

OVERVIEW

Seawalls and levees are constructed hard structures designed to protect the coastline. Seawalls and bulkheads are vertical structures along a beach or bluff that protect against strong waves. Seawalls can have a variety of appearances, and are typically made of stone or concrete, however other materials can be used. Bulkheads tend to include corrugated steel.

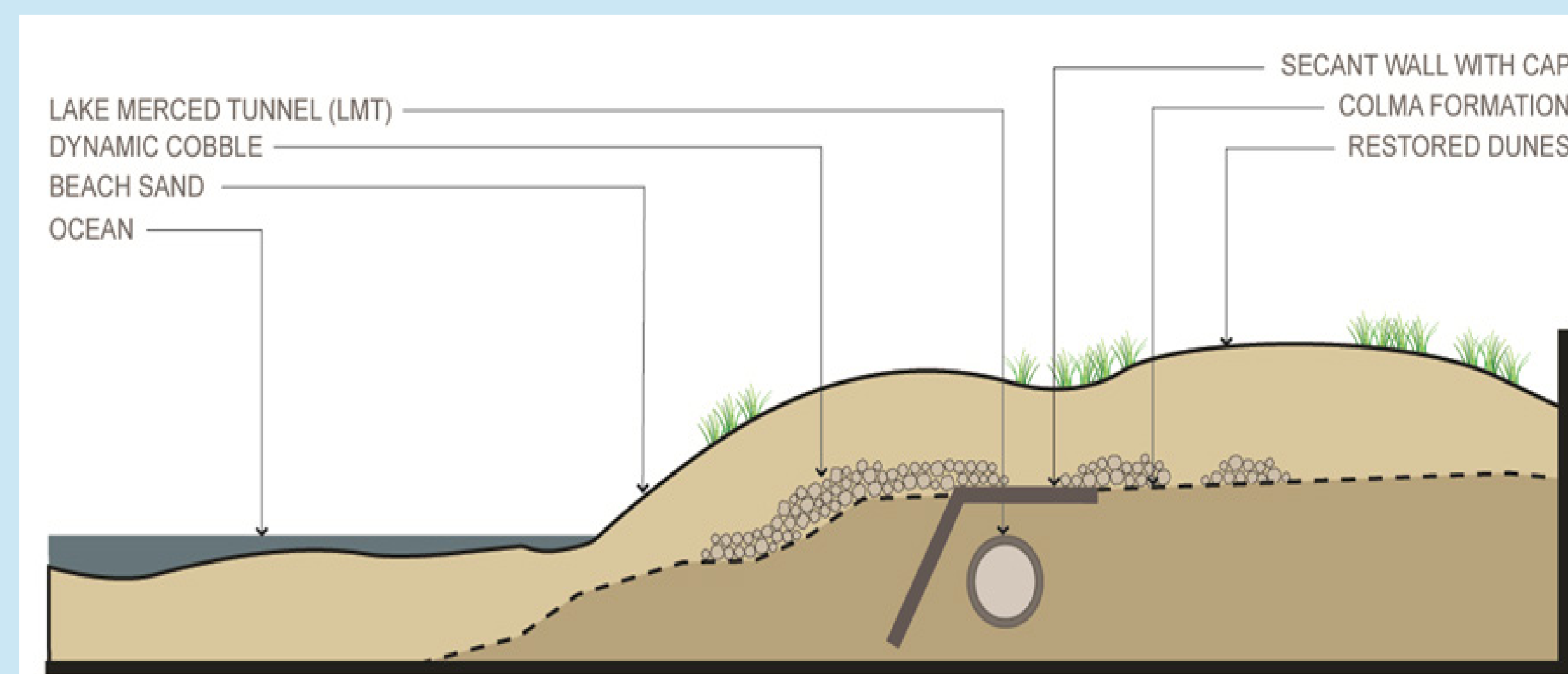
Revetments protect sloped land areas from eroding by absorbing or dissipating wave energy. They are made by piling stone or concrete rubble or placing interlocking material with a filter layer to allow drainage, and a base for stability. Revetments are common along the Marin County shoreline.

Levees are typically compacted and mounded dirt, or an embankment, used to prevent water from flowing towards development or agricultural lands in riverine and estuarine environments. Raising existing levees may be an effective adaptation strategy; however, the risk to assets behind levees and maintenance costs may increase as sea level rises. Measures that combine these hard structures with nature based methods are also possible (see case study).



Ocean Beach, San Francisco

Hybrid approaches that combine adaptation measures may be the most practical in some situations. For example, the Ocean Beach Master Plan includes a hybrid approach in south Ocean Beach where prior development and erosion have resulted in an acute hazard to both built and natural assets. At this location, a low-height seawall is proposed as far landward as possible, requiring removal of roadway and parking within a managed retreat framework. The plan also includes beach nourishment and dune construction, and includes adaptive management with revisions anticipated for higher sea level rises after 2050.



PROS

- Protect against wave damage and erosion
- Seawalls can be constructed in small spaces.
- Can be made to blend into natural surroundings.
- Implementing these strategies will likely follow a traditional permitting process involving the local permitting agencies, California Coastal Commission, California State Lands Commission, and additional agencies for structures proposed below mean high water.

CONS

- Not all of these measures are favored by regulatory agencies and stakeholders that prioritize natural resources.
- Negative net cost benefit because the loss in recreational and habitat value was greater than the costs to build the structure. (ESA PWA 2012)
- Visual impacts
- Revetments require more area than a seawall and could negatively impact public access.
- These structures can accelerate beach erosion when beach width narrows and waves reach the structure.
- Require frequent maintenance or reconstruction.

Where could this strategy be located?

