







# North Portsea Island

## How we design and build our defences

Caroline Timlett

Coastal Project Engineer

*working together - protecting our coastline*

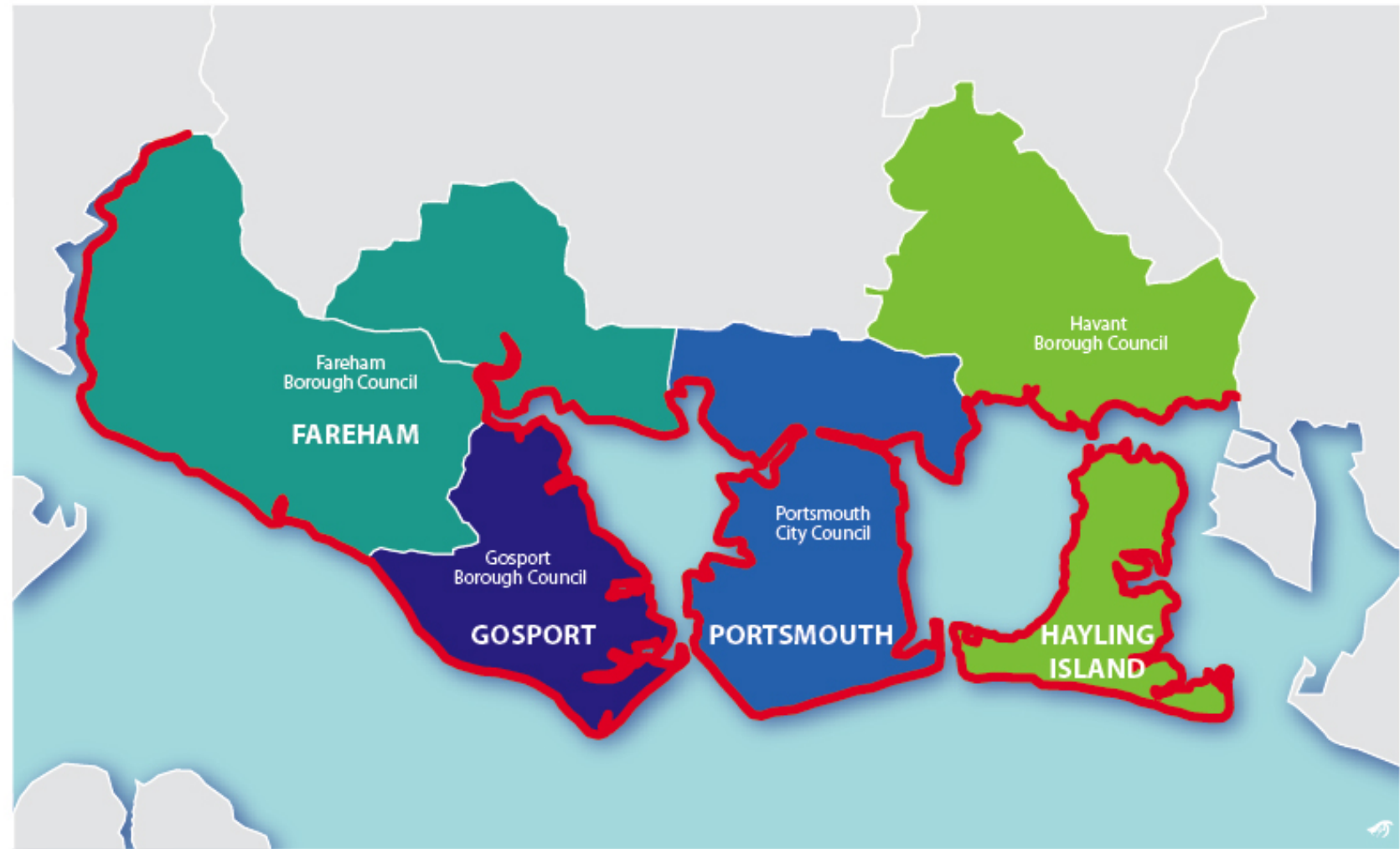




- The ESCP, who we are, what we do
- Introduction to the North Portsea Island Scheme
- Processes of design
- Detailed design
- Construction
- Questions and Answers



*“To provide an effective and efficient coastal flood and erosion risk management service across partnering authorities, through co-ownership of objectives and an equitable fee structure.”*







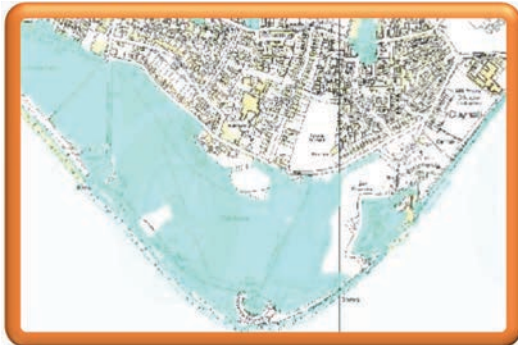
## ESCP Employs 48 members of Staff





## ESCP

### Strategy & Planning



### Capital Projects

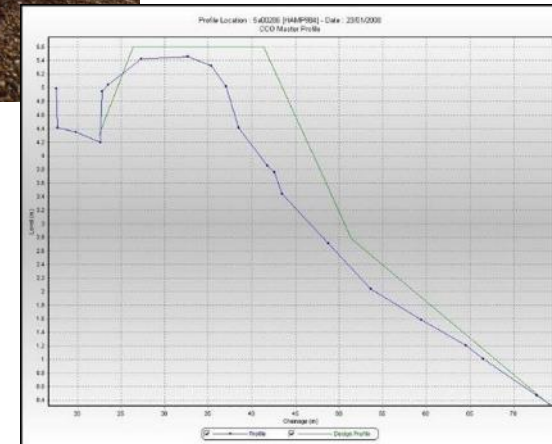
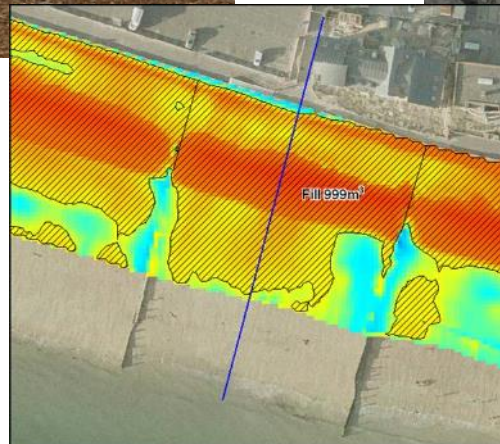


### Operations & Maintenance





**Coastal Monitoring:  
Using GPS equipment to monitor the beach levels  
and to see how they change over time.**



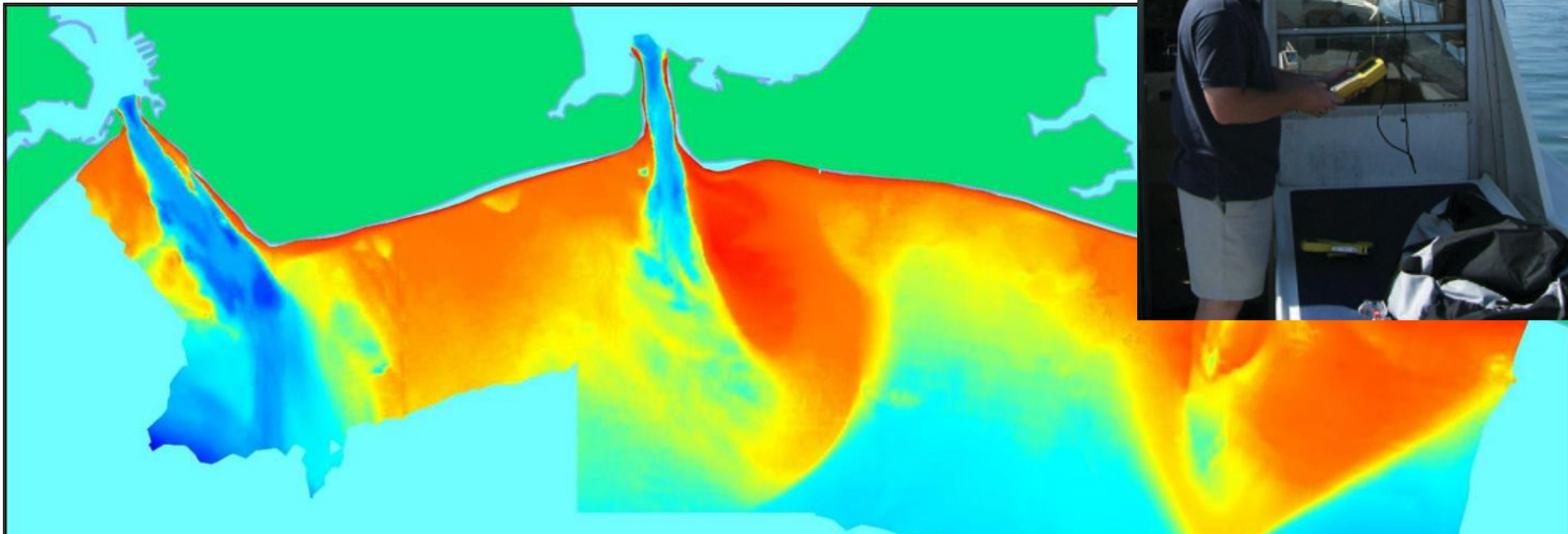


## Coastal Monitoring:

We also survey the seabed to monitor for change.

We use the hydrographic GPS Surveys to inform:

- Bathymetric differences
- Dredging
- Wave parameters
- Structure performance







## Partnership Overview



Portchester to Paulsgrove

Construction Value: £8 million  
Partnership Funding: £8 million  
Construction:  
Approx. 700 properties at risk of flooding over the next 100 years.



North Portsea Island

Construction Value: £66.5 million  
Construction period: 2015 - 2022  
Over 4000 properties at risk from flooding over the next 100 years.



Anchorage Park

Construction Value: £1.5 million  
Construction period: April - Autumn 2015  
Over 4000 properties at risk from flooding over the next 100 years.



Eastoke

Construction Value: £6 million  
Construction completed: November 2013  
Approx. 1750 properties at risk from flooding over the next 100 years.

River Hamble to Portchester Strategy



Value: Strategy - £544,000 to implement - £16-30 million  
Currently in Development Stage  
Approx. 3000 properties at risk of flooding over the next 100 years.  
Total Damages approx. £717 million by 2115



Southsea

Construction Value: £66 million  
EA Approval Sum: £118 million  
Over 12,000 properties at risk of flooding over next 100 years  
Construction period: 2016 - 2022



Hayling Beach Management

Construction Value: £1.6 million over 5 years  
Involved both beach recycling and beach nourishment  
Approx. 1750 properties at risk from flooding over the next 100 years.

Working together - protecting our coastline



# Scheme location



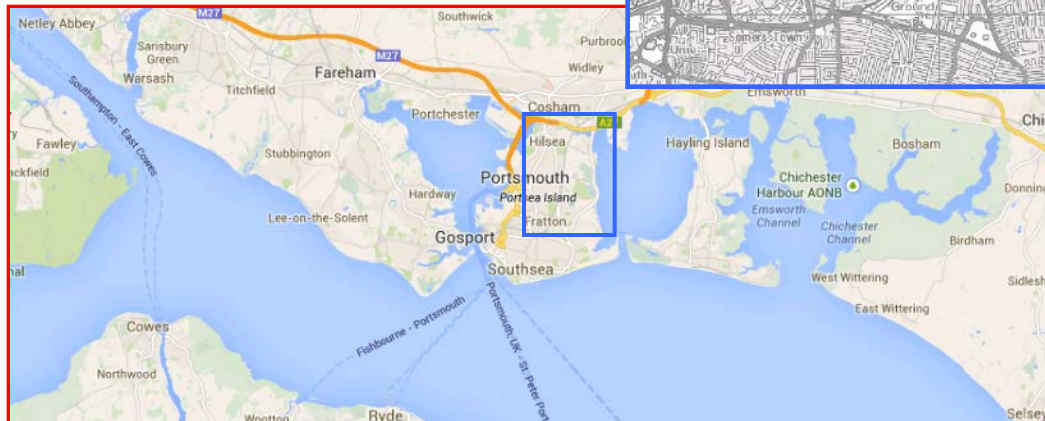
North Portsea Island frontage

The UK's only island city

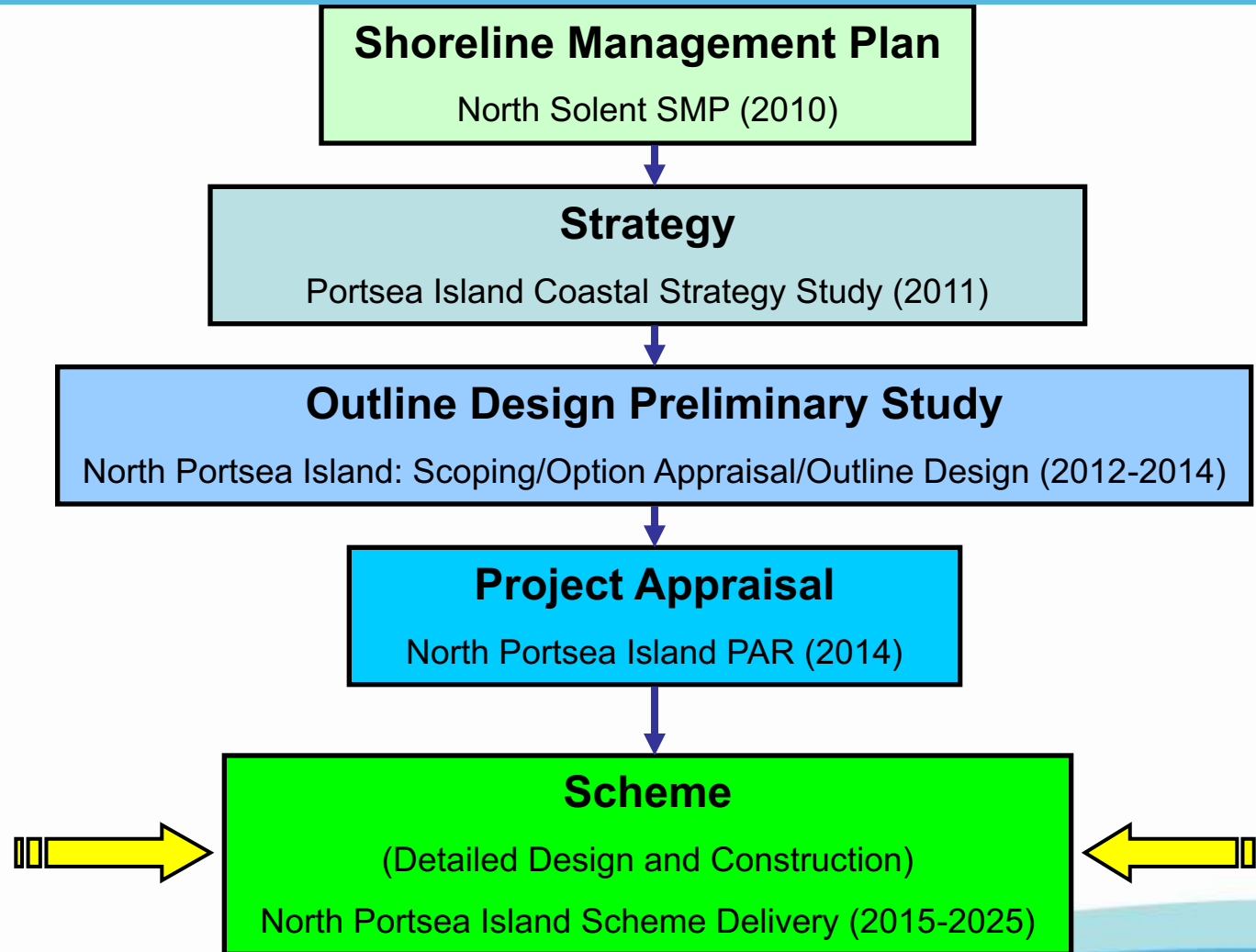
Most densely populated city in UK outside London

Environmental Designations: SPA, SAC, Ramsar, SSSI

North Portsea Coastline 8.4km







***SMPs aim to balance the management of coastal flooding and erosion risks, with natural processes, and the consequences of climate change.***

North Solent SMP outlines the approach to shoreline management for the North Solent over the next 100 years

It has been developed and adopted by all Local Authorities from Hurst Spit to Selsey Bill

North Solent SMP adopts a “**Hold the Line**” policy for Portsea Island (2010)





North Solent SMP adopts a “**Hold the Line**” policy for Portsea Island (2010)

Portsea Island Coastal Strategy (2011)

Identifies 7 discrete flood cells within Portsea Island

Strategy identifies two priority flood cells where work is required within the first 10 years of the strategy

North Portsea Island (Flood Cell 4)

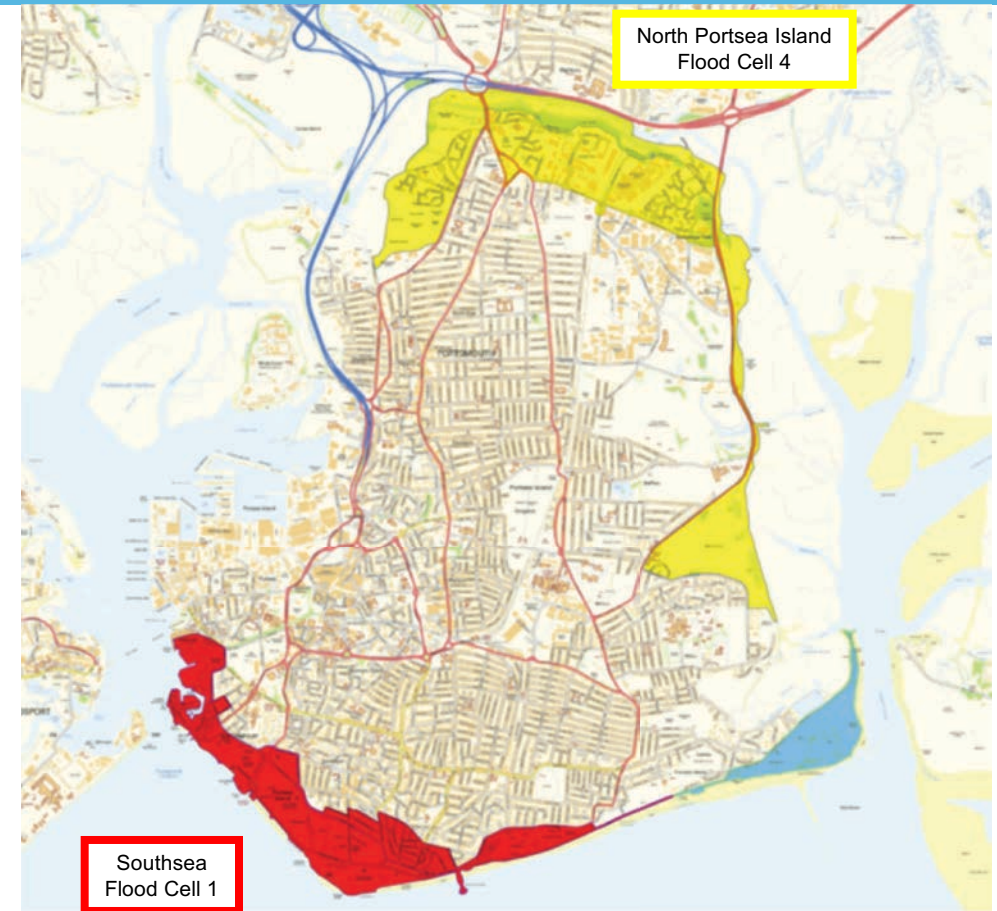
Southsea (Flood Cell 1)

North Portsea Island is identified as **Flood Cell 4**

Southsea (Flood Cell 1) and NPI (Flood Cell 4) identified as priority frontage

**North Portsea Island Strategy Recommendation:**  
Provide 1 in 200 (0.5% AEP) SoP for the next 100 years

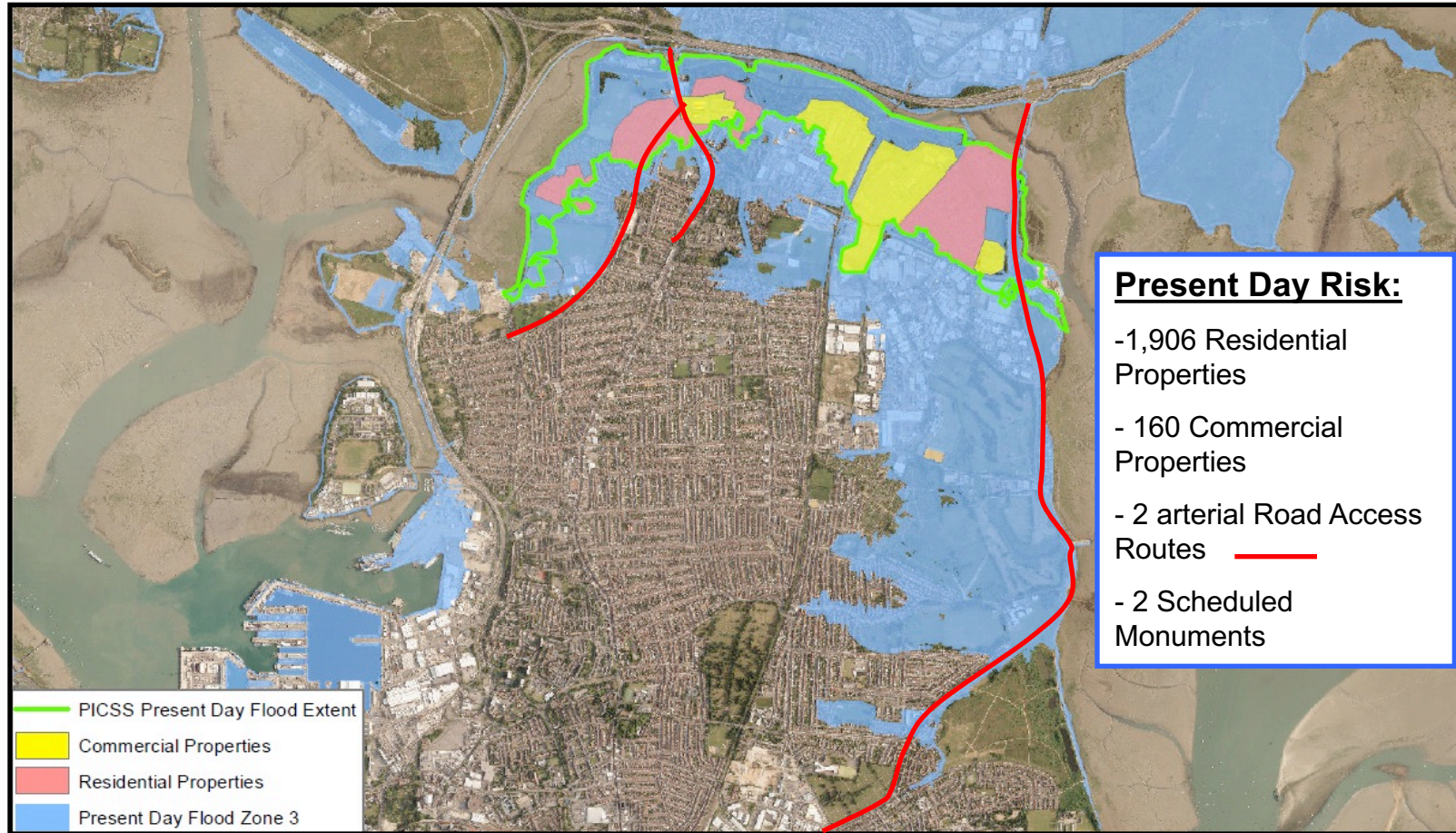
The North Portsea Island scheme has been progressed following an accelerated programme in accordance with the Environment Agency’s Programme for Acceleration and Growth (PAG) and looks to provide a 1 in 500 (0.2% AEP) SoP Scheme







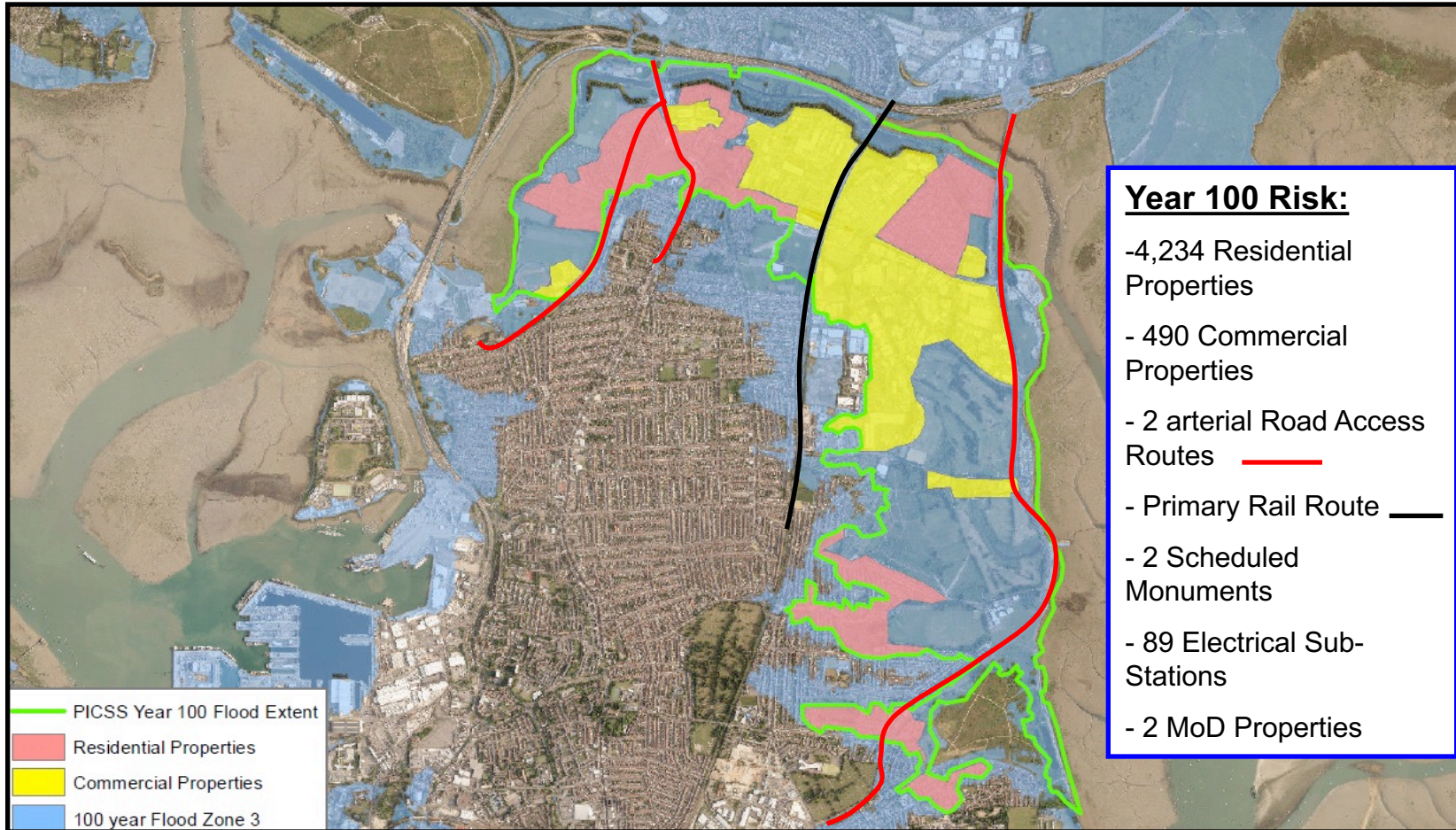
## Risk - Present Day Flood Extent







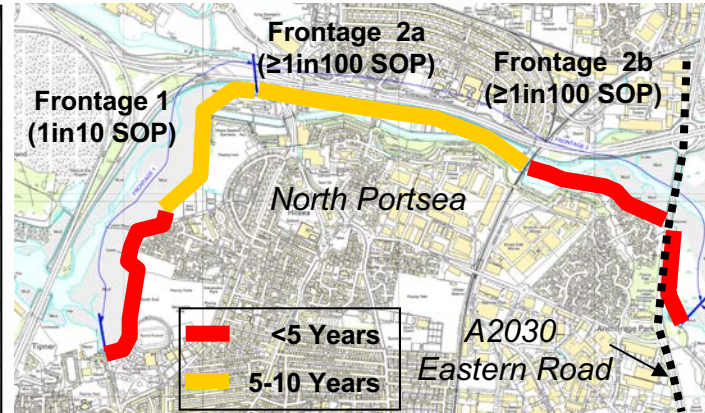
## Risk - Year 100 Flood Extent





## The Problem

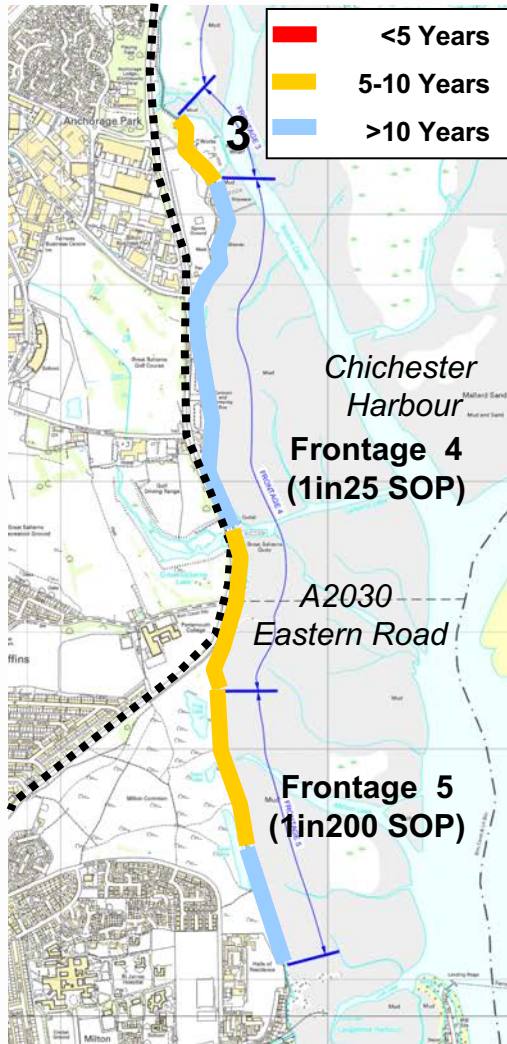
### Frontage 1 & 2





# The problem – failing defences

Frontage 3, 4, & 5



Fragile seawall coping



Overwashing Jan 2014



Low defence height



Tidal flooding A2030- Eastern Road Jan 2014



Ad-hoc rubble defence



Defence damage





# The problem - flood risk



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## Anchorage Park



1:500yr Water Level  
1:200yr Water Level  
Existing Crest Height 3m AOD  
1.8m AOD

Front view of Sea Wall



Rear view of Sea Wall

Existing Crest Height



Op

Do Nothing					
Do Minimum					
Advance the line					
Retreat the line					

Op



Tidal control barriers (Ports Creek and Tipner Lake)

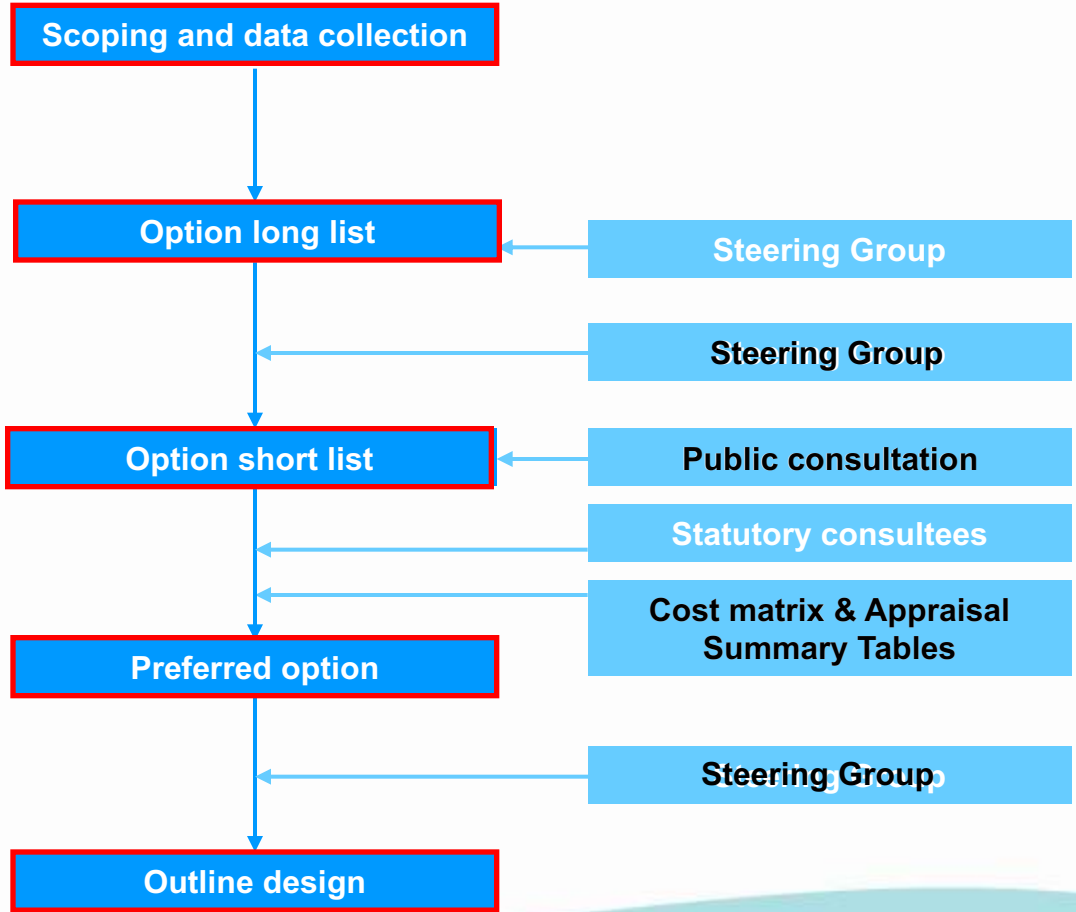
Property level protection measures set-b

Accept overtopping and improve drainage

Harbour barrage

Infill Ports Creek

Beach management



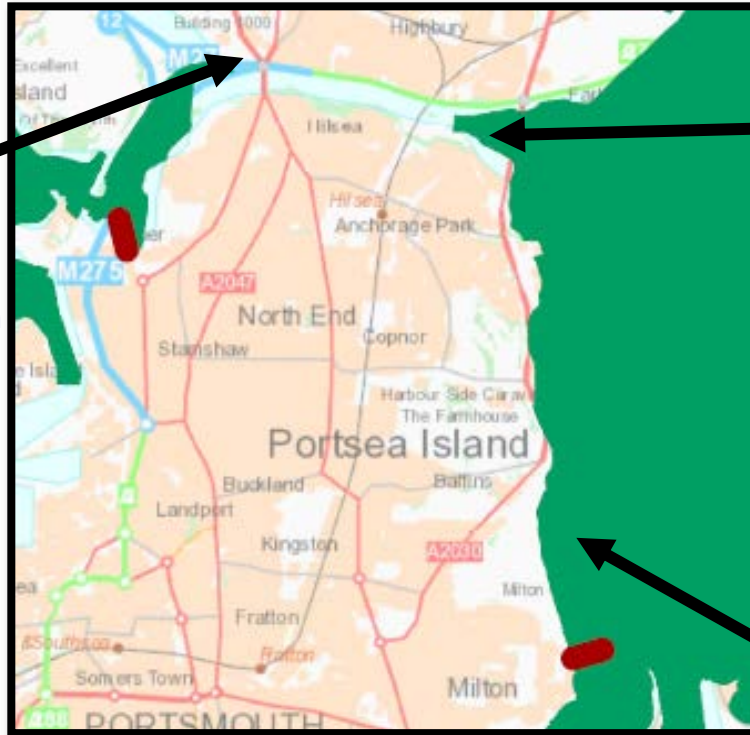


## Internationally Important Environment of Portsmouth and Langstone Harbours

**SPA Features: Intertidal Mudflats and Eelgrass Beds**



**Portsmouth Harbour SPA & Ramsar**



**SPA / SAC Features: Mudflat and Spartina Swards**



**Chichester and Langstone Harbours SPA, SAC & Ramsar**



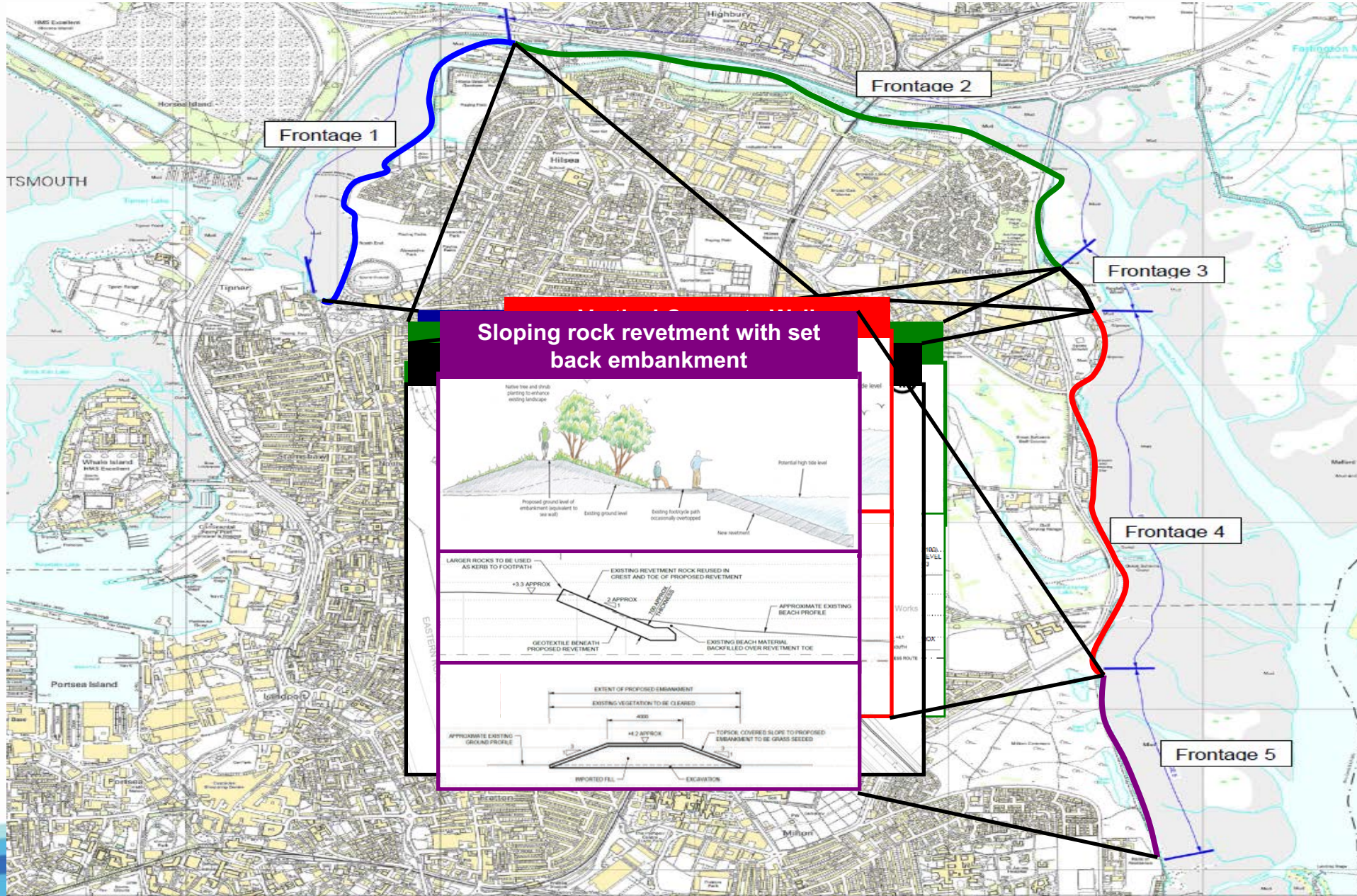
**SPA Feature – Brent Geese**



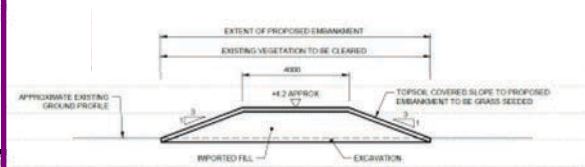
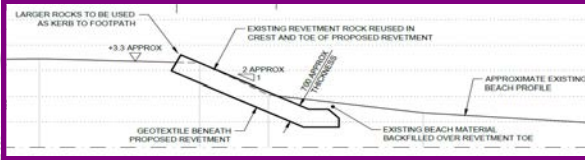
**5.7% Western Siberian / Western Europe Population**

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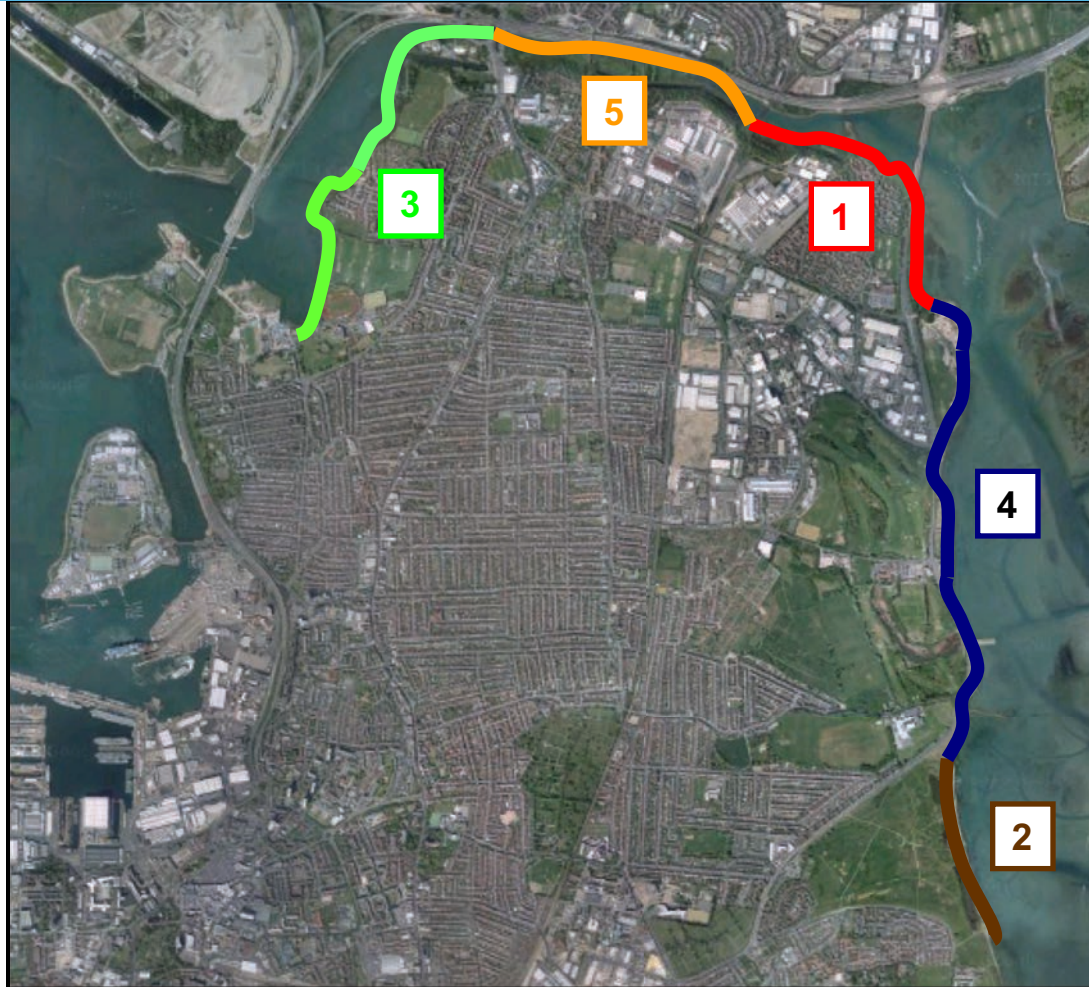
### Sloping rock revetment with set back embankment







# Delivery phasing



- **Phase 1**  
 (Year 1-2)  
 SoP = 1 % AEP  
 RESIDUAL LIFE = 5 - 10 YRS  
 HAZARD = VERY HIGH
- **Phase 2**  
 (Year 2)  
 SoP = 0.5 % AEP  
 RESIDUAL LIFE = 5 - 10 YRS  
 HAZARD = MEDIUM
- **Phase 3**  
 (Year 3 - 5)  
 SoP = 10 % AEP  
 RESIDUAL LIFE = < 5 YRS  
 HAZARD = MEDIUM
- **Phase 4**  
 (Year 5 - 8)  
 SoP = 4 % AEP  
 RESIDUAL LIFE = 5 - 10 YRS  
 HAZARD = MEDIUM
- **Phase 5**  
 (Year 9 - 10)  
 SoP = 0.5 % AEP  
 RESIDUAL LIFE = 5 - 10 YRS  
 HAZARD = MEDIUM





**North Portsea Island Scheme PV Benefits**

**= £642m**

**North Portsea Island Scheme Costs**

**= £58m**

**Benefit Cost Ratio**

**= 11.07**

**EA Approved Funding (2014)**

(Detailed Design and Construction)

North Portsea Island Scheme Delivery (2015-2025)

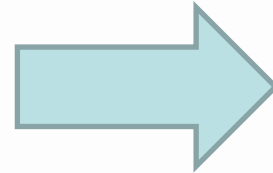
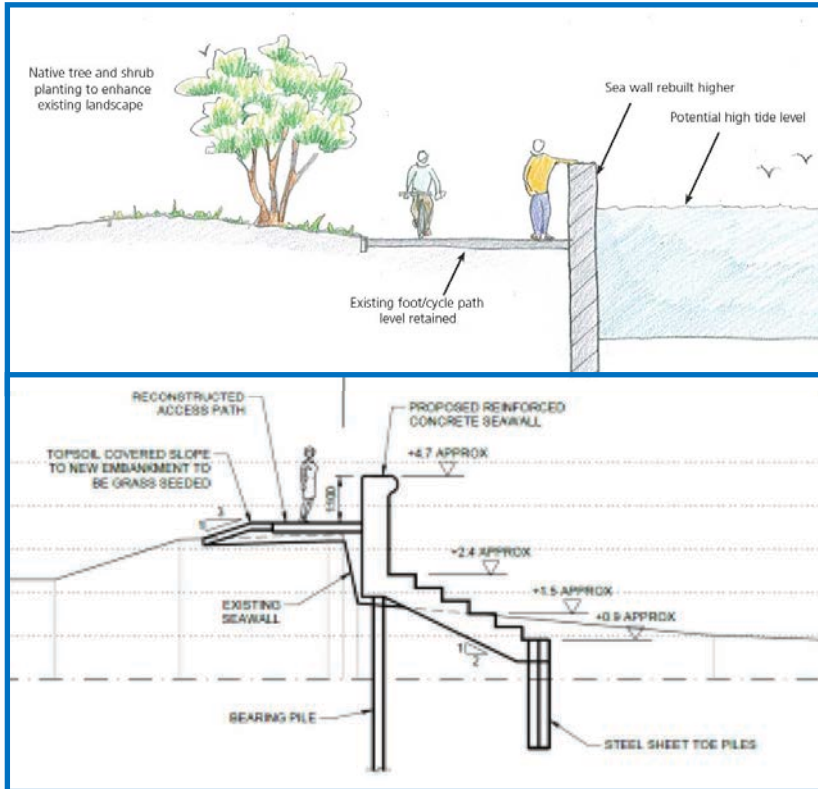






## Outline design - preferred option

### Eastern Road



Refine the design



Define defence height  
 – Tuflow modelling  
 - Site Investigations



Refine the look



Design landscaping

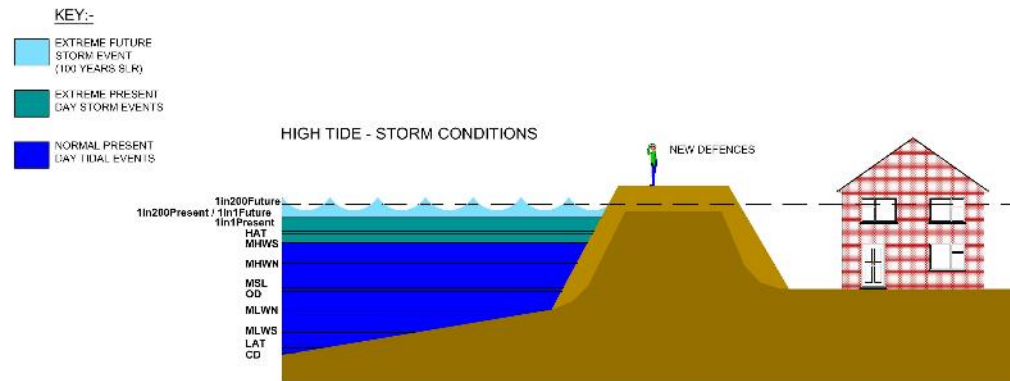
Stakeholder engagement

## Define defence height

## Design defences for next 100years

### SEA LEVEL RISE

#### POTENTIAL FUTURE SCENARIO - DEFENCE UPGRADE



Current Defra guidance predicts an average of 6mm Sea Level Rise per year in Southern of England.

Isostatic movement of the UK (north-west Britain rising, causing south-east of England to sink;

Subsidence of our coast associated with tectonic fault between The Solent and north east France;

Thermal expansion and glacial melt associated with Climate Change.





## Topographic Surveys



The ESCP in-house survey team have completed a full topographic survey of the North Portsea coastline.

## Structural Investigations



Investigations to establish the condition of existing structures.

## Ecological Surveys



Ecology specialists have undertaken detailed habitat and reptile surveys to understand the schemes impact on local flora and fauna.

## Archaeology and Heritage



Archaeology and Heritage specialists have been involved in the development of the scheme to protect known heritage assets and unknown archaeological remains.

## Ground Investigation



Borehole, trial pits and soil testing has been undertaken to establish the site ground conditions and test for contaminants.

## Detailed Design

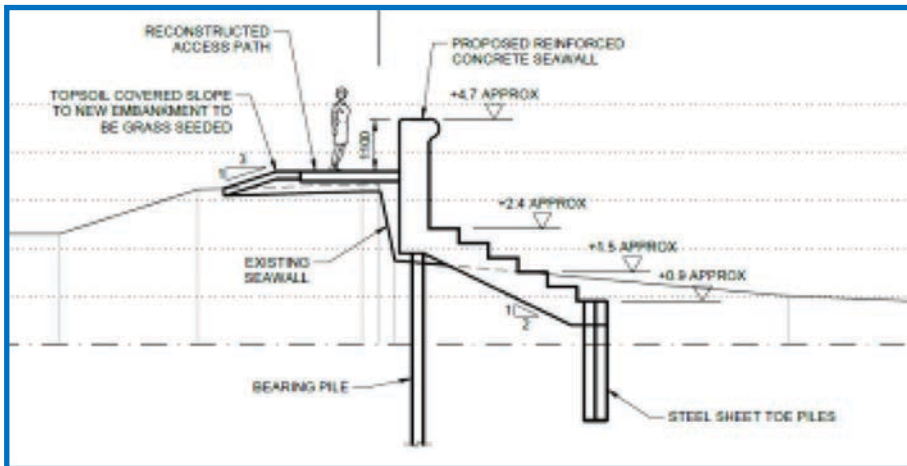


The detailed design for each phase has been completed drawing on all the information from previous phases.

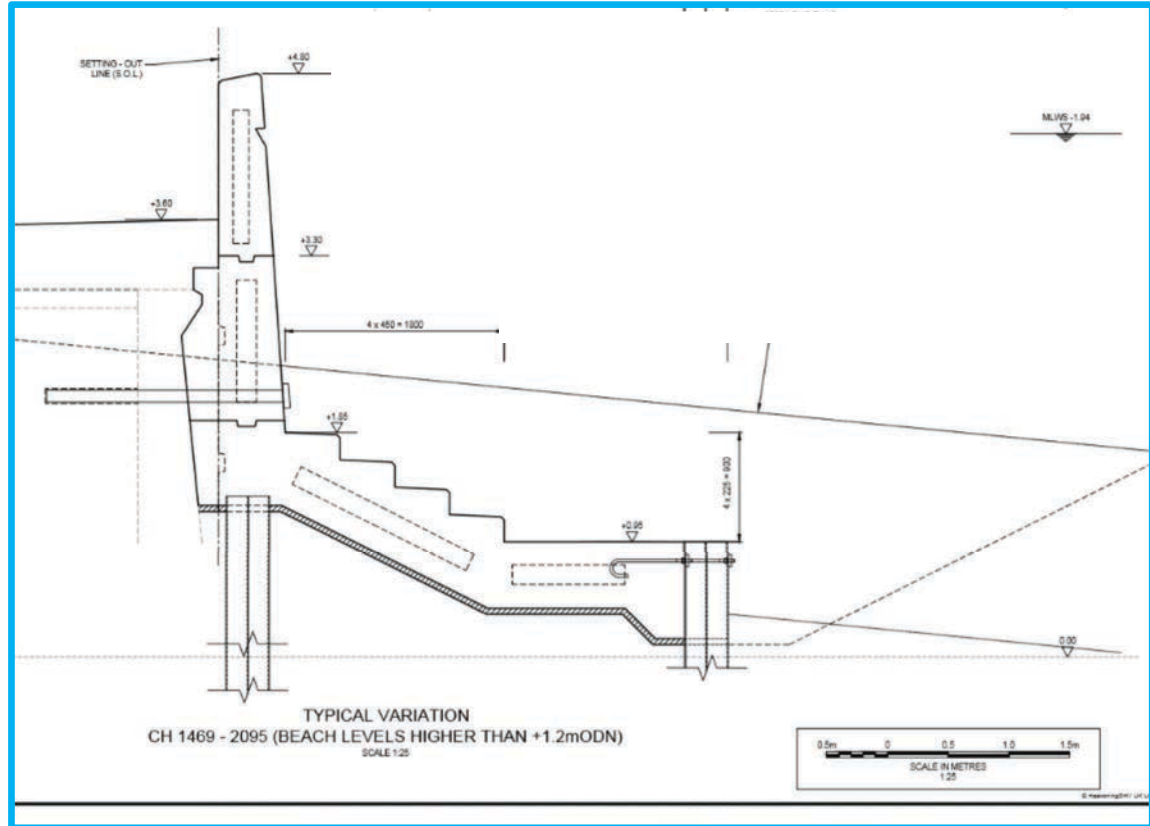


## Define defence height

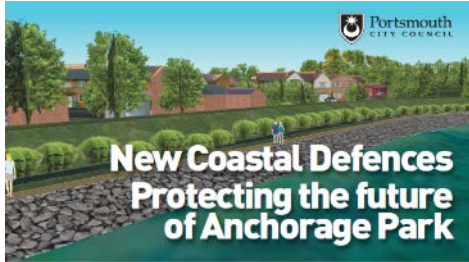
## Outline



## Construction design







Construction of new coastal flood defences at Anchorage Park is planned to start in early 2015.

This is part of the North Portsea Island Coastal Defence Scheme.

Find out more about what the new defences will look like and how you may be affected during construction by dropping-in at the following events:

**Thursday 15th January 2015, 12 – 8pm, and  
Friday 16th January 2015, 12 – 8pm**

Anchorage Lodge, Sywell Crescent, Anchorage Park, PO3 5UB

We look forward to seeing you there.

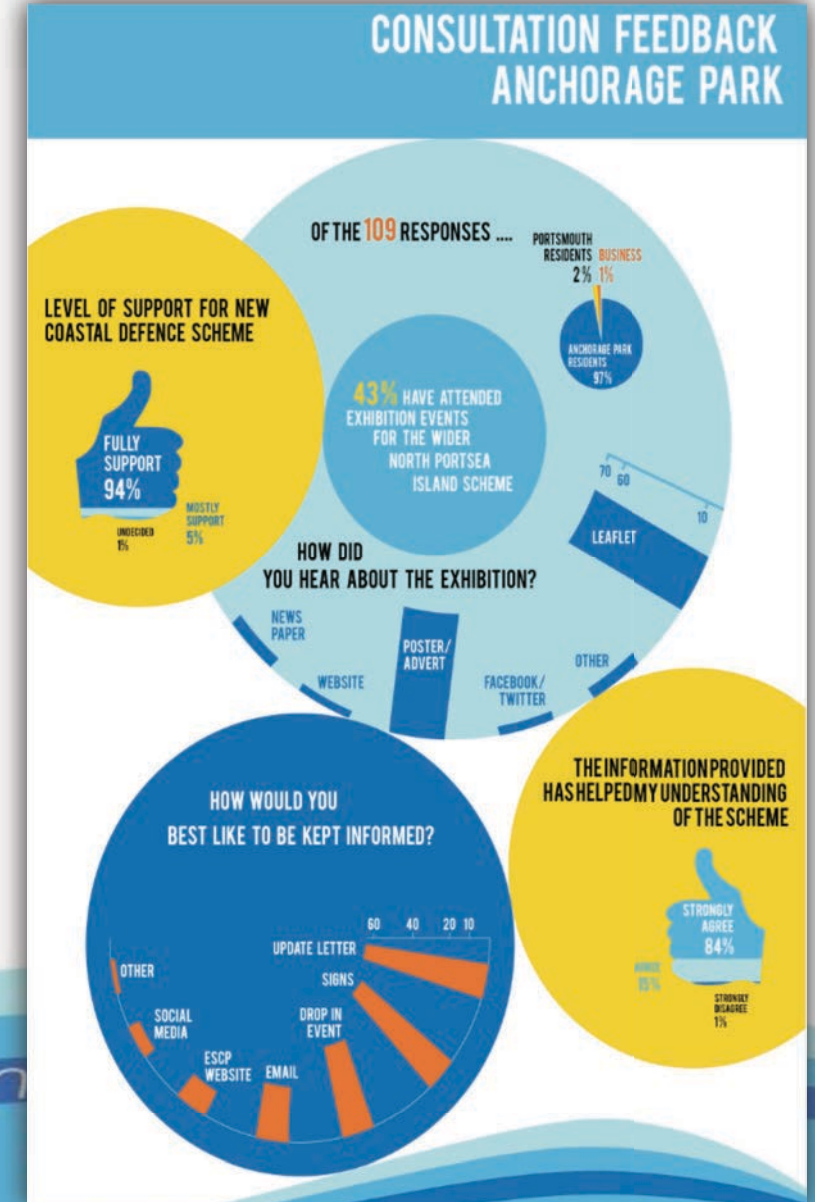
Visit [www.escp.org.uk](http://www.escp.org.uk) or email [info@escp.org.uk](mailto:info@escp.org.uk) for more information.

[/EasternSolentCoastalPartnership](https://www.facebook.com/EasternSolentCoastalPartnership)  
[@EasternSolentCP](https://twitter.com/EasternSolentCP)



Key stakeholders have been engaged, which has helped shape the design.

- Public exhibitions;
- Meetings;
- Website.







## EASTERN ROAD COASTAL DEFENCES - SUPPORTING LANDSCAPE IMAGES

### General Aim

The aim is for the landscape character at Eastern Road is to continue the palette from Tipner Lake & Ports Creek, to draw on the colours and materials so there is a cohesive link around the north and east of the island coastline route.



### Site Furniture

At promontories and lookouts, timber & corten steel picnic tables, benches with backrests and litter bins.



### Graphic Art

At key locations along coast defence wall, such as Tangier Road junction where the wall comes close to Eastern Road, graphic art could be grit-blasted into the concrete. Images might include wildlife of the harbour

### Promontories & Steps

Simple post and rail metal balustrades along sides of steps and edge of promontories overlooking the harbour



### Path surface

Functional surface treatment of light coloured brendon gravel, similar to Milton Common



### Waymarking Features

Totem signage for waymarking to be used at key points along the route, highlighting specific natural and cultural heritage such as wildlife in the harbour, what you can see on the horizon, the old saltern quay.

### Tree & Shrub planting

Pines, Tamarisk & native shrubs and scrub vegetation to help clothe the verges and embankments, provide vertical form and variety to the landscape character where it is currently bland.



### Viewing promontories

Grass mounds to the rear of the coast path to allow raised viewing promontories overlooking the harbour., much like what we have at Southsea. Low seating walls made from locally sourced stone to allow places to perch, catch your breath and enjoy the view. These might involve rocks and steps to articulate slopes and create interest.



### Car parking and vehicle restraints

Stout timber posts and rock boulders to demarcate parking areas with informal barriers



### Potential Interventions

Potential for fitness equipment along the coast path route to encourage healthy outdoor pursuits, and at Great Salterns Quay car park, a kiosk to encourage people to stop and enjoy the view

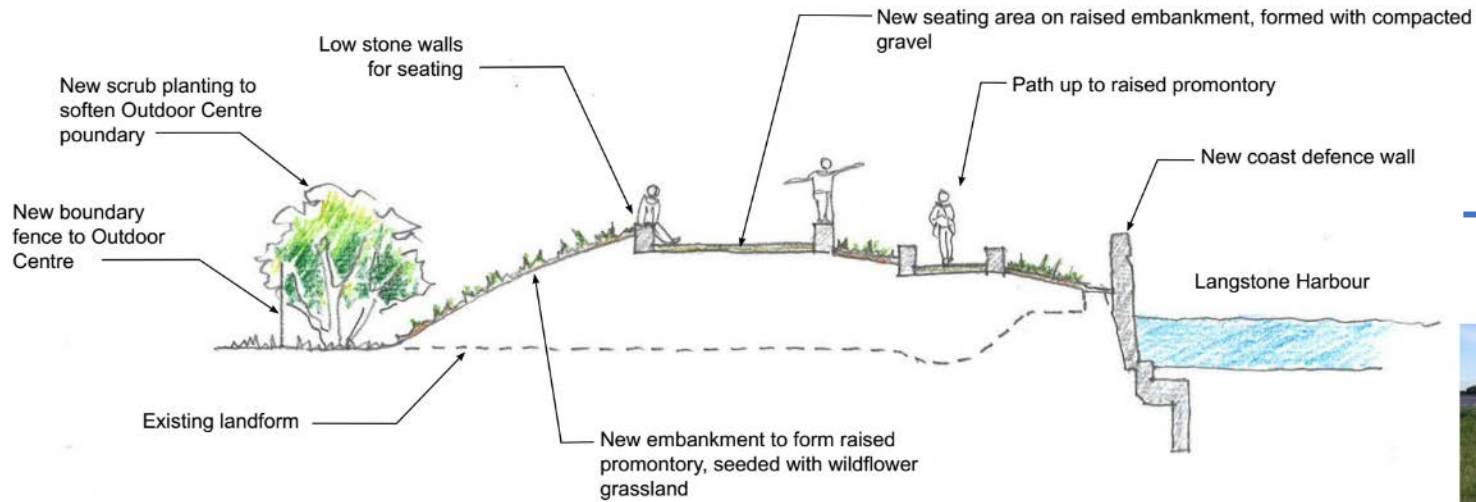






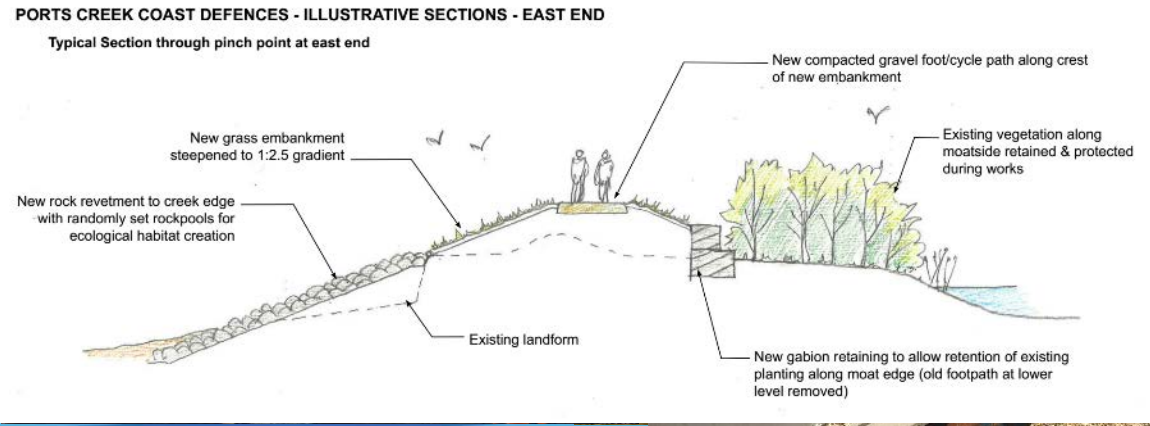
Landscaping

Raised promontory south of Outdoor Centre





<span style="color: red;">■</span>	<b>Phase 1</b> (Year 1)	Anchorage Park Construction Complete (2015-16)
<span style="color: brown;">■</span>	<b>Phase 2</b> (Year 2)	Milton Common Construction Complete (2015-16)
<span style="color: green;">■</span>	<b>Phase 3</b> (Year 3 - 5)	Tipner Lake Construction in progress (2017-19)
<span style="color: blue;">■</span>	<b>Phase 4</b> (Year 5 - 8)	Eastern Road Construction programmed (2019-2022)
<span style="color: orange;">■</span>	<b>Phase 5</b> (Year 9 - 10)	Ports Creek Construction programmed (2023-2024)



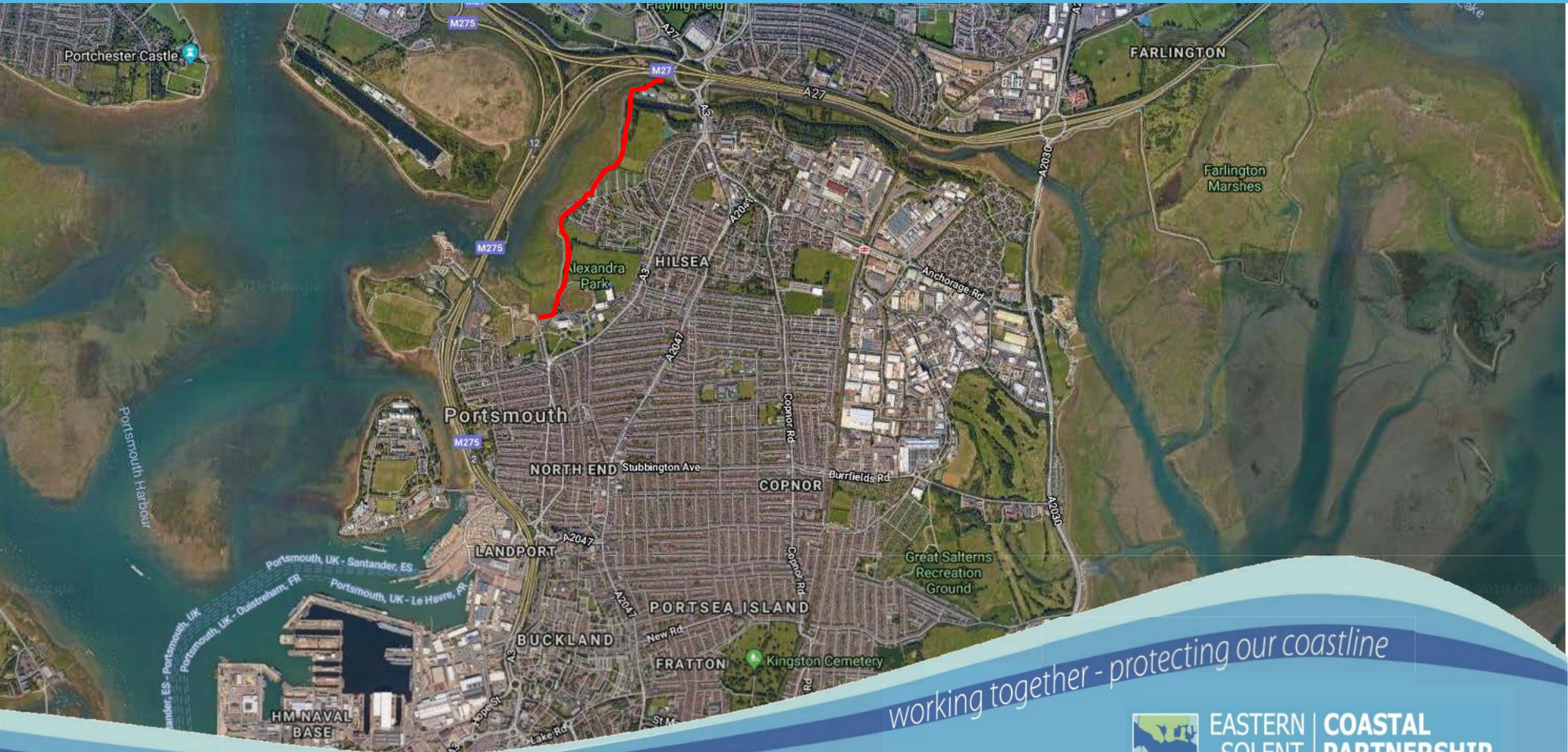




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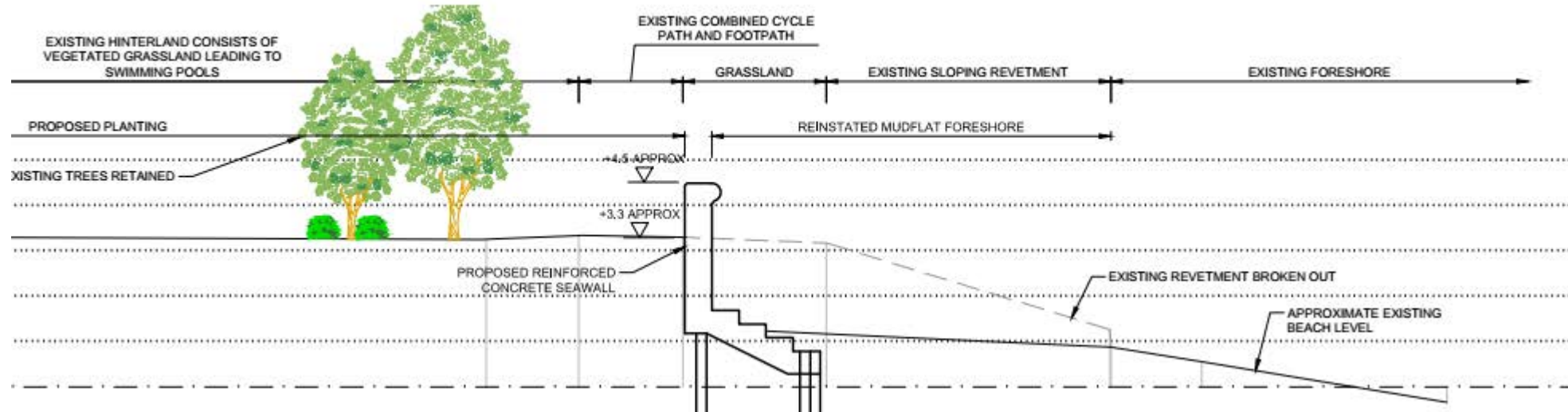
1.85km frontage within Portsmouth Harbour  
Raised concrete wall along full frontage  
Various site constraints:

- Services
- Scheduled monuments
- Residential properties
- Public amenity
- Industrial land use
- Historic landfill
- Former MOD land
- Environmentally designated harbour

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Construction will be delivered in phases:

- Phase 1: Alexandra Park  
- April 2017 – October 2018
- Phase 2: whole site  
- April 2018 – October 2018
- Phase 3: complete northern  
- April 2019 – October 2019

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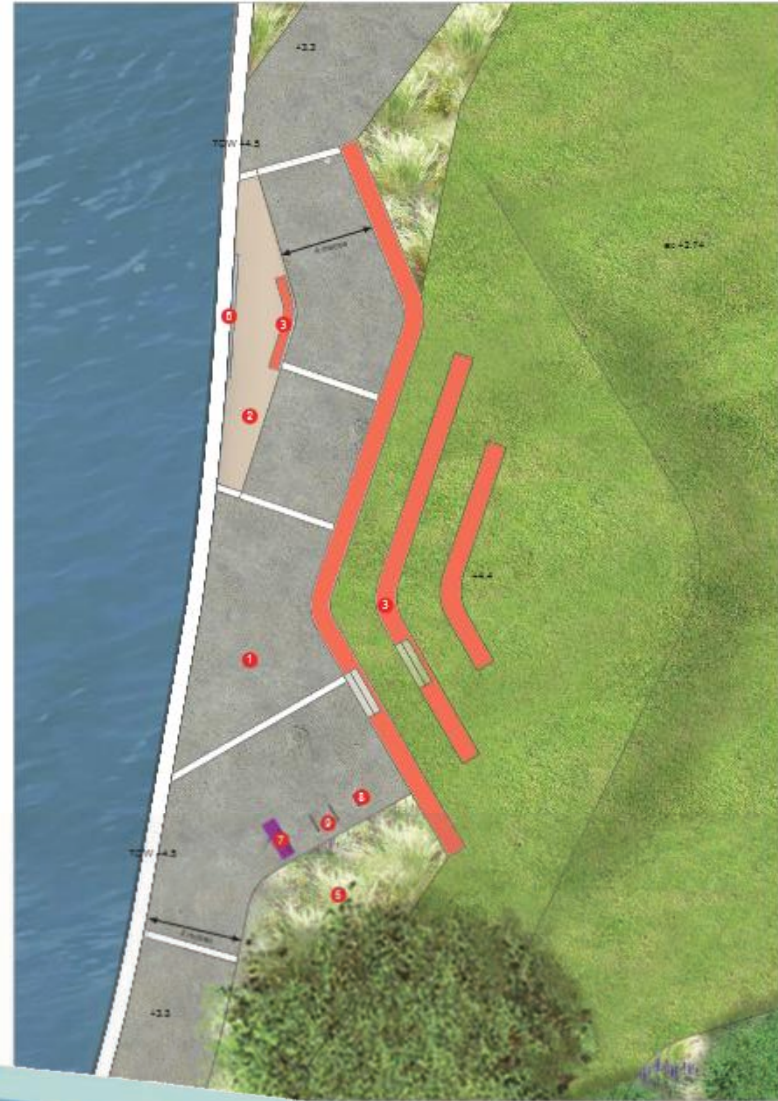












Smooth Tarmac or Natrex Asphalt



Timber effect concrete decking and planks (localised to flood wall and pedestrian surfacing)



Timber seating terraces



Perching Seat



Indicative Herbaceous Planting (to comprise large swathes of grasses and herbaceous/evergreen perennials and infer minimal maintenance)



Interpretation Hide



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Thank you

Questions?



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**[www.escp.org.uk](http://www.escp.org.uk)**



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