 23, 2019.

California Department of Transportation and California Department of Fish and Game, *California Essential Habitat Connectivity Project: A Strategy for Conserving a Connected California*, February 2010.

City of Seal Beach, *City of Los Angeles Department of Water and Power Specific Plan*, amended November 9, 2015.

City of Seal Beach, *Draft Coastal Land Use Plan* (not certified), March 2008.

City of Seal Beach, *General Plan*, adopted December 2003.

City of Seal Beach, *Local Hazard Mitigation Plan*, May 31, 2019.

City of Seal Beach, *Main Street Specific Plan*, adopted July 8, 1996.

City of Seal Beach, *Municipal Code*, 2019.

City of Seal Beach, *Parks and Community Services Master Plan*, adopted July 22, 2013.

City of Seal Beach, *Sea Level Rise Vulnerability Assessment*, prepared by Moffatt & Nichol, October 2019.

City of Seal Beach, *Sewer Master Plan 2018*, submitted by AKM Consulting Engineers, February 2018.

City of Seal Beach, *Specific Plan for the Development of Pacific Electric Right-of-Way*, adopted October 1974.

City of Seal Beach, *Where to Park in Old Town* Graphic.

City of Seal Beach – Public Works, *Approved 5-Year Capital Improvement Program*, FY 2018/2019 – 2022/2023.

CNIC, *Naval Weapons Station Seal Beach*, https://www.cnic.navy.mil/regions/cnrsw/installations/nws_seal_beach.html, accessed October 17, 2019.

Commander, Navy Installations Command, *Naval Weapons Station Seal Beach*, https://www.cnic.navy.mil/sealbeach, accessed September 13, 2018.

County of Los Angeles Department of Parks and Recreation, *Trails: San Gabriel River Trail*, https://trails.lacounty.gov/Trail/265/san-gabriel-river-trail, accessed September 14, 2018.

Department of Defense Lodging, *Navy Getaways Lodging Patron Eligibility*, http://www.dodlodging.net/NG_PATRON_ELIGIBILITY_oct_16.pdf, accessed October 30, 2018.

Department of Defense Lodging, *Seal Beach RV Park (Seabreeze)*, http://get.dodlodging.net/propertys/Seal-Beach-RV-Park-(Seabreeze)-, accessed October 25, 2018.

Globe at Night Organization, *What is Light Pollution?*, https://www.globeatnight.org/light-pollution.php, accessed September 26, 2019.

Google Maps, 2019.

Hellman Properties LLC, *Hellman Ranch Specific Plan*, adopted October 1996.

Long Beach Transit, *Regular Service Route Schedules and Maps*, http://www.lbtransit.com/Services/,accessed September 14, 2018.

Orange County Transit Authority, *System Map*, https://www.octa.net/Bus/Routes-and-Schedules/System-Map/, accessed September 14, 2018.

Seal Beach Chamber of Commerce, *Chamber of Commerce Events*, https://sealbeachchamber.org/,accessed September 14, 2018.

Seal Beach Loins Club, https://www.sealbeachlions.org/, accessed September 14, 2018.

Seal Beach Swim Club, *Rough Water Swim*, https://www.teamunify.com/TabGeneric.jsp?_tabid_=5400&team=scssbsc, accessed September 14, 2018.

Southern California Association of Governments, *About: SCAG*, http://www.scag.ca.gov/Pages/default.aspx, accessed September 14, 2018.

State of California, *Public Resources Code Division 20*, California Coastal Act, 2019.

U.S. Census Bureau, *QuickFacts Seal Beach city, California*, https://www.census.gov/quickfacts/fact/table/sealbeachcitycalifornia/IPE120218, accessed September 19, 2019.

U.S. Fish and Wildlife Service, *Draft Comprehensive Conservation Plan/Environmental Assessment Seal Beach National Wildlife Refug*e, March 2011.

U.S. Fish and Wildlife Service, *Seal Beach National Wildlife Refuge | California*, https://www.fws.gov/refuge/seal_beach/, accessed October 17, 2019.

U.S. Fish and Wildlife Service, *USFWS Critical Habitat Portal*, https://ecos.fws.gov/ecp/report/table/critical-habitat.html, accessed January 23, 2019.

U.S. Fish and Wildlife Service, *Wetlands Mapper*, https://www.fws.gov/wetlands/data/Mapper.html, accessed January 23, 2019.

Appendix A

City of Seal Beach Sea Level Rise Vulnerability Assessment

City of Seal Beach
Sea Level Rise Vulnerability Assessment

Prepared For:

City of Seal Beach

City of Seal Beach, Planning Department
211 Eighth Street
Seal Beach, CA 90740

Prepared By:

moffatt & nichol
3780 Kilroy Airport Way, Suite 600
Long Beach, CA 90806

Funded by CCC Grant LCP 17-01

CALIFORNIA COASTAL COMMISSION

November 2019

Contents

Table of Figures

Table of Tables

Document Verification

Client	City of Seal Beach
Project Name	City of Seal Beach LCP
Document Title	City of Seal Beach Sea Level Rise Vulnerability Assessment
Document Sub-title	–
Status	Final Report
Date	November 21, 2019
Project Number	9721
File Reference	Q:\LB\9721 Seal Beach LCP\8 Deliverables\Reports\Draft to CCC_7-12-19

Revision	Description	Issued by	Date	Checked
00	Draft report for CCC review	JT	4/15/2019	AH
01	Updated draft report for CCC review	JT/AVS	5/13/2019	AH
02	Final report for submittal to CCC	JT	7/12/2019	AH
03	Revised final report for submittal to CCC	JT	10/17/2019	AH
03	Revised final report	JT	11/21/2019	AH

Disclaimer

It is understood that estimating and projecting future weather, tidal, ocean and on-shore conditions and their impacts upon existing or contemplated developments or resources is difficult, complex and based on variable assumptions, and further, is impacted by factors potentially beyond Moffatt & Nichol's ability to predict or control. Accordingly, any estimates, forecasts reviews or assessments provided as part of the Services are presented solely on the basis of the assumptions accompanying the estimates, forecasts, reviews and assessments, and subject to the information or data utilized at the time of this Project. As such, Moffatt & Nichol (M&N) makes no warranty that the mitigation measures will be adequate to protect against actual climate events. In addition, to the extent M&N utilizes materials provided by the Client or third parties, or material that is generally available, M&N is entitled to rely upon any such information concerning the Project, except to the extent it is explicitly provided that M&N will independently verify the accuracy or completeness of such materials or information.

Produced by:
Moffatt & Nichol
4225 East Conant Street
Long Beach, CA 90808
(562) 950-6500
www.moffattnichol.com

1. Introduction

1.1 Study Approach

The Sea Level Rise Vulnerability Assessment for the City of Seal Beach assesses potential impacts to coastal resources across multiple sea level rise (SLR) scenarios. An inventory of coastal resources within the City was compiled as an initial step of the Vulnerability Assessment. Analyses then focused on the extent to which local coastal hazards are influenced by multiple sea level rise scenarios. The overlap of projected future hazard zones and coastal resources is used to identify future vulnerabilities and the SLR thresholds at which critical coastal resources of the City are impacted. Key questions that guide the vulnerability assessment are illustrated in Figure 1-1. The Vulnerability Assessment is designed to inform policy and SLR adaptation strategy development as part of the City of Seal Beach Local Coastal Program update process.

For the purposes of this study a coastal resource is broadly defined as any natural or constructed feature that provides a benefit to the City. City coastal resources are grouped into the following categories: coastal development, utilities infrastructure, public safety facilities, transportation infrastructure, coastal access and recreation, and environmental resources. An inventory of those resources included in the Vulnerability Assessment can be found in Section 3.

The vulnerability of a coastal resource to SLR hazards is evaluated through an analysis of its exposure, sensitivity, and adaptive capacity. Within this study exposure refers to the type, duration, and frequency of coastal hazards a specific resource is subject to under a given SLR scenario. Sensitivity represents the degree to which a resource is impaired by exposure to coastal hazards, and adaptive capacity refers to the ability of a resource to cope with changes in coastal hazards over time. A discussion of the specific coastal hazard analysis methodologies used within the study can be found in Section 4.4.

Figure 1-1: Key questions for a Vulnerability Assessment.

1.2 Coastal Setting

The City of Seal Beach is located within the northern portion of Orange County. The coastal setting within the City is defined by a number of major shoreline structures (Figure 1-2). The northwestern shoreline of the City is bordered by the San Gabriel River. The San Gabriel River mouth is defined by two jetty structures. The east jetty of the San Gabriel River extends approximately 200 feet beyond the City shoreline while the west jetty, which also forms part of the Alamitos Bay Entrance Channel, extends significantly further.

Immediately southeast of the San Gabriel River is the primary sandy beach area of the City. The sandy beach area is divided into western and eastern sections by the Seal Beach Municipal Pier (Figure 1-3). The western portion of the Municipal Pier is augmented with a concrete sheet pile groin. The western portion of the sandy beach is the larger of the two areas and generally varies from approximately 500 to 1000 feet in width. Beach width along the smaller eastern beach varies from 100 to 400 feet, occasionally narrowing further during episodic erosion events. This sandy beach area is backed by parking facilities and shoreline development including a small engineered wall bordering the Seal Beach Promenade.

The western jetty of Anaheim Bay forms the eastern barrier of the recreational beach area. This trapezoidal rubble mound jetty and a second eastern jetty downcoast make up the entrance to the Seal Beach Naval Weapons Station (SBNWS), providing significant wave protection to the interior of Anaheim Bay. Downcoast of the eastern Anaheim Bay jetty is the community of Surfside, a private development that lies seaward of the Pacific Coast Highway (Figure 1-4). The shoreline along the surfside community consists of an open coast sandy beach. Residential development lies immediately landward of the sandy beach area, with some areas of rock revetment fronting the far western structures of the community.

Figure 1-2: Coastal setting within the City of Seal Beach

Figure 1-3: Seal Beach Municipal Pier and surrounding beach areas (Copyright © 2008. Kenneth and Gabriel Adelman, California Coastal Records Project).

Figure 1-4: Eastern Seal Beach coastline featuring the Anaheim Bay east jetty, Pacific Coast Highway, and western border of the Surfside community (Copyright © 2008. Kenneth and Gabriel Adelman, California Coastal Records Project).

1.3 Study Area

The study area for the Vulnerability Assessment encompasses the full extent of the City of Seal Beach shoreline and coastal zone. The study does not include specific analyses of resources that are outside of City jurisdiction such as the Seal Beach Naval Weapons Station. The study area extends landward as necessary to capture the full extent of coastal hazards present under each SLR scenario analyzed. There are three distinct regions where the combined effects of SLR, coastal and fluvial storms could result in flooding of the community. These regions are subject to unique hazards as discussed below.

1.3.1 Seal Beach - Open Coast

The coastal reach between the San Gabriel River and Anaheim Bay jetties encompasses West Beach, the Seal Beach Municipal Pier and East Beach. This is the center of beach-related activity in Seal Beach due to the accessibility and proximity to Main Street, residential development and visitor serving amenities. This area is currently exposed to coastal erosion, wave runup and flooding during extreme events. Sea level rise has the potential to increase these hazards impacting the recreational beach areas, amenities and residential development.

1.3.2 Surfside Community – Open Coast

The Surfside Community, south of Anaheim Bay, is also exposed to the open coast and associated process of coastal erosion, wave runup and flooding during extreme events. Located downcoast of complete littoral barrier formed by the Anaheim Bay jetties, this segment of shoreline is particularly vulnerable to erosion and dependent on regular nourishment from the United States Army Corps of Engineers (USACE) to maintain a sandy beach in front of residential development.

1.3.3 Inland low-lying areas

Inland low-lying areas of Seal Beach are also susceptible to potential flooding from sea level rise in combination with high tides and fluvial events from sources such as the San Gabriel River, Los Cerritos Wetlands and Anaheim Bay. The low-lying areas include portions the Electric Avenue corridor, commercial development adjacent to Westminster Boulevard and Leisure World.

2. Coastal Processes

Coastal processes refer to the waves, water levels, and sediment transport (including both long-shore and cross-shore) which shape the coastline of Seal Beach. These dynamic processes are largely driven by natural forces but have also been significantly modified by anthropogenic activities (i.e. development, coastal structures and beach nourishment). This section describes coastal processes and how they have affected the shoreline along Seal Beach. The influence of SLR on coastal processes is discussed in Section 4.

2.1 Water Levels

The tides in Southern California are semidiurnal, meaning there are two low waters and two high waters each lunar day, an approximately 25-hour time period. The National Oceanographic and Atmospheric Administration (NOAA) operates tide stations throughout southern California. The Los Angeles tide station (Station 9410660) provides a long-term sea level record near the City of Seal Beach. The station is located within Los Angeles Harbor and has been collecting data since 1923. Data from this station represents the most complete source of water elevation data relevant to the City of Seal Beach and can be used to characterize the variability in existing water levels (Figure 2-1).

Astronomical tides account for the most significant amount of variability in the total water level. Typical daily tides range from mean lower low water (MLLW) to mean higher high water (MHHW), a tidal range of about 5.5 feet. During spring tides, which occur twice per lunar month, the tide range increases to almost 7 ft due to the additive gravitational forces caused by alignment of the sun and moon. During neap tides, which also occur twice per lunar month, the forces of the sun and moon partially cancel out, resulting in a smaller tide range of about 4 ft. The largest spring tides of the year, which occur in the winter and summer, are sometimes referred to as “King” tides and result in high tides of 7 ft or more above MLLW and tidal ranges of more than 8 ft. King tides can lead to dry-weather or “nuisance” flooding in low-lying coastal areas even in the absence of a storm or swell event, though this is currently not an issue within the City of Seal Beach.

Ocean water levels typically vary within predictable ranges; however, it is not uncommon to experience sea level anomalies such as El Niño or storm surge that significantly increase the predicted water level above the normally-occurring astronomical tide. These events can increase the predicted tides over the course of several days to several months. SLR will cause these anomalous tidal elevations to become more commonplace as existing water levels rise across the entire tidal range.

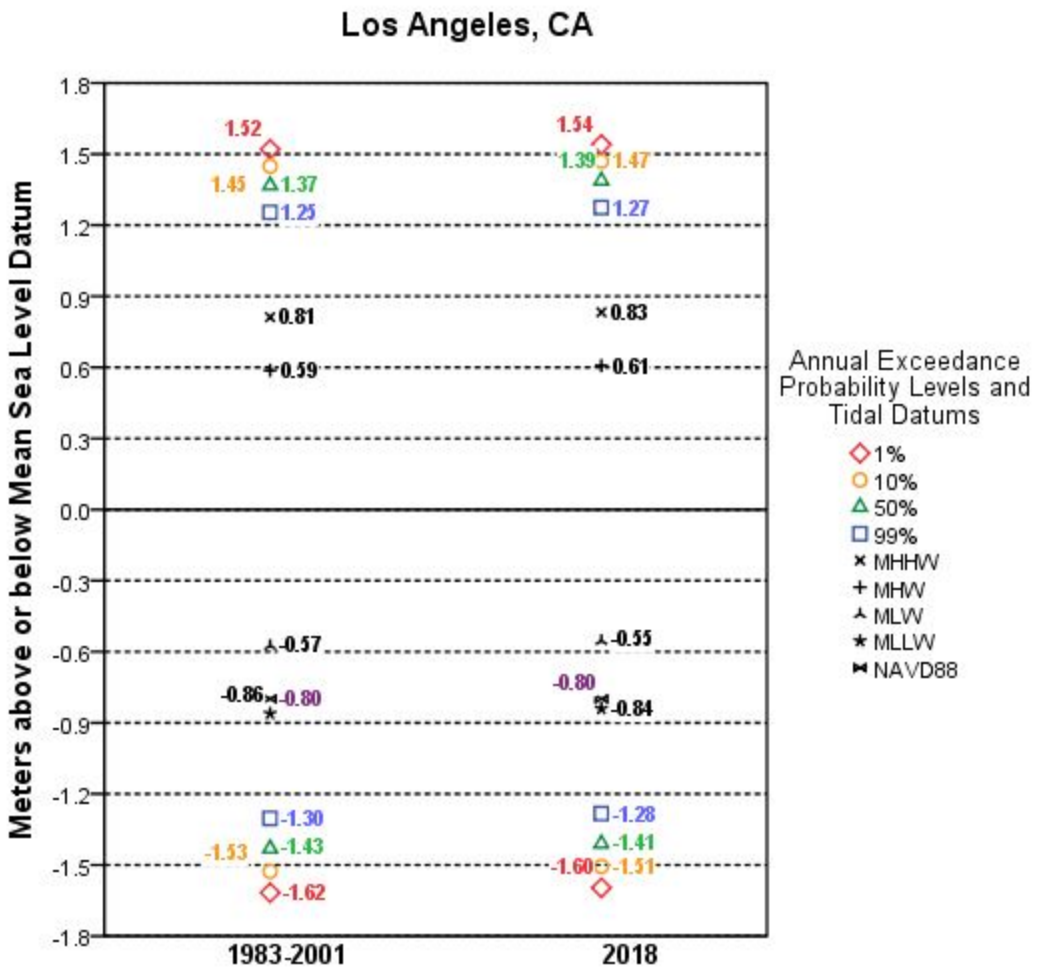


Figure 2-1: Los Angeles tidal datums and historic water elevations from NOAA station 9410660.

2.2 Wave Climate

The wave exposure within the City of Seal Beach is typical of the area. In summer months the City is exposed to southerly swells generated by tropical storm systems and other wave energy from the southern hemisphere. Swell events from the west and northwest become more prominent during winter months. Due to sheltering from the Palos Verdes Peninsula, the Port complex and the Channel Islands the predominant wave exposure windows are from the west and south directions as illustrated in Figure 2-2.

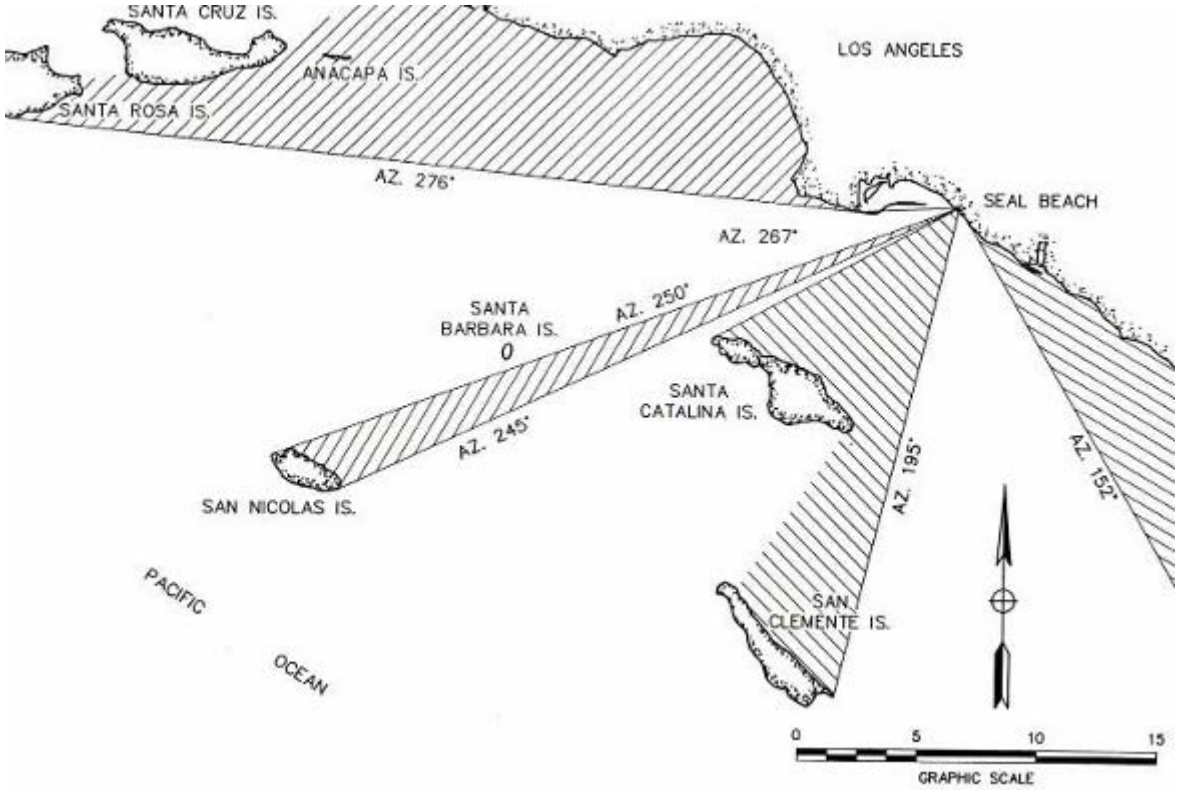


Figure 2-2: Wave exposure windows at Seal Beach.

A typical wave period for local, wind-driven seas in the region is 6 to 14 seconds, while the wave period for offshore swell events ranges from 12 to 22 seconds (Moffatt and Nichol, 2004). Breaking wave heights of 18 feet have been recorded along the shoreline during past storm events, representing a storm with an occurrence interval of approximately 10 years (Moffatt and Nichol, 2004). The larger wave heights (>15 feet) are associated with winter storm events from a westerly direction, typical during strong El Niño events.

During winter swell events wave energy is reflected off of the Anaheim Bay west jetty. Wave energy is then amplified in the region of 13th Street to Dolphin Street due to constructive interference between incoming swells (Figure 2-3). This phenomenon results in significantly higher wave heights along east beach and a corresponding increase in erosion, wave runup and flooding of back beach areas. Most historic wave damage along east beach has occurred during periods of high wave energy combined with elevated water levels (Moffatt and Nichol, 1991). Past wave impacts include flooding of the shoreline promenade and damage to residences along the waterfront east of the Seal Beach Municipal Pier. Storms during the winter of 1983 represent a historic example of these wave hazards and prompted an evaluation of the shoreline protection strategies used throughout the City. Conditions during the winter 1983 storms were estimated to represent a storm with a 25 to 50-year recurrence interval and a high tide elevation approaching a 100 year recurrence interval (Moffatt and Nichol, 2004).

In the summer months the City is also exposed to long period swell form the southern hemisphere and occasionally large tropical swell events generated by tropical storms or hurricanes off the coast of Mexico. An example of this type of event is Hurricane Marie (August 2014) which generated 12 to 15 foot waves at Seal Beach resulting in flooding of the back beach development and damage to the Anaheim Bay east

jetty. South swells tend to focus more wave energy toward the western shoreline near the San Gabriel River jetties.

Figure 2-3: Wave reflection and amplification along the eastern Seal Beach waterfront.

2.3 Littoral Processes

The littoral process within the City of Seal Beach are heavily influenced by the jetty, groin, and pier structures located along the shoreline. The combination of the large jetty structures at the mouth of the San Gabriel River and the western border of Anaheim Bay isolates the City of Seal Beach from common upcoast and downcoast sand transport patterns, creating what amounts to a pocket beach along the waterfront (Moffatt and Nichol, 1984). The primary natural source of sediment to the waterfront is the San Gabriel River, which has shown a decrease in sediment supply over time as development has increased in the region.

Downcoast sand transport along the Seal Beach waterfront is limited by the Long Beach offshore breakwater and San Gabriel River jetties as these structures shelter the City from westerly wave action. Upcoast sand transport is increased by the Anaheim Bay west jetty due to the reflection of wave energy off of the jetty. This combination of restricted sand supply, reduced downcoast transport, and increased upcoast transport creates localized erosion in the vicinity of 13th Street and Dolphin Street where wave action is amplified (Moffatt and Nichol, 2004). The wave amplification process is evident from the ground level photos in Figure 2-3. The resulting sediment transport processes are shown in plan view in Figure 2-4.

Figure 2-4: Longshore sediment transport patterns along Seal Beach.

The concrete sheet pile groin along the Seal Beach Municipal Pier was initially constructed in 1959 to offset this effect and prevent undue loss of beach area east of the Pier. Without this structure in place it is estimated that erosion rates in the area would increase by approximately 50%. Despite this measure to conserve sand along the eastern shoreline, it is estimated that 1.75 to 3.25 feet of sandy beach areas is lost on an annual basis as a result of transport over the Municipal Pier groin and offshore over the Anaheim Bay west jetty (Moffatt and Nichol, 2004).

2.4 Sediment Management Activities

A sand management program is conducted along the City shoreline to address the chronic loss of beach area and reduce potential for flood damage due to strong winter storm events or large tropical swell events in the summer. The sediment management activities include backpassing, dike building and nourishment that date back to the 1950s after the west jetty was lengthened to its current configuration.

Backpassing refers to the movement of sediment from a downdrift location to an updrift location. Seal Beach is unique among most southern California beaches because the pre-dominant direction of longshore sediment transport is from south to north (or southeast to northwest). The City backpasses sediment from west beach to east beach on an annual basis for construction of the winter dike. The dike is typically constructed in October and removed in May and is located approximately 100 feet seaward of residential development (Figure 2-5). While this strategy has generally been effective in the past there have been instances where the dike is overtopped or flanked by large waves during high tides, resulting in flooding landward of the dike. The crest elevation of the dike varies from 20 to 23 feet (MLLW) with a top width of 14 feet and shown in the typical cross section (Figure 2-6).

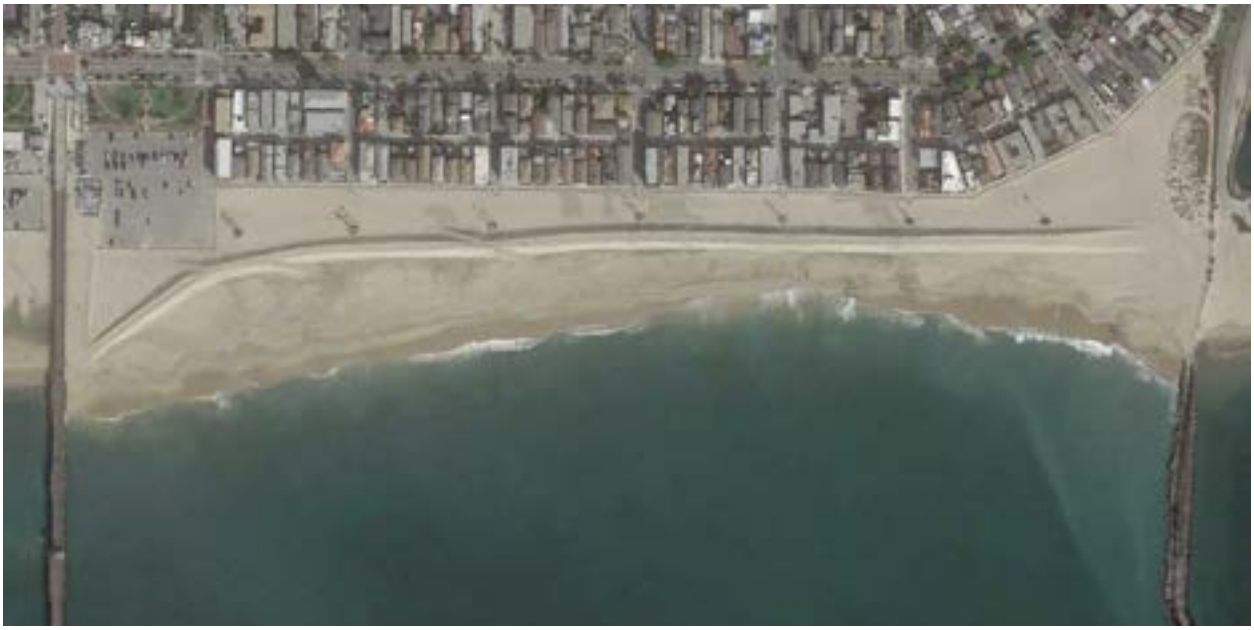


Figure 2-5: Satellite image of sand dike construction in winter 2017. (Photo credit Google Earth)

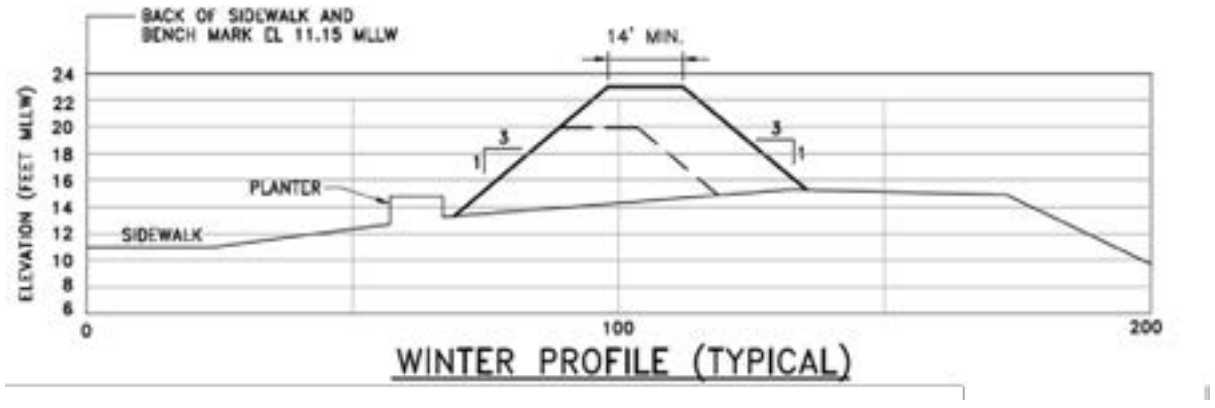


Figure 2-6: Typical cross section of winter dike.

Past sand nourishment events at Seal Beach have been sporadic and are generally supplied by dredge material from nearby projects, offshore sources or inland sources on an opportunistic basis. The placement of nourished material typically occurs along the east beach to widen the berm and provide a buffer for the winter dike.

The Surfside community is located downcoast of a complete littoral barrier formed by the Anaheim Bay jetties. These structures have cutoff the natural supply of sediment from beaches and rivers upcoast. The United States Army Corps of Engineers began regular beach nourishment cycles at Surfside-Sunset Beach in 1964 as mitigation for the downcoast shoreline impacts of the Anaheim Bay Jetties and to provide a feeder beach for the 13 miles of downdrift shoreline. Over 17 million cubic yards have been placed since 1964 (USACE, 2014). Recent nourishments have occurred at a frequency of about once every 5-7 years. Sand is placed immediately downcoast of the eastern Anaheim Bay jetty, dramatically increasing beach width (Figure 2-7). Downcoast sand transport is also exacerbated by wave energy reflected off the East Jetty resulting in an erosion signature (embayment) evident in many aerial images. The highest risk of coastal flooding occurs at the end of each nourishment cycle due to the reduced beach width fronting the west end of the Surfside community (Figure 2-8).

Figure 2-7: Shoreline downcoast of Anaheim Bay following a nourishment event in 2009.

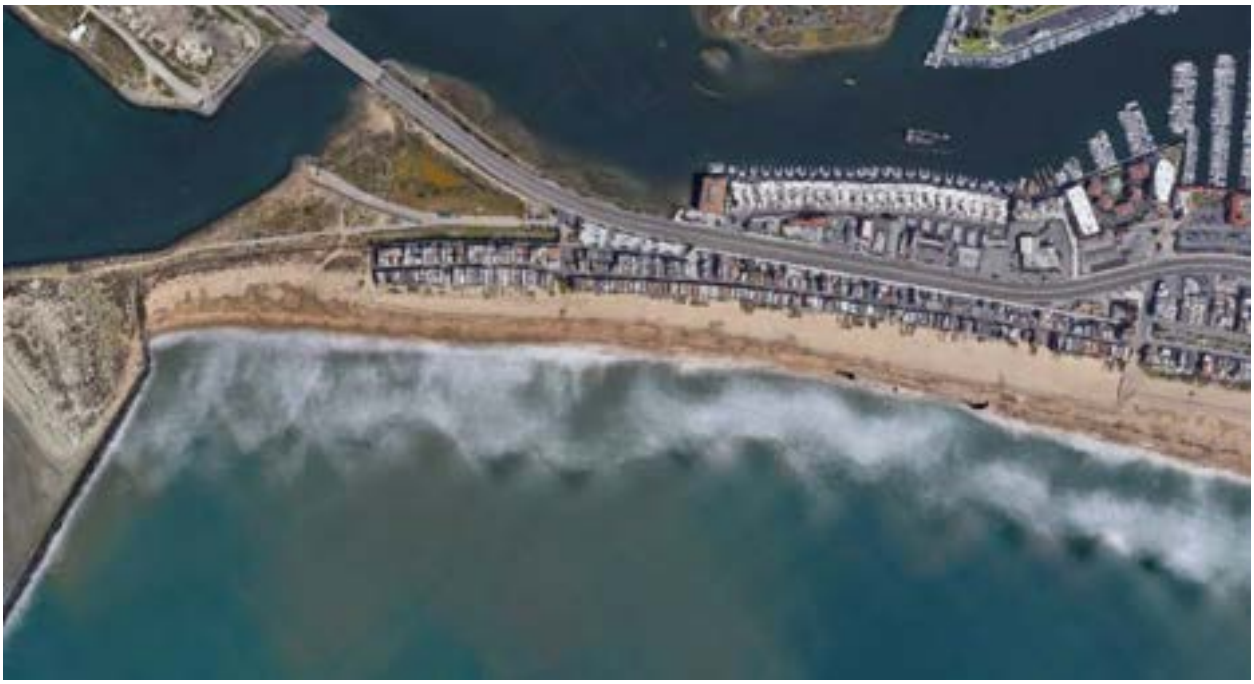


Figure 2-8: 2018 imagery of shoreline downcoast of Anaheim Bay showing significant loss of beach area from previous nourishment event.

3. City of Seal Beach Coastal Resource Inventory

Resource	Description
Coastal Development	All residential and commercial development within the City of Seal Beach subject to potential coastal hazards, including the Seal Beach waterfront, Surfside community, and inland areas surrounding coastal wetlands. Individual parcel and zoning information obtained from City staff.
Utilities Infrastructure	Water and electric infrastructure including electric substations, lift stations, pump stations, storm drains, gravity mains, force mains, and water lines. Data obtained from publicly available state and county datasets as well as City staff.
Public Safety Facilities	Safety facilities such as police stations, fire stations, and lifeguard stations located within the City. Data obtained from City staff.
Transportation Infrastructure	Local and major roadways within City limits. Critical local and regional roadways such as the Pacific Coast Highway are highlighted in analyses. Data obtained from public state and county datasets as well as City staff.
Coastal Access and Recreation	All coastal park areas, sandy beach areas, coastal access points, and parking facilities potentially subject to SLR hazards. Data obtained from City staff.
Environmental Resources	Coastal wetland areas including the Seal Beach National Wildlife Refuge and Los Cerritos Wetlands. Area boundaries based on zoning data provided by City staff.

4. Sea Level Rise

4.1 What is Sea Level Rise?

SLR science involves both global and local physical processes, as illustrated in Figure 4-1. Models are created based on science's best understanding of these processes on global and local scales, and, therefore, are dynamic and periodically updated to reflect these changes. On a global level, the most recent predictions come from the Intergovernmental Panel on Climate Change's Fifth Assessment Report (AR5) released in 2013. The AR5 projections for SLR were 50% higher than the Intergovernmental Panel on Climate Change's Fourth Assessment Report (AR4) (released 2007) due to the addition of ice sheet dynamics on SLR. At the state level, the CCC recommends using the best available science, which is expected to be updated every 5 years.

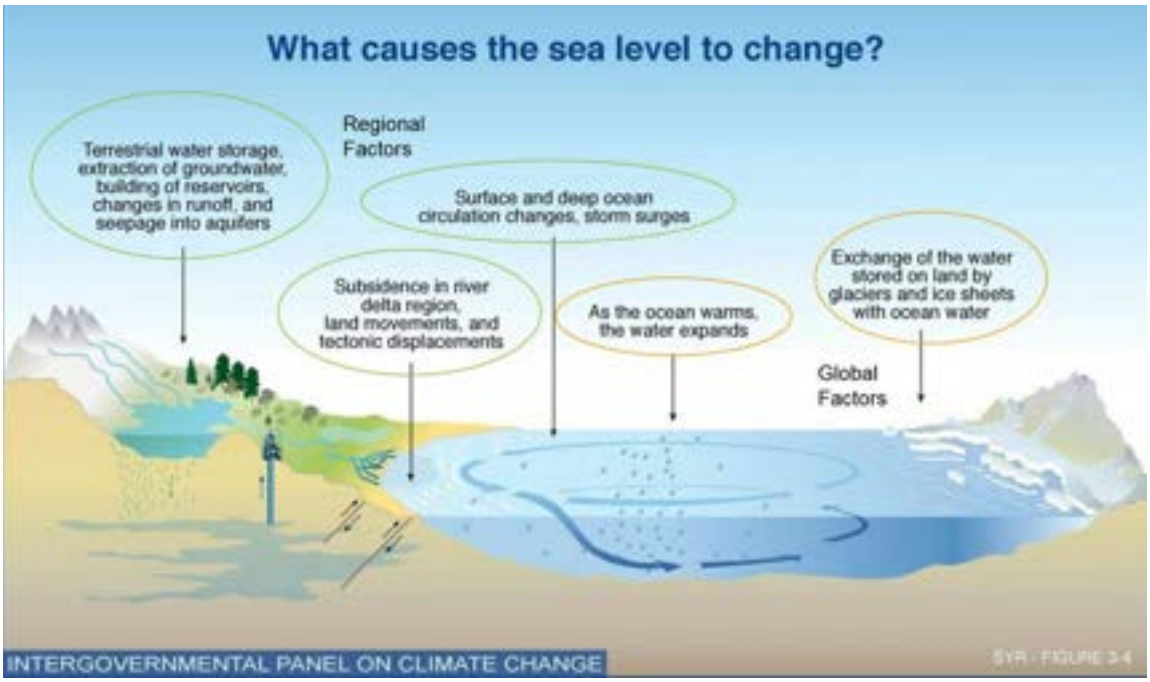


Figure 4-1: Regional and global factors that can contribute to changes in sea level (IPCC, 2013)

4.2 Projections and Probability

State of California Ocean Protection Council (OPC) Science Advisory Taskforce updated the best available science through the Rising Seas in California: An Update on Sea Level Rise Science report, released in April 2017. This report was then used to update the OPC's California State Guidance in 2018. The 2018 OPC SLR Guidance is now referenced as the best available science throughout the updated CCC SLR Policy Guidance document (2018).

The OPC (2018) Guidance projects SLR for multiple emissions scenarios and uses a probabilistic approach based on Kopp et al., 2014 to generate a range of projections at a given time horizon for 12 tide gauges along the California coast. The projections for the Los Angeles tide gauge are referenced in this section.

CCC SLR Policy Guidance recommends using projections associated with a high emissions future given that worldwide emissions are currently following the high emissions trajectory. The 2018 California State Guidance Document lays out a risk decision framework that explains when to use low or high-risk aversion in the planning process. With this framework, the probabilistic projections inform a decision-making process rather than trying to estimate the exact rate or occurrence of SLR based on an individual scenario or projection.

For the 2050 time horizon the "likely range" of SLR is between 0.5 to 1.0 feet. Kopp et al. 2014 estimated there is a 66% probability that SLR will fall within this "likely range". The likely range of SLR at the 2100 time horizon is 1.3 – 3.2 feet for a high emissions scenario. The upper end of the "likely range" is recommended for low risk aversion situations where impacts from SLR greater than this amount would be insignificant, or easily mitigated. The state recommends this high-risk tolerance (low aversion) to be used when considering resources where the consequences of SLR are limited in scale and scope with minimum disruption and where there is low impact on communities, infrastructure, or natural systems. This "low risk aversion" curve is shown in orange in Figure 4-2. At any given time horizon there is a 17% chance that SLR will exceed this curve.

For medium-high risk aversion situations more conservative (lower probability) projections for SLR are recommended by the OPC Guidance. These projections have a 1-in-200 chance (0.5% probability) of occurring at a given time horizon and would be appropriate for use on projects where damage from coastal hazards would carry a higher consequence and/or a lower ability to adapt such as residential and commercial structures. A sea level rise of 1.8 feet is projected at the 2050 time horizon, 3.3 feet at 2070 and 6.7 feet at 2100. The "medium-high risk aversion" curve is shown in red in Figure 4-2 and is most applicable for the residential development along the City's shoreline.

The OPC guidance also includes a specific singular scenario (called H++), based on projections by Sweet et al., 2017 which incorporates findings of Pollard & Deconto, 2016 that predict Antarctic ice sheet instability could make extreme sea-level outcomes more likely than indicated by Kopp et al. 2014 (Griggs et al., 2017). Because the H++ scenario is not a result of probabilistic modeling the likelihood of this scenario cannot be determined. Due to the extreme and uncertain nature of the H++ scenario, it is most appropriate to consider when planning for development that poses a high risk to public health and safety, natural resources and critical infrastructure (OPC, 2018). The H++ extreme risk aversion curve is shown in purple in Figure 4-2.

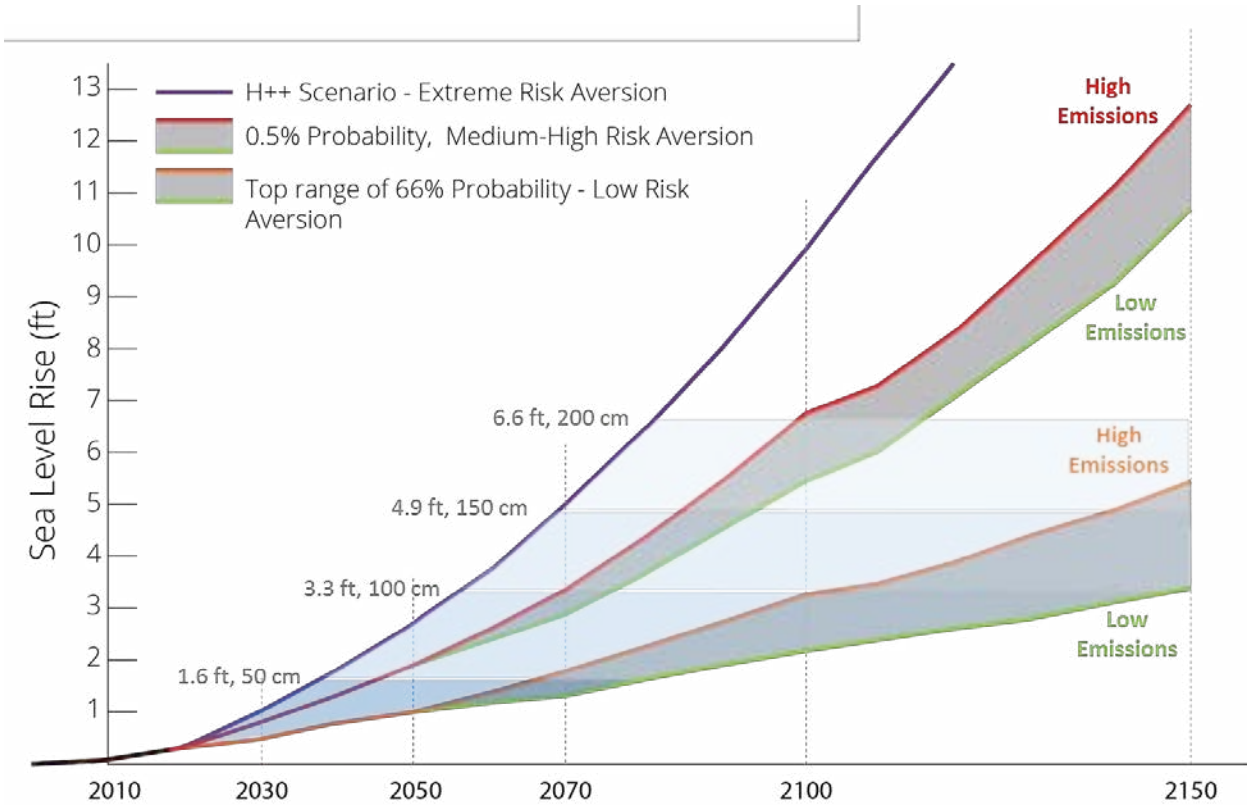


Figure 4-2: Approximate Sea Level Rise Projections for Three Risk Aversion Levels (OPC, 2018)

4.3 Selected SLR Scenarios

Climate science is a constantly changing field, often with high degrees of uncertainty. In the case of California's SLR, the OPC has high confidence in estimates for SLR to around year 2050, after which emissions scenarios cause predictions to diverge. Due to the high degree of uncertainty associated with predicting when and at what rate SLR will occur, this study looks at a range of SLR increments (scenarios) starting with present day conditions and including extreme SLR. Four scenarios have been selected for this study that consider increments of SLR between 1.6 and 6.6 ft, as shown in Figure 4-3, and based on available hazard data for the region discussed in Section 4.4. The probabilities that sea level rise will meet or exceed a particular height over a given time horizon are based on Kopp et al. 2014 and described below.

1. Sea level rise of 1.6 feet (50 cm) is representative of the low risk aversion projection for 2070 which means there is an 83% probability sea level rise will not exceed this amount over the next 50 years. There is less than a 5% probability that this amount of SLR will occur before 2060. Under a worst-case extreme SLR scenario (H++) this amount of SLR could occur by 2040.

2. Sea level rise of 3.3 feet (100 cm) is representative of the medium-high risk aversion projection for 2070 which means there is a 99.5% probability sea level rise will not exceed this amount over the next 50 years. However, under a worst-case extreme SLR scenario (H++) this amount of SLR could occur by 2060.

3. Sea level rise of 4.9 feet (150 cm) represents the medium-high risk aversion projection for the 2080-2090 time horizon. There is a ~95% probability that 4.9 feet of SLR does not occur until after 2100. However, under a worst-case extreme SLR scenario (H++) this amount of SLR could occur by 2070.

4. Sea level rise of 6.6 feet (200 cm) is representative of the medium-high risk aversion projection for 2100 which means there is a ~99.5% probability sea level rise of this magnitude will not occur this century. This scenario provides a conservative projection for SLR to be applied on projects with a longer design life (75-100 years) and subject to medium-high consequences if SLR is underestimated.

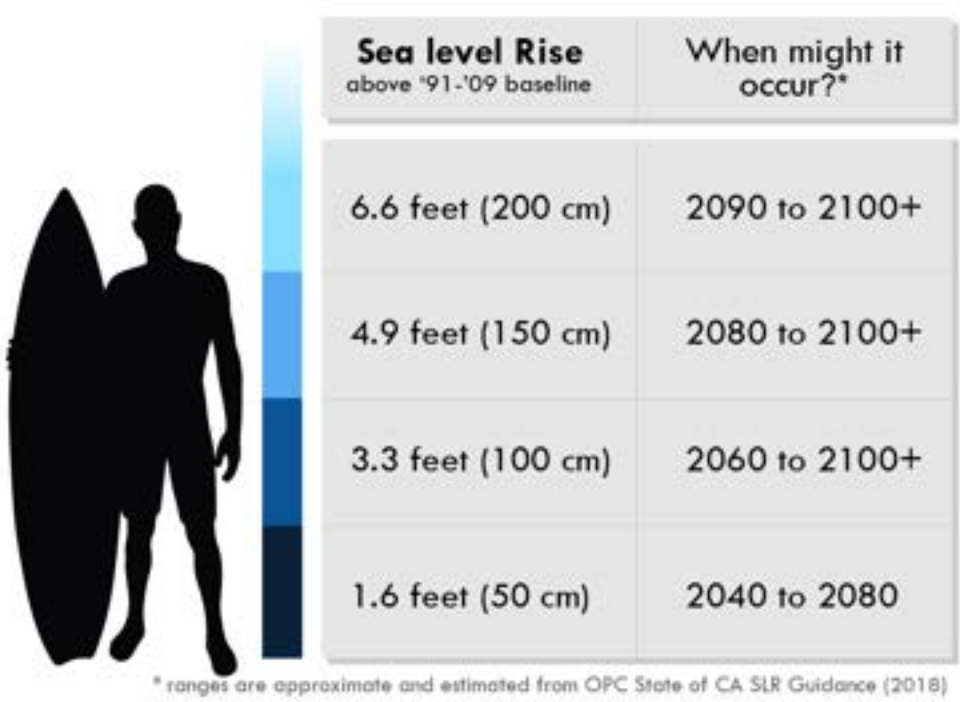


Figure 4-3: SLR scenarios selected for vulnerability analysis and projected timing of impacts.

4.4 CoSMoS SLR Hazard Evaluation

The effects of SLR on storm and non-storm related flooding were evaluated using results of the Coastal Storm Modeling System (CoSMoS) Version 3.0, Phase 2, a multi-agency effort led by the United States Geological Survey (USGS) to make detailed predictions of coastal flooding and erosion based on existing and future climate scenarios for Southern California. Other SLR hazard viewers such as the NOAA Sea Level Rise Viewer are also available, but these tools lack the regional focus and depth of information provided in CoSMoS modeling efforts.

The CoSMoS modeling system incorporates state-of-the-art physical process models to enable prediction of currents, wave height, wave runup, and total water levels (Erikson et al., 2017). A total of 10 SLR scenarios are available, increasing in 0.8 ft (0.25 m) increments from 0 to 6.6 ft (0 to 2 m) and also including

an extreme SLR scenario of 16.4 ft (5 m). CoSMoS modeling results provide predictions of shoreline erosion, cliff erosion, and coastal flooding under both average conditions and extreme events.

Hazard analyses for the City of Seal Beach focus primarily on shoreline erosion and coastal flood modeling results given the lack of erodible bluffs within the City coastal zone. The hazards depicted in this report are presented solely based on the assumptions and limitations accompanying the CoSMoS data available at the time of this study. No additional numerical modeling or independent verification of the CoSMoS data was performed.

4.4.1 Wave Modeling

Available CoSMoS storm scenarios include annual, 20-year, and 100-year return period storm events. Future storm conditions are downscaled from winds, sea-level pressures, and sea surface temperatures of an established global climate model (Erikson et al., 2017). Additional modeling was performed to translate projected deep water waves to shore, simulating additional regional and local wave growth. Due to the large geographical extent of CoSMoS modeling efforts, the same representative storm events are used across southern California to model wave impacts. Each of the selected representative storm events produces waves from a W-NW direction typical of winter storms (Table 4-1). CoSMoS Wave modeling results show nearshore wave heights of approximately 10ft along the coast of Seal Beach. Wave heights are diminished within areas shadowed by jetty structures. It should be noted that wave modeling immediately downcoast of Anaheim Bay does not fully extend to the current shoreline.

Table 4-1: Boundary conditions associated with each CoSMoS modeled storm scenario.

Scenario	Hs (ft)	Tp (s)	Dp (degrees)	Maximum wind speed (m/s)
Background	5.7	12	286	NA
1-year storm #1	14.4	16	284	22.8
20-year storm #1	19.2	18	281	22.3
20-year storm #2	20.1	18	292	28.7
100-year storm #1	20.3	16	264	26.6
100-year storm #2	22.3	18	287	30.3

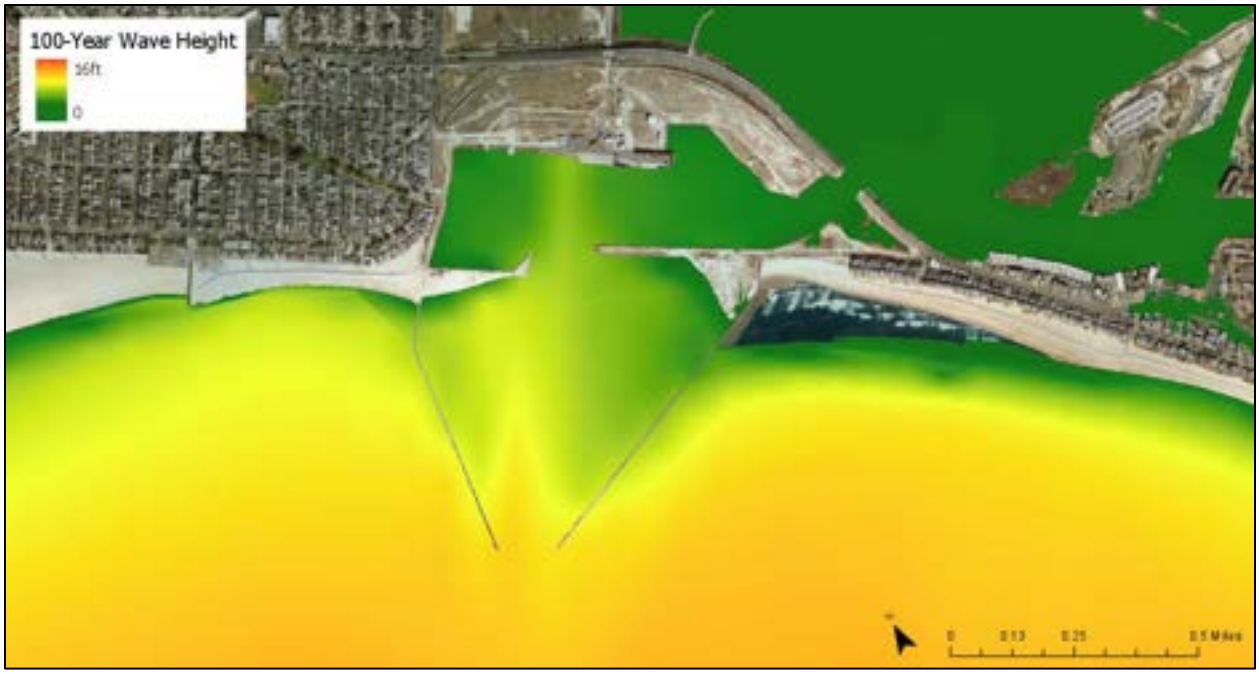


Figure 4-4: CoSMoS wave modeling results for a 100-year storm event under current conditions.

4.4.2 Coastal Flood Projections

CoSMoS coastal flooding projections simulate the effects of erosion, wave runup, and overtopping during storm events. Coastal flood extents are calculated and mapped at profiles spaced approximately 300 ft along the shoreline. The projected coastal water levels used in flood mapping consider future shoreline change, tides, sea level anomalies like El Niño, storm surge, and SLR. Future wave conditions used in the model are based on forecasted conditions out to year 2100. All flood events are modeled in conjunction with a high spring tide, a tide height that occurs approximately twice a month, to represent a near worst-case scenario (Erikson et al., 2017).

CoSMoS coastal flood modeling results assume that future shoreline retreat will be halted at the existing development line and that no beach nourishment events will occur to maintain existing beach widths. These assumptions may have potential impacts on flood modeling results within the City of Seal Beach due to the recurring nourishment programs that take place along much of the shoreline. Projected coastal flood extents, unlike shoreline erosion, are permitted to extend beyond the line of development. Assumptions regarding the specific type, height, and shoreline profile of existing coastal protection structures are not immediately available for large-scale modeling efforts such as CoSMoS. These parameters are key in providing precise evaluations of the wave runup height and potential for flooding landward of specific structures, and thus it may be prudent to verify CoSMoS findings in a subsequent coastal flood modeling effort.

4.4.3 Shoreline Erosion Projections

CoSMoS shoreline erosion projections include long-term erosion resulting from SLR and projected wave conditions. Shoreline erosion projections are modeled with the CoSMoS Coastal Online Assimilated Simulation Tool (COAST), which includes a suite of models that consider historic erosion trends, long-shore

and cross-shore sediment transport, and shoreline changes due to increased water levels. These models were tuned with historic data to account for unresolved sediment transport processes and inputs such as sediment loading from rivers and streams, regional sediment supply including beach nourishment and bypassing, and long-term erosion.

The CoSMoS-COAST shoreline projections are based on an initial shoreline mapped from a 2009-2011 LIDAR data set (Erikson et al., 2017). Due to the dynamic nature of the shoreline in Seal Beach, the initial shoreline present in CoSMoS modeling efforts may not fully reflect the current shoreline position. In select locations the current shoreline is significantly landward of CoSMoS initial shoreline projections, particularly along Surfside Avenue where large beach nourishment events take place. This variation in shoreline width is shown in Figure 2-7 and Figure 2-8. Within these areas the shoreline erosion due to each SLR scenario may reach further inland than depicted in CoSMoS projections.

CoSMoS shoreline erosion projections for each level of SLR are based on four management scenarios. Management scenarios are defined by the presence or absence of shoreline armoring and beach nourishment. The use of shoreline armoring is referred to as a "Hold-the-Line" scenario, and shoreline erosion modeling under this scenario assumes that the existing boundary between sandy beach areas and development is maintained with coastal structures. The "No Hold-the-Line" scenario assumes no such armoring is in place and allows shoreline erosion projections to propagate inland to the maximum potential extent based solely on topography. In a similar manner to the shoreline armoring scenarios, the "Beach Nourishment" management scenario assumes that historical beach nourishment practices are continued into the future, whereas the "No Beach Nourishment" scenario assumes the beach is left in its current state. The No Hold-the-Line, No Beach Nourishment scenario is used for hazard analyses within this study in order to document the full suite of potential SLR hazards.

4.4.4 Limitations of CoSMoS Projections

The regional focus of the CoSMoS modeling effort results in certain limitations when applied at smaller scales or specific locations. The limitations are particularly evident at locations where wave action and littoral processes are heavily influenced by coastal structures and sediment management activities such as Seal Beach. Some limitations of the CoSMoS model and how they may influence the projected exposure of resources in Seal Beach are discussed in this section. The following section is based on our general understanding of the CoSMoS regional modeling approach compared with our local knowledge of coastal hazards in Seal Beach. An independent verification of their model was not performed because the site-specific details, assumptions and inner workings of the CoSMoS model are not publicly available.

Surfside Community

Perhaps the most significant limitation of the model results in Seal Beach is the starting shoreline used downcoast of the Anaheim Bay entrance. The CoSMoS shoreline projections and flood mapping are based on an initial shoreline mapped from a 2009-2011 LIDAR data set which represents a post-nourishment condition at Surfside/Sunset Beach where the beach is at its widest. Approximately 2 million cubic yards were placed immediately south of the Anaheim Bay east jetty in 2009/2010 nourishment. This segment of the study area is subject to significant variation over a typical nourishment cycle as illustrated in Figure 2-7 and Figure 2-8. Since the CoSMoS modeling of future shoreline position and flooding was applied to a nourished beach the results underestimate the potential for erosion and flooding of the Surfside Community in all SLR scenarios, especially the higher scenarios of 3.3 to 6.6 feet.

East Beach

It's uncertain the degree to which the unique wave dynamics and sediment management activities at east beach are reflected in the CoSMoS results. Since the flooding was evaluated based on one-dimensional transects it's unlikely the wave amplification effects described in Section 2.2 were incorporated into the flood modeling. This would result in an underestimate of the potential for flooding under each SLR scenario.

The winter dike constructed annually along east beach does not appear in the CoSMoS digital elevation model (DEM). Therefore, we assume this feature was not reflected in the one-dimensional transect modeling used to predict future flooding. If the modeling effort did not include the winter dike the results would provide a conservative estimate of the extent of flooding due to wave runup and overtopping of the beach berm.

Sediment management activities such as backpassing and nourishment provide an artificial source of sand to east beach which would influence future shoreline position. It's possible these are reflected in the CoSMoS-COAST shoreline projections since the model includes historic shoreline trends that were influenced by these sediment management activities.

San Gabriel River / Los Cerritos Wetlands / Anaheim Bay

The majority of flooding predicted by CoSMoS appears to be from tidally influenced water bodies such as the San Gabriel River, Los Cerritos Wetlands and Anaheim Bay. Since the CoSMoS model does not model extreme fluvial events the flooding appears to be a result of SLR in combination with high ocean water levels. However, the hydraulic connection (i.e. flood path) from these water bodies is not well defined or described in the CoSMoS data. It's uncertain if or how existing flood control measures such as levees, berms and walls were accounted for in the flood modeling. The DEM resolution used in the CoSMoS model may not adequately resolve the elevation of narrow features such as levees or flood walls. If a hydraulic connection does exist the amount of flooding is often limited by the volume of water conveyed through a particular connection over a period of time (i.e. peak of the tide cycle).

Given the various inland water bodies and potential for surface and below surface connections, it's difficult to diagnose the source of predicted flooding and what could be done to mitigate flooding form the CoSMoS results alone. A more detailed City-focused analysis would be required to identify any potential hydraulic connections that exist and evaluate the potential for flooding under each SLR scenario.

5. Vulnerability Assessment

5.1 Coastal Development

Short-term Vulnerability

Coastal development within the City of Seal Beach has a low vulnerability to non-storm flood hazards under short-term SLR projections. Non-storm flood projections under a 1.6ft SLR scenario do not approach any areas of the Seal Beach waterfront or Surfside community, resulting in minimal hazard exposure for these resources. Despite minimal direct exposure to tidal flood hazards, coastal development east of the Seal Beach Municipal Pier and within Surfside can still be considered sensitive to short-term SLR hazard projections due to the ongoing sand management practices within these areas. Even small reductions in beach width may alter these practices and lead to potentially undesirable outcomes, such as a loss of aesthetic value if winter berms are pushed further inland.

Coastal development is projected to be much more vulnerable to flooding during a 100-year storm event under short-term SLR scenarios. While storm flood hazard projections under current conditions do not overlap with any coastal development areas, projections under a 1.6ft SLR scenario cover a large, low-lying area immediately south of the Pacific Coast Highway stretching from the San Gabriel River to Anaheim Bay. Flooding within this inland area appears to stem from Anaheim Bay and the San Gabriel River rather than directly from the coast. Storm flood projections under this short-term scenario also extend inland from Anaheim Bay at the eastern and western ends of the Surfside community. As noted in Section 4.4.4, flood potential for development at the western end of Surfside may be underestimated due to changes in shoreline width following nourishment events.

Though the short-term hazard exposure of coastal development is limited to temporary flooding during extreme storm events, these hazards are still of concern due to the high sensitivity of affected areas. If flood mitigation measures are not in place, even minor flooding of the densely developed coastal areas within the Seal Beach waterfront and Surfside community can lead to extensive structural damages. While hazard sensitivity is high within these areas, overall short-term SLR hazard vulnerability is mitigated somewhat by potential adaptive capacity. A number of reliable options exist to mitigate temporary, storm-driven flood hazards projected under short-term SLR scenarios given that flood depths are <1 foot in the majority of affected areas. Potential adaptation measures include both wet and dry flood-proofing of threatened structures as well as incremental improvements to existing flood protection mechanisms. Such measures can typically be implemented more efficiently and at a lower cost than measures designed to address recurrent non-storm flooding or widespread flooding at depths exceeding 5 feet as projected under extreme SLR scenarios.

Long-term Vulnerability

Coastal development within Seal Beach is vulnerable to long-term SLR hazard projections under multiple scenarios. Specific impact projections including number of structures impacted and total estimated damages can be found in Section 6.1. Significant hazard exposure is projected for non-storm conditions under 3.3ft, 4.9ft, and 6.6ft SLR scenarios. Under the 3.3ft SLR scenario tidal flood projections become widespread within the low-lying area south of the Pacific Coast Highway, covering an area similar to that seen for 100-year storm conditions under a 1.6ft SLR scenario. Non-storm flood projections under a 4.9ft SLR scenario show further flooding in coastal areas between 4th and 7th Street and in areas inland of the

Pacific Coast Highway, including the entirety of Leisure World and portions of the commercial area along Westminster Boulevard. Beachfront property is also more exposed to flood hazards under this scenario, with areas along the eastern and western portions of the Seal Beach waterfront and Surfside community projected to experience recurrent tidal flooding. This is of particular concern in the eastern portion of Surfside, where shoreline projections show only a small amount of intact sandy beach area. While not shown specifically in CoSMoS hazard projections, this may also be the case along the entirety of the Surfside shoreline in the absence of a recent nourishment event. Non-storm flood projections under a 6.6ft SLR scenario extend across the entirety of beachfront property east of the Seal Beach Municipal Pier and within the Surfside community, covering the majority of development south of the Pacific Coast Highway. Incremental increases in inland flood extents are also seen under this scenario.

100-year storm flood projections show widespread flooding of coastal development under less extreme SLR scenarios. In addition to areas immediately south of the Pacific Coast Highway, storm flood projections under a 3.3ft SLR scenario cover significant portions of inland areas and beachfront property within the City, including the entirety of Leisure World and areas at the far western portion of the Seal Beach waterfront. Storm flood projections become more extensive with 4.9ft SLR, covering almost the entirety of development bordered by Main Street and the Pacific Coast Highway as well as all beachfront property within Surfside. Flood projections under this scenario also extend further into the Westminster Boulevard commercial area. Storm flood projections increase incrementally across all areas with 6.6ft SLR, notably within the Surfside community and eastern Seal Beach waterfront where flooding from the coastline joins flooding from surrounding bays over large areas.

Coastal development is highly sensitive to flood hazards projected under long-term SLR scenarios. While it is possible for limited structural damage due to temporary inundation to be repaired in a reasonable timeframe, the recurrent and widespread non-storm flooding projected under 3.3ft, 4.9ft, and 6.6ft SLR scenarios will likely prevent use of these areas due to ongoing damages and frequent loss of access if no adaptation measures are implemented. Storm flood hazard sensitivity also increases when considering long-term SLR scenarios due to the expanded area and increased severity of flood projections, especially within the Surfside community and beachfront areas. Adaptive capacity is also diminished when considering long-term flood projections. Many traditional flood mitigation practices such as structural elevation or retrofitting are not designed for the frequent inundation events or potential undermining from shoreline erosion projected under long-term SLR scenarios, and there are limited unoccupied areas at higher relief in the immediate vicinity of existing coastal development for use in alternative adaptation strategies.

5.2 Utilities Infrastructure

Short-term Vulnerability

Water and energy infrastructure within the City of Seal Beach is projected to experience minimal hazard exposure for non-storm conditions under short-term SLR scenarios. The only utilities resource exposed to non-storm flood hazards under a 1.6ft SLR scenario is the Aquatic Park lift station. Hazard exposure increases substantially when considering 100-year storm conditions under short-term SLR scenarios. Storm flood projections under a 1.6ft SLR scenario cover a number of water infrastructure resources in the area south of the Pacific Coast Highway. Affected resources include the 1st Street Lift Station, Pump

Station 35, the West End Pump Station, and a number of storm drains and catchment basins along the eastern end of Electric Avenue Median Park.

Pump and lift stations have the greatest sensitivity to SLR hazards among the utilities resources exposed under short-term SLR scenarios. The Aquatic Park lift station has the greatest degree of sensitivity due to the potential for recurrent non-storm flooding with 1.6ft SLR, which could severely disrupt the functioning of the station on a regular basis. Other utilities infrastructure exposed to storm-driven flooding is less sensitive to short-term SLR hazards. Structural damage to pump and lift stations may occur, but the temporary nature of flooding limits damage potential and provides opportunities for repair following extreme storm events. Storm flooding may also reduce the functionality of stormwater infrastructure, potentially causing upstream flooding if elevated water levels coincide with a major rain event, though once again these impacts would be temporary.

Though complex, water infrastructure has a relatively high adaptive capacity when considering projected short-term SLR hazards, helping to maintain low overall vulnerability. Elevation of small-scale utilities infrastructure is more feasible than larger residential or commercial infrastructure due to the lack of large engineered structures and reduced need for access. Utilities infrastructure within projected storm flood areas under a 1.6ft SLR scenario could likely employ this or other similar strategies to address temporary flood issues, though infrastructure subject to non-storm flooding such as the Aquatic Park lift station may require additional adaptation measures.

Long-term Vulnerability

The SLR hazard vulnerability of utilities infrastructure increases substantially when considering long-term SLR scenarios. Non-storm flood projections under a 3.3ft SLR scenario cover much of the water infrastructure south of the Pacific Coast Highway, including all pump and lift stations except those located on the Municipal Pier and 8th Street. Inland water infrastructure within Leisure World and surrounding areas is projected to become impacted by non-storm flooding with 4.9ft SLR, with flood extents also approaching the City electric substation. Non-storm flood projections increase incrementally with 6.6ft SLR, with additional flood areas encompassing the 8th Street pump station and the entirety of the electric substation.

Utilities infrastructure exposure to storm flooding occurs at lower long-term SLR thresholds. Storm flood projections with 3.3ft SLR cover all lift and pump stations with the exception of the Municipal Pier pump station. Upland water infrastructure within Leisure World is also impacted under this scenario. Storm flood projections with 4.9ft SLR additionally cover the electric substation. Incremental increases in flood projections with 6.6ft SLR do not extend over any additional major utilities infrastructure but will result in more frequent and more severe overall storm flood conditions in previously affected areas.

Utilities infrastructure can also be considered more sensitive to long-term SLR hazards due to the widespread nature of non-storm flooding. Water and electrical infrastructure may be able to accommodate and recover from localized, infrequent structural damage or system disruption due to temporary flooding during extreme storm events, but it is unlikely that systems will remain functional if a large portion of utilities resources become subject to recurring non-storm inundation, especially considering non-storm flood projections under 4.9ft and 6.6ft SLR scenarios. Storm flood projections under a 3.3ft SLR scenario are also likely to cause significant impacts to utilities infrastructure due to the city-wide nature of flooding. Any inundation of the electric substation, whether storm-driven or non-

storm related, is also likely to result in impacts to the facility itself and disruption of critical services throughout the City.

The adaptive capacity of water and electric infrastructure is also reduced for long-term SLR hazard projections. While localized adaptation measures may be feasible when addressing short-term SLR flood hazards, long-term adaptation measures may require more extensive protection, redesign, or relocation of utilities resources due to the extent and magnitude of non-storm and storm-driven flood projections.

5.3 Public Safety Facilities

Short-term Vulnerability

Public safety facilities, within the City of Seal Beach, including fire stations, lifeguard stations, and the City Community Safety Building, have minimal vulnerability to short-term SLR hazards due to a lack of exposure. No major safety facility infrastructure is projected to be impacted by either non-storm or storm-driven flood hazards under a 1.6ft SLR scenario.

Long-term Vulnerability

The long-term SLR hazard vulnerability of public safety facilities is also limited due to relatively low hazard exposure. The only structures impacted under non-storm conditions are the Community Safety Building and Lifeguard Headquarters with 6.6ft SLR. These same structures are within 100-year storm flood projections under a 3.3ft SLR scenario. No additional public safety facilities are projected to be impacted with 4.9ft SLR, while 6.6ft SLR storm flood projections include Fire Station 48 in the northern portion of the City. In addition to direct exposure to flood hazards, the effectiveness of public safety initiatives within the City will likely be reduced as flooded transportation infrastructure surrounding facilities leads to increased response times.

The Community Safety Building and Lifeguard Headquarters are likely to experience the greatest impacts among public safety facilities. Non-storm flood conditions as projected under a 6.6ft SLR scenario would likely result in repeated structural damage and severe disruption of use. Storm flood projections also pose a significant risk under long-term SLR scenarios. Storm flooding projections with 3.3ft SLR show potential inundation of both facilities, and any impacts seen under this scenario will become more common under 4.9ft and 6.6ft SLR scenarios. Though storm-related flooding is temporary in nature, even infrequent damage to these structures could reduce emergency response capacity and lead to significant impacts to public use and safety of surrounding recreational areas including beaches.

Long-term adaptive capacity remains high for these resources. Traditional flood mitigation actions such as wet or dry floodproofing remain as options to address temporary, storm-driven flooding as projected under a 3.3ft SLR scenario. In the event that such measures are no longer sufficient to address coastal hazards under more extreme SLR scenarios, available land at higher relief exists immediately landward for potential relocation or realignment of resources.

5.4 Transportation Infrastructure

Short-term Vulnerability

Transportation infrastructure within the City of Seal Beach is potentially vulnerable to projected storm flood conditions under short-term SLR scenarios. No major transportation resources are exposed to

projected flood hazards for non-storm conditions under a 1.6ft SLR scenario. Storm flood projections under a 1.6ft SLR scenario cover several critical transportation routes, including select segments of the Pacific Coast Highway, Seal Beach Boulevard, and Marina Drive. A number of local roads south of the Pacific Coast Highway and north of Electric Avenue are also projected to experience flooding during extreme storm events with 1.6ft SLR.

Though short-term SLR hazard exposure is limited to temporary flooding during extreme storm conditions, major transportation infrastructure remains sensitive to projected hazards. While roads are generally resistant to structural damage during short-term inundation as projected under a 1.6ft SLR scenario, the disruption of major regional transportation corridors such as the Pacific Coast Highway and Seal Beach Boulevard, even on a limited basis, has the potential to impact critical services throughout the City and surrounding areas. This sensitivity is compounded by the likely need for emergency services in waterfront areas during major storm events when flooding will be most severe.

Adaptive capacity of transportation infrastructure is generally high when considering localized, temporary inundation during extreme storm events. Elevation, protection, or floodproofing of critical access routes can typically be employed to address these hazards without the need for significant reconfiguration of transportation resources.

Long-term Vulnerability

Transportation infrastructure is significantly more vulnerable to flood hazards projected under long-term SLR scenarios. Non-storm flood projections under a 3.3ft SLR scenario cover large segments of the Pacific Coast Highway, Marina Drive, and Seal Beach Boulevard within coastal areas. Under a 4.9ft SLR scenario non-storm flood projections extend continuously across the majority of local roads south of the Pacific Coast Highway and west of Seal Beach Boulevard. Inland portions of Seal Beach Boulevard and Westminster Boulevard are also impacted under this scenario. The incremental increase in non-storm flood projections under a 6.6ft SLR scenario does not impact any additional major transportation resources, but non-storm flooding projected under previous scenarios will become more frequent and severe.

Storm flood projections result in similar exposure but at less extreme SLR scenarios. Flood projections under a 3.3ft SLR scenario cover the majority of the Pacific Coast Highway west of Seal Beach Boulevard, extend continuously across local roads south of the Highway, and extend across large upland segments of Seal Beach Boulevard and Westminster Boulevard. Storm flood projections under a 4.9ft SLR scenario extend further along local roads north and south of the Pacific Coast Highway and along Westminster Boulevard east of Seal Beach Boulevard. A similar, incremental increase in flood extents is seen under a 6.6ft SLR scenario.

Along with increased exposure, transportation infrastructure is more sensitive to the types of hazards projected under long-term SLR scenarios. Extensive structural damage is more likely if transportation infrastructure is subject to repeated non-storm inundation, and frequent disruptions of use within non-storm flood areas is likely to significantly reduce the utility of any affected resources. Widespread inundation during extreme storm events as projected under 3.3ft and greater SLR scenarios is also likely to significantly disrupt transportation patterns throughout the City and surrounding areas until floodwaters subside.

The adaptive capacity of transportation infrastructure is also diminished for long-term SLR hazard projections. Mitigation beyond localized measures for critical infrastructure will likely be necessary to address the extensive nature of non-storm and storm flood projections under a 3.3ft SLR scenario. The city-wide extent of non-storm flood projections under SLR scenarios greater than 3.3ft also presents a significant challenge for adaptation, likely requiring significant redesign or realignment of transportation resources throughout the City.

5.5 Coastal Access and Recreation

Short-term Vulnerability

A number of coastal access and recreation resources are vulnerable to projected short-term SLR hazards. Non-storm flood projections under a 1.6ft SLR scenario show shoreline retreat of approximately 40ft along the Seal Beach waterfront. Approximately 100ft of shoreline retreat is projected within the Surfside community under this scenario. Storm flood projections under a 1.6ft SLR scenario cover multiple coastal access points and park areas at the western end of the Seal Beach waterfront, including the San Gabriel River Greenbelt and Windsurf Park. Storm flood projections extend further inland under this scenario, approaching the current location of seasonal sand berm construction along the eastern portion of the Seal Beach waterfront and Surfside community.

The eastern portion of the Seal Beach waterfront and Surfside community are highly sensitive to any loss of beach area due to continual erosion of the shoreline at these locations. Any loss of beach width in these areas has the potential to disrupt ongoing seasonal sand management practices necessary to maintain current beach width, including sand berm construction. Loss of beach width and higher water levels will also likely require higher berms placed closer to existing development to mitigate storm flood damage, potentially reducing the recreational and aesthetic value of beach areas while the berm is in place. Additional storm flood projections are also likely to increase the severity of episodic erosion events.

Adaptive capacity for coastal access and recreation resources is highest in the western portion of the Seal Beach waterfront where beach width and sediment supply are greatest. This area will likely be able to accommodate short-term shoreline retreat due to SLR, though increased storm flood hazard mitigation measures may be required to prevent damage to coastal parks in the area. Adaptive capacity is limited along the eastern portion of the Seal Beach waterfront and the Surfside community. In each of these areas the narrower sandy beach is backed by coastal development, preventing landward migration of beach areas over time with increased SLR and erosion.

Long-term Vulnerability

Coastal access and recreation resources within the City of Seal Beach are highly vulnerable to projected long-term SLR hazards. A more detailed discussion of the potential economic impacts of beach loss within the City can be found in Section 6.2. Non-storm flood projections under a 3.3ft SLR scenario show substantial shoreline retreat, covering the 1st Street coastal access point and surrounding coastal parks. In the eastern portion of the Seal Beach waterfront these projections cover approximately half of the current beach width at the narrowest locations, bordering existing sand berm placement locations. Non-storm flood projections under a 3.3ft SLR scenario also extend beyond current sand berm placement in the eastern portion of the Surfside community, ending approximately 100ft from existing development. Storm flood projections with 3.3ft SLR extend across the majority of coastal access points within the City including Municipal Pier parking facilities and the eastern beach promenade.

Non-storm flood projections with 4.9ft SLR extend beyond current sand berm placement locations in the eastern Seal Beach waterfront, approaching parking areas and leaving minimal remaining beach width at select locations. Beach area in the far eastern portions of Surfside is eliminated entirely under these hazard projections. Storm flood projections with 4.9ft SLR extend further inland along the western Seal Beach waterfront and cover almost the entirety of the eastern waterfront, inundating all but two coastal access points. Storm flood projections increase incrementally within the Surfside community under this scenario, extending beyond current sand berm placement across approximately half of the shoreline.

Non-storm flood projections under a 6.6ft SLR scenario extend fully across portions of the eastern Seal Beach waterfront, dividing the current beach into two small, isolated areas and inundating all eastern coastal access points. Non-storm flood projections also leave minimal beach width in areas surrounding the Municipal Pier and fully inundate Pier parking facilities. Beach areas are also eliminated entirely across significant portions of the Surfside community. Storm flood projections under this scenario show marginal increases over non-storm flood projections with the exception of the western Seal Beach waterfront, where flooding extends inland from the San Gabriel River.

Coastal access and recreation resources remain highly sensitive to these hazard projections. The extensive shoreline retreat seen in long-term hazard projections is likely to significantly reduce or eliminate the utility of sandy beach areas within the eastern Seal Beach waterfront and eastern portions of Surfside. The SLR hazard sensitivity of these areas is again compounded by potential disruption of sand management practices needed to maintain beach width under current conditions. Use of the southern portions of the San Gabriel River Greenbelt, Windsurf Park, and 1st street parking facilities is also likely to be significantly disrupted due to repeated tidal inundation with 3.3ft or greater SLR. Other coastal access points and Municipal Pier Parking facilities may be unavailable for extended period following flooding during major storm events with 3.3ft SLR, or on a more frequent basis due to non-storm flood projections under more extreme SLR scenarios.

Adaptive capacity is once again limited due to the presence of coastal development immediately landward of beach areas. Without room for landward migration, additional sand placement measures or other similar actions will likely be needed to maintain usable beach width in areas surrounding the Municipal Pier, the eastern Seal Beach waterfront, and the Surfside community under 3.3ft and greater SLR scenarios. Adaptive capacity for coastal parking facilities is aided by the presence of open space landward of these resources and the relative ease of elevation or relocation due to the lack of large structures.

5.6 Seal Beach Municipal Pier

Like many timber piers along the coast of California, the Seal Beach Municipal Pier experienced significant damage during the severe winter storm events of 1983. During a series of large wave events at the end of January 1983 a ~300 foot segment of the pier collapsed adjacent to the concrete groin. Several months later, during another large swell event in March 1983, a much longer ~700 foot segment pier collapsed leaving only the base of the pier and the outer end of the pier standing. Photographs of the pier after these events are shown in Figure 5-1. The large wave heights, long wave periods (20-25 seconds) and westerly direction were factors in the extremely large waves impacting the Seal Beach area. The sequence of extreme storms during this season resulted in severe beach erosion and coastal flooding in addition to pier damage. The middle segment of the pier was re-built in 1985 with a deck elevation of 26 feet, MLLW

(25.8 ft NAVD), three feet higher than the outer segment of the pier which remains at a deck elevation of 23 feet, MLLW (22.8 ft, NAVD).

Figure 5-1: Damage to Seal Beach Municipal Pier during the winter of 1983.

Water levels and wave heights from CoSMoS were used to evaluate the exposure of the Pier to damage from large wave events in combination with sea level rise. The pier is considered to be vulnerable to storm damage when the maximum wave crest elevation reaches the deck elevation. Most timber pier structures are sensitive to the dynamic loads resulting from a wave crest impacting the pier deck structure. Major damage experienced during the 1983 events was attributed to the combination of wave crests exceeding the pier deck, scour at the sea bed, excessive wave-induced forces on deteriorated piles, and debris from broken piles impacting other piles.

Short-term Vulnerability

For purposes of this analysis the significant wave height from the CoSMoS 100-year event was used to calculate a maximum wave crest elevation profile for each SLR scenario. The wave crest elevation profiles (solid lines) and water level profiles (dashed lines) are provided in Figure 5-2 in relation to the existing pier deck elevation. The results indicate that the vulnerability of the pier deck increases substantially for SLR scenarios of 3.3 feet and higher. However, due to the factors described below, the pier structure would likely be vulnerable to significant damage in an extreme event with any amount of SLR.

One factor not reflected in the CoSMoS wave heights is the amplification of wave height that occurs when an incident wave combines with a reflected wave (off of the Anaheim Bay west jetty) in the vicinity of the Pier. This amplification typically occurs in the surf zone which could explain why the outer segment of the pier survived the storms of 1983, but the middle segment experienced complete failure.

The significant wave height for the CoSMoS 100-year event (~10-12 feet) near the Seal Beach Municipal Pier is smaller than estimated in prior studies. Prior studies (USACE, 2002 and M&N, 1984) indicate a wave height of 10 feet is more representative of a 1-year to 5-year return period. The offshore wave parameters used in the CoSMoS model may be representative of a 100-year event for the greater southern California region but not for Seal Beach. The local wave exposure of Seal Beach is sensitive to the wave period and direction which is why the 1983 events were so problematic.

The Coast of California Storm and Tidal Waves Study (CCSTWS) for Orange County (USACE, 2002) estimated the 100-year wave height in Seal Beach to be about 18 feet (USACE, 2002). A prior study on coastal hazards in Seal Beach by Moffatt & Nichol (M&N, 1984) estimated the 100-year breaking wave height to be about 27 feet. Based on these larger wave heights, the pier would be vulnerable to an extreme storm today, especially if the event coincided with a high water level.

Long-term Vulnerability

This analysis indicates that any amount of SLR will increase the potential for damage during an extreme event. Assuming the CoSMoS wave heights are representative of a 1-5 year return period the higher SLR scenarios of 3.3 to 6.6 feet will significantly increase the frequency at which wave crest elevations exceed the pier deck. Two complicating factors that will also increase the vulnerability of the pier are long-term shoreline erosion which will shift the hazards further landward and the deterioration of the pier structure which could reduce the capacity of the structure to withstand additional wave impact forces.

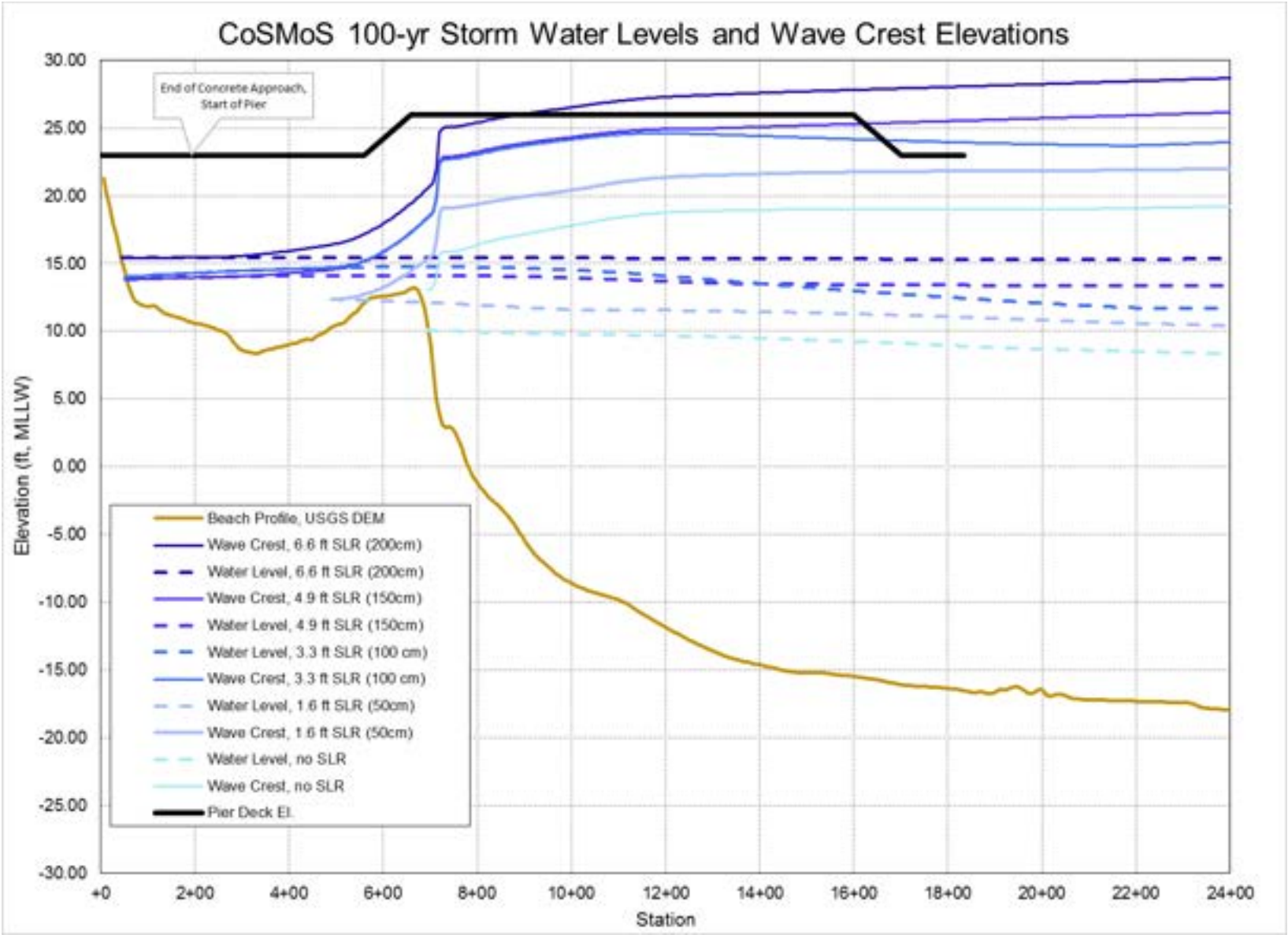


Figure 5-2: Wave crest profiles at Seal Beach Municipal Pier based on CoSMoS 100-year event.

5.7 Environmental Resources

Short-term Vulnerability

The Seal Beach National Wildlife Refuge is potentially vulnerable to short-term SLR hazards, while the Los Cerritos Wetlands have limited short-term vulnerability due to a lack of hazard exposure. Non-storm flood projections under a 1.6ft SLR scenario extend inland in the areas surrounding the Seal Beach National Wildlife Refuge, while no additional flooding is projected within the Los Cerritos Wetlands. Storm flood projections under a 1.6ft SLR scenario increase significantly in the region surrounding the Seal Beach National Wildlife Refuge. Flood projections are once again absent from the Los Cerritos Wetlands under this scenario.

Despite some degree of hazard exposure within the Seal Beach National Wildlife Refuge, overall hazard vulnerability is mitigated by potential adaptive capacity. Though wetlands are largely resistant to temporary inundation hazards, coastal wetlands can be sensitive to consistently elevated non-storm water levels if landward retreat or sediment accretion is prevented or inhibited. The ample open space landward of wetland areas within the Refuge reduces this concern when considering projected short-term SLR hazards, potentially allowing current coastal wetlands to migrate to higher ground over time. It should be noted that this potential adaptive capacity is highly dependent on a number of dynamic processes including rates of SLR, coastal sediment accretion, and the ability of wetland species to colonize new areas, and as such may require ongoing monitoring efforts to ensure preservation of ecological functions.

Long-term Vulnerability

Coastal wetlands are more vulnerable to flood hazards projected under long-term SLR scenarios. Non-storm flood projections increase significantly within the Seal Beach National Wildlife Refuge under a 3.3ft SLR scenario, extending more than 3,000ft inland from current Refuge boundaries in select locations. Non-storm flood projections under a 4.9ft SLR scenario extend further inland within the Seal Beach National Wildlife Refuge and also encompass the entirety of the Los Cerritos Wetlands area. Incremental increases in non-storm flood projections are seen in each area with 6.6ft SLR.

Storm flood projections under a 3.3ft SLR scenario cover almost the entirety of the Los Cerritos Wetlands and extend approximately 1000ft further inland than the 1.6ft SLR scenario in the areas surrounding the Seal Beach National Wildlife Refuge. Incremental increases in storm flood projections are seen in each area under 4.9ft and 6.6ft SLR scenarios.

Long-term increases in tidal elevations pose the greatest threat to coastal wetlands within the City of Seal Beach. The large increase in non-storm flood projections within the Seal Beach National Wildlife Refuge with 3.3ft SLR has the potential to significantly alter the structure and function of wetlands in the surrounding area, particularly if the inland migration of tidal floodwaters exceeds the landward migration rate of wetland areas. Despite increased non-storm flood projections, adaptive capacity for these resources is still present, as available space remains inland of current wetland areas within the Refuge even under extreme SLR scenarios. Other strategies such as thin-layer sediment placement may also mitigate SLR impacts by gradually elevating wetland areas as SLR increases. The Los Cerritos wetlands are generally more sensitive to long-term SLR hazards due to a lower of adaptive capacity. Non-storm flood projections under a 4.9ft SLR scenario become a major concern for the Los Cerritos wetlands where, unlike the Seal Beach National Wildlife Refuge, limited open space is available to facilitate landward migration. The potential for loss of these coastal wetland areas is further exacerbated under a 6.6ft SLR scenario.

6. Economic Impacts of SLR

6.1 Structural Damages

Potential structural damages to coastal structures within the City of Seal Beach are based on depth-damage relationships established through the USACE North Atlantic Coast Comprehensive Study (NACCS). These depth-damage relationships are specifically designed to better capture damage due to coastal storms as opposed to riverine flooding (U.S. Army Corps of Engineers, 2015b). The USACE functions provide estimates of minimum, most likely, and maximum damages to structures as a percentage of total structure value.

For the purposes of this analysis damage estimates throughout the City are based on inundation depth-damage relationships for USACE Prototype 5B: Two Story Residence, No Basement (Figure 6-1). Damage estimates were determined for each land parcel using flood depths from projected non-storm and 100-year storm conditions under each SLR scenario. Percent damages estimates were translated into dollar values using the current median Zillow Home Value Index for the City of Seal Beach. Results of this analysis are summarized in

Table 6-1 and Table 6-2. These estimates are not intended to be exact measurements of damage to structures within the city due to SLR hazards but are instead meant to provide information on the relative scale of potential damage under various SLR scenarios to inform adaptation planning initiatives.

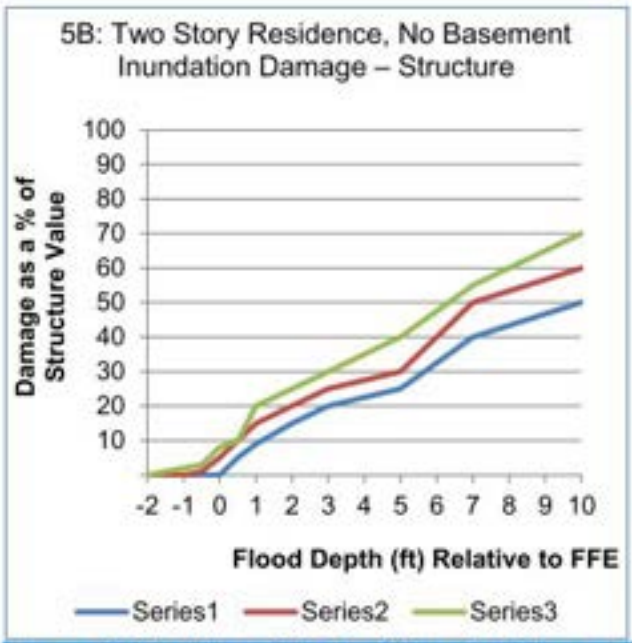


Figure 86. Prototype 5B: Two-Story Residence, No Basement, Inundation Damage – Structure

Table 67. Prototype 5B: Two-Story Residence, No Basement, Inundation Damage – Structure

Flood Depth	Min	Most Likely	Max
-2.0	0	0	0
-1.0	0	0	2
-0.5	0	1	3
0.0	0	5	8
0.5	5	10	10
1.0	9	15	20
2.0	15	20	25
3.0	20	25	30
5.0	25	30	40
7.0	40	50	55
10.0	50	60	70

Figure 6-1: NACCS inundation depth-damage values for Prototype 5B: Two Story Residence, No Basement.

Table 6-1: Potential structural damage due to non-storm SLR hazards under multiple scenarios.

SLR (ft)	Conditions	Parcels Impacted	Damages ($)		
			Minimum	Most Likely	Maximum
1.6	Non-Storm	0	0	0	0
3.3	Non-Storm	800	81,000,000	122,000,000	148,000,000
4.9	Non-Storm	1350	181,000,000	251,000,000	313,000,000
6.6	Non-Storm	1900	321,000,000	425,000,000	526,000,000

Table 6-2: Potential structural damage due to 100-year storm SLR hazards under multiple scenarios.

SLR (ft)	Conditions	Parcels Impacted	Damages ($)		
			Minimum	Most Likely	Maximum
1.6	100-Year Storm	850	75,000,000	119,000,000	146,000,000
3.3	100-Year Storm	1450	167,000,000	241,000,000	296,000,000
4.9	100-Year Storm	1900	314,000,000	417,000,000	519,000,000
6.6	100-Year Storm	2000	487,000,000	617,000,000	738,000,000

Inundation damage estimates for non-storm conditions reflect SLR exposure thresholds seen in hazard analyses. No parcels were impacted under non-storm conditions for the 1.6ft SLR scenario, but likely damages under a 3.3ft SLR scenario exceed $120 million. Non-storm flood damage projections grow steadily under more extreme SLR scenarios, with likely damages exceeding $250 million for a 4.9ft SLR scenario and $420 million for a 6.6ft SLR scenario. Storm flood damage projections follow a similar trend but occur at less extreme SLR scenarios, reaching approximately $118 with 1.6ft SLR, $240 million with 3.3ft SLR, and $416 million with 4.9ft SLR. Likely storm damage projections increase substantially under a 6.6ft SLR scenario, exceeding $600 million. Refer to the maps in Appendix A for the CoSMoS flood zones predicted for each scenario.

6.2 Non-Market Value Loss

Non-market value refers to those goods and services that cannot be directly measured through a market price when bought or sold. The non-market value of coastal resources is defined in terms of recreation value and ecosystem services such as water quality improvements in wetlands or the provision of ecological diversity within coral reefs. Non-market values loss within the City of Seal Beach is likely due to projected significant losses of sandy beach area along the Seal Beach waterfront and Surfside community as SLR increases.

Beaches provide non-market value in a number of ways including recreation and storm buffering capacity (California Department of Boating and Waterways, 2011). These values can be quantified in terms of willingness to pay, or the amount that an individual consumer would be willing to consume the good or use the associated service (Raheem et al., 2009). Non-market beach value can be broken down further in terms of use. Direct use value consists of activities such as fishing or boating. Indirect use refers to benefits such as shoreline protection or groundwater discharge, and non-use values include cultural or existence values that do not rely on use or proximity to beaches.

Determination and quantification of non-market values associated with beaches remains challenging due to the inherent variability between locations. U.S. EPA estimates of the economic value of coastal ecosystems are used in this analysis to define beach value loss in a spatially explicit manner. U.S. EPA economic value estimates are based on a comprehensive review of past studies by economists, conservation biologists, and California Ocean Protection Council staff to provide policy-relevant ecosystem service values for the California coastline. The study considered over 30 categories of ecosystem services in total and provides quantitative estimates of erosion regulation, recreation and ecotourism, and cultural heritage values associated with beach ecosystems (Table 6-3).

Table 6-3: Non-market values of California beach ecosystems in 2008 U.S. dollars (Raheem et al., 2009)

Non-Market Service Category	Service Flow Per Acre Per Year
Recreation and Ecotourism	16,946
Erosion Regulation	31,131
Cultural Heritage Values	27
Total Value	48,104

The City of Seal Beach contains approximately 87 acres of sandy beach area, resulting in a total annual service flow of approximately $4,872,000 based on EPA non-market service valuations and adjustments to 2018 dollars using Consumer Price Index values. Sea level rise is projected to significantly reduce this sandy beach area over time. Estimates of beach loss based on CoSMoS shoreline projections under a no hold-the-line, no-nourishment scenario along with resulting loss in service flow per year are presented in Table 6-4.

Table 6-4: SLR impacts on non-market values for City beach areas (2018 $US)

SLR Scenario	Loss of Beach Area (Acres)	Service Flow Loss Per Year
0ft	0	0
1.6ft	8.8	492,800
3.3ft	18.8	1,052,800
4.9ft	28.5	1,596,000
6.6ft	38.3	2,144,800

7. Environmental Justice

Environmental justice components of future SLR hazards were evaluated using the 2016 Social Vulnerability Index (SOVI), published by the U.S. Center for Disease Control (CDC), and the results of CalEnviroScreen 3.0, an environmental health screening tool developed by the California Environmental Protection Agency (CalEPA) and the Office of Environmental Health Hazard Assessment (OEHHA). The SOVI program uses 15 socioeconomic and demographic factors at the census tract level to identify socially vulnerable areas where populations may be more adversely impacted during disaster events. These variables are organized around four themes: socioeconomic status, household composition and disability, minority status and language, and housing and transportation. Analyses presented within this study are based on summary variables for each theme, generated through percentile ranking of each variable for all census tracts within the state of California. Percentile ranking values range from 0 to 1, with higher values indicating greater vulnerability.

CalEnviroscreen data is also available at the census tract level. Pollution burden within each census tract is characterized using a suite of statewide indicators on pollution exposure and environmental effects. In a similar manner to the SOVI, percentiles are used to assign scores for each indicator in a given geographic area. Percentile scores are averaged and combined to produce an overall pollution burden score for each census tract relative to other tracts within California, scaled with a range of 0 to 10, with 10 representing the highest pollution burden. Specific variables included in pollution burden scoring and each SOVI theme are detailed below.

7.1 Socioeconomic Status

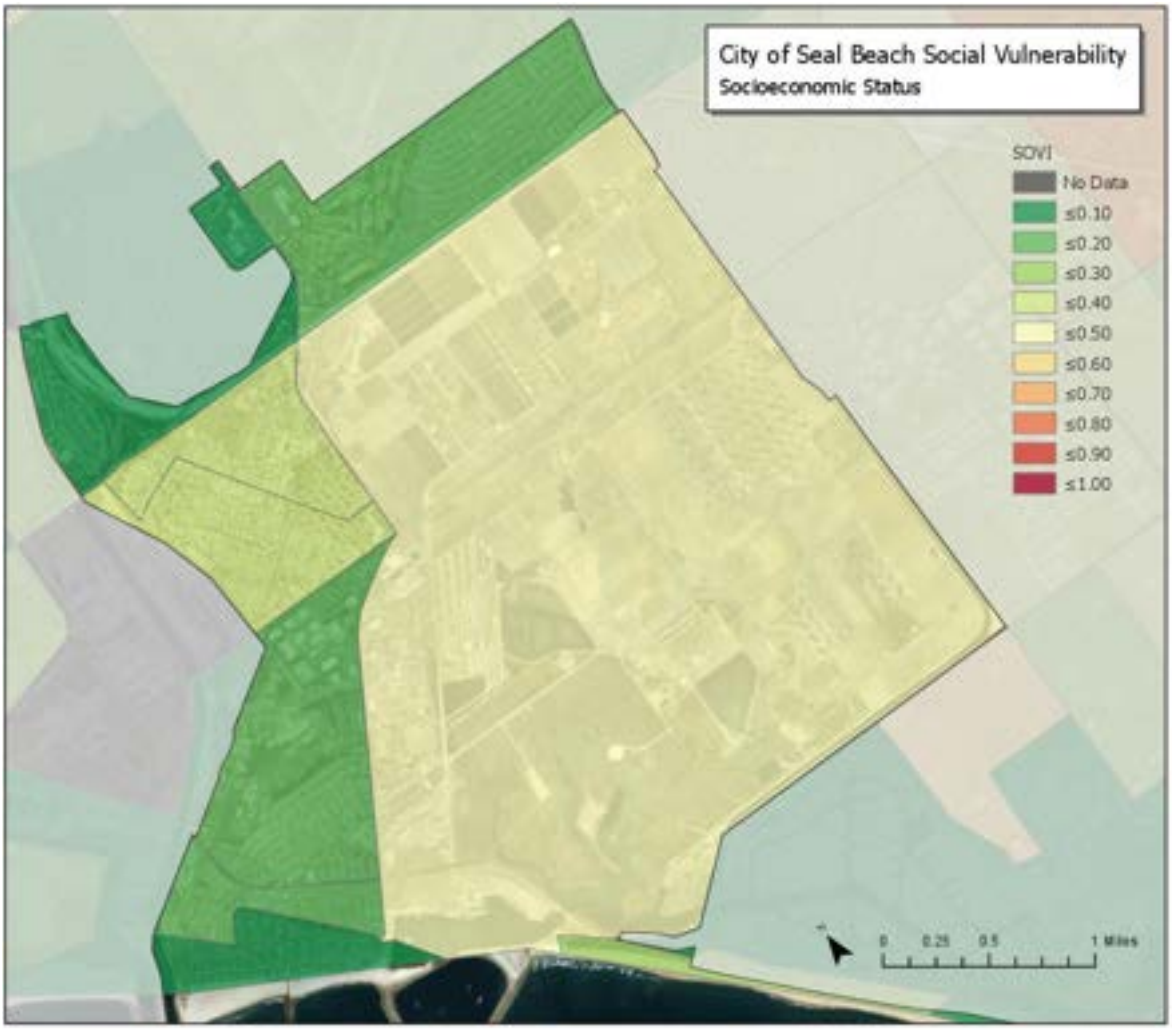


Figure 7-1: CDC SOVI socioeconomic status summary data within the City of Seal Beach.

The socioeconomic status summary variable is based on four factors: percentage of persons living below the poverty line, percentage of civilians age 16+ that are unemployed, per capita income, and the percentage of persons age 25+ with no high school diploma (Figure 7-1). Overall socioeconomic vulnerability is low within the City of Seal Beach, shown by the lack of census tracts in the upper half of percentile rankings. Waterfront areas in the City are among the least vulnerable in terms of socioeconomic status. Inland portions of the City such as Leisure World and military areas have greater socioeconomic vulnerability, though again their overall ranking within the state only approaches median values.

7.2 Household Composition and Disability

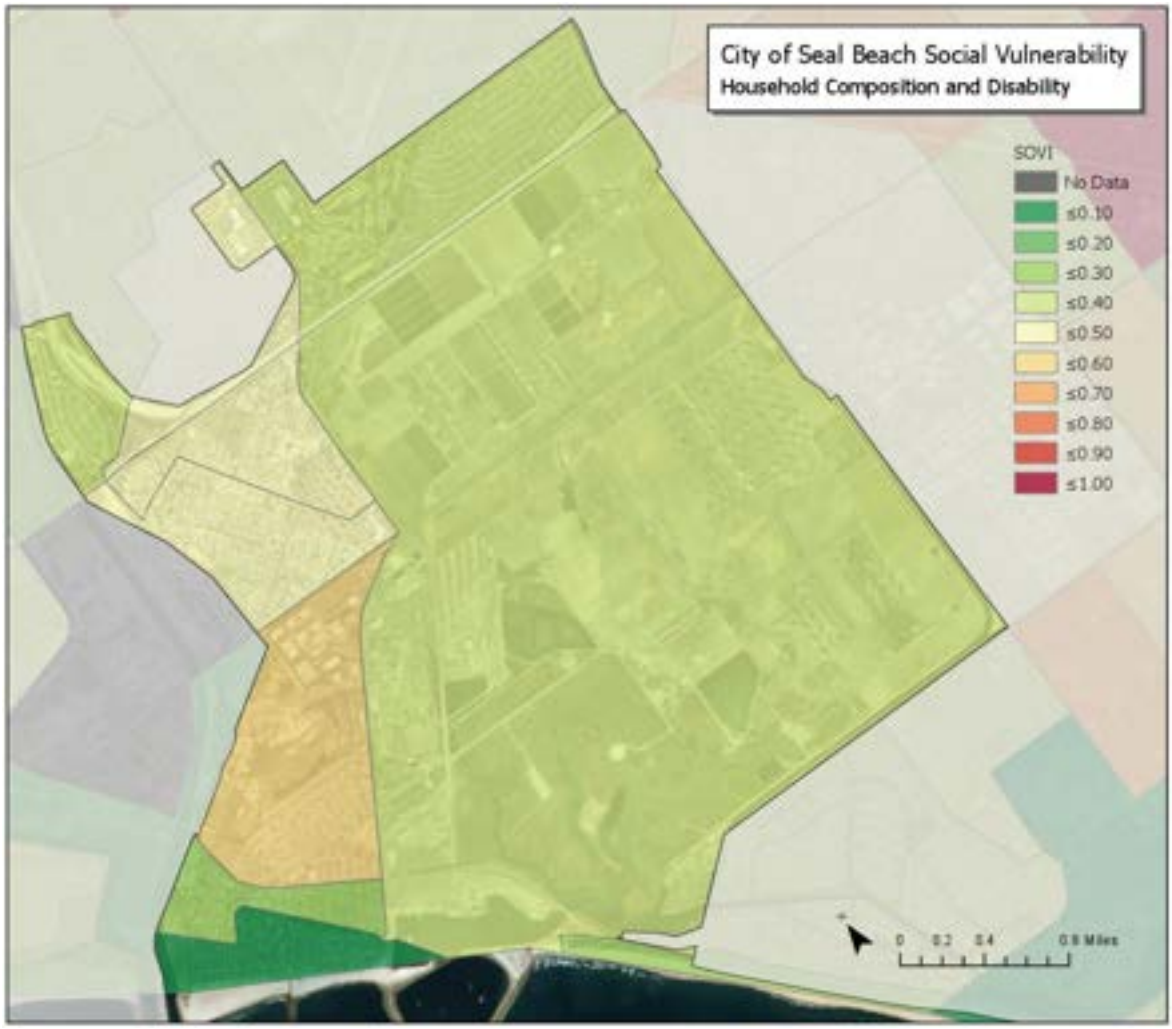


Figure 7-2: CDC SOVI household composition and disability summary data within the City of Seal Beach.

Disaster vulnerability due to household composition and disability is based on the following factors: percentage of persons aged 65 and older, percentage of persons aged 17 and younger, percentage of non-institutionalized civilians with a disability, and percentage of single parent households with children under 18 (Figure 7-2). Waterfront areas again show low social vulnerability when considering household composition and disability. Areas inland of the Pacific Coast Highway have the highest vulnerability based on household composition and disability. Leisure World remains below median values when considering a combination of all household composition and disability variables but ranks highly in terms of elderly population. Approximately 77% of the population within the two census tracts that make up Leisure World are over the age of 65 according to census estimates, a total of over 6,000 individuals.

This concentrated elderly population is likely to complicate SLR hazard adaptation and disaster response efforts. Inland flooding projected under long-term SLR scenarios covers the entirety of Leisure World and may require evacuation prior to major storms or significant response efforts afterwards. Planning for any such efforts must account for the additional needs and reduced capabilities of elderly populations.

7.3 Minority Status and Language

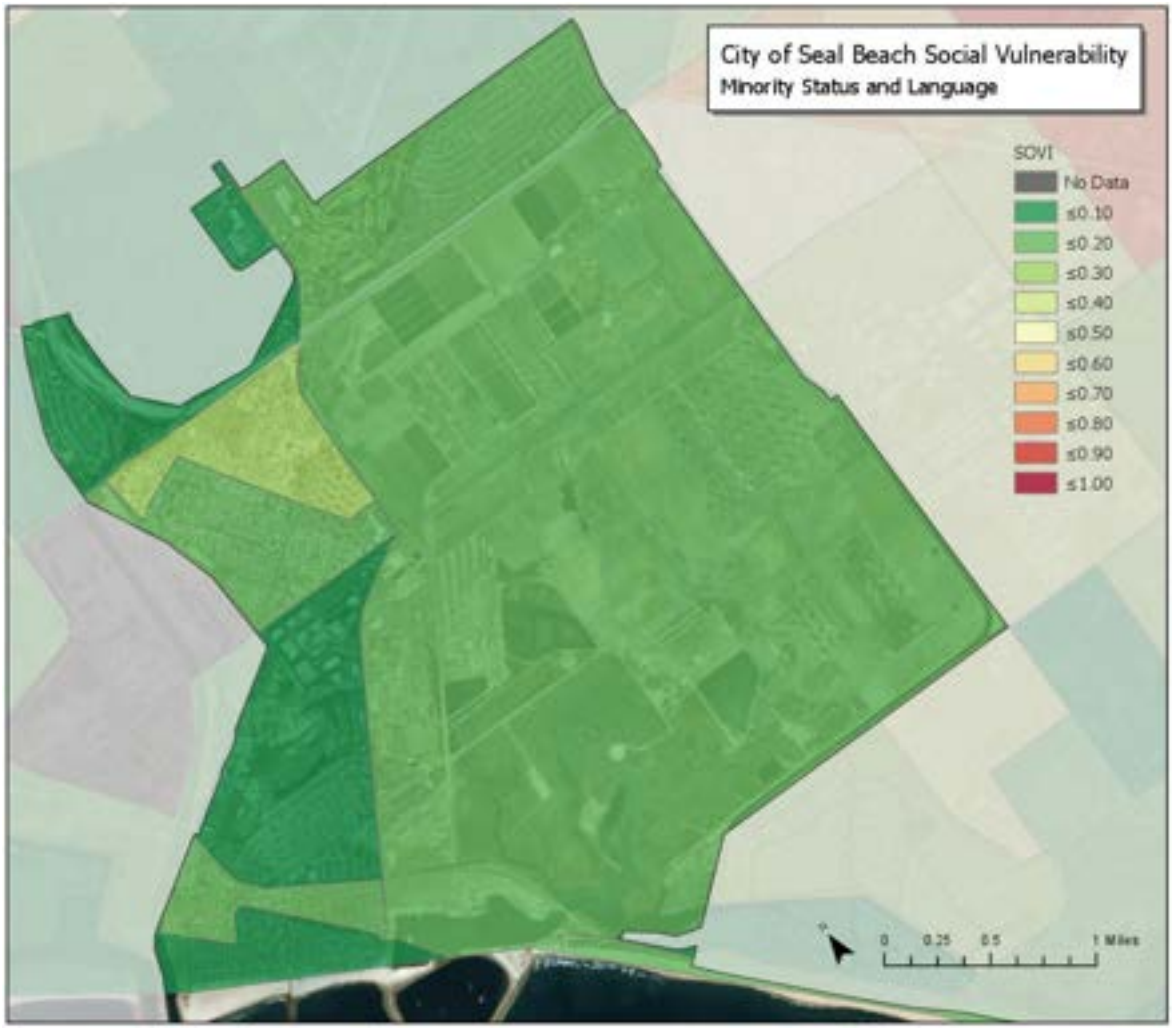


Figure 7-3: CDC SOVI minority status and language summary data within the City of Seal Beach.

Vulnerability due to minority status and language is based on two variables: the percentage of persons that do not identify as white, non-Hispanic, and the percentage of persons age 5+ who identify as speaking English "less than well" (Figure 7-3). Limited vulnerability due to minority status and language is seen within the City of Seal Beach. All census tracts within the City are well below median values. The highest vulnerability for these factors is seen in areas of Leisure World, though this tract remains in the lower third of overall rankings.

7.4 Housing and Transportation

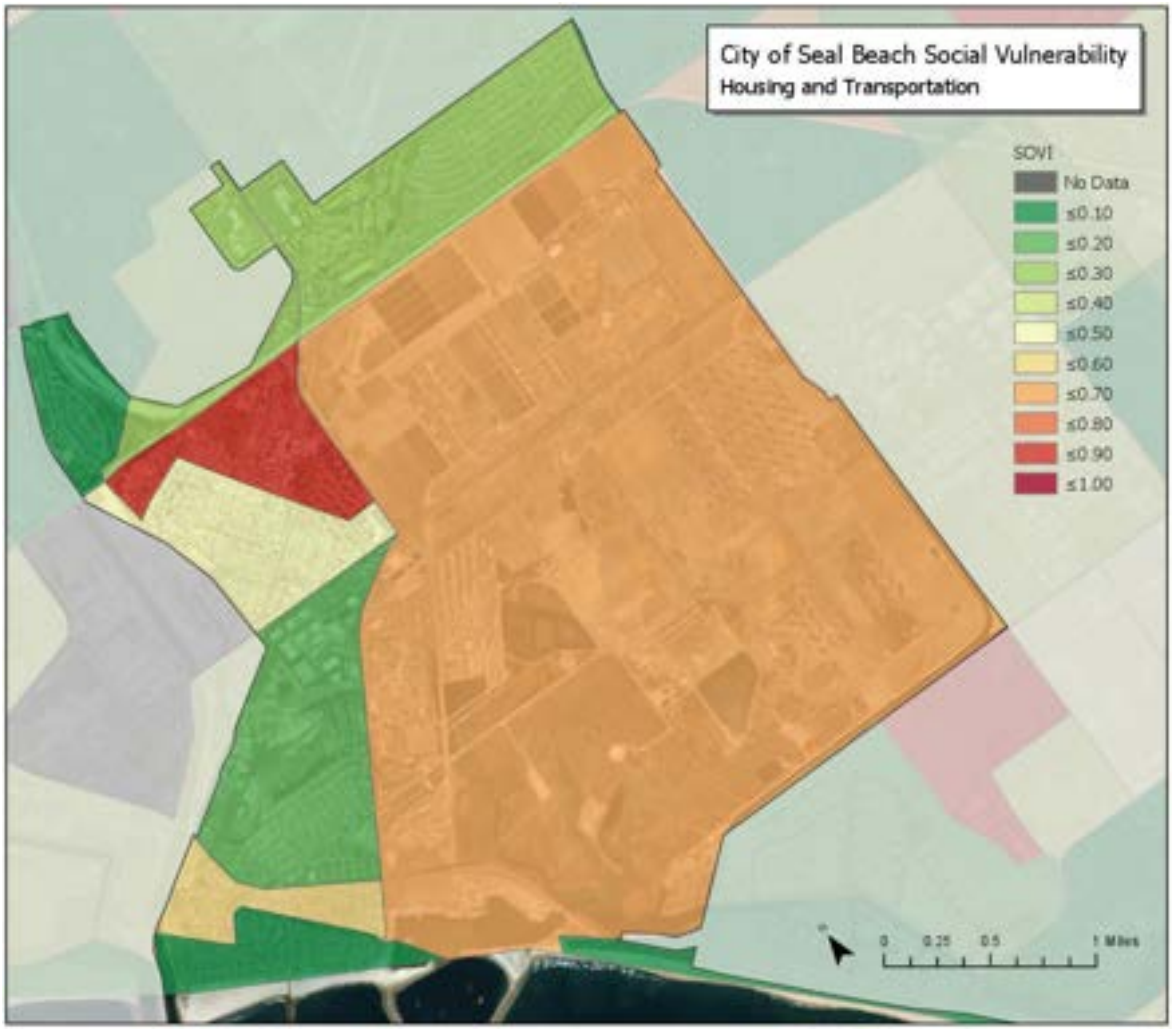


Figure 7-4: CDC SOVI housing and transportation summary data within the City of Seal Beach.

Social vulnerability due to housing and transportation is based on several factors including the percentage of housing structures with 10 or more units, the percentage of mobile homes, the percentage of household with more people than rooms, percentage of houses with no vehicles, and the percentage of persons in institutionalized group quarters (Figure 7-4). Vulnerability based on these factors varies throughout the City of Seal Beach. Waterfront areas show low vulnerability, but several inland portions of the City show high vulnerability in terms of housing and transportation. Areas immediately south of the Pacific Coast Highway and military areas are above median values, while a large portion of Leisure World ranks near the upper 10% of census tracts within California.

Flood projections cover large portions of the area south of the Pacific Coast Highway and Leisure World under multiple SLR scenarios. The scale of development, type of development, and lack of vehicle access each have the potential to hinder disaster response or recovery efforts for populations in these areas. Leisure World is again an area of particular concern due the concentrated elderly population, compounding additional vulnerability due to housing and transportation resources. Planning for these

factors in future response and adaptation efforts will greatly mitigate the potential impacts to human health and safety.

7.5 Coastal Access

Potential loss of coastal access is a major environmental justice consideration for the City of Seal Beach. Flood hazard projections under multiple SLR scenarios include local and regional transportation routes, several coastal access points, and parking facilities along the Seal Beach waterfront. Available beach area is also projected to decline significantly with SLR. Access points and parking facilities are detailed in Figure 7-5. Specific SLR thresholds and vulnerabilities for these resources are discussed in Section 5.5.

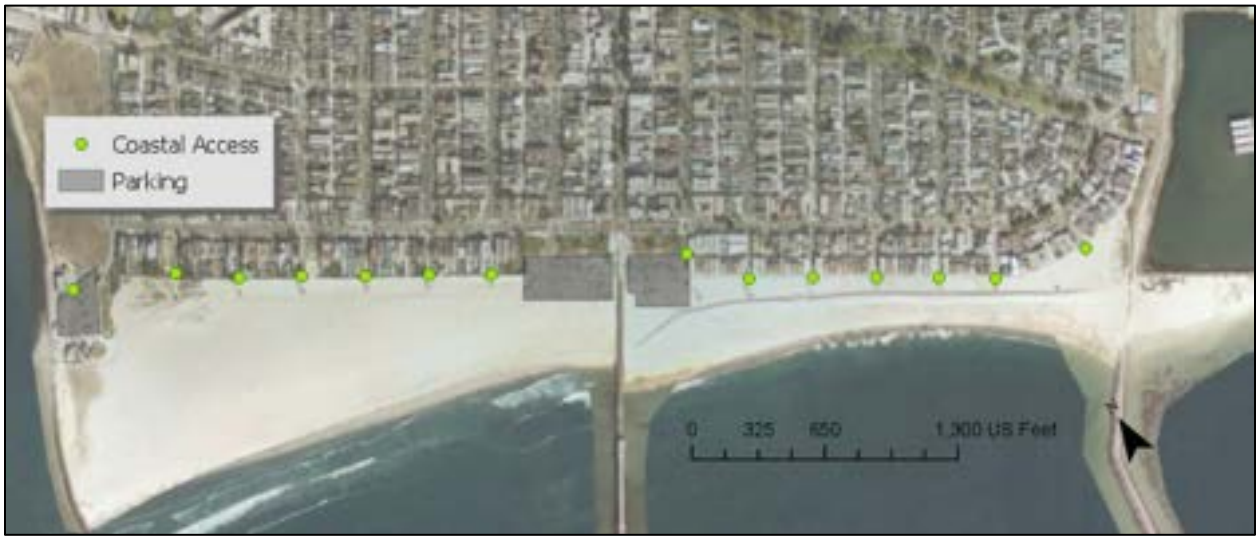


Figure 7-5: Coastal access points and parking facilities within the City of Seal Beach.

In the absence of mitigation actions, SLR hazard projections will significantly impede coastal access for both local and regional populations that do not live in the immediate vicinity of the waterfront as major coastal transportation routes such as the Pacific Coast Highway and Seal Beach Boulevard become unavailable due to flooding. Though limited data exists on specific communities that make use of the coastal resources within the City, it is highly likely that City beaches and access points serve as major recreational and cultural resources for a broad spectrum of communities within the City and surrounding areas due to the low cost of parking in the pier and jetty lots compared to other beach cities as well as available free street parking. Loss of low-cost public parking facilities at 1st Street and the Municipal Pier is of particular concern given their potential as an affordable access point for any disadvantaged communities in the region, as local street parking alone is unlikely to fully accommodate demand during peak beach visitation times. Adaptation efforts will also likely be required to maintain current levels of beach use along the eastern portion of the Seal Beach waterfront, where minimal beach width remains under severe long-term SLR scenarios. Loss of this area would greatly reduce available space for public use and could lead to regular congestion of western beach areas.

7.6 Environmental Pollution Burden

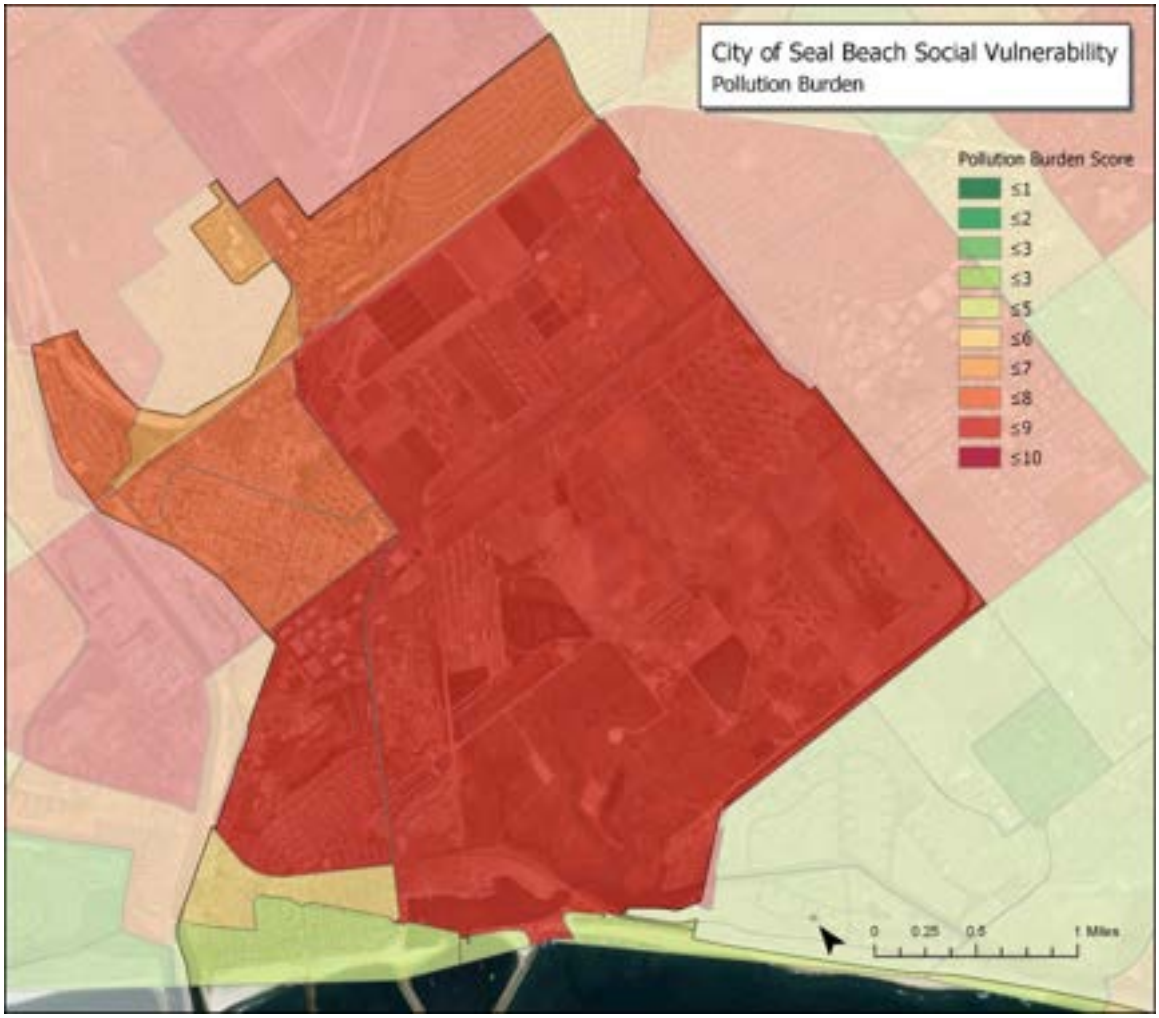


Figure 7-6: Environmental pollution burden within the City of Seal Beach per CalEnviroScreen 3.0

Environmental pollution burden indicators included in CalEnviroScreen assessments are divided into exposure indicators and environmental effects indicators. Exposure indicators include measurements of ozone, airborne particulate matter, drinking water contaminants, pesticide use, toxic releases from facilities, and traffic density. Environmental effects indicators include data relating to cleanup sites, groundwater threats, hazardous waste generators and facilities, impaired water bodies, and solid waste sites and facilities. When determining final environmental pollution burden scores for each census tract environmental effects indicators were given one-half weight and exposure indicators were fully weighted.

Overall environmental pollution burden is elevated throughout the majority of the City of Seal Beach, with the greatest exposure seen within inland portions of the City. Much of the environmental burden within the City can be attributed to dense traffic patterns, airborne particulate matter, and emissions from surrounding industrial facilities, each of which ranks highly when compared to other census tracts. These additional environmental burdens, particularly in inland areas, should be taken into consideration when forming future SLR adaptation planning strategies and efforts.

8. SLR Adaptation

The following outline of SLR adaptation strategies and policy objectives represents an initial step in the development of specific adaptation measures to reduce potential impacts identified in the SLR Vulnerability Assessment. Listed adaptation strategies and policy objectives build on work done by other municipalities that are updating their LCPs and are designed to be compatible with model adaptation measures included in CCC SLR guidance documents (California Coastal Commission, 2015, 2018). Listed adaptation strategies and policy objectives are not intended to be exhaustive or fully developed but are instead designed to be used as a high-level SLR adaptation planning framework for future adaptation measure development, analysis, and evaluation within the City of Seal Beach.

8.1 Adaptation Strategy Overview

Changing coastal hazards due to SLR can be addressed in a number of different ways. Though numerous adaptation methods are available, individual adaptation measures generally fall into one of three main categories: protection, accommodation, and retreat (Figure 8-1). In a SLR adaptation context protection refers to those strategies that employ hard or nature-based engineered measures to defend existing development from future SLR hazards without changes to the development itself. Accommodation refers to strategies that involve modifying existing development or designing new development in a way that reduces the potential future impacts of SLR. Adaptation strategies centered on retreat focus on measures to relocate or remove existing development from identified high-hazard areas while limiting the construction of any new development in such areas. In practice, SLR adaptation often relies on hybrid approaches that combine elements from multiple categories over different spatial and temporal scales.

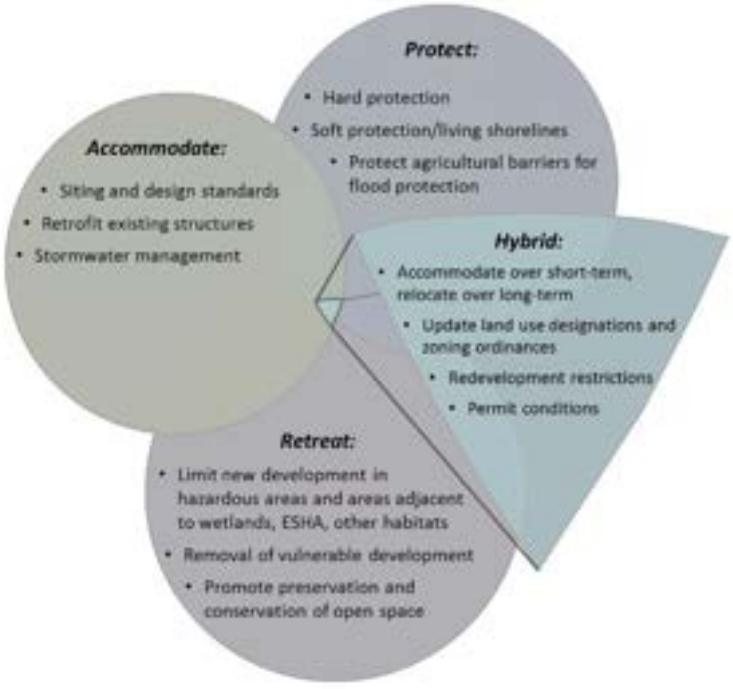


Figure 8-1: General SLR adaptation strategies and mechanisms (California Coastal Commission, 2015).

For the purposes of this study no individual adaptation strategy or category is to be considered a categorical "best" option for SLR adaptation planning within the City of Seal Beach. It is understood that a variety of adaptation strategies will be necessary to account for the different hazard vulnerabilities and coastal resources present at various locations within the City, and that adaptation strategies will need to be adjusted over time as their relative effectiveness changes.

8.1.1 Protection

Shoreline protection structures such as the San Gabriel River levees, Seal Beach Municipal Pier groin, and Anaheim Bay jetties have played a key role in the history of the City. As detailed in Section 2.3, these structures greatly influence the sandy beach areas along the Seal Beach waterfront and Surfside community. Due to the widespread presence and long history of shoreline protection structures within the City of Seal Beach, the continued maintenance and improvement of shoreline infrastructure will likely be an important component of near-term SLR adaptation efforts.

Protection strategies provide a means to minimize projected damage and disruption from higher water levels and wave events associated with low to moderate SLR scenarios. Protection strategies are generally most effective at mitigating periodic hazards due to flooding and wave overtopping associated with storm events. These strategies can also be employed to address localized high-risk areas or reinforce specific points of vulnerability to prevent flooding over a large area. Protection strategies may be less effective when considering frequent non-storm flooding projected within low-lying areas of the City under high to extreme SLR scenarios, especially in cases where future water levels are projected to consistently exceed current shoreline elevations. Given these limitations, protective structures alone are unlikely to form an effective long-term adaptation strategy for all highly vulnerable areas if SLR reaches the upper bounds of current projections. Long-term protection strategies may be appropriate if strategic reinforcement can reduce widespread flood potential, as is the case for inland portions of Seal Beach where flooding appears to originate from the San Gabriel River and Anaheim Bay rather than the coast. Protection strategies may also be employed as a potential first step to address current and near-term risk while long-term adaptation measures are developed and implemented.

An advantage of employing protection strategies within the City of Seal Beach is the ability to utilize existing infrastructure and sand management practices. Both hard and nature-based shoreline protection measures can be employed to enhance and maintain existing shoreline infrastructure within the City of Seal Beach. Hard protection measures include traditional engineered structures such as seawalls, revetments, and bulkheads, while nature-based protection measures involve the use of infrastructure such as beaches, reefs, or dune systems to reduce SLR hazards in coastal areas. Additional hard or nature-based protection measures within the City of Seal Beach can be used in high-risk areas where existing coastal structures are exposed to storm hazards, such as the eastern Seal Beach waterfront or the Surfside shoreline. Existing revetment structures in the interior of Anaheim Bay and along the San Gabriel River can also be enhanced to reduce the potential for inland flooding across a range of SLR scenarios (Figure 8-2). Each of these strategies can be accomplished in a manner that provides benefits to ecosystems. One such method would be to integrate environmentally sensitive materials such as ECOncrete® into existing or enhanced revetment structures. Similar materials could also be used to create artificial reefs or additional hard-bottom habitat along the coastline in order to provide wave protection. Existing sand management practices can also potentially be leveraged in any construction of dune systems or living shorelines.

Figure 8-2: Example of additional levee reinforcement to prevent flooding within inland areas.

A key drawback of shoreline protection strategies is the potential disruption of natural littoral processes. The fixed barrier created by hard protections structures that run parallel to the coast prevents the inland migration of natural beaches and habitats over time as SLR increases. This phenomenon can already be seen along coastal development in the eastern waterfront of the City, where sandy beach areas require continued nourishment due to a lack of sand supply and increased erosion caused by the reflection of wave energy. If these coastal resources are unable to move inland, public beach recreational areas are projected to decline significantly over time in the absence of increased nourishment. Extreme protection measures extending significantly above the current shoreline may also result in negative visual impacts along the waterfront.

8.1.2 Accommodation

Accommodation strategies can be employed as alternative to or in conjunction with protective measures. These strategies are often employed for coastal structures or resources that rely on coastal access or proximity to the shoreline where it is not feasible to rely on shoreline protection. Depending on the characteristics of the coastal resource and type of accommodation employed, accommodation strategies can address coastal hazards across low, moderate, and severe SLR scenarios.

Coastal resources and structures can accommodate SLR hazards through both modification of existing development and design of new development. Accommodation strategies based on structural modification include actions such as structural elevation, retrofitting for flood resilience, and the use of

flood resistant materials during construction (Figure 8-3, Figure 8-4). Accommodation strategies based on design can address SLR hazards by including potential relocation, redesign, or other form of adaptation in initial structural plans or by employing additional shoreline setbacks where possible. These strategies can be employed on an individual basis or on a community-wide scale through specific land-use designations, zoning ordinances, or other measures.

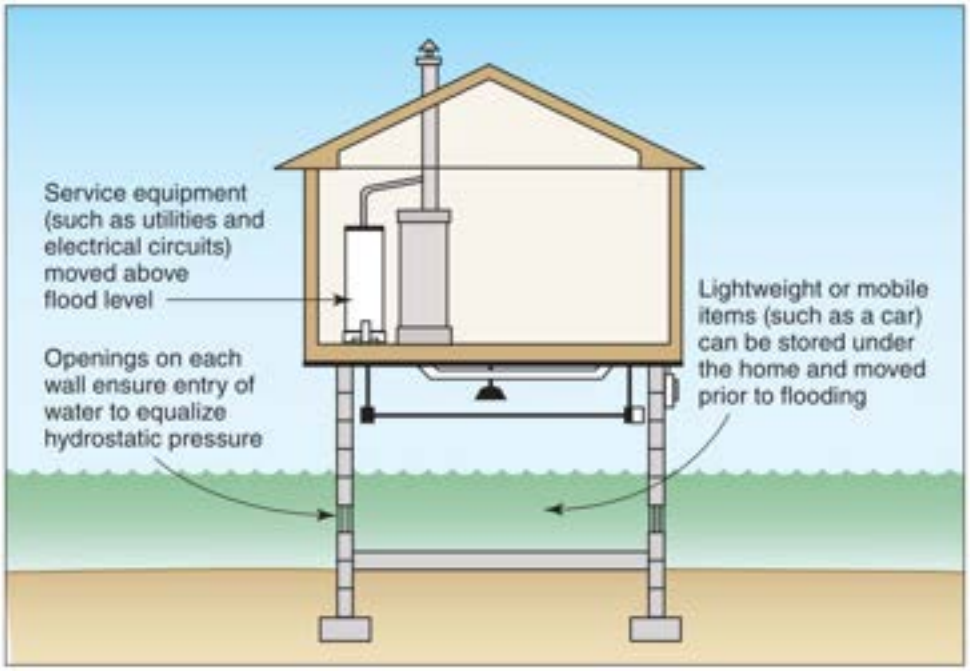


Figure 8-3: Example cross section of an elevated home using continuous foundation walls (FEMA, 2014).

Accommodation strategies can be implemented in a number of areas throughout the City of Seal Beach. Temporary or permanent floodproofing retrofits can be employed within current and projected future flood prone areas to reduce the impacts and recovery time following flood events. These measures are most appropriate in projected storm flood zones where flood events will not occur on a regular basis but must still be accounted for. An example would be the implementation of improved drainage infrastructure along low-lying waterfront roadways to collect and convey floodwaters, restoring critical transportation routes in a timely manner (Figure 8-5). Additional adaptation strategies may be necessary within projected non-storm flood zones along coastal and inland areas to accommodate future SLR hazards. Coastal-dependent structures such as lifeguard stations or coastal access facilities can be elevated to avoid repeated tidal flooding or wave damage. Elevation is also an option for other structures within low-lying areas, but the effectiveness of this strategy will be reduced if non-storm flooding prevents access to structures on a consistent basis.

While structural elevation can successfully mitigate coastal hazards driven by SLR, potential drawbacks are also present. If elevation of structures along a shoreline becomes widespread, elevated structures may reduce the aesthetic value of coastal areas or impact community character. Uncoordinated structural elevation initiatives, where only select structures are elevated in an area, can also result in a patchwork of different vulnerabilities within hazard zones, complicating future adaptation planning. Under high to extreme SLR scenarios, the continued elevation of structures in their current location can also result in a

situation where structures unintentionally become elevated directly over tidelands, presenting access and maintenance challenges.

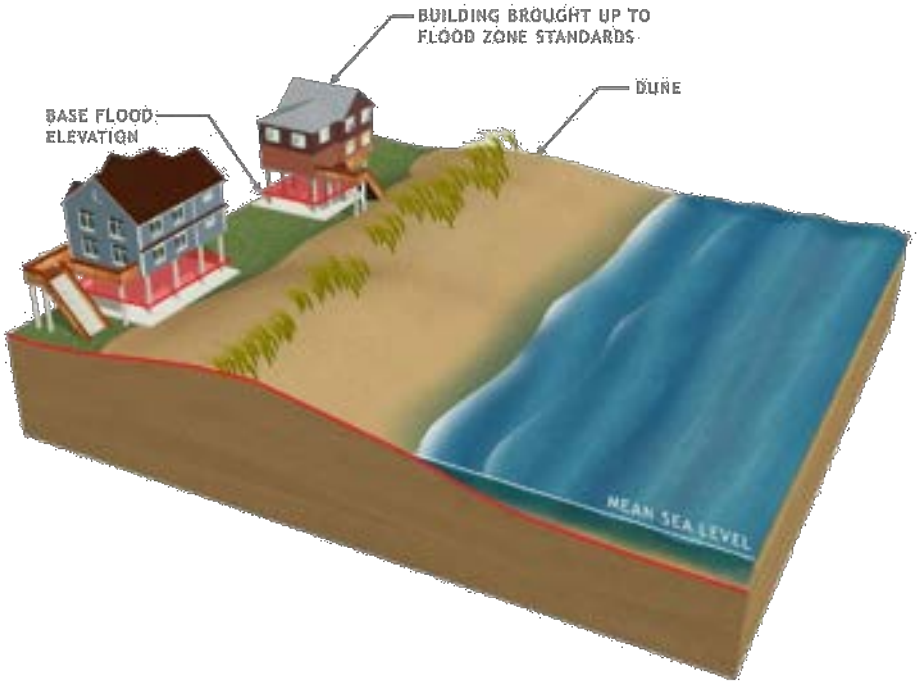


Figure 8-4: Example of elevated shoreline structures to prevent damage during flood events.

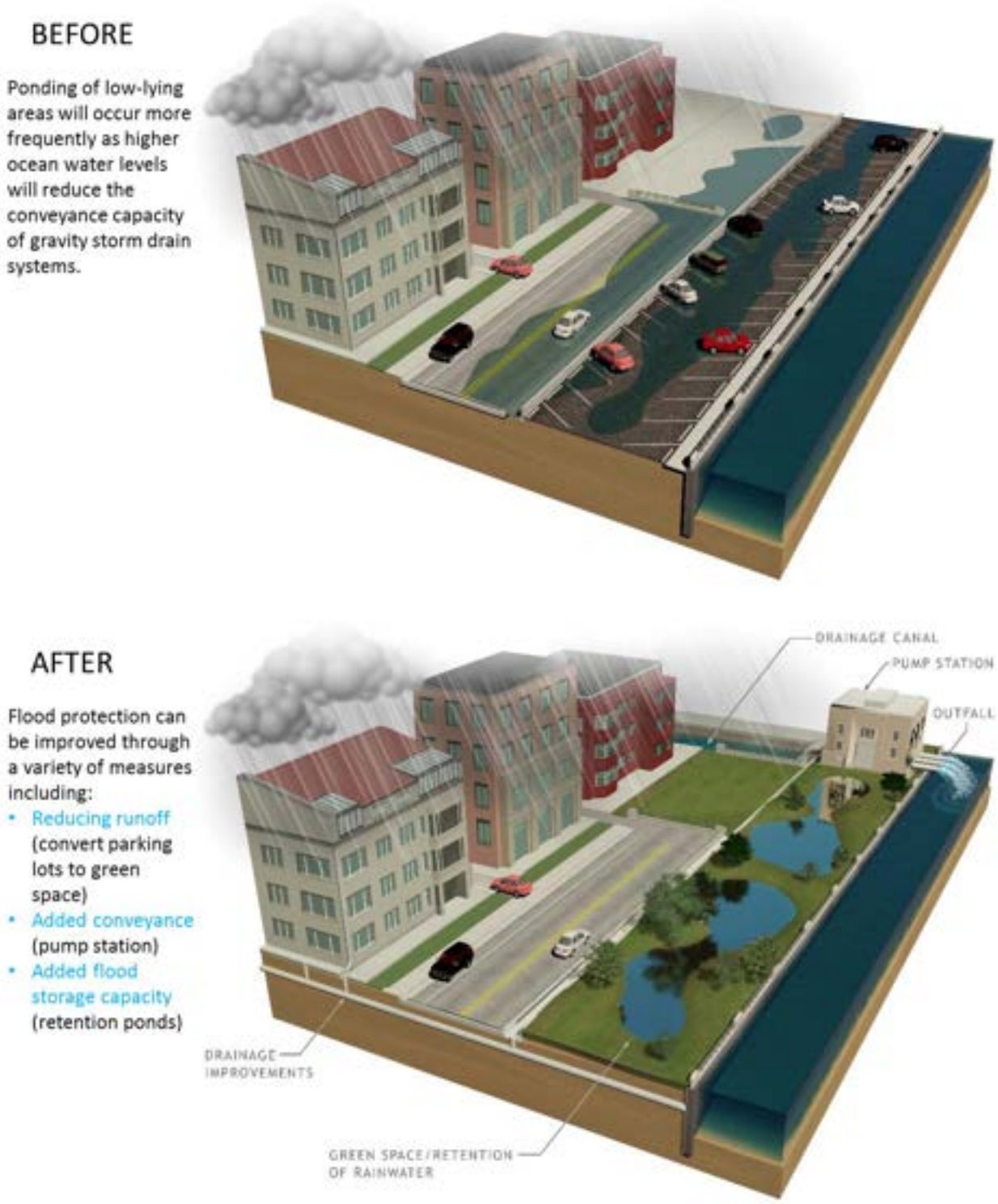


Figure 8-5: Example of drainage improvements to reduce flooding (U.S. Army Corps of Engineers, 2015a).

8.1.3 Retreat

Directly removing or relocating vulnerable structures away from hazard areas represents an effective long-term form of SLR adaptation under high to extreme SLR scenarios. Retreat strategies can be employed for cases in which any feasible protection or accommodation strategies become insufficient to address coastal hazards. Retreat strategies can be implemented in a variety of ways including land use designations or zoning ordinances designed to encourage new development within less vulnerable areas. Property acquisition programs, rolling easements, transfer of development rights programs, and permit conditions can additionally be used to gradually move highly vulnerable existing development away from current and future hazard areas.

Successful employment of retreat strategies often requires available areas located landward of vulnerable structures or resources. This is a complicating factor throughout much of the City of Seal Beach due to the high density of development in coastal areas. Available areas at higher elevations are also limited due to the relatively low relief within the City and extent of coastal wetlands, restricting potential retreat options. Despite these limitations retreat strategies can potentially result in greater resilience to SLR hazards at a lower cost than protecting structures in place under extreme SLR scenarios, while also avoiding recreation and coastal access issues that could result from additional shoreline protection. Retreat strategies can also be implemented in combination with protection or accommodation strategies as a method to plan for and address SLR hazards under a worst-case scenario.

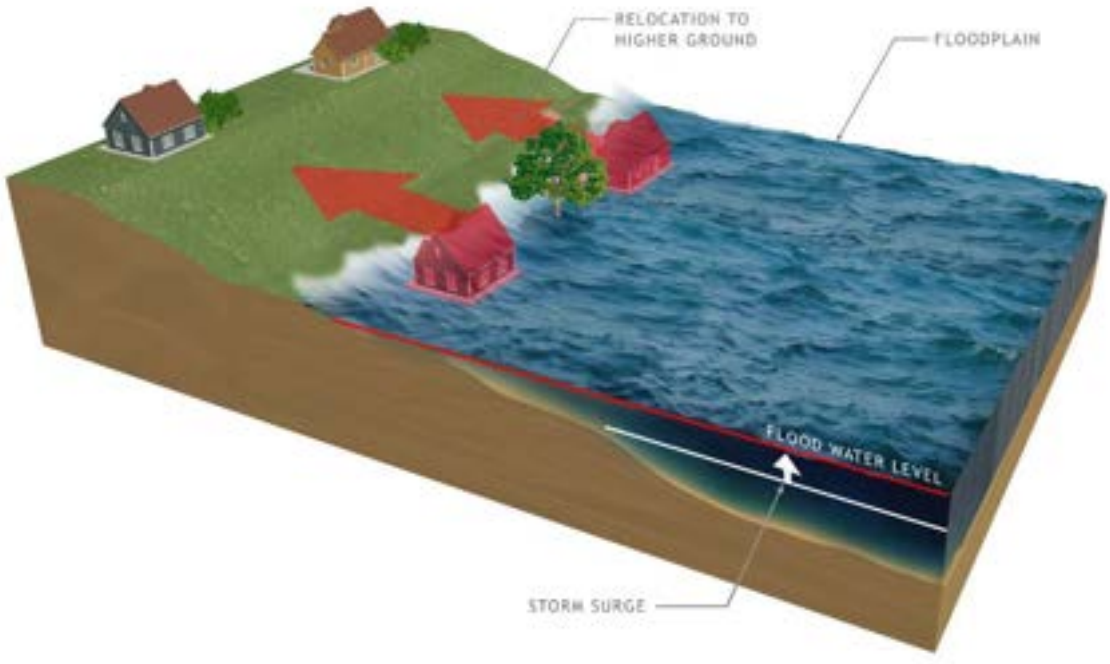


Figure 8-6: Example of retreat strategies within high-hazard areas.

8.2 SLR Adaptation Policy Objectives

8.2.1 Understand SLR Hazards

Knowledge of the timing, magnitude, and location of future SLR hazards is critical to SLR planning and adaptation efforts. Policies in pursuit of this goal will focus on ways to best obtain, utilize, and disseminate current and future SLR information to inform decision-making in coastal areas.

Ensuring the use of best-available climate science is a key component to achieving this goal. Policies to define best-available science will allow for the most accurate determination of potential future coastal hazards and the planning horizons associated with those hazards. Specifically defining best-available climate science will also provide a consistent standard for SLR adaptation planning, enabling the use of coordinated adaptation strategies within the City. Adaptation policies focused on continued hazard monitoring enable continual updates of SLR adaptation strategies and provide concrete information on when critical hazard thresholds have been exceeded. Hazard monitoring programs can take a number of forms including tracking regional SLR rates or documenting storm conditions that lead to localized coastal flooding. Tracking existing impacts such as beach width loss, overtopping of existing shoreline protection, and frequency of flood events can also inform ongoing SLR adaptation efforts.

Disseminating identified best-available science is also necessary to support public understanding and participation in SLR adaptation and planning. Policies designed to inform the general public of projected future hazards due to SLR encourage responsible decision-making at the individual level and can potentially increase public support for SLR adaptation initiatives within the City. Policies focused on disclosing potential risks associated with new development can also provide an important mechanism for educating property owners about projected SLR hazards and their options for addressing them.

8.2.2 Manage Development in SLR Hazard Areas

Siting and construction standards for new coastal development or redevelopment projects represent key mechanisms to reduce SLR hazard impacts to new and existing development. Policies in pursuit of this goal will focus on reducing exposure to coastal hazards over the duration of new or proposed development.

Incorporating projected SLR hazards into the initial siting of new development is an important step in mitigating SLR hazards. Policies put in place to reduce new development within high-risk areas help prevent the growth of SLR vulnerability and the need for future adaptation measures. Policies focused on siting new development can also reduce the need for additional shoreline armoring, preserving natural shoreline processes that benefit coastal uses and resources.

Managing redevelopment is another method to control SLR vulnerability. Policies that establish limitations on continued redevelopment in hazard areas reduce future SLR vulnerability by restricting growth of high-risk structures and reducing ongoing repetitive losses. Policies focused on specific redevelopment thresholds also provide an opportunistic mechanism to implement SLR adaptation standards over time.

SLR hazard considerations can also be included in the design of new development or redevelopment. Policies that establish adaptive design requirements can reduce the initial SLR vulnerability of structures and facilitate additional long-term adaptation efforts as they become necessary. Due to their focus on

adaptive flexibility over time, these policies can form an important component of phasing a response to SLR impacts.

8.2.3 Reduce Coastal Hazards

Enhancements and additions to existing coastal hazard reduction measures are often necessary to account for potential increases in hazard levels due to SLR. Policies in pursuit of this goal will focus on protection from and accommodation of current and future SLR hazards through both structural and nature-based means.

Managing the establishment and maintenance of shoreline protection measures can provide multiple benefits to SLR adaptation efforts. Policies that establish standards for the construction, evaluation, repair, and maintenance of existing shoreline protection measures enable the ongoing functionality of protective measures as coastal hazards change with rising water levels, reducing potential for failure under future conditions. Policies related to new or additional shoreline protection measures can reduce the potential for unwarranted or ineffective shoreline protection structures and can also help ensure that alternative, nature-based strategies are given appropriate consideration.

Standardizing approaches to structural floodproofing can also benefit adaptation efforts. Policies that establish appropriate situations and best practices for floodproofing retrofits or redesign allow for the consistent and effective application of these strategies within hazard areas. These types of policies can also improve awareness of available floodproofing mechanisms by providing a standardized reference for interested parties.

8.2.4 Use a Coordinated Approach to SLR Adaptation

Coastal processes that affect SLR hazards often extend beyond the parcel scale. Participating in coordinated regional SLR hazard mitigation planning efforts can substantially increase the efficiency and cost-effectiveness of SLR resilience measures. Policies in pursuit of this goal will focus on potential coordinated programs that could benefit coastal resources in the City of Seal Beach. For example, any approach to mitigating flooding from the San Gabriel River would require coordination between local, state and federal agencies and numerous other stakeholder groups. While this represents a significant planning and coordination effort, the outcome could produce multiple benefits for a wide variety of resources on a regional scale.

Aligning planning documents within the City is another method to efficiently finance and implement SLR adaptation. Policies that address compatibility between the Local Hazard Management Plan and the Local Coastal Program help to ensure that proactive adaptation efforts are coordinated across City departments and that responses to damage from future coastal hazards are streamlined. These policies can also help secure additional SLR mitigation funding by identifying project types that meet the goals of both planning documents in order to fully leverage available federal and state funding opportunities.

8.2.5 Phase SLR Adaptation Measures Over Time

Developing a phased adaptation approach can provide a flexible implementation mechanism for future SLR adaptation efforts. Policies that establish appropriate SLR hazard mitigation trigger types, hazard thresholds, and responsive actions can substantially improve the implementation of SLR adaptation

measures by providing clear guidelines for the timing and type of future SLR adaptation efforts. Including community participation provisions in the initial phased adaptation planning process can also increase clarity surrounding the potential timing and justification of future SLR adaptation measures.

A key benefit of such an approach is that the timing of phases can be adjusted as new SLR hazard information becomes available, mitigating the uncertainty surrounding long-term SLR projections. Due to this reliance on continually updated hazard information, any phased adaptation strategies must also involve a monitoring plan related to coastal hazards, as discussed in Section 8.2.1, to inform hazard thresholds. Potential coastal hazard monitoring programs and trigger types within various areas of the City are discussed further in Section 8.3.

Along with updates to coastal hazard information based on monitoring programs, a phased adaptation approach must also consider the potential lead times associated with various adaptation measures. The amount of time necessary for planning, funding, and implementation will vary based on the type and specific design considerations of each adaptation measure, and so action may need to be taken before triggers are met to avoid potential hazard impacts. This is particularly true for strategies that involve significant changes within densely developed areas due to the large amount of infrastructure present. The challenges associated with extended project lead times can be mitigated through the use of short and medium-term adaptation measures while long-term adaptation planning and implementation occurs.

8.3 Adaptation Options

SLR adaptation can take a number of forms within the City depending on the severity and timing of SLR impacts as well as resources available to implement adaptation measures. The following section outlines potential adaptation measures, phasing sequences, and trigger types for the waterfront, Surfside community, and inland areas, including actions that can be taken in the near future to aid ongoing adaptation efforts. Adaptation measures, phasing, and triggers within this section represent proposed options for consideration and guidance and are not intended as prescriptive solutions. Future implementation of any adaptation measure should be based on project-specific evaluations that account for the feasibility and impacts of potential alternatives, any prior or planned adaptation actions, and any updates to SLR science or projections. Potential SLR adaptation phasing strategies within each area are presented in Table 8-1, Table 8-2, and Table 8-3. Potential locations for each type of adaptation measures are detailed in Figure 8-7, Figure 8-12, and Figure 8-16.

8.3.1 Seal Beach Waterfront

Coastal flooding and loss of beach width are the primary SLR hazards along the Seal Beach waterfront. Projected beach width decreases by 40 feet and 100 feet under 1.6ft and 3.3ft SLR scenarios respectively, with minimal to nonexistent beach width remaining along East Beach in the 4.9ft and 6.6ft SLR scenarios. Coastal flood projections are seen at the at the western end of West Beach under storm conditions with 1.6ft SLR, then under non-storm conditions with 3.3ft and greater SLR. Though not displayed in CoSMoS model results, flooding along the eastern waterfront is likely under extreme storm conditions with 1.6ft SLR given the history of coastal hazard impacts in the area. Storm flood projections are seen along significant portions of the eastern waterfront with 3.3ft and 4.9ft SLR, stemming from both the coastline and the interior of Anaheim Bay. Under 6.6ft SLR these areas in the eastern waterfront are projected to flood under non-storm conditions.

8.3.1.1 Proposed Phasing

Table 8-1: Seal Beach Waterfront, Potential SLR adaptation triggers and proposed phasing.

SLR Scenario	Adaptation Trigger	Adaptation Measures[1]
0ft	N/A	• Evaluate flood protection capacity of East San Gabriel River levee in area of Windsurf Park. • Develop beach width monitoring program. • Explore regional sediment management opportunities.
1.6ft	• Loss of beach width at East Beach. • Storm flooding in Windsurf Park, Municipal Pier.	• Enhance sediment management practices to maintain beach width at East Beach. • Distribute floodproofing information to waterfront residents and businesses. • Implement floodproofing measures in Windsurf Park. • Implement floodproofing at Municipal Pier facilities and encourage implementation in East Beach residential area.
3.3ft	• Non-storm flooding in Windsurf Park, West Beach. • Loss of beach width necessary for seasonal berm construction at East Beach.	• Increase flood protection capacity of East San Gabriel River levee in area of Windsurf Park. • Implement nature-based measures to increase elevation at far western portion of West Beach as necessary. • Maintain beach width at East Beach through enhanced sediment management augmented with additional nourishment as is feasible. • Utilize deployable flood barriers along East Beach during extreme storm events. • Improve flood storage and conveyance within East Beach residential area.
4.9ft	• Minimal beach width fronting Pier facilities at West Beach. • Increased frequency and extent of storm flooding at East Beach.	• Implement nature-based shoreline protection measures across West Beach. • Employ a combination of permanent and temporary flood barriers within the East Beach residential area.
6.6ft	• Complete loss of beach area at East Beach. • Non-storm flooding of East Beach residential area or Pier facilities.	• Implement hard shoreline protection in critical areas of East Beach. • Elevate coastal recreation and access facilities serving the Municipal Pier. • Elevate residential area along East Beach.

1. Measures listed for each progressive SLR scenario may be necessary only if previously implemented measures become insufficient based on performance and hazard monitoring

Figure 8-7: Potential SLR adaptation measure types and locations for waterfront areas.

8.3.1.2 Enhanced sediment management

Enhancements to the existing sediment management practices of backpassing, seasonal dike building, and opportunistic nourishment along the Seal Beach waterfront provide an option for adaptation across multiple SLR scenarios (Figure 8-8). Given the local sediment transport patterns additional efforts will likely be most effective if targeted at the erosion zone within East Beach. Beach width in critical portions of East Beach can be augmented by increasing the frequency or magnitude of existing sediment management activities and pursuing additional beach nourishment opportunities.

The winter dike constructed during winter months along East Beach requires approximately 70 feet of beach width as currently designed, though if beach width were to decline to this extent little area would be available seaward of the dike. A beach width of 130ft would allow for 30ft buffer areas seaward and landward of sand dike. Relatively minor shoreline retreat is projected with 1.6ft SLR, with approximately 190ft of beach width projected to remain along East Beach. These impacts could likely be offset by backpassing greater quantities of sand from West Beach to East Beach, increasing the frequency of backpassing events, or conducting additional beach nourishment in the area if compatible sediment sources become available.

Absent additional adaptation measures, SLR of 3.3ft is projected to reduce beach width along East Beach to approximately 130ft, leaving only small buffer areas landward and seaward of the winter dike. Under this scenario significant nourishment from outside sources would likely be required to maintain current beach width fronting the winter dike. At 4.9ft and 6.6ft SLR beach width at East Beach is projected to decline to 70ft and 15ft respectively, below the width necessary for winter dike construction.

Nourishment at East Beach is currently conducted on an opportunistic basis. Establishing a regular schedule of nourishment, potentially as a component of the Orange County Coastal Regional Sediment Management Plan, may significantly aid adaptation efforts. The effectiveness of any SLR adaptation strategy based on sediment management or nourishment is dependent on the scale of effort and dedicated resources. If sufficient material is available at a feasible cost additional nourishment has the potential to offset SLR impacts across all SLR scenarios evaluated, though this would likely require significant investment to address beach loss as projected under 3.3ft and greater SLR scenarios. An initial step in evaluating the potential effectiveness of future nourishment is establishing a regular beach profile monitoring program to evaluate the performance of current sediment management and nourishment practices.

Benefits

- Due to upcoast and downcoast sediment transport barriers, additional sediment placement along the waterfront is unlikely to experience significant losses, though transport from East Beach to West Beach will remain.
- Existing recreational and environmental value of beaches is preserved.
- Increased beach width and height provides flood protection benefits to East Beach residential area.
- Maintaining beach width provides necessary space for potential additional adaptation measures such as vegetated dune systems or other living shoreline approaches.

Challenges

- Securing funding necessary for additional sediment management or nourishment.
- Aligning any additional nourishment with existing Regional Sediment Management plans.
- Physical and chemical sediment compatibility determinations.
- Ongoing beach width and elevation monitoring programs.

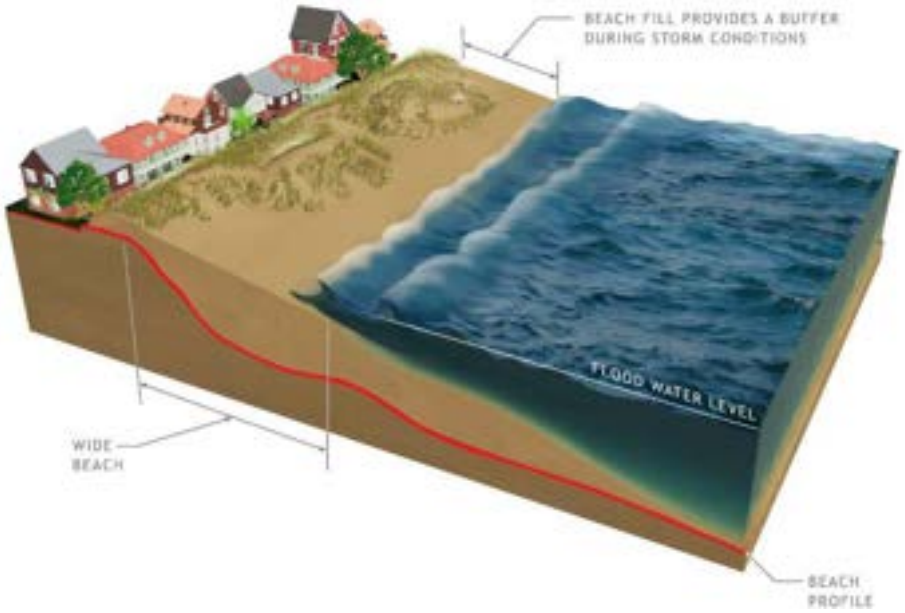


Figure 8-8: Conceptual example of flood protection benefits provided by enhanced beach width.

8.3.1.3 Nature-based shoreline protection

Nature-based shoreline protection approaches can be used to supplement SLR adaptation in waterfront areas under scenarios where existing sediment management practices or additional nourishment become insufficient. Nature-based protection measures can consist of both living shoreline approaches that rely solely on natural protective functions as well as hybrid approaches that use a combination of engineered and nature-based techniques to allow for additional flexibility in project design. Opportunities exist for each of these approaches to mitigate evolving SLR hazards along the waterfront.

Under a 1.6ft SLR scenario CoSMoS flood projections show storm flooding within a low-lying portion of West Beach. These impacts can potentially be mitigated by establishing a vegetated dune to maintain beach elevation necessary to prevent landward flooding. Newly established dunes can utilize types of vegetation present in existing dunes to the south and east of Windsurf Park. It is likely that a nature-based approach would be sufficient to maintain beach elevations in this area given the lack of erosive forces at the back beach, though dune elevations may need to be raised over time to keep pace with SLR.

Nature-based shoreline protection can be expanded across sections of the waterfront to mitigate coastal hazards under a 4.9ft SLR scenario, potentially as an expansion of any dune systems previously implemented at the far western portion of West Beach. Such a strategy is most feasible along West Beach where beach width remains available with 4.9ft SLR. Implementation along East Beach may be feasible if additional nourishment or enhanced sediment management is successful in maintaining consistent beach width. A hybrid approach, involving vegetated dunes placed atop a buried cobble revetment or similar structure (Figure 8-9), can be employed to provide additional protection along critical portions of West

Beach under this scenario, such as the area fronting Pier facilities. Once established, this adaptation measure can potentially remain effective at the higher 6.6ft SLR scenario if sand supply in front of the dune is sufficient to keep pace with SLR. This type of measure is less feasible along East Beach where erosive forces would continually remove sand fronting any buried revetment structures.

Benefits

- Can provide co-benefits of habitat restoration along with coastal hazard protection.
- Highly compatible with recreational beach use.
- Nature-based approaches are compatible with other SLR adaptation strategies such as ongoing beach nourishment or elevation of landward resources.

Challenges

- Extreme erosion events may require re-establishment of natural features or re-nourishment of beaches fronting hybrid structures.
- Initial establishment of self-sustaining dune vegetation.
- Ongoing maintenance requirements for hybrid structures in high erosion areas.
- Viewshed impacts if dune systems are established in close proximity to existing development.
- Managing windblown sand for paths or development adjacent to a dune system.

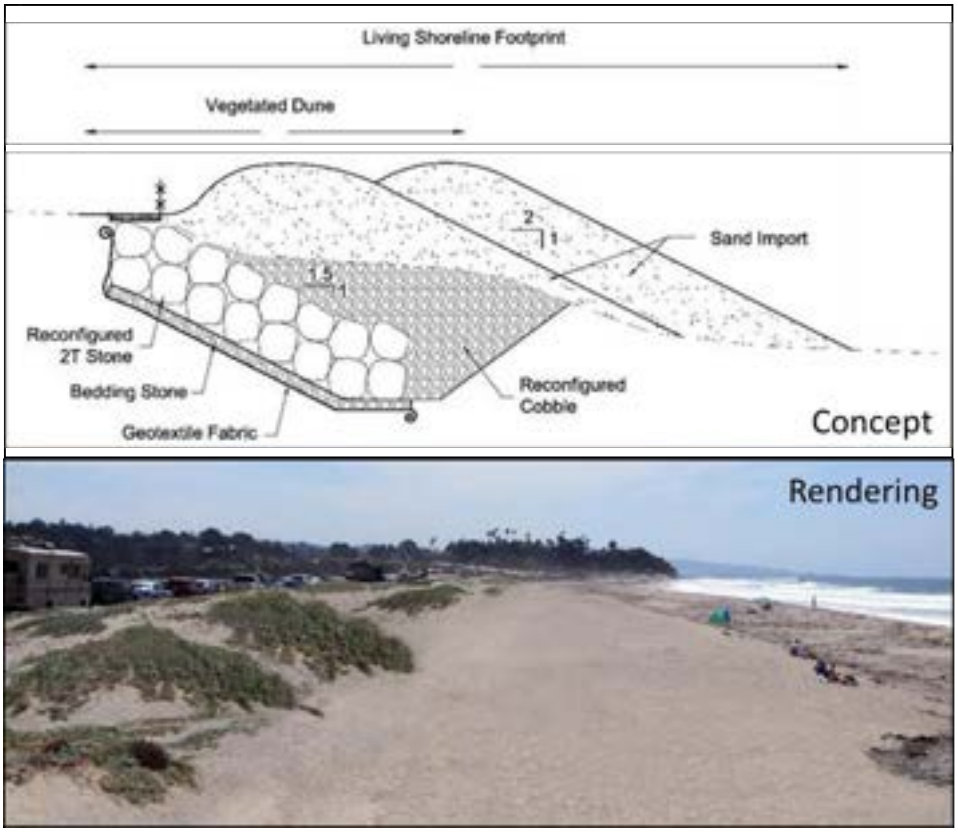


Figure 8-9: Conceptual cross-section and illustration of a hybrid dune system at Cardiff State Beach.

8.3.1.4 Structural accommodation

Structural flood hazard accommodation measures can be used to reduce the impact of temporary flood hazards driven by extreme storm events. Floodproofing retrofits can be used within Windsurf Park to address projected storm flood hazards under a 1.6ft SLR scenario, including installation of removable barriers across building entrances and use of flood resistant materials in parking areas (Figure 8-10). Similar measures can be used within Municipal Pier facilities and parking areas to mitigate storm flood projections under 3.3ft and 4.9ft SLR scenarios. Floodproofing measures can also be applied within the residential area along East Beach as an additional layer of flood protection, but retrofits should not be relied upon as a standalone measure due to the impacts associated with even minor flooding of residential structures.

Parcel scale floodproofing retrofits are likely ineffective for projected flood hazards under a 6.6ft SLR scenario, where non-storm flooding extends across significant portions of the waterfront. Accommodation through elevation of structures and resources can be used to address frequent flood hazards under this scenario. Direct elevation of existing structures is often not feasible over a wide area due to cost, but large-scale redevelopment efforts can provide opportunities to accommodate flood hazards by increasing first floor elevations or improving floodwater storage and conveyance in high-hazard areas. Converting first floor spaces to non-habitable uses such as parking can also facilitate flood hazard accommodation and reduce potential damages from storm-driven flood hazards.

Benefits

- Floodproofing measures require no additional space dedicated to flood protection.
- Retrofits can be applied to structures as needed in response to sea level rise.
- Floodproofing can be applied to coastal recreation facilities that require close proximity to the shoreline without extensive impacts to coastal access or visual character.
- Elevation above critical hazard thresholds provides effective, long-term flood mitigation benefits.

Challenges

- The effectiveness of floodproofing measures depends on flood duration, flow velocity, wave action, and debris.
- Adequate warning time prior to installation may be required depending on the type of floodproofing measure employed.
- Ongoing maintenance efforts are often required to maintain watertight connections on installed floodproofing measures.
- High costs associated with widespread elevation of large structures or re-development of large areas to reduce hazard exposure.
- Grade transitions, access and viewshed impacts if resources are elevated significantly above current levels.

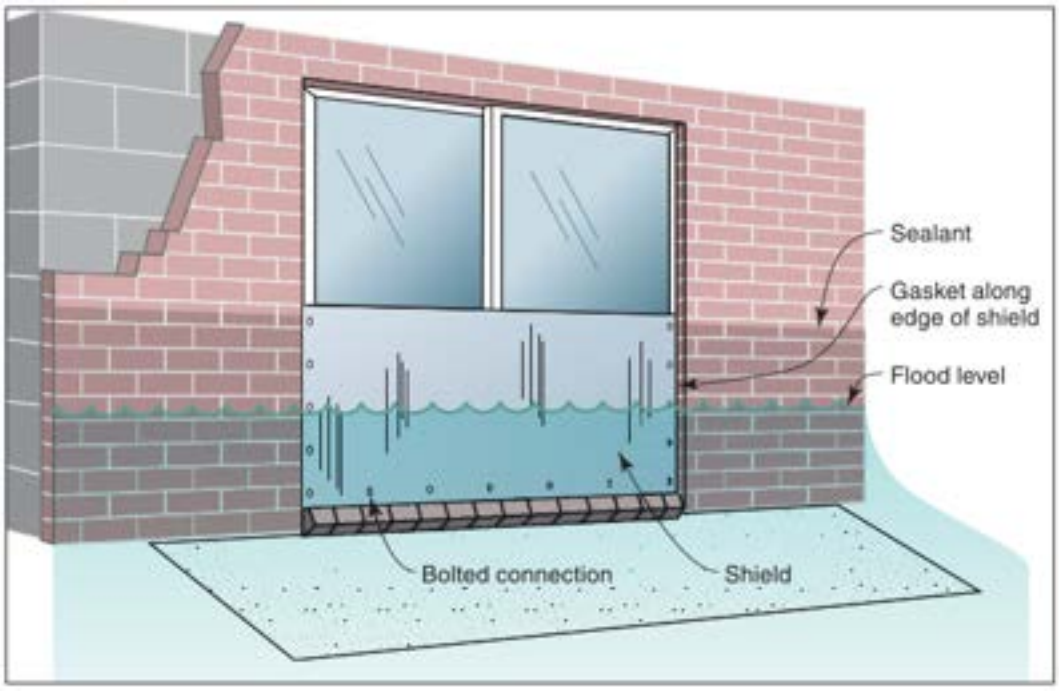


Figure 8-10: Conceptual example of dry floodproofing measures using bolted connections (FEMA, 2014).

8.3.1.5 Hard shoreline protection

Hard shoreline protection measures can be implemented along critical areas of the waterfront in the event that sediment management or nature-based shoreline protection are no longer feasible options to protect coastal resources. The high erosion hazard zone along East Beach is the area most likely to require such measures due to the reduced beach width projected under 3.3ft and greater SLR scenarios. Enhancements to the San Gabriel River levee may also be necessary to prevent flooding in the far western area of West Beach, discussed further in Section 8.3.3.2.

Deployable flood barriers can be used to mitigate temporary storm flood hazards along East Beach as projected with 3.3ft and 4.9ft SLR. A wide variety of deployable flood barriers are available to accommodate the specific risk and protection requirements, including those that can be completely constructed and deconstructed as part of deployment or permanently installed, rising into position when needed due to hydrostatic pressure. Alternative flood barriers such as water-filled structures can also be used to rapidly address flood risk around specific structures. Under a 3.3ft SLR scenario the use of temporary barriers fronting residential development along East Beach may be sufficient to address flood hazards driven by extreme storm events. A combination of temporary and permanent structural flood barriers may be required under a 4.9ft SLR scenario due to increased flood hazard potential (Figure 8-11). In such a scenario, deployable barriers can be used as a means to maintain access to coastal resources under non-storm conditions.

If complete erosion of East Beach occurs, as is projected under a 6.6ft SLR scenario, permanent shoreline stabilization infrastructure can be implemented along critical portions of East Beach to prevent flooding of the landward residential area. Rock revetment is often used to stabilized threatened coastlines in high wave energy environments, potentially in combination with vertical seawalls or bulkheads to reduce wave

overtopping during extreme events. Though such measures are often of last resort and assume loss of beach area fronting the revetment, adverse impacts could be partially mitigated through the use of environmentally compatible materials in construction or in combination with nature-based strategies.

Benefits

- Structural measures can be designed to specific hazard protection levels with high confidence.
- Deployable measures are flexible in terms of location, requiring no permanent, dedicated space.
- When used in combination, permanent and deployable measures allow for maintenance of existing coastal access points during non-storm conditions.
- Implementation can potentially be phased over time, with additional reinforcement or enhancement as needed to address evolving SLR hazards.

Challenges

- Potential regulatory challenges involved with implementation of hard protection measures in a manner consistent with the Coastal Act.
- Widespread implementation of permanent shoreline stabilization infrastructure on an eroding shoreline can result in the loss of sandy beach area and reduce coastal access.
- Maintenance and repair costs may become prohibitive if water elevations frequently exceed a structure's crest elevation.
- Large vertical structures along the shoreline can have adverse aesthetic impacts if not designed in concert with other resources.
- Successful implementation of deployable flood barriers depends on advance flood warning.
- Potential storage, assembly, and disassembly costs associated with deployable flood barriers.

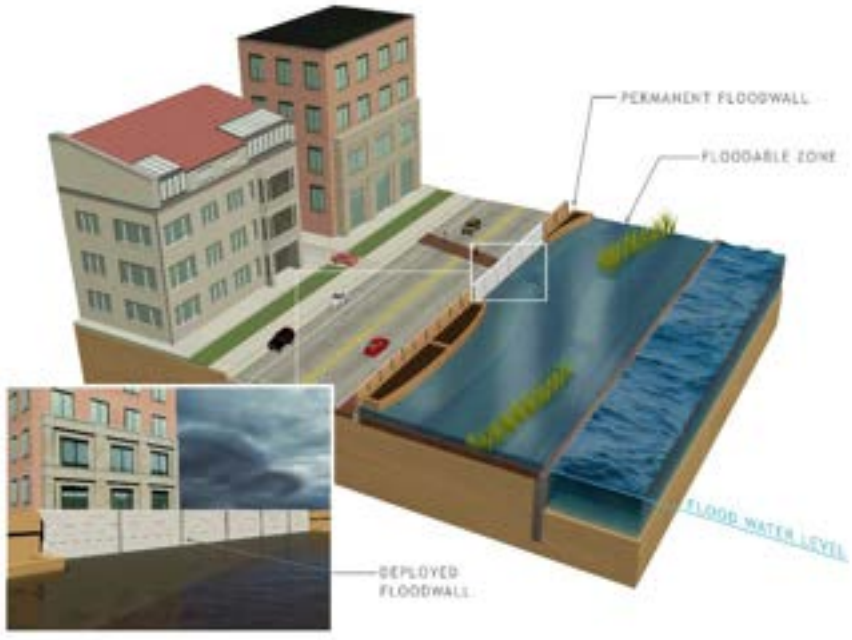


Figure 8-11: Example of a flood protection strategy using both permanent and deployable flood barriers.

8.3.2 Surfside Community

SLR hazards projected for Surfside include shoreline retreat, flooding from the open coast shoreline, and flooding from interior shorelines. CoSMoS hazard projections are not significant with 1.6ft SLR, but these projections may significantly underestimate potential hazards along the open coast at the end of USACE nourishment cycles, particularly at the western portion of the Surfside community. Any existing coastal hazards due to erosion or storm-related flooding will be exacerbated under such a scenario. With 3.3ft SLR minimal beach width is projected along the open coast of Surfside, and storm flood projections extend across select residential areas. Beach width is projected to be absent or extremely limited along the open coast of Surfside with 4.9ft SLR, and storm flood projections extend across the full extent of development. Shoreline projections move landward across portions of Surfside under a 6.6ft SLR scenario, with development now subject to flooding under non-storm conditions. Given the CoSMoS modeling limitations, adaptation options presented in this section consider the potential for hazard conditions projected at the eastern portion of Surfside to extend across the entire open coast shoreline.

8.3.2.1 Proposed Phasing

Table 8-2: Surfside Community, Potential SLR adaptation triggers and proposed phasing.

SLR Scenario	Adaptation Trigger	Adaptation Measures[1]
0ft	N/A	• Develop beach width monitoring program. • Continue winter berm construction along open coast. • Conduct supplementary hazard analyses that account for an eroded shoreline at the end of each nourishment cycle. • Coordinate with USACE to explore options for more regular nourishment to mitigate SLR impacts.
1.6ft	• Reduction in beach width along open coast. • Inundation of habitat along interior shoreline.	• Support increased nourishment as feasible to maintain beach width along open coast shoreline. • Support nature-based protection approaches along interior shorelines. • Structural accommodation through floodproofing
3.3ft	• Storm flooding from interior shoreline in limited areas. • Extended periods of minimal beach width.	• Utilize deployable flood barriers to prevent flooding from interior areas. • Implement nature-based shoreline stabilization measures along open coast. • Structural accommodation through elevation.
4.9ft	• Widespread storm flooding from interior shoreline.	• Implement combination of permanent and temporary flood barriers along interior areas. • Support improvement of hard interior shoreline protection infrastructure.
6.6ft	• Extended periods of complete beach loss.	• Implement hard shoreline protection infrastructure as necessary to prevent loss of structures along open coast.

1. Measures listed for each progressive SLR scenario may be necessary only if previously implemented measures become insufficient based on performance and hazard monitoring

Figure 8-12: Potential SLR adaptation measure types and locations for the Surfside community.

8.3.2.2 Enhanced beach nourishment

Beach nourishment is currently conducted along the Surfside community shoreline as a means to maintain beach area following construction of the Anaheim Bay jetties, which block sediment transport from upcoast areas. Existing nourishment efforts conducted by federal agencies can potentially be enhanced over time to offset shoreline retreat projected with SLR, either through more frequent nourishment at existing volumes or use of greater volumes during nourishment events. As nourishment is currently conducted as part of ongoing federal programs, the feasibility of increased nourishment in the area will depend on the cooperation of federal agencies. Additional nourishment may also potentially be secured through participation in any newly developed or augmented regional sediment management programs, as any increased nourishment in the area will not only benefit beaches along Surfside but also supply sediment to the 13 mile stretch of downcoast shoreline.

Given the current hazard exposure of the area at the end of existing nourishment cycles, additional nourishment will likely be necessary to maintain adequate beach width along Surfside with 1.6ft SLR. Minimal projected beach width along the open coastline of Surfside with 3.3ft SLR indicates a need for significant additional sediment placement under this scenario to offset SLR impacts. Though possible if additional sediment sources are secured on a regular basis, nourishment as a stand-alone SLR adaptation measure is unlikely to be feasible under 4.9ft and 6.6ft SLR scenarios.

The timing of additional nourishment will play a key role in SLR hazard mitigation. Due to the lack of natural sediment supply, a cycle of increased coastal hazard resilience post-nourishment followed by increased hazard exposure as sediment is eroded and transported downcoast is present in the area. Limiting the time at which only a minimal, eroded beach remains along the shoreline can serve as an important mechanism of coastal hazard resilience for Surfside. Given the potential for accelerated erosion with SLR, conducting additional nourishment based on critical beach width thresholds can help prevent situations in which residential development becomes subject to increased hazard exposure. Implementation of a beach profile monitoring program can inform such thresholds as well as help determine appropriate timing and magnitude of future nourishment events.

Benefits

- Existing recreational and environmental value of beaches is preserved.
- Increased beach width and height provides flood protection benefits.
- Maintaining beach width provides necessary space for potential additional adaptation measures such as vegetated dune systems or other living shoreline approaches.
- Sediment placed south of Anaheim Bay jetties supplies beaches across region.

Challenges

- Securing any funding necessary for additional sediment management or nourishment.
- Coordinating additional nourishment with USACE or regional programs.
- Ongoing beach width and elevation monitoring programs.

8.3.2.3 Nature-based shoreline protection

Similar to the Seal Beach waterfront, nature-based shoreline protection strategies can be used along the Surfside shoreline at the point where existing or additional beach nourishment is unable to fully mitigate coastal hazards. Implementation along the open coast is most likely to be effective following a nourishment event when beach width is greatest. Nature-based protection strategies can also be utilized along select interior shorelines as a means to bolster adaptive capacity within sensitive ecological areas.

Nature-based measures such as vegetated dune restoration are unlikely to form long-term solutions along the Surfside coastline without additional nourishment due to rates of erosion and lack of sediment supply, as any newly established vegetation would be lost as shorelines retreat to levels seen in Figure 2-8. If additional or more regular nourishment does take place nature-based approaches may become more viable methods of slowing erosion and maintaining beach height provided that dunes do not become exposed to significant wave energy.

Nature-based approaches are more feasible along undeveloped interior shorelines where wetland and dune habitat are already established. The elevation of these habitat areas can be raised over time to keep pace with SLR through thin-layer placement, involving small volumes of sediment spread over a wide area to avoid adverse impacts to native vegetation (Figure 8-13). This approach has the potential to address hazards across all SLR scenarios if properly coordinated with elevation of other resources such as the interior coastal access pathway and Pacific Coast Highway.

A hybrid dune system as discussed in Section 8.3.1.3 can also be utilized along the Surfside coastline to address hazards projected at 3.3ft and greater SLR scenarios. Assuming current nourishment practices, this amount of SLR is likely to result in minimal to non-existent beach width along the open coast in the years after nourishment events. In such a scenario a hybrid dune would act as a last line of protection, preventing hazard exposure landward during critical periods before the next nourishment cycle while maintaining aesthetic and recreational value following nourishment events.

Benefits

- Interior nature-based measures can provide hazard protection while preventing loss of sensitive habitat.
- An open-coast hybrid dune system is potentially compatible with both pre-nourishment and post-nourishment shoreline conditions.
- Nature-based or hybrid protection measures along interior or open-coast shoreline can be adjusted over time to account for additional hazard conditions or adaptation strategies.

Challenges

- Erosion rates and lack of sediment supply limit nature-based options on open coast.
- Timing of implementation given rates of erosion following nourishment events.
- Measures will not eliminate the need for ongoing nourishment along open coast.
- Aesthetic impacts if open coast hybrid protection measures are constructed at heights significantly above existing development or become completely eroded under pre-nourishment conditions.

- Ongoing deployment and mobilization necessary for successful thin-layer placement along undeveloped interior shorelines.

Figure 8-13: Thin-layer sediment placement within the Seal Beach National Wildlife Refuge (M&N, 2016)

8.3.2.4 Structural accommodation

Floodproofing and elevation remain as options for SLR adaptation within the Surfside community, though effective implementation may be complicated as the area contains primarily multi-story residential development. Floodproofing retrofits can be used to mitigate impacts from storm flood hazards projected under a 1.6ft SLR scenario but are best applied as a supplement to other adaptation strategies aimed at preventing floodwaters from entering the community. Accommodation measures suitable for flood hazards projected under 3.3ft and greater SLR scenarios are limited to those based on increasing the elevation of structures in hazard zones (Figure 8-3, Figure 8-4). As is the case along the waterfront, elevation of individual structures is unlikely to be feasible unless conducted as a component of a community wide redevelopment effort. A more feasible approach may be to convert first floor residential areas to uses such as parking or storage without adjustment to other portions of the structure.

Benefits

- If implementation is feasible, elevation provides a long-term solution to SLR hazards within residential development areas.
- Damage to multi-story residential structures can be reduced by converting existing first floors to alternative uses such as storage or parking.
- Floodproofing retrofits can reduce storm damage without significant alteration to existing structures or uses.

Challenges

- Costs associated with widespread elevation efforts, especially for the 4.9ft and 6.6ft SLR scenarios.

- Coordination and consistent application of any elevation measures to avoid a patchwork of varying vulnerabilities within residential areas.
- Coordination of elevation efforts with surrounding infrastructure such as roadways, utilities infrastructure, and neighboring development to maintain access and services under high-hazard conditions.

8.3.2.5 Hard shoreline protection

Hard shoreline protection measures can be used to mitigate projected flood hazards along interior and open coast shorelines if other options are not feasible. In a similar manner to waterfront areas, deployable barriers can be used initially to address flood hazards during extreme events such as those projected along the interior area of the Surfside Community with 3.3ft SLR (Figure 8-14). With 4.9ft SLR, deployable measures within interior areas may need to be augmented with permanent flood protection infrastructure such as floodwalls due to the widespread nature of storm flood projections and select areas of non-storm flooding.

With 6.6ft SLR deployable barriers are unlikely to be a feasible option due to the increased extent of non-storm flood projections. Projected flood hazards under this scenario can be mitigated by enhancing existing shoreline stabilization infrastructure found along developed shorelines within Anaheim Bay. It should be noted that much of the existing stabilization infrastructure along interior shorelines lies outside City jurisdiction, and so any improvements would require coordination with adjacent land owners, agencies and municipalities. If alternative SLR adaptation measures are insufficient, erosion hazards along the eastern portion of the Surfside coastline with 6.6ft SLR can be mitigated through improvement and expansion of rock revetment currently located in western beach areas (Figure 8-15). While a rock revetment would halt shoreline retreat, elevation landward of the revetment would still be required to address non-storm flood impacts projected under a 6.6ft SLR scenario.

Benefits

- Deployable flood barriers can be implemented along interior shorelines without extensive alteration to existing infrastructure.
- Structural shoreline protection is already present in the form of bulkheads lining boating infrastructure along Mariner Drive, which can be improved though coordination with neighboring municipalities.
- Open coast shoreline stabilization can be expanded as needed and has a high level of resilience to erosive forces in the area.

Challenges

- Open coast shoreline stabilization measures such as rock revetment can reduce coastal access opportunities if exposed for a long period of time.
- Widespread implementation of rock revetment, without other adaptation options, can result in aesthetic impacts and alteration of community character.
- Interior shoreline infrastructure lies outside City jurisdiction.
- Potential regulatory challenges involved with implementation of hard protection measures in a manner consistent with the Coastal Act.

Figure 8-14: Conceptual design of water-filled barriers that can be rapidly deployed around threatened structures. (Visualization produced by M&N for NYCEDC, Interim Flood Protection Citywide)

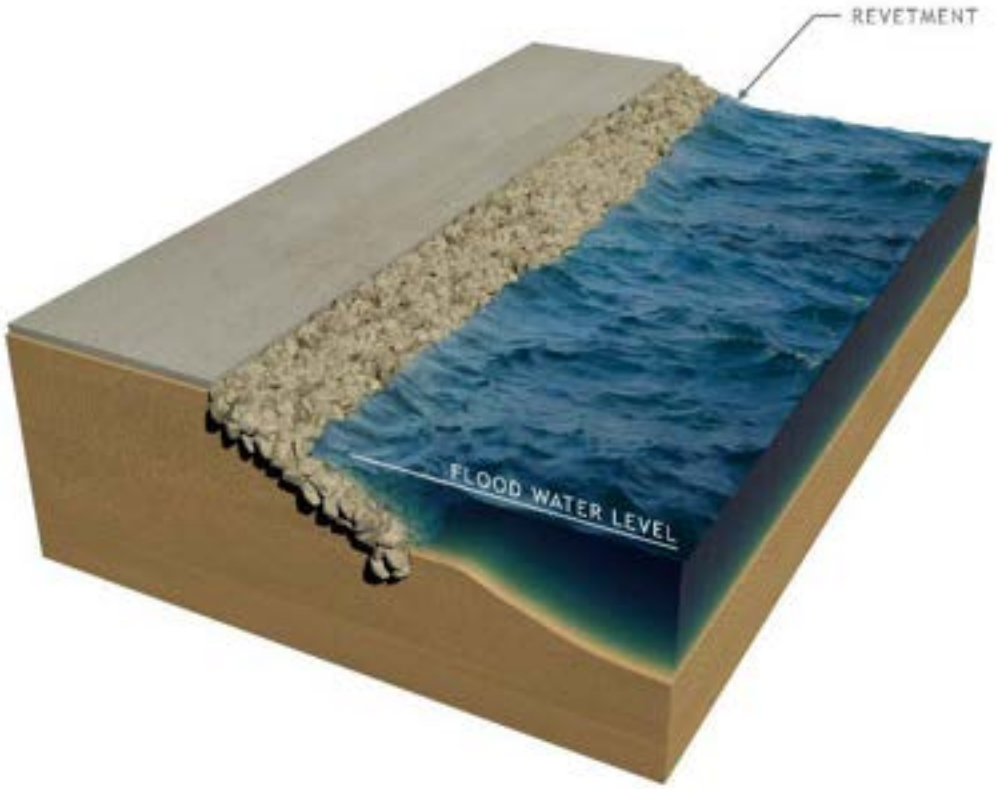


Figure 8-15: Conceptual example of a rock revetment used to stabilize shorelines subject to severe erosion.

8.3.3 Inland Low-Lying Areas

Flood projections within inland portions of the City are present under all SLR scenarios evaluated. With 1.6ft SLR the low-lying area surrounding electric Avenue is projected to flood under storm conditions. Storm and non-storm flood projections also extend landward within the Seal Beach National Wildlife Refuge under this scenario. With 3.3ft SLR storm flood projections encompass portions of the Los Cerritos Wetlands and Leisure World, and non-storm flooding is projected along Electric Avenue. With 4.9ft SLR both Leisure World and the Los Cerritos Wetlands are projected to flood under non-storm conditions, as are significant portions of the Seal Beach National Wildlife Refuge. These non-storm flood projections increase further with 6.6ft SLR.

8.3.3.1 Proposed Phasing

Table 8-3: Inland Low-lying Areas, Potential SLR adaptation triggers and proposed phasing.

SLR Scenario	Adaptation Trigger	Adaptation Measures
0ft	N/A	• Evaluate the hydraulic connectivity of the San Gabriel River and Anaheim Bay to verify critical connections to City development and interior flood patterns shown in CoSMoS model results. • Explore opportunities for drainage improvements in low-lying areas exposed to flooding.
1.6ft	• Storm flooding along low-lying portion of Electric Avenue. • Inundation of wetland habitat within Seal Beach National Wildlife Refuge.	• Increase flood protection capacity of San Gabriel River and Anaheim Bay levees surrounding Electric Avenue. • Support thin-layer placement programs within Seal Beach National Wildlife Refuge as feasible. • Implement drainage infrastructure improvements along the low-lying portion of Electric Avenue.
3.3ft	• Storm flooding within Los Cerritos Wetlands, Leisure World. • Storm flooding west of Kitts Highway.	• Increase flood protection capacity of San Gabriel River levee in vicinity of Los Cerritos Wetlands. • Implement nature-based flood protection strategies within critical areas bordering the Los Cerritos Wetlands and Seal Beach Boulevard. • Implement structural interior flood barriers at critical areas bordering the Los Cerritos Wetlands and Seal Beach Boulevard.
4.9ft	• Hazard conditions outside previous design standards.	• Evaluate and adjust previously implemented adaptation strategies as appropriate.
6.6ft	• Hazard conditions outside previous design standards.	• Evaluate and adjust previously implemented adaptation strategies as appropriate.

1. Measures listed for each progressive SLR scenario may be necessary only if previously implemented measures become insufficient based on performance and hazard monitoring

Figure 8-16: Potential SLR adaptation measure types and locations for inland areas.

8.3.3.2 Hard interior flood protection

Maintenance and strategic improvement of existing shoreline infrastructure lining the San Gabriel River and the interior shorelines of Anaheim Bay has the potential to mitigate projected floods hazards across large portions of the City (Figure 8-2). An initial step for any improvements is an evaluation of existing infrastructure to verify hydraulic connection points shown in CoSMoS modeling.

Provided that CoSMoS results are verified, increasing the elevation of shoreline infrastructure along West Beach and Electric Avenue can potentially eliminate storm flood projections under a 1.6ft SLR scenario. Under a 3.3ft SLR scenario further improvements to San Gabriel River levees can be made in the area of the Los Cerritos Wetlands to address flood projections throughout Leisure World. Structural barriers at critical points surrounding the Seal Beach National Wildlife Refuge can also mitigate these flood hazards if flooding is shown to originate from Anaheim Bay rather than the San Gabriel River, potentially by elevating portions of existing roadways. Once established, structural flood protection measures in interior areas can be elevated or expanded as necessary to address additional flood hazards projected under 4.9ft and 6.6ft SLR scenarios.

Benefits

- Structural shoreline protection infrastructure is already present along the interior of the San Gabriel River and Anaheim Bay and could be augmented to increase capacity for the 1.6 and 3.3 ft SLR scenarios.
- Improvements at critical hydraulic connection points can address widespread landward flood hazard projections.
- Existing infrastructure inspection, maintenance, and repair efforts can be leveraged as opportunities to increase flood protection capacity.

Challenges

- San Gabriel River levees and Anaheim Bay shoreline infrastructure are not directly managed by the City.
- Planning, design, and funding requirements for large-scale infrastructure improvements.
- Coordination with military staff to develop adaptation strategies to protect against flooding from Anaheim Bay or other areas under military jurisdiction.
- Potential regulatory challenges involved with implementation of hard protection measures in a manner consistent with the Coastal Act.

8.3.3.3 Nature-based interior flood protection

Nature-based protection measures can be used to address flood hazards in inland areas by creating barriers at critical points to contain floodwaters within low-lying coastal habitats. Elevation surfaces used in CoSMoS modeling show hydraulic connections at the northern portion of the Los Cerritos Wetlands and areas near the intersection of Westminster Boulevard and Seal Beach Boulevard. The available open space in these areas provides opportunity for implementation of a variety of nature-based measures depending on the desired footprint of adaptation measures.

Vegetated berms can be implemented in areas where a narrow footprint is desired and are potentially more suitable within the smaller, more complex area at the northern border of the Los Cerritos Wetlands. Once vegetation becomes well established a nature-based approach may be feasible to address SLR hazards across all scenarios evaluated due to the lack of wave exposure, provided that berms are constructed with an appropriate height and slope to ensure stability. A "horizontal levee" approach can be utilized where a wider footprint is feasible, potentially in the area south of Westminster Boulevard. This approach involves a more gradual increase in elevation over a wide area, resulting in ample stability over time with diminished aesthetic impacts (Figure 8-17).

Benefits

- Barriers at critical hydraulic connections can prevent flood impacts across large portions of the City.
- Successful implementation of nature-based measures can result in multiple benefits to a variety of resources.
- Horizonal levees reduce the potential for aesthetic impacts due to lack of steep grade changes associated with conventional berms or levees.
- Strategies can be adjusted over time due to a lack of large structural elements.

Challenges

- Periodic monitoring or maintenance may be required to ensure ongoing ecosystem health.
- Environmental impact and permitting considerations if barriers are implemented near sensitive habitat areas.
- Coordination with additional stakeholders to implement measures in areas not under City jurisdiction.
- Berms and levees can interfere with existing drainage patterns within developed areas. Interior flood protection behind these barriers would have to be evaluated to prevent stormwater flooding.

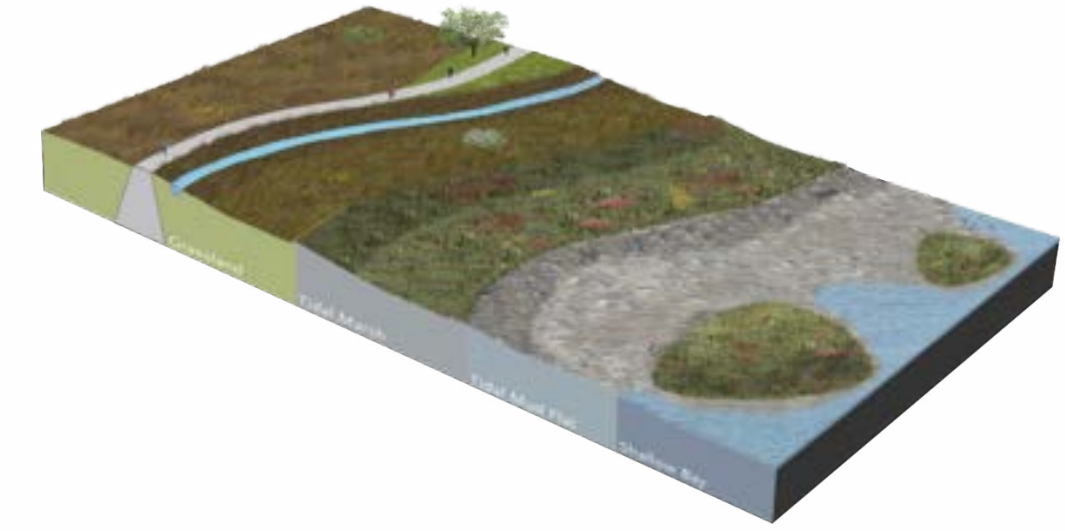


Figure 8-17: Conceptual example of a horizontal levee involving a gradual increase in elevation across different habitat types. (Image courtesy of San Francisco Bay Ecotarium)

8.3.3.4 Drainage improvements

Widespread application of accommodation measures such as floodproofing or elevation is unlikely to be feasible across the extent of inland flood projections. Drainage improvements along the Electric Avenue corridor can mitigate storm related flood hazards as projected under a 1.6ft SLR scenario by facilitating drainage of floodwaters through increased storage and conveyance capacity (Figure 8-5). Interior flooding projected within this area stems from floodwaters that overtop select portions of the shoreline infrastructure lining Anaheim Bay and the San Gabriel River and are then transported across low-lying areas. Drainage infrastructure such as pump stations, storm drains, and water storage features along Electric Avenue and surrounding areas can reduce potential flood extents and damages by conveying floodwaters away from critical development if shoreline overtopping occurs. These measures may also be implemented within Leisure World to mitigate storm flood impacts projected with 3.3ft SLR but would require implementation across a more widespread area, potentially reducing feasibility.

Drainage improvements are unlikely to be effective if areas become subject to non-storm flooding, projected along Electric Avenue with 3.3ft SLR. Despite limitations under these conditions on their own, drainage improvements could complement other measures such as structural flood barriers by reducing the extent and duration of flooding if barriers are overtopped under extreme conditions. Drainage improvements should also be considered in combination with any additional interior flood barriers as a means to remove interior floodwaters that can result from rainfall runoff.

Benefits

- Provides a means to control the extent and path of floodwaters without significant alterations to structures or other coastal resources.
- Improvements can be integrated into existing features such as park areas along Electric Avenue, where additional water features could potentially serve as a detention ponds.
- Drainage improvement measures additionally mitigate flood hazards driven by rainfall.
- Provides a redundant layer of flood protection in the event coastal barriers are overtopped or a significant rainfall event coincides with a high ocean water level, backing up gravity-operated storm drains.

Challenges

- Improvements must be coordinated across the area of implementation to be effective.
- Ongoing maintenance requirements may be costly based on the type and extent of drainage measures implemented.
- Limited effectiveness as a standalone measure beyond reducing impacts from temporary storm flooding.

9. References

California Coastal Commission. (2015). *California Coastal Commission Sea Level Rise Policy Guidance: Interpretive Guidelines for Addressing Sea Level Rise in Local Coastal Programs and Coastal Development Permits*.

California Coastal Commission. (2018). *Residential Adaptation Policy Guidance: Interpretive Guidelines for Addressing Sea Level Rise in Local Coastal Programs*.

California Department of Boating and Waterways. (2011). The Economic Costs of Sea-Level Rise to California Beach Communities. *San Francisco State University*.

Erikson, L., Barnard, P., O'Neill, A., Vitousek, S., Limber, P., Foxgrover, A., … Warrick, J. (2017). CoSMoS 3.0 Phase 2 Southern California Bight: Summary of data and methods. *U.S. Geological Survey*.

FEMA. (2014). *Homeowner's Guide to Retrofitting: Six Ways to Protect Your Home From Flooding*.

Griggs, G., Arvai, J., Cayan, D., Deconto, R., Fox, J., Fricker, H., … Whiteman, E. (2017). Rising Seas in California: An Update on Sea-Level Rise Science. *California Ocean Science Trust*.

IPCC. (2013). *Climate Change 2013: The Physical Science Basis. Contribution of Working Group I to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change*.

Kopp, R. E., Horton, R. M., Little, C. M., Mitrovica, J. X., Oppenheimer, M., Rasmussen, D. J., … Tebaldi, C. (2014). Probabilistic 21st and 22nd century sea-level projections at a global network of tide-gauge sites. *Earth' s Future*, 383–407. https://doi.org/10.1002/2014EF000239.Abstract

Moffatt and Nichol. (1984). *The Winterization of Seal Beach*.

Moffatt and Nichol. (1991). *Overview of Sand Replenishment and Groin Repair Issues: Seal Beach, California*.

Moffatt and Nichol. (2004). *Groin Rehbilitation Study: Seal Beach, California*.

Pollard, D., & Deconto, R. M. (2016). Contribution of Antarctica to past and future sea-level rise. *Nature*, *531*. https://doi.org/10.1038/nature17145

Raheem, N., Talberth, J., Colt, S., Fleishman, E., Swedeen, P., Boyle, K. J., … Boumans, R. M. (2009). *The Economic Value of Coastal Ecosystems in California*.

U.S. Army Corps of Engineers. (2002). *Coast of California Storm and Tidal Waves Study, South Coast Region, Orange County*.

U.S. Army Corps of Engineers. (2014). *Beach Erosion Project Review Plan: Surfside-Sunset (Stage 13) San Gabriel River to Newport Bay Orange County, California*.

U.S. Army Corps of Engineers. (2015a). *North Atlantic Coast Comprehensive Study: Resilient Adaptation to Increasing Risk, Main Report*.

U.S. Army Corps of Engineers. (2015b). *North Atlantic Coast Comprehensive Study: Resilient Adaptation to Increasing Risk, Physical Depth Damage Function Summary Report*.

Appendix A Hazard Maps

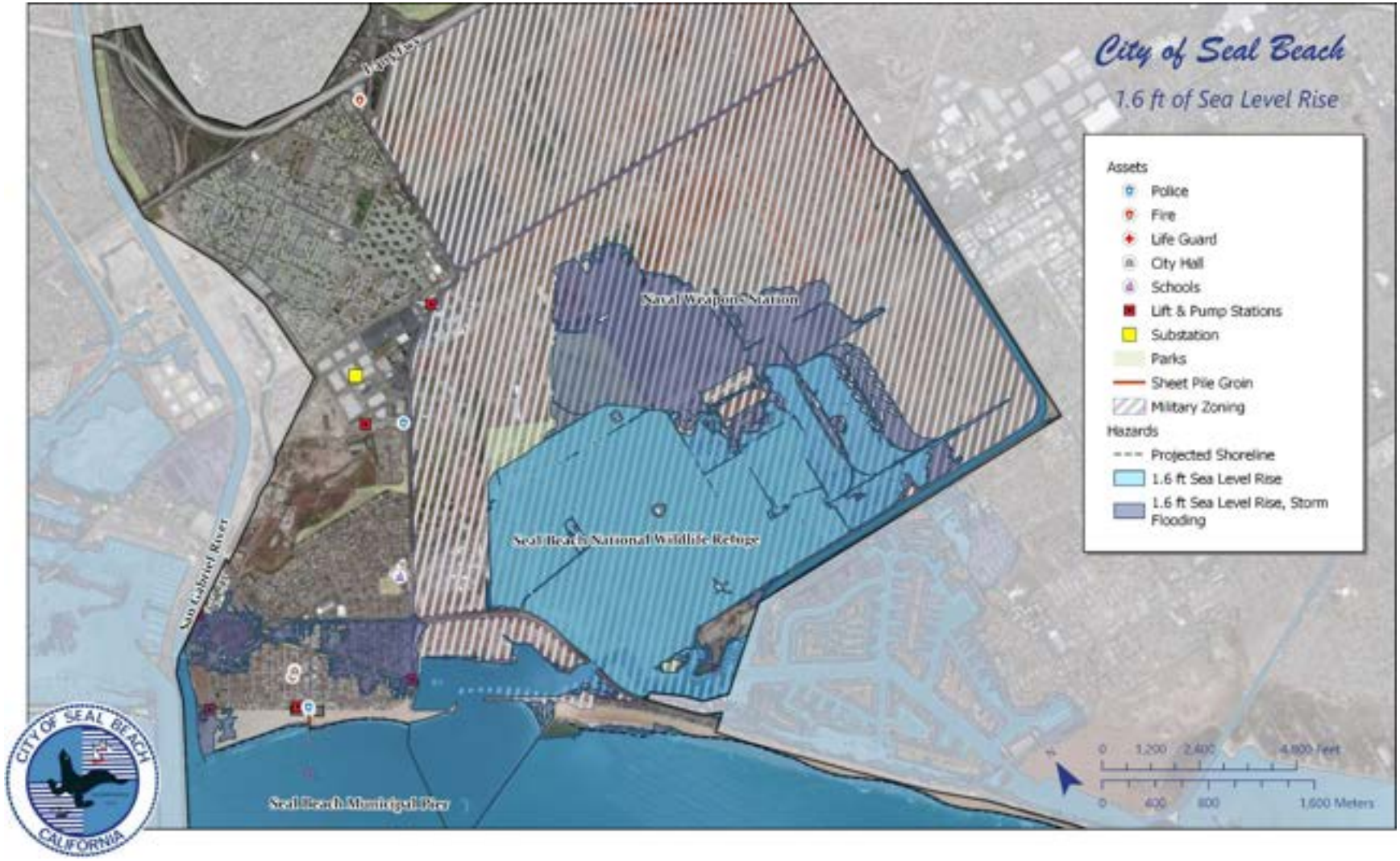


Figure A-1: 1.6ft SLR hazards, full City extent.

Figure A-2: 1.6ft SLR hazards, Seal Beach waterfront.

Figure A-3: 1.6ft SLR hazards, Surfside.

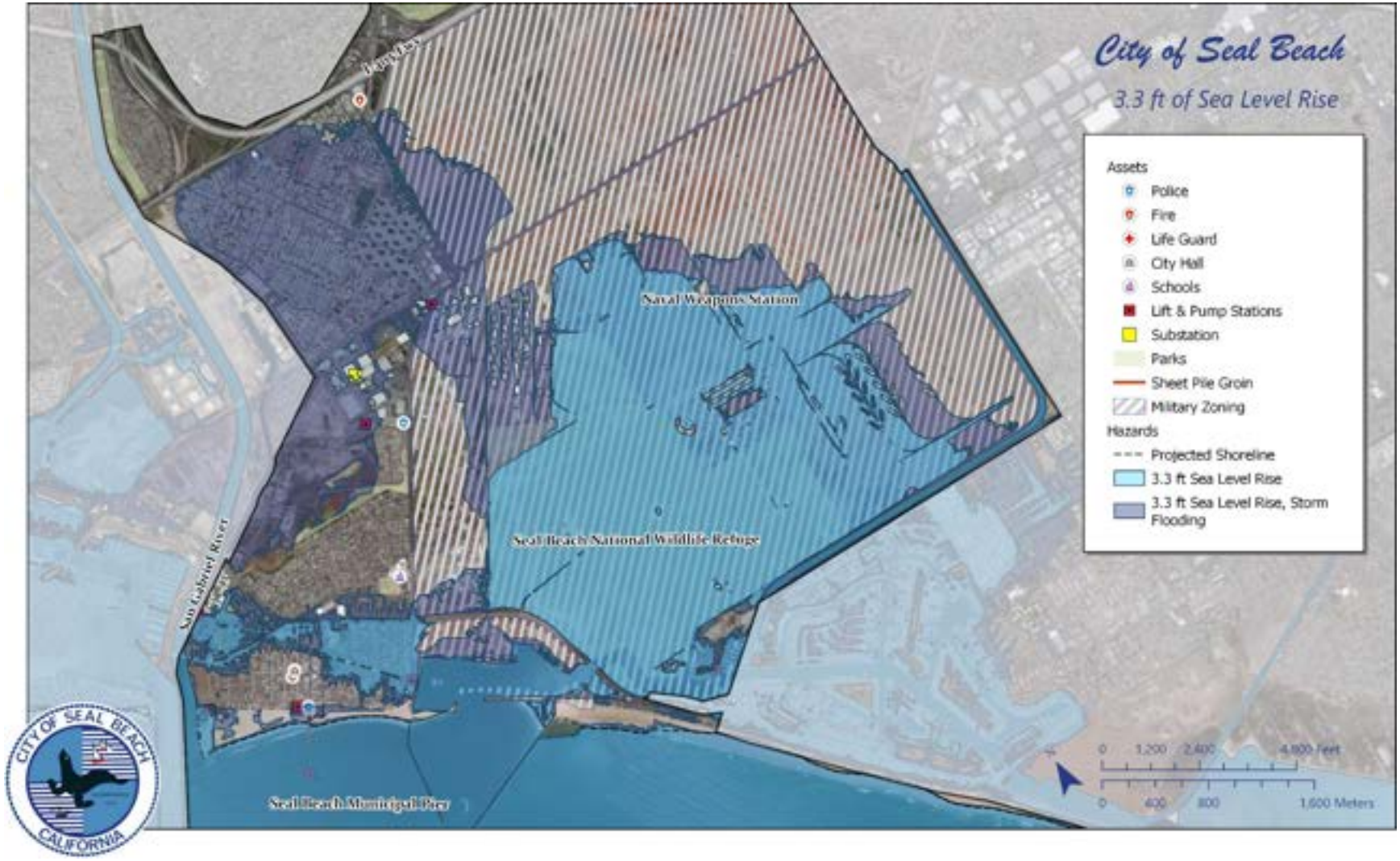


Figure A-4: 3.3ft SLR hazards, full City extent.

Figure A-5: 3.3ft SLR hazards, Seal Beach waterfront.

Figure A-6: 3.3ft SLR hazards, Surfside.

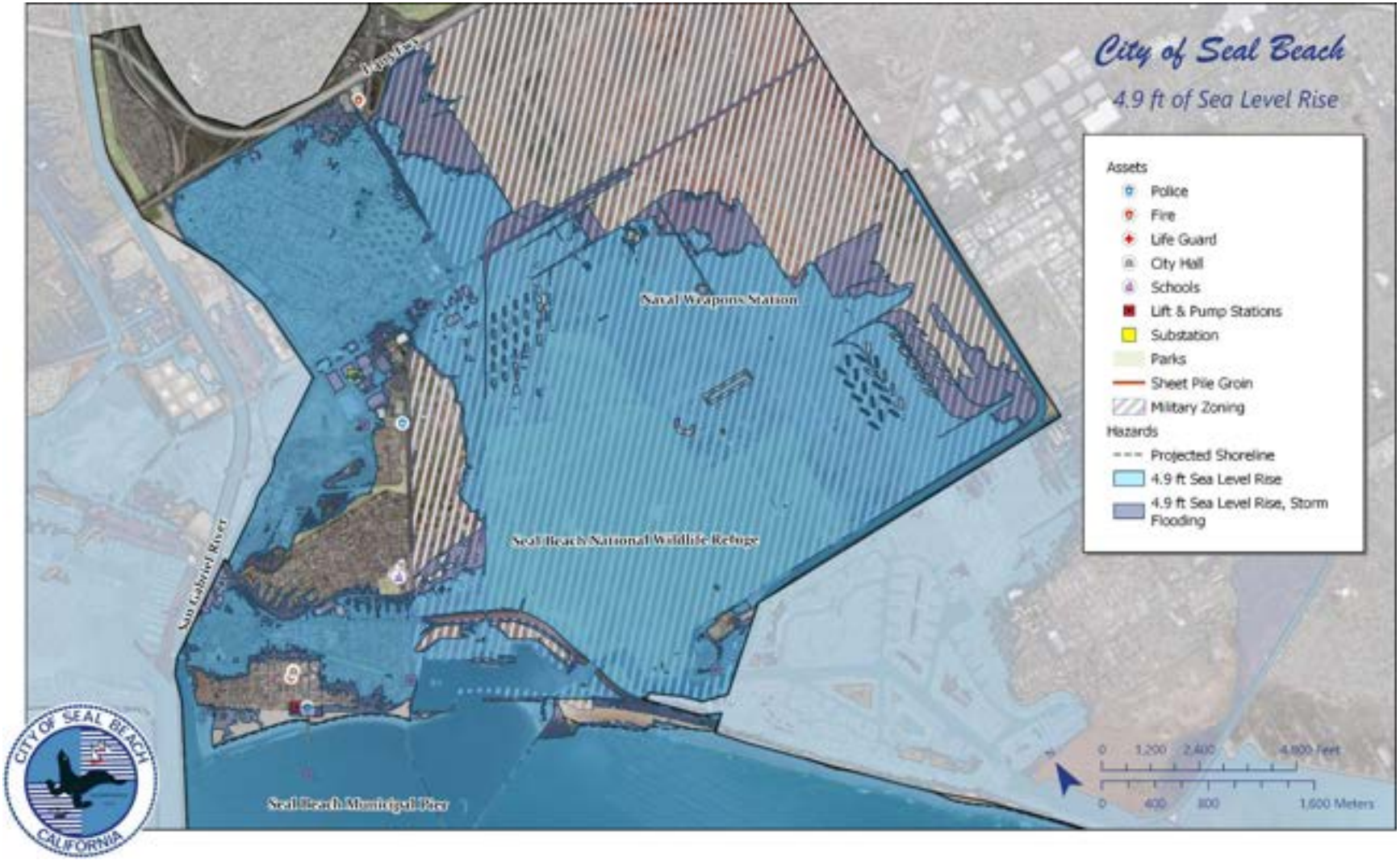


Figure A-7: 4.9ft SLR hazards, full City extent.

Figure A-8: 4.9ft SLR hazards, Seal Beach waterfront.

Figure A-9: 4.9ft SLR hazards, Surfside.

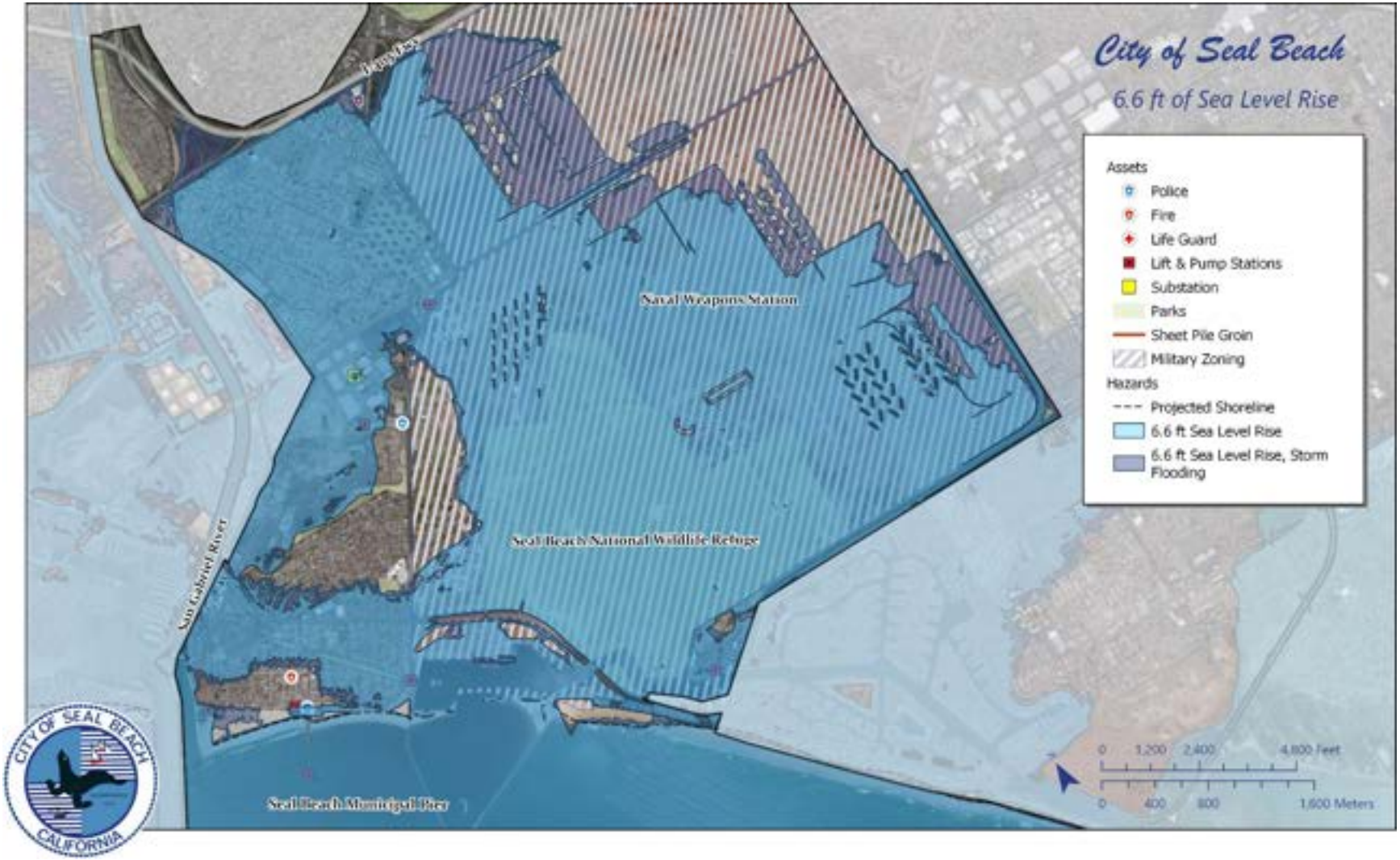


Figure A-10: 6.6ft SLR hazards, full City extent.

Figure A-11: 6.6ft SLR hazards, Seal Beach waterfront.

Figure A-12: 6.6ft SLR hazards, Surfside.