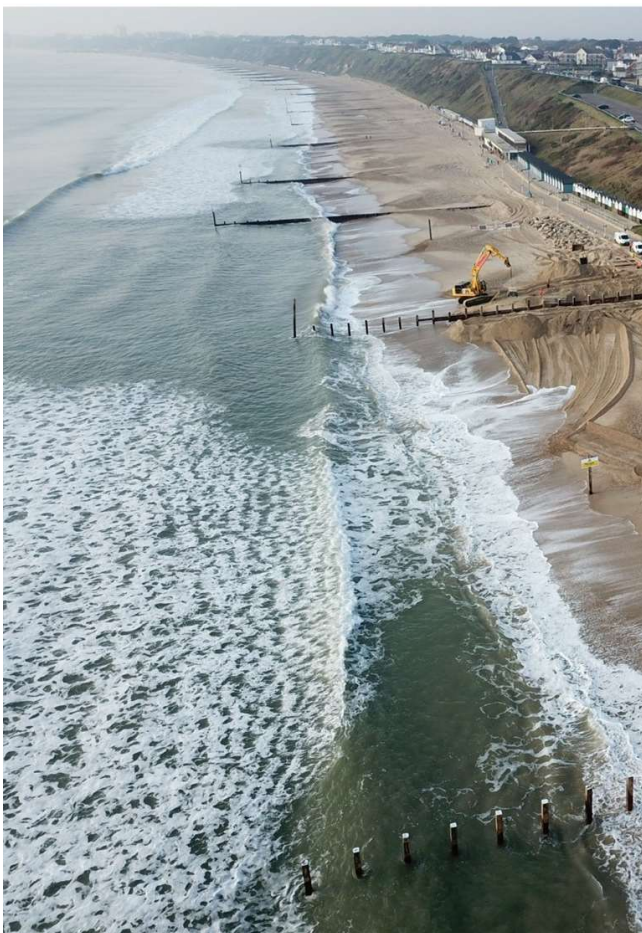


Poole Bay Coastal Defence Scheme

Prevention of longshore drift



Issue

Poole Bay stretches from Sandbanks in the west to Hengistbury Head in the east. Whilst being one of the most vibrant and diverse sections of coast in England, it is at permanent risk of coastal erosion. This could be as much as 1 metre each year if there were no defences in place, putting the residential and business properties along this 18km stretch of coastline at risk.

As part of the Poole Bay Beach Management Scheme, Suttle Projects were appointed as Principal Contractor by Bournemouth, Christchurch, Poole (BCP) Council to undertake the replacement of 20 timber groynes in Poole Bay, along with exploratory investigations for the repair and upgrade of Hengistbury Head Long Groyne. The work phases totalled £5 million in value and the work was undertaken over several winter working periods.

A project of this nature will always bring challenges and our approach to simplifying projects would prove to be invaluable in putting the residents and public at the forefront of our methodology, respecting the environment, and achieving a safe and successful delivery in this aggressive tidal location.



Solution

To prevent longshore drift of the sand and protect the beaches along this coastline from unwanted erosion, twenty timber groynes were designed by the client for a phased replacement. This was to be carried out over a five-year period, predominantly over the off-peak winter months to minimise disruption during the summer season.

The complete programme of works was tendered in two stages. Having successfully delivered the first phase, we were able to apply our learning and best practices to offer an efficient and effective solution for award of the second phase.

As a local SME, we were able to provide the benefits of an efficient cost, and highly skilled specialist trades who were experienced in the challenges of working within the intertidal beach zone, simplifying the project to reduce risk and deliver certainty.

Public Realm Working Environment

Bournemouth and Sandbanks seafronts are a major asset in attracting tourism to the region, with visitors being increasingly attracted all year round, not just during the summer months. Consequently, the wintertime still sees many public activities and events taking place on the promenades and beaches that had to be at the forefront of our thinking when developing the most appropriate methodologies to complete the works.

With sand becoming unstable during excavation, and movements of large plant and equipment, access to areas of the beach were restricted to the public during the works, but with safe access to the promenade maintained at all times.

Timber Groyne Replacement

Each groyne is between 5.0 and 7.5m deep and approximately 75 metres in length. They consist of 10 metre long timber piles spaced 2.5 metres apart, with a 12.5 metre king pile located out at sea. The piles are connected with 17 rows of bolted timber planking, with each groyne requiring approximately 225 planks.

Our self-delivery and owned and maintained plant and equipment allowed us to simplify the project, providing certainty of cost, programme and capability efficiencies. Multiple groynes were constructed simultaneously to maximise the low tide working windows and provide additional flexibility in the programme for inclement weather conditions.

The process of installing the piles was carefully developed to avoid causing any later deflection along the line. This commenced with the location being marked out using a robotic total station to ensure accurate dimensional control. Our Leader Mounted Auger was then used to drill to the required depth, loosening the natural soil to allow the piles to be driven into position using our Movax vibratory pile driving attachment mounted on a 35-tonne excavator.

The timber planking was assembled using a 24-tonne excavator with fork attachments to minimise manual handling. Heavy duty pneumatic hand tooling was used to fix the tropical hardwood together with marine grade fixings. Where the planks were required to be installed deeper into the beach, heavy excavators were deployed to excavate along the line of the piles.



Environmental Considerations

Each groyne was constructed using a mix of new tropical hardwood planking, and recycled hardwood planking from the previously deconstructed groynes.

The new timber used was certified sustainable by the Forestry Stewardship Council and

chosen for both its high strength and durability, and its resistance to the destructive marine life which can eat the wood.

The deconstruction works ensured that all materials possible were recovered for recycling or reuse in future coastal projects. The recycled timber was used for the bottom 12 -14 rows of planking. The timber that was found to be unsuitable for use on the groynes was recycled for other local projects.

Hengistbury Head Long Groyne

Whilst undertaking the timber groyne replacement, additional project work was instructed to assess the condition of the Hengistbury Head Long Groyne. Long Groyne is located within a Site of Special Scientific Interest and plays a critical role in reducing coastal erosion in Poole Bay. It is also a significant structure in stabilising coastal erosion in the adjacent Christchurch Bay.

The 150 metre long voided concrete and rock groyne, was understood to be at risk of serious deterioration in the middle of the structure, requiring a detailed survey to establish the extent of the potential damage.





In order to inspect the core of the structure, the protective rocks surrounding it had to be removed. Great care had to be taken to avoid disturbing the groyne itself and risk causing further damage to the concrete structure.

All works had to be planned collaboratively with BCP Council, Natural England and the Environment Agency to ensure compliance with their exacting standards.

The sequence of rock removal and reinstatement was meticulously planned with BCP's coastal engineer to ensure that the concrete structure would not be excessively exposed to wave action whilst unprotected by its rock armour.

Once the concrete structure was exposed, we assisted our supply chain in undertaking the high-definition subsea survey. This was undertaken using sonar and laser technology to create a 3-dimensional visualisation that revealed the groyne to be in poor condition.

The investigatory work gave BCP the necessary information to design a major strengthening scheme to increase the resilience of the groyne structure which will protect the coastline from sea level rise over the next 100 years.

Outcome

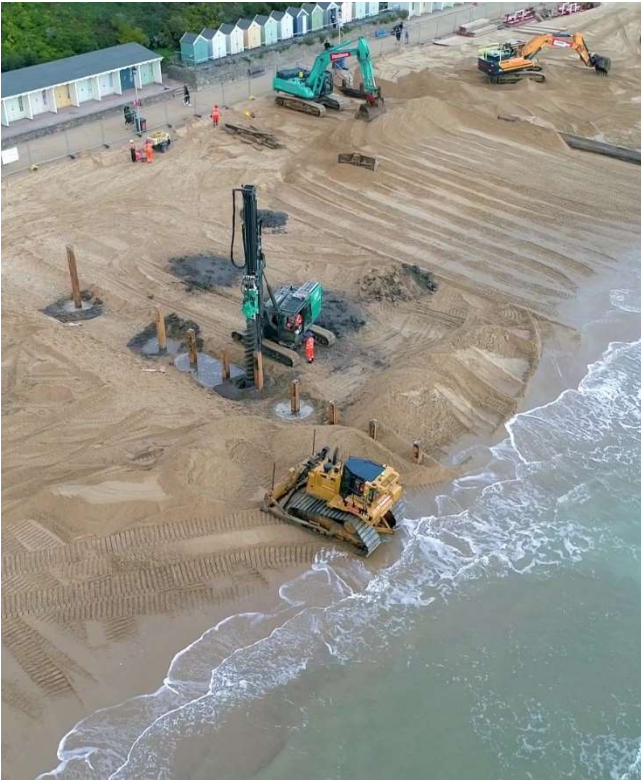
Productivity

We combined our proven approach in simplifying projects with the use of our directly employed trades who are highly familiar with the challenges of working within the intertidal beach zone. This allowed us to provide the benefits of being a local SME, whilst also reducing risks and delivering certainty at a more efficient cost.

Multiple groynes were constructed simultaneously to maximise the low tide working windows and provide additional flexibility in the programme for inclement weather conditions. Utilising our owned and maintained plant and equipment provided programme and capability efficiencies.

Sustainability

With the works being located on the public beaches and promenades, our methodologies and communication protocols prioritised public safety and minimising disruption during the many public activities and events that took place while the works were in progress.



Deconstruction of the old groynes ensured that all materials possible were recovered for recycling or reuse in future coastal projects. The timber that was found to be unsuitable for use on the groynes was recycled for other local projects.

Creativity

The phases of this programme were tendered progressively in stages. We were able to secure subsequent awards by capturing the learning and best practice from each completed section and incorporating those benefits into more effective processes to demonstrate efficiencies across each subsequent phase.

Reliability

Whilst removing the protective rocks surrounding Long Groyne to enable inspection great care was taken to avoid disturbing the groyne itself or risk causing further damage to the unprotected structure.

Simplifying Projects Better more reliable outcomes

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