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## Appendix A – Sea Level Rise

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- I. **Purpose.** To ensure that sea level rise is adequately addressed in the review of coastal development permit applications and in future updates and amendments to the City's Local Coastal Program (LCP).
- II. **Introduction.** Climate change and sea level rise have the potential to significantly threaten many resources within the City's coastal zone, including shoreline development, coastal beach access and recreation, habitats, and scenic resources. These resources are subject to specific protections and regulations in the Coastal Act and the City's LCP.

Given that the width of the City's beaches varies between fifty and six-hundred (50 and 600) feet, a sea level rise of as little as six (6) inches may have a negative impact on the low-lying areas around Newport Bay that are not protected by bulkheads and seawalls. Seawalls and bulkheads may also themselves cause coastal resource impacts by causing flooding and eventual loss of areas seaward of the structure that would otherwise migrate inland, such as beaches—a process often called “coastal squeeze.” Sea level rise may also cause increased coastal bluff retreat in the southern portion of the City where the beaches are narrow, and the surf pounds at the base of the bluffs, eroding away the soft bedrock that forms the cliffs.

The potential impacts of sea level rise include loss of recreational beaches due to accelerated erosion, loss of waterfront property through erosion and inundation of low-lying areas, the loss of coastal bluff property through increased bluff retreat, and the loss of and changes to natural habitats in the Upper Newport Bay, Semeniuk Slough, and other low-lying natural areas. In addition, there could be severe social and economic hardships associated with the loss or relocation of visitor-serving, recreational, and coastal-dependent and coastal-related businesses and facilities.

- III. **City's Plan of Action.** The City understands there is a threat of flooding and inundation in and around Newport Harbor due to sea level rise. Acknowledging the considerable uncertainty in the magnitude of the rise in sea level, the City intends to undertake a proactive program to monitor the rate of sea level rise and be prepared to implement a both now and in the future. A vulnerability assessment will be prepared to help develop a long-term adaptation strategy. In both the short and long-term, potential actions may include requiring proper siting and maintenance of public and privately-owned seawalls; requiring public and privately-owned seawalls caps be extended per City standards; revising City standards for new seawall, top-of-seawall elevation and finished floor elevations; studying ways to provide and maintain public access to beaches, docks and piers; and monitoring and replenishing beach sand loss in the harbor and along the ocean.

The efforts of the City, both immediately and long-term, are directly in accordance with the Coastal Land Use Plan policies which are listed below:

**2.8.6-1.** Prepare and periodically update comprehensive studies of seasonal and long-term shoreline change, episodic and chronic bluff retreat, flooding, and local changes in sea levels, and other coastal hazard conditions.

**2.8.6-2.** Continue to monitor beach width and elevations and analyze monitoring data to establish approximate thresholds for when beach erosion or deflation will reach a point that it could expose the backshore development to flooding or damage from storm waves.

**2.8.6-3.** Develop and implement a comprehensive beach replenishment program to assist in maintaining beach width and elevations. Analyze monitoring data to determine nourishment priorities, and try to use nourishment as shore protection, in lieu of more permanent hard shoreline armoring options.

**2.8.6-4.** Maintain existing groin fields and jetties and modify as necessary to eliminate or mitigate adverse effects on shoreline processes.

**2.8.6-5.** Permit revetments, breakwaters, groins, harbor channels, seawalls, cliff retaining walls and other structures altering natural shoreline processes or retaining walls when required to serve coastal-dependent uses or to protect existing principal structures or public beaches in danger from erosion and when designed to eliminate or mitigate adverse impacts on local shoreline sand supply, unless a waiver of future shoreline protection was required by a previous coastal development permit.

**2.8.6-6.** Design and site protective devices 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.

**2.8.6-7.** Discourage shoreline protective devices on public land to protect private property/development. Site and design any such protective devices as far landward as possible. Such protective devices may be considered only after hazard avoidance, restoration of the sand supply, beach nourishment and planned retreat are exhausted as possible alternatives.

**2.8.6-8.** Limit the use of protective devices to the minimum required to protect existing development and prohibit their use to enlarge or expand areas for new development or for new development. "Existing development" for purposes of this policy shall consist only of a principle structure, e.g. residential dwelling, required garage, or second residential unit, and shall not include accessory or ancillary structures such as decks, patios, pools, tennis courts, cabanas, stairs, landscaping etc.

**2.8.6-9.** Require property owners to record a waiver of future shoreline protection for new development during the economic life of the structure (75 years) as a condition of approval of a coastal development permit for new development on a beach, shoreline, or bluff that is subject to wave action, erosion, flooding, landslides, or other hazards associated with development on a beach or bluff. Shoreline protection may be permitted to protect existing structures that were legally constructed prior to the certification of the LCP, unless a waiver of future shoreline protection was required by a previous coastal development permit.

**2.8.6-10.** Site and design new structures to avoid the need for shoreline and bluff protective devices during the economic life of the structure (75 years).

## **Future Steps**

Based on the expected rate of sea level rise, the City staff will revise existing or devise new policies for consideration by City Council and incorporation into the LCP through a future LCP amendment. Current policies that could be revised include changes to the minimum finished floor elevation, maximum roof heights, setbacks, public access requirements, existing or new seawall requirements including associated mitigation requirements, and drainage requirements.

As part of a future LCP update, the City will conduct a sea level rise vulnerability assessment for the City's entire coastal zone. Recent peer reviewed science indicates that, in the next few decades, most sea level rise impacts will be experienced during extreme events like El Ninos and storms. Therefore, monitoring tide gauges alone will not be sufficient to predict and prepare for those impacts. Further, development decisions made today will affect vulnerabilities of that development decades from now. Structures with a long "lifetime", high sensitivity, or low adaptive capacity should be sited in locations that avoid sea level rise-related hazards for their economic lifetimes, and those siting and design decisions should be made using best available information on the projected future risks of sea level rise.

A future vulnerability assessment will include the geographic extent of the public tidelands granted to the City, as required by AB 691, as well as development within the entire coastal zone. Such a study will use the current best available science<sup>1</sup> regarding projections of sea level rise and use scenario based analysis to consider potential amounts of future sea level rise. The vulnerability assessment will help the City prepare an LCP update that implements additional actions based on the actual rise in sea level as well as in response to expected future impacts, where appropriate. Those actions will include strategies that minimize coastal hazards and maximize protection of coastal resources including but not limited to public access within State tidelands.

The City will continue to analyze the potential impacts of sea level rise on the community and will consider policies and corresponding development standards for public review and discussion. The City will also coordinate with local and regional partners to share information and adaptation planning ideas related to sea level rise. Information gained from analysis of wave-runup and flooding potential for individual development projects will be used along with the City-wide vulnerability assessment to develop Local Coastal Program amendments, which will require review and approval by the Coastal Commission.

## **IV. Review of Coastal Development Permits.**

Upon certification of the Local Coastal Program, the City will issue coastal development permits, based on policies and standards contained therein.

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<sup>1</sup> At the time of the drafting of this Implementation Plan, the National Research Council's 2012 report, *Sea-Level Rise for the Coasts of California, Oregon and Washington: Past, Present and Future* (NCR 2012) is considered the best available science on sea level rise in California.

The City will use the best-available science to determine a range of sea level rise projections for use in reviewing coastal development permit applications. Sea level rise science continues to evolve, and some processes that are not fully understood may potentially have large effects on future sea level rise. Therefore, the City will re-examine the best available science periodically in conjunction with the release of new information on sea level rise. The City will consider relevant science that is current, peer-reviewed, and widely accepted among the scientific community, such as the newly developed FloodRISE project from UC Irvine.

The National Research Council's 2012 report, *Sea-Level Rise for the Coasts of California, Oregon and Washington: Past, Present and Future* (NRC 2012) provides sea level rise projections of 2-12 inches by 2030, 5-24 inches by 2050, and 17-66 inches by 2100 for Southern California. Sea level rise amounts expected by years other than 2030, 2050, and 2100 should be calculated by interpolating or extrapolating data points using best fit equations. Sea level rise projections that match the anticipated project life of the development under consideration should be used.

In its review of coastal development permits, the following policy shall be implemented in addition to the relevant policies stated in Section III.

**2.8.3-1.** Require all coastal development permit applications for new development on a beach or on a coastal bluff property subject to wave action to assess the potential for flooding or damage from waves, storm surge, or seiches, through a wave uprush and impact reports prepared by a licensed civil engineer with expertise in coastal processes. The conditions that shall be considered in a wave uprush study are: a seasonally eroded beach combined with long-term (75 years) erosion; high tide conditions, combined with long-term (75 year) projections for sea level rise; storm waves from a 100-year event or a storm that compares to the 1982/83 El Niño event.

**Applicability.** Sea level rise should be considered in the review of a CDP when the project is in an area that is reasonably expected to be impacted by sea level rise over the lifetime of the new development, including but not limited to areas on low-lying land, on eroding coastal bluffs, or are in proximity to water. These include:

- “Low-lying land” areas include the Semeniuk Slough, West Newport, Lido Peninsula, Balboa Peninsula, Bay Island, Balboa Island, Little Balboa Island, Collins Island, Balboa Coves, Mariners’ Mile, Balboa Bay Club Resort, Bay Shores, Harbor Island, and Beacon Bay.
- “Eroding coastal bluffs” include those along Ocean Boulevard in Corona del Mar and in Shorecliffs and Cameo Shores.
- “Proximity to water” includes all of the above areas and shoreline properties in Newport Shores, Newport Island, Lido Isle, Harbor Island, Bayside, Carnation Cove, China Cove, Bayside Village, Newport Dunes, and Dover Shores.

To facilitate this review, the following steps/analysis shall be required in developing the application submittal.

- Step 1** Establish the projected sea level rise range for the proposed project's planning horizon (life of project) using the current best available science.
- Step 2** For each sea level rise scenario identified in Step 1, determine how physical impacts from sea level rise may impact the project site, including erosion, structural and geological stability, flooding and inundation.
1. **Wave Uprush and Wave Impacts (see Section 21.30.015.E.2).** The wave uprush and wave impact the analysis should identify risks that potentially could occur over the anticipated life of the project from 1) a seasonally eroded beach combined with long term (75-year) erosion, including accelerated erosion rates resulting from sea level rise; 2) high tide conditions, combined with long-term (75 year) projections for sea level rise; and 3) storm waves from a 100-year event or a storm that compares to the 1982/83 El Niño event.
  2. **Geologic Stability (see Section 21.30.015.E.4).** Geologic stability reports should analyze site-specific stability and structural integrity without reliance upon existing or new protective devices (including cliff-retaining structures, seawalls, revetments, groins, buried retaining walls, and caisson foundations) that would substantially alter natural landforms along bluffs and cliffs. Geologic stability can include, among others, concerns such as landslides, slope failure, liquefiable soils, and seismic activity. In most situations, the analyses of these concerns will be combined with the erosion analysis to fully establish the safe developable area.
  3. **Erosion.** The erosion analysis should establish the extent of erosion that could occur from current processes, as well as future erosion hazards associated with the identified sea level rise scenarios over the life of the project. If possible, these erosion conditions should be shown on a site map, and the erosion zone, combined with the geologic stability concerns, can be used to help establish locations on the parcel or parcels that can be developed without reliance upon existing or new protective devices (including cliff-retaining structures, seawalls, revetments, groins, buried retaining walls, and caissons) that would substantially alter natural landforms along bluffs and cliffs.
  4. **Flooding and Inundation.** The flooding or inundation analysis should identify the current tidal datum and include analysis of the extent of flooding or inundation that potentially could occur from the identified sea level rise scenarios.
  5. **Other Impacts.** Any additional sea level rise related impacts that could be expected to occur over the life of the project, such as saltwater intrusion should be evaluated. This may be especially significant for areas with a high groundwater table such as wetlands or coastal resources that might rely upon groundwater.
- Step 3** Determine how the project may impact coastal resources, considering the influence of sea level rise over the life of the project. Resources to

consider shall include public access and recreation, coastal habitats, water quality, archaeological/paleontological resources and scenic resources.

**Step 4** Seek alternatives to avoid resource impacts and minimize risk to the project, such as increasing heights of sea walls or finished floor elevations.

**Step 5** In conjunction with the approval of the CDP, appropriate conditions of approval will be placed on the project.