Management Unit 5: Cakeham Estate to East Head

Unit limits

3500m from 478500E, 097200N to 476750E, 099350N

Coastal processes

An area of low soft cliffs along the Cakeham Estate frontage giving way to a shingle storm ridge at the East Head recreation area, and then extending into Chichester Harbour as a sand and shingle spit. The wide sandy lower beach is stable or accreting but the storm beach and parts of the backshore are eroding. Ongoing erosion of the upper beach will threaten properties at Cakeham Estate and may cause breaching of the storm ridge towards East Head.

Geology
- Bracklesham Beds overlain by sands and gravels in the nearshore zone, with a shingle storm ridge protecting a low plateau of Brickearth deposits

Wave climate
- Dominant waves from southwest (40% of time)
- Secondary waves from south (30% of time)
- Complex wave patterns at the entrance to Chichester Harbour
- Extremely wide foreshore reduces wave energy to the west

Tidal regime
- Ebb tide sets to south and southeast
- Flood tide sets to north and northwest
- Currents are strong and ebb dominated in the harbour entrance (maximum 1.0 - 1.5 m/s in main channel)
- Currents are weaker and flood dominated along remaining shoreline (maximum 0.75 - 1.0 m/s)

Sediment transport
- Weak nett drift from southeast to northwest
- Some feed of sand from the Chichester outer bar
- Wind blown sand feed to East Head dunes
- Sediment budget is negative on the upper beach, but balanced or positive across lower foreshore

Possible future change
- 300mm sea level rise over 50 years
- Increased inshore wave energy
- Decreased nett drift but increased short term fluctuations

Table 5.1 Extreme wave heights and water levels

Probability	1:1 year	1:10 years	1:50 years
Nearshore wave height Hs (m)*	1.4 - 4.3**	1.7 - 5.2	1.8 - 5.8
Maximum water level (m OD)	2.75	3.10	3.25

* at the -2m CD contour assuming MHWS tide level. Waves assumed to be depth limited to 4.4m.
** lower values to west, higher values to east .

Existing defences

The main line of defence is a shingle storm beach controlled by timber groynes. Groynes vary in design and some are in very poor condition. Where the groynes extend onto the sandy foreshore, lee side scour causes the development of tidal ponds. Much of the Unit is also protected by timber breastworks or short lengths of gabions. The gabions have been placed to reduce localized erosion, but have a very limited life. An extremely wide lower beach provides partial shelter from wave attack to the west and along East Head. The neck of East Head is subject to erosion and requires maintenance to prevent a breach. The dunes of East Head are actively managed.

Natural environment

Most of the foreshore and East Head Spit are within the Bracklesham Bay or Chichester Harbour SSSIs (Chichester Harbour is also an SPA and Ramsar site) or within the West Wittering Beach SNCI. The western half of the Unit is also within the Solent Maritime possible candidate SAC. These sites are designated for biological, geological or geomorphological interests. Shoreline management operations must comply with statutory procedures including the Habitats Directive. In particular, operations should consider the classic exposures of Bracklesham Beds at East Wittering, the sand dune/shingle system of East Head and West Wittering Beach and the saltmarsh/wet lands in the lee of East Head Spit.

Land use

The immediate backshore along the whole frontage is public open space. There is an elongated area of high value housing along the eastern half of the Unit set back from the shoreline. To the west the backshore is used for beach huts and informal recreation. The western half of the Unit is within the Chichester Harbour AONB.

Human environment

The frontage is valued for public recreation and relatively easy access to an undeveloped area of coast. There are several sites of historical/archaeological importance and Cakeham Manor is a Scheduled Ancient Monument.

Planning policies

The entire area is designated as Countryside and is protected from significant development. Additional planning restrictions apply within the Chichester Harbour AONB, particularly with respect to preserving the landscape.

Statutory policy documents	-	West Sussex Structure Plan, Deposit Draft
	-	West Sussex Minerals Local Plan, Consultation Draft
	-	Chichester District Local Plan, Deposit Draft
Non-statutory harbour policy	-	Chichester Harbour Management Plan

Table 5.2 Impact matrix

	Do nothing	Hold the line	Retreat the line	Advance the line
Effects on physical environment and coastal processes	Increased drift. Breach of East Head neck. Wave and current erosion in lee of East Head.	Future increase in wave attack.	Reduced wave attack at shoreline. Release of potential drift material. Breach of East Head neck?	Increased wave attack. Drift interrupted, affecting upper and lower foreshore.
Effects on human environment	Loss of high value property. Reduced recreation access.	Existing situation improved. Opportunities for improved public access.	Reduced open space in front of Cakeham Estate. Reduced recreation access.	Reclaimed land available for development or recreation.
Effects on natural environment	Increased geological exposure on open coast. Loss of marshes and wetlands in lee of East Head.	Geological interest reduced. East Head and harbour habitat maintained.	Increased geological exposure. Change to dunes, marshes and wetlands at East Head?	Loss of geological interest. Long term deterioration of East Head Spit.
Implications for coastal defence	Increasing erosion followed by failure of groynes and breastwork.	Improve defences for future situation	New defence line required in front of Cakeham Estate.	Substantial new defences required.
Impact on adjacent units	Increased exposure of harbour shoreline in lee of East Head. Increased erosion at west end of Unit 4.	Negligible	Increased erosion at west end of Unit 4. Exposure of harbour in lee of East Head?	Accretion to east. Possible detrimental impact on lower foreshore, and therefore on wave climate and tidal regime.

Losses due to "do-nothing" option

Existing defences have a residual life of up to 10 years. After this time the groynes and breastwork will be in disrepair and the gabion work will be destroyed. Localized erosion problems will develop, resulting in considerable loss of backshore. Future increases in water levels and wave heights will increase the damage. Residential property at Cakeham Estate will be at risk from erosion in the medium term. At East Head the neck will breach and East Head Spit will be an island at high tide. Existing sheltered habitat in the lee of East Head will be lost and the harbour shoreline of West Wittering will be subject to increased wave attack.

Other losses include loss of recreational use of the western part of the frontage and restricted access to East Head Spit.

Preferred option

Economic, environmental and recreational losses due to do-nothing are unacceptably high. There is no existing need for land reclamation to justify the high costs of advancing the line. A substantial retreat is not acceptable due to economic, environmental and recreational losses. A minor retreat would be acceptable, however the cost of establishing a new line would be equal to or greater than the cost of holding the existing line. The preferred option is, therefore, to **hold the line** by upgrading the existing defences. A 1:50 year standard of defence is assumed appropriate.

Schemes should be implemented within a strategic defence programme for the Selsey peninsula and the West Wittering frontage within Chichester Harbour.

Suggested management operations

Short term
- Extend and upgrade breastwork along full frontage, with new works set back from existing shoreline
- Maintain groyne field, with possible replacement of long timber groynes by shorter rock structures
- Recharge and maintain the beach
- Strengthen the neck of East Head by addition of sand/shingle bund on the back face

Chichester Harbour Barrage

A scheme to build a surge barrage across the mouth of Chichester Harbour has been suggested as a possible method of reducing flood risks around the full extent of the Harbour. This scheme would involve construction of a barrier from the shoreline near East Head neck out to the deep entrance channel where the barrage would be sited. The barrage would only be operated during those extreme events when widespread flooding would otherwise occur. At the time of writing the scheme is not expected to progress.

The barrier would follow the early 19th Century shoreline that was formed by a substantial shingle ridge. The barrier would provide protection to East Head and may allow formation of an area of mudflats and saltmarsh in the protected waters to landward. The costs of this scheme would be set against benefits to the whole harbour. Extensive economic, engineering, hydrodynamic, navigational and environmental studies would be required to establish the viability and benefits of the barrage.

The barrage would not alter the need for works to hold the line along Cakeham Estate.

Preliminary economic assessment

Losses due to "do-nothing"

- Residential property at Cakeham Estate £10M
- Cost of new defences in harbour £1M

Cost of "hold the line"

- Upgrade existing defences, partial recharge £7M