# COASTAL FLOOD DEFENCES: BREAKWATERS

Coastal flood defences are key to protecting our coasts against flooding, which happens when normally dry, low-lying flat land is inundated by sea water. There are both hard and soft coastal engineering methods which can be used to mitigate the risk of flooding and coastal erosion.

Breakwaters are a form of **hard engineering** - these methods are often used as a temporary measure to protect against coastal flooding as they are costly and only last for a relatively short amount of time before they require maintenance. They are very effective at protecting the coastline in the short-term as they are immediately effective as opposed to some longer term soft engineering methods. However, they are often intrusive and can cause issues elsewhere at other areas along the coastline.

## What do breakwaters involve?

Breakwaters are offshore, sloped or vertical concrete walls designed to reduce the erosive power of waves out at sea so that once they reach the shore, the wave energy is reduced. An additional benefit of breakwaters is that they create calmer waters for ships. Breakwaters can be made from rock, stone or concrete and some run parallel to the shoreline.

## Advantages and Disadvantages

- ✓ Reduce the amount of long shore drift which prevents the transport and erosion of sediment along the shore.
- ✓ Low maintenance.
- ✓ Provide good protection for bays.
- ✓ Do not prevent natural dune processes from taking place.

- ✗ Not aesthetically pleasing.
- ✗ Expensive to build.
- ✗ Can cause strong currents which may be hazardous to the public.
- ✗ During periods of high tide: can sometimes be over-topped, effectiveness can be reduced, and can be dangerous to the public walking along them as they could get trapped.
- ✗ Risk of being destroyed during storm events - expensive repair and maintenance costs.

**Douglas breakwater**
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## Case Study: Fish-tail groynes/breakwater in Morecambe

**Fish-tail groyne, Morecambe**
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Morecambe is located on the North West coast of Lancashire in Morecambe Bay. The area has always been at risk from coastal flooding and erosion through coastal storms and high tides. In order to limit the amount of coastal flooding, erosion and sediment transport, fish-tail groynes have been built using limestone blocks out to sea from the shore to dissipate wave energy and retain sand on the beach. The groynes prevent the process of longshore drift so that sediment isn't transported further down the bay away from Morecambe. The groynes are very similar to breakwaters in terms of size and design. The groynes have reduced wave energy considerably and as a result, sediment accretion on the beach has shifted from coarse material to silts and clays.

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