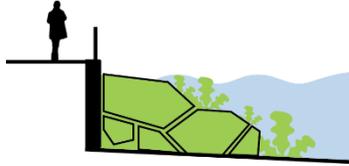


Gabion Baskets

Flood Adaptation Measure



ECOLOGICAL INFRASTRUCTURE



WATER LEVEL RANGE:

Intertidal to supratidal

SHORELINE LOCATION:



Rye Harbour ©Leonard Bentley/CC BY-SA 2.0

DESIGN LIFE 50+ years	ADAPTABILITY High	IMPACT ON THE WATERFRONT Minor Intervention	CONSTRUCTION COST TBD
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COASTAL FLOOD HAZARDS MITIGATED:

Enhancements can provide flood protection when combined with other physical infrastructure



MEASURES COMPATIBILITY:		ECOSYSTEM SERVICES: Measure may affect these shoreline values			
Flood	Seismic	↑	↑	↑	—
Seawalls, Levees	N/A	Aquatic Habitat	Terrestrial Habitat	Water Quality	Carbon Storage
		—	—	—	—

DESCRIPTION:

Gabions are rectangular, compartmented baskets that are filled with natural stone. They are typically used for slope stability and erosion protection with applications that include retaining walls, revetments and embankment toe walls, canal and river bank protection, and silt filtration from stormwater runoff. The baskets are flexible and permeable, supporting vegetation growth as the small rock fill will tend to filter/trap fine sediments in their interstices.

CONSIDERATIONS:

- More suitable for spatially constrained or erosive environments with low to moderate wave energy and/or greater slopes.
- The establishment of vegetation can improve ecological value but

ADVANTAGES:

- Highly erosion resistant.
- Vegetation can be established to improve aesthetic and habitat value of revetment.
- Effective for scour protection and embankment stability.

DISADVANTAGES:

- Stability of the stone depends on the cage remaining intact. Cage can break up over time in high wave or corrosive environments or due to vandalism.
- Limited to low to moderate wave environments.

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requires labor to install, monitor, and maintain. Environmental conditions should be considered to select suitable species.

- Gabions are relatively flexible, allowing some settlement and deformation without failure or loss of efficiency and, therefore, have more relaxed foundation requirements than more rigid structures.

- Can be incorporated on a steeper slope than loose rock, potentially reducing the footprint of the project.
- Can be used to reduce erosion at the toes of existing structures.

- Increased maintenance to initially establish vegetation and potentially later to remove invasive species or cut vegetation back.

CONSTRUCTION IMPACTS TO THE PUBLIC:

- Construction can occur from either land or water, minimizing public disturbances.

SEA LEVEL RISE ADAPTATION OPPORTUNITIES:

- Plantings should be selected to be compatible with water levels/inundation at the site.
- Future sea level rise could submerge the plants requiring re-planting or migration of the plants up the slope over time.
- Additional baskets could be added to the crest to adjust for future sea level rise.

CASE STUDIES:

- None cited

DESIGN OPPORTUNITIES:

Ecological Enhancements

- Plant species can be selected to maximize habitat value.

Urban Design

- Flexible design can be easily incorporated into urban design improvements and other flood mitigation measures.

Form

- Flexible form can accommodate sites with greater slope and spatial constraints.

DESIGN CONSIDERATIONS:

- PVC-coated or stainless steel wire should be used for baskets in saltwater environments.
- Not suitable for high energy marine environments where basket mesh can corrode or abrade.
- Geotextile filter may be required to prevent washout of foundation or bank material and minimize settling.
- Vegetation must be compatible with salinity and inundation at the site.

HISTORICAL RESOURCE CONSIDERATIONS:

- Vegetation to be established should be compatible with native flora and fauna.

SITE-SPECIFIC CONSIDERATIONS:

- Environmental conditions (water levels, waves, currents, propeller jets from maritime activity) should be well defined for each site considered.
- Geotechnical investigations should be performed to determine potential for settlement and global stability failure.
- Success of vegetation will be dependent on salinity and inundation tolerances of the target species.

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URBAN DESIGN CONSIDERATIONS:

- As with unvegetated revetments, vegetated revetments can present a hazard if people walk on or climb down the revetment.
- Measures should be employed to discourage people from climbing down to the water over the revetment and damage vegetation.

INSTALLATION AND CONSTRUCTABILITY CONSIDERATIONS:

- Gabions depend on their baskets to contain the rock fill. Vandalism of baskets could lead to failure of the structure.

OPERATIONS AND MAINTENANCE CONSIDERATIONS:

- Periodic inspections should be performed to ensure the integrity of the baskets.
- Maintenance may be required over time to repair damaged baskets.
- Watering may be necessary initially for vegetation planted above the water line and subsequently if site experiences dry conditions.
- Less maintenance is required over time once the vegetation becomes established (after up to 3 years).
- Maintenance may be required to re-plant after storm damage, remove invasive species, or to cut-back or trim the vegetation if it grows too much.