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LUP Update Guide

Section 9. Shoreline Erosion & Protective Devices

Coastal Act Sections 30211, 30221, 30251, and 30253 all place high priority on preserving the ocean and recreational value of beaches.

California's beaches, dunes and coastal bluffs are some of the most valued recreational resources of the coastal environment and the Coastal Act places a high priority on preserving these ocean and recreation values. These shoreline resources are subject to coastal erosion and with projected sea level rise, erosion may be even more pronounced in the future. But measures to address this erosion, including armoring with shoreline protective devices, can have significant adverse impacts.

Some of these impacts include:

- Direct loss of sandy and rocky intertidal areas that often have been found to be a critical component of the marine ecosystem;
- Interruption of natural shoreline processes, that may contribute to erosion of the shoreline in many areas;
- Impedance of public access to and along the coastline as a result of the structure's physical occupation of the beach; and
- Degradation of scenic and visual resources.

The Coastal Act Sections 30235 and 30253 (see sidebar) provide standards under which shoreline protective structures may be considered to respond to coastal erosion. The coastal environment and existing development patterns vary along the shoreline and the LCP should provide that a case by case review of development proposals, including accounting for site-specific constraints in addressing shoreline erosion.

LCPs are a key mechnism for addressing the long term protection of the state's extraordinary shoreline resources. An LUP Update offers the opportunity to plan comprehensively to investigate the different shoreline conditions and develop alternative development patterns that, as implemented over time, will minimize armoring and protect or restore shoreline areas and sand supplies, taking into account projected sea level rise.

As explained in Section 8 (Coastal Hazards) of this Guide, an effective method for minimizing risks from hazards is to avoid siting development in hazardous areas, rather than engineering protection, and that should be a primary goal. When working on your LCP, you can revise or add policies that reduce the need for shoreline protection, minimize adverse impacts of allowed protection, and facilitate alternative forms of shoreline protection that do not involve

armoring. Remember that most shoreline protective devices and beach nourishment projects meet the definition of development found in §30106 of the Coastal Act (http://www.coastal.ca.gov/coastact.pdf), as do many demolition and reconstruction or redevelopment projects, including those of existing shoreline protective structures. Thus, LUP policies should reflect that the appropriateness, design and duration of protective structures will be a consideration in permit review for both shorefront development (including redevelopment) and for the shoreline structures themselves – whether the work is new, replacement, repair or maintenance.

Much shoreline protection may fall within the Commission's continuing permit jurisdiction. Nevertheless, you should consider LCP policies that include shoreline protection to address any development over which you may have jurisdiction.

Policy §30235, regarding shoreline protective devices, states "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 fish kills should be phased out or upgraded where feasible."

What should an updated Shoreline Erosion and Protective Devices component include?

♦ Policies

Most LCP policies dealing with shoreline protective devices incorporate the relevant Coastal Act policies. In addition to Chapter 3 policies, your LCP policies should illustrate how the Coastal Act will be carried out, taking into consideration the unique features and needs of your area. Depending on the geologic conditions of your coastal area, it may be important to revise or develop new LCP policies to guide development, including for example:

- Area specific policies to establish or increase setbacks;
- Requirements to implement beach nourishment;
- Policies to limit the time period over which a permit for a shore protection device is valid and to tie the approval of the shore protection device to the continued existence of the existing structure only; and
- Policies to address repair, maintenance and removal of protective devices, and other policies related to siting and design of development to avoid the need for armoring.

♦ Maps and Inventories

To be most effective, LCPs should include updated resource assessment information, including for example:

- An updated map or inventory and descriptions of existing shoreline protective devices, including revetments, breakwaters, groins, harbor channels, seawalls, cliff retaining walls, and other such construction and their permit history.

- An inventory of available studies on local and regional coastal processes and beach resources;
- Hazard maps showing present and future areas of potential inundation, flooding, beach erosion and bluff retreat, as appropriate.

♦ Definitions

Your LCP should include clear definitions consistent with the Coastal Act and California Code of Regulations. The LCP examples linked below all offer examples. In relation to shoreline protective structures, the recent Commission actions have focused on some of the following definitions:

Some definitions are in the Coastal Act Sections 30100 – 30122. Other definitions are in various sections of the CA Code of regulations including, for example, 13006-13012 and 13577

- Economic life of structure
- Coastal Structure, such as:

  Coastal Structure means a structure located at the base of the bluff, such as a seawall, revetment, or rip rap that is located at, or is seaward, of, the bluff dripline. A coastal structure is intended to protect, support and/or stabilize the bluff toe and/or ***mid or upper bluff area that has experienced, or is likely to experience material erosion or instability and protect a bluff*** *home or other principal structure, or coastal dependent use from the effects of wave action erosion and other natural forces.*

- Principal Structure, such as:

  Any primary living quarters, main commercial buildings and functionally necessary appurtenances to those structures such as septic systems and infrastructure.

- Littoral Cell
- Mean High Tide Line, such as:

  Mean High Tide Line means the ambulatory line on the beach (contour lines) represented by the intersection of the beach face and the elevation represented by the average of all high tides (higher high tides and lower high tides) occurring over a 19-year period. The mean high tide elevation should be represented by the most recent 19-year tidal epoch as established by the National Ocean Service.

- Coastal Bluff and Coastal Bluff Edge- pursuant to California Code of Regulations 13577(h)
- Coastal Redevelopment or Major Remodel such as:

(1) additions; (2) exterior and/or interior renovations; or (3) demolition of an existing bluff top home or other principal structure which result in:

1. Demolition or replacement of 50% or more of an existing structure, including but not limited to, alteration of 50% or more of exterior walls and/or major structural components of the floor, roof and foundation, or a 50% increase in floor area; or

2. Demolition, renovation or replacement of less than 50% of an existing structure where the proposed remodel would result in cumulative alterations exceeding 50% or more of the existing structure from the date of certification of the LUP.

Where can I read some examples of updated LCP Shoreline Erosion and Coastal Structures policies?

There are some recent examples of LCPs that address shoreline protection policies. For example, see:

- **The City Of Laguna Beach Local Coastal Program Major Amendment LGB-MAJ-1-10 (Land Use Element Update),** at: http://documents.coastal.ca.gov/reports/2011/12/W9c-12-2011.pdf The resulting modified text of the Laguna Beach LUP is:
- **Laguna Beach General Plan Land Use Element,** at: http://documents.coastal.ca.gov/reports/2012/5/W13a-5-2012-a1.pdf
- **City of Newport Local Coastal Program Land Use Plan,** Chapter 2 Land Use and Development, Section 2.8, starting on pg. 2-49, at: http://www.newportbeachca.gov/PLN/LCP/Internet%20PDFs/CLUP_Part%202_Land%20Use%20and%20Development.pdf . This is part of the complete Newport Beach LUP:
- **City of Newport Local Coastal Program Land Use Plan**, at: http://www.newportbeachca.gov/index.aspx?page=1317
- The **Revised Findings On City of Solana Beach LCP Land Use Plan**, at: http://documents.coastal.ca.gov/reports/2012/6/Th24a-6-2012.pdf

What are some important LCP issues related to shoreline erosion and protection?

As you update your LCP, keep in mind the long-term consequences of shoreline armoring during a time of rising sea level, including the immediate and long-term repercussions on public beaches and recreation.

♦ Avoiding Future Shoreline Armoring

Appropriate siting of development in shorefront or blufftop areas is one method for ensuring that new development will not require future shoreline protection thereby avoiding and minimizing the adverse effects of shoreline protective devices. Information related to geologic setbacks is more fully discussed in Section 8 (Coastal Hazards) of this Guide.

No Future Shoreline Protection Policy

Identifying the sufficient setback is one part of developing a policy to avoid cumulative effects of armoring. You should also consider a policy that directs that, where geologic site assessments confirm that new development is proposed to be safe for the life of the development, there will be no armoring permitted in the future that would alter natural shoreline processes or substantially alter natural landforms along bluffs and cliffs.

To support such a policy, an updated LCP should ensure that when required, geologic assessments are complete and reliable and use best scientific information and techniques when confirming that the development will be safe from hazards for its economic life. These assessments should account for - geologic conditions changing over time, oceanfront and blufftop lots eroding, episodic erosion and bluff failure, and seemingly stable bluffs becoming unstable in the future. Even though geologists cannot predict conditions with absolute certainty, geological assessments can better inform the decision-making process. Applicants should be held accountable for any submitted information that determines that a site is safe for development without the need for protective devices.

An example of an LUP policy to prohibit any future shoreline protective devices that would alter natural shoreline processes or substantially alter natural landforms along bluffs and cliffs could be as follows:

> *Shoreline and bluff protection structures should not be permitted to protect new development. All permits for development on blufftop or shoreline lots that do not have a legally established shoreline protection structure shall be conditioned to require that prior to issuance of any grading or construction permits, the property owner record a deed restriction against the property that ensures that no shoreline protection structure shall be proposed or constructed to protect the development, and which expressly waives any future right to construct such devices that may exist pursuant to Public Resources Code Section 30235.*

For Commission permit findings discussing this issue, see for example:

- **Coastal Development Permit 5-09-105 (Norberg),** at: http://documents.coastal.ca.gov/reports/2012/7/Th11a-7-2012.pdf

Updated LCP policies to avoid future shoreline protection should also address siting and design of other than principal structures. You should consider policies that would assure that accessory structures are constructed so as to be relocated should they become threatened by erosion and should identify alternative protection for septic systems, including relocation.

Reassessing the Need for Shoreline Protection

One component of an LCP update could be a comprehensive shoreline strategy that seeks to identify specific shoreline segments that should remain free, or eventually be free, of all or certain types of protective armoring. To limit the impacts of shoreline armoring, an LCP update can consider revising policies to reflect the uncertainty associated with shoreline armoring and that existing shoreline protective devices may be removed over time, taking into consideration changing climatic conditions and the effect of shoreline structures on coastal resources or public access.

Shoreline protective devices can deteriorate over time, especially if they have no major maintenance and/or modification. They can be subject to heavy wave and storm action which can be exacerbated by sea level rise over time, with resultant impacts to the strength and integrity of the device. In addition, the structures the shoreline protection was originally authorized to protect may themselves have changed. It is possible that a shorefront structure has been remodeled or relocated such that the shoreline protection is no longer necessary; or, the primary structure may be of an age or condition that construction of shoreline protection is not reasonable given the probable redevelopment of the entire site.

As discussed more fully in Section 8 (Coastal Hazards), you should consider LUP policies that address how to site a principal structure that is replacing one protected by an existing shoreline protective device so as to avoid the need for a new or expanded shoreline protective device, and to allow for removal of the existing device, if at all possible. The stability of new development without future shoreline protection should be affirmed in the geotechnical evaluation and findings and conditions of the coastal permit. In updating the LCP, you should consider policies that aim at linking any shoreline protective device to the existing principal structure for which it was built, not to new development. You should consider policies which limit the extent of allowed repairs or replacement of existing shoreline protection devices that are no longer necessary to protect the principal structure they were built to protect.

For example, LCP updates should consider policies that require an evaluation of any existing shoreline protective devices in conjunction with any coastal permit applications for redevelopment of the site. Policies could require that

any approval of a shoreline protective device be limited to a defined period of time to allow a reassessment of the need for the protection and alternatives that include options for removal, in light of the impacts of shoreline protective structures. The consequences of rising sea levels may further affect this time period. It has been the Commission's experience that shoreline armoring, particularly in a significantly high-hazard area, tends to be augmented, replaced, and/or substantially changed over time. Although, as the appropriate length of time in any particular case may depend on the facts at issue, updated LCP policies may require as part of a coastal permit review that the applicant conduct a site specific determination of the expected life of the shoreline structure based on the specific geologic assessment, the erosion rates and projected sea level rise.

For more explanation of this issue, see, for example:

- **Commission findings on Coastal Development Permit # 6-09-033 (Garber et.al.),** at: http://documents.coastal.ca.gov/reports/2010/10/Th16c-10-2010.pdf
- **Findings for suggested modifications of the City of Solana Beach LUP for Shoreline Hazards section,** beginning on page 59, at: http://documents.coastal.ca.gov/reports/2012/6/Th24a-6-2012.pdf

♦ Sea Level Rise

As sea level rises, coastal communities will need to decide how best to adapt and revise their LCPs to reflect the adaptation strategy. Climate change is also projected to lead to an increase in the number and frequency of storms and extreme events. The combined impacts of sea level rise and extreme storm events will need to be considered in shoreline protection policies. As shoreline protective devices can adversely affect beaches and other coastal resources, an LCP update can include policies to implement a number of techniques, in addition to setbacks, to avoid future armoring.

One example would be to consider rolling easements that will gradually locate development further inland as sea level rises. For more information, see:

- **Rolling Easements,** at: www.epa.gov/cre/downloads/rollingeasementsprimer.pdf

Another example is to restrict development on beaches and bluff faces to only public access facilities. For example, see the City of Malibu and City of Laguna Beach policies:

- **City of Malibu Land Use Plan**, at: http://qcode.us/codes/malibu-coastal/

  4.29. *No permanent structures shall be permitted on a bluff face, except for engineered stairways or accessways to provide*

public beach access. Such structures shall be constructed and designed to not contribute to further erosion of the bluff face and to be visually compatible with the surrounding area to the maximum extent feasible.

- **Laguna Beach General Plan Land Use Element,** p. 7-20, at: http://documents.coastal.ca.gov/reports/2012/5/W13a-5-2012-a1.pdf

Action 7.3.5 *Prohibit development on oceanfront bluff faces, except public improvements providing public access, protecting coastal resources, or providing for public safety. Permit such improvements only when no feasible alternative exists and when designed and constructed to minimize landform alteration of the oceanfront bluff face, to not contribute to further erosion of the oceanfront bluff face, and to be visually compatible with the surrounding area to the maximum extent feasible.*

Additional information is discussed in Section 8 (Coastal Hazards) of this Guide. And, the Commission is developing more specific guidance for addressing sea level rise in LCPs and when completed will be linked here.

♦ Minimizing and Mitigating Impacts of Armoring

When updating your LCP policies, you should require that impacts of shoreline armoring, when authorized, be mitigated.

For example, LCP policies should ensure that if allowed, the shoreline protection is of a type and design that will result in the least impact to the resources. LCP policies should require that applicants for shoreline protection perform an alternatives analysis that evaluates different types of options or structures, for example, the impacts of a vertical wall rather than a sloping rock revetment. Mitigation can also include relocating structures to avoid public lands and limiting encroachment onto the beach, compensating for loss of public access and recreation, and designing the structure to be visually compatible with the environment.

Information Needs

LCP policies should ensure adequate information to develop applicable mitigation. Information required in a geologic analysis can include, for example:

- Amount of beach that will be covered by the shoreline protective device;
- Amount of beach that will be lost over time through passive erosion;
- Total lineal feet of shoreline protective devices within the littoral cell where the device is proposed;

- Cumulative impact of added shoreline protective devices for the structure's littoral cell;
- Identification and evaluation of the condition of any existing seawall; any impacts it may be having on public access and recreation, scenic views, sand supplies, and other coastal resources; opportunities to modify or replace the existing armoring device in a manner that would eliminate or reduce these impacts; and
- Evaluation of whether the principal development proposed to be protected, as proposed or modified, could be safely established on the property for the expected life of the structure without a shoreline protective device.

Sediment Supply Impacts

Shoreline Protective devices must be designed to eliminate or mitigate adverse impacts on local shoreline sand supply. Loss of sediment/sand supply to the beach and the nearshore environment has multiple deleterious effects. Hazards are increased because of increased erosion and subsequent damage from waves, coastal recreation opportunities are decreased, and armoring may become necessary in places where it was not previously needed.

Consider including language in your LCP to advance a regional management approach to sediment supply; one that emphasizes the public recreational and habitat value of beaches and works to improve those values. An LCP can identify local involvement in regional opportunity (see sidebar).

The California Coastal Sediment Management Workgroup facilitates regional approaches to protecting, enhancing and restoring California's coastal beaches and watersheds through federal, state and local cooperative efforts. Read about it, at: http://www.dbw.ca.gov/csmw/default.aspx

There may be several different mitigation approaches to consider in an LCP update, such as:

- Identifying the impacts from sea level rise and extreme events on sediment supply;
- Developing a comprehensive shoreline protection program that includes regular shoreline surveys to develop short and long-term shoreline trends, identifying priorities for types of shoreline protection, setting forth technical criteria and standards for the structural design of shoreline protective devices, and developing programs for opportunistic beach nourishment using cleaned dredge material, clean material from flood control structures, clean excavation material and other innovative sources;
- Identifying potential sources of sand for beach nourishment, such as removal of sand from flood control structures or debris basins, excavation of sand from marine terrace deposits, harbor and navigation channels and other offshore supplies;
- Identifying which beaches should have priority for nourishment;

- Developing a program to allow for the mitigation of seawall impacts through payment of an annual or regular fee that is used to improve recreational opportunities by replenishing beaches in the same littoral cell as the seawall;
- Encouraging voluntary consolidation or purchase of property or development of a transfer-of-development credit program as a means to reduce development potential of coastal fronting land;
- Seeking federal and state funds available for more localized studies about the impact of beach erosion and responses;
- Joining or establishing a regional shoreline authority that will enable mutual support and coordination on shoreline issues that are of concern beyond an individual jurisdiction;
- Establishing an overlay or geologic hazard assessment district and designating areas of coastal resource significance on the LUP and zoning maps, to limit in-filling for relatively undeveloped areas and to limit seaward encroachment of new development.

For helpful information and ideas on how to mitigate impacts from seawalls, see:

- **Report on In-Lieu Fee Beach Sand Mitigation Program: San Diego County,** 1997, at: http://www.coastal.ca.gov/pgd/sand1.html,

The Coastal Sediment Management Workgroup (see sidebar on previous page) and various regional partners have completed three Regional Sediment Management Plans which can offer some information. See information at:

- **Coastal Regional Sediment Management Plans,** at: http://www.dbw.ca.gov/csmw/crsmp.aspx

For some additional information and examples on addressing the impacts of shoreline armoring on recreation and habitat loss and requiring mitigation for these impacts, see the the following Coastal Commission actions:

- **Coastal Development Permit 6-07-133 (Li, Encinitas),** at: http://documents.coastal.ca.gov/reports/2010/6/W11a-6-2010.pdf
- **Coastal Development Permit 6-05-72 (Las Brisas Condominium HOA)**, at: http://www.coastal.ca.gov/sd/W8e-10-2005.pdf.

Beach Recreation Impacts

Refer to Section 1 (Public Access) for a discussion of the mitigation of impacts of shoreline protective devices on public access and recreation that the Commission has addressed. For example see:

- **Coastal Development Permit 3-02-024 (Ocean Harbor House Seawall)**, at: http://www.coastal.ca.gov/sc/Th13a-1-2005.pdf

♦ Monitoring and Maintenance Issues

Most shoreline protection efforts (structures or nourishment) need occasional maintenance for the protection effort to continue to perform effectively. In many cases, maintenance occurs only when someone notices that there is a possible problem, following a major storm event which may have damaged the shoreline protection, or when there is extra sand or rock from another project and maintenance can be done conveniently. An alternative to random maintenance is to initiate a monitoring program which provides triggers or conditions which would lead to some form of maintenance, when necessary. For example:

- **County of Santa Cruz County Code,** Section 16.10.070, **at:** http://www.codepublishing.com/ca/santacruzcounty/

  16.10.070 (H)(3)(g) All shoreline protection structures shall include a permanent, County approved, monitoring and maintenance program.

The Coastal Commission often requires monitoring and maintenance, such as in:

- **Coastal Development Permit 3-10-044 (Crest Enterprises LLC)**, Special Conditions #9 and 10, respectively, on pg. 35, at: http://documents.coastal.ca.gov/reports/2011/7/W7a-7-2011.pdf

Proposed "maintenance" may trigger the issue of how to deal with a seawall that is reaching the end of its useful design life and whether continued incremental repairs are appropriate. Required geotechnical reports should assess design life, extent of necessary "repairs," expected future "repairs," and alternatives.

You should consider policies that address the potential impacts of the "repaired" wall, particularly if the impacts of a structure in that location have never been addressed. In addition, if a seawall is at the end of its design life, this is an appropriate time to consider whether any type of shore protection is still necessary, and if some protection is necessary, whether the existing structure is the type and design that has the least potential for future and long-term impacts to coastal resources, and whether mitigation for any impacts is provided.

Procedurally, some seawall maintenance will require coastal permits (see Code of Regulations §13252). For more information, read more from Coastal Commission's staff engineer in:

- **Procedural Guidance Document: Monitoring,** January 1997, at http://www.coastal.ca.gov/pgd/pgd-mon.html#Introduction