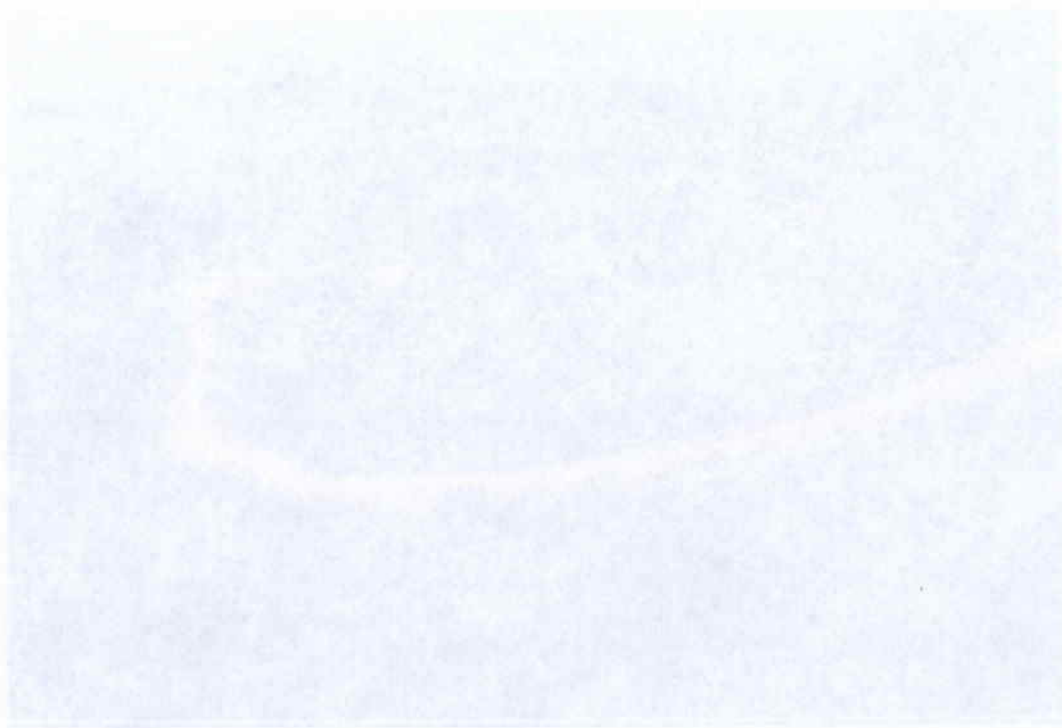


Annex 5:
of
Appendix K: Environmental Statement:
Guidance for an Appropriate Assessment

EASTOKE POINT COASTAL DEFENCE WORKS Southern Hayling Frontage

Guidance for an Appraisal Assessment
October 2017



It is the policy of the Council to ensure that the coastal defence works are maintained in a state of good repair and that the works are designed to provide a high level of protection against coastal erosion and flooding. The Council will ensure that the works are designed to provide a high level of protection against coastal erosion and flooding. The Council will ensure that the works are designed to provide a high level of protection against coastal erosion and flooding.

EASTOKE POINT COASTAL DEFENCE WORKS Southern Hayling Frontage

Guidance for an Appropriate Assessment

October 2011



Havant, Portsmouth & Gosport Coastal Partnership
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Appendix 5:	Southern Regional Habitat Creation Programme Letter confirming 0.4ha for the Eastoke Coastal Defence Works

1.0 Non Technical Summary

This document is a guidance note to inform an Appropriate Assessment (AA) for the development of a sustainable coastal defence scheme for managing coastal erosion and flooding risks along the Eastoke Point frontage of Hayling Island, Hampshire, UK. The report reviews the current state of knowledge regarding the study area, describes the present coastal protection concerns and addresses any issues that arise from the proposed operation.

Havant Borough Council, acting in its capacity of Coast Protection Authority, is responsible for managing the flood risk from the sea at Eastoke Peninsula, which is located along the south eastern frontage of Hayling Island, Hampshire.

A number of environmental designations have been awarded to sites within the Eastoke Peninsular area. The Peninsula is entirely surrounded by the Chichester and Langstone Harbour's Special Area of Protection (SPA). Chichester Harbour is also designated as a Site of Special Scientific Interest (SSSI), a Ramsar Site and an Area of Outstanding Natural Beauty (AONB). The peninsular also falls within the boundaries of the Solent Maritime Special Area of Conservation (SAC). Sandy Point, located on the eastern tip of the Eastoke Peninsula is designated as a Local Nature Reserve and the Southern Eastoke Frontage is a designated Site of Importance for Nature Conservation (SINC).

For all European Sites specified under Regulation 61 of the Conservation of Species and Habitats Regulations 2010, an Appropriate Assessment is required to be undertaken by law where any project:

- (a) *is likely to have a significant effect on a European site (either alone or in combination with other plans or projects), and*
- (b) *is not directly connected with or necessary to the management of that site* (Part 2 (Section 21))

A European Site is any classified SPA and any SAC from the point where the Commission and the Government agree the site as a Site of Community Importance. An Appropriate Assessment is also required, as a matter of Government Policy, for potential SPAs, candidate SACs and listed Ramsar Sites for the purpose of considering development proposals affecting them (PPS 9 Biodiversity and Geological Conservation). Therefore this report has been designed to act as guidance to the 'Competent Authority' who will be undertaking the assessment as part of the consideration of the planning application for the proposed Eastoke Point Coastal Defence works.

Through correspondence, Natural England requested that an Appropriate Assessment is to be carried out to assess whether the proposed development is likely to have a significant effect on the interest features on the Solent Maritime SAC either alone or in combination with other plans or projects. The main concerns that Natural England highlighted relate particularly to the potential impacts to the estuaries interest feature from the proposed scheme, which is listed below:

- Saltmarsh communities,
- Intertidal mudflat and sand flat communities,
- Intertidal mixed sediment communities,
- Subtidal sediment communities.

This report has addressed the four key areas of interest (as highlighted above) and concluded that the Eastoke Point Coastal Defence Works is considered unlikely to cause an adverse affect on the integrity of the SAC, SPA and Ramsar Site during the construction phase. With regards to whether the scheme will cause an adverse affect to these environmental interest features over the next 100 years, there is some debate and uncertainty amongst professionals about whether the scheme will cause intertidal habitat losses through coastal squeeze. The Eastoke Point Sectoral Strategy Study (October 2006) concluded that there *could* be some intertidal habitat losses through coastal squeeze over the 100 year strategy period and judged to be between negligible and 0.4ha. Therefore as a precautionary approach, compensatory habitat between negligible and 0.4ha will need to be provided for. The Southern Region Habitat Creation Programme have been informed for the potential need for an additional 0.4ha to be set aside for the Eastoke Point Coastal Defence Works scheme.



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This report concurs with the North Solent Shoreline Management Plan (NSSMP), 2010 that; implementing the 'Hold the Line' policy primarily through beach management over the next 100 years along the Eastoke Peninsula is considered as supporting natural development. This is supported by a number of observations:

- (a) Maintaining, replacing and/ or improving the rock groynes will not adversely impact on the loss of habitat of the SAC for the following reason:
 - i) The groyne footprints have varied considerably since initial installation and therefore have created an adaptable environment.
 - ii) The proposed rock groynes will not extend beyond the footprint of the existing or previous groyne structures.
- (b) Beach recharge will not have an adverse affect on the Estuary function for the following reasons:
 - i) the scale of the recharge is relatively small in comparison to the volumes of material already in the system (proposal of recharging approximately 3 groyne bays in comparison to the approved beach management of the whole Eastoke frontage).
 - ii) the existing ebb-dominated tidal flows within Chichester Harbour will limit the recharge material being carried into the harbour and smothering intertidal habitats.
 - iii) the volume of recharge proposed will be less than what has existed at this location in the recent past.
- (c) Sediment contamination from both the recharge and introduction of new materials will not have a significant affect on the Estuary function as tests will have already been undertaken on the proposed recharge materials to ensure that they are not contaminated.

Through implementing the NSSMP policy of Hold the Line (HTL) along the Eastoke peninsula, the natural coastal processes could potentially be restricted, which could in turn affect the ability of the estuary to evolve and adapt in response to rising sea levels. However, it should be noted that as the Eastoke Point Coastal Defence works is primarily proposing to maintain the beach frontage via beach management, Eastoke Peninsula is considered to be a dynamic (not fixed) frontage and these soft engineering techniques are deemed to be "supporting the natural development" of the frontage (North Solent SMP, 2010). Also it should be noted that through implementing 'Hold the Line' at Eastoke Peninsula, the proposed scheme will protect the integrity of the Sandy Point Local Nature Reserve and provide ongoing protection for terrestrial and foreshore SSSI and SAC/SPA/Ramsar habitats on the Peninsula. It will also afford protection and maintenance of features within the AONB (Eastoke Point Sectoral Strategy Study, 2006).

As part of the Appropriate Assessment for the NSSMP, the effects on estuary process within the sites of international importance have been assessed. It was concluded that with designated habitats seaward of coastal defences, holding the line at these defences cannot avoid having an adverse effect on seaward habitats. The NSSMP Appropriate Assessment has been approved under Imperative Reason of Overriding Public Interest (IROPI) by the Secretary of State, and the habitat creation requirements arising from the NSSMP will be delivered by the Environment Agency's Southern Regional Habitat Creation Programme (SRHCP) at Medmerry. Please see Appendix 5 for a letter of confirmation from the Regional Habitat Creation Programme (RHCP) Manager that 0.4ha of intertidal habitat to compensate for losses to Natura 200 sites potentially caused by the Eastoke Point Coastal Defence works has been included in the South East RHCP.

With respect to estuary function Natural England provides the following comments "*Natural England is satisfied that through the habitat creation at Medmerry a new and sustainable estuary function will be created in the region. As each estuary is different with its own ecological and physiological characteristics it would be unrealistic to attempt to replicate each estuary in a like for like basis. The new estuary at Medmerry will provide its own ecological and physiological characteristics to support Ramsar and SPA bird interests and contribute to ensuring a sustainably functioning coast.*"

Natural England states that "the impacts identified and assessed in the strategy [sic, recte scheme] are in accordance with the North Solent SMP Appropriate Assessment and subsequent IROPI case, thus it is considered that the IROPI case for the higher level SMP Appropriate Assessment can be used for



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this strategy [sic, recte scheme].” Natural England has provided Havant Borough Council with a letter of support for the scheme stating “Natural England agrees with the outcomes in the Appropriate Assessment” (see Appendix 4).



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2.0 Background

2.1 The Habitats Directive

Directive 92/43/EEC on the Conservation of Natural Habitats and Wild Fauna and Flora – the 'Habitats Directive' - provides legal protection for habitats and species of European importance. Article 2 of the Directive requires the maintenance or restoration of habitats and species of European Community interest, at a favourable conservation status. Articles 3 - 9 provide the legislative means to protect habitats and species of Community interest through the establishment and conservation of an EU-wide network of sites known as *Natura 2000*. *Natura 2000* sites are Special Areas of Conservation (SACs) designated under the Habitats Directive and Special Protection Areas (SPAs) designated under the Conservation of Wild Birds Directive (79/409/EEC).

For all European Sites specified under Regulation 61 of the Conservation of Species and Habitats Regulations 2010, an Appropriate Assessment is required to be undertaken by law where any project:

- (a) *is likely to have a significant effect on a European site (either alone or in combination with other plans or projects), and*
- (b) *is not directly connected with or necessary to the management of that site*

(Part 2 (Section 21))

A European Site is any classified SPA and any SAC from the point where the Commission and the Government agree the site as a Site of Community Importance. An Appropriate Assessment is also required, as a matter of Government Policy, for potential SPAs, candidate SACs and listed Ramsar Sites for the purpose of considering development proposals affecting them (PPS 9 Biodiversity and Geological Conservation). Therefore this report has been designed to act as guidance to the 'Competent Authority' who will be undertaking the assessment as part of the consideration of the planning application for the proposed Eastoke Point Coastal Defence works.

2.2 The Appropriate Assessment Process

The Habitats Directive promotes a hierarchy of avoidance, mitigation and then compensatory measures, where avoidance of significant adverse effects to a *Natura 2000* site should take precedent. To achieve this hierarchy, there are set stages that should be followed under the Habitats Directive decision making process (Scott Wilson et al, 2006). These stages are illustrated in Figure 1.

"Stage 1: Screening" of the process has already been carried out for the Eastoke Point Coastal Defence Works "A Study to Inform the Scoping Phase for an Environmental Impact Assessment" (Screening Report) which determined that due to the presence of a number of environmental designations awarded to sites within the Eastoke Peninsular area, an Appropriate Assessment is likely to be required by law for the proposed works. This is Stage 2 of the process which consists of six sub-stages or tasks as shown below. This report is therefore concentrating on Stage 2A through to 2B of the decision making process for Stage 2C through to 2F is to be carried out by the 'Competent Authority'.

- a) Stage 2A: Analyse the site(s) and the reasons for its designation, and the underlying trends affecting it.
- b) Stage 2B: Analyse the plan, including its key components and how it would be implemented in practice.
- c) Stage 2C: Analyse other plans and projects that could contribute to 'in combination' effects
- d) Stage 2D: Analyse how the plan, in combination with other plans and projects, and the site will 'interact' when the plan is implemented, i.e. Appropriate Assessment
- e) Stage 2E: Where applicable, propose and assess mitigation measures for addressing adverse effects
- f) Stage 2F: Prepare an Appropriate Assessment Report for consultation with key stakeholders including Natural England



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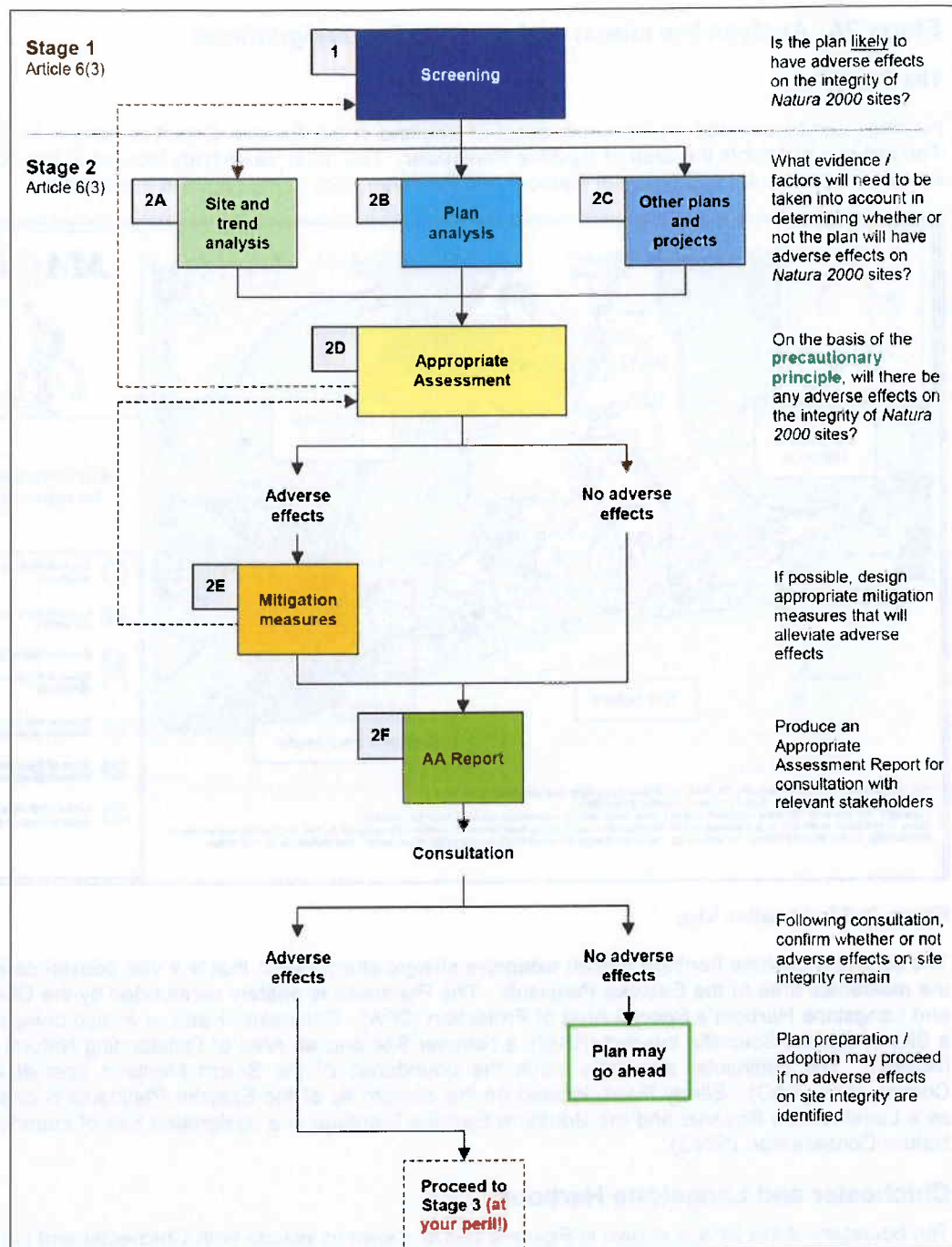


Figure 1: Summary of Appropriate Assessment Stages



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3.0 Stage 2A: Analyse the site(s) and reasons for designations

3.1 The Study Area

Hayling Island is located on the south coast of England in the Eastern Solent as shown in Figure 2. The red box highlights the area of Eastoke Peninsular. The main water body located to the north and east of the peninsular is Chichester Harbour and the water body to the south, is the Solent.

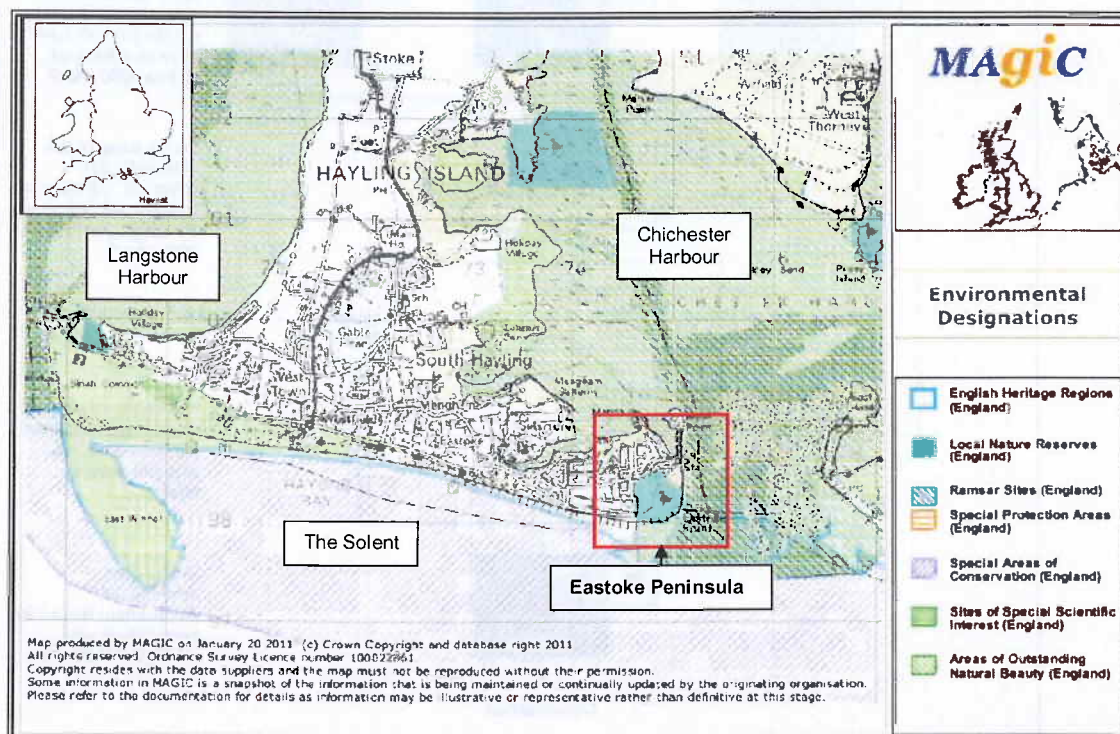


Figure 2: Site Location Map

The southern Eastoke frontage has an extensive shingle storm beach that is a vital coastal defence for the residential area of the Eastoke Peninsula. The Peninsula is entirely surrounded by the Chichester and Langstone Harbour's Special Area of Protection (SPA). Chichester Harbour is also designated as a Site of Special Scientific Interest (SSSI), a Ramsar Site and an Area of Outstanding Natural Beauty (AONB). The peninsular also falls within the boundaries of the Solent Maritime Special Area of Conservation (SAC). Sandy Point, located on the eastern tip of the Eastoke Peninsula is designated as a Local Nature Reserve and the Southern Eastoke Frontage is a designated Site of Importance for Nature Conservation (SINC).

3.2 Chichester and Langstone Harbours SPA

The boundary of the SPA is shown in Figure 2 and is shown to include both Chichester and Langstone Harbours. The sites qualifying features are:

- Internationally important populations of regularly occurring Annex 1 species; sandwich tern *Sterna sandvicensis*, common tern *Sterna hirundo* and little tern *Sterna albfrons*;
- Internationally important populations of regularly occurring migratory species; Grey Plover (*Pluvialis squatarola*), Sanderling (*Calidris alba*), Dunlin (*Calidris alpina*), Redshank (*Tringa totanus*), Brent Geese (*Branta bernicla*), Shelduck (*Tadorna tadorna*) and Teal (*Anas crecca*);



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- Internationally important assemblage of waterfowl; and
- Nationally important populations of the following migratory species; Ringed Plover (*Charadrius hiaticula*), Curlew (*Numerius arquata*), Bar-tailed Godwit (*Limosa lapponica*), Turnstone (*Arenaria interpres*), Wigeon (*Anas penelope*), Pintail (*Anas acuta*), Shoveler (*Anas clypeata*) and Red-breasted Merganser (*Mergus serrator*).

The table below was developed for the Screening Report for the Eastoke Point Coastal Defence Works and shows the qualifying interest features of the SPA and Ramsar sites for the area.

Interest Feature	Conservation Objective	Consequences of the operation on conservation objective	Mitigation Measures proposed
Internationally important populations of regularly occurring Annex 1 Species	Subject to natural change, maintain in a favourable condition the habitats for the internationally important populations of the regularly occurring Annex 1 species namely; • Sand and shingle • Saltmarsh • Intertidal mudflats and sandflats • Shallow coastal waters	Nil	N/A
Nationally important regularly occurring Migratory Species	Subject to natural change, maintain in a favourable condition the habitats for the internationally important populations of the regularly occurring migratory species, namely; • Saltmarsh • Intertidal mudflats and sandflats • Boulder and cobble shores • Mixed sediment shores	Nil	N/A
Internationally important wetland regularly supporting 20,000 waterfowl	Subject to natural change, maintain the wetland regularly supporting 20,000 waterfowl in a favourable condition.	Nil	N/A
Wetland supporting 1% or more of the individuals in a population of one species or sub-species of waterfowl	Subject to natural change, maintain the wetland supporting 1% or more of the individuals in a population of waterfowl species in a favourable condition.	Nil	N/A

Table 1: SPA & Ramsar Features, Conservation Objectives & Impacts from the Proposed Operation

3.3 Chichester and Langstone Harbours Ramsar Sites

The proposed Eastoke Coastal Defence Works lies within an area that has been designated under Criterion 1a of the Convention as it comprises internationally important wetland characteristics of the Atlantic biogeographical region including:

- estuaries
- saltmarshes
- intertidal mudflats and sandflats

It qualifies under Criterion 3a of the Ramsar Convention as the wetland regularly supports 20,000 waterfowl. It also qualifies under Criterion 3c of the Convention by supporting 1% or more of the individuals in a population of waterfowl species. Table 1 above shows the qualifying interest features for the designated Ramsar Site and Figure 2 above illustrates the boundary of the designated Ramsar Site.

3.4 The Solent Maritime Special Area of Conservation (SAC)

The boundary of the SAC incorporates the two local harbours (Chichester and Langstone) and extends out into the Solent, thus surrounding the Eastoke Peninsular, see Figure 2.

The qualifying interest features of the Solent Maritime SAC are in Table 2 opposite, taken from the Screening Report, highlights the Interest Features, Conservational Objectives and the identified consequences of the operations on the conservational objectives as outlined in the Eastoke Point Coastal Defence Works report "A Study to Inform the Scoping Phase for an Environmental Impact Assessment".



Table 2: SAC Features, Conservation Objectives & Impacts from the Proposed Operation...

Interest Feature	Conservation Objective	Consequences of the operation on conservation objective	Mitigation Measures proposed
Annual vegetation of drift lines	Subject to natural change, maintain the Annual vegetation of drift lines in a favourable condition.	Construction plant would run adjacent to a site populated with vegetated shingle. Construction of defences in areas populated with vegetated shingle.	Identify the extent of the vegetated shingle and cordon off the site to ensure that there is no disturbance from plant traffic. Identify areas of vegetated shingle to keep disturbance to a minimum. Carrying out a seed collection and dispersal programme for the vegetated shingle species pre (collection) and post (dispersal) construction works. Guidance from the County Ranger will be sort on this programme.
Sandbanks which are slightly covered by seawater all the time - Subtidal gravelly sand and sand - Subtidal muddy sand - Subtidal eelgrass beds	Subject to natural change, maintain the sandbanks slightly covered by seawater all the time in a favourable condition.	Nil	N/A
Atlantic Salt Meadows - Low-marsh communities - Mid-marsh communities - Upper marsh communities - Transitional high marsh communities	Subject to natural change, maintain the Atlantic salt meadows in a favourable condition.	Nil	N/A

<i>Salicornia</i> and other annuals colonising mud and sand - Annual <i>Salicornia</i> saltmarsh communities <i>Suaeda maritima</i> saltmarsh communities	Subject to natural change, maintain the <i>Salicornia</i> and other annuals colonising mud and sand in favourable condition.	Nil	N/A
Mudflats and sandflats not covered by seawater at low Tide: - Intertidal mud communities - Intertidal muddy sand communities - Intertidal sand communities - Intertidal mixed sediment communities	Subject to natural change, maintain the mudflats and sandflats not covered by seawater at low tide in favourable condition	Nil	N/A
Estuaries - Saltmarsh communities. - Intertidal mudflat & sandflat communities. - Intertidal mixed sediment communities. - Subtidal sediment communities. - cordgrass swards (including <i>Spartina maritime</i>, <i>Spartina alterniflora</i> and <i>Spartina x townsendii</i> communities);	Subject to natural change, maintain the Estuaries in a favourable condition.	Implementing the SMP policy of Hold the Line along the Eastoke peninsula is considered to potentially restrict natural coastal processes and thus affect the ability of the estuary to evolve and adapt in response to rising sea levels. Construction plant running along the beach may cause potential pollution through increasing turbidity and hydrocarbon pollution (spillages/ leakages)	<i>"Natural England is satisfied that through the habitat creation at Medmerry a new and sustainable estuary function will be created in the region... The new estuary at Medmerry will provide its own ecological and physiological characteristics to support Ramsar and SPA bird interests and contribute to ensuring a sustainably functioning coast."</i> Restrict contractors method of working: - i.e. No land based plant to drive into the sea - Contractors to keep vehicles maintained to avoid fuel/ oil leaks - Contractors to submit method statements to avoid potential pollution - Designated vehicle refuelling areas away from beach frontage (Site Compound).

...continued Table 2: SAC Features, Conservation Objectives & Impacts from the Proposed Operation

After consulting with Natural England, their key interest feature of concern is the likely effects of the proposed scheme to the SAC, in particular the effects on the Estuary Feature. With reference to the 'Solent European Marine Site' report (English Nature 2001), the importance of the Estuary feature are as follows:

- The Solent European marine site encompasses a major estuarine system on the south coast of England with examples of several different types of estuary.
- It is the only European marine site within the UK to contain more than one physiographic estuary type, comprising four bar-built estuaries (Newtown Harbour, Beaulieu, Langstone Harbour and Chichester Harbour) and four coastal plain estuaries (Yar, Medina, Kings Quay Shore and the Hamble).
- The estuaries contain a wide range of both intertidal and subtidal habitats, with important examples of natural transitions from terrestrial to marine environments
- Estuaries are highly dynamic physiographic systems, they have a natural tendency to accumulate sediment, thereby changing their form from their original Holocene morphology to a state where tidal energy is dissipated by subtidal and intertidal sediments.
- Eelgrass beds are found in both Chichester and Langstone harbours and are nationally rare. They are an important habitat as they provide spawning, nursery and refuge areas for fish. They also help stabilise the sediment, contribute to primary productivity and are also an important food source for over wintering waterfowl such as dark-bellied brent geese *Branta bernicla bernicla* (Davison and Hughes, 1998).

National guidelines on what constitutes "favourable condition" have been prepared by English Nature (now known as Natural England) for each habitat type. Conservation objectives have also been defined. A copy of the conservation objectives and accompanying favourable condition tables is provided in Section 5, Table 2 of the 'Solent European Marine Site' (English Nature 2001) (found in Appendix 1).

English Nature has prepared a favourable condition table for the Solent Maritime cSAC interest features (now a full SAC), against which the impacts of any proposed projects would be measured. The targets for the attributes of each interest feature supplement the conservation objectives as follows:

- a) subject to natural change, maintain the estuaries in favourable condition, in particular:
 - no decrease in extent from an established baseline
 - the intra and inter-estuarine tidal prism/cross section (TP/CS) relationship should not deviate from an established baseline
 - average temperature and salinity should not deviate from an established baseline
 - average phytoplankton concentration should not deviate from an established baseline
 - range and distribution of subtidal communities
- b) subject to natural change, maintain the annual vegetation of drift lines in favourable condition, in particular:
 - no decrease in linear extent of vegetation
 - no increase in extent constrained by introduced structures, landforms or operations
 - sediment supply to and within the site through coastal processes to allow a balance of accretion and erosion
 - substrate composition with sufficiently low levels of human induced disturbance
 - presence and broad distribution of stands of *Atriplex prostrata*/*Beta vulgaris maritima*-dominated community and other local variants
- c) subject to natural change, maintain the Atlantic Salt Meadows in favourable condition, in particular:
 - distribution and extent of low marsh, mid-marsh, upper-marsh and upper transitional marsh communities

- presence and abundance of constant species of characteristic low-marsh, mid-marsh, upper-marsh and upper transitional marsh communities
- d) subject to natural change, maintain the *Salicornia* and other annuals colonising mud and sand in favourable condition, in particular:
- no increase in algal material cover
 - no increase in extent
 - no change in distribution and extent of annual *Salicornia* saltmarsh communities
- e) subject to natural change, maintain the cordgrass swards in favourable condition, in particular:
- distribution and extent of smooth and Townsend's cordgrass communities
- f) subject to natural change, maintain the intertidal mudflats and sandflats in favourable condition, in particular:
- no decrease in extent
 - no change in shore profile
 - average abundance of macroalgal mats should not increase
 - average PSA parameters, measure, organic carbon content and black layer depth should not deviate significantly
 - range and distribution should not deviate significantly
- g) subject to natural change, maintain the sandbanks which are slightly covered by seawater at all times in favourable condition, in particular:
- no decrease in extent
 - average grain size parameters, range and distribution and depth should not deviate significantly
 - distribution and extent of characteristic biotopes should not deviate.

3.5 Environmental Baseline

The Eastoke Peninsula benefits from a combination of existing defences; the southern Eastoke frontage has an extensive shingle storm beach that is a vital coastal defence for the residential area of the Eastoke Peninsula. This is maintained through beach management via approved annual beach recycling and periodic re-nourishment of the beach. Also, the defences already in place at the Eastoke Point area comprise an existing rock revetment, rock groynes, and a splash wall.

For the Beach Re-nourishment works, both a Study to inform an Appropriate Assessment (AA) and an Environmental Impact Assessment was commissioned by Havant Borough Council and carried out by Halcrow Group Limited in July 2005. The 2005 AA report considers the potential affects of the re-nourishment works on the Environmental Designations within the Eastoke Peninsula area. This report was produced for the purpose of informing the Competent Authority (Havant Borough Council) when undertaking the AA as part of consideration for approving planning permission for the works. Natural England (then English Nature) was consulted during this process and confirmed that they had *no objection* to the scheme (as confirmed in Section 1: Background of the Study to inform an Appropriate Assessment, July 2005). For the purpose of this report, the information provided in previous reports has been reviewed and the relevant information utilised.

3.5.1 Coastal Processes

Chichester Harbour Entrance

An extract from the SCOPAC Sediment Transport Study, last updated 2004, explains the coastal processes within the study area (extract can be found in Appendix 2) which is summarised below.

The sediment circulation within Chichester Harbour is made up of complex circulations varying both spatially and temporally. Sediment supply to the channel is possible by either eastward or westward littoral drift at the harbour entrance; Figure 3 below, taken from the SCOPAC Sediment Transport Study, illustrates sediment transport for the study area. The purple arrows demonstrate the littoral drift transport mechanism, whilst the red arrows demonstrate the Estuarine sediment transport mechanism.

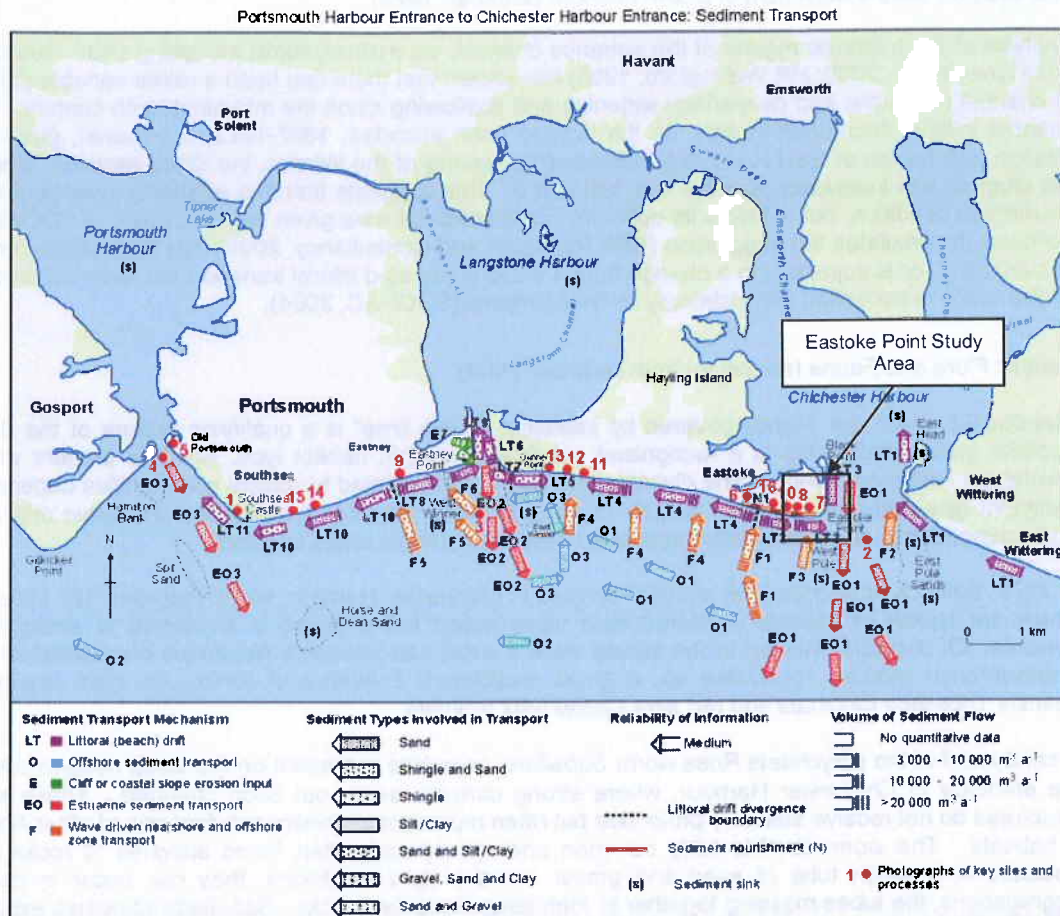


Figure 3: Sediment Transport for Portsmouth to Chichester Harbour Entrances, supplied by SCOPAC.

The littoral drift transport system demonstrates a drift divide along the Eastoke southern frontage (Creek Road) where sediment west of Creek Road transports westwards along the frontage to Gunner Point and material east of Creek road is generally transported eastwards, around Eastoke Point and up into Chichester Harbour. On the Eastern side of Chichester Harbour, sediment is supplied at rates up to $70,000\text{m}^3\text{a}^{-1}$ from East Head via the Winner gravel bank or directly from the distal end of the spit (Webber, 1979; ABP Research and Consultancy Ltd, 2000). Supply from this source has reduced significantly with the progressive and comprehensive protection of the shoreline of Bracklesham Bay since 1874 (Harlow, 1980) and has probably now virtually ceased following extension and upgrading of the groyne at West Wittering in the mid 1980s (SCOPAC, 2004). Contemporary supply to the tidal channel consists almost entirely of eastward drift of mostly fine gravel and sand from Eastoke Point. Virtually no fresh material is now introduced into the offshore transport pathway in the tidal channel; sediments transported will be those periodically pushed onshore from the tidal delta by storms from the south (SCOPAC, 2004).

The combination of transport patterns over short and long term, suggests that there may be an overall counter-clockwise circulation of sediments in the entrance to Chichester Harbour, with material moving

out of the estuary on the western side through Emsworth Channel under the influence of the strong ebb currents (Halcrow 2005). Compared with the other harbours, the entrance channel to Chichester Harbour is deeper and has higher ebb and flood tidal current velocities. Sediments entering the tidal channel are flushed offshore and deposited at varying distances from the entrance depending upon sediment size, wave conditions and water depth. Gravel can be transported a maximum of 1 to 2km offshore and sand a maximum of 3.5km offshore (Webber, 1979).

Analysis of the hydraulic regime at the entrance channel, via hydrodynamic modelling (ABP Research and Consultancy, 2000; HR Wallingford, 1998) has shown that there has been a rather variable pattern of channel narrowing and deepening; widening and shallowing since the mid-nineteenth century. The channel initially decreased in size, as the Winner bank accreted, 1887-1923; but overall, given the rotation and retreat of East Head and subsequent lowering of the Winner, the cross-sectional area of the channel has increased over the last 150 years. This suggests that it is adjusting towards a new equilibrium condition, but is below its optimum cross-sectional area given the tidal prism of Chichester Harbour. It stimulates the suggestion (ABP Research and Consultancy, 2000) that the harbour mouth has adjusted, or is adjusting, to a change from a wave-dominated littoral transport fed sediment budget to one which is controlled more strongly by tidal currents (SCOPAC, 2004).

3.5.2 Benthic Flora and Fauna (an extract from Halcrow, 2005)

"Sandbanks which are slightly covered by seawater all the time" is a qualifying feature of the SAC. Subtidal gravel and sands is a recognised sub-feature of this habitat type, which is present within Chichester Harbour Channel. The diversity and types of associated biological communities depend on sediment type and other physical factors. Typical in fauna are worms, crustaceans, bivalve molluscs and echinoderms. Surface mobile fauna often includes shrimps, crabs and fish.

In 2002, Baldock *et al* undertook subtidal surveys in Chichester Harbour, which recorded 127 species, which are typical of habitats sheltered from wave action but exposed to moderate to strong tidal currents. Of particular interest in the survey were a small sea anemone *Halcampa chrysantellum*, an opisthobranch mollusc *Haminoea* sp, a small nudibranch *Eubranchus doriae*, an alien bryozoan species *Tricellaria inopinata* and red alga *Callophyllis laciniata*.

A sandy reef of the polychaete Ross worm *Sabellaria spinulosa* is present on the steep eastern side of the entrance to Chichester Harbour, where strong currents scour out deep channels. These solid structures do not receive statutory protection but often represent important sub-features of other Annex 1 habitats. The worm itself is fairly common and widespread, often found attached to rocks and boulders in a rough tube of sand and gravel. In the right conditions, they can occur in dense aggregations, the tubes massing together to form large, irregular blocks. *Sabellaria spinulosa* extracts both food and tube-building materials from passing seawater. The right level of movement and the right grade of building materials are essential for the formation of large blocks.



4.0 Stage 2B: Analyse the plan, including its key components and how it would be implemented in practice.

4.1 Project Description

Havant Borough Council recently commissioned HR Wallingford to undertake a study (Eastoke Point Coastal Defence Study, May 2009 available to view on the Havant Borough Council website at: <http://www.havant.gov.uk/havant-11342>) to develop a sustainable coastal defence scheme to manage coastal erosion and flooding risks along the Eastoke Point frontage of Hayling Island. The Study considered a total of six main options for coastal defences of the Eastoke Point area. The studies preferred option for the Eastoke Peninsula, comprised a hybrid of various defences to achieve the desired standard of flood protection of 0.5% Annual Exceedance Probability (1 in 200 year) to these low-lying residential areas.

This preferred option proposed the following:

- Groyne replacement or improvement,
- Rock revetment,
- Improvement and maintenance of splash wall,
- Beach recharge,
- Groyne maintenance,
- Revetment maintenance,
- Beach recycling and management.

The proposed scheme will be designed to be capable of adaptation in the light of changes to wave conditions, tide levels or for unforeseen effects. This is thought appropriate due to unpredictable waves and near shore depths in this area. Also, the scheme will be designed to be capable of adaptation to ensure that should the design create adverse environmental impacts, or a navigational hazard, then steps can be taken to address the situation at relatively low cost.

4.1.1 Groyne Replacement or improvement

At this stage it is proposed that the existing timber groyne numbers 4, 5, 6 and 7 are replaced with new rock groynes. The new groynes will probably be constructed with 3 to 6 tonne armour rock. The majority of the groyne will normally be buried by beach. The top of the groyne will generally follow the profile of the beach but may be up to 1m above the level of the beach; this may increase after a storm event. Some work may also be required to Groyne 2.

It is also proposed to connect the existing timber groynes numbers 9, 10 and 11 to the new rock revetment, again probably with 3 to 6 tonne rock armour. This connection will normally be buried under the beach.

4.1.2 Rock revetment

It is proposed to construct a new rock revetment between Groyne 2 and Groyne 12 again probably with 3 to 6 tonne armour rock. Between Groynes 6 and 12 the revetment will protect the existing concrete recurve seawall from undermining and erosion. It will also assist in stabilising the top of the beach and act as a second line of defence if the beach is removed in a storm event. Between Groyne 4 and 5 the rock revetment will protect the existing sheet piles which are in reasonable condition. Between groyne 2 and 4 the revetment will provide the secondary defence at the back of the beach against erosion. At groyne 2 it will tie in to the previously constructed rock revetment.

The majority of this revetment will be covered in beach material and will therefore not be visible except if it is exposed by a storm event. In some areas it may be necessary to use the rock to increase the height of the back of the beach and to use it to help in keeping the beach in place. The elevation of the berm is yet to be decided but it is unlikely to exceed +6m. OD. The elevation will need to be carefully designed to balance the standard of defence against the visual intrusion of the increased height of the berm.

4.1.3 Existing splash wall

The existing splash wall is at the rear of the promenade and extends from Groyne 7 westwards. It provides a tertiary line of defence for the housing on the landward side of the wall from flooding by overtopping water. It is currently a reinforced concrete wall in reasonable condition. Part of the design will involve reviewing the overtopping flows and drainage for these flows. This may involve the need to raise the splash wall to contain these flows. If this is the case the increase in level will be balanced against the visual impact of the increased height and the opportunity will be taken to consider visual enhancement of the area.

In addition as part of the overtopping flows review the opportunity will be taken to review the current stoplog arrangements at the two access points and see if they can be altered to reduce the amount of overtopping flows they are allowed to pass and also to improve disabled access at these locations.

4.1.4 Beach Recharge

It will be necessary to recharge the beach between groynes 3 and 7. This is needed to act as the primary coastal defence in this area. In the past it has been difficult to maintain the profile of the beach here and part of the current scheme is to design the groynes to keep the beach in place. The beach recharge material is likely to be similar to that existing on the beach. It is likely to be from an offshore source and delivered to the area by sea. Due to the water depths it is unlikely that it can be delivered directly to the required location. It may therefore be necessary to land the material further to the west and then transport it along the beach to the required location.

4.1.5 Groyne maintenance

There will be a continuing need to maintain the rock groynes if rocks become displaced or if it found that the groynes need to be amended in height or length to adjust to changing conditions.

4.1.6 Revetment maintenance

There will be a continuing need to maintain the rock revetment if rocks become displaced during a storm event or if the beach is washed away and the revetment becomes a safety hazard due to the displaced rocks.

4.1.7 Beach recycling and management

It is likely that the current recycling and management regime will need to continue once the scheme is completed. This is necessary to maintain the primary defence, the beach to the required standard. It is hoped however that the scheme will reduce both the quantity and the frequency of the operation.

4.1.8 Construction period

It is estimated that the scheme will take approximately six months to construct and the preferred construction period is **April to September**. This is economically advantageous as the Contractors costs will be lower with less down time during the summer. It will also avoid disturbance to overwintering birds. It is believed that the interface with the tourists can be managed safely as the scheme location is away from the main beach frontage.

4.2 Purpose

The purpose of the project is to develop and maintain a sustainable and adaptable coastal defence scheme to manage coastal erosion and flooding risk along the Eastoke Point frontage of Hayling Island. The aim of the design is to incorporate a hybrid of various defences to achieve the desired standard of flood protection of 0.5% Annual Exceedance Probability (1 in 200 year) to these low-lying residential areas.

4.3 Likely Significant Effects

Havant Borough Council commissioned Halcrow Group Ltd in 2005 to carry out a Study to inform an Appropriate Assessment for Beach Renourishment on the Eastoke Frontage. These works include replenishing the beach with materials which have been dredge from either Chichester Harbour or from

local dredge sites. The 2005 report considered the likely affects of the replenishment scheme on the European designated sites within the study area, considering both by the likely affects of the scheme on sediment transport system and the likely affects from dredging the Chichester Harbour Channel. The report quotes correspondence with English Nature (now known as Natural England) confirming that English Nature had no objections to the scheme. Therefore, this report will utilise the conclusions drawn in the 2005 report and expand on them in this section.

Through correspondence, Natural England has requested that an Appropriate Assessment be carried out to assess whether the proposed development is likely to have a significant effect on the interest features on the Solent Maritime SAC either alone or in combination with other plans or projects. The main concerns that Natural England highlighted relate particularly to the potential impacts to the estuaries interest feature from the proposed scheme, which are listed below:

- Saltmarsh communities,
- Intertidal mudflat and sand flat communities,
- Intertidal mixed sediment communities,
- Subtidal sediment communities.

This report will now consider each aspect of the proposed scheme in turn and assess whether there is likely to be a significant affect on the SAC.

4.3.1 Groyne replacement and improvement

Maintaining, replacing and/ or improving the rock groynes will have an affect on the littoral drift of sediment eastwards from the Creek Road area. It will be designed to reduce the feed of material around Eastoke Point and up into Chichester Harbour.

Historic drawings and designs illustrate that the groynes along Eastoke Point have varied in length, shape and size since they were first introduced to the Eastoke Southern Frontage in the approximately 1910 (HMSO, 1907 – 1911) see Appendix 3.

It is the intention of the new scheme to keep the length of the new rock groynes within the footprint of the historic groynes in order to reduce but not eliminate the eastwards littoral drift of beach material. This will reduce the need for the annual beach recycling from the Ness at Chichester Harbour entrance on to the main frontage. This in turn will produce a more stable foreshore which is more likely to encourage the development of vegetated shingle.

4.3.2 Rock revetment

The new rock revetment will be buried under the existing beach and will be largely above MHWS. For this reason it will not have an effect on the SAC from a physical perspective.

The potential for introducing contaminated material to the beach area when introducing new materials for the rock revetment structure needs to be considered. To avoid this, the rock material will need to meet appropriate specifications set by our in-house engineer to assure the quality, dimensions, material type, resistance to abrasion etc of the material used.

4.3.3 Improvement and maintenance of splash wall

The possible improvements to the splash wall will take place on the existing footprint of the wall and will have no effect on the SAC.



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4.3.4 Beach recharge and Beach recycling and management

Of the beach material placed on the Eastoke Point area, namely between groynes 3 and 7, even though the rock groynes will be designed to manage the beach movement by maintaining the beach profile, some material may naturally be transported eastwards through littoral drift, around Eastoke Point and into Chichester Harbour. Whilst some of this may be carried out of the harbour by the strong ebb tidal currents in the entrance channel, some of the material passing has the possibility to cover intertidal habitats such as mudflats. However, in the 2005 report for the Beach Renourishment scheme, this possibility was considered and it concluded that due to the '*...modest scale of the re-nourishment works, it is unlikely that additional material at Eastoke Beach is affecting annual losses of sediment or movement of the material eastwards...*' (Halcrow, 2005). The beach recharge and recycling proposed by this scheme is of a much smaller scale (recharging approximately 3 groyne bays compared to the whole Eastoke frontage as with the current approved beach recycling project) than the Beach Renourishment/ Recycling scheme which has already been approved.

The potential for introducing contaminated material to the beach area when recharging the beach using dredged material should be considered. As stated in the 2005 report (5.2(c)), '*as the material to be used for recharge will be coarse grained (sand/gravel)...it is unlikely to contain pollutants. Information on whether pollutants are contained within the dredged sediment should be available for the licensed offshore extraction sites.*'

Considering the above, it is deemed unlikely that the beach recharge/ recycling as part of the proposed scheme will significantly adversely affect the interest feature.

4.3.5 Groyne and Revetment maintenance

Maintenance of the groynes and revetments will consist of replacement of any rock armour units if they become dis-lodged during a storm event. This would normally be accompanied by the reshaping of the beach in the area, following the same event. There is therefore unlikely to be to be adverse effects on the estuarine features over and above that which has occurred naturally.

5.0 Conclusions

This report has demonstrated that the proposed Eastoke Point Coastal Defence Works will largely remain within the footprint of the existing coastal defences and is not considered to cause adverse affect on the integrity of the SAC, SPA and Ramsar Site during the construction phase. With regards to whether the scheme will cause an adverse affect to these environmental interest features over the next 100 years, there is some debate and uncertainty amongst professionals about whether the scheme will cause intertidal habitat losses through coastal squeeze. The Eastoke Point Sectoral Strategy Study (October 2006) concluded that *"the option to hold the line may cause impact through coastal squeeze over 100year period, resulting in a potential loss of 0.4ha of designated intertidal habitat"*. Therefore as a precautionary approach, compensatory habitat between negligible and 0.4ha will need to be provided for. The Southern Region Habitat Creation Programme have been informed for the potential need for an additional 0.4ha to be set aside for the Eastoke Point Coastal Defence Works scheme.

This report concurs with the North Solent Shoreline Management Plan (NSSMP), 2010 that; implementing the 'Hold the Line' policy primarily through beach management over the next 100 years along the Eastoke Peninsula is considered as supporting natural development. This is supported by a number of observations:

- (a) Maintaining, replacing and/ or improving the rock groynes will not adversely impact on the loss of habitat of the SAC for the following reason:
 - i) The groyne footprints have varied considerably since initial installation and therefore have created an adaptable environment.
 - ii) The proposed rock groynes will not extend beyond the footprint of the existing or previous groyne structures.
- (b) Beach recharge will not have an adverse affect on the Estuary function for the following reasons:
 - i) the scale of the recharge is relatively small in comparison to the volumes of material already in the system (proposal of recharging approximately 3 groyne bays in comparison to the approved beach management of the whole Eastoke frontage).
 - ii) the existing ebb-dominated tidal flows within Chichester Harbour will limit the recharge material being carried into the harbour and smothering intertidal habitats.
 - iii) the volume of recharge proposed will be less than what has existed at this location in the recent past.
- (c) Sediment contamination from both the recharge and introduction of new materials will not have a significant affect on the Estuary function as tests will have already been undertaken on the proposed recharge materials to ensure that they are not contaminated.

Through implementing the NSSMP policy of Hold the Line (HTL) along the Eastoke peninsula, the natural coastal processes could potentially be restricted, which could in turn affect the ability of the estuary to evolve and adapt in response to rising sea levels. However, it should be noted that as the Eastoke Point Coastal Defence works is primarily proposing to maintain the beach frontage via beach management, Eastoke Peninsula is considered to be a dynamic (not fixed) frontage and these soft engineering techniques are deemed to be "supporting the natural development" of the frontage (North Solent SMP, 2010). Also it should be noted that through implementing 'Hold the Line' at Eastoke Peninsula, the proposed scheme will protect the integrity of the Sandy Point Local Nature Reserve and provide ongoing protection for terrestrial and foreshore SSSI and SAC/SPA/Ramsar habitats on the Peninsula. It will also afford protection and maintenance of features within the AONB (Eastoke Point Sectoral Strategy Study, 2006).

As part of the Appropriate Assessment for the NSSMP, the effects on estuary process within the sites of international importance have been assessed. It was concluded that with designated habitats seaward of coastal defences, holding the line at these defences cannot avoid having an adverse effect on seaward habitats. The NSSMP Appropriate Assessment has been approved under Imperative Reason of Overriding Public Interest (IROPI) by the Secretary of State, and the habitat creation

requirements arising from the NSSMP will be delivered by the Environment Agency's Southern Regional Habitat Creation Programme (SRHCP) at Medmerry. Please see Appendix 5 for a letter of confirmation from the Regional Habitat Creation Programme (RHCP) Manager that 0.4ha of intertidal habitat to compensate for losses to Natura 200 sites potentially caused by the Eastoke Point Coastal Defence works has been included in the South East RHCP.

With respect to estuary function Natural England provides the following comments "*Natural England is satisfied that through the habitat creation at Medmerry a new and sustainable estuary function will be created in the region. As each estuary is different with its own ecological and physiological characteristics it would be unrealistic to attempt to replicate each estuary in a like for like basis. The new estuary at Medmerry will provide its own ecological and physiological characteristics to support Ramsar and SPA bird interests and contribute to ensuring a sustainably functioning coast.*"

Natural England states that "the impacts identified and assessed in the strategy [sic, recte scheme] are in accordance with the North Solent SMP Appropriate Assessment and subsequent IROPI case, thus it is considered that the IROPI case for the higher level SMP Appropriate Assessment can be used for this strategy [sic, recte scheme]." Natural England has provided Havant Borough Council with a letter of support for the scheme stating "Natural England agrees with the outcomes in the Appropriate Assessment" (see Appendix 4).



References

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