Coastal Partners

Hayling Island Coastal Management Study
Frequently Asked Questions

Version 1.0

September 2021

Sea Level Rise and Climate Change

- **What value are Coastal Partners using as an estimate for future sea level rise?**
  For estimates of future sea level rise we are required to use the UK Climate Change Projections (UKCP18). This is the latest national Environment Agency (EA) guidance on sea level rise. All projects are to adopt the *"Representative Concentration Pathway 8.5 (RCP8.5) high emissions scenario 70th %ile (for design purposes) and 95th %ile (for sensitivity testing)."* This equates to 1.15 m of sea level rise by 2100 and 1.4 m by 2120, relative to the 1981-2000 baseline for the RCP8.5 95th%ile and 0.88m sea level rise by 2100 and 1.03 m by 2120 relative to the 1981-2000 baseline for RCP8.5 70th%ile.

- **Do storm surges form part of these calculations?**
  Storm surges do form part of our analysis. We use the latest national EA guidance available for extreme sea levels, in this case the Coastal Flood Boundary Dataset (CFBD2018). The extreme sea levels presented in the CFBD2018 include the effects of storm surges and astronomical tides. Localised changes in sea level induced by onshore wave action, orientation, or topography at the coastline are simulated within the EA flood modelling which the Strategy is using.

- **Are there any anticipated changes to the sea level rise values incorporated into the strategy?**
  No, there are no anticipated changes to the sea level rise values used in the strategy, as the current national guidance (UKCP18 and CFBD2018) was only released in 2018. If the guidance is updated during the strategy's development, then an assessment using sensitivity tests will be made to determine the impact of the change and a decision will be made as to whether a re-run of the modelling is required.

Bi-modal Wave Study

- **What are bi-modal waves and why are they important for the open coast of Hayling Island?**

  A bi-modal sea state exists where high energy swell waves generated in the Atlantic Ocean occur alongside locally generated wind waves (shorter period but higher wave height). The result is a high energy environment that can do a lot of damage through increased overtopping of our beaches and sea defences. Given the proximity of Hayling Island, it is susceptible to these bi-modal wave conditions when long period swell waves refract around the Isle of Wight, coinciding with local storm conditions. For more information see https://coastalpartners.org.uk/bi-modal-summary#:~:text=A%20bi-modal%20sea%20state%20exists,period%20but%20higher%20wave%20height).

- **How have Coastal Partners been considering bi-modal waves in their coastal management practices?**

We are fortunate to now have a wave buoy at Hayling that is sensitive enough to record when both these (bi-modal) conditions occur at the same time. We now have enough data to make reliable insights into these combined events, which appear to cause more erosion. However, there is a need for further research into this topic, to create new analysis and design tools to consider bi-modal waves, which are a particular risk to the South Coast of England. We are working with the Environment Agency to try and make this happen.

To support our Beach Management Plan at Eastoke, we secured funding to appoint world-renowned advisors, HR Wallingford to provide insight into how bi-modal seas affect our shingle beaches. It is important to note that bi-modal extremes and multivariate analysis (the probability of two or more extreme events occurring at once) are a complex and relatively new topic, for which Coastal Partners are leading the way nationally in their application. Up until recently, wind and swell waves were considered separately in design assessments, and this was industry standard practice as design tools were not available to test these bi-modal extremes on our beaches and structures. The industry has since made significant steps forward in our understanding of these wave conditions, but lacks new design tools to consider their effects, which are still in the research and development stage.

Our research into this topic has been recognised by the coastal engineering sector, and we have been asked to present our early findings at the international Coasts, Marine Structures & Breakwaters conference in 2022, highlighting the cutting-edge nature of our research.

Coastal Partners continue to apply our expert knowledge and insight to manage our beaches. While the tools we have available are limited, we are exploring new ways to apply these which test the sensitivity of our beaches to bi-modal waves. For more information see https://coastalpartners.org.uk/bi-modal-summary#:~:text=A%20bi-modal%20sea%20state%20exists,period%20but%20higher%20wave%20height).

- **Are bi-modal waves a new phenomenon?**

  Bi-modal waves are not a new phenomenon, however, it's only since the Hayling wave buoy was deployed in 2003 as part of a network of nearshore wave buoys across the south coast of England (https://coastalmonitoring.org/) that scientists have been able to analyse the data to understand these key events better.

  The Environment Agency are aware of the issue, however, it is a complex subject matter for which tools and models are required to test and simulate these conditions. The first model 'SHINGLE-B' was developed by HR Wallingford in 2016, although it takes time for these models to be considered robust enough to apply to design conditions. Whilst we await new guidance from the Environment Agency, we continue with our own research studies, supported by industry experts, which will help to inform the next update of the South Hayling Beach Management Plan, starting in 2024.

- **Will this bi-modal work be incorporated into the Hayling Island Coastal Management Strategy?**

The Coastal Management Strategy is a broad strategic review of coastal management for the whole island looking at a range of factors, over long-time scales and large geographic areas. Extreme bi-modal waves are a very specific example of the complex processes that shape our coast. We will recognise the impacts of bi-modal waves in the Strategy in relation to future management. More detailed assessment on bi-modal waves will be undertaken when we come to the detailed design of new defences or are looking to predict the severity of extreme storm conditions. For the strategy we are using the government approved JBA flood model, although will make appropriate allowances in our assessment for any uncertainties and undertake sensitivity tests using the current tools that are available to us, to enable strategic policies to be developed and discussed.

- **Is there a wave buoy off of Hayling Island?**

  Yes, the Hayling Directional WaveRider (DWR) buoy is part of a national network of wave buoys across the UK and has been collecting data for nearly 20 years. The UK is ahead of the game internationally with respect to monitoring waves and water levels around the UK, so we have a fantastic dataset available to us. The Channel Coastal Observatory manage all the coastal monitoring data we use, and you can view yearly reports from 2003 (https://coastalmonitoring.org/reports/#southeast) and real time data (https://coastalmonitoring.org/realtimedata/?chart=71&tab=waves) from the Hayling Wave buoy via their website.

Coastal Erosion

- **Are erosion zones being produced as part of the Strategy?**

  Yes. The erosion zones produced for the strategy are produced following Environment Agency and Treasury guidance which assumes erosion will commence once defences fail at the end of their residual lives. There are also scenarios whereby defences are maintained and improved. The erosion zones incorporate the latest sea level rise guidance (UKCP18), updated 'rebound' rates and updated erosion rates. Further information on the erosion zone methodology will be available when the full strategy is released along with maps.

- **Do the updated erosion zones incorporate the findings from the Bi-modal Wave Study?**

  The methods used to forecast erosion estimates are based on an industry approved approach and produce indicative zones of erosion to inform coastal land management. There is currently no approved industry standard to specifically include bi-modal conditions into strategic erosion zone modelling. These events are however, picked up through measuring the average beach erosion rate, which are then projected landward.

General

- **When will the Strategy be published?**

The current programme for the Strategy allows for a 3-month public consultation phase early in 2022. At this point the whole island will have the opportunity to view and comment on the draft recommendations. Following this, any required amendments will be made and the Strategy finalised. Subject to approvals by Havant Borough Council (HBC) and the EA, we hope to have an approved adopted short-term implementation plan and Strategy in place by October 2022.

- **What happens next?**

Our coastal management work does not stop there. Subject to funding, we will begin to implement the strategy programme of works and look to progress the coastal management schemes recommended. The Shoreline Management Plan and Coastal Management Strategy for the island will also be periodically updated to keep up to date.