

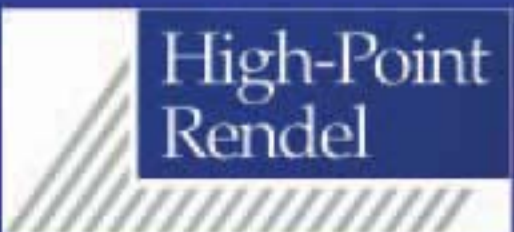


**East Pier, Castle Headland & The Holms**  
Coastal Protection Works SCARBOROUGH



*Working in Partnership to Achieve Success*

*Creating Coastal Confidence*





# Welcome to one of the largest Coast Protection Schemes in Europe today...

Welcome to one of the largest coast protection schemes in Europe today. This brochure is designed to provide a simple guide to the coast protection work currently taking place around Scarborough's historic Marine Drive and East Pier, to protect the castle headland and harbour.

A Coastal Defence Strategy Study adopted by Scarborough Borough Council identified this length of the town's seafront as needing urgent attention.

The existing Victorian and 16th Century structures were coming to the end of their life, resulting in severe damage and overtopping by waves - putting people and property at risk.



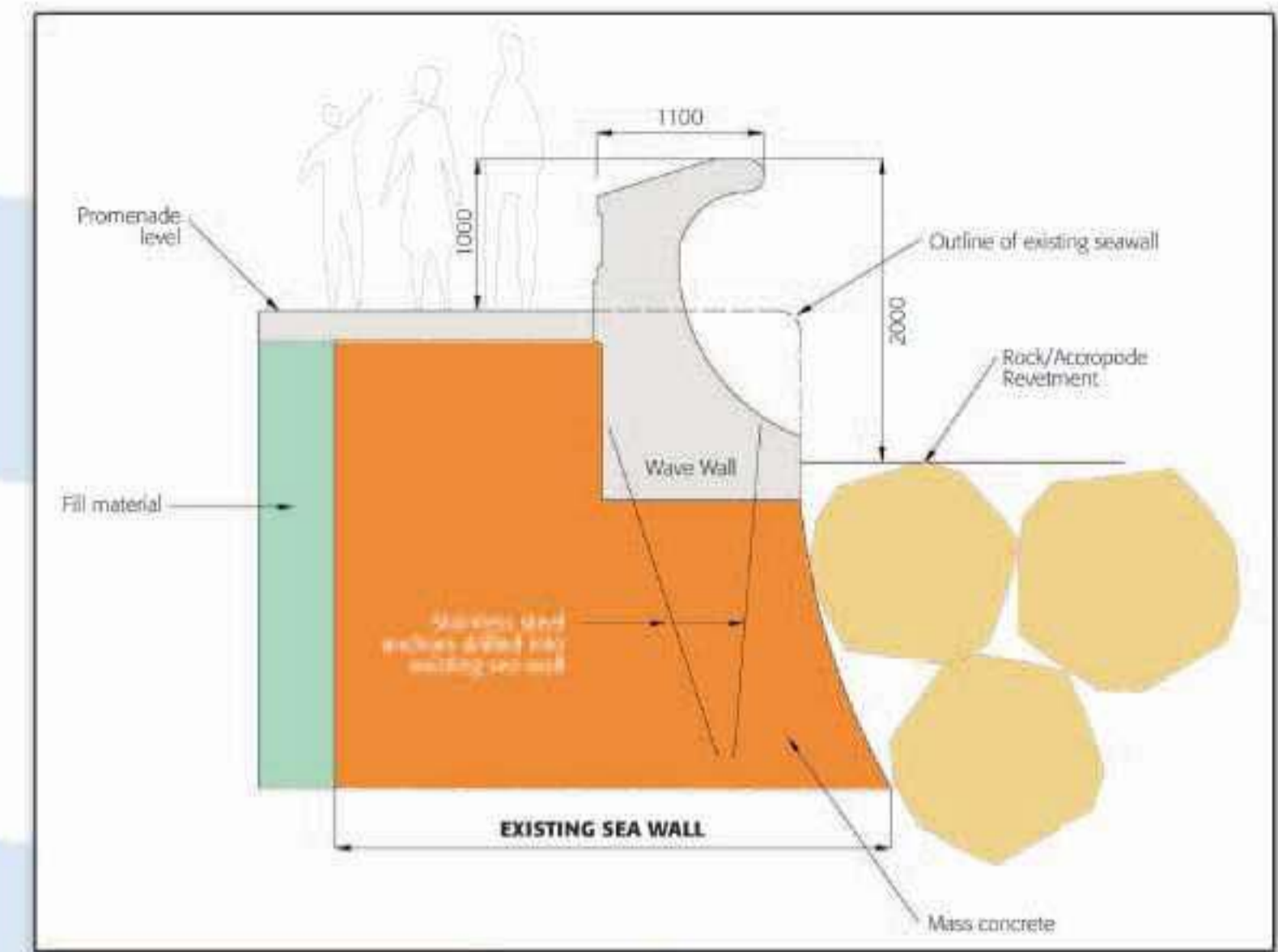
## The Problem

*The Principal Aims and Objectives of the Scheme are therefore to:*

- Protect our beautiful coastline for at least the next 50 years and beyond
- Limit overtopping to reduce wave damage and the impact of storm events on the harbour, Marine Drive and the public
- Carry out work that respects the environmental attributes and expectations associated with this very special site
- Be cost-effective (asset values to be protected show the benefits of the scheme to be almost £300m) The cost of the works is approximately £34 million.



Delivering Rock to North Bay



## WAVE WALL

This 1 metre high wave return wall, is an integral part of the scheme design and has created much public interest since it necessitated the removal of the railings along the frontage of the works. In brief it is required to:-

- Deal with residual waves overtopping the armouring (including future sea level rise),
- Enhance the safety of users of the promenade and highway,
- Reduce the risk of anyone gaining access to the armour from the Marine Drive,
- Reduce the number of times Marine Drive will be closed to traffic (currently on average 35 times/year).

The wall has been sensitively designed, in conjunction with key agencies including the Emergency Services and others. It required planning permission and has been endorsed by DEFRA and the Health and Safety Executive.



Piling from Jack Up Barge





Jack up rig working on Castle Headland

Collecting rock from Drop Off Point

## BRIEF HISTORY

The harbour at Scarborough dates back to medieval times. Work to protect this area began in 1732 when the building of the East Pier provided the first line of coastal defence for the harbour. Over the years repairs have been carried out to this Grade 2 listed structure with major work between 1882 and 1891 comprising a 200 metre long apron of cement and large rubble stones.



## Construction of Marine Drive

The sea defence around Castle Headland and The Holms, which is now approximately 100 years old, was the subject of much discussion at its planning stage. The Council of the day managed to get money and permission from parliament to build the 1,300 yards of wall around the base of the castle to the East Pier. Work was scheduled to take three years and at first all went well until waves destroyed some of the work and other problems surfaced. The last stone was not laid until 1904 and the intention was to open the roadway in 1905. But with extreme waves and abnormally high tides causing further damage, coupled with legal arguments, it was not until 1908 that the problems were sorted out. The formal opening of the Royal Marine Drive was carried out by the Duke and Duchess of Connaught.



It is a testimony to our forefathers that these structures have lasted as long as they have. However, in 1999 Scarborough Borough Council commissioned a Coastal Defence Strategy for the whole of the Scarborough town frontage from Scalby Mills in the north to the Holbeck in the south. Arising from this the East Pier, Castle Headland and The Holms were identified as those sections in need of most urgent attention. It was agreed that these parts were not going to last much longer and there was a danger of structural failure. A detailed survey carried out concluded that the sea walls at Castle Headland and The Holms would probably last less than five years. The East Pier was considered at serious risk because of the very poor condition of the apron and lower masonry.

Thanks are given to Mr Charles Braithwaite of Scarborough for his kind permission to use the photographs on this, and the preceding page.

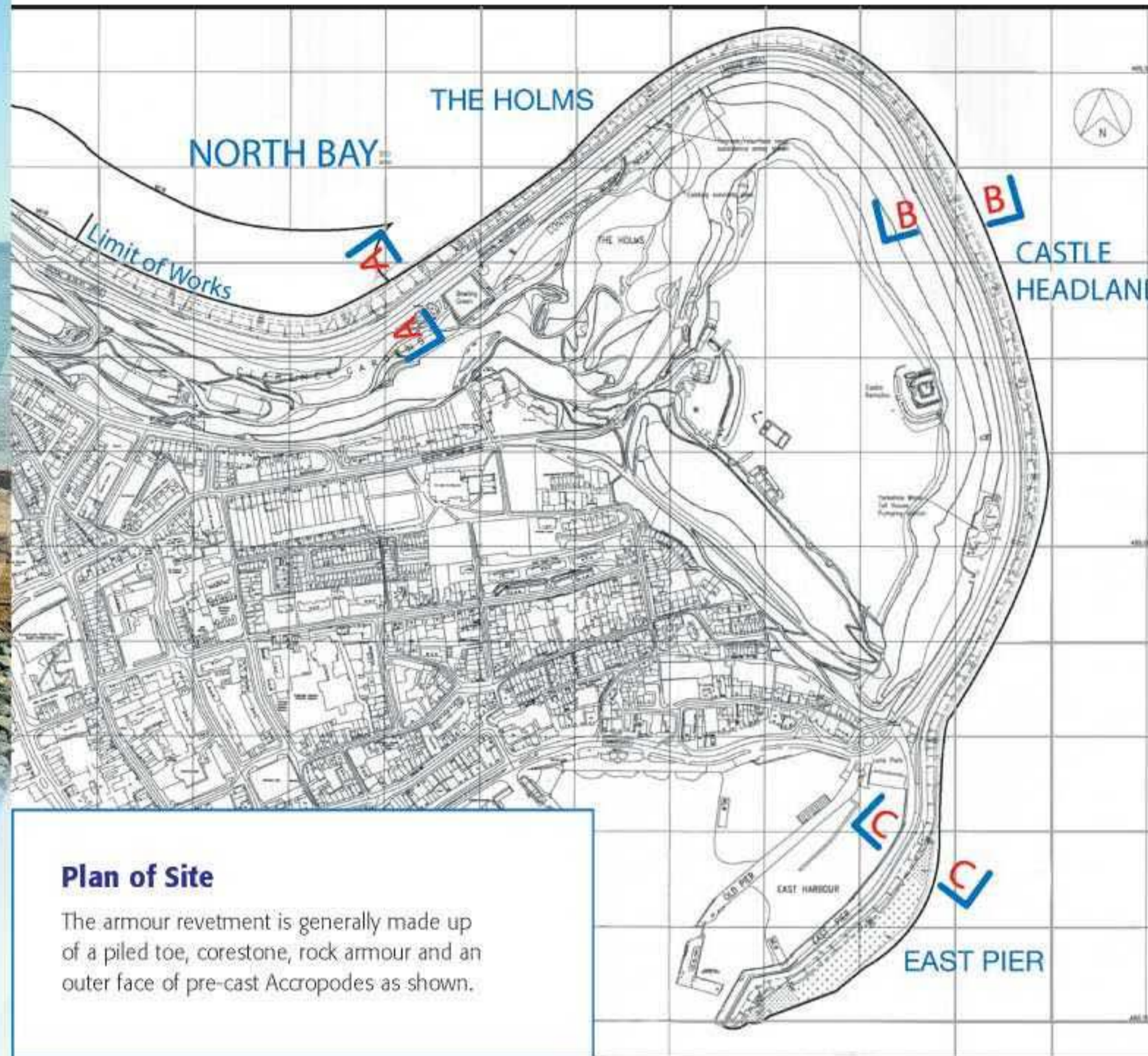
## THE SCHEME

The new scheme involves extra protection along a 2.1km stretch on the seaward side of East Pier and around Castle Headland and The Holms. This will prevent the erosion of the existing pier and sea defence, reduce impact damage to the structure and reduce wave overtopping. Its design is sympathetic to the environmental importance of the area. At the East Pier and Castle Headland the armour units are 6.3 cubic metre Accropodes, a French designed, pre-cast concrete interlocking block designed to absorb the impact of the sea. A 150-metre length at the root of the East Pier will include 9 cubic metre Accropodes. These will be topped off with rock. At The Holms the preferred armour units are 5 to 10 tonne rocks, all imported from Larvick in Norway. Repair work has been carried out to all the existing structures and a new one metre high wave return wall is to be installed around Castle Headland and The Holms to help catch the residual overtopping and flip it back seawards.



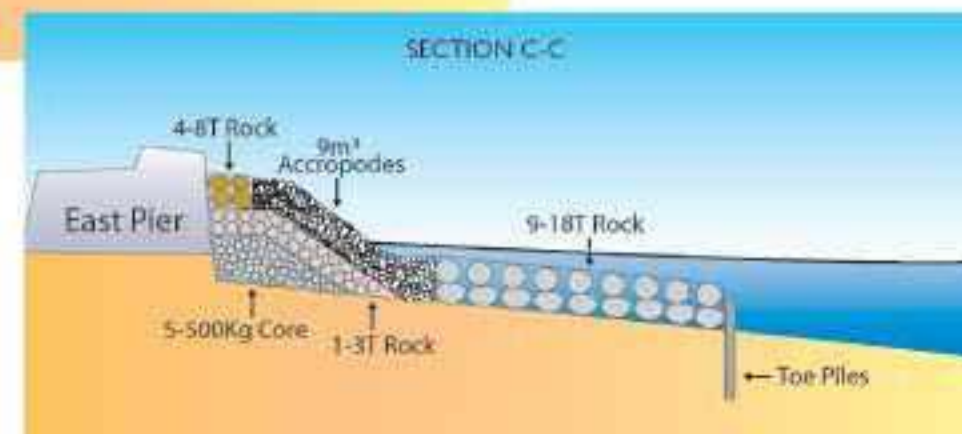
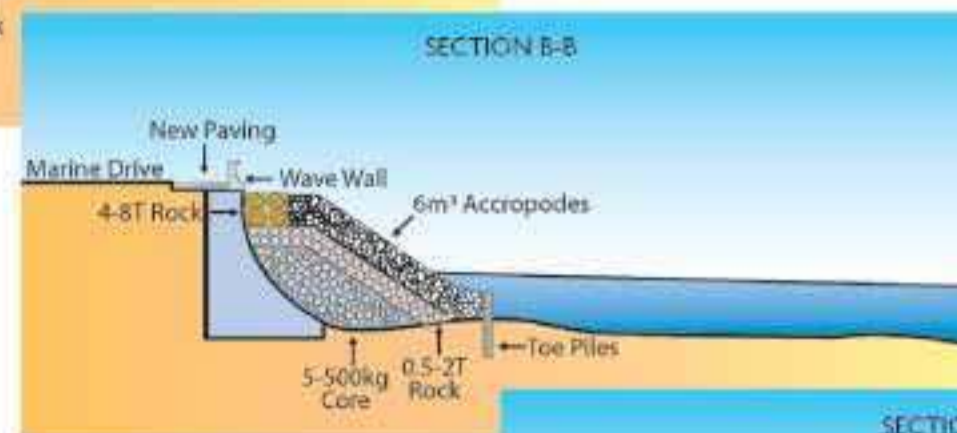
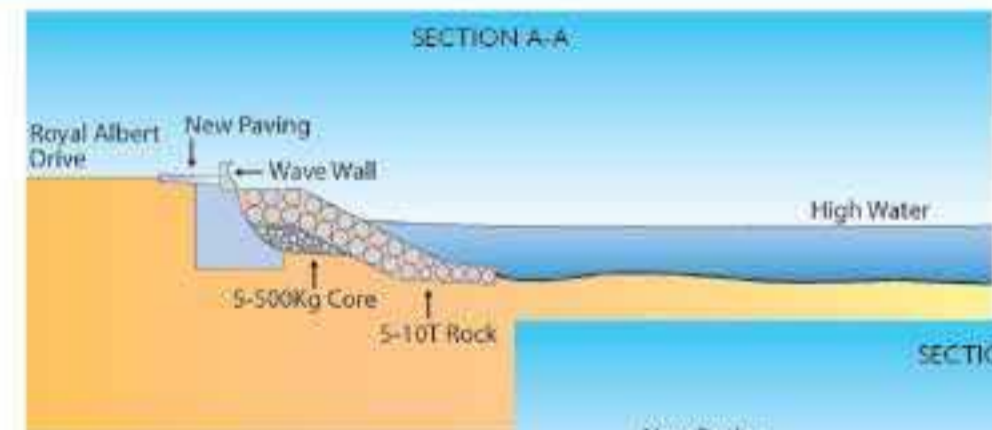


Piling using land based rig



### Plan of Site

The armour revetment is generally made up of a piled toe, corestone, rock armour and an outer face of pre-cast Accropodes as shown.



Piling from jack up barge



Production and Transport of Accropodes



# Working in Partnership to Achieve Success

**Client:** The client for this Scheme is Scarborough Borough Council working in Partnership with The Department for Environment, Food, and Rural Affairs, who are joint sponsors of the Scheme.

The construction cost of the scheme is approximately £34 million funded through a combination of DEFRA Coast Protection Grant (75%) and Scarborough Borough Council Capital Budget (25%).

## Principal Contractor:

The Principal Contractor is Edmund Nuttall Limited, a multi-discipline national civil engineering contractor, part of the international ROYAL BAM Group.

The contract is being administered from their North East area office in Newcastle upon Tyne.

## Main Subcontractors and Suppliers:

Robert Howell Construction Ltd.	Handling and Placing of rock armour
Ritchies (Part of Nuttall Ltd.)	Installation of toe piles
Ritchies (Part of Nuttall Ltd.)	Repairs to concrete face of existing wave wall
Stema Shipping Ltd.	Supply of rock armour from Norway

**Designers:** The design was produced for Scarborough Borough Council by Consultants High Point Rendel, London, in association with HR Wallingford, Oxford who carried out model testing of the scheme.

**Site Supervision:** Site supervision is being undertaken on behalf of Scarborough Council by High Point Rendel.

**Liaison Group:** To help in the successful delivery of this project a liaison group, made up from local, directly effected organisations, has been set up. The partnership acknowledge the contribution made by this Group.

## PRINCIPAL ELEMENTS OF THE SCHEME

- 5,500 tonnes of stone masonry to be used on the East Pier
- 280,000 tonnes of rock revetment imported from Norway
- 11,000m<sup>2</sup> of concrete 'boardwalk paving' around Marine Drive
- 630 pre-cast concrete piles around Castle Headland and the East Pier
- 4,400 pre-cast concrete Accropodes required along the Castle Headland and the East Pier
- 1 metre high wave return wall approx 1700 metres long

