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## 5-19-0345-A2 (OC Parks & CA State Parks)

## November 16, 2022

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Kingdom Hall of Jehovah's Witnesses Nobis Preschool DoubleTree Suites by Hilton Hotel Doheny... Doheny State Beach Doheny State Beach Palisades Elementary School San Juan Doheny Creek **State Beach** CAPISTRANO BEACH Doheny Barge Bait State Beach Suites at Dana Point **Dana Point** Capistrano Beach Park Harbor **Pines** Park **Pacific Ocean** Capistrano **Beach County Crawfish Rock** 🐆 Kawamata Se Park Capistrano **Bay District** Sector Layers Google



## Exhibit 2 – Proposed Project Plans



Existing Portable Restrooms to Remain



**Capistrano Beach County Park** Interim Shore Protection Plan



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NORTH





Exhibit 3 – Proposed Monitoring and Maintenance Plan

PRODUCED FOR ORANGE COUNTY PARKS Sep 02, 2022

# CAPISTRANO BEACH COUNTY PARK AND DOHENY STATE BEACH NATURE-BASED PILOT PROJECT

# **Monitoring Plan**



# **Document Verification**

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## 1. Purpose

This monitoring plan describes (1) methods for monitoring project performance and (2) thresholds for maintenance and adaptive management of the proposed nature-based shoreline protection pilot project described in Coastal Development Permit (CDP) No. 5-19-0345. The purpose of the pilot project is to test the performance and evaluate the effectiveness of a nature-based approach as a potential solution for long-term shoreline protection along Capistrano Beach County Park and Doheny State Beach. The proposed project consists of an approximately 1150-ft cobble berm covered by a sand berm and vegetated dunes, as shown in Figure 1-1, to protect a public pedestrian/bicycle path ("coastal trail"), parking, and other infrastructure along Capistrano and Doheny Beaches in Dana Point, CA.



#### FIGURE 1-1: CONCEPTUAL NATURE-BASED PILOT PROJECT – PLAN VIEW

Monitoring of the pilot project is proposed to cover a period of five years after the initial construction to measure the performance of the project and to support maintenance and adaptative management actions. Monitoring will be performed by trained volunteers ("citizen scientists") when possible, and by qualified biologists, engineers, and scientists when required. Monitoring will occur at the project site and at a nearby reference beach (Poche Beach, San Clemente, CA; roughly two miles downcoast of the project site) to incorporate natural temporal environmental variability into the evaluation of project success criteria.

The scope of monitoring proposed in this plan is dependent upon funding available to the County and State Parks, availability of volunteer/citizen science and academia support to perform monitoring tasks and is pending the County's receipt of the final CDP from the Coastal Commission. It is expected that specific aspects of this plan (e.g., monitoring schedule/frequency, monitoring forms) will be further detailed over time.

The current plan submittal outlines the goals and success criteria for the pilot project and provides a framework for monitoring parameters and methods. Monitoring parameters have been prioritized in the sections below to identify metrics critical for project success to accommodate inherent uncertainty in project funding.

# 2. Success Criteria

The proposed nature-based shoreline protection at Capistrano Beach and Doheny Beach is primarily intended to:

- 1. provide protection from overtopping by storm waves;
- 2. stabilize the shoreline;
- 3. avoid/minimize impacts to coastal resources;
- 4. increase site desirability by beach users;
- 5. provide data for the engineering design of similar natural coastal protection strategies; and
- 6. enhance native flora and fauna habitat.

In general, "success" for the pilot project is defined as the County's and State Parks' ability to determine if this nature-based approach is appropriate (or not) for implementation along other segments of Capistrano and Doheny Beaches as a long-term solution, following the five-year monitoring period. This pilot project is intended to determine the level of performance associated with each of the goals above over the course of five years following project construction. The list above is generally in priority order, i.e., the most important success criteria are on the top of the list. Successful monitoring must answer the following questions in order to inform the County's long-term Master Plan decision making:

#### For project performance:

- 1. Does the design afford an adequate level of overtopping protection over time?
- 2. Is the beach capable of rebuilding via natural processes at a rate similar to that of a comparable beach?
  - a. If not, is the cobble capable of maintaining a level of shoreline protection similar to that of a comparable cobble beach when exposed?
- 3. Has the project caused adverse impacts to the nearshore and/or downcoast beaches?
- 4. Does the vegetated dune have a similar level of vegetated cover and composition as a comparable vegetated shoreline?
  - a. If so, does it provide habitat for native wildlife typically associated with dune systems?
- 5. Does the pilot project support a level of recreational beach use that is similar to a comparable beach?

#### For public safety:

- 6. Does the beach berm form scarps more than 3 ft tall during summer?
- 7. Are cobbles thrown more than 20 ft from the cobble berm crest during storms?

#### For basic maintenance:

- 8. Is there an increase in maintenance of the bicycle path and parking lot due to sand/cobble?
- 9. Are invasive weeds becoming established and reaching management thresholds?
- 10. Are modifications needed for educational signage and/or access fencing to limit pedestrian incursions?

#### And for adaptive management:

- 11. Is there substantial transport of cobble off-site?
- 12. Does the buried cobble berm adversely affect the establishment of dune vegetation?
- 13. Does the design retain a beach berm during summer months?
- 14. Does the vegetated dune adversely affect the ability of the cobble berm to rebuild?

Monitoring methods for each element of the monitoring program are discussed in the following section.

# 3. Monitoring Methods

To address these questions, the pilot project will include monitoring of (1) waves and water levels, (2) site topography and shoreline position, (3) native flora and fauna, and (4) site desirability. Methods and sources for data collection are provided below. Maintenance needs are discussed in a following section.

### 3.1. Waves and Water Levels

The evolution of the pilot project will primarily be related to total water levels, which are the maximum runup elevation generated by the combination of tidal water levels and wave conditions (wave heights and periods), as well as wave overtopping. Specific monitoring methods to support the evaluation of project performance are provided below, with optional elements (pending funding) shown in *grey italics*.

Metric	Method	Source(s)
Tidal water level	Monitor and archive verified hourly water	NOAA Los Angeles gage <sup>1</sup> (9410660), located ~40 miles northwest of project site.
	active tide gages.	NOAA La Jolla gage <sup>2</sup> (9410230), located ~47 miles southeast of site.
Significant wave	Monitor and archive site-specific and offshore wave conditions.	Site-specific conditions:
heights,		Hourly modelled wave conditions at CDIP MOP Transect OC105 <sup>3</sup>
period, and direction of		Optional Alternative: Hourly observed wave conditions via a wave gage (Nortek Signature1000 <sup>4</sup> or similar) deployed in 20 ft of water immediately offshore of the project site
period		Optional: Twice-daily site-specific wave face height and wave period measured by CoastalComs <sup>5</sup> camera – see Figure 3-1.
		Offshore conditions:
		Oceanside Offshore buoy (NDBC #46224/CDIP #045) <sup>6</sup> , located ~20 miles southeast of project site.
		San Clemente Basin buoy (NDBC #46086) <sup>7</sup> , ~70 miles southwest of site.
Optional: Wave runup	Record wave runup: (a) along the beach face at project site and (b) at one off-site "control" location (such as transect 2 in Figure 3-1)	One camera-based system (such as mini-Argus <sup>8</sup> ) mounted at each site at elevation on a light fixtures pole nearest the site of interest.
Wave overtopping following events with return	Record qualitative evidence of dune and/or exposed cobble berm overtopping	<ul> <li>Field inspections, carried out by trained volunteers as possible. Include:</li> <li>1) Photographic evidence of overtopping, such as of damage to vegetation or sediment and cobble overwash;</li> <li>2) Estimated number of overtopping locations along the dupp and/or</li> </ul>
periods greater		cobble crest; and
man'n year,		<ol> <li>Estimated maximum alongshore distance of overwash for each location of overtopping.</li> </ol>

<sup>1</sup> See https://tidesandcurrents.noaa.gov/stationhome.html?id=9410660

<sup>2</sup> See https://tidesandcurrents.noaa.gov/stationhome.html?id=9410230

<sup>3</sup> See modelled wave conditions for ČDIP coastal wave Monitoring and Prediction (MOP) system Transect OC105:

https://cdip.ucsd.edu/mops/?moplist=Orange\_County&pub=nonpub&xitem=info&mop=OC105

<sup>4</sup> See https://www.nortekgroup.com/products/signature-1000

<sup>5</sup> See https://www.coastalcoms.com/ for capabilities

<sup>6</sup>See https://www.ndbc.noaa.gov/station\_page.php?station=46224

<sup>7</sup> See https://www.ndbc.noaa.gov/station\_page.php?station=46086

<sup>8</sup> See methods previously developed by the US Geological Survey and US Army Corps of Engineers (https://apps.dtic.mil/sti/pdfs/AD1067054.pdf),

following Holman and Stanley (2006; doi: 10.1016/j.coastaleng.2007.01.003).

<sup>9</sup> Previously modelled historical wave conditions at the site will be used to provide wave height and wave period thresholds for 1-year and 20-year storm events. Site-specific wave forecasts for CDIP MOP Transect OC105 will be actively monitored for events exceeding the thresholds, which will also trigger pre- and post-storm beach elevation surveys.

Measurements of wave overtopping will capture the number of times in which wave runup overtops the proposed dune and/or exposed cobble berm and may be used with wave conditions and cross-shore elevation profiles (see below) to determine the level of protection afforded by the design. If compared with similar information at a control site (if funding allows), wave overtopping information could also be used to better understand project efficacy for specific wave conditions.



FIGURE 3-1: LOCATIONS OF THE COASTALCOMS CAMERA AND CROSS-SHORE TRANSECTS TO BE MONITORED

## 3.2. Site Topography and Shoreline Position

The success of the project will primarily be driven by the ability of the design to (a) maintain the presence of a beach berm during summer, and (b) be resilient to typical seasonal erosion patterns and storm events. The ability of the pilot project to provide protection to shoreline amenities and infrastructure will be evaluated by comparing measurements of beach elevation, sand/cobble distribution, and wave runup along at least one shore-normal transect within the project footprint (within Capistrano Beach County Park, Doheny State Park, or both if funding permits) with similar measurements collected at one upcoast (north of project site) and at least one downcoast (south of project site) location.

Specific monitoring methods to support the evaluation of project performance, coastal impacts, and public safety are included below, with optional elements (pending funding) shown in *grey italics*.

Metric	Method	Source(s)
Seasonal erosion/accretion	Measure cross-shore elevations twice per year (October and May), starting no less than one year prior to construction of pilot project and completing in the October or May following the 5-yr pilot period.	<ul> <li>Elevations captured with total station/rodman onshore and acoustic echo sounder offshore, by survey professionals.</li> <li>Elevations will be measured in at least 1m cross-shore intervals from the landward limit of the beach to approximately -40 ft NAVD88<sup>10</sup> offshore along:</li> <li>1) At least one shore-normal transect within the project bounds (Capistrano Beach, Doheny Beach, or both);</li> <li>2) One shore-normal transect upcoast (north) of the project site;</li> <li>3) At least one shore-normal transect downcoast (south) of the project site (Poche Beach).</li> <li>See Figure 3-1 for transect locations.</li> </ul>
-	Track shoreline locations at least twice per year (October and May)	Monthly shoreline locations captured by CoastalComs <sup>11</sup> cameras installed at Capistrano Beach and Poche Beach ( <i>reference site</i> ). Optional: photograph the long-term evolution of the project using an opportunistic volunteer-based system, such as CoastSnap <sup>12</sup> .
Seasonal cobble movement	Determine the change in beach sand/cobble composition along each shore-normal transect twice per year (October and May)	Photographs of 3 ft x 3 ft area every 20 ft along each cross-shore transect and visual characterizations of the associated sediment type within each photograph using descriptions contained in the Wentworth (1922) sediment scale <sup>13</sup> or the USACE SandSnap photographic method <sup>14</sup> ; carried out by trained volunteers. Optional: collect one representative surface sediment sample every 20 ft along each cross-shore elevation transect for laboratory analysis to determine $D_{50}$ .
	Track locations of cobble near the project site twice per year (October and May)	Record (with handheld GPS) locations of cobble along the exposed shoreline within the project boundary, as well as 1000 ft north and south of the project boundary, twice per year; this may be carried out by trained volunteers. Optional: Survey locations of cobble tagged with passive RFID tags <sup>15</sup> ; if less than 75% of RFID cobble is accounted for within the project bounds, RFID surveys may expand to adjacent sites to track locations and effects of cobble.
Storm-driven erosion/accretion	Measure cross-shore elevations no more than ten days before wave conditions are forecast to exceed ~20-yr <sup>16</sup> return period event and again no more than five days after the event concludes.	Elevations would be collected using the same methods as for seasonal cross-shore elevation surveys.

<sup>&</sup>lt;sup>10</sup> The landward limit of the existing offshore rock outcroppings at the project site are located at approximately -20 ft NAVD88; the offshore survey will extend to approximately -40 ft NAVD88 which is consistent with the extent of other historic and ongoing transect surveys in this area.
<sup>11</sup> The CoastalComs system uses 5 minutes of video footage at the predicted time of mean sea level to determine the georeferenced shoreline location. Monthly images, shoreline positions, and numbers of visitors are currently provided to OC Parks on an annual basis.

<sup>&</sup>lt;sup>12</sup> See Harley et al. (2019). *Shoreline change mapping using crowd-sourced smartphone images*. Coastal Engineering 150:175-189. Doi: 10.1016/j.coastaleng.2019.04.003

<sup>10.1016/</sup>j.coastaleng.2019.04.003. <sup>13</sup> See https://pubs.usgs.gov/of/2006/1195/htmldocs/images/chart.pdf

<sup>14</sup> See SandSnap (arcgis.com)

<sup>&</sup>lt;sup>15</sup> See Allan et al. (2006). The use of Passive Integrated Transponder (PIT) tags to trace cobble transport in a mixed sand-and-gravel beach on the high-energy Oregon coast, USA. Marine Geology 232: 63-86. doi: <u>10.1016/j.margeo.2006.07.005</u>

<sup>&</sup>lt;sup>16</sup> Previously modelled historical wave conditions at the site will be used to provide wave height and wave period thresholds for 1-year and 20-year storm events. Site-specific wave forecasts for CDIP MOP Transect OC105 will be actively monitored for events exceeding the thresholds, which will also trigger pre- and post-storm beach elevation surveys.

Metric	Method	Source(s)
	Optional: Measure cross-shore elevations no more than ten days before conditions are forecast to exceed ~1-yr <sup>16</sup> return period event and again no more than five days after the event concludes.	Elevations would be collected using the same methods as for seasonal cross-shore elevation surveys.
	Optional: Characterize onshore sand and cobble movement no more than ten days before conditions are forecast to exceed ~1-yr and ~20-yr <sup>16</sup> return period events and again no more than five days after the event concludes.	Optional: Elevations captured with UAV/drone survey of project site. These surveys could possibly be performed by University of California researchers, if available, or by survey professionals.
Storm-driven cobble movement	Track landward limit of cobble and projectile cobble characteristics following storm events with return periods greater than 1 year <sup>16</sup> .	Field inspections, to be carried out by trained volunteers when possible. Inspections will contain coordinates and approximate diameters of cobbles landward of the dune crest, if present. If more than 20 cobbles are estimated to be landward of the dune crest, the locations and approximate diameters of the 10 most landward cobbles will be recorded.
	Optional: track overall cobble locations no more than three days before conditions are forecast to exceed 1-yr <sup>16</sup> event and again no more than three days after the event concludes.	Survey locations of cobble tagged with passive RFID tags <sup>15</sup> ; if less than 75% of RFID cobble is accounted for within the project bounds, RFID surveys may expand to adjacent sites to track locations and effects of cobble.

Cross-shore elevations at the site over time will be used to evaluate changes in local sediment volume as well as the landward/seaward movement of the beach and cobble profile associated with wave events and seasonal changes. Measurements of grain size at the project site over time may be examined for eventdriven and seasonal changes, such as the exposure and/or burial of cobble at the site. The grain size measurements will provide context for seasonal erosion patterns and will enable a more accurate estimate of long-term project resilience.

The potential locations for the shore-normal transects are shown in Figure 3-1 relative to transects surveyed by Coastal Frontiers Corporation (CFC) and historically by the U.S. Army Corps of Engineers. To take advantage of available CFC and USACE historical elevation data, one transect at the project site will coincide with the existing transect DB-1805, and one downcoast transect will coincide with the existing transect SC-1720 (in the vicinity of San Clemente North Beach). Three new transect locations may be added to support the pilot project: one within the Doheny Beach segment of the pilot project, one approximately 1600 feet upcoast of the pilot project site within Doheny State Beach, and one at Poche Beach which is approximately 2 miles downcoast of the pilot project site. Data collected as part of funded projects, such as the City of San Clemente's shoreline monitoring LCP grant, will be used to conserve costs and reduce duplication of effort.

## 3.3. Native Flora and Fauna

Metric	Method	Source(s)
Vegetated dune health	Seasonal dune vegetation surveys	Surveys by qualified professionals (or trained volunteers if possible) along at least two consistent 3-ft-wide shore- normal transects (1) within the project footprint and (2) within a reference site at the south end of Poche Beach. Surveys will describe (for each transect):

Metric	Method	Source(s)	
		1) native flora species present;	
		<ol><li>invasive flora species present;</li></ol>	
		<ol> <li>Iocations of species along transect (optional);</li> </ol>	
		<ol> <li>approximate number of individual plants per species (optional).</li> </ol>	
Optional: native fauna habitat	Seasonal dune habitat surveys	Surveys by qualified professionals (or trained volunteers if possible) along at least two consistent 3-ft-wide shore-normal transects (1) within the project footprint and (2) within a reference site at the south end of Poche Beach. Surveys will describe (for each transect): 1) native fauna species present; 2) types of native fauna habitats present; and, 3) approximate locations of native fauna.	
Optional: Bird Population Counts	Seasonal bird population counts for the project site and reference site	Bird counts within the viewshed of the CoastalComs cameras currently installed at Capistrano Beach (project site) and Poche Beach (reference site).	

Measurements of dune vegetation and native fauna habitat will be used to review of the aspects of the habitat most similar to the "natural" long-term distribution.

## 3.4. Site Desirability

Metric	Method	Source(s)
Number of beach users	Annual visitor counts at the project site and reference beach site	Annual visitor counts within the viewshed of the CoastalComs cameras <sup>17</sup> currently installed at Capistrano Beach ( <i>project site</i> ) and Poche Beach ( <i>reference site</i> ).
		Optional: counts of available parking spaces at the Capistrano Beach parking lot as part of routine inspections of sandcubes.
Public perception	<ul> <li>Public surveys conducted:</li> <li>1) Immediately after construction;</li> <li>2) 2 years after construction;</li> <li>3) 5 years after construction</li> </ul>	Surveys conducted equitably and considering all potential users and uses of the project site, using the Capistrano Beach Master Plan survey <sup>18</sup> as an example.

The number of users over time and surveyed perception of the project site would both be expected to increase for a successful pilot project.

## 3.5. Monitoring for Marine Debris from Sandcubes

Monitoring of the sandcubes within the pilot project section will continue in compliance with the current *Capistrano Beach County Park Monitoring and Maintenance Plan.* 

## 3.6. Monitoring Frequency / Schedule

For all monitoring parameters, surveys/data collection will occur at least once prior to construction of the nature-based pilot project and continue for five years following completion of construction.

<sup>&</sup>lt;sup>17</sup> The CoastalComs system currently provides OC Parks with the numbers of visitors to Capistrano Beach on an annual basis.

<sup>&</sup>lt;sup>18</sup> See Capistrano Beach Public Access Survey here for example: <u>https://www.fhbp.org/capistrano-beach-public-access-survey/</u>

# 4. Maintenance and Adaptive Management

As this is a pilot project and a goal is to understand how the constructed project performs and evolves over time and over a range of coastal conditions, maintenance and adaptive management over the 5-year pilot project duration will be limited to actions required to ensure dune vegetation success within the first year, for public safety, and if significant loss of shoreline amenities and infrastructure is imminent. Monitoring triggers will be further developed through more detailed engineering and design of the proposed project. However, several preliminary triggers are provided below for consideration.

## 4.1. Routine Maintenance Activities

Biweekly maintenance visits will be required to

- Ensure the dunes are free of garbage/debris;
- Allow staff to repair dune fencing as necessary;
- Clear sand and cobble from bicycle path; and
- Perform cursory monitoring of the dune and beach for public safety.

### 4.2. Maintenance and Remedial Action Triggers

Maintenance triggers will be evaluated during routine monitoring surveys.

#### 1. Cobble movement which adversely impacts public safety or coastal resources

If the cobble becomes exposed (i.e., loses sand cover), there is increased potential for the cobble to move offshore and alongshore or to become airborne during wave events. If this is to occur, it may be necessary for the County to remove the imported cobble from the beach and install sandbags or to do an emergency beach nourishment (assuming a beach sand source is available).

#### 2. Presence of beach scarps greater than 3 ft in elevation.

If routine biweekly maintenance visits reveal beach scarps greater than 3 ft in elevation, the locations and elevations of scarps above this threshold will be recorded and smoothed with earth-moving equipment by County staff for public safety.

#### 3. Inland migration of the beach face to within 10 ft of the pedestrian/bike coastal trail.

If routine biweekly maintenance visits reveal that the beach face has migrated landward to within 10 ft of the coastal trail (and thus threats to shoreline amenities and infrastructure are immediate), the County will install or replace sandbags along the seaward side of the coastal trail which will remain in place until the County is able to implement the relevant portion of the Capistrano Beach Master Plan, consistent with plans, specifications and requirements of previously issued interim CDP.. The County will notify CCC staff when this situation occurs.

#### 4. Less than 75% of dune vegetation survival after the initial year.

If less than 75% of initial beach vegetation has survived after the first year following construction (determined following the second post-construction vegetation survey), additional planting will occur such that vegetated cover reflects the design coverage. Following this replanting, no further maintenance will be performed (other than removing garbage/debris) so as to understand the natural evolution of the dune vegetation over the 5-year pilot project period.

## 4.3. Project Failure

Project failure is defined as:

- lack of protection from overtopping by storm waves (damage to shoreline amenities and infrastructure);
- lack of stable shoreline;
- adverse impacts to coastal resources (nearshore and downcoast);
- increased public safety risks; and
- lack of data to make decision, i.e., the data collected from the pilot project does provide the ability for the County and State Parks to determine if this nature-based approach is appropriate (or not) for implementation along other segments of Capistrano and Doheny Beaches as a long-term solution.

Other potential failure criteria such as lack of beach use desirability and lack of any flora and fauna enhancement will be considered in the long-term solution decision-making process, but do not necessarily constitute definitive failure. Occurrence of failures associated with the first four bullets could result in the need for remedial action during the five-year monitoring period (see above). Occurrence of any of these failures could result in the decision to not consider this nature-based approach as a viable long-term (Master Plan) solution at Capistrano and Doheny Beaches, in which case sandbags may need to be installed as interim protection measure pending the outcome of the Master Plan effort.

# 5. Reporting

Following project construction, annual monitoring and maintenance reports will be submitted to OC Parks, who will in turn report to the California Coastal Commission and will share reports with the public via the OC Parks Capistrano Beach webpage<sup>19</sup>. Annual reports will include preliminary monitoring results as well as all surveyed profiles, monitoring field logs, and any maintenance activities, including associated maintenance triggers, type of maintenance, and any material volumes manipulated. A final report will be provided within six months following completion of the 5-year monitoring period.

<sup>&</sup>lt;sup>19</sup> See <u>https://www.ocparks.com/beaches/capistrano-beach</u>

## Exhibit 4 – Sea Level Rise Projections

[Excerpt from Moffat & Nichol April 2019 *Capistrano Beach County Park Coastal Resiliency Study*]...1.6 ft and 3.3 ft [of sea level rise] at Capistrano Beach are shown in Figure 4.11 and Figure 4.12, respectively. Note that the "initial shoreline" position shown in these CoSMoS graphics is significantly seaward of the actual current shoreline position. Based on the current more landward shoreline position (which can be seen in the underlying aerial photograph), the "final shoreline" based on future sea level rise will also be significantly more landward than shown in these graphics.



FIGURE 4.11. CoSMoS 3.0 PHASE 2 SHORELINE PROJECTIONS <u>WITH 1.6FT SEA LEVEL RISE</u> FOR THE NO NOURISHMENT, NO HOLD-THE-LINE SCENARIO



FIGURE 4.12. CoSMoS 3.0 Phase 2 Shoreline Projections <u>with 3.3FT Sea Level Rise</u> for The No Nourishment, No Hold-The-Line Scenario

# Summary of Three Alternatives



#### Protective Element Sculpted Vertical Seawall

- Vertical wall with sculptural finish to mimic natural bluffs
- Amount of wall exposed will fluctuate with sand levels





#### Protective Element Rock Revetment

- Revetment crest can be raised as needed for future SLR
- Amount of rock exposed will fluctuate with sand levels





#### Accommodating Element Pile-Supported Structure

- Accommodation strategy
- Pilings support turnaround, plaza, ADA ramp, and bike path as shoreline erodes





CAPISTRANO BEACH PARK MASTER PLAN PUBLIC WORKSHOP 2