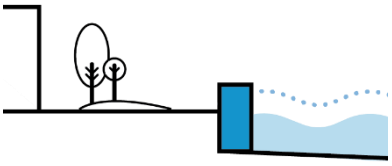
Measure Profile

New Seawall Bayward

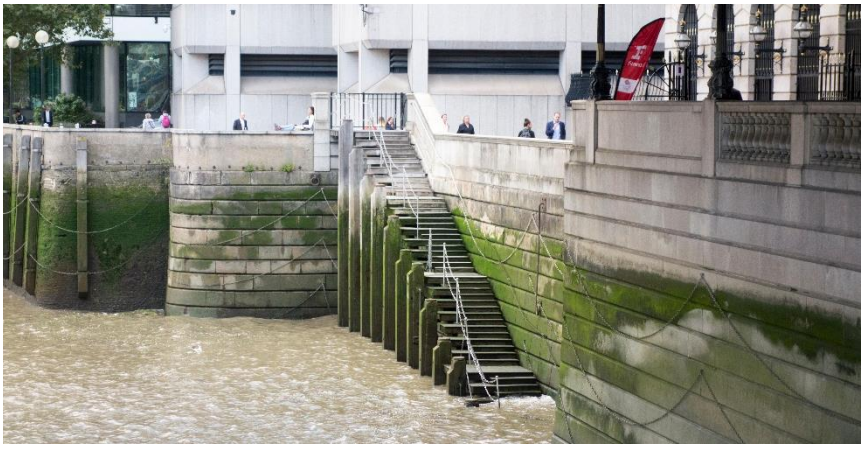
Flood Adaptation Measure

PHYSICAL INFRASTRUCTURE



SHORELINE LOCATION:

In Water



Steps down into the river Thames from the Thames Path on the north bank - London, UK © CAMimage / Alamy Stock Photo

DESIGN LIFE	ADAPTABILITY	IMPACT ON THE WATERFRONT	CONSTRUCTION COST
100+ years	High	Major Intervention	TBD

COASTAL FLOOD HAZARDS MITIGATED:

Sea Level Rise

Storm Surge

Groundwater

Waves

Erosion

MEASURES COMPATIBILITY:

Flood	Seismic
Tidal Gates, Elevated Piers	Nearshore Buttress

ECOSYSTEM SERVICES: Measure may affect these shoreline values

Aquatic Habitat — Terrestrial Habitat — Water Quality — Carbon Storage

DESCRIPTION:

A new seawall can be constructed in the water behind the alignment of the existing wharf structures and buildings. This location provides additional space to accommodate adaptation over time while not significantly increasing the fill area in the Bay. This seawall could be constructed using steel sheet piles, concrete caisson, and other structures.

CONSIDERATIONS:

- Fill in Bay will require significant permitting challenges.

ADVANTAGES:

- Works well with seismic measures.
- Long design life, with robust foundation expected to last many years.
- Passive flood protection solution, so no operational cost to deploy.

DISADVANTAGES:

- Highly disruptive to some Port bulkhead or shed tenants.
- Bay fill permitting considerations.
- Settlement problem with potential impacts to existing landside infrastructure.

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Waterfront Resilience Program

New Seawall Bayward

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	• Waterside construction allows for less disruption to Promenade and Embarcadero usage from construction activities	
CONSTRUCTION IMPACTS TO THE PUBLIC: • Construction can be completed from waterside and reduce impacts to the Promenade and Embarcadero.	**SEA LEVEL RISE ADAPTATION OPPORTUNITIES:** • Adaptation of seawalls is possible and can be factored into the design. • Increased foundation capacity and land provides room for adaptation to accommodate future sea levels.	**CASE STUDIES:** • Thames River, London, UK

DESIGN OPPORTUNITIES:

Ecological Enhancements	Urban Design	Form
• Ecological concrete structures, stepped slopes, and other ecological enhancements can be applied to the waterside face of the new seawall to provide habitat.	• Construction of new land at shoreline can provide new opportunities for public access spaces and uses.	• New shoreline edge can have articulated edge and provide new forms of access to the waterfront.

DESIGN CONSIDERATIONS:

- When building the new seawall, the old bulkhead wall is encapsulated behind the new wall and fill.
- Being in a relatively high seismic hazard alignment along the waterfront, any new wall would need to accommodate potential ground movement during a seismic event, consistent with USACE seismic standards.
- New fill in the area just offshore has the potential to increase consolidation settlement of the young bay mud, which could impact the promenade, underground utilities and bulkhead buildings.

SITE-SPECIFIC CONSIDERATIONS:

- Existing wharves and bulkhead buildings.
- Wastewater outfall locations will add challenges but not impossible to work around.

URBAN DESIGN CONSIDERATIONS:

- New land on waterside of existing seawall provides many opportunities for urban design improvements, public access, and uses.

INSTALLATION AND CONSTRUCTABILITY CONSIDERATIONS:

- Impact to the bulkhead buildings will be a challenge but eliminates most disruption to Embarcadero roadway and promenade relying mainly on marine equipment, or landside equipment working from new land east of the promenade.
- Weak soils will present a challenge for placing new fill and staging equipment and materials.
- Rock dike will likely pose additional constructability challenges for driving sheet pile just outboard of the rock dike.

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ARCHITECTURAL CONSIDERATIONS

- ADA transitions and access across the elevated stretch of wall/berm would require good urban design and accessibility layout.

HISTORICAL RESOURCE CONSIDERATIONS

- Performing this work at or near bulkhead buildings will require significant consultation.
- Bulkhead buildings would need to be dismantled, stored and re-assembled after the wall is in place and land behind is filled.

OPERATION AND MAINTENANCE CONSIDERATIONS

- Low operational and maintenance costs; this is a passive flood protection solution.