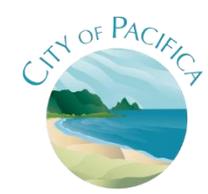


# City Pacifica Sea Level Rise Local Coastal Plan (LCP) Update

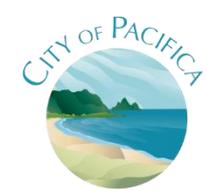
June 23, 2018

Public Workshop #4





# Welcome and Introductions



# Meeting Objectives

- Provide an overview of the sea level rise planning process, including work completed to date, where we are now, and where we're headed.
- Provide an overview of adaptation measures, including trade-offs between specific measures.
- Review and discuss considerations and methodology for identifying appropriate measures for Pacifica.
- Review and discuss draft adaptation measures identified for specific locations in Pacifica's coastal zone.



# Meeting Agenda

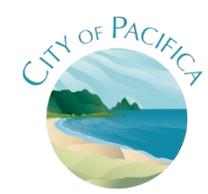
<b>12:00 p.m.</b>	Welcome, Agenda Review and Introductions
<b>12:10 p.m.</b>	Update on Sea Level Rise Planning Process
<b>12:20 p.m.</b>	Summary of Input Provided to Date
<b>12:25 p.m.</b>	Overview of Adaptation Measures <ul style="list-style-type: none"><li>• Trade-offs between measures</li></ul>
<b>12:40 p.m.</b>	Considerations for Identifying Appropriate Adaptation Measures
<b>1:00 p.m.</b>	Draft Adaptation Measures for Pacifica's Coastal Zone
<b>1:30 p.m.</b>	Public Comment and Q&A
<b>3:00 p.m.</b>	Adjourn



# Proposed Ground Rules

*Please:*

1. Focus your input on the meeting objectives
2. Honor the agenda and time limits for discussion
3. Interact respectfully
4. Turn off or silence cell phones

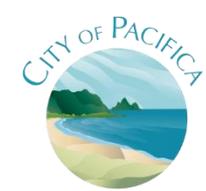


## Public Participation During Meeting

- **Public comment will be invited at end of meeting.**
- **Please fill out comment/question card.**
- **Attendees can also provide input by submitting comment forms.**

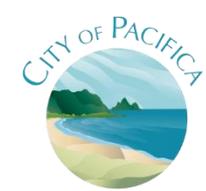


# Sea Level Rise Planning Process



# Pacifica's Local Coastal Plan Need for Update

- Current LCP land use policies adopted in 1980.
- Draft LCP Update prepared, but not adopted.
- Draft LCP Update does not consider sea level rise impacts or provide adaptation policies.
- Incorporating the Adaptation Plan will bring the document into conformance with Coastal Commission policy guidance.



# Sea Level Rise LCP Update Project Goals

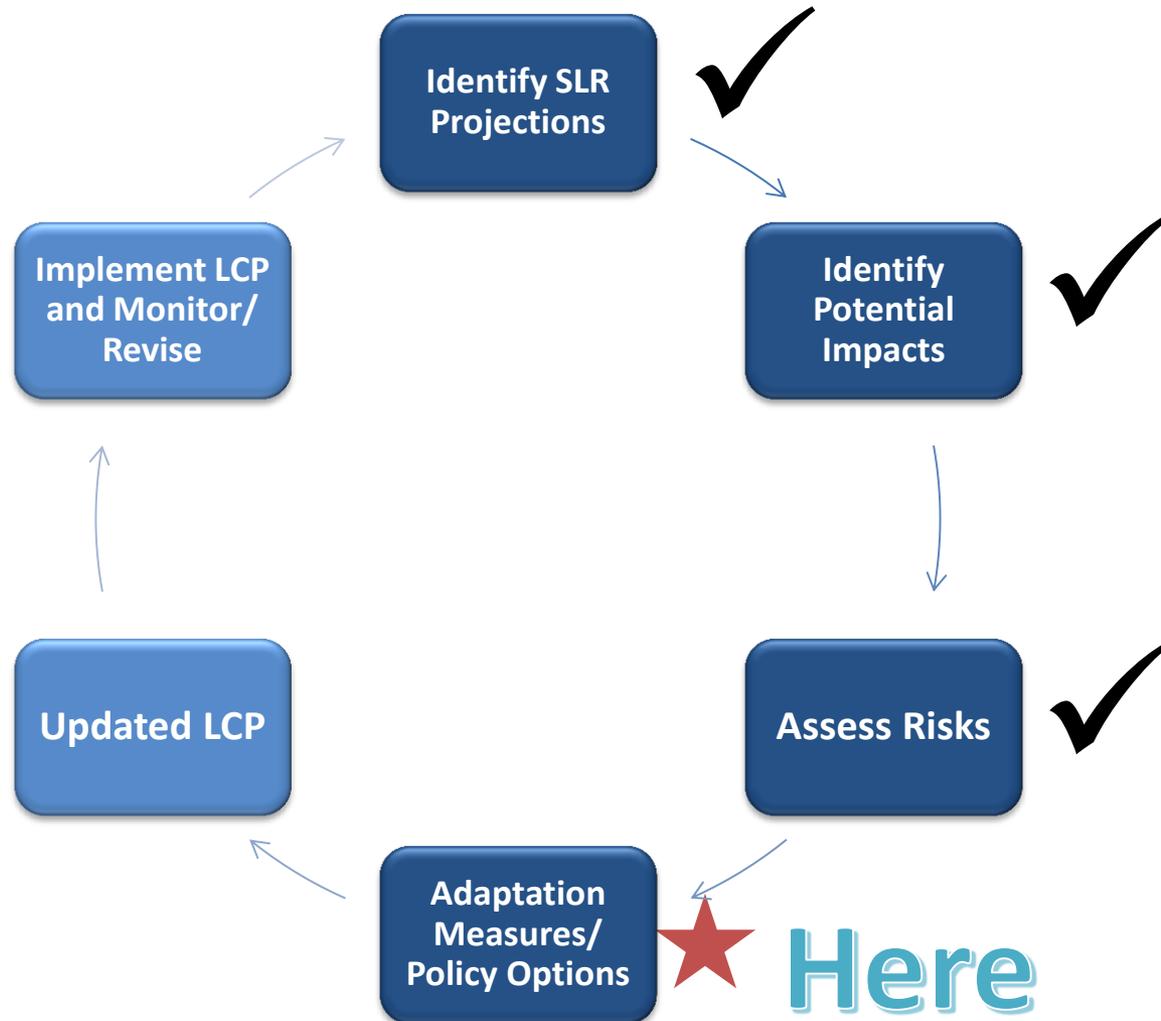
- ***Bolster efficacy of public safety efforts.***
- ***Respond to climate change.***
- ***Preserve Existing Neighborhoods and Promote Environmental Justice and Local Economic Vitality.***
- ***Preserve and enhance coastal access.***

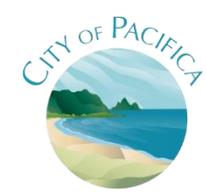




# Sea Level Rise & Adaptation Planning

## Coastal Commission Guidance





## Adaptation – Public Input and Beyond

Process

- ***In Progress:* analyze adaptation alternatives for each subarea, including a cost benefit analysis of alternatives.**
- **Preliminary Adaptation Plan released (discussed at this meeting).**
- **Final Draft Adaptation Plan will be released for public comment (end of July).**
- **Public Meeting on Final Draft Adaptation Plan on August 11.**



## Adaptation – Public Input and Beyond

Process

- **Release Draft LCP Update policies and response to comments on the Final Draft Adaptation Plan by end of September.**
- **October- Draft LCP Update policies comment period and public/workgroup meetings.**
- **Planning Commission and City Council will consider the LCP Update Adaptation policies and LCP Update prior to sending it to CA Coastal Commission for certification. Dates TBD.**



# Follow the LCP Update Online

Home > Departments > Planning > Sea Level Rise

## Sea Level Rise

The City of Pacifica is working to modify its draft Local Coastal Plan (LCP) update by incorporating findings of how sea level rise and erosion will impact social, economic, and physical coastal resources including homes, businesses, and critical facilities and infrastructure, and strategies that will prepare the City to deal with these impacts. Support for this effort is provided in part by the California Coastal Commission and the Coastal Conservancy.

**CALIFORNIA COASTAL COMMISSION**

**Coastal Conservancy**

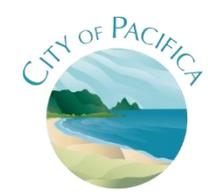
**PROGRESS**

Project Launch	Assessment Preparation	Adaptation Plan Development	Update Draft LCP	City Public Hearings	CCC Certification
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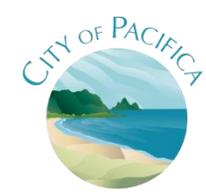
**PUBLIC OUTREACH EVENTS**

To find more information on the public outreach events summarized below, including agendas and other meeting materials, please visit the Sea Level Rise Public Participation webpage [here](#).





# Adaptation Alternatives

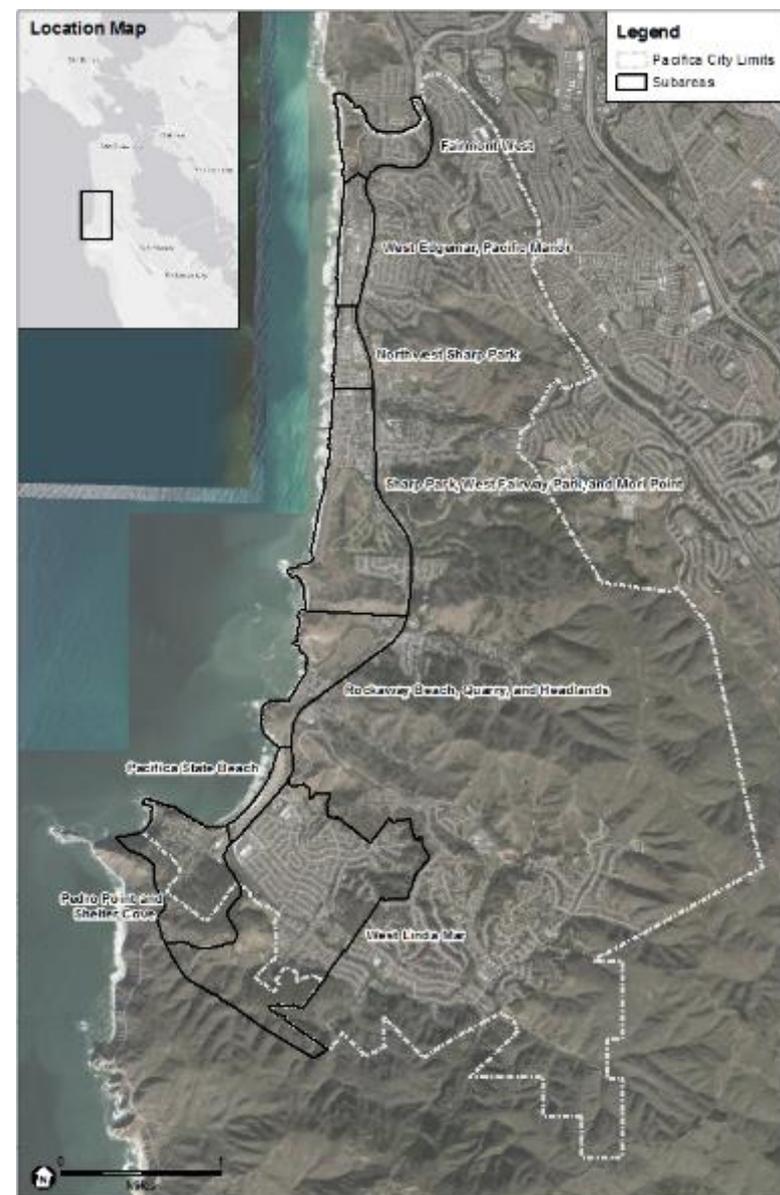


# Adaptation Alternatives Analysis – Purpose

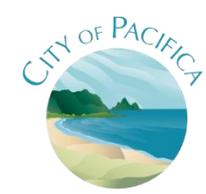
- DOES – Test a reasonable number of potential alternative strategies for sea-level rise adaptation (cost-benefit analysis) to inform Adaptation Plan and policies
- DOES – Define potential strategies through time to enable analysis
- DOES NOT – define what Pacifica will/won't do to adapt
- DOES NOT – force Pacifica to assume high SLR will occur
- DOES NOT – restrict future consideration of other options



# Adaptation Measures – Sub-area Suitability



- Does the measure protect existing development (where applicable)?
- Does the measure align with community values (public and work group input received throughout project to date)?
- Compatibility with geographic/morphologic setting (is there space/right conditions for success?)
- Does the measure support and/or improve existing recreational and ecological functions?



# Adaptation Measures – Sub-area Suitability

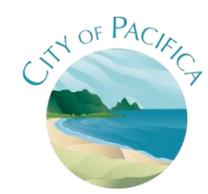
Measures	Pros	Cons	Fairmont West	West Edgemar and Pacific Manor	Northwest Sharp Park	Sharp Park, West Fairway Park and Mori Point	Rockaway Beach, Quarry and Headlands	Pacifica State Beach	West Linda Mar	Pedro Point and Shelter Cove
Setbacks for Development	Avoid hazards, enables natural shoreline, sustains beach	development at risk if erosion is worse than estimated, need open space	+	-	-	-	+	-	-	-
Deed Restrictions and Conservation Easements	Conserves views, natural shoreline and beach,	Needs open space to initiate	=	-	-	-	=	+	-	-
Rolling Easements	Conserves views, natural shoreline and beach,	Complicated once easement reaches development, need open space	+	-	-	-	+	+	-	-
Fee Simple Acquisition	Avoid hazards, enables natural shoreline, sustains beach	Expensive, requires landowner agreement.	=	-	=	-	=	=	=	=
Managed Realignment or Relocation	Avoid hazards, enables natural shoreline, sustains beach	Expensive in developed areas, legal challenges, need place to relocate.	+	-	-	=	=	+	-	-
Transfer of Development Rights	Avoid hazards, enables natural shoreline, sustains beach	Land must be undeveloped	+	-	-	-	+	-	-	-
Beach Nourishment	Habitat and recreational value, buffers against backshore erosion	Limited sand available, high rates needed with SLR.	+	+	+	+	+	+	+	n/a
Dune Restoration / Nourishment	Habitat value, buffers against backshore erosion and flooding	Require space, monitoring	-	-	-	=	-	+	n/a	-
Horizontal Levee (Ecotone Levee)	Habitat value, buffer against erosion and flooding forces	Require space, monitoring	-	-	-	=	-	-	-	-
Structural Adaptation/ Elevation	Raise structure above flood hazard zone, limit damages	costly, alters exposure landward of structure, may need to raise again	-	-	+	+	+	+	+	+
Elevate / Reconstruct Road	Reduces flood exposure, uses available space.	May need wider easement to raise on fill, does not address erosion alone.	-	-	=	=	=	+	+	-
Seawalls and Revetments	Familiar/in use, prevents erosion, maintains property in place	Costly construction and maintenance, esp. with sea level rise, loss of beach on eroding shores	+	+	+	+	+	=	+	+
Sand Retention Structures	Helps retain sand, potential recreation and habitat function	costly, not effective without beach, requires maintenance with sea level rise, ocean impacts	+	+	+	+	=	=	n/a	-
Traditional Levee	Prevents flooding	Require space, not suitable for wave action .	-	-	-	+	-	-	=	-



# Fairmont West Sub-area



Adaptation Alternative	Adaptation Measures	Description
<b>1 Accommodate / Protect Hybrid</b>	Transfer of development rights, Armor	<b>Now:</b> Allow erosion to proceed, option to transfer development rights. Maintain Dollaradio and armoring. <b>Future:</b> Assumes existing armor is maintained at Dollaradio. Backshore is allowed to erode until need to armor to protect road and utilities.
<b>2 Protect</b>	Armor, Beach nourishment, Sand retention structures, Transfer of development rights	<b>Now:</b> Place 100ft wide beach nourishment. Maintain Dollaradio and armoring. <b>Future:</b> Place sand: 100ft beach nourishment every time beach width falls below minimum threshold, increasing frequency as SLR accelerates. Build sand retention structures, timing to be determined with shore response modeling (part of overall artificial headlands strategy for north Pacifica).
<b>3 Retreat</b>	Managed retreat of infrastructure, transfer of development rights	<b>Now:</b> Allow bluff erosion to proceed, maintaining beach area. Assume Dollaradio armoring is maintained. Implement TDR (optional) and hazard avoidance measures in undeveloped parcels. <b>Future:</b> relocate road with consideration to maintain access to private property, relocate wastewater main away from erosion hazard. Timing TBD via shore response modeling. Maintain revetment for Dollaradio.



# West Edgemar and Pacific Manor Sub-area



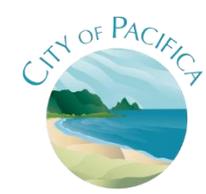
Adaptation Alternative	Adaptation Measures	Description
1 Protect	Armor	<p><b>Now:</b> Armor bluffs between Manor Dr and Bill Drake Way and along SF RV Resort.</p> <p><b>Future:</b> Maintain armor as needed to remain effective, timing TBD via shore response modeling.</p>
3 Protect	Armor, Beach nourishment, Sand retention structures	<p><b>Now:</b> Place 100ft wide beach nourishment. Maintain armoring and build armor between Manor Dr and Bill Drake Way and SF RV Resort.</p> <p><b>Future:</b> Future: Place sand: 100ft beach nourishment every time beach width falls below minimum threshold, increasing frequency as SLR accelerates. Build sand retention structures, timing to be determined with shore response modeling (part of overall artificial headlands strategy for north Pacifica).</p>
3 Retreat	Managed removal/relocation of assets	<p><b>Now:</b> Option to private property owners to remove or abandon existing armoring structures protecting property once it is damaged or no longer effective and to allow erosion.</p> <p><b>Future:</b> Remove or relocate public structures and infrastructure only when no longer necessary to support existing development.</p>



# Northwest Sharp Park Sub-area



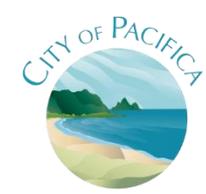
Adaptation Alternative	Adaptation Measures	Description
1 Protect	Armor	<b>Now:</b> Maintain existing armor, build new armoring elsewhere. <b>Future:</b> Maintain armor as needed to remain effective, timing TBD via shore response modeling.
3 Protect	Armor, Beach nourishment, Sand retention structures	<b>Now:</b> Maintain existing armor, build new armor elsewhere. Nourish beach by 100 feet. <b>Future:</b> Place sand: 100ft beach nourishment every time beach width falls below minimum threshold, increasing frequency as SLR accelerates, timing TBD via shore response modeling. Build sand retention structures
3 Retreat	Managed removal/relocation of assets	<b>Now:</b> Option to private property owners to remove or abandon existing armoring structures protecting property once it is damaged or no longer effective and to allow erosion. <b>Future:</b> Remove or relocate public structures and infrastructure only when no longer necessary to support existing development.



# Sharp Park, West Fairway Park and Mori Point



Adaptation Alternative	Adaptation Measures	Description
1 Protect	Armor, levees	<p><b>Now:</b> Maintain existing armor, extend seawall to close Clarendon gap to SPGC levee. Assumes SF will armor and maintain SPGC levee. Build stormwater detention basins with setback levees and stormwater pump stations at Clarendon/Lakeside Ave and end of Fairway Drive.</p> <p><b>Future:</b> Maintain armoring, increase seawall height to limit wave overtopping.</p>
2 Protect	Armor, Beach nourishment, Sand retention structures, Levees	<p><b>Now:</b> Maintain existing armor, extend seawall to close Clarendon gap to SPGC levee. Nourish beach by 100 feet. Build stormwater detention basins with setback levees and stormwater pump stations at Clarendon/Lakeside Ave and end of Fairway Drive.</p> <p><b>Future:</b> Maintain armoring, raise seawalls to limit wave overtopping. Place sand: repeat 100 foot beach nourishment every time beach width falls below minimum threshold, increasing frequency as SLR accelerates. Build sand retention structures, timing to be determined with shore response modeling (part of overall artificial headlands strategy for north Pacifica).</p>
3 Retreat	Managed removal/relocation of assets	<p><b>Now:</b> Option to private property owners to remove or abandon existing armoring structures protecting property once it is damaged or no longer effective and to allow erosion.</p> <p><b>Future:</b> Remove or relocate public structures and infrastructure only when no longer necessary to support existing development.</p>



# Rockaway Cove, Quarry and Headlands Sub-area



Adaptation Alternative	Adaptation Measures	Description
1 Protect / Accommodate Hybrid	Armor, managed removal of assets, Development setbacks	<p><b>Now:</b> Maintain existing armoring structures, allow erosion in south cove (City owned). Development setbacks for quarry property.</p> <p><b>Future:</b> Erosion continues in south cove until Hwy 1 threatened, assume Caltrans armors embankment or takes an alternative adaptation strategy. Relocate south cove public facilities as needed. Armor will be upgraded in the future as needed to maintain efficacy as beaches narrow and wave impacts on the armor increases with sea level rise. The schedule of upgrades/repairs will be determined by shore response modeling. Armoring upgrades could include raising armor to prevent overtopping with sea level rise.</p>
2 Protect / Accommodate Hybrid	Armor, Beach nourishment, Development setbacks	<p><b>Now:</b> Place sand: 100ft beach initially and every time beach width falls below minimum threshold. Development setbacks for quarry property.</p> <p><b>Future:</b> Nourish 100ft beach every time beach width falls below minimum threshold to delay need to armor Hwy 1 and reduce maintenance needs for existing armor, increasing nourishment frequency as SLR accelerates, timing TBD via shore response modeling.</p>
3 Retreat / Accommodate Hybrid	Managed removal/relocation of assets, Development setbacks	<p><b>Now:</b> Option to private property owners to remove or abandon existing armoring structures protecting property once it is damaged or no longer effective and to allow erosion. Development setbacks at Quarry and Headlands.</p> <p><b>Future:</b> Remove or relocate public structures and infrastructure only when no longer necessary to support existing development.</p>



# Pacifica State Beach Sub-area



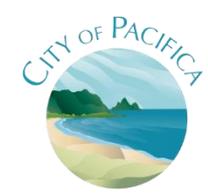
Adaptation Alternative	Adaptation Measures	Description
1 Protect	Armor, Flood protection	<p><b>Now:</b> Maintain existing armoring structures, build new armor on private lands south parking and pump stations. Allow erosion of northern dunes.</p> <p><b>Future:</b> Floodproof pump stations. Raise and armor Highway 1 to counteract erosion and wave overtopping exposure for West Linda Mar, timing TBD via shore response modeling and Caltrans adaptation planning.</p>
2 Protect	Armor, Beach nourishment	<p><b>Now:</b> Maintain existing armoring structures, build new armor on private lands south parking and pump stations. Allow erosion of northern dunes.</p> <p><b>Future:</b> Nourish 100' beach and dunes when beach width falls below the minimum beach width, timing TBD via shore response modeling. Assumes Caltrans Raises and armors Hwy 1 as needed. Floodproof pump stations as needed.</p>
3 Retreat / Protect Hybrid	Managed retreat, Armor	<p><b>Now:</b> Allow erosion at publicly owned areas (optional for privately owned commercial facility in this sub-area).</p> <p><b>Future:</b> Remove parking and relocate pump stations. Raise and armor Highway 1 (part of West Linda Mar hybrid strategy) to counteract erosion and wave overtopping exposure, timing TBD via shore response modeling and Caltrans adaptation planning.</p>



# West Linda Mar Sub-area



Adaptation Alternative	Adaptation Measures	Description
1 Protect	Armor/Flood Protect	<b>Future:</b> Assumes Caltrans will raise Highway 1 (with armor) to protect the highway from wave overtopping (which will also provide protection to the neighborhood). Build levee/floodwall along San Pedro Creek to limit river flooding exposure and coastal exposure with future SLR. Add pump station and sub drain to manage rising groundwater with SLR in lowest areas of neighborhood.
2 Accommodate	Elevate structures, Groundwater management	<b>Now:</b> Follow requirements of City's Flood Damage Prevention Ordinance. <b>Future:</b> install sub drain and groundwater pump station to manage rising groundwater with SLR. (~120 structures affected by 2100 groundwater, ~300 structures affected by 2100 coastal storm (100-yr))



# Pedro Point and Shelter Cove Sub-area



Adaptation Alternative	Adaptation Measures	Description
1 Protect	Armor	<p><b>Now:</b> Assume existing private armoring structures are maintained and expanded along Shoreside Dr. Armoring of the headland is included in the form of a rock revetment but detailed slope stability and engineering analyses would be required to validate any design to limit erosion of the headland.</p> <p><b>Future:</b> Maintain armored toe of headland. Shelter Cove not considered in this plan due to access issues.</p>
2 Protect / Accommodate Hybrid	Armor, Beach nourishment, Elevate structures.	<p><b>Now:</b> Assume armor is maintained and expanded along Shoreside Dr. In conjunction with Pacifica SB nourishment, nourish 100' beach as part of Pacifica State Beach alternative.</p> <p><b>Future:</b> Nourish 100' beach when beach width falls below the minimum beach width, increasing frequency as SLR accelerates, timing TBD via shore response modeling. Raise buildings above coastal flooding elevation.</p>
3 Retreat	Managed removal/relocation of assets	<p><b>Now:</b> Option to private property owners to remove or abandon existing armoring structures protecting property once it is damaged or no longer effective and to allow erosion.</p> <p><b>Future:</b> Remove or relocate public structures and infrastructure only when no longer necessary to support existing development.</p>



# Economic Analysis Progress Report

- **Adaptation Strategies/Hazards merged with Parcel Data**
- **Estimating Residential, Government and Residential Land/Structures**
- **Beach Recreation most significant at Pacifica State Beach**
  - Nourishment needed to support recreation after 2050
- **Costs of Managed Retreat are being evaluated**
- **Economic Analysis will also include:**
  - Sales and TOTs Loss from Flooding
  - Sales & TOTs from Beach Recreation



# Economic Analysis Next Steps

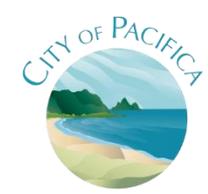
- **Complete Cost-Benefit Analysis of alternatives**
  - **Shoreline change analysis**
    - **Adaptation strategy timing**
    - **Adaptation strategy costs**
    - **Recreation and ecological outputs**
  - **Modify hazard maps in response to adaptation strategies**
  - **Perform exposure analysis for adaptation strategies**
  - **Estimate damages and costs, review and revise, incorporate into Adaptation Plan**
- **Develop near-term adaptation priorities based on City and public input and near-term vulnerabilities.**
- **Draft Sea-level Rise Policies for next Workgroup meetings and Public Workshop**



# Sea Level Rise LCP Update

## Next Steps

- **Complete and Release Final Draft Adaptation Plan.**
- **Written comments are currently being accepted. The comment period will last until *30 days after* the release of Final Draft Adaptation Plan.**
  - Fill out a comment form today
  - Send comments to: [sealevelrise@ci.pacifica.ca.us](mailto:sealevelrise@ci.pacifica.ca.us)
- **Public Meeting on Final Draft Adaptation Plan on August 11<sup>th</sup>, 12-3pm @ Community Center.**



# Public Comment and Q&A

[Please fill out comment/question card]