

4 APPRAISAL OF OPTIONS AND RATIONALE FOR PREFERRED PLAN

Document title	Poole and Christchurch Bays Shoreline Management Plan Review Sub-cell 5f Hurst Spit to Durlston Head
Document short title	Section 4
Status	Report V3
Date	2011
Project name	Poole and Christchurch Bays SMP2
Project number	9T2052
Client	Bournemouth Borough Council
Reference	9T2052

CONTENTS

		Page
4.1	Introduction	1
4.1.1	General Principles and Objectives for Management	1
4.1.2	High Level Plan Development	2
4.1.3	Comparison of Scenarios for the SMP Area	3
4.1.4	Definition of Policy Development Zones	14

4.1 Introduction

4.1.1 General Principles and Objectives for Management

Section 1 of the SMP report provides the overall aim of the process. The essential aspect of this is the need to develop a long term sustainable plan recognising the overall connectivity along the whole SMP coastline, while also maintaining the attention to detail that will result in this plan being deliverable at a local scale.

As has been discussed in Section 3, through consultation and review of various plans, there have been diverse and important issues identified that provide the baseline for why there is the need to manage the coast. It is these issues that the SMP attempts to address, from the perspective of flood and coastal erosion risk management, and which, therefore, provide the framework for the development of the plan. Based upon these issues, and incorporating national and regional policy, a set of overall principles have been adopted.

- To contribute to a sustainable and integrated approach to land use planning;
- To avoid damage to and where possible enhance the natural environment;
- To support the cultural heritage;
- To minimise and reduce reliance on sea defence and coastal protection;
- To protect homes from flooding where sustainable into the future;
- To protect homes from loss through erosion where sustainable into the future;
- To protect opportunities for employment;
- To support adaptation by all coastal communities;
- To avoid damage to the historic environment where practicable; and
- To maintain or enhance the high quality landscape.

The development of these principles was discussed with the Client Steering Group and Elected Members Forum and a discussion paper is presented as part of Appendix B.

Within this discussion paper the above principles were interpreted broadly over the whole SMP area in terms of the following specific high level objectives:

- Maintain the sustainable economic viability of the key urban/commercial areas to protect employment opportunities;
- Maintain exposure of the geologically designated cliff line wherever possible;
- Protect homes from flooding where sustainable into the future;
- Protect homes from loss through erosion where sustainable into the future;
- Ensure no net loss of species or habitats;
- Minimise and reduce reliance on defences; and
- Allow natural evolution of the shoreline where possible.

As a result of discussions considering these objectives, certain points have been developed:

- With respect to the natural environment, it has been highlighted that on the open coast, in particular, it is the ability of the coast to evolve that is valued as much as any specific existing aspect of that changing environment. Also that it is the characteristics of coastal change which contributes to the value of the frontage in terms of coastal use. These factors are important in assessing how the above objectives are met.

- That the important economic viability of the main urban centres of Bournemouth, Poole, Christchurch and Swanage is essentially linked to the use of the coast. In the case of Bournemouth and Swanage, and the more locally significant settlement of Milford-on-Sea, this is particularly linked to the sea fronts; their promenades and beaches. In areas such as Poole and Christchurch there is also a greater emphasis on their waterfronts and boat use.
- This is also an important feature in relation to Wareham. These aspects reflect that it is not merely the objective to maintain the hard assets and infrastructure that has to be considered but also how this is managed in relation to broader associated features. This also highlights the fact that in each of the main urban areas, their setting, within the natural diversity of the coastal zone, is of equal importance. This is well expressed in the Bournemouth Seafront Strategy:

“The major selling point of the seafront is the environmental setting of Poole Bay, and the visual impact of the cliffs and cliff tops, sheltered Chines, sandy beaches and clean seawater.”

- That the viability of Poole is strongly dependent on its port and associated water use facilities and through this is very dependent on navigation access to Poole Harbour.

More specific objectives, reflecting the general characteristics of each section of the coast are developed within the discussion paper based on the Theme Review (Appendix D).

4.1.2 High Level Plan Development

The aim of the SMP is to provide a consistent approach to flood and coastal erosion risk management over the whole Sub-cell 5f frontage. This consistency has to take account of the physical aspects of coastal management, ensuring that decisions in one area take account of the impact they have in other areas in terms of processes and geomorphology. Ultimately, however, this has to take account of the impact on the interrelationships between the socio-economic and ecological values identified for different areas of the coast as a whole; these being the real drivers behind any intent of management.

Through the review of coastal processes (Appendix C) and the thematic review (Appendix D) it may be understood that the coastline exhibits a high degree of interaction; both within the specific themes of physical processes, ecology and socio-economic and between these themes. There are large scale issues driving management as identified in the high level objectives discussed above, but these have to be recognised, themselves, as being interdependent. Management decisions in one area of coast may have significant influence elsewhere on how best to manage other areas or other interests.

Such interaction may be quite local (between adjacent policy units), may extend over substantial lengths of coast (linking together the decision making process over a group of policies) or may have potentially cumulative impacts that have to be viewed at the scale of the whole SMP; or indeed beyond the area of this SMP. In developing individual policy units, therefore, it is necessary to maintain a broad perspective with respect to potential impacts, within which to consider more locally important issues.

In line with the procedural guidance for SMP2, a hierarchical approach is taken. This initial section of the plan and policy development process considers first the whole SMP coastline considering how potential general management scenarios might influence long term management.

4.1.3 Comparison of Scenarios for the SMP Area

Description of the Physical Structure

The SMP area is shown in Figure 4.1.1. Summarising the points made in Appendix C (Coastal Processes), it may be seen that the open coast is divided into three principal areas: that of Swanage Bay, including the high ground of Durlston Head and the main headland of Handfast Point, Poole Bay and, separated from this by Hengistbury Head, Christchurch Bay.

Poole Harbour both interacts with and influences the coast at the south western end of Poole Bay. The extent of this interaction is seen to be largely limited within an area defined by Redend Point, the influence of the Poole Harbour entrance holding forward the coast over this whole section. Christchurch Harbour lies behind Hengistbury Head with low lying land to either side of the headland. To the east of the area, Hurst Spit acts a barrier defence in front of the western saltmarshes of the Solent, with the deep western entrance channel to the Solent separating the spit from the Isle of Wight.

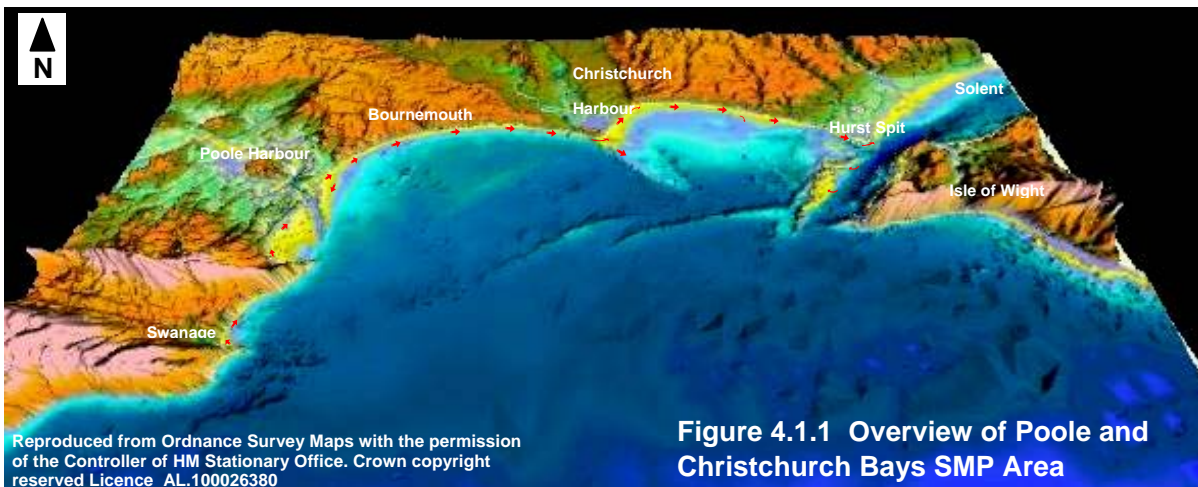


Figure 4.1.1 Overview of Poole and Christchurch Bays SMP Area

The coastline as seen today is of recent geological origin, formed over the last 9000 years by erosion of the soft Tertiary glacial deposits of sand and clay following the breaching of the chalk ridge that ran westward from the Needles, on the Isle of Wight, to Ballard Down and Handfast Point. The formation of the shoreline has been driven by the dominant southwest wave climate, carving out the long curving sweep of Poole and Christchurch Bays.

The immediate perception of the shoreline is that of a narrow, cliff, dune and shingle ridge backed foreshore of sand and shingle. In reality the coastal geomorphology is determined by the whole profile extending into the sub-tidal zone. In particular the influencing feature of Hengistbury Head extends out to the southeast as a more resistant bed forming the Christchurch Ledge, influencing wave approach and erosion of the sea bed (and hence shoreline) within Christchurch Bay. Hurst Spit lies at the root of the large Shingles Bank; a

narrow tidal channel separates the spit from the bank. The Dolphin Bank and Sands lie as a ridge influencing wave approach to Christchurch Bay. As mentioned earlier the ebb delta to Poole Harbour extends its influence over the whole coast between Canford Cliffs and Studland Bay, and this in turn is influenced by both the shape of and the flow through the harbour entrance. In addition to their geomorphological influence, the offshore features are integral pathways for sediment transfer within the offshore area and in the interaction between the offshore and the shoreline sediment processes.

The coastline continues to change. At a local scale this is most obviously seen in the continued retreat of the cliffs along the Christchurch Bay frontage, in the patterns of erosion and accretion within Studland Bay and, although obscured by the regular recharge of the beaches, in the pressure for erosion along the Bournemouth sea front. In the much longer term, well beyond the 100 year period of the SMP, there could be far larger changes more fundamental to where pressure develops in terms of management.

Unconstrained Scenario

An outline projection of the long term change has been made (Wright 1981) and this is shown in Figure 4.1.2. The significance projection is really in understanding the long term pressures on the coast and where critical management decisions, with a longer view on the coastline, have to be made. The obvious key feature is Hengistbury Head. The eventual loss of this feature creates increased pressure for erosion on the coast, principally to the west.

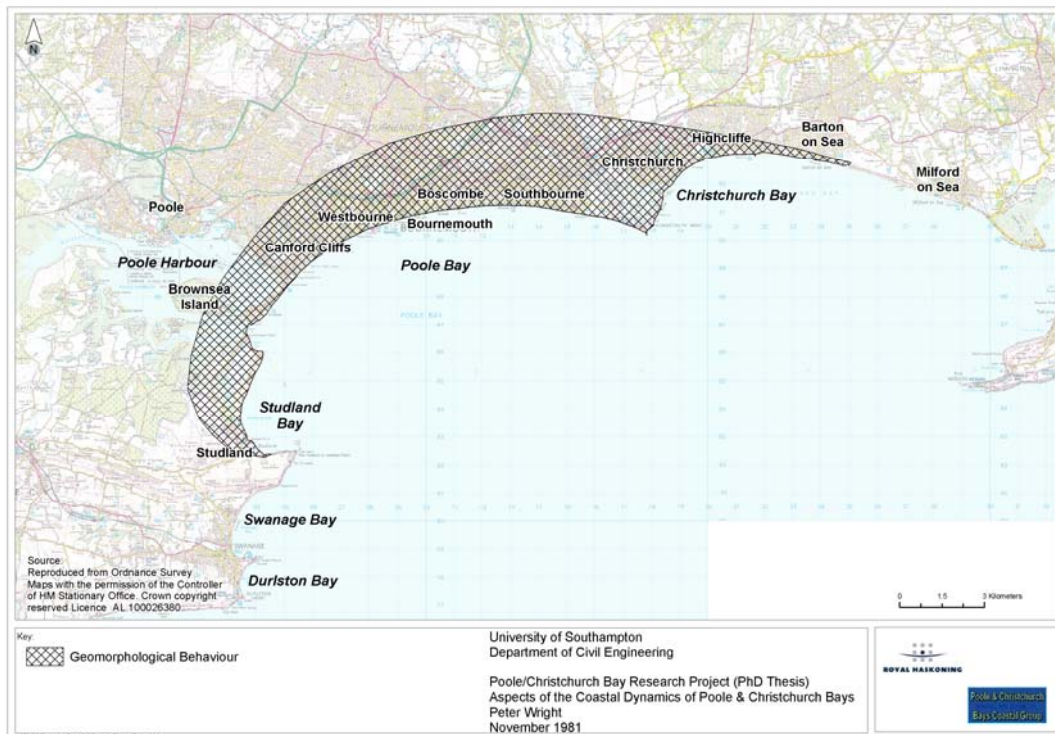


Figure 4.1.2 Future geomorphological prediction.

Loss of Hengistbury Head, with an underlying policy to allow natural evolution, would result in substantial change, as shown in the figure. This impact would be seen over the whole

section between Hengistbury Head and Handfast Point. Although the actual entrance to Poole Harbour would be set back as shown, there would be some modification of this shape in that Poole Harbour would continue to impose some control on the development of the coast. The actual shoreline would, however, be set back some considerable distance.

Under this unconstrained long term scenario, certain points may be made:

- Without management of the physical behaviour of the coast there would be no point, over the next 200 years or longer, at which the coast would establish a stable alignment. It is not therefore a situation where limited retreat, or adaptation, along the Bournemouth and Poole Bay frontage could achieve a fundamentally more sustainable position. The Poole Bay seafront and the management of Poole Harbour would need to be adapting continuously. This would clearly fail to deliver the objectives for these areas.
- Christchurch Harbour would be lost with no sensible opportunity to maintain the essential features identified within this area.
- The town of Christchurch would, in the same way as Bournemouth, be under continuing pressure.
- Interestingly, much of the Christchurch Bay frontage, despite being currently an area where there is most obviously significant change, would in the long term establish a more stable alignment not substantially different from present day. Only at its western end would there be significant set back of the frontage.
- The above point also highlights that the position of Milford on Sea appears to be the controlling down drift feature to Christchurch Bay, with Hurst Spit being a feature more influenced and influencing the approaches to the Solent.
- Swanage and the headlands at the western end of the SMP frontage remain, at this large scale, little affected.

Clearly from the above, while the general objectives for maintaining a changing coastline are met by this unconstrained scenario, the value of this is mitigated by the collapse of the economic viability of the area and the destruction of the cultural heritage. As a long term vision this scenario is rejected.

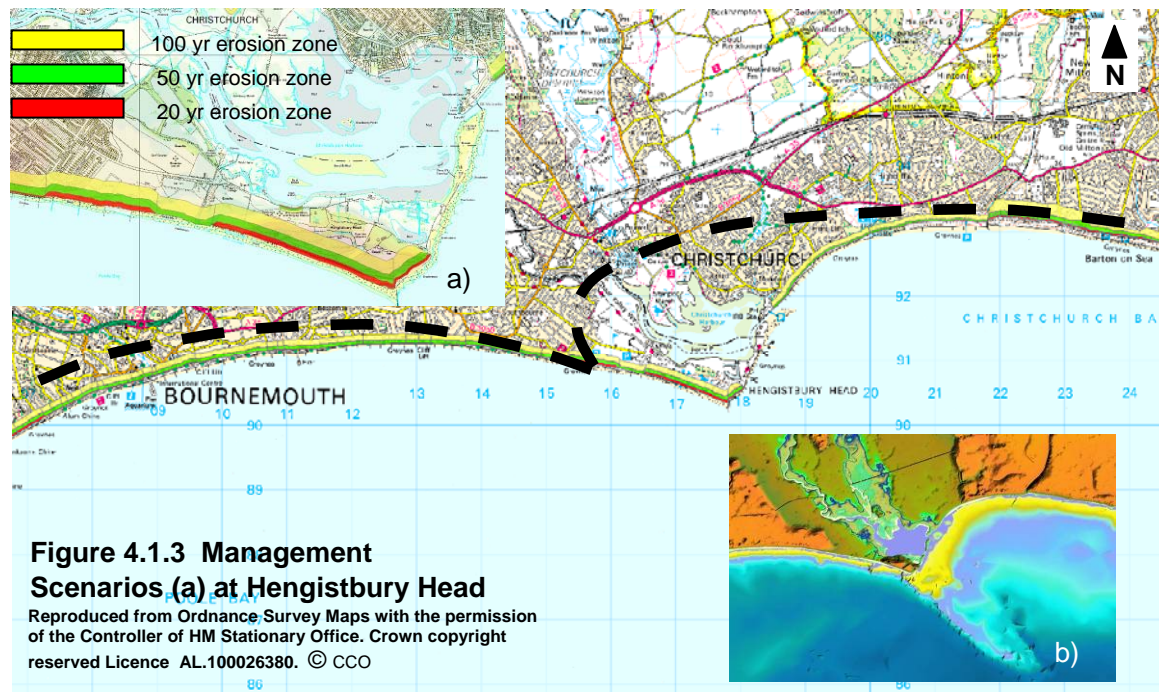
In terms of management objectives, this highlights the need to manage the coast and its future evolution. The area is characterised by its natural beauty and intrinsic value. This has to be sustained not least for the value it contributes to the other uses of the coast. This existing value has been established in its current form under the present regime of an extensively managed coast. The objective for management of the natural environment is not in conflict with that of meeting the overall intent of delivering human aspirations. However, on the broader scale, acceptance that a significant proportion of this SMP frontage will remain a managed area is important.

With this understanding, it is possible to consider where high level decisions have to be made. Since Hengistbury Head represents a fundamental control point within the SMP area, the consideration starts with this section of the coast. Developing out from there, other sections of the coast are considered with respect to their influence on (and interaction with) other areas of the SMP.

Consideration of Alternative High Level Management Scenarios

Hengistbury Head

A critical area for management is Hengistbury Head. This feature controls the long term development of the overall frontage. The predicted long term, No Active Intervention, development of the Head and adjacent coast has been shown in Figure 4.1.3.



In figure 4.1.3 a), the potential erosion zones over the 100 year period are shown to extend some 100m to 200m back from the existing shoreline position. In effect, slightly beyond the 100 year period, erosion would have removed the bulk of the headland, ultimately leaving only a lower lying hard point reinforced by the ironstone nodules in a weaker clay deposit.

The shoreline to the west would then move back in line with the erosion of the headland such that there would be width of some 100m at the narrowest point of the isthmus. To the east, the headland would have moved so far out of line with any attempt to maintain Mudeford Spit that management there would be outflanked. At this point Hengistbury Head no longer acts as an effective control.

There are three basic response scenarios to this.

Scenario (a)
Description: Accept loss of Hengistbury Head and reinforce the coast to the west to manage the frontage.
Rationale: The essential aim in strategic management of this area, under this scenario, is to prevent long term increasing pressure on the Bournemouth frontage and to maintain the overall shape of Poole Bay.
Implications: There would be a need to substantially increase the defence to the west of Hengistbury Head. This would most appropriately be in the vicinity of Southbourne, taking advantage of the higher ground in this area. Movement of this control point would still result in some wish for the coast to readjust

to a more stable configuration. Unless the control point at the coast extended offshore, the effective northerly shift in the headland is likely to result in some readjustment as shown by the black dashed line in Figure 4.1.3. This line is indicative of a trend of readjustment in the coast rather than being a definitive erosion line. There would be increased difficulty in retaining a foreshore in front of Bournemouth, as the sea front would then be substantially advanced of any geomorphologically stable alignment. The new headland would restrict sediment supply to the east in much the same way as seen at Hengistbury Head at present.

To the west, the theoretical coast line would attempt to adjust as shown. As at present, there would be additional influence from the Christchurch Ledge, the inland end of which would be at Hengistbury Head. This ledge would not, however, be attached to the coast. Christchurch Harbour would be lost although there is likely to be some form of ebb delta developed within the new bay. The core centre of Christchurch would be at the new coast, assuming that with the increased pressure on the Stanpit and Mudeford frontages, these villages would be abandoned. The overall bay shape developed would be deeper than the present western end of Christchurch Bay principally due to the lesser influence of the Christchurch Ledge. This would therefore mean that new defences would be required to the eastern flank of Southbourne.

The overall influence or change of influence, on the coast further east would be less significant. The frontages of Barton and Milford would still be under pressure to erode in the longer term however there would initially be an increased sediment supply to the east.

Impacts: The principal losses would occur within and around the shore of Christchurch Harbour. This would include loss of the fishing industry, recreational use of the harbour area, the loss of Mudeford Spit and Mudeford Quay area. There would be a significant loss of property in the Christchurch area and there would be a need for increased defence to areas protected. Following the initial period of increased sediment supply, controlling the coast at Southbourne would result in little further sediment moving from Poole Bay into Christchurch Bay. There would be a loss of the mosaic of habitat within Christchurch Harbour including areas designated as SPA, SAC and Ramsar sites.

Scenario (b)

Description: Accept loss of Hengistbury Head and reinforce the coast to the west to manage the frontage and also defend at Mudeford Quay.

Rationale: The essential aim in strategic management of this area is to prevent long term increasing pressure on the Bournemouth frontage and to maintain overall shape of Poole Bay, but also to limit erosional damages within Christchurch Bay.

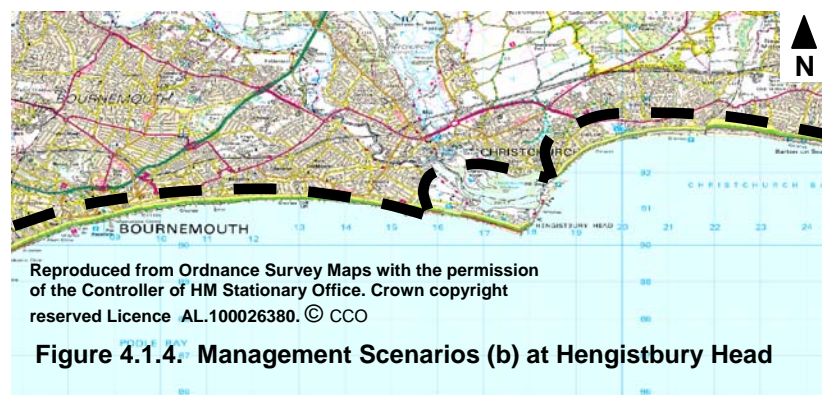


Figure 4.1.4. Management Scenarios (b) at Hengistbury Head

Implications: The general shape of the coast is shown in Figure 4.1.4. There would still be a need for a substantial defence to the west of Hengistbury Head with all concomitant implications for the west Poole

Bay area. The new headlands would restrict sediment supply to the east in much the same way as seen at Hengistbury Head at present. Finer sediment now believed to bypass Hengistbury Head would tend to be retained in the new Christchurch Harbour Bay.

To the east of the headland at Southbourne, Christchurch Bay would probably develop as a series of sand banks forming the ebb delta of the Avon and Stour. The defence line at Mudeford and Stanpit would need to be upgraded as a coastal, rather than estuarial flood defence. There would still be pressure for erosion on the eastern side of Mudeford and erosion would still influence the coast to the east.

Impacts: The principal losses would occur within and around the shore of Christchurch Harbour as with scenario (a). This would include loss of the fishing industry, recreational use of the harbour area, and the loss of Mudeford Spit. Potentially the frontage between Christchurch and Mudeford would create significant opportunity for developing sand beaches. Following an initial period of increased sediment supply, controlling the coast at Southbourne would result in little sediment moving from Poole Bay into Christchurch Bay. There would be a loss of the mosaic of habitat within Christchurch Harbour including areas designated as SPA, SAC and Ramsar sites. This would be replaced by open coast habitat.

Scenario (c)

Description: Maintain defence at Hengistbury Head.

Rationale: The aim under this scenario would be to limit and control erosion of Hengistbury Head with the underlying approach to maintaining management of Poole Bay and to maintain Christchurch Harbour

Implications: The Head is currently maintained through management of the Long Groyne. This would need to be reinforced and over time a stronger hard point developed. This location does have the advantage, however, of being on the platform of Christchurch Ledge and protection at this headland would maintain the combined influence of the headland and the Ledge on Poole Bay. There would still be the potential erosion to the isthmus connecting Southbourne to Hengistbury and the potential for a more sustained breach through to Christchurch harbour in this area. Management and the implications of this are considered in further detail later. Under this scenario, however, the overall area of Christchurch Harbour would be maintained. Stanpit and Mudeford would continue to gain protection from erosion although there would still be a flood risk to these areas; as there would be to Christchurch.

Hengistbury Head would still act as the principal down drift headland to Poole Bay and as such would provide the basic underlying structure for management of the Bournemouth Frontage. Sediment supply from Poole Bay through to Christchurch Bay would be restricted and, subject to future management of the Bournemouth frontage, may be very limited in the long term.

Impacts: Sustaining the overall integrity of Christchurch Harbour would maintain the opportunity to sustain continued use of the area. The mosaic of habitats would in principle be maintained although there may still be natural change due to more local factors and as a result of sea level rise. There would be no increased pressure on the Bournemouth frontage although this would still be under greater pressure due to sea level rise.

The increasing constraint on sediment supply to the east would increasingly impact on the management of Mudeford Spit. This loss of sediment supply would also impact more generally on Christchurch Bay in the long term. There would be constraint on the naturalness of the coastline and there would be locally a greater reliance on defence. This could be seen as mitigated to a degree by the reduced pressure on other frontages. The corollary of this would be maintaining the significant heritage value of Hengistbury Head.

Discussion of Scenarios

There are seen as being four basic scenarios for management. These are recognised to be long term scenarios setting out potential long term visions for management. The first, that of allowing natural development of the whole central section of the SMP frontage, is rejected on the grounds previously discussed. Of course there continues to be uncertainty in relation to the extent of sea level rise and in terms of future long term socio-economic attitudes. However, such a long term vision for allowing unconstrained evolution of the coastline fails to provide the basic geomorphological structure necessary to deliver the present objectives in an integrated manner. It would also remove the opportunity to deliver the anticipated objectives for the future.

To maintain the overall control of coastal evolution, the critical location is Hengistbury Head. All the scenarios for management, set out above, would require significant long term commitment to maintaining control of the coast. Overall, scenario (c) is considered to provide a more sustainable approach certainly over the next 100 years. Notwithstanding the need to provide, over time, a more robust defence at Hengistbury Head, this location has a more secure platform for defence and would incur less pressure in terms of management of the coast to the west. It also provides a more sustainable structure for management of Christchurch and the associated areas of Mudeford and Stanpit, as well as maintaining the opportunity for adaptable management of Christchurch Harbour and its associated interests.

In the future, beyond the period of the SMP, scenario (b) could offer an alternative approach, which, while resulting in significant need for change in the use of the Christchurch Harbour area, maintains the opportunity to adapt to greater pressure on the coast as a result of sea level rise. Adopting Scenario (c) over the period of the SMP2 would not constrain the opportunity to adapt to an approach defined by scenario (b) in the longer term future. Awareness of this possible change in approach has to be taken into consideration at a detailed level as the management of the adjacent coastlines under the preferred approach (scenario (c)) is developed.

Regardless of the scenario chosen, management of this area does impose conditions on management of the adjacent coastlines. To the west, there will be continued pressure for erosion of the sea front at Bournemouth, both under the preferred SMP2 scenario of holding Hengistbury Head and with the very long term option of controlling the coast at Southbourne and Mudeford Quay. To the east, there is likely to be a diminishing supply of sediment from Poole Bay through to Christchurch Bay under any of the scenarios.

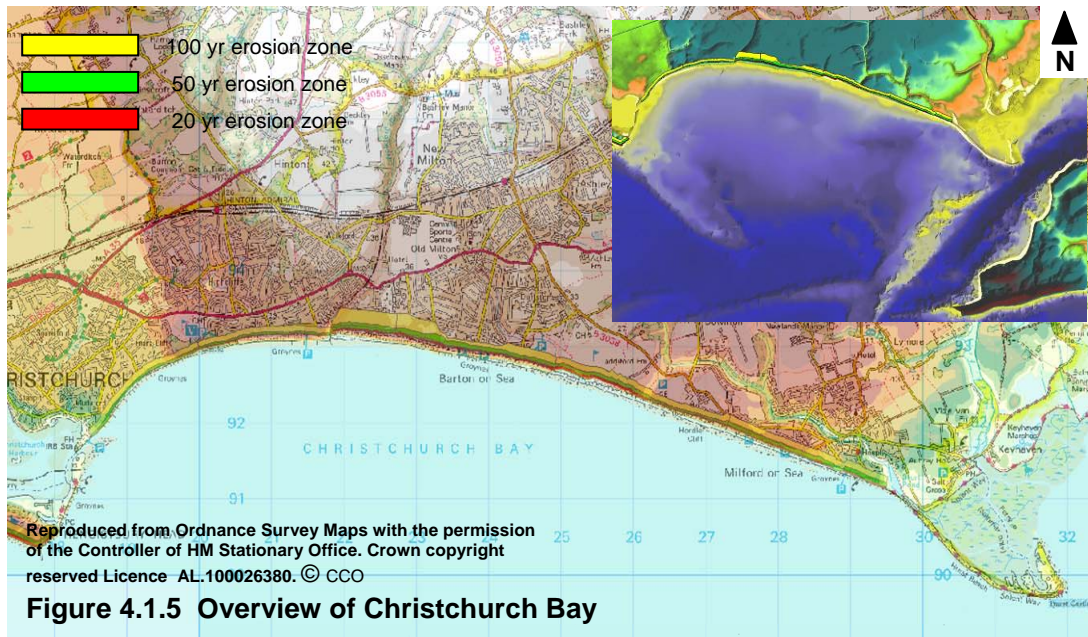
Based on the approach of maintaining Hengistbury Head it is possible to examine decisions in other areas.

Christchurch Bay

This section of the SMP frontage is shaped by wave action and sediment movement determined within the controls of Hengistbury Head and a combination of features (the entrance channel to the Solent, the Shingles Bank and the Isle of Wight) at the eastern end. This is shown in Figure 4.1.5, together with the zone of anticipated erosion of the shoreline. At the larger scale, the frontage is seen as being very close to its natural alignment, although at the more local scale the pressure for erosion on the high clay, sandy/shingley cliffs is

significant in terms of shoreline management. A key component of this management is the supply of sediment and its distribution along the shoreline.

In terms of overall scenarios affecting the coast at an SMP scale, the approach to management in the area of Hengistbury Head discussed above is clearly important, principally at the western end of the bay. The preferred general approach to maintaining Hengistbury Head, with the possible much longer term approach to strategic control at Mudeford Quay, defines a framework for considering the approach to management of the Christchurch Bay frontage. Part of this understanding is that sediment supply between Poole Bay and Christchurch Bay will progressively reduce over time.



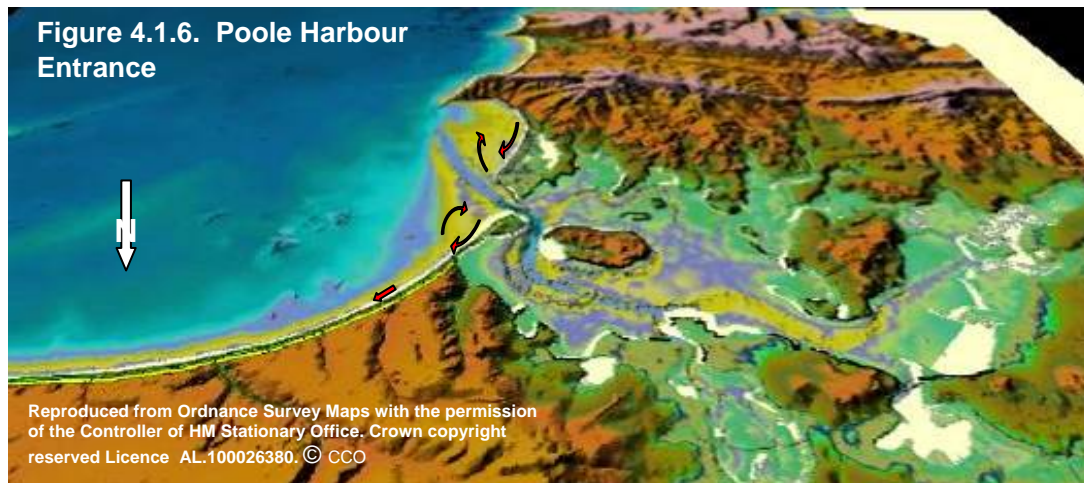
At the eastern end there is, realistically, no overriding intent driving substantial change to the underlying features controlling the behaviour of the Bay (i.e. policy for management of the western end of the Isle of Wight, the approaches to the Solent or management of the Shingles Bank are not going to change to the point of influencing management of Christchurch Bay).

Also at an SMP level, the management of the main Christchurch Bay frontage is not going to impact on general policy for other areas. The SMP and its associated policy can therefore be developed at a more local level considering the shoreline management of each section of the frontage. Clearly in considering this, the approach to management of Hurst Spit can have significant influence on the area within the approaches to the Solent.

Poole Harbour

Management issues within Poole Harbour are complex, with major potential interaction between the objectives of maintaining a healthy, adapting natural environment while also sustaining the economic viability of the town and the harbour. In terms of the interaction with the open coast of Poole Bay, this is principally focused on the manner in which the entrance channel and the associated ebb tide delta influence sediment movement.

Handfast Point controls this whole western end of Poole Bay and in particular influences the extent to which the coast is dominated by the entrance to Poole Harbour. This can be seen in Figure 4.1.6. There is an understanding that sediment movement, both north of the entrance and to the south, in Studland Bay, tends to be in a clockwise path, with some possible loss of sediment to the north. This generalised pattern of behaviour is recognised to be more complex than shown by the arrows in Figure 4.1. 6 and less certain. Even so, in broad terms it may be seen that the position of the entrance is quite critical in terms of interaction with the coast.



It seems unlikely even if the Studland dunes were to be regularly breached or over topped that there would be development of a new entrance channel in this area. The existing channel is, however, very influential in maintaining the integrity of this barrier dune system.

There is greater uncertainty in relation to the Sandbanks Peninsula. Regular breaching of this bank could, in time, create a new more northerly entrance to the harbour. There is little evidence to suggest that this would become a naturally preferred entrance; although equally, there is no geotechnical evidence to indicate any substantially harder geology preventing this. The development of a new entrance would have significant impact on the hydrodynamic behaviour of the Harbour. At present the harbour hydrodynamics are complex. In response to the double high water and the low tidal range there is a period of standing water at and following high water.

Creation of a permanent entrance across the Sandbanks Spit has the potential to allow creation of distinct flood and ebb dominant channels. Most probably, therefore, there would be a reduction in flow through the existing entrance, with a tendency for flood dominance. This could result in significant change to the configuration of Hook Sands, with consequential impacts on Studland Bay and the dune system. The trend would be for a reduction in the size and influence of the ebb delta, resulting in greater exposure and erosion along the coast. This may provide greater feed of material to the north combined with a tendency for material to be taken into the estuary.

At Sandbanks, the influence of the new entrance would be to move the nearshore banks further north, with development of an ebb delta. The development of the position and extent

of this ebb delta would still be limited by the extent of Handfast Point, with the potential for greater sediment lost from the harbour mouth system.

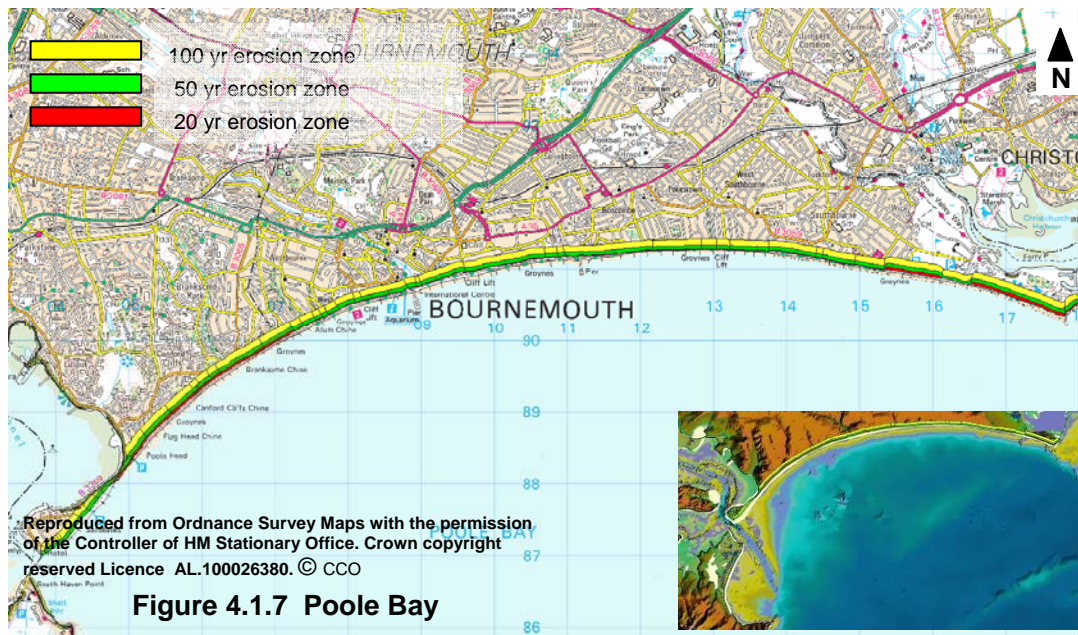
Although the scenario given above can only really be guessed at in any detail, it demonstrates a realistic potential for significant change. Such change would have major impacts on the operation of the Harbour, management of the Studland Peninsula and the valued interest of the coast. There is a small potential for increased sediment along the Bournemouth frontage but this is unlikely to be significant in terms of management.

This high level assessment indicates significantly greater benefit in maintaining the integrity of the Sandbanks frontage than merely that provided by the existing use of the Peninsula. Although maintaining this frontage in the longer term will require significant intervention, the case for management, in principle, of this frontage is felt to be justified. The manner in which this management might be achieved is considered later in more detail.

From the perspective of highlighting essential high level issues, it may be concluded that the management of Sandbanks and Studland Bay need to be considered in management of the Poole Harbour area.

Poole Bay (Bournemouth)

The high level discussion of the Hengistbury Head area and the above discussion of the Poole Harbour frontage set the context within which to examine the central section of Poole Bay. In terms of management of the eastern end of this frontage, the intent is to maintain the basic control at Hengistbury Head, with the potential caveat that in the longer term (beyond the 100 year period of the SMP2) there may be a need to adapt management of Christchurch Harbour. At the south-western end of the Bournemouth frontage, the general configuration of Poole Harbour entrance would be maintained with the need to maintain the integrity of Sandbanks Spit.



An overview of the frontage is shown in Figure 4.1.7, showing also the anticipated erosion zones under the No Active Intervention Scenario.

There is relatively uniform pressure for erosion over the whole frontage. In effect, in the absence of defence, the whole coastline wishes to roll back to a more stable alignment. At the large scale, this pressure is not great and is controlled ultimately by:

- The position of Handfast Point, where even without management it will dominate the development of the bay;
- The defence of Hengistbury Head.

At the local scale, with the important development associated with the sea front and the promenade and the significance of maintaining a good beach width, the relatively limited extent of erosion has massive implications in terms of the economic viability of the town and its regional and national status.

The present management approach is to protect the frontage by regular beach recharge, together with a comprehensive regime of groyne management, repair and replacement. Prior to this work the seawalls and infrastructure along the shoreline were at immediate risk of failure, with the potential exposure of the vulnerable cliff face and the loss of major assets along the whole frontage.

The existing practice of periodic beach re-nourishment provides significant quantities of sediment to the SMP shoreline, with potential feed, predominantly to the east, benefiting other areas of the coast. The need for re-nourishment is continually under review. Studies in the 1990s, following the first two recharge campaigns, allowed assessments to be made of when future supply would be required and understanding the critical factor in the frequency of recharge operations has been the overall increasing pressure resulting from sea level rise.

Management of the Bournemouth frontage is considered in more detail in subsequent sections of the document. In terms of overall influence with respect to the SMP area as a whole, while initially significant, management of the central Poole Bay frontage is seen as being of decreasing influence to adjacent sections of the coast in the future. Management of the area will however be critical to the detailed management of the area around Hengistbury Head and in consequence, potentially critical to the local management approach to Christchurch Harbour

Swanage

Swanage Bay is separated from management of the main SMP area by the hard headland of Handfast Point. There are no overriding reasons for intervention at this point and the limited future erosion of this headland is such that the separation it provides will not diminish.

While Peveril Point is also a hard headland, separating Durlston Bay and Swanage Bay, part of the town extends across the headland. There is also considered to be the potential for sediment from Durlston Bay to supply Swanage Bay. The whole area, therefore, needs to be considered as one, but may be considered in detail separate from other sections of the SMP area.

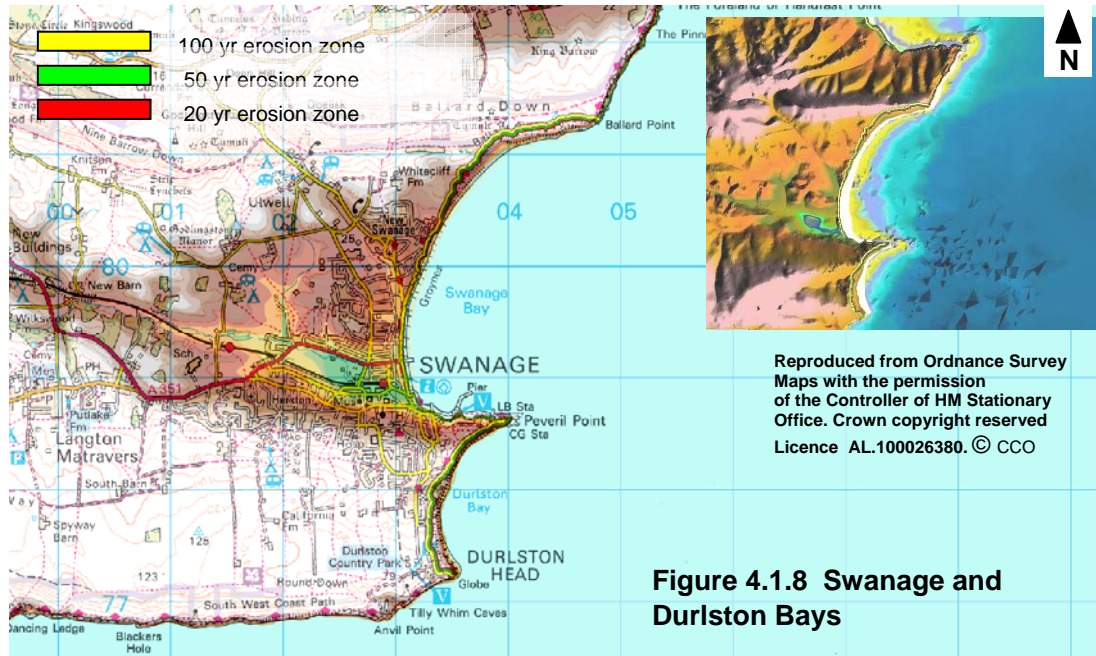


Figure 4.1.8 Swanage and Durlston Bays

4.1.4 Definition of Policy Development Zones

The above assessments and consideration of high level scenarios sets a framework for consideration of sections of the coast in greater detail. In effect, the above discussion sets the playing field for this detailed development of the Plan and policies over the three epochs.

The main conclusions at this stage are that:

- Maintaining Hengistbury Head as a control point on the coast provides greatest opportunity for delivering the objectives in an integrated manner. However, in the longer term, most probably beyond the period of the SMP2, there may be a need to adapt management of the area around Christchurch Harbour. This would have significant consequences in terms of management of the adjacent coastline, which needs to be borne in mind in developing SMP policy.
- In holding the position of Hengistbury Head, it is probable that there would be diminishing supply of sediment from Poole Bay through to Christchurch Bay. This may in the short term be influenced by management of Poole Bay, but in the longer term this, regardless of the management approach in Poole Bay, may be a less significant link.
- The management in the area of Hengistbury Head therefore extends into Christchurch Bay, in that management of the Double Dykes frontage would have implications for Christchurch Harbour. However, further east, management of the central section of Christchurch Bay becomes a distinct area.
- Management of Poole Harbour would be with the intent of maintaining the integrity of Sandbanks Spit and sustaining use of the Harbour. The associated behaviour and interaction with the coast extends to include Studland Bay, but this overall intent of management does limit the influence of management at the coast, such that the Central Poole Bay area, extending to Hengistbury Head and Christchurch Harbour, may be considered in detail separate from the Poole Harbour Entrance and Poole Harbour itself.

- Swanage and Durlston Bays can be considered separately from other sections of the SMP area.

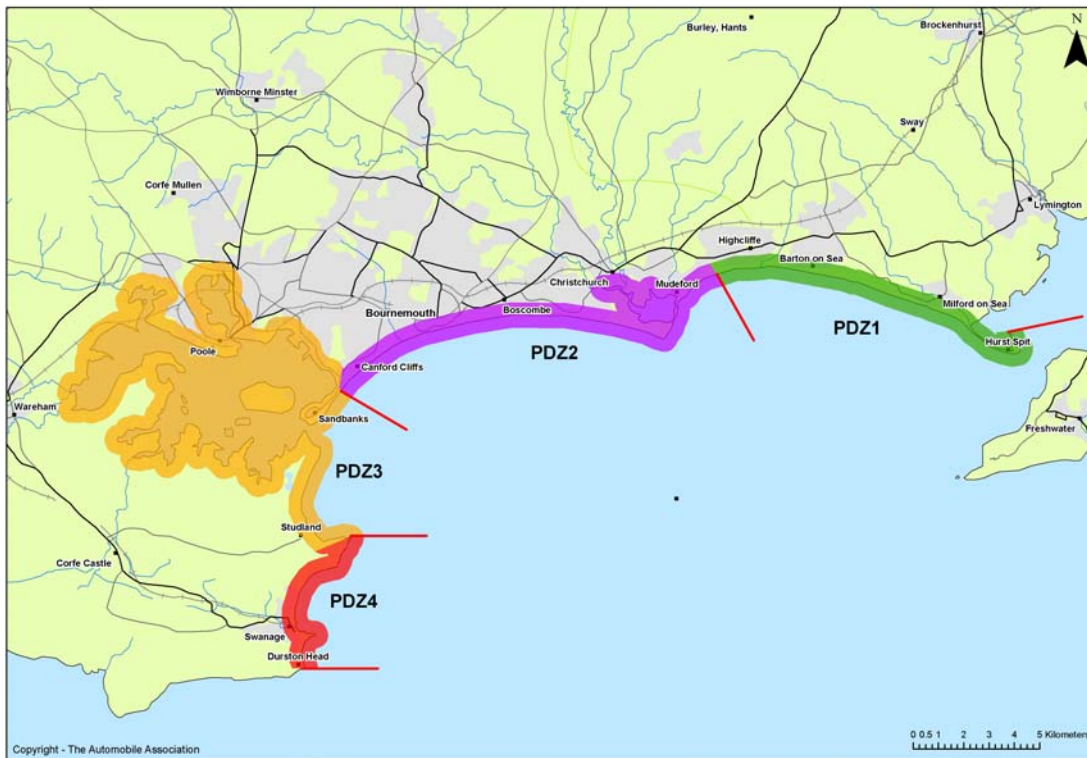


Figure 4.1.9 Poole and Christchurch Bays SMP2 PDZs

The areas defined above are considered as policy development zones (PDZs). The boundaries are recognised not to be hard lines and there is a recognition that locally across boundaries, there will be issues in common. The proposed divisions are shown above in Figure 4.1.9.

The following sections within Section 4 of the SMP document consider these zones in greater detail. The format for each zone assessment is described in Section 3 of this document.



Poole and Christchurch Bays Shoreline Management Plan Review Sub-cell 5f

Section 4. Policy Development Zone 1

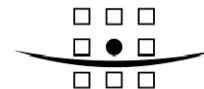
Bournemouth Borough Council

2011

Report V4

9T2052

A COMPANY OF




ROYAL HASKONING

HASKONING UK LTD.
COASTAL & RIVERS

Stratus House
Emperor Way
Exeter, Devon EX1 3QS
United Kingdom
+44 (0)1392 447999 Telephone
Fax
info@exeter.royalhaskoning.com E-mail
www.royalhaskoning.com Internet

Document title Poole and Christchurch Bays Shoreline
Management Plan Review Sub-cell 5f
Section 4. Policy Development Zone 1
Document short title PDZ 1
Status Report V4
Date 2011
Project name Poole and Christchurch Bays SMP2
Project number 9T2052
Client Bournemouth Borough Council
Reference 9T2052/R/301164/Exet

Drafted by JGL Guthrie
Checked by J Ridgewell and TL Eggiman
Date/initials check
Approved by H Hall 
Date/initials approval

CONTENTS

		Page
4.2	PDZ 1 Central and Eastern Sections of Christchurch Bay	1
4.2.1	Overview	3
4.2.2	Baseline Management Scenarios	14
4.2.3	Discussion and Detailed Policy Development	27

4.2 PDZ 1 Central and Eastern Sections of Christchurch Bay



Hurst Spit to Friars Cliff
- Chainage 0km to 15km.



SMP 1 Management Units

UNIT	LOCATION	CHAINAGE	POLICY
	North Point to Hurst Point	0 -2km.	Not previously covered by SMP1
CBY7	Hurst Spit	2 – 5km	Hold the Line, short and long term
CBY6	Milford-on-Sea to Hordle Cliff	5 – 7km	Hold the Line, short term and long term
CBY5	Hordle Cliff to Barton Common	7 – 9.5km.	Do Nothing short term, Selective Retreat long term
CBY4	Barton Common to Cliff House Hotel	9.5 – 11.5km	Hold the Line, short term and long term.
CBY3	c) Marine Drive West, Barton	11.5 – 12km	Retreat short term, Hold the Line long term.
	b) Naish Holiday village.	12 – 12.6km	Retreat short term, Do Nothing long term
	a) Chewton Bunny	12.6 – 12.9km	Retreat short term, Hold the line long term.
CBY2	Chewton Bunny to Mudeford Sandbank	12.9 – 17.2km	Selectively Hold the Line, short and long term. Undefended sections possibly retreat long term.

Note: SMP1 policy was set over a 50 year period. Short term refers to immediate approach to management of defences with long term policy being set for the 50 years.



Figure 4.2.1

4.2.1 OVERVIEW

PRINCIPAL FEATURES (further details are provided in Appendix D)

Built Environment:

The main settlements are Milford-on-Sea, Barton-on-Sea and Highcliffe. Behind Hurst Spit is the village of Keyhaven. The main seafront centre of Milford is immediately behind the existing defence line with a car park, residential property and seafront services. The main coast road and car parks are situated at the crest of Rook Cliff and properties are situated on land behind the road. At Barton-on-Sea there are car parks and open ground with properties behind. At Highcliffe there is a large car park and Café at the eastern end of the cliff, overlooking Chewton Bunny, with various properties backing on to the cliff crest. A large holiday park is located to the rear of the crest of the large mobile clay Naish Cliff. It is recognised that the built environment and coastal communities are at risk from future coastal erosion. However key infrastructures, principally electricity sub-stations, are located only in the Highcliffe area and are set some distance back from the cliff crest.

Heritage and Amenity:

Hurst Spit Castle was built between 1541 and 1544 and is now designated as a scheduled monument. Highcliffe Castle is a Grade I Listed Building and one of the most important Listed Buildings in the area. Bramble Lane - situated in an area to the north of Chewton Common Road, is designated a Conservation Area by NFDC, as are two areas within Milford-on-Sea; one is centred around the green in the village centre and the other centred around the church. The previously derelict White House hospital on the seafront at Milford-on-Sea is an important Listed Building and prominent coastal landmark.

There have been important paleontological finds at Barton-on-Sea, with a number of isolated finds of worked flint tools in the Friars Cliff area, dating from Prehistoric, Neolithic and Bronze Age eras. Some pieces of Bronze Age metalwork have also been discovered in the area. There are also earthworks at Taddiford Gap that may have been associated with the medieval village of Hordle. There are a string of strategically located car parks at locations along the cliff top, at Milford, Barton and Highcliffe which provide important access to the coastline. At Milford and beneath Rook Cliff, behind existing defences, there are a large number of beach huts. Similarly at Barton-on-Sea, there are beach huts to the base of Barton Cliff. There is access to the shore at Chewton Bunny. The coast to the east is popular as open beach beneath the slumping cliffs, while the area to the west has more formal paths over the slope and to the base of Highcliffe. Hurst Spit is part of the Solent Way footpath and .also extends along the cliff top through Milford-on-Sea

The entire frontage is valued for its recreation value. There is one golf course between Milford-on-Sea and Barton-on-Sea.

Nature Conservation:

The marshes behind Hurst Spit are designated as SPA, SAC and Ramsar. The designated areas include Hurst Spit and Sturt Pond behind the Milford-on-Sea seafront. The cliffs from Milford-on-Sea through to Friars Cliff are a designated SSSI and there is a local nature reserve further up the Dane Stream, upstream of the Milford bridge. The cliffs along the frontage are significant for fossils as well as for their geological value. The overall landscape is considered very important.

KEY VALUES.

Despite the proximity of large areas of residential properties, the key value of the area is the semi natural coastline, its dynamic nature and the changing nature of the landscape. It is important both in terms of the geological and geomorphological understanding this provides, as well as the educational value in a more general sense. Within this context is the important community of Milford-on-Sea and

Barton-on-Sea, together with its seafront and cliff top amenity area, and the important general recreational access to the coast and its foreshore. Within the significant semi-natural environment are the internationally important areas of designated habitat behind and including the shingle ridge of Hurst Spit. The heritage aspect of the coast is vitally important with specific features of Highcliffe and Hurst Castle. The paleontological finds establish a long history of man's use of the area and the development and change of human use within the context of a changing coastline.

<p>OBJECTIVES (the development of objectives is set out in Appendix D based on objectives listed in Appendix E)</p> <ul style="list-style-type: none"> • Manage risk to properties due to erosion where sustainable. • Support adaptability of the local cliff-top communities. • Maintain the community of Milford-on-Sea and Barton-on-Sea • Manage Hurst Spit appropriately to deliver the objectives stated within North Solent SMP. • Maintain geological exposures of the designated cliff line. • Minimise loss of habitat or species if possible (identify compensatory habitat elsewhere within SMP area if any net loss occurs). • Maintain the dynamic coastal zone and its capacity to change. • Maintain the outstanding landscape and the views and appreciation of the varied coastal environment. • Reduce and minimise reliance on defences.

DESCRIPTION

This zone extends from the eastern end of Hurst Spit through to the Friars Cliffs and extends approximately 15km.

The eastern end the frontage is formed by Hurst Spit. At its western end this barrier beach joins and aligns itself with the coastline at Milford-on-Sea. The beach line curves out to link with its most easterly point at Hurst Castle and Hurst Point, before returning back as a recurved spit (between Hurst Point and North Point) within the Solent.



The land behind the spit comprises saltmarsh. A main channel is formed at the end of the Spit and this cuts through the marsh, splitting into two smaller channels. One of these extends up as the Keyhaven Lake to form the Avon Water at Keyhaven. The second, Mount Lake, runs behind Hurst Spit, through a short intertidal drainage inlet linking with Sturt Pond and above that the Danes Stream through the town. Along the northern side of Sturt Pond (and along the intertidal drainage inlet), behind the coastal defences to the west of the saltmarsh, is a low earth flood embankment. This acts to protect agricultural land, the village of Keyhaven and the caravan park to the south east of Milford-on-Sea.

At the proximal end of Hurst Spit, the front face has been reinforced with major rock revetment. To the west of this rock revetment is the start of the Milford-on-Sea defences which is comprised of a number of old sections of concrete sea wall with timber groynes maintaining a beach. Where beach levels are reduced, there are also a number of sections of rock revetment which protect the wall. An example of this is at the White House which is protected by a sea wall and rock armour defences. These form a slight promontory, forming the headland of the shallow bay through to Hurst Spit. The defences protect the main seafront car park, open ground and seafront residential and commercial properties. There are also beach huts along the sea wall.



The sea wall combined with timber groynes, and then further lengths of rock revetment, continue west along the toe of Rook Cliff. At the crest of the cliff is open ground car parks and coastal footpath (forming part of the Solent Way). The main coast road is set back from the crest of the cliff by some 30m to 50m and there are properties to the rear of the road. Rook Cliff rises steeply from the defence along this section. The



cliff, comprising sands and gravels overlying clay continues to slump at its base with regular weathering at the crest.



There are numerous beach huts located along the toe of the cliff, between Rook Cliff and Hordle Cliff. Hordle Cliff sets back slightly from the alignment of the defence along Rook Cliff and adopts a shallower gradient with a wider extent of shingle at the toe. This change in profile reflects the slight valley through this section of the coast and the composition of the cliff material. The main drainage is to the Danes Stream, running eastward down to Milford-on-Sea. At the crest of the cliff there is

generally open ground with the former school, now the residential development of Scholars Retreat, and Hordle Manor Farm, being the only development.

At the start of the higher Barton Cliffs, the backshore coastal slope pushes forward, with the high water mark close to the toe of the cliff. The higher cliffs comprise an upper sandy/shingle stratum overlying clays, forming a slight bevel to the toe of the slope. The crest of the cliff generally consists of open ground with agricultural land and, to the west, a golf course.

From this area to the west, the hinterland tends to increase in height with drainage channels cutting through the coast. This contrasts to the area further east, where the land tends to fall away to the hinterland. The first major stream, the Becton Bunny, cuts the coast as a deeply cut valley some 800m east of Barton-on-Sea.

To the west of Becton Bunny, the foreshore again narrows and there are extensive protection works to the toe of the cliff. These works are comprised of a number of major rock strongpoints, linked by rock revetment.

In addition drainage works have been undertaken to help reduce groundwater levels, which is the main driver of slope instability and cliff recession at this location..

The lower protected level has become well vegetated and access tracks lead to the lower part of the cliff, the beach and to a collection of beach huts. At the crest of the cliff is open ground with Marine Drive East set back some 50m. There is continuous development inland of the road. There are a limited number of properties between the road and the cliff and these include a small cluster of properties at Barton Court and the Cliff House Hotel towards the western end. It is at Barton Court or Fisherman's Walk, in the centre of the Barton-on-Sea frontage that the nature of the cliff starts to change. To the east are the steeper gravelly cliffs in front of Marine Drive East. To the west are the more predominantly clay cliffs running through to Naish Cliff, the clay stratum dipping to the east.



All the cliffs along the Barton-on-Sea section have been re-graded which has improved the stability; however the angle of repose is still steeper than the naturally stable angle. The cliffs are therefore over-steep and subject to continued failure driven by the underlying groundwater / combined with the underlying geology.



The cliffs located below the western side of Barton-on-Sea (below Barton Court through Marine Drive into Marine Drive West) are currently unstable due to ground movement associated with an area of active landslides. This section is protected by rock revetment and strongpoints, however the drainage system had largely failed. Further along Marine Drive West and into the large Naish Holiday Village the coastline is undefended and the cliffs are erode due to toe erosion and shallow rotational landslides. The centre of the Holiday village is situated 200m from the crest of the coastal slope with holiday chalets populating the entire area.

To the western end of Naish Cliff, the Chewton Bunny cuts in a steep valley through to the coast. The entrance to the valley is defended on its western side by an arrangement of rock structures at the start of the defences to Highcliffe. This marks a distinct step in the coastal alignment, reflecting both the introduction of defences, but also the nature of the cliff material and drainage patterns.



The cliffs at Highcliffe have been significantly managed all the way through to the steeper, but lower, undefended section below Rothesay Park and Highcliffe Castle. Tracks have been developed down the coastal slope and along the lower defended platform at the shoreline. The defence comprises of large rock groynes or breakwaters, tending to be at shorter spacing than those at Barton. There is a rock revetment between the rock structures but this generally remains buried beneath the shingle. The coast in this area is aligned to the south rather than the more southwesterly facing orientation of the Barton frontage.

The cliffs at Highcliffe have been significantly managed all the way through to the steeper, but lower, undefended section below Rothesay Park and Highcliffe Castle. Tracks have been developed down the coastal slope and along the lower defended platform at the shoreline. The defence comprises of large rock groynes or breakwaters, tending to be at shorter spacing than those at Barton. There is a rock revetment between the rock structures but this generally remains buried beneath the



At the crest of the cliffs is open ground to the east, with residential property backing on to the cliff at the western end.

The cliff line reduces in height to the west, down to the frontages of Friars Cliff and beyond to Mundeford and Mundeford Quay.

PHYSICAL PROCESSES (The following information is provided as a brief summary, further details are provided in Appendix C).

TIDE AND WATER LEVELS (mODN)

Location	LAT	MLWS	MLWN	MHWN	MHWS	HAT	Neap range	Spring range	Correction CD/ODN
Hurst Point		-1.13	-0.43	0.47	0.87		0.9	2	-1.83
Christchurch Entrance		-0.31	-0.21	0.49	0.89		0.7	1.2	-0.9

Extremes(mODN)

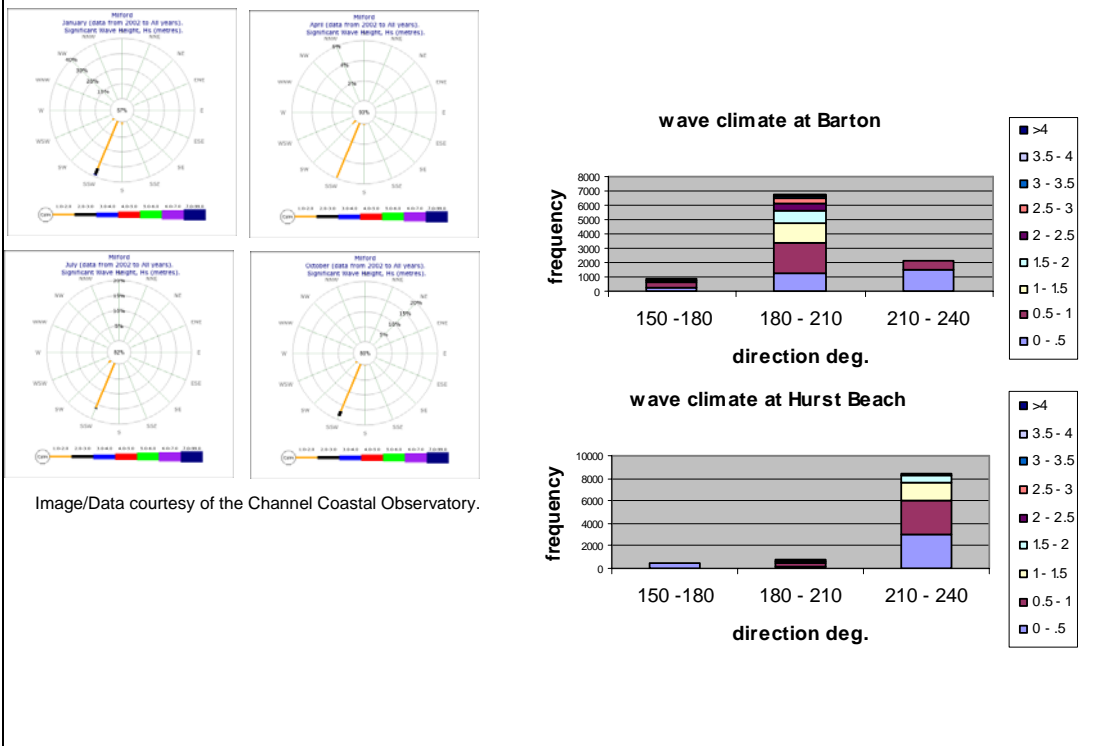
Location:	1:1	1:10	1:25	1:50	1:100	1:200	1:500	1:1000
Barton-on-Sea	1.43	1.70	1.80	1.88	1.96	2.04	2.15	2.23
Hengistbury Head	1.39	1.65	1.75	1.83	1.91	1.99	2.09	2.17

WAVE CLIMATE

The dominant wave direction is from the south to south-west, which corresponds with the direction of longest fetch and longer period swell waves originating in the Atlantic Ocean. Shorter period wind waves from the east and south-east are less influential in terms of geomorphological development along the frontage, although significant storms do occur from these directions and can result in significant local impact.

The largest waves (and therefore greatest amount of wave energy) are received by Hurst Spit and the easterly part of Christchurch Bay. The presence of the Christchurch Ledge extending south-easterly from Hengistbury Head and the ebb-tide delta at the mouth of Christchurch Harbour creates shallower bathymetry and some attenuation of wave energy in the westerly part of Christchurch Bay.

The presence of the Isle of Wight and the Needles provides shelter to Hurst Spit from waves approaching from south to south-east.



Image/Data courtesy of the Channel Coastal Observatory.

The CCO have been monitoring the wave climate along this SMP frontage using Waverider directional wave buoys at Milford (OS 427297E 90361N) since 1996.

The nearshore wave roses show the very strong direction bias within this zone of the coast. Inshore wave climates are reported for Barton-on-Sea and Hurst Beach.

Although the strong directional bias is clearly maintained, the dominant direction at the shoreline changes; this is reflected in the change in orientation of the shoreline itself.

TIDAL FLOW

Currents across the main section of the frontage are relatively low; peak flows less than 0.5 m/sec. Flows increase to the eastern end between Hurst Spit and the Shingles Bank on the flood. Within the entrance to the Solent, in the area of Hurst Castle, peak flood and ebb flows are in the order of 1 m/sec.

PROCESSES

Control Features:

Overall the zone is controlled by the presence of Hengistbury Head and is also influenced by Christchurch Ledge and to the east by a combination of features including the headland of the Isle of Wight and the western approaches to the Solent. Associated with this is the influence, particularly on Hurst Spit, of the Shingles Bank. Within the zone, the development of the *shoreline* has been influenced by the robustness and height of the various sections of cliff and, associated more locally with this, both the projection of these cliff types influencing the erosion of the sea bed topography and their extent inland.

Existing defences at Highcliffe, Barton-on-Sea and at Rook Cliff are also seen as influencing and controlling the shore form, both locally (where defended) and with respect to adjacent frontages. The defence at Milford-on-Sea has created a slight headland, influencing and linking through to the defence at the start of Hurst Spit.

Local drainage has an influence upon the cross shore geomorphological profiles and, as a consequence, on the patterns and rates of erosion.

Existing Defences:

Individual defences are identified in Appendix C. Defence is provided to Hurst Castle, Milford-on-Sea, Barton-on-Sea and Highcliffe. The works at Milford are typically linear defences extending through to the root of Hurst Spit. The main defence to the town is suffering from lower beach levels and general deterioration. The works beneath Rook Cliff are in similarly poor condition. At Barton-on-Sea the defences, particularly at the western end, have suffered from heave of the underlying clays. More recent defences at Highcliffe are in good condition but are reliant on beach recharge and management. Hurst Spit acts as a defence to the low lying saltmarsh within the entrance to the Solent and there are low flood banks around the periphery of this area.

Processes:

The dominant aspects of the coastal processes within this zone are the supply and movement of sediment. The main external control features identified above provide constraints on the development of the natural system. Sediment has been historically supplied to the shoreline by erosion of the cliffs and has been transported along and away from the shore by wave energy. The interaction at the eastern end with the entrance to the Solent has tended to segregate sediment with:

- Wave action allowing generation of Hurst Spit as a shingle feature, re-curving within the estuary;
- Sand and shingle being moved, again by wave action but also within the entrance channel by

currents, to form the Shingles bank; and

- General water movement feeding finer sediment into the Solent sustaining and developing the saltmarshes.

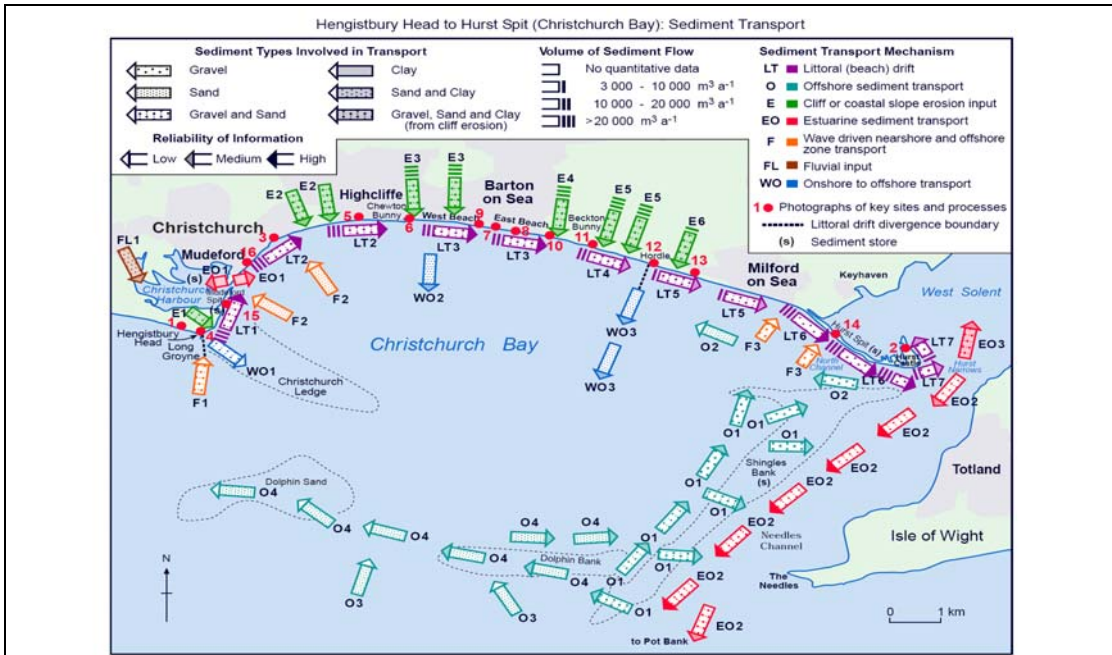
As the coast has evolved to a more stable alignment, the sediment supply has been reduced. The erosion of the coast continues, however the coast is not yet in net alignment with the wave energy. Of importance are the more local features of the coast, where sediment is retained by natural variation in the coastal alignment or where cross shore defences are in place retaining the beaches. This does support the concept developed from modelling, that the existing alignment is not excessively in advance of its stable position. Change does however continue and, in particular, that change is seen in the retreat of the crest of the cliffs, even in areas where the coastal toe has been stabilised. Increasing rates of sea level rise will continue to impose pressure from further retreat of the shoreline. This will have two effects:

- There will be increased wave action on the toe of the coastal slopes, increasing instability; and
- There will be increased potential for long shore drift as the coast is held (either naturally or by man made structures) out of line with its natural alignment.

As the cliffs have provided a degree of resistance to adopting a stable alignment, the natural process by which the cliff develops a stable slope is constrained. Given the complex interaction between the cliffs and the shoreline, an important distinction is made between shoreline erosion (moving towards a stable alignment of the beaches in relation to the plan shape of the coast) and cliff recession (the process whereby the crest and slope of the cliff adjusts to a more stable profile). In some areas this latter process is most strongly influenced by the underlying geology and the effects of groundwater. **The two processes are, however, fundamentally linked.** As material falls or slumps to the toe, so wave action removes this natural support. Unloading of the toe causes instability and shallow rotational sliding along predefined slip surfaces (block & graben system) leading to failure of the cliff. The cliffs are unable to develop a more stable slope. In other areas it is purely that removal of material from the shoreline exposes the cliffs to continuing erosion and over steepening.

In effect, along this section of the coast the erosion at the toe has kept pace with the recession of the crest of the slopes. The material of which the cliff is composed is critical to this process. The most obvious example of this is at Naish. Here, because of the high clay content of the cliff and the high ground water levels within the slope, the natural angle of repose is very shallow; ground water is the dominant influence. Even if toe erosion were stopped, the cliff would continue to fail and the cliff crest would retreat back a large distance. To a lesser degree the cliff at Barton-on-Sea would still retreat despite the current defences. In this latter case, tension cracks regularly develop with the cliff crest failing in sections. There is some sliding of the lower sections of this coastal slope. At Hordle, because the cliff is already set back in relation to the alignment of adjacent sections of the shoreline, a more stable slope has been achieved. At Highcliffe, the defences to the base of the cliff have also allowed the cliff to adopt a stable slope with little movement at the crest. The stability of the slope has also been improved by regarding of the cliff face.

Sediment released from the cliffs is moved to the east and in areas this slows erosion elsewhere. This is shown in the following figure.



Map courtesy of SCOPAC, 2004 (www.scopac.org.uk).

Figure 4.2.2

This analysis has been developed at a relatively broad scale. Further analysis, particularly developed from on-going monitoring, has shown some significant variation from the generalised patterns shown above. The monitoring has identified that there is likely to be discrepancies between the wave climate (determined by recent wave monitoring data) and the rate of sediment transport along the coastline which is presented in the model in figure 4.2.2. It is proposed that this model will be subject to a thorough review in future studies as identified in the Action Plan. Nevertheless as it currently stands the Sediment Transport model identifies the following specific points with respect to management:

- That although the drift along Highcliffe frontage is seen as being large, the potential sediment supply from the cliff is relatively low and the area is protected from the prevailing south-westerly winds. This deficit will be exacerbated by the probable long term reduction in supply from Poole Bay. Some of the deficit is made up by onshore supply of sediment from the area to the north of the Christchurch Ledge.
- The potential supply from the Naish Cliff and the Barton Cliffs is high, with the potential to feed the high drift rate along this frontage and to the east. Naish cliff tends to provide a much higher proportion of fine sediment rather than beach building material.
- Drift rates are shown to decrease towards the Milford frontage but then an increase along Hurst Spit. More detailed information for the area has shown that, while Hurst Beach is quite dynamic, the actual net drift rate over the frontage is relatively small. As an overall feature it remains quite stable. However, there is a clearly little sediment held in front of the Milford-on-Sea seafront.
- Although the assessed drift rates along the frontage are significant, they are a magnitude less than in many of the eroding coastal systems of the UK.

At Hurst Spit, the actual processes driving the development of the Spit are complex and less well understood. The Spit is under pressure to roll back with sea level rise. This pressure is modified by the presence of the Shingles Bank. There is believed to be some natural supply from the offshore area.

Protection to sections of the shoreline form headlands. This tends to reduce sediment supply immediately to the east of the headland and this then causes creation of sub-bays, set back further from the overall alignment of the coast. The depth to which these sub-bays form, or would form, is relative to their position within the overall bay. In this way, smaller bay shapes tend to be more pronounced within the central section of the bay than if formed further to the east.

Unconstrained Scenario:

Although unrealistic, because of the residual impact of defences, this scenario considers how the coast would respond, if all defences were removed. It is useful in examining the pressure along the frontage.

Both the shoreline and the back crest of the shore would tend to move back in unison over the Mundeford area. In the same way, the cliff crest and shoreline position along the Highcliffe section would tend to move back together, potentially some 100m. At the western end of Highcliffe, without the bastion at this point, recession of the cliff would be more severe as the softer Naish cliff line retreats more rapidly. The shoreline would erode at a rate more in line with adjacent frontages. Barton-on-Sea is already slightly in advance of the natural shoreline to the east and west and might be expected to erode, initially, at a faster rate. This would incur increasing recession of the cliff top as the toe support is removed and the over steepened cliff becomes unstable.

The cliff section to the east of Barton-on-Sea is slightly set back. Even so, because the high water mark is close to the toe of the cliff, there would be significant pressure on this frontage to erode. Hordle Cliff is provided some control by the cliff to the west and more significantly by the Rook Cliff frontage at Milford. The erosion at Hordle Cliff would be determined very much by the rate of erosion at Rook Cliff. This cliff, without its defences would retreat, initially, quite rapidly.

POTENTIAL BASELINE EROSION RATES

Base rates have been assessed from monitoring and historical data. The range of potential erosion is assessed in terms of variation from the base rate and sensitivity in potential sea level rise. Further detail on erosion rates is provided in Appendix C. The base rates provided below are taken as an average based on historical records. The rates are a composite value based on erosion of the toe and recession of the crest of the cliff and reflect the erosion rates following failure of defences.

(Sea Level Rise assumed rates: 0.06m to year 2025; 0.34m to year 2055; 1m to year 2105. Baseline date 1990.)

Location	Base Rate	Notes	100yr. Erosion / Recession (m)
Highcliffe	1.1m/yr	Erosion resisted by defences and slopes stabilised	120m
Naish Cliff	2.8m/yr	Shoreline position held forward by material slumping from the coastal slope.	280m to 410m
Barton-on-Sea	1.2m/yr	Erosion resisted by defences and cliff crest continues to retreat.	120m to 230m
Barton Cliffs	2.7m/yr		150m
Hordle Cliffs	0.8m/yr		120m
Rook Cliff	1m/yr	Erosion resisted by defences.	150m
Milford on Sea	1m/yr	Erosion resisted by defences.	150m

4.2.2 BASELINE MANAGEMENT SCENARIOS

PRESENT MANAGEMENT

Present Management is taken as that policy defined by SMP1, modified by subsequent strategies or studies. It should be noted that both in the case of SMP1 and that of many of the strategies undertaken before 2005, the period over which the assessment was carried out tended to be 50 years.

SMP1			MODIFIED POLICY		
MU	LOCATION	POLICY	REF	LOCATION	POLICY
Not identified	Area to rear of Hurst Spit				
CBY 7	Hurst Spit	HTL	S1	Hurst Spit	Beach recharge and management.
CBY 6	Milford on Sea	HTL	S1	Milford on Sea	Beach recharge and maintain defences.
CBY 5	Hordle and Barton Cliff	DN/ Retreat	S1	Hordle and Barton Cliff	Allow natural evolution.
CBY 4	Barton-on-Sea	HTL	S1	Marine Drive East to Sea Rd.	Stabilise cliff, maintain defences.
			S1	Sea Rd to Marine Drive West	Beach recharge and cliff drainage.
CBY 3	Naish	Retreat and selectively HTL	S1	Marine Drive West	Drainage, beach recharge and new rock headland (yr 20 – 30).
			S1	Naish Holiday Park	NAI
			S1	Chewton Bunny	Maintain Rock headland associated with defence to west.
CBY 2	Highcliffe	Selectively HTL	S1	Highcliffe	Reduce size of groynes and use to repair revetment, maintain headland to east end, beach management and recharge frontage to east (CBY3).
			S1	Highcliffe Castle	Maintain erosion but protect Castle in long term.
			S1	Friars Cliff	Replace timer Groynes with rock, beach management and recharge.

References:

S1

Christchurch Bay Strategy Study(DRAFT) - April 2007

BASELINE SCENARIOS FOR THE ZONE

Introduction

Two baseline scenarios are considered below, these being: No Active Intervention, assuming that no further action is taken to defend the coast, and With Present Management, developing the approach defined by SMP1 and subsequent strategies. In the latter case the approach defined for the next 50 years is extended over the next 100 years.

In examining these scenarios, the SMP2 has initially considered the whole frontage as one, considering how management and behaviour of different sections of the coast may influence one another (e.g. if one section of the coast is held by defence, how will this impact upon the development of other sections of the frontage). This establishes the various links between sections of the coast and provides a context for examining more specific sections of coast in greater detail.

As discussed earlier (Section 4.1.1 - Processes), this section of the coast works in two interrelated ways. On a frontage by frontage scale, the rates of erosion of the coast and the rate of recession of the crest of the cliffs is very largely determined by the geotechnical properties of the backshore. The ability of the coast to erode is determined by the ability of the cliffs and foreshore to resist wave action; the more able the foreshore is to dissipate or absorb wave energy, or the stronger the nature of the cliffs are, the less the shoreline will erode. Defences act to strengthen the coast in this respect. The nature of the cliff, together with its drainage and moisture content, also dictates the behaviour of cliff crest recession; so that even where the toe of the cliff is no longer eroding, the crest of the cliff may still retreat inland until it establishes a stable slope (or natural angle of repose). This retreat behaviour of the crest may be through continuing weathering and falls from the cliff face or may involve deeper seated failure, movement of large sections of the whole slope or surface slides. Where there is continuing erosion of the toe, the coastal slope can never reach a stable slope and the two processes work together, with a retreating coastal profile.

Along the shoreline, coastal behaviour is largely driven by the movement of sediments (drift), this being driven by the waves (or in some locations by tidal flow). If the wave approach is at an angle to the shoreline, sediment is moved. Sediment may be replaced by drift from adjacent frontages but, if not, the foreshore and toe of the coastal slope will erode. Cross shore structures may resist this movement. The rate of movement in any area is, therefore, largely determined by the orientation of the shoreline. Where there is a promontory (headland) in the coast; where a cliff is more resilient or there are defences, sediment is able to build up, realigning the shore more in tune with the direction of the wave angle. Down drift of such a point there tends to be increased erosion, until such a time as the headland actually starts to provide shelter to the coast down drift and a stable bay is formed (a log spiral bay). The basic process is shown in the following diagram.

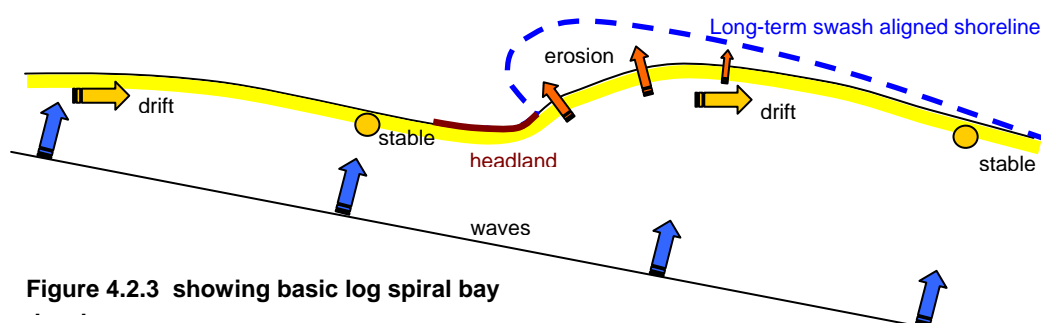


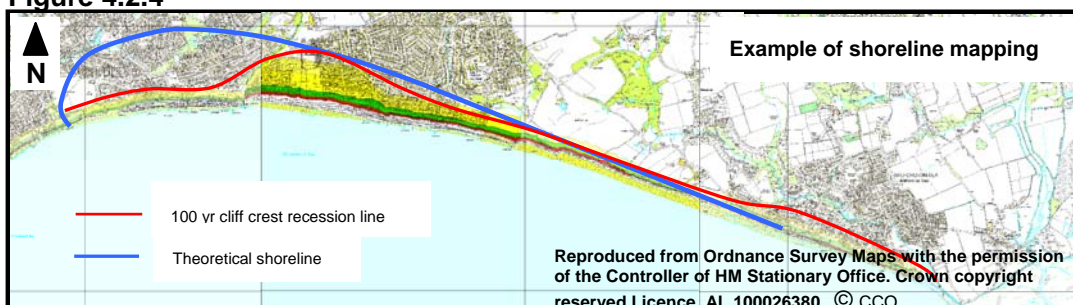
Figure 4.2.3 showing basic log spiral bay

The two processes, that of cross-shore behaviour and that of longshore interaction, work together to shape the coast and have to be considered both in the description of the baseline scenarios (below) and in discussion and development of policy (section 4.1.3).

The baseline erosion, mapped in Appendix C and discussed in the subsequent sections, has been determined from examination of historical records and monitoring data, in combination with information from geotechnical studies. As such, although generally shown as recession lines at the crest of the cliff, they reflect the past development patterns of the coast, incorporating both erosion and cliff recession. This provides a good analysis of where the crest of the cliff may be over the three epochs. However, they cannot, and do not attempt to, assess how, by holding sections of the shoreline or through the natural shaping of the coast through wave action, the frontages may continue to erode in the longer term or how management across different sections may influence the rate of erosion of the shoreline or toe of the coastal slope over the coast as a whole.

To help address this, a high level assessment has been made of the possible bay development arising from different scenarios. This assessment, based on average wave energy direction, consideration of potential hard points and the existing larger scale bay shape, provides rough estimates of how the shoreline (the toe of the coastal slope) might develop. This shape is described as a theoretical shoreline in the following sections; as shown in the example below. Where the theoretical shoreline lies well behind the mapped cliff recession line, the process of retreat would be one of combined erosion and cliff recession, if these processes are not constrained artificially. The development of the full bay shape could continue well beyond the hundred year period of SMP2.

Figure 4.2.4



Where the theoretical shoreline aligns closely with the existing shoreline, the pressure for erosion is likely to be less, although still occurring, and would tend to be more stable. This would depend on the degree of control imposed at the down drift end. In these areas the process of cliff recession is still likely to occur and the mapped recession lines under any scenario are still relevant in assessing potential loss of assets.

The theoretical shoreline is acknowledged to be indicative and does not fully take account of the variation in wave angle and exposure over the whole length of the coast, nor does it take account of the local influence of topography and bathymetry. Recognising this, it would be inappropriate to map this line in detail (the actual retreat lines are shown in greater detail in Appendix C). The various figures in subsequent sections aim only to aid discussion of different approaches to management. However, this approach is useful in highlighting over the larger scale where the coast would be under pressure to erode and how management in different sections of the coast might then influence this erosion, supply and drift of sediment affecting adjacent sections of the shoreline.

No Active Intervention (Scenario 1):

Overview

Under this scenario, no works would be taken to maintain existing defences along the frontage. With the exception of the rock revetment at the Milford-on-Sea end of Hurst Spit (with an estimated residual life of 50 years), it is reported that all defences would fail or would become ineffective within the first epoch of the SMP. The coast would resume an uninterrupted pattern of erosion. Erosion would occur to the toe of the cliffs as the alignment of the coast attempts to adjust to form a stable bay in line with typical wave energy on the frontage. Cliff recession zones for the three epochs (20yrs, 50yrs, 100yrs) have been assessed based on historic patterns of recession. This is shown in the following figure (Figure 4.2.5). Detailed maps of recession are provided in Appendix C.

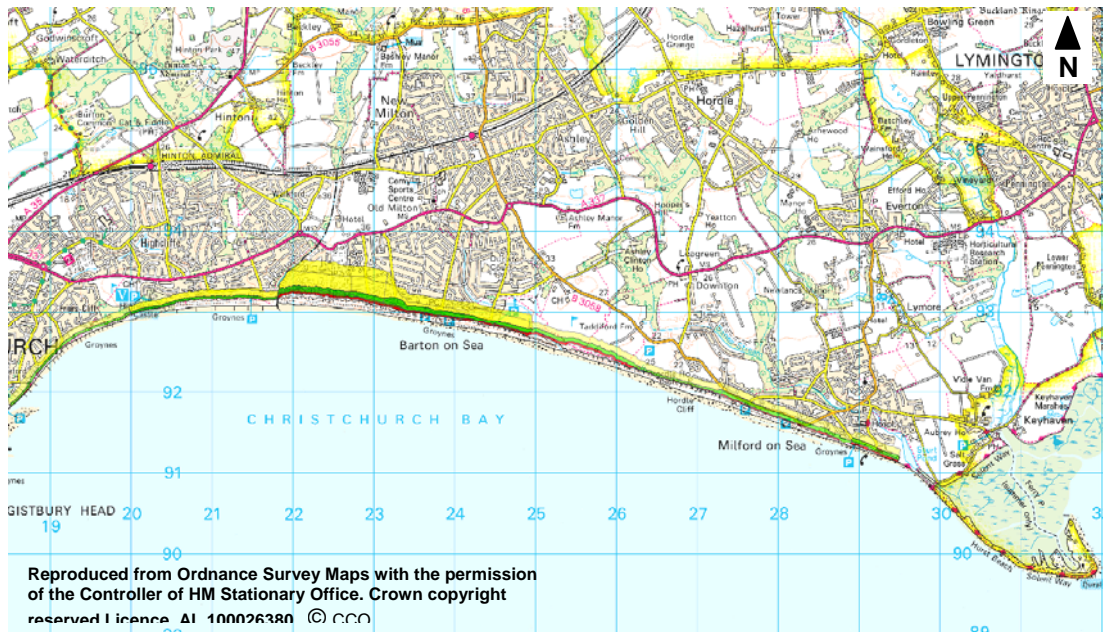


Figure 4.2.5

Figure 4.2.6 shows, superimposed on this recession plot, the estimated theoretical equilibrium shoreline, as discussed in the introduction to this section of the report.

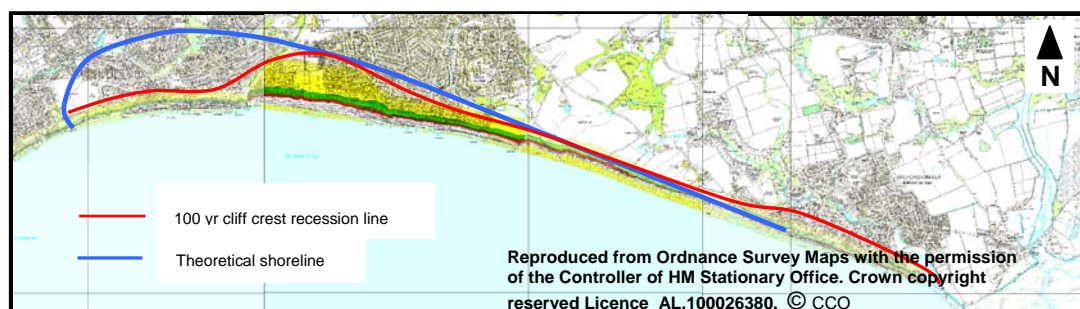


Figure 4.2.6

It may be seen that over the western end of the frontage, under a no active intervention scenario, the cliff recession rates would dictate the position of the coast over the period of the SMP2. There is unlikely to be any underlying geomorphological restraint slowing rates over this period and the full pattern of erosion and recession is likely to occur. Further erosion of the shoreline would continue beyond the 100 years, as suggested by the theoretical shoreline shape, and the cliff line would

continue to retreat. This erosion and cliff recession would vary along the frontage as different geology was encountered. At the eastern end, assuming the underlying control imposed by the entrance to the Solent does not significantly alter; the shoreline would erode to some degree at Rook Cliff, where it is held by defences, but would be tending to a more natural alignment. The cliff recession would still occur as the coastal slope adjusts to a more stable profile. This eastern section would gain some benefit from increased sediment transported from the eroding cliffs to the west. However, this would be a slow process of sediment release over time. The main beneficiary of this increased supply of beach material would be Hurst Spit, although a substantial volume of material would feed in to the nearshore area and beyond the spit, to the approaches of the Solent. It is not suggested that allowing the western half of the zone to retreat would substantially benefit the eastern half over the period of the SMP.

The key points highlighted by this overview of the frontage are:

- The long term erosion problem faced at the western end of the frontage;
- That at large scale the eastern end of the frontage is well aligned to wave energy;
- That at present, both the defended cliffs to the eastern end of Barton-on-Sea and the slight promontory formed by the defended section of Rook Cliff do act as headlands and are therefore quite strategic in management of the whole frontage. (In the case of Rook Cliff this is shown by the accumulation of sediment within the shallow bay to the west of Rook Cliff);
- That the position of these two areas, in relation to the theoretical equilibrium shape of the larger frontage does suggest that development of any down drift local embayment might be quite shallow.

The more specific consequences of this no active intervention scenario is discussed below, section by section, from east to west.

Hurst Spit.

Hurst Spit would benefit to a degree from the increased supply of sediment from the west. However, due to the slow release of material from the cliffs, while defences continue to have a residual impact this may not be sufficient to compensate for the loss of sediment around Hurst Point. Without the management and recycling of sediment, the shingle ridge of Hurst Beach may well breach. The overall feature is likely to sustain itself in some form but at a lower level. However, it seems unlikely that without maintenance of the defences to Hurst Castle, that the Castle would remain for the next 100 years. This would result in significant change, impacting on the sustainability of Hurst Beach and North Point and this in turn would impact on the marsh area behind.

There would also be significantly increased flood risk, due purely to water levels in the area behind Hurst Spit. Even at present, areas of Keyhaven are within the flood risk area and a substantial part of the village is at risk on higher return periods. With sea level rise, by mid-way through the third epoch virtually all the village would be at risk on a 1:10 year event, if defences were not in place. This area is covered by the adjacent Solent SMP2, but the point raised is in the increased exposure and increased level of risk as a result of more frequent overtopping and potential for breach along Hurst Beach.

Milford on Sea

Following failure of defences, the seafront at Milford would be lost, with the loss of property behind. Although the rock revetment at the root of the Spit would act as a hard point over the first two epochs (and probably into the third epoch) this would tend to allow formation of a more substantial beach to the west, this area would be a potential position for a breach through to Sturt Pond.

Despite the supply of sediment from the west slowing rates of erosion, the road above Rook Cliff would be cut by erosion and recession of the cliff. This could happen within the next 50 years. Property to the western side of Milford-on-Sea, between Rook Cliff and Hordle Cliff would be lost in the third epoch.

Hordle Cliff to Barton Cliff

Further west, the golf course would lose an estimated 150m width of its frontage, although, over this section of the coast, erosion of the toe to the cliff may start reducing and it is unlikely that the golf course club house would be lost in the foreseeable future. Similarly the main coastal road would be safe over this section of the coast.

Barton-on-Sea to Highcliffe

The group of properties seaward of Marine Drive in Barton-on-Sea would be lost during the first epoch, with the road and the property immediately behind Marine Drive probably lost within the next 50 years. Erosion of the Barton-on-Sea frontage would continue, taking out a further three to four rows of properties over the 100 years. With more severe erosion, the recession of the cliff might have taken out a further two rows of properties over this period. Under this scenario, future losses might be expected at a rate of two rows of properties every 50 years, beyond the 100 year period. Much of the Naish Holiday Village would be lost including the Holiday Village centre. Under this scenario there would be significant loss at Highcliffe, over the 100 years, including loss of the Castle and areas of property along Rothesay Drive and Wharnccliffe Road.

Overview of Impacts

The potential economic damages are identified in Table 1 at the end of this sub-section. Table 2 provides an assessment against the general objectives. Clearly significant properties would be lost under this scenario. Essential aspects such as the seafront would be lost at Milford-on-Sea, together with its main access road to the west. Access to the town would still be possible and the centre of the town would still exist, but the loss of its seafront would reduce one of its core values to the area. With continuing erosion in areas such as Barton-on-Sea, adaptation would be increasingly difficult.

Hurst Spit would provide a good degree of shelter to the marshes behind, although clearly the loss of the Castle would impact on tourism and character of the area.

One major benefit would be the fresh exposure of the geological features along the coastline and successfully maintaining the dynamic nature of the coast. Due to the dip of the geological beds, continued erosion of the exposure at Naish Cliff would lead to eventual loss of the resource. In addition, access to the coast would be severely constrained and, with the loss of car parks and open areas from which to appreciate the landscape, this value of the coast would be significantly affected. This would be exacerbated by the continuing abandonment and loss of property in areas such as Highcliffe and Barton-on-Sea. Overall, landscape values are assessed as having been diminished.

The character of the area would be substantially different and would not contribute in the same manner to the overall benefit of the communities or to the region. The persistent threat to properties over the Barton-on-Sea frontage, continuing beyond the 100 year period of the SMP2, would result in adverse impacts to the community and loss of value to property extending back into the town.

With Present Management (Scenario 2):

Overview

The present management scenario is based on that set by SMP1 and updated through the development of the recent draft Christchurch Bay Strategy. Although in draft, this strategy is taken as reflecting the intent of WPM within this baseline scenario. The intent defined within the strategy is to provide continued protection to all existing areas currently defended and to extend management to the west of Barton-on-Sea and, through recharge, to the slowing of erosion in front of Naish Cliff. The intent of the strategy is also to maintain defences at Milford-on-Sea and to continue to manage the future development of Hurst Spit. The strategic approach relies quite heavily on beach recharge to supplement the loss of sediment across the whole frontage.

Under this scenario, the coast is divided as a series of hard points, protecting or delaying loss of specific assets. This is shown in outline in Figure 4.2.7.



Figure 4.2.7

These hard points are:

- At the revetment to the root of Hurst Spit (specifically the breakwater at the eastern end of the revetment). Hurst Castle forms the down drift control feature to the spit; although the actual shape of the whole spit is strongly influenced by the nearshore banks and the entrance to the Solent;
- At Rook Cliff, with the defences at the White house and the seawall in front of Milford acting as local hard points;
- To the east of Barton-on-Sea, forming a bay between here and Rook Cliff;
- Along the whole length in front of Barton-on-Sea;
- At the eastern end of Highcliffe with a bay developing through to the extension of defence to the west of Barton-on-Sea; and
- At the eastern end of Friars Cliff with a small bay developing through to Highcliffe Castle, which would be defended in the longer term,

The intent of the strategy is to maintain sediment supply to the frontage largely through recharge. As sea level rise occurs, this will place a greater emphasis on the need for additional sediment. In particular, in reducing the potential to retain sediment in front of Highcliffe through reducing the length of groynes, this will place greater pressure on the linear approach to defence and on the need for greater effort in maintaining the revetment. Any sediment provided to this frontage will principally be held within the embayment at Naish Cliffs and by defences in front of Barton-on-Sea. Significant reliance would be placed on the defences extended to the west of Barton-on-Sea, in an area of the coast understood to be subject to underlying instability.

Drift to the east of Barton-on-Sea would be maintained to a degree by the increased erosion of the cliffs in this area. This would provide some additional material to support the defence of Milford-on-Sea and Hurst Spit.

The more specific consequences of this with present management scenario are discussed below section by section from east to west.

Hurst Spit.

The revetment to the root of Hurst Spit would be maintained and a programme of recharge and recycling of sediment would be undertaken to maintain Hurst Spit. The draft strategy makes no specific reference to the defence of the Castle but it is taken that defence of this feature would be part of the with present management scenario. The with present management approach emphasises the need to consider each element of the Spit (Hurst Beach, Hurst Castle and North Point) as part of one geomorphological feature.

In maintaining Hurst Spit, it is also taken that under this scenario the flood defences along the rising ground along Saltgrass Lane, to Keyhaven and to the centre of Milford-on-Sea, would be maintained. Even with the intent to maintain Hurst Spit, there would be a need to increase levels of flood defence to Milford and to Keyhaven. Retaining defences, particularly along Saltgrass road would result in squeeze of the marshes in this area, typically over the third epoch of the SMP. This would be considered in detail within the adjacent North Solent SMP2.

Milford on Sea

At Milford-on-Sea the existing defence line would be maintained with recharge in front. Holding the existing line in front of the low lying seafront of Milford-on-Sea, would be well in advance of the natural shoreline position and, despite the intent to maintain the Hurst Spit revetment, considerable effort would be required to maintain any significant beach to this area. The benefit of creating a hard point at the revetment is effectively lost because of the advanced position of the hard linear defence along the Milford seafront. The maintenance of this existing defence line would incur increasing loss of the beach and the need for substantially raised defence levels.

The linear approach to defence along the frontage between the seafront and Rook Cliff again provides little scope for naturally retaining a beach in this area and with present management, therefore relies upon increased effort put in to maintain the existing structures.

Hordle Cliff to Barton Cliff

Between Milford and Barton-on Sea, erosion would be allowed to occur along Barton Cliff through to Hordle Cliff. Works would be undertaken to maintain defences at the eastern end of Hordle Cliff and along Rook Cliff to protect properties and the road. A bay would be developed between the defence at Rook Cliff and the defence to the eastern end of Barton-on-Sea, potentially creating increased erosion along Barton Cliff but being controlled, further east, by holding Rook Cliff. The development of this bay, with control at the eastern end, would tend to reduce erosion at the eastern end of Hordle Cliff.

Barton-on-Sea to Highcliffe

The strategy over this whole section is based on defining intervention lines, at which time action (toe protection and drainage) would be taken to defend assets such as Highcliffe Castle, the Holiday Village and individual properties such the Cliff House Hotel. This staged approach is driven primarily by economic and funding constraints, works being justified by the imminent loss of hard assets, allowing loss of open recreational land in front of specific assets. Furthermore this approach is continued over the Barton-on-Sea frontage, extending the existing defence system further to the west, imposing greater control over the erosion of the Naish Cliffs.

Even with this additional protection to the west of Barton-on-Sea, the recession of the cliff crest would continue, potentially resulting in the loss of a significant area of the Holiday Village and, in the latter epochs, areas of west Barton-on-Sea. Over the central area of Barton-on-Sea, cliff crest recession is likely to affect assets at the cliff crest. This highlights the combined influence of coastal erosion and the underlying instability of the cliff profile.

The strategy identifies that the underlying geology (comprising interbedded sands and clays), which varies along the coastline, due to the dip of the underlying geological units, have resulted in subtle variances in the rate and mode of cliff failure along the coastline. A number of different cliff behavioural units have been identified between Chewton Bunny and Barton Common. It is recognised that to some degree the problem of high ground water and the associated pore water pressure and associated landslide potential affect all sections of the frontage.



Cliff behavioural Units – Barton-on-Sea

To the west, in particular, the area is affected by deep seated failure in the underlying clays as well as more active slumping of the coastal slope. It is reported that existing defence structures in this area are already affected by heave of the underlying ground. The central section has a slightly more stable profile with a wider lower platform protected by groynes and revetment. Both the central and eastern section are still vulnerable to failure of the cliff structure, but both sections suffering significantly from failure of the overlying, over-steepened gravel exposures. Under the strategy, therefore, despite works to stabilise and protect the toe of the cliffs, there is an expected loss of cliff top assets and open ground at Barton-on-Sea, with continuing losses to the Naish Holiday Village and cliff recession over the whole of the Barton-on-Sea frontage.

Associated with the recommended policy of recycling of beach material from the western end of the zone back along the Mudeford section of the coast, is a need to recharge the frontage in front of Highcliffe to supplement drift to the east; this principally being for the benefit of Naish Cliff. As part of this plan, it is intended to allow the cliffs between Friars Cliff and Highcliffe to erode, although defending Highcliffe Castle at some time in the future. It is also suggested in the strategy that the length of the groynes along the Highcliffe frontage are reduced in length and rock used to increase the strength of the revetments. The eastern end of the Highcliffe frontage would be reinforced to provide an anchor to the coast at this position.

Overview of Impacts

The potential economic damages under this scenario are identified in Table 1 at the end of this sub-section. The damage assessment made for the SMP2 under WPM, based on the 100 year cliff recession, are considerably higher than predicted in the draft strategy. Critical to this is the potential delay assumed in loss made in the strategy study. Table 2 provides an assessment of this baseline scenario against the general objectives.

The intent of the scenario is to reduce the rate of erosion in all areas of the coast, with the exception of that along the Barton to Hordle Cliff section. Even so, unless in areas such as Naish Cliff and the Barton-on-Sea Frontage there were substantial works to stabilise the coastal slope, both through drainage and direct slope stability techniques, assets will still suffer loss in the future. Defence at the western end of Barton-on-Sea will become increasingly difficult to maintain in an advanced position and their long term sustainability would be questionable. Also long term defence of the Milford-on-Sea seafront will become increasingly difficult with sea level rise. As such, the objective of 'managing risk to properties where sustainable' is only considered to be partially addressed.

While the community of Milford-on-Sea is maintained, the use and appearance of the seafront would be significantly altered through loss of the beach and increasing levels of defence. In extending the defence to the west of Barton-on-Sea, a perception and expectation of longer term protection may be created. This may result in increased difficulty in adaption of the community in the long term.

The scenario would aim to increase the influence of defence over the designated cliff line. Although this would still allow exposure of the cliffs in front of Highcliffe Castle (until the Castle was protected) and would reduce erosion of the specific geological formation at Naish Cliff, overall there would be a reduction in cliff erosion. This would also further constrain the capacity for the coast to change.

There is a potential loss of saltmarsh area behind Hurst Spit as flood defences are maintained. Although this area strictly falls within the adjacent SMP area, under this scenario the assumed intent to maintain and increase flood defences would impose greater reliance on the need to maintain the level as well as the volume of Hurst Spit, imposing potentially greater need for management of the active spit area in the face of increasing sea levels. This may constrain an adaptive approach to management of this feature.

The intention of this scenario is to reinforce and extend defences as assets come under more immediate risk. This approach aims, therefore, to increase reliance on defences in the future, with more emphasis on linear defence of the frontage. In the longer term, actions such as reducing the length of the groynes at Highcliffe, extending defences at Barton-on-Sea and increasing defences at Milford-on-Sea would reduce the ability to maintain beaches and could therefore impact on the overall landscape and appearance of the frontage. The lack of economic value allowed against the important open spaces, associated with the enjoyment of the frontage, forces this approach to focus on a long term approach of being forced back to defence of specific hard assets.

Table 1. Economic Assessment

The following table provides a brief summary of damages determined by the SMP2 analysis for the whole PDZ. Further details are provided in Appendix H. Where further, more detailed information is provided by studies, this is highlighted. The table aims to provide an initial high level assessment of potential damages occurring under the two baseline scenarios. The damages for each epoch are current values. These are discounted to give present values in the final column. It is important for the reader to note that the loss figures quoted only refer to domestic dwellings and no account has been taken of commercial, industrial or infrastructure property values.

ASSESSMENT OF EROSION DAMAGES

Epoch		0 -20 year		20 – 50 years		50 – 100 years		Present Value Damages (£x1000)
No Active Intervention	SMP1 MU	Number of properties	Value x £1000	Number of properties	Value x £1000	Number of properties	Value x £1000	
<i>Location</i>								
Hurst Spit	CBY7	0	0	0	0	0	0	-
Milford on Sea	CBY6	0	0	40	10,407	484	125,920	17,420
Hordle Cliff	CBY5	0	0	0	0	1	260	28
Barton-on-Sea	CBY4	1	260	7	1,821	316	82,212	9,792
Naish Cliff	CBY3	0	0	1	260	261	67,903	7,494
Highcliffe	CBY2a	0	0	3	706	147	34,597	4,022
Total for PDZ1								38,756
With Present Management	SMP1 MU	No.	x £1000	No.	x £1000	No.	x £1000	Present Value Damages (£x1000)
<i>Location</i>								
Hurst Spit	CBY7	0	0	0	0	0	0	-
Milford on Sea	CBY6	0	0	0	0	164	42,667	4,651
Hordle Cliff	CBY5	0	0	0	0	1	260	28
Barton-on-Sea	CBY4	1	260	7	1,821	316	82,212	9,792
Naish Cliff	CBY3	0	0	1	260	261	67,903	7,494
Highcliffe	CBY2a	0	0	1	235	1	235	109
Total for PDZ1								22,074
Notes								
The economic assessment undertaken as part of the draft strategy (2006) recognises the significant uncertainty in determining damages due to prediction of cliff behaviour in the area of Barton-								

on-Sea and Naish Cliff. It is indicated that PV damages occurring under NAI would be £40M (Highcliffe to Mundeford), between £30M and £51M (Naish and Barton-on-Sea), £1M (Hordle Cliff) and £43M (Milford and Hurst Spit). This takes account also of loss of beach huts. The respective WPM damages are assessed as £1M (Highcliffe to Mundeford), between £1M and £2M (Naish and Barton-on-Sea), £1M (Hordle Cliff) and £1M (Milford and Hurst Spit).

ASSESSMENT OF POTENTIAL FLOOD RISK

		Flood risk total tidal and fluvial 2008		Flood risk total tidal and fluvial 2102		
No Active Intervention	SMP1	Number of properties	Value x £1000	Number of properties	Value x £1000	Averaged PVD (£x1000)
Location	MU					
Hurst Spit	CBY 7					
Milford on Sea	CBY 6	69	17,951	146	37,984	17,155
With Present Management						
No Active Intervention	SMP1	Number of properties	Value x £1000	Number of properties	Value x £1000	Averaged PVD (£x1000)
Location	MU					
Hurst Spit	CBY 7					
Milford on Sea	CBY 6	0	0	0	0	0

OTHER INFORMATION:

No other assessment of flood damages has been made.

Table 2. General Assessment of Objectives

The following table provides an overall assessment of how the two baseline scenarios impact upon the overall objectives agreed by stakeholders. These objectives are set out in more detail within Appendix E. The table aims to provide an initial high level assessment of the two baseline scenarios, highlighting potential issues of conflict. These issues are discussed in the following section, examining alternative management scenarios from which SMP2 policy is then derived.

OBJECTIVE	NAI				WPM			
	Neutral	Fails	Partial	Positive	Neutral	Fails	Partial	Positive
Manage risk to properties due to erosion where sustainable.								
Support adaptability of the local cliff-top communities.								
Maintain the community of Milford on Sea								
Manage Hurst Spit appropriately to deliver the objectives stated within North Solent SMP.								
Maintain geological exposures of the designated cliff line.								
Minimise loss of habitat or species if possible (identify compensatory habitat elsewhere within SMP area if net loss occurs).								
Maintain the dynamic coastal zone and its capacity to change.								
Maintain the outstanding landscape and the views and appreciation of the varied coastal environment.								
Reduce and minimise reliance on defences.								

4.2.3 DISCUSSION AND DETAILED POLICY DEVELOPMENT

In considering the two baseline scenarios, while the behaviour of the cliffs determines rates of erosion and cliff recession, a key aspect of the coast is its overall plan shape as much as the local cross-shore behaviour of the cliffs and foreshore. The draft strategy acknowledges this in terms of its attention to maintaining sediment drift over the frontage. As identified in the strategy, and in past examination of the frontages, one of the main constraints in the area is the way in which defence of the coast has developed in the past and, associated with this, the way in which the development has occurred behind defences. The strategy is further constrained by its necessary focus on strict economic justification for actions. As such, with present management is focused on an approach of considering the timing of when defences may be most effectively be put in place to limit loss of assets.

The brief within the procedural guidance for SMP2 allows greater latitude in considering the overall values of the area, with the intent to create a more balanced approach to overall sustainability of these values.

Under the no active intervention scenario, this balance is seen to be strongly in favour of natural evolution of the frontage. This is at the expense of both the built and historical environment and also the loss of opportunity to enjoy this naturally developing coastline. This loss would have considerable impacts at a regional level in terms of recreation and tourism, as well as a local impact on the value of the coast to communities through its ability to sustain their economic well being.

Even under the with present management approach, many of the values of the area are not met. There is still considerable loss of property as the cliff crest retreats, even where defences are held or new defences added. As such neither of the baseline scenarios identifies an ideal approach to the future management of the zone.

The approach taken in this discussion of policy initially considers the eastern end of the frontage. Although management of this section has a degree of dependence on the availability of sediment from the west, this is not seen as the critical factor in management. Increased sediment supply under no active intervention may be of assistance in managing the shoreline, but is not identified in the strategy as being fundamental. Indeed, the with present management approach which recommends maintaining and increasing the defence at Rook Cliff, would in any event, tend to reduce sediment supply to the Milford-on-Sea seafront and to Hurst Spit.

This eastern section of the coast is closely aligned to the net wave energy approaching from the south west. There is, however, still pressure on the coast to erode (and sea level rise and increasing wave energy inputs will sustain this pressure). While this section assists in holding the coast to the west to an extent, any impacts due to erosion of this control point on the coast to the west are only likely to be local. This eastern section of the frontage, therefore, can be considered to be essentially independent of the coast to the west, but management of this section provides a useful reference point before considering other sections in more detail.

Hurst Spit and Milford-on-Sea

This area is under pressure both from erosion of the front face and the hinterland is potentially at risk from flooding. The extent of erosion under the no active intervention scenario, together with the potential 100 year flood extents for present day and mid-way through the third epoch (with sea level rise) are shown on Figure 4.2.8 below.

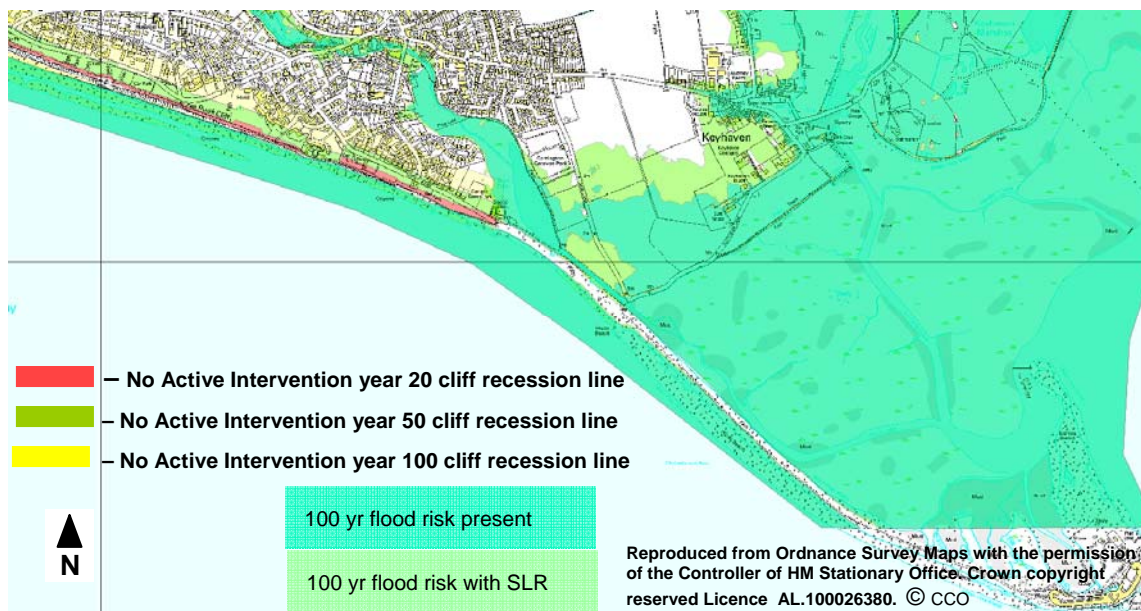


Figure 4.2.8

(Note: plots are indicative and further detail of flood risk should be obtained from Environment Agency flood risk mapping.)

Considering first Hurst Spit, this feature is considered important as a defence to the area behind as well as being an important feature in its own right. Despite the defence works at the root of the Spit and the hard defence at the Castle, the feature, as a whole, is important for its characteristic geomorphological form and the continuing evolution of the recurve behind the castle (North Point). There are also older recurves visible which demonstrate the historical evolution of the Spit.

Hurst Castle is an important aspect of the built heritage and the whole spit forms part of the Solent Way. Management, as at present, needs, therefore, to consider the whole geomorphological structure as one, with management of individual areas being undertaken in a manner sympathetic to the specific values of each section. In this way, the overall policy is to maintain the feature and position of the Spit.

To achieve this, the control imposed by the revetment and breakwater to the western end and the defence of Hurst Castle needs to be maintained. To maintain the beach section the bulk of the ridge will need to be sustained and reinforced by recharge and this is sensibly achieved in part through recycling sediment from North Point. However, removal of sediment from the North Point needs to be undertaken in a manner that does not destroy the overall natural value of this section. This would subject to continued monitoring and a local management plan as at present.

Within the overall intention to maintain Hurst Spit, there would be no intent to actively defend North Point. The Castle would come under increasing pressure of erosion and it would be important to maintain some further degree of control at the western end to

ensure that the castle defences did not become out of alignment with the central section of the Spit. This could tend to reduce sediment transported beyond the Castle. The secondary spit within the entrance to the Solent is therefore likely to roll back. This would sensibly be allowed to happen, maintaining the integrity of this feature and the protection it provides to the saltmarsh at the rear of the Castle.

In terms of policy, Hurst Spit is defined as one policy unit, with a policy of Hold the Line. The intent of this policy, as described above, is to maintain the semi-natural behaviour of the spit through maintaining existing controls and through recharge and recycling of sediment.

Management of the rest of this eastern end of the PDZ needs to consider the whole



Beach huts to the west of Rook Cliff

frontage of Rook Cliff, the seafront of Milford-on-Sea and the interaction between the seafront and the defence at the root of Hurst Spit.

The existing sediment supply from the west is estimated as being of the order of 3000m³. This could be increased by allowing Rook Cliff to set back further, benefiting from sediment held beneath Hordle Cliff. Associated with such a retreat would be loss of the main coast road, potentially within the next 20 years

and substantial loss of cliff top property starting towards the end of the second epoch and continuing throughout the period of the SMP2. There would also be loss of the car parks along Rook Cliff and the beach huts at the toe of the cliff.

Retreat of Rook Cliff, while increasing sediment to the main seafront area, would also increase pressure for erosion along this section. In effect the control point would be moved to the east. Sediment would not be retained in front of the seafront and the wall in this area would come under increasing pressure. This pressure would increase with sea level rise. At present there are several local control points: at the apex of Rook Cliff where the road runs closest to the cliff crest, in front of the White House and at



Seawall to the seafront at Milford-on-Sea

the curve in the stepped sea wall along the seafront. The rock revetment to the root of Hurst Spit acts as a final control feature. Particularly, with respect to the stepped sea wall and the most western end of the rock revetment, these positions appear to have been determined by practice rather than overall design, with the junction between the sea wall and the revetment constrained by the closeness of the channel linking Sturt Pond with the sea. The main section of the rock revetment to the root of Hurst Spit allows adjustment to a more consistent alignment through to the forward shape of the Spit and is supported by the design of the rock groyne at the eastern end.

The defended flood risk area to the far side of the Sturt Pond would require increased flood protection if the standard of defence was to be retained. This would result in squeeze of the saltmarsh. Therefore irrespective of the protection provided by Hurst Spit, there is an issue here with respect to future management.

No active intervention would be unacceptable in terms of delivering the core values for the area. With present management merely relies on reinforcing defences which are already under pressure over the whole frontage. The assessment of economic justification of with present management under the strategy appraisal highlights there may be difficulty in funding holding the existing line in the long term.

Two potential scenarios present themselves. In either, it may be seen that the coast is already formed as a series of very shallow indentations between more prominent defended locations. Rather than attempting to artificially control the whole frontage as a linear defence, an opportunity now exists to provide a more rational approach to defence; allowing increased width in areas to retain beaches between more established control points. This would aim to maintain open space in some areas while using existing open space to create a less linear approach to defence. The two scenarios are set out below.

<p>Scenario (a)</p> <p>Description: Maintain control of strategic headlands while allowing the coast to readjust between these points. The main control points would be locally at Rook Cliff, at the White House and at the breakwater along the revetment to Hurst Beach.</p> <p>Rationale: The apex of Rook Cliff (between the cliff access point and where Park Lane is closest to the cliff crest) already provides a reasonable control in the coast, protecting the road immediately behind and the length of coast to the west and providing control for the coast to the east. This is currently defended by a length of old wall and rock revetment.</p> <p>Despite the possibility of moving the road back or redirecting the coastal road to the rear via Kivernell Road, Whitby Road and Pless Road, this would remove access to the seafront properties along Cliff Road. Holding the line at this Rook Cliff location but allowing retreat of the shoreline to the west provides the opportunity of reducing recession to rates more akin to those recorded along Hordle Cliff. Towards the end of the second epoch, consideration would need to be given to creating a further control point at the junction of Whitby Road and Cliff Road, set back from the existing alignment. The overall intent would be to create a more stable cliff line able to be managed to protect both property and the coast road over the 100 year period. Beyond the period of the current SMP, there may be the need to allow further realignment of this western section and this would include loss of property and the road. This period of 100 years needs to be used, through planning, to allow width for further realignment. The intent, however, would be to continue maintaining defence at the apex of Rook Cliff as a key control to Milford-on-Sea.</p> <p>To the east of Rook Cliff, there is opportunity to allow the cliff to erode back. If this were uncontrolled further to the east, a substantial part of the Milford seafront would be lost, in addition to creating a significant step in the coast through to Hurst Spit. Typically, therefore, defence in front of the White House might be reinforced to limit erosion between here and Rook Cliff.</p> <p>The position of the western end of the rock revetment to the root of Hurst Spit and the eastern end of the existing sea wall is constrained by the channel to Sturt Pond. The position of this itself is</p>

constrained by the need to maintain the flood embankments to Saltgrass and New Lane. With increasing sea level it is seen as unlikely that these flood defences would be maintained. Despite the risk of this being more towards the end of the second epoch, consideration of long term management, whereby this area is opened up to tidal inundation would create opportunity for existing habitat development and replacement and may provide further opportunity for removing the constraint on the alignment of the root of the Spit. Consideration could also then be given to allowing Sturt Pond to discharge directly to the sea, potentially influencing the development of a small ebb tide delta. The net affect of such an overall approach would be to allow realignment of the seafront between the root of the spit and the control point at the White House. This may require readjustment of the existing rock revetment at its western end and removal and setting back of the existing sea wall. Given the anticipated residual life of the revetment (50 years), such realignment might be considered during the second epoch of the SMP2. However, this scenario would influence the management of the existing defences and would impose constraints in terms of planning development of the seafront area.

This approach to management would help support maintenance of Hurst Spit, allowing a more sustainable position to be taken for the rock revetment. The intent would be to maintain the revetment and rock breakwater. As discussed earlier the overall policy for the spit would be for continued management through recharge and recycling of material allowing the integrity of the Spit to be retained while allowing this feature to adjust with increase in sea level. This would maintain a degree of protection to the saltmarsh behind the ridge.

Implications: At the western end of Milford, above the Cliff, the implications would be that over the first two epochs, although allowing the coast to erode back, the control provided by defence of Rook Cliff would sustain the coastal road and property behind. In the third epoch this would need to be re-assessed and there may be loss of property and re-alignment of the road. Between Rook Cliff and the White House, the intent would be to provide a more sustainable defence line to the frontage, rather than necessarily relying on the existing linear form of defence. The aim would still be to provide protection to the properties along Shingle Bank Drive. This may involve realignment of the open ground in this area, providing a more natural defence to these properties.

The White House would be protected as a control point but further east, the approach would incur loss of areas of the existing sea front, principally areas of the car park and some property towards the eastern end of the frontage. It would however, allow development of a more natural and sustainable beach to Milford.

Behind coastal defences the implications would be to allow increased flooding of areas of agricultural land but to maintain flood defence to Keyhaven and the centre of Milford, subject to the findings of the adjacent SMP.

Impacts: Despite defences being improved, further natural erosion would occur to several areas of cliff. This would be in a controlled manner maintaining some balance between allowing natural development of the shoreline and the intent to maintain access and open landscape values. There is the potential loss of the coast road and properties to the western end of the town over the third epoch. Along the main sea front of Milford there would be loss of some of the existing facilities and some property but there would be gain in allowing development of a healthy beach in front of the set back defences. Hurst Spit and Hurst Castle would remain.

Scenario (b)

Description: Maintain control of strategic headlands, allowing the coast to adjust naturally to the west

but advancing the foreshore between Rook Cliff and the root of Hurst Spit.

Rationale: This scenario would be very similar to the approach in scenario (a) to the west of Rook Cliff and over the frontage of Hurst Spit and Hurst Castle. The emphasis in defence would still be to defend Rook Cliff, with the intent to control the natural development of the cliff line to the west. At Hurst Spit, the intent would be to continue management of the Spit and the Castle.

It is between Rook Cliff and the rock revetment to the root of the Spit that this scenario differs from that set out above. Here the intention would be to use the control imposed by the two existing hard points and the defence of the White House to pull the beach in between forward. Typically this might be by means of reefs or nearshore breakwaters to influence development of the shoreline. The rationale behind this would be largely to retain the existing facilities along the Milford Seafront, but also to provide a more continuous sediment path between Rook Cliff and Hurst Spit.

Implications: As with scenario (a), at the western end of Milford, above the Cliff, the implications would be that over the first two epochs, although allowing the coast to erode back, the control provided by defence of Rook Cliff would sustain the coastal road and property behind. In the third epoch this would need to be re-assessed and there may be loss of property and re-alignment of the road. Between Rook Cliff and the rock revetment at the root of Hurst Spit, the implications would be for the development of a wider beach defending Milford Seafront and providing additional amenity value.

Behind coastal defences the implications would still be to allow increased flooding of areas of agricultural land but to maintain flood defence to Keyhaven and the centre of Milford, subject to the findings of the adjacent SMP.

Impacts: Despite defences being improved, further natural erosion would occur to several areas of cliff. This would be in a controlled manner maintaining some balance between allowing natural development of the shoreline and the intent to maintain access and open landscape values. There is the potential loss of the coast road and properties to the western end of the town over the third epoch. Along the main sea front of Milford, there would be improved development of a healthy beach in front of the existing defence line. Hurst Spit and Hurst Castle would remain.

The principal difference in approach between scenarios is management of the Milford-on-Sea seafront area. Clearly scenario (b) offers less disruption to the frontage here, but potentially at an increased cost and a detailed study would need to be undertaken both to determine the feasibility of the scheme and to ensure that technically it was sustainable in detail. As such, this scenario can only be put forward in principle as a recommended way forward but one that offers potential benefit both to defence and to re-establishing a more direct management link between the main coast and management of Hurst Spit.

Overall, however, it is possible to define general policy within this section of the zone. In this, under either scenario, there would be a series of interconnected policy units aimed at delivering a coordinated approach to management. The policy, as previously discussed would be to maintain the overall integrity of Hurst Spit. This approach would include maintenance of the rock revetment and groyne at the root of the Spit, providing the necessary structure for management along the Milford-on-Sea frontage. Management of this section would remain essential to either approach to management of the coast to the west.

The section of coast between Rook Cliff and the White House would in principle be hold the line, although locally between these two points the approach should look to adapt defence from that of holding the existing linear defence to one of potentially allowing some further erosion and cliff recession to provide a more sustainable line of defence. This would also aim to restore some of the geological interest which is at present obscured. In holding the overall headland at Rook Cliff, the policy between here and the root of the Spit would initially be to maintain the existing line of defence but with the longer term intent to realign the seafront of Milford-on-Sea. The preferred approach to realignment would be to use nearshore structures to draw the shoreline forward, creating the opportunity to develop a more substantial beach and to maintain continuity of management of sediment between Rook Cliff and Hurst Spit. This may not attract full funding under flood and coastal erosion risk management and therefore, is likely to require a collaborative funding approach. It does, however, meet objectives to sustain the Milford seafront area in a sustainable manner and, therefore, has the potential for collaborative funding drawing upon the intent to maintain this important tourism and recreational aspect of the town.

As a default position, if such funding were not possible, the recommended approach would be for realignment back from the existing line of defence to encourage a more sustainable alignment of a new embayment. This would incur loss of open space and properties in the area.

Behind Hurst Spit It would be recommended that consideration is given within the adjacent SMP for managed realignment of the defences along Saltgrass and New Lane.

To the west of Rook Cliff, the intent would be to manage retreat of the cliff line such as to maintain the function of the coastal road and to avoid loss of properties over the next 100 years. This management would rely on defence more locally than at present beneath Rook Cliff, with the potential requirement for groynes as the cliff erodes back. The longer term intent, subject to monitoring of sea level rise and recession rates, would be to develop the road to the rear of the front line of properties as the main coastal road and to eventually abandon defence of the properties. This section of the coast would settle back to a more stable alignment held by the defence at Rook Cliff.

Overall this approach focuses effort for defence on critical locations of the coast. It accepts that in the longer term there is likely (even under a no active intervention approach along the coast to the west) to be a reduction of sediment supply as the coast to the west adjusts to a more stable alignment. The approach may therefore still require sediment recharge (as under with present management) but against a shoreline more adapted to help retain sediment. There would be loss of assets such as car parks probably starting over the second epoch. However, the approach maintains the main aspects of the community while also maintaining access, beaches and landscape. The approach would need to be considered further at detailed strategy level.

This sets the underlying approach to defence at the eastern end of the zone, fixing the underlying control at this end of the frontage. From this it is possible to consider different scenarios for the western frontages. These need to be considered over the full extent of the zone.

General discussion of the Western and Central Sections of the Zone.

The two baseline scenarios have been considered for the coast to the west of Milford-on-Sea. As discussed in the introduction to the previous section describing the baseline scenarios the general coastal shape arising from these two high level options may be examined in relation to an overall theoretical shoreline position. The indicative shape of the coast and cliff recession are shown in figures (4.2.9) -(no active intervention) and (4.2.10) - (with present management). These baseline scenarios are then developed further in relation to alternative approaches to management in specific areas.

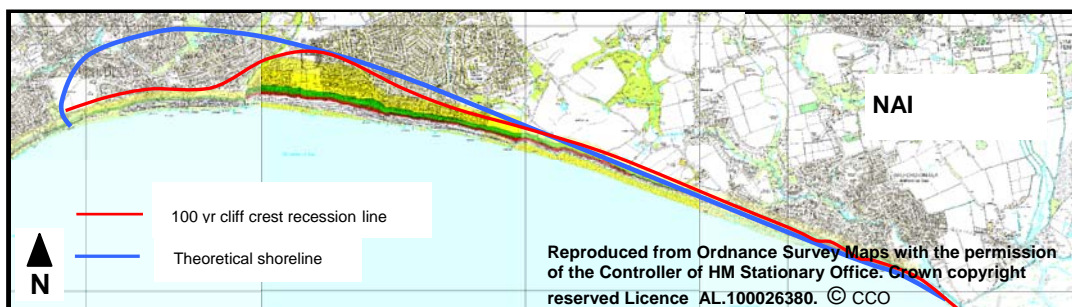


Figure 4.2.9

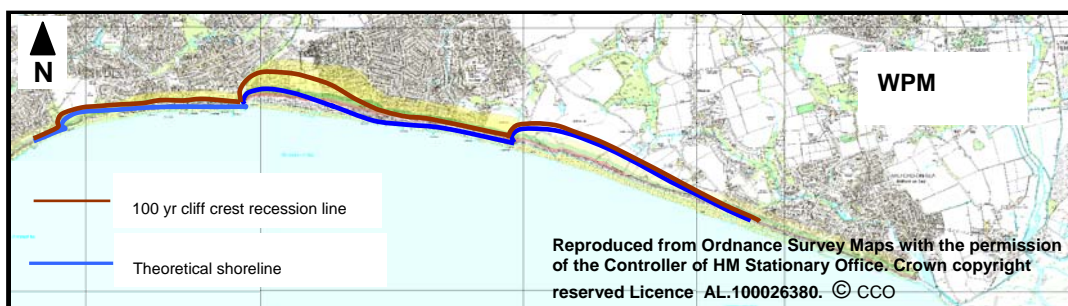


Figure 4.2.10

The essential differences are in the controls imposed at the western end under Highcliffe and in holding the line along the Barton-on-Sea frontage. The implications of this are the threat of longer term erosion beyond the period of the SMP in both these locations, with continued uncertainty at Highcliffe and especially, and more obviously, in the very substantial loss of property over the 100 year period at Barton-on-Sea.

Holding the line at Barton-on-Sea but allowing continued erosion at Highcliffe would not significantly reduce the rate of erosion to the community of Highcliffe. Although providing some additional sediment supply to the Barton-on-Sea frontage, there would be continued instability along this frontage and pressure for erosion. The Naish Cliff frontage would continue to be subject to substantial erosion of the shoreline and continuing set back of the crest of the Naish Cliff. Therefore there is no significant strategic benefit in abandoning the control of the coast to the west of Chewton Bunny.

Accepting this, an alternative scenario may be considered in holding the line at Chewton Bunny but allowing uncontrolled erosion at Barton-on-Sea. In outline the overall pattern of development of the coast under this scenario is shown in Figure 4.2.11.

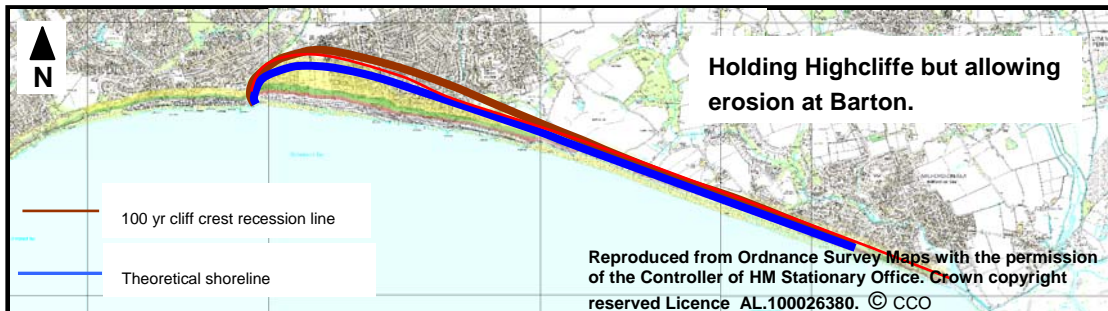


Figure 4.2.11

It may be seen that under this scenario the longer term recession of the cliff equates relatively well to the predicted 100 year recession line based on current recession rates and is, over this period, little different to the general no active intervention scenario. In effect over the period of SMP, holding the line at Chewton Bunny or abandoning defence at the existing headland has little relevance over the next 100 years in terms of management along much of the Naish or Barton Cliff section of the coast. In terms of SMP2 policy this section in front of Highcliffe may be considered independently.

In terms of the central section of the zone, between Hordle Cliff and Barton, there is some difference in behaviour in that defence at Barton-on-Sea would tend to create a slightly deeper embayment affecting the erosion of the golf course, as the frontage compensates for the retention of sediment further to the west.

Overall this transition zone between Barton-on-Sea and the undefended section of Barton Cliff is a local issue not impacting on essential features of the use of the area and, therefore, not material effecting the defined policy both under no active intervention and with present management for allowing this section of the coast to develop naturally.

In developing policy therefore for the SMP2 the coast may be examined further as three principal sections.

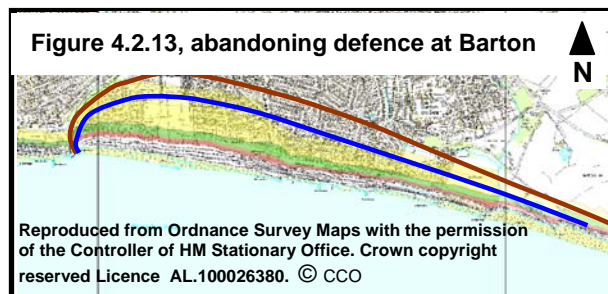
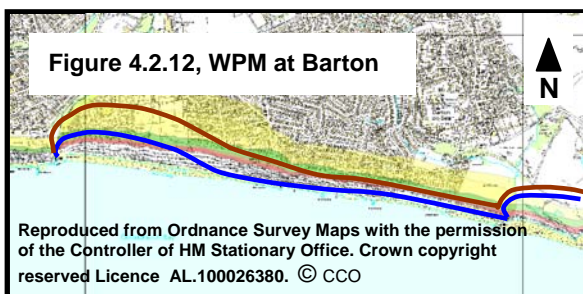
Hordle Cliff to Barton-on-Sea.

There is no justification for management of this frontage in terms of defence. There will be continued loss to the golf course but this would not justify any attempt to manage the process of erosion. The frontage provides important natural supply of sediment to the east and is an important part of the geological SSSI. The proposed management of the coast at Milford-on-Sea would tend to reduce erosion to the eastern end of Hordle Cliffs and as such it is unlikely that the new development at the former school or Hordle Manor would be loss over the next 100 years. The function of the coastal road would be maintained; the intention in later epochs would be to realign at such stage when the coastal road is under threat from erosion. This frontage is seen as being one policy unit with a policy of no active intervention.

Barton-on-Sea to Naish Cliffs.

The general scenarios set out above are shown in comparison in Figures (4.2.12) (with present management) and (4.2.13) (withdraw defence from the Barton-on-Sea seafront) below.

With present management, as indicated by the draft strategy, provides some additional control to erosion and recession over the Naish Cliff frontage but still with an accepted loss in the longer term of a substantial area of the Naish Holiday Village and properties to the west of Barton-on-Sea. There is significant discrepancy between the residual damages identified through the economic assessment within the draft strategy and those determined as part of the higher level assessment made for this SMP2. This highlights potentially the substantial uncertainty associated with predictions of cliff recession.



What may, however be seen is that defence aimed at protecting the western end of Barton-on-Sea (Marine Drive and Marine Drive West) lies well within the active slumping cliff zone of Naish Cliffs (as shown by the recession zones in Figure 4.2.14). Even with significant drainage works to the cliff in this area the property to this end of the town would remain at risk. The development of a more long term stable alignment of the coast between Chewton Bunny and the defence at Barton-on-Sea would depend on reinforcing a headland, beneath Marine Drive West, in an area potentially at risk from underlying instability. This is not considered to be sustainable.

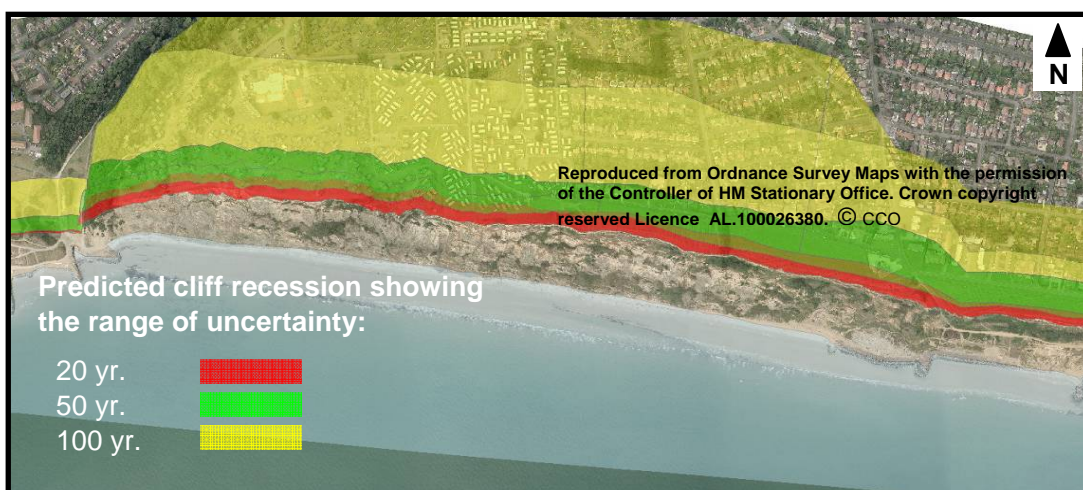
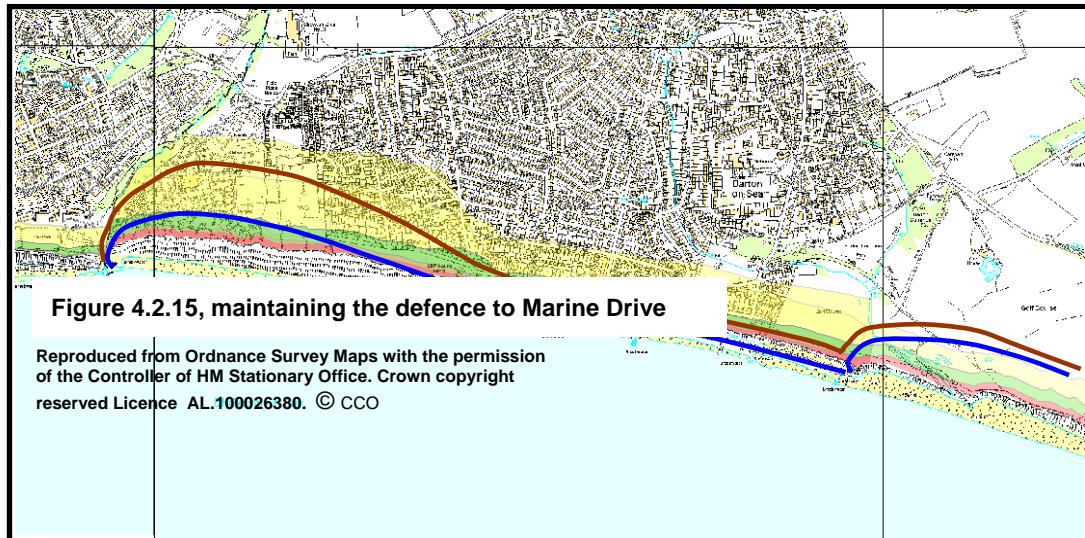


Figure 4.2.14

The alternative of withdrawing defences along the whole Barton-on-Sea frontage would, however, result in loss of not just the sea front but potential recession of the cliff back close to the inland centre of the town, potentially affecting the sustainability of Barton-on-Sea as a community (as shown in figure 4.2.13).

In attempting to mitigate this, one further scenario is considered, that of moving defences back to the centre of the seafront area, in the area of Fisherman's Walk. This is shown in outline in Figure 4.2.15.



This provides a more secure location for controlling the shape of the coast, with the intent of maintaining through the current practice of drainage and toe protection the areas of Marine Drive East and, at least over the first two epochs, the properties forward of the road. Even under this approach, there would be continued recession of the cliff crest due to continued failure of the upper gravels. However the intent would be to restrict recession within the open space seaward of the road over the next 50 years. This is identified as possible within the draft strategy. Works would be required to significantly reinforce the toe defence and to provide dynamic toe weight through recharge.

This achieves a more sustainable approach, notwithstanding that from Barton Court to the west there would be substantial loss of property over the period of the SMP2.

To attempt to alleviate this to some extent, there would be a need for progressive change in management over the three epochs. The existing defences, in terms of the most westerly rock groynes and revetment could be managed initially but with the intent of retaining these more as a shoreline cell as they begin to fail over the first epoch. This would act to provide a degree of transitional defence, delaying erosion and continue to provide a degree of protection to the retained defence to the east (to the east of the Fisherman's Walk). The toe of Naish Cliff would continue to erode back, although there is the potential, subject to more detailed study, to slow this erosion with beach recharge. This would need to recognise the intent to maintain integrity of the SSSI. The potential supply from a defended section of the coast to the west is not considered to be that relevant to management of the Naish Cliffs. The intent would, however, be to provide a limited degree of protection to the frontage, slowing general recession of the cliff line particular to the area of west Barton-on-Sea (Marine Drive and Marine Drive West) , allowing potentially a 50 year period of adaption to loss of properties at the crest of the cliff. It is probable, however, that the Cliff House Hotel would be lost significantly earlier.

A detailed assessment of the geotechnical risk would be required, as recommended by the draft strategy, to define with more confidence how this transitional approach would be developed.

This intermediate scenario offers a high degree of protection to core areas of Barton-on-Sea without substantially reducing the existing value of the eroding cliffs. The approach, in comparison with that of with present management, provides significantly less reliance on defence and greater opportunity for maintaining natural coastal change. The approach also aims to maintain much of the recreational use of the coastal slope in front of the town. In time it would establish better access to the Naish Cliff as erosion creates greater width in the shoreline zone for establishing a beach to the frontage.

This section of the coast is therefore defined as three policy units, managed to achieve the overall shoreline management plan. The defence along the eastern frontage of Barton-on-Sea (beneath Marine Drive East) would be maintained. Despite this, recognising the crest of the cliff will continue to set back, there will be risk to property in the longer term; this will need to be managed. As such the policy is for managed realignment, while holding the defence at the toe. The eastern boundary of this policy unit would need to be treated as a transition between this unit and that of the no active intervention along the rest of Barton Cliff. To the west of the defended frontage there would be a unit where defence, is adapted and toe erosion allowed in a controlled manner. Over this section the policy is also managed realignment but with the distinction that the toe defence would not be fully maintained. This would be from Barton Court through to Marine Drive West. The main section of Naish Cliffs would have a similar policy of managed realignment, recognising the significant issues arising from the retreat of the cliff line, but here there would be no hard defence. In application, there may be some justification for beach recharge, but with the intent of merely slowing erosion to allow adaptation of use of land to the rear.

Highcliffe and Friars Cliff

In defining the approach to the Naish and Barton-on-Sea frontages, there is, as suggested in the draft strategy, benefit in maintaining the control point at Chewton Bunny; in part to maintain a degree of control on the coast to the east, but primarily as a means of stopping outflanking of defences to the important recreational area and properties to the eastern end of Wharncliffe Road. However, given that Naish Cliff benefits little from sediment derived from the frontage to the west and that the SMP policy for Naish Cliff would be for managing the retreat of the cliff, there seems little value in reducing the ability to maintain a defence along Highcliffe. The strategy does, however, suggest some benefit to the actual frontage in reducing the length of the rock groynes in this area.

There is significant benefit in terms of property at risk along the crest of High Cliff (to the village of Highcliffe). This coupled to the fact that the cliff line is relatively stable would indicate that maintaining a good beach width through recharge and beach management is preferable to concentrating efforts directly on maintenance of the revetment behind the beach. Taking this approach it may be more appropriate to reinforce the breakwater to the western end with the intent of retaining a better level of natural defence beneath Friars Cliff and the Highcliffe Castle. This would still maintain a degree of exposure of the as yet unmanaged cliff line in this location but would reduce the need in the future for more substantial management of the frontage. Future requirement for defence in this local area beneath Friars cliff is uncertain in detail during the period of the SMP2. The

with present management policy is for maintaining this as an undefended section of cliff until such a time as defence might be required to the castle.

In principle therefore the overall policy is for management and the local future decision as to defence of the castle would be considered in more detail in the future. At the level of the SMP the intent would be to hold the line over this section of the coast, but with the intent to minimise future extension of defences.

PDZ1

Management Area Statements

Hurst Spit and Milford on Sea (CH. 0 TO –CH 7.5 KM.)
Covering previous SMP1 management units CBY7 and CBY6

Hordle Cliff to Chewton Bunny (CH. 7.5- TO –CH 13 KM.)
Covering previous SMP1 management units CBY5 to CBY3

Highcliffe to Friars Cliff (CH.13 - TO – CH 15 KM.)
Covering part of previous SMP1 management unit CBY2





Location reference:	Hurst Spit and Milford-on-Sea
Management Area reference:	CBY A
Policy Development Zone:	PDZ1

* Note: Predicted shoreline mapping is based on a combination of monitoring data, analysis of historical maps and geomorphological assessment with allowance for sea level rise. Due to inherent uncertainties in predicting future change, these predictions are necessarily indicative. For use beyond the purpose of the shoreline management plan, reference should be made to the baseline data.




The following descriptions are provided to assist interpretation of the map shown overleaf.

100 year shoreline position:

The following maps aim to summarise the anticipated position of the shoreline in 100 years under the two scenarios of “With Present Management” and under the “Preferred Policy” being put forward through the Shoreline Management Plan.

-  In some areas the preferred policy does not change from that under the existing management approach. In some areas where there are hard defences this can be accurately identified. In other areas there is greater uncertainty. Even so, where the shoreline is likely to be quite clearly defined by a change such as the crest of a cliff the estimated position is shown as a single line.
- Where there is a difference between With Present Management and the Preferred Policy this distinction is made in showing two different lines:
 -  With Present Management.
 -  Preferred Policy.
-  In some areas, the Preferred Policy either promotes a more adaptive approach to management or recognises that the shoreline is better considered as a width rather than a narrow line. This is represented on the map by a broader zone of management:

Flood Risk Zones

-  General Flood Risk Zones. The explanation of these zones is provided on the Environment Agency’s web site www.environment-agency.gov.uk. The maps within this SMP document show where SMP policy might influence the management of flood risk.
-  Indicate areas where the intent of the SMP policy is to continue to manage this risk.
-  Indicate where over the 100 years the policy would allow increased risk of flooding.

The maps should be read in conjunction with the text within the SMP document.



SUMMARY OF PREFERRED PLAN RECOMMENDATIONS AND JUSTIFICATION

PLAN:

The underlying intent of the plan for this area is to maintain the core values of Milford-on-Sea but in such a way as to provide continuity with the management of Hurst Spit and allowing some increased exposure of the designated geology, while maintaining control of the development of the shoreline. Management of the Spit would be controlled by holding the line at Hurst Castle and through maintaining the eastern end of the rock revetment and the groyne. Although the spit beyond the Castle would be allowed to develop naturally, the intent would be to recycle material from that section back on to the central section of the spit. As such this Hurst Spit section is defined as one policy unit.

At present there is increasing pressure on the main sea frontage to the town. The intent here would be to manage the frontage through control of erosion in front of the White House and through retaining a beach in front of the old sea wall. This would require drawing the natural alignment forward, potentially through the use of offshore structures. It is recognised that this approach may not meet funding requirements and that such an approach would, therefore, need to identify collaborative funding streams. As a default, should collaborative funding not be put in place, it may be necessary to consider realigning the defence line backwards to create the space to maintain a sustainable defence and area of beach.

The intent is to maintain defence through to Rook Cliff, but focussing defence at key locations. This creates an opportunity for a more sustainable defence and allows some further erosion of the cliff face. This would be in a controlled manner. To the west of Rook Cliff, through holding the line at the apex of the cliff and thereby protecting the closest point of the road, the intent would be to allow controlled erosion of the cliff line. The intent would be to maintain the coastal road at least over the next 50 years. Through monitoring erosion rates and sea level rise, decisions would be deferred as to the degree of further control that might be required and sustainable in managing this western frontage. At present it is considered that during the final epoch, there may be a need to realign the road and that over the final epoch there may be some loss of properties along this section of the frontage. The intent behind this is to allow development of a more substantial beach area, providing protection to the realigned road and properties further back from the cliff line.

PREFERRED POLICY TO IMPLEMENT PLAN:	
From present day	Maintain existing defence practice to Hurst Spit. To undertake detailed study of management in front of Milford seafront with the intent to develop more localised hard points and beach control structures rather than reliance on the existing linear defence approach. Continue recharge and recycling.
Medium term	Maintain existing defence as above. Construct a new offshore control in front of Milford sea front, subject to funding. To adapt use of open space to the west of Rook Cliff. Continue recharge and recycling
Long term	Maintain existing and new defence as above. Re-assess potential control along the frontage west of Rook Cliff with the

	intent for further managed realignment, subject to monitoring. Continue recharge and recycling.
--	--

SUMMARY OF SPECIFIC POLICIES

Policy Unit		Policy Plan			Comment
		2025	2055	2105	
CBY.A.1	Hurst Spit	HTL	HTL	HTL	Maintain the overall integrity of the geomorphological feature through beach management and maintenance of rock revetment to west and in front of Hurst Castle. North Point would be allowed to develop naturally while continuing to provide a source of sediment for recycling under an agreed coastal management plan.
CBY.A.2	Milford Seafront	HTL	MR	MR	Investigate options for developing a continuous beach between Rook Cliff and Hurst Spit, subject to funding.
CBY.A.3	Rook Cliff	HTL	HTL	HTL	Local realignment controlled by hard points.
CBY.A.4	Cliff Road	MR	MR	MR	Intent to maintain road and property but with possible future need for further realignment beyond the period of the SMP.
Key: HTL - Hold the Line, A - Advance the Line, NAI – No Active Intervention MR – Managed Realignment					

CHANGES FROM PRESENT MANAGEMENT

The change is primarily in the approach to defence of the area, moving from a linear defence line to one of working in cooperation with natural processes. This aims to establish a more long term sustainable approach to defence of the town and continued management of Hurst Spit.

IMPLICATION WITH RESPECT TO BUILT ENVIRONMENT

Economics		by 2025	by 2055	by 2105	Total £k PV
Property	Potential NAI Damages/ Cost £k PV	12718	6237	15619	34575
	Preferred Plan Damages £k PV	12718	2543	6545	21806
	Benefits £k PV	0	3694	13725	17419
	Costs of Implementing plan £k PV	2481	688	595	3764


Location reference:	Hordle Cliff to Chewton Bunny
Management Area reference:	CBY B
Policy Development Zone:	PDZ1

* Note: Predicted shoreline mapping is based on a combination of monitoring data, analysis of historical maps and geomorphological assessment with allowance for sea level rise. Due to inherent uncertainties in predicting future change, these predictions are necessarily indicative. For use beyond the purpose of the shoreline management plan, reference should be made to the baseline data.



The following descriptions are provided to assist interpretation of the map shown overleaf.


100 year shoreline position:

The following maps aim to summarise the anticipated position of the shoreline in 100 years under the two scenarios of “With Present Management” and under the “Preferred Policy” being put forward through the Shoreline Management Plan.


-  In some areas the preferred policy does not change from that under the existing management approach. In some areas where there are hard defences this can be accurately identified. In other areas there is greater uncertainty. Even so, where the shoreline is likely to be quite clearly defined by a change such as the crest of a cliff the estimated position is shown as a single line.


- Where there is a difference between With Present Management and the Preferred Policy this distinction is made in showing two different lines:


-  With Present Management.
-  Preferred Policy.

-  In some areas, the Preferred Policy either promotes a more adaptive approach to management or recognises that the shoreline is better considered as a width rather than a narrow line. This is represented on the map by a broader zone of management:

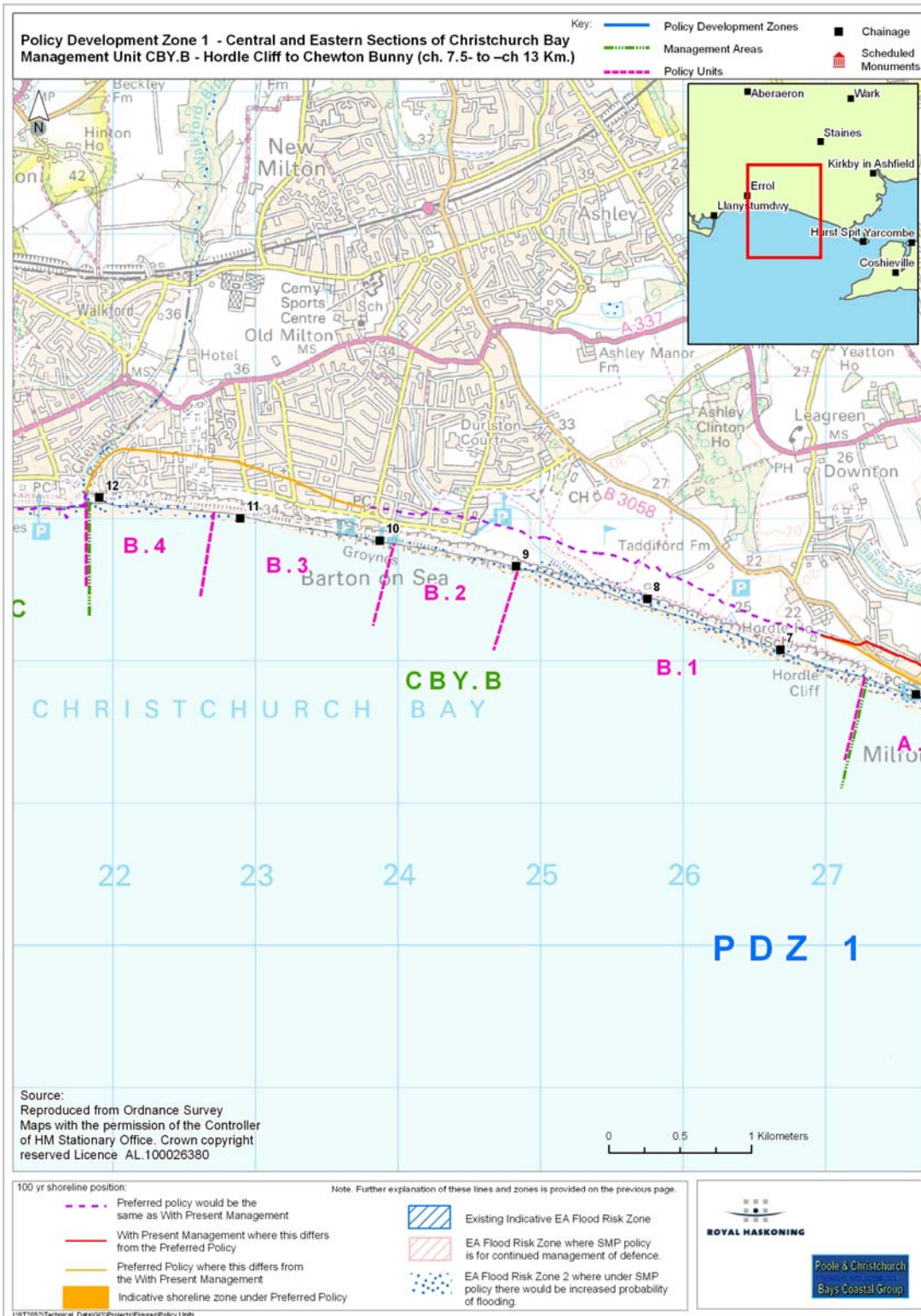
Flood Risk Zones

 General Flood Risk Zones. The explanation of these zones is provided on the Environment Agency’s web site www.environment-agency.gov.uk. The maps within this SMP document show where SMP policy might influence the management of flood risk.

 Indicate areas where the intent of the SMP policy is to continue to manage this risk.

 Indicate where over the 100 years the policy would allow increased risk of flooding.

The maps should be read in conjunction with the text within the SMP document.



SUMMARY OF PREFERRED PLAN RECOMMENDATIONS AND JUSTIFICATION

PLAN:

The intent of the plan is to develop a long term readjustment of defence approach to the area:

- Protecting the eastern sea front development of Barton-on-Sea from erosion (Marine Drive East), while maintaining the important open space of the cliff and coastal slope. Works would be undertaken to improve stability of the coastal slope but accepting further loss due to cliff crest recession, particularly over the steep crest cliff.
- Allow gradual failure of the defences to the western end of the town (Marine Drive and Marine Drive West) allowing adaption to loss of property and progressive loss of the holiday park (Naish Cliff). The intent would be to maintain a degree of control through adaption of existing defences and drainage so as to reduce the rate of loss of assets and to provide some transition between Naish Cliff and the defended section to the east. This might be supported by limited recharge to the frontage but the intent would not be to provide long term defence to Naish Cliff.
- To develop a transitional approach to management between the eastern frontage of Barton-on-Sea and Barton Cliffs to the east but with the intention not to extend defence further east but to allow natural erosion and recession of the coastline through to Hordle Cliff.

PREFERRED POLICY TO IMPLEMENT PLAN:	
From present day	Maintain defence to central and east Barton-on-Sea and to undertake minimal readjustment of defence further to the west. Maintain drainage. To investigate minimising defence east of Barton-on-Sea.
Medium term	Maintain defence to east Barton-on-Sea and work with communities to develop a plan for loss of properties to the western end.
Long term	Maintain defence to central and east Barton-on-Sea and work with communities to develop a plan for loss of properties to the western end.

SUMMARY OF SPECIFIC POLICIES

Policy Unit		Policy Plan			
		2025	2055	2105	Comment
CBY.B.1	Hordle Cliff to Barton	NAI	NAI	NAI	Allow natural rollback.
CBY.B.2	Barton-on-Sea Marine Drive East	MR	MR	MR	Maintain defence and improve drainage. The crest of the cliff will however continue to set back.
CBY.B.3	Barton-on-Sea Marine Drive and Marine Drive West	MR	MR	MR	Initially maintain defence and drainage allowing this to adapt to provide a transitional defence to Naish Cliff.
CBY.B.4	Naish Cliff	MR	MR	MR	Potential limited intervention with recharge to allow adaption of use.
Key: HTL - Hold the Line, A - Advance the Line, NAI – No Active Intervention MR – Managed Realignment					

CHANGES FROM PRESENT MANAGEMENT

There would be a reduction in defence to the western end of Barton-on-Sea, resulting in significant increased risk to property. Defences would be maintained beneath Marine Drive East, but the information from monitoring indicates that there may be longer term losses even along this section. Management of Naish Cliff may include some beach recharge but there would be a change in long term policy in that this would aim to slow erosion but not to significantly alter the natural behaviour of the cliffs. The coast between Barton and Hordle Cliff would be allowed to erode as at present.

IMPLICATION WITH RESPECT TO BUILT ENVIRONMENT

Economics		by 2025	by 2055	by 2105	Total £k PV
Property	Potential NAI Damages/ Cost £k PV	184	739	16360	17313
	Preferred Plan Damages £k PV	0	0	1701	1701
	Benefits £k PV	184	739	14661	15584
	Costs of Implementing plan £k PV	5494	1833	1252	8579


Location reference:	Highcliffe to Friars Cliff
Management Area reference:	CBY C
Policy Development Zone:	PDZ1

* Note: Predicted shoreline mapping is based on a combination of monitoring data, analysis of historical maps and geomorphological assessment with allowance for sea level rise. Due to inherent uncertainties in predicting future change, these predictions are necessarily indicative. For use beyond the purpose of the shoreline management plan, reference should be made to the baseline data.



The following descriptions are provided to assist interpretation of the map shown overleaf.


100 year shoreline position:

The following maps aim to summarise the anticipated position of the shoreline in 100 years under the two scenarios of “With Present Management” and under the “Preferred Policy” being put forward through the Shoreline Management Plan.


-  In some areas the preferred policy does not change from that under the existing management approach. In some areas where there are hard defences this can be accurately identified. In other areas there is greater uncertainty. Even so, where the shoreline is likely to be quite clearly defined by a change such as the crest of a cliff the estimated position is shown as a single line.


- Where there is a difference between With Present Management and the Preferred Policy this distinction is made in showing two different lines:

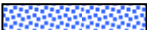
 With Present Management.
 Preferred Policy.

-  In some areas, the Preferred Policy either promotes a more adaptive approach to management or recognises that the shoreline is better considered as a width rather than a narrow line. This is represented on the map by a broader zone of management:

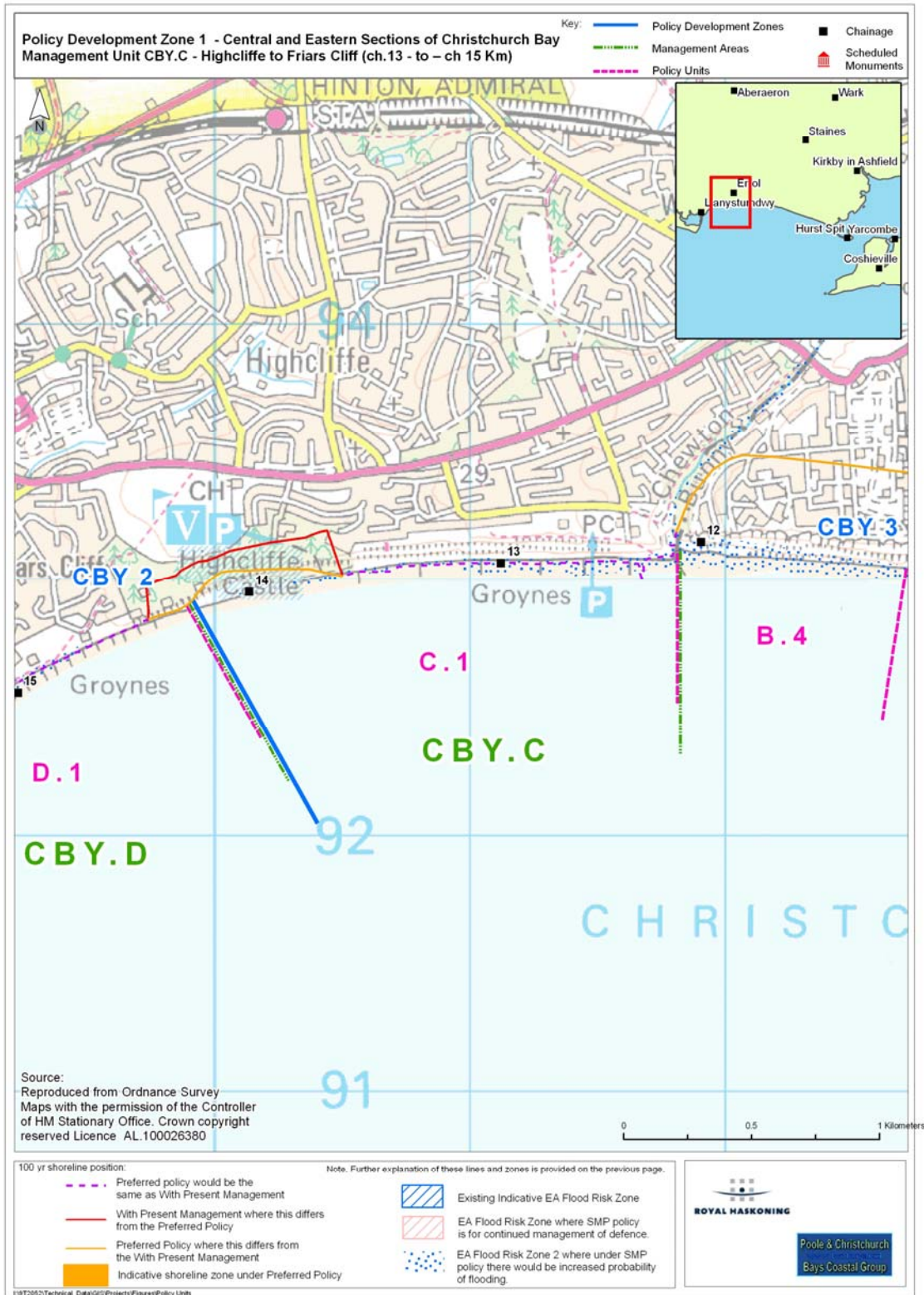
Flood Risk Zones

 General Flood Risk Zones. The explanation of these zones is provided on the Environment Agency’s web site www.environment-agency.gov.uk. The maps within this SMP document show where SMP policy might influence the management of flood risk.

 Indicate areas where the intent of the SMP policy is to continue to manage this risk.

 Indicate where over the 100 years the policy would allow increased risk of flooding.

The maps should be read in conjunction with the text within the SMP document.



SUMMARY OF PREFERRED PLAN RECOMMENDATIONS AND JUSTIFICATION

PLAN:

The intent of the Plan is to maintain defences to Highcliffe with the aim of sustaining both protection to properties and the amenity use of the coastal slope and foreshore. The aim would be to maintain the width of the defence retaining beaches.

PREFERRED POLICY TO IMPLEMENT PLAN:	
From present day	Maintain existing defences and beach recharge.
Medium term	Maintain existing defences and beach recharge.
Long term	Maintain existing defences and beach recharge. Examine risk to Highcliffe castle with the potential to improve defence in this area while substantially maintaining exposure of the natural cliff.

SUMMARY OF SPECIFIC POLICIES

Policy Unit		Policy Plan			Comment
		2025	2055	2105	
CBY.C.1	Highcliffe to Friars Cliff	HTL	HTL	HTL	Detailed consideration of need for defence to Highcliffe Castle in the long term.
Key: HTL - Hold the Line, A - Advance the Line, NAI – No Active Intervention MR – Managed Realignment					

CHANGES FROM PRESENT MANAGEMENT

No significant change.

IMPLICATION WITH RESPECT TO BUILT ENVIRONMENT

Economics		by 2025	by 2055	by 2105	Total £k PV
Property	Potential NAI Damages/ Cost £k PV	0	251	3711	4022
	Preferred Plan Damages £k PV	0	0	0	0
	Benefits £k PV	0	251	2711	4022
	Costs of Implementing plan £k PV	0	713	70	783

=0=0=0=



Poole and Christchurch Bays Shoreline Management Plan Review Sub-cell 5f

Section 4. Policy Development Zone 2

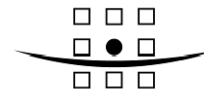
Bournemouth Borough Council

2011

Report V4

9T2052

A COMPANY OF



ROYAL HASKONING

HASKONING UK LTD.
COASTAL & RIVERS

Stratus House
Emperor Way
Exeter, Devon EX1 3QS
United Kingdom
+44 (0)1392 447999 Telephone

info@exeter.royalhaskoning.com E-mail
www.royalhaskoning.com Internet

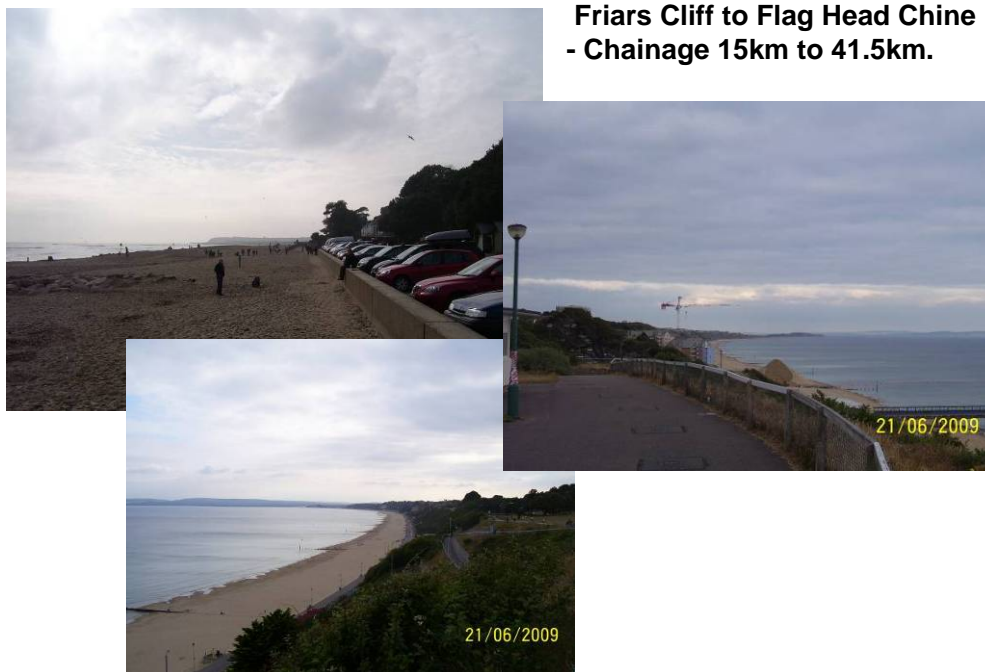
Document title Poole and Christchurch Bays Shoreline
Management Plan Review Sub-cell 5f
Section 4. Policy Development Zone 2
Document short title PDZ 2
Status Report V4
Date 2011
Project name Poole and Christchurch Bays SMP2
Project number 9T2052
Client Bournemouth Borough Council
Reference 9T2052/R/301164/Exet

Drafted by JGL Guthrie
Checked by J Ridgewell, N Carpenter
Date/initials check
Approved by TL Eggiman, H Hall 
Date/initials approval

CONTENTS

		Page
4.3	PDZ 2 Christchurch Harbour and Central Poole Bay	1
4.3.1	Overview	4
4.3.2	Baseline Management Scenarios	16
4.3.3	Discussion and Detailed Policy Development	31

4.3 PDZ 2 Christchurch Harbour and Central Poole Bay



SMP 1 Management Units

UNIT	LOCATION	CHAINAGE	POLICY
CBY2	Chewton Bunny to Mundeford Sandbank	12.9 – 17.2km	Selectively Hold the Line, short and long term. undefended sections possibly retreat long term.
CHB5	Mundeford Quay	17.2 – 17.8km	Hold the Line, short term and long term
CHB4	Mundeford Town	17.8 – 19km.	Hold the Line, short term and long term
CHB3	Stanpit and Grimbury Marshes	19 – 21km	Do Nothing with long term retreat
Christchurch, not previously included		21 – 23km	
CHB2	Southside	23 – 25.7km	Do Nothing
CHB1	Harbour-side of Mundeford Spit	25.7 – 26.3km	Hold the Line.
CBY1	b) Mundeford Spit.	26.3 – 27km	Hold the Line
	a) Hengistbury East	27 – 28 km	Retreat
PBY3	Warren Hill	28 – 29 km	Allow the backshore to retreat selectively holding the beach width.
PBY2	Point House Café to Warren Hill	29 – 30.4 km	Selectively Hold the Line
PBY1	Sandbanks to Point House Cafe	30.4 – 43.9	Hold the Line

Note: SMP1 policy was set over a 50 year period. Short term refers to immediate approach to management of defences with long term policy being set for the 50 years.

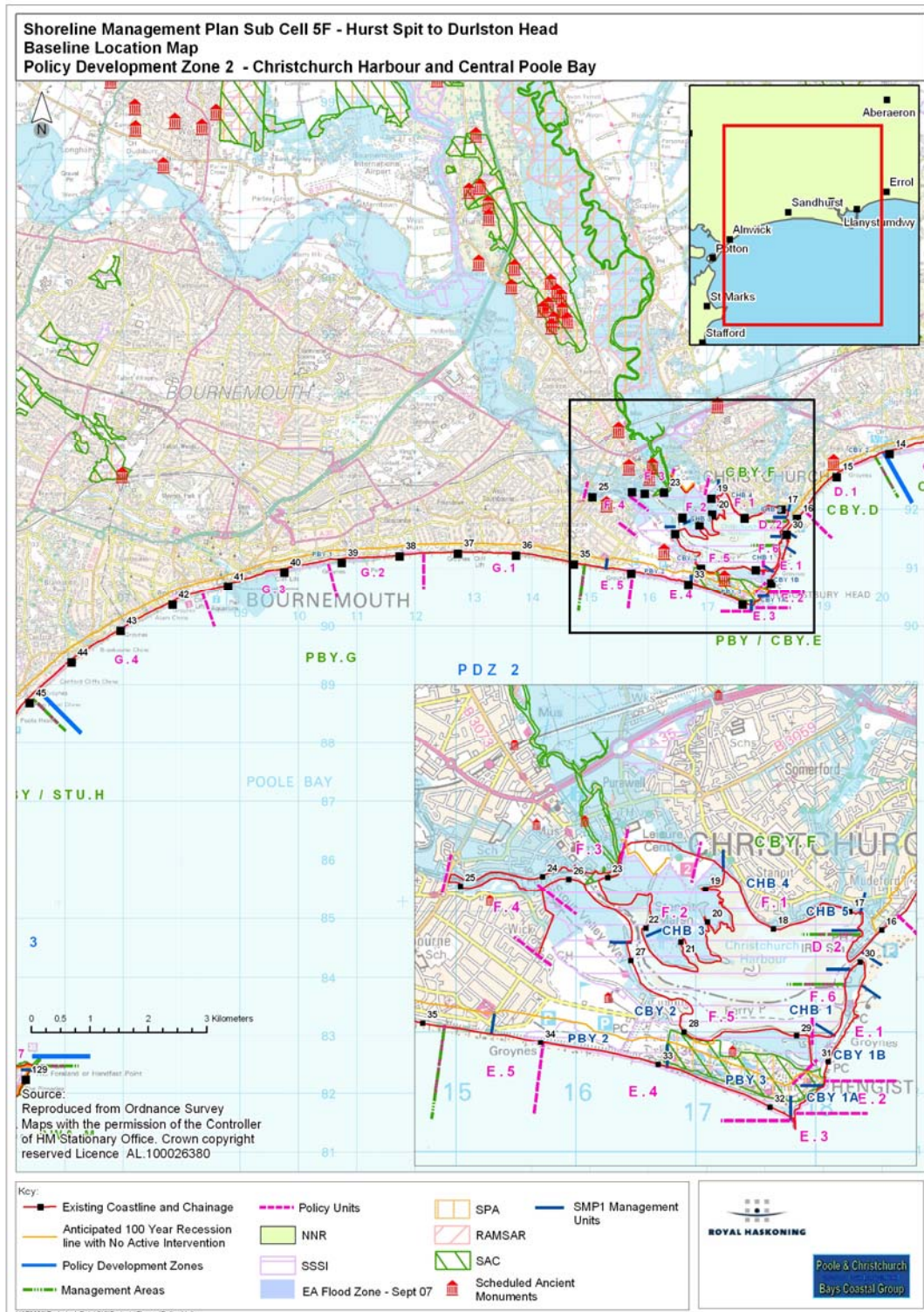


Figure 4.3.1

4.3.1 OVERVIEW

PRINCIPAL FEATURES (further details are provided in Appendix D)

Built Environment:

There are two major conurbation areas: the Bournemouth area; including Southbourne, Boscombe and Westbourne and the centre of Bournemouth itself, and extending through to the area of Canford Cliffs within the Borough of Poole, and the Christchurch area; including Christchurch, Stanpit, Mudeford and Friars Cliff. The two main sea front areas, separated by Hengistbury Head have very different characters but are both seen as being an integral aspect of the built environment with promenades, large numbers of beach huts or sea front chalets as well as commercial and tourism related properties. Although the main trunk roads lie back from the coast, the main A35 runs across the flood plain directly linked to the tidal area of Christchurch Harbour. There are local roads within the Christchurch conurbation lying closer to the shoreline and potentially at risk from flooding. The coastal road linking through the Bournemouth conurbation runs along the crest of the steep coastal cliff. There is an important fishing fleet based within Christchurch Harbour, the RNL station and a ferry service between Mudeford Quay and the Mudeford Sandbanks. There are three funicular railways or Cliff Lifts over the Bournemouth frontage providing access to the promenade and the two piers. Apart from the roads, there is little critical infrastructure within the direct coastal erosion zone, although there are electricity substations, schools and hospitals set a short distance back. There are substations, schools and the main sewage works to Christchurch located in the tidal flood risk zones of the Stour and Avon at the back of Christchurch Harbour.

Heritage and Amenity:

Hengistbury Head and its associated area is an important archaeological area (scheduled monument (SM)), with examples of iron age settlement. This area has various earth works and barrows, including the Double Dykes. There are important SM's within Christchurch, including the Bridge, Monastery and the old town walls.

Amenity, both for local recreation and tourism, underpinning the regional economy, is a very important aspect of the area. There are important recreational moorings and a marina within Christchurch Harbour. Over the whole frontage there are car parks and access points to the coast. A major car park has been developed in the area between Southbourne and Hengistbury Head. The promenades are an essential feature of the coast together with amenity beaches. Access along the sea front is now continuous between Mudeford Quay through to Friars Cliff and along the whole Poole and Bournemouth frontages. In each area there are management plans, zoning use and providing pedestrian, cyclist and disabled access.

The landscape provides an important aspect of the recreational and tourism values, with important longshore views, as well as seascape views to the Isle of Purbeck and the Isle of Wight. Christchurch Harbour provides an essentially different and less developed landscape.

There is a golf course and leisure centre at Christchurch with a golf driving range at Wick.

Nature Conservation:

Christchurch Harbour is an SSSI, with further designation of the River Avon system and the Purewell Meadows. Hengistbury Head is designated SPA and SAC (*Dorset Heathlands and Dorset Heath*), with the River Avon and Avon Valley, extending from Christchurch up river, being SPA, SAC and Ramsar. There are discrete sections of cliff designated SSSI for its geological exposures along the Poole Bay frontage. These include areas at Southbourne, adjacent to Boscombe Pier, along much of the central section of Bournemouth and through to Canford Cliff Chine. There are areas both along the Poole Bay frontage and at Mudeford Spit and Quay designated SNCI for cliff top grasslands and for the dunes and shingle beaches.

Within Christchurch Harbour there is a Field Studies Centre, important for research and monitoring of habitats as well as providing nature conservation educational services. There is also a bird observation and ringing centre to the rear of Hengistbury Head. Christchurch Harbour and the associated area of Hengistbury Head provide a very important nature conservation area generally, contrasting but complementing the more developed open coast sea front.

KEY VALUES

Notwithstanding the major conurbations situated on the coast and within Christchurch Harbour, an essential feature of the area is the varied natural and dynamic value of the coast and harbour area. The open coast represents that quintessence of the British seaside, with the expectation of open access, sea, sand, history and landscape; supported by facilities for recreation, activity and enjoyment.

The different areas of the coast provide emphasis to the varying aspects of this. The Mundeford Quay area aims to provide a generally less intrusive use of the coastal strip benefiting from quiet areas of beach and managed coastal slopes with well defined areas of greater beach use activity and local water sport. Mundeford Spit offers an area of traditional beach use supported by the large number of beach huts.

While varying in character, area by area, the Poole Bay seafront is strongly developed as a high quality seaside attraction, enticing more visitors than any other coastal area of the UK. The vision is that “The seafront will become an environmental showcase for the town, promoting environmental values to our visitors”. (Bournemouth Seafront Strategy 2007 – 2011.) The values of the area are, therefore, as much about the overall setting of the coast and its landscape as it is about maintaining open access and facilities on the sea front. This varied context is provided in the value of the semi-natural cliffs and open space at the cliff crest and in the more natural unobtrusive development of Christchurch Harbour. In many ways Hengistbury Head typifies this interaction as an iconic part of the landscape, valued for both its natural and historic environment. It plays an important role in being the closest and most accessible natural ‘green space’ area for much of the eastern part of the Bournemouth area.

Christchurch and Mundeford add important heritage value to the area and the evidence of man’s early settlement in the area of Hengistbury Head is carried forward in the later historic development of these areas at the mouth of the Avon and Stour.

These local values of the coastal area contribute fundamentally to the regional value of the two conurbations, in maintaining a vibrant sustainable sense of community and economic well-being. While maintaining this economic well-being of the developed coast is seen as a primary driver, this is inextricably linked to maintaining the natural conservation values, the historical perspective and environment, high quality landscape and varied use of the area.

These values are brought together as an interrelated set of management objectives developed from the above, but more specifically from the individual objectives identified in Appendix D and E.

OBJECTIVES (the development of objectives is set out in Appendix D based on objectives listed in Appendix E)

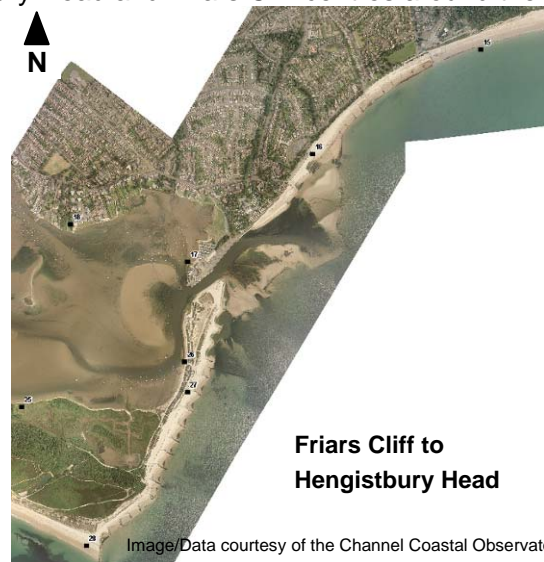
- Protect economic viability of Bournemouth, Poole and Christchurch;
- Maintain important heritage values with Christchurch;

- Support management of heritage interests around Hengistbury Head;
- Reduce flood risk to Christchurch and Mudeford.
- Retain and improve the width and amenity value of the intertidal (beaches) area in Poole Bay;
- Maintain essential sea front facilities.
- Maintain the opportunity for commercial, recreational and sports use of the water, in particular the use of shore-based facilities such as Mudeford Quay;
- Manage risk to properties due to erosion and flooding where sustainable;
- Maintain open space and recreational use of such space;
- Minimise net loss of species/habitat (identify compensatory habitat if any net loss occurs);
- Maintain opportunity for natural development of the mosaic of habitats, particularly within Christchurch Harbour;
- Maintain geological exposure of cliff line;
- Maintain the outstanding landscape and the views and appreciation of the varied coastal environment;
- Support adaptability of coastal communities;
- Reduce reliance on defences.

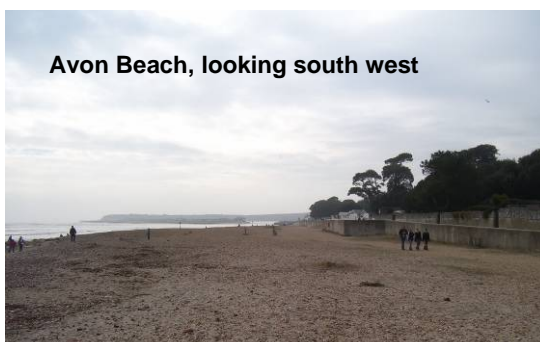
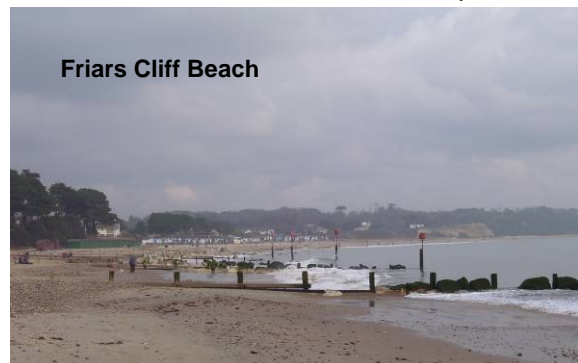
DESCRIPTION

The Policy Development Zone which extends from the western end of Friars Cliffs through to Flag Head Chine at Poole (and including Christchurch Harbour), covers a distance of some 26km.

The open coast section between Hengistbury Head and Friars Cliff centres around the entrance to Christchurch Harbour. To the south, attached to the high ground of the Head, is Mudeford Spit. The spit sets back slightly from the eastern cliff line and is defended by rock groynes and revetment. The Spit is populated by private beach huts and has some limited public facilities. This heavily defended spit closes off the entrance to the harbour, with the narrow channel (the Run) fixed between the end of the spit and the hard defences to Mudeford Quay. The end of the spit overlaps the end of Mudeford Quay and there is an extensive ebb tide delta extending from the end of the spit nearly 1 kilometre further north in front of the open coast.



This northern section of the frontage is defended by sections of sea wall and groynes through to the undefended section of cliff at Steamer Point. The foreshore comprises sand with some areas of shingle. The cliff at Steamer Point is some 20m in height and this reduces in level quite rapidly, such that along much of the frontage the level of the back cliff is of the order of 4m to 5m ODN. This backshore level drops further to Mudeford Quay, with the quay area being around 3m ODN. This frontage is divided into four principal zones within the Christchurch Beaches and Hinterland Management Plan, these being:



- Mudeford Quay, with its car park, boat facilities, RNLI station and ferry terminal to Mudeford Spit;
- Gundimore, defended by a sea wall and linking Mudeford Quay to Avon Beach;
- Avon Beach, the main beach use area backed by its promenade, car parks and commercial facilities, and backed also by the Avon Run Road;
- Friars Cliff beach, protected by

groynes and seawall and backed by open public space, the Maritime and Coastguard Training centre and ending at the undefended section of Friars Cliff.

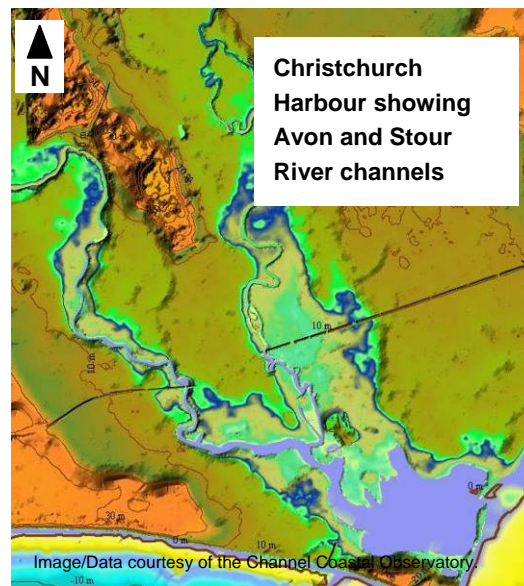
Behind the shoreline is a large area of residential properties, making up the newer part of Mundeford. The town extends down to its older core set back from the shore within the



lee of Mundeford Quay. Here, the frontage comprises low retaining walls backed by generally open grass areas to properties behind. There is a wide expanse of muddy foreshore in front of the wall. The old town and the main road run around the small bay created by the river Mude and the Bure Brooke in the lee of the Quay. Newer development has taken place on the low headland to the west of this small bay. This area is more

densely developed forward of the main core of the town and there are landing stages and slipways servicing the significant boat use of this lower area of Christchurch Harbour.

Further within the Harbour, on its northern side, are large areas of mud flat and saltmarsh, marking the change in character of the estuary, from open intertidal flood plain to that of a more riverine environment. The saltmarsh, though now eroding in areas, is understood to be a past sink for sediment delivered from the two main rivers. The main River Avon channel is held to the western side of the estuary, with the wider valley closed off on its eastern side by higher ground linked to the island forming the centre of Christchurch. There is also a small area of high ground slightly further forward of this at Crouch Hill, within the area of the marsh.



Behind the marshes is reclaimed land in front of Stanpit and the main centre of Christchurch. These areas are defended, typically by embankments and walls set back from the estuary edge. Although Stanpit is largely built upon the rising higher ground to the east of the river valley, with little development to the estuary side of the road, much of the core of Christchurch, to either side of Bridge Street, lies within the larger valley floor of the Avon.

Upstream of the town, the old river valley has not generally been developed. The A35 road and railway line run across the valley on embankments.

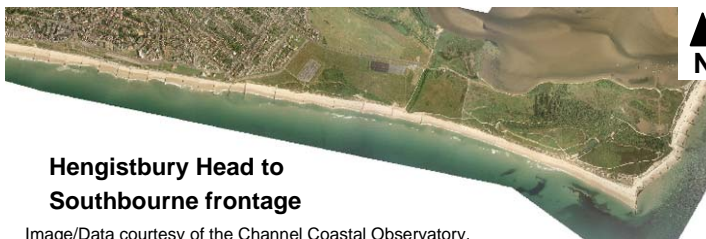
To the western side of the Avon, Christchurch has developed around and out from the ridge upon which sits the Priory and remains of the Castle. Much of the surrounding development is within the potential flood plain of the Avon and the Stour.



Christchurch and Wick

To the southern side of the Stour, the land rises relatively steeply to the rear of Southbourne. The village of Wick extends down to the edge of the estuary with some new development within the old village behind Wick Farm. To the east side of Wick is a golf driving range and golf course, with the range developed over the tidal flood plain but the golf course set further up the slope. Along the southern side of the estuary the land is

undeveloped, sloping down to a saltmarsh area giving out to the mud and sand flats of the wider intertidal harbour area. The Field Study Centre is just to the west of the narrowest neck of land between the Harbour and the open coast. The Iron Age earthworks of Double Dykes are located some 500m to the west of the narrowest part of the neck, cutting across the isthmus from the coast to Christchurch Harbour behind the rising land of Hengistbury Head. The lowest-lying topography of the isthmus coincides with the position of the Double Dykes. The neck of land is littered with evidence of early settlement, with several tumuli over the low lying land and upon the rising land of the headland.



Hengistbury Head to Southbourne frontage

Image/Data courtesy of the Channel Coastal Observatory.



The mature saltmarsh area widens again in the lee of the headland and the shelter of Mudeford Spit.

Along the open coast to the south and west of the Spit,

Hengistbury Head rises steeply with eroding cliffs protected by rock groynes. At the Head is the Long Groyne, holding a wider area of beach and dune against the south face of the headland. There is a shallow bay developed between the headland and the first main section of promenade and coast defence at Southbourne. To the west of the Double Dyke area commences a series of timber groynes which extend through the BBC section of the Poole Bay frontage. The Double Dykes section itself is defended by a gabion wall and three rock groynes.



Double Dykes, looking east toward Warren Hill

The main Poole Bay frontage at the larger scale describes a continuous sweeping arc from Southbourne through to the cliffs at Canford; however it shows considerable variation from this overall alignment at the local scale. This reflects principally the staged construction of the coastal defence.



Southbourne

At the western end of Southbourne, the lower land is held forward by groynes and the promenade. This forms a shallow bay to the higher cliffs at Boscombe Overcliff Drive. The rising cliffs of Southbourne have been graded back with properties close to the crest of the cliff.

Further west, the cliff is more natural, with heavy vegetation on the cliff face and over a good width to the road and properties behind.

This cliff line and groyned sand foreshore curves through to the valley and pier at Boscombe. The pier has recently been refurbished and the area to the rear of the pier largely redeveloped. A surfing reef is under construction in this vicinity, complementing the redevelopment of the area.



To either side of Boscombe Pier there are particular exposures of the coastal slope designated as SSSI. The promenade runs along this entire section of coast, protecting the toe of the cliffs.

The coastal road to the west of Boscombe runs close to the crest of the slope with property directly behind. The promenade continues through some 2.5km to the centre of Bournemouth, with the Bournemouth Pier at the entrance to the Bourne valley. The Bournemouth

International Centre (BIC) is located immediately behind the Pier, together with significant core development of the town.

The pier area tends to locally hold the foreshore area forward, forming a further shallow bay along West Cliff and through to the cliffs at the end of this zone.

The Poole Bay frontage is cut by several valleys, (or chines); some of which are developed as wooded parks and public open space. Areas of both the chines and the coastal slope and crest are locally designated as SSSI.

Along West Cliff and through to Flag Head Chine at the end of the zone, properties tend to be set back from the cliff line, with gardens extending to the cliff crest. In other areas, local roads approach the cliff but, with the notable exception of the Avenue at Branksome Chine, the main through roads lie well back from the coast.



PHYSICAL PROCESSES (further details are provided in Appendix C)

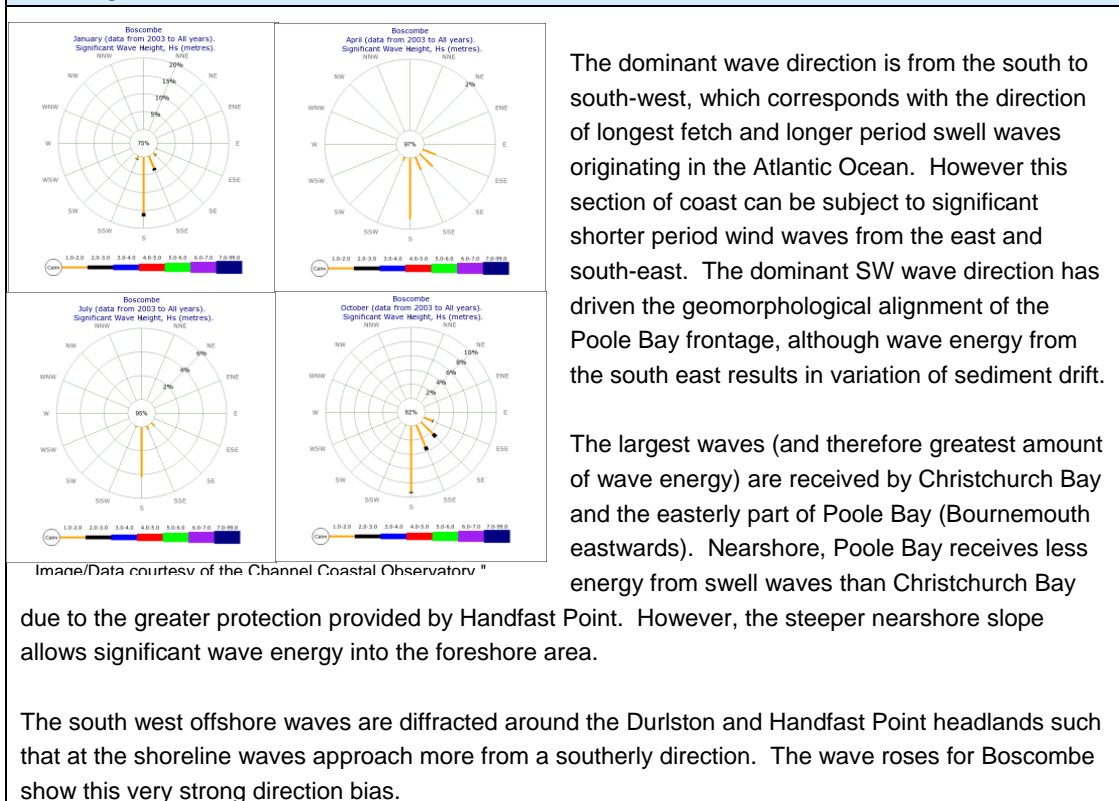
TIDE AND WATER LEVELS (m.ODN)

Location	LAT	MLWS	MLWN	MHWN	MHWS	HAT	Neap range	Spring range	Correction CD/ODN
Christchurch Entrance		-0.31	-0.21	0.49	0.89		0.7	1.2	-0.91
Bournemouth		-0.9	-0.3	0.2	0.6		0.5	1.5	-1.4

Extremes(m.ODN)

Location:	1:1	1:10	1:25	1:50	1:100	1:200	1:500	1:1000
Christchurch Priory Quay	1.39	1.65	1.75	1.83	1.91	1.99	2.09	2.17
Hengistbury Head	1.39	1.65	1.75	1.83	1.91	1.99	2.09	2.17
Bournemouth	1.38	1.63	1.73	1.81	1.88	1.96	2.06	2.14
Sandbanks	1.39	1.63	1.73	1.80	1.88	1.95	2.05	2.12

WAVE CLIMATE



TIDAL FLOW

Currents across the main section of the frontage are relatively low: peak flows less than 0.5 m/sec. Tidal and wave induced currents have been assessed as being a significant factor in biasing west to east sediment transport across Solent Beach and past Hengistbury Head and it is reported that there is a strong southerly current developed off the Head over the ebb tide. Flows through the entrance to Christchurch Harbour, through the Run, are very strong both on flood and ebb.

PROCESSES

Control Features:

The log spiral shape of Poole Bay is controlled by the headland at Handfast Point. The zone overall is then controlled by the presence of Hengistbury Head, acting as a downdrift control to the coast to the west and an updrift headland to the coast to the east. Mudeford Quay provides an anchor for the entrance to Christchurch harbour with flows from the estuary acting to influence development of the Christchurch seafront through the development of the ebb tide delta. Within Christchurch Harbour the areas of high ground upon which Christchurch is built controls the position of the Avon, allowing development of the marshes in front of Stanpit. The high ground ridge at Wick acts to divert the Stour in an easterly direction creating the opportunity for marsh development to the southern side of the estuary. Local to the Poole Bay frontage, the defended ridge coming down from Southbourne acts as a minor headland, tending to create a secondary bay over the frontage between Southbourne and Hengistbury Head (Double Dykes). Along the Poole Bay frontage there is local variation created by defences.

Existing Defences:

Individual defences are identified in Appendix D. The general description of defences is provided above. This is summarised below.

Mudeford Quay is a heavily defended and modified natural landform, with vertical sea walls and quay structures. To the north of Mudeford Quay, sea walls continue beneath the low cliffs, through to Friars Cliff, fronted by timber and rock groynes along the beach. Within lower Christchurch Harbour, along the northern shore, are low front face walls. Local ad-hoc flood defences are provided to properties behind. The main area of Christchurch is defended by embankments and defences generally set back from the waterfront, although there are tidal defences along the rivers. The area of Wick is partially defended. There are no formal defences along the southern side of Christchurch Harbour. Mudeford Spit is heavily defended with rock groynes and rock revetment and the groynes extend in front of the eastern flank of Hengistbury Head.

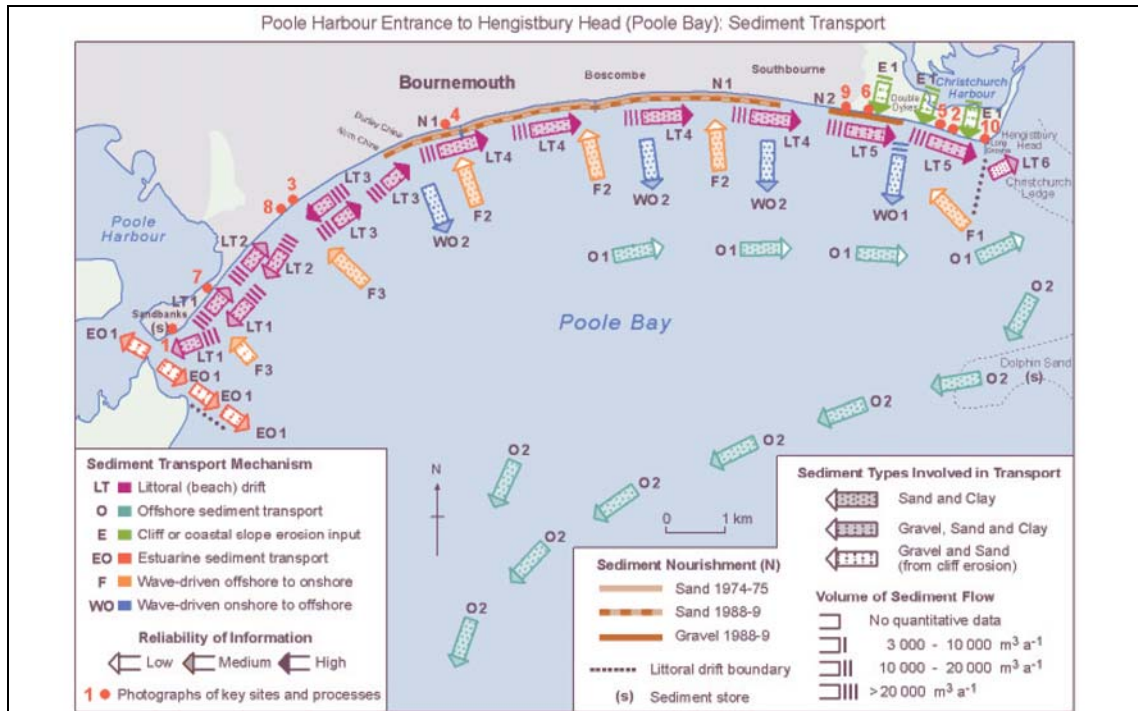
The position of Hengistbury Head is currently held by the Long Groyne. There are a series of groynes along the Solent Beach (3 rock groynes in the area of Double Dykes) and groynes are in place over much of the frontage to the west, as far as Alum Chine. Upgrading of the older timber groynes to rock structures has been recently completed for the Poole Beach section. The main defence however along the Poole Bay frontage is the beach, which is regularly recharged. Behind the beach is a sea wall and promenade, which provides secondary defence to the entire Poole and Bournemouth frontage as far east as Southbourne.

Over the Christchurch frontage defences have been assessed as having a residual life of some 20 to 30 years, although this is very dependent of beach recharge in the area. The defences along Mudeford Spit appear in reasonable condition but again rely on recharge to maintain their integrity. The Poole Bay defences are sustained through regular beach recharge and there is a programme for upgrading groynes from timber to rock. The gabion wall in front of Double Dykes is in poor condition in places and because of its nature is only likely to have a residual life of some 5 years. The Long Groyne is in poor condition.

Within Christchurch Harbour the lower estuary defences are exposed to low energy conditions and with low level maintenance are likely to remain as a competent boundary defence for 20 to 50 years. The local flood defences behind the front line are not formally maintained and in places provide only limited flood defence. The main embankments and defences around Christchurch are infrequently exposed and are reported to be in good condition.

Processes:

The general processes are summarised in the following diagram.



MMIV © SCOPAC Sediment Transport Study

Figure 4.3.2

The main features of this are:

- The net drift along the Poole Bay frontage is from west to east. This however, is very variable and there can be periods of drift reversal from east to west. Under specific storm conditions very high drift rates (in the order of $100,000\text{m}^3$ can be developed). Observation of drift alignment in relation to groynes highlights this variation, showing some areas to be more stable than others;
- There is minimal interchange between the shoreline and the nearshore area, apart from at the eastern end;
- There are both inputs and outputs of sediment at the western end of the zone. This is also a variable supply and loss of sediment from the Canford Cliffs area;
- There is sediment transfer around Hengistbury Head, although with the Long Groyne in place this tends to be through the nearshore area of the Christchurch Ledge;
- Sediment supply to the eastern beaches therefore tends to be through interaction with the nearshore area, associated with the ebb tide delta of the Harbour;
- There is little or no natural sediment supply from the cliffs along Poole Bay due to the defences;
- The low, soft frontage around Double Dykes does provide some sediment to the foreshore, as do the Hengistbury Head cliffs to the east of Double Dykes;
- Historically the cliff face to the east of Hengistbury Head provided sediment to Mudeford Spit, but contemporary trends show no erosion occurring since the installation of groynes in 1986;
- Although nominally ebb dominant, there is a supply of coastal sediment to within Christchurch Harbour;
- Fine sediment supply is provided by fluvial flow from the rivers to Christchurch Harbour.

On the open coast there is a general deficit of sediment and this is compensated for by recharge. With sea level rise, the trend will be for increased drift and loss of sediment. Sediment movement along the shoreline towards Hengistbury Head is reported as being strongly influenced by flows at the coastline

biasing sediment movement towards the east. However, the area of beach and dune immediately to the west of Long Groyne has remained quite stable, showing less drift variation as a result of changes in wave direction and reinforcing the significance of the Long Groyne in controlling sediment to the west more generally.

There is erosion reported to areas of saltmarsh within Christchurch Harbour (Appendix C). There have been no detailed studies to map the extent or location of such erosion.

Unconstrained Scenario:

Although unrealistic, because of the residual impact of defences, this scenario considers how the coast would respond, if all defences were removed. It is useful in examining the pressure along the frontage.

The fundamental change at the shoreline would be the erosion (and eventual loss beyond the period of the SMP2) of the influence of Hengistbury Head. This unconstrained erosion would tend to reduce the width of the isthmus between Southbourne and Hengistbury Head, leading eventually to a breach in this area through to Christchurch Harbour. The Southbourne headland would continue to erode back and associated with this would be a general erosion of the frontage along Poole Bay.

To the east of Hengistbury Head, there may be an increase in sediment supply to Mudeford Spit. However, this Spit would tend to roll back, increasing pressure on the Run. This in turn would result in increased erosion of Mudeford Quay. It seems probable that the overlap between the quay and the spit would become unsustainable. The differential erosion of the Spit, in relation to the erosion of the eastern side of Hengistbury Head, would make it likely that a breach would occur along the Spit. The eastern end of the Spit may well then meld itself to Mudeford Quay, with a new entrance developing closer to Hengistbury Head. A new channel and ebb delta configuration would be established, with the Mudeford Quay Spit rolling back into the Harbour.

The coast to the north of Mudeford Quay would continue to erode back in line with the process described above.

As the influence of Hengistbury Head was lost, the entrance to Christchurch Harbour would become a large delta system with variation in channels and banks. There would be a general infilling of the harbour area system.

To the west of the now lost Hengistbury Head, the Poole Bay frontage would erode back significantly, allowing the Bay to assume a more classic log spiral form, with erosion affecting the frontages of Southbourne, Boscombe, Bournemouth and Poole. In line with the log spiral plan form, the extent of erosion back into the hinterland would increase from east to west, with the West Cliff and Poole frontages likely to undergo the greatest recession.

Potential Baseline Erosion Rates

Base rates have been assessed from monitoring and historical data. The range of potential erosion is assessed in terms of variation from the base rate and sensitivity in potential sea level rise. Further detail on erosion rates is provided in Appendix C. The base rates provided below are taken as an average based on historical records. The rates are a composite value based on erosion of the toe and recession of the crest of the cliff and reflect the erosion rates following failure of defences.

(Sea Level Rise assumed rates: 0.06m to year 2025; 0.34m to year 2055; 1m to year 2105. Baseline date 1990)

Location	Base Rate	Notes	100yr. Erosion / Recession (m)
Highcliffe	1.1m/yr	Erosion resisted by defences and slopes stabilised	120m
Avon Beach	1.4m/yr	Erosion resisted by defences	120m
Hengistbury Head East	1.6m/yr	Erosion partially constrained by defences	160m
Hengistbury Head	1.8m/yr	Erosion partially constrained by defences	180m
Bournemouth Cliffs	1.7m/yr	Erosion resisted by defences and slopes stabilised	150m
Canford Cliffs	1.8m/yr	Erosion resisted by defences and slopes stabilised	180m

4.3.2 BASELINE MANAGEMENT SCENARIOS

PRESENT MANAGEMENT

Present Management is taken as that policy defined by SMP1, modified by subsequent strategies or studies. It should be noted that both in the case of SMP1 and that of many of the strategies undertaken before 2005, the period over which the assessment was carried out tended to be 50 years.

SMP1			MODIFIED POLICY		
MU	LOCATION	POLICY	REF	LOCATION	POLICY
CBY 2	Mudford Quay to Highcliffe	Selectively HTL	S1	Mudford Quay to Friars Cliff	Hold The Line. Replace timber Groynes with rock, beach management.
CHB5	Mudford Quay	HTL	S2	Mudford Quay	Manage Flood Risk. Maintain flood warning, support local resilience/adaptation. Reassess in line with sea level rise.
CHB4	Mudford Town	HTL	S2	Mudford Town	Manage Flood Risk. Maintain flood warning, support local resilience/adaptation. Reassess in line with sea level rise.
CHB3	Stanpit and Grimbury	Do Nothing with Retreat in long term	S3	Purewell	Maintain and raise frontline flood defence.
	Christchurch	Not included in SMP1	S3	Central Christchurch (area 3.4)	Extend frontline defence and raise.
			S3	Mill Race (area 3.3)	Construct frontline defences (low priority score).
			S3	Priory Quay (area 3.2)	Maintain and raise defence (excluding further work to Priory Marina).
			S3	Stour Frontage of Christchurch (area 3.1)	Construct and raise riverside defences.
CHB2	Southside	Do Nothing	S3	Wick	Raise and extend defences.
			S3	Hengistbury to Wick	No Active Intervention.
CHB1	Harbour-side of Mudford Spit	HTL	S3	Harbour-side of Mudford Spit	Hold The Line. Beach recharge to raise level (low priority score).
CBY1	b) Mudford Spit.	HTL	S1	Mudford Spit	Hold The Line.. Beach recharge.
CBY1	a) Hengistbury East	Retreat	S1	Hengistbury	Managed retreat.
PBY3	Warren Hill	Retreat Cliff , HTL to beach width	S4	Not concluded/ based on existing practice *	Current policy for maintaining Long Groyne.
PBY2	Point House Café to Warren Hill	Selectively HTL	S4	Not concluded/ based on existing practice *	Current policy to maintain defence to Double Dykes.
PBY1	Sandbanks to Point House Cafe	HTL	S4	Not concluded/ based on existing practice *	Current policy to maintain recharge with groynes.

References:

- S1 *Christchurch Bay Strategy Study(DRAFT) - April 2007*
S2 *Mudford and Stanpit Feasibility Report (EA November 2008)*
S3 *Christchurch Bay Strategy Study. Christchurch Harbour Benefit Cost Assessment (June 2008)*
S4 *Poole Bay and Harbour Strategy – 2004 (* the policy for these frontages was not conclude in strategy. Current practice is HTL)*

The key objectives determined from the Catchment Flood Management Plan (2008) for the area is set out below.

- Prevent an increase in the number of people affected by river and tidally influenced flooding;
- Prevent an increase in the economic damages to residential, commercial properties and infrastructure caused by river and tidal flooding;
- Prevent an increase in the economic damages to agricultural land caused by river and tidally influenced flooding in the rural areas;
- Where appropriate to ensure the floodplains are utilised for recreational and green space;
- Where appropriate to ensure rivers and floodplains are utilised for the benefit of nature conservation and restore them to their naturally functioning state, particularly in the urban areas;
- To sustain and improve the condition of internationally and nationally designated sites within areas prone to flooding;
- To increase biodiversity, BAP habitats and amenity values of the river-floodplain environment; and
- Protect significant historic environment assets and their settings from flood related deterioration.

BASELINE SCENARIOS FOR THE ZONE

No Active Intervention (Scenario 1, NAI):

Under this scenario, no works would be undertaken to maintain existing defences along the frontage. Because of the residual impact of structures, evolution of the unconstrained scenario would be modified, although in the longer term the development of the coast would be similar.

Under this scenario, there are two underlying influences at work, the change in structure or geomorphology of the coast and the increased risk of flooding. The first impacts on the whole zone, the second is of more significance in terms of the areas around Christchurch Harbour.

Geomorphological Change

Over the time scale of the SMP2, the following sequence would tend to occur. Over the first epoch, groynes would tend to fail through lack of maintenance. This would be associated with, and accelerate the loss of beaches generally over the frontage. Potentially most significant in the longer term would be the failure of the Long Groyne. While this would result in some increase of sediment feed to the east, this would also be at the expense of significant erosion of the Solent Beach area. Erosion of this frontage would only be temporarily held by the defences in front of Double Dykes. As this frontage erodes back there would be increased pressure on the local headland of Southbourne. Loss of this headland, coupled with the more general loss of the foreshore and beach over much of the rest of the Poole Bay frontage, would expose the old sea wall and promenade behind. This wall would fail within the second epoch and erosion would occur to the cliffs behind.

East of Hengistbury Head, the additional sediment would provide a degree of additional protection,

but as exposure to wave action occurred with the loss of the Long Groyne, so sediment drift along the frontage would increase. This sediment would not be retained as defences in this area started to fail and Mudeford Spit would become increasingly vulnerable to breach. The defences to the north of Mudeford Quay would benefit more significantly from the failure of the Long Groyne and loss of control along the spit. However, as the groynes in this area failed during the second epoch so sediment would be carried still further east. Over the second epoch defences generally over Avon Beach to Friars Cliff would fail and erosion would occur along this frontage.

It has been assessed that even under this No active Intervention scenario, the isthmus between Hengistbury Head and Southbourne would remain as a barrier over the period of the SMP. There would be increased probability of a breach occurring but it seems unlikely that this would form a permanent new channel to Christchurch Harbour. More probably a new entrance would form along the length of Mudeford Spit. This would result in a different configuration of the estuary channels and may result in increased saltmarsh development behind the isthmus. The existing saltmarsh behind Mudeford Spit would tend to be eroded. In the longer term, erosion of Hengistbury Head would result in continued erosion of the coast to either side of the headland. Under existing predicted erosion rates, the full width of Hengistbury Head (some 400m) would be lost within some 200 years. This does not take account of sea level rise which would increase erosion rates. On this basis, there would be a full breach at the isthmus within about 150 years, based solely on erosion rates. This might be expected to occur earlier taking account of increased overwash and the potential impact of sea level rise.

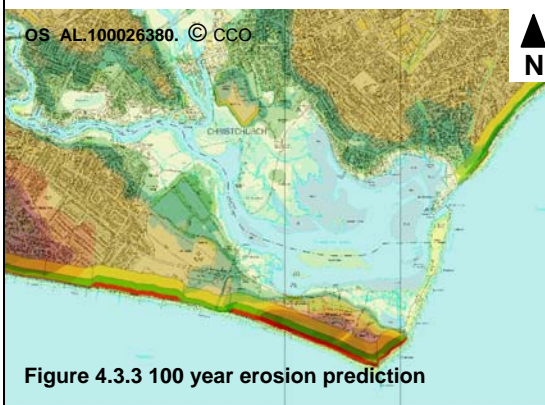


Figure 4.3.3 100 year erosion prediction

It would be the breach of Mudeford Spit, potentially during the second epoch, which would result in increased wave energy within Christchurch Harbour. It seems unlikely, however, that there would be significant increase in wave height over the period of the SMP 2 due to a breach at the isthmus. In the longer term (100 to 150 years) both the reduction in size of Hengistbury head and a breach at the isthmus would contribute to this. The predicted 100 year erosion position under this scenario is shown in the adjacent diagram. This does not make any

prediction as to erosion of Mudeford Spit, this being closely linked to the rate of erosion of Hengistbury Head.

The initial breach at Mudeford Spit would result in increased wave action generally over the Mudeford town frontage, substantially increasing flood risk in this area. The old spit of Mudeford Quay would develop to a degree and this would make navigation of the harbour entrance difficult.

Flood Risk

With sea level rise there would be increased risk of flooding around the shore of Christchurch Harbour. Although it seems unlikely that defences would be under any greater pressure for erosion, without raising defences or raising the existing natural river banks, many areas would suffer from flooding. At Mudeford Quay, the operational area of the quay, (irrespective of the pressure for erosion) may become untenable, with substantially greater overtopping. The main areas of flooding would be within Christchurch. Over the longer term (150 years), there would be significant increase in wave exposure to many of the frontages due to the geomorphological changes discussed above.

Overall Impacts

The potential economic damages arising from projected erosion and flooding are identified in Table 1 at the end of this sub-section.

The impact of this scenario would be substantial and significant. There would be loss of assets all the way along the seafront. Both in

the areas of Bournemouth and Christchurch, there would be little opportunity to maintain the important tourist attraction of the seafront. Not only would facilities be lost but there would also be loss of the beach. It would not be until the third epoch that major damage would occur along the Christchurch frontage in terms of hard assets, although there would be loss much earlier of the important area of beach huts situated on Mundeford Spit. Along the Bournemouth and Poole seafront there would be some £60 million loss of hard assets during the first two epochs with some £5 million lost along the Poole frontage in epoch one. During the third epoch damages would increase by some £550 million as the cliffs erode back. This large increase in damages is highlighted in the comparison between the draft strategy (50 year horizon) and the subsequent project appraisal (100 year horizon).

Flooding to Christchurch and associated areas would be in the order of £100 million over the next 50 years. The potential flood risk would increase significantly with sea level rise, potentially affecting both the centre of Christchurch and areas along the Stour. Landfill sites are also identified within the potential flood risk area in front of Christchurch and Stanpit.

At Mundeford, properties most at risk tend to have some local private defence. Most properties

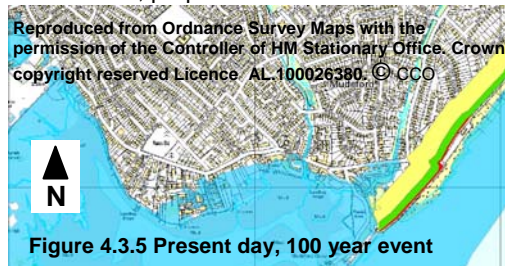


Figure 4.3.5 Present day, 100 year event

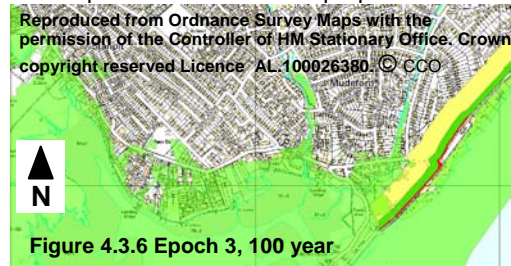


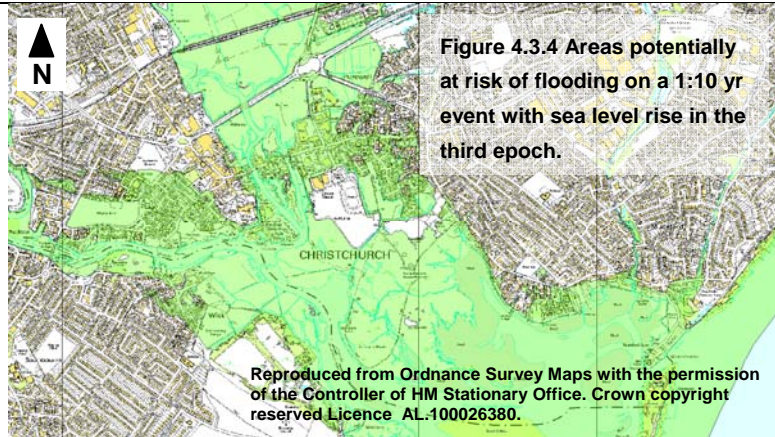
Figure 4.3.6 Epoch 3, 100 year

presently at risk within this area would only suffer inundation on very extreme events. With sea level rise, this situation could change such that a larger number of properties are at direct risk on a more frequent basis. Even so, within the Mundeford area, flood risk tends to be limited to properties seaward of the main road.

Two plots are shown: for the estimated 100 year event (present day) and the estimated 100 year event in 2075, having added an average sea level rise mid-way through epoch 3.

(Note: plots are indicative and further detail of flood risk should be obtained from Environment Agency flood risk mapping.)

On the open coast under this scenario, the ability of the cliffs over the zone to erode would be restored, maintaining new exposures of the cliff face. While this would improve the geological interest of the area, the general and continuing loss of properties and infrastructure along, particularly, the



Poole Bay frontage, would have a negative impact on the landscape associated with the area. There would also be substantial loss of heritage value in terms of important features within Christchurch and the older archaeological interests associated with Hengistbury Head.

There would be some scope for natural development of existing habitat and the mosaic of habitat within Christchurch Harbour. In some areas, however, such habitat may be squeezed against the more steeply rising land around the edge of the Harbour area.

There is likely to be greater saline influence within the upper valley of the Avon, certainly leading to change of habitat at the southern extent of this designated area. In the longer term (100 years to 200 years) the natural habitat development within Christchurch Harbour would radically change. The actual impact, both within the Harbour area and within the Avon valley, would critically depend on the flood or ebb dominance of the estuary processes and upon, therefore, the capacity of the estuary and new estuary areas to accumulate sediment. This would determine whether mud flat and saltmarsh would develop or whether there would be increasing erosion of critical habitat with sea level rise. The scope for replacement of freshwater and brackish habitat within the area would be limited. It could not, therefore, be concluded that there would be no net loss to the ecological system.

Overall, the essential balance and diversity of interests of the zone would suffer, failing to support the interactive value between human, natural and historic interests. This has been identified as an essential quality of the area. This is reflected in the assessment against objectives set out in Table 2 at the end of this subsection.

With Present Management (Scenario 2):

The present management scenario is based on that set by SMP1 and updated through the development of the recent draft strategies (Ref. S1, S3 and S4). Although in draft, these strategies are taken as reflecting the intent of Present Management within this baseline scenario, together with on-going day to day management of the frontages.

Along the open coast the With Present Management (WPM) aims to Hold the Line over all sections, with the exception of Hengistbury Head East. Here the policy would be to allow realignment of the frontage with continued controlled erosion of the cliff. The general practice elsewhere would be to recharge beaches and maintain groynes and control structures. There is the potential for replacement of timber groynes with rock groynes. This is recommended by the draft strategy for the eastern end of the zone, extending the use of rock groynes, replacing timber groynes to the east. Replacement with timber and rock groynes is also being considered along the frontage to the west of Bournemouth.

In the area of Solent Beach, between Southbourne and Hengistbury Head the intent would be to continue defence of Double Dykes and to further groyne the beach frontage. This is all in line with SMP1 policy of selectively hold the line.

Within Christchurch Harbour, the draft strategy recommended maintaining and generally increasing flood defence to assets in the areas of Mundeford, Stanpit, Christchurch and Wick. The principal areas of increased defence under the draft strategy would be at Mundeford, Wick and the Stour frontage of Christchurch. In the case of Wick, this potentially extends defence beyond that envisaged by SMP1. The identification of the landfill site at Stanpit has resulted in recommendations within the draft strategy for maintaining the advanced line of defence, as opposed to the SMP1 policy for potential long term retreat.

Subsequent, more detailed study of the Mudeford Town frontage has shown that the high level strategic assessment of flood risk to properties overestimates the risk. The recommendation from this more detailed study (Mudeford and Stanpit Pre-Feasibility 2008) for this area, is to support maintenance of private flood defences and possible resilience measures to locally reduce flood impact on property.

As with scenario 1 (No Active Intervention), discussed above, the assessment of With Present Management considers first the impact of this scenario on the coastal form and the potential pressures introduced into the coastal system. The discussion then considers the impact of flood defence within the Harbour area and the impacts this might induce.

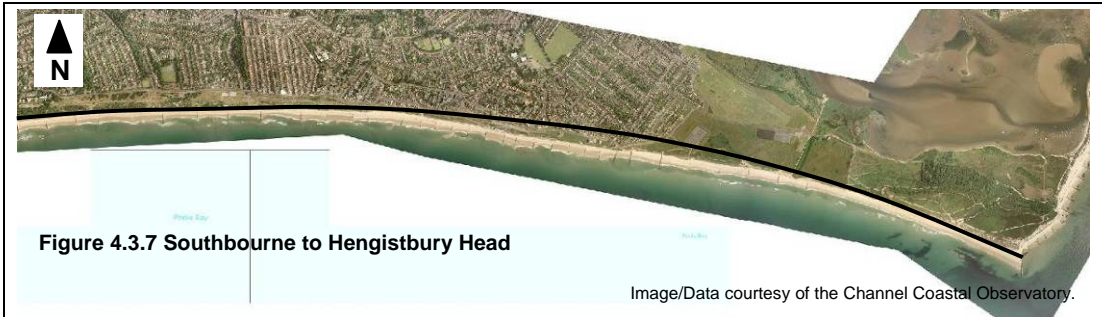
Geomorphological Change

The intent is to hold the overall position of Hengistbury Head, with the replacement of the Long Groyne. This will to some extent continue to restrict sediment from moving to the east (although to a degree this is mitigated by the continued policy for recharge). However, maintaining the influence of the Head fixes the general shape of the coast to the east and management of this frontage is considered on this basis. Over the short term, holding the alignment of Mudeford Spit maintains the position of the Christchurch Harbour entrance, supported behind by maintaining Mudeford Quay. This in turn supports the development of the ebb tidal delta which in turn provides sediment and protection to the Avon Beach through to Friars Cliff. The management policy for continued recharge to the area, together with imposing slightly greater control using rock groynes, compensates for the potential reduction of sediment. The impact of this on the coast to the east was considered in policy to the management of the coast to the east based on the proposed form of management set out in PDZ1.

Despite sea level rise, maintaining a beach in the area between Mudeford Quay and Friars Cliff is considered appropriate to sustaining the values of the frontage. The existing pressures along the Mudeford Quay frontage will increase in line with sea level rise and there is likely to be increased frequency of sea wall overtopping. However, continued defence of the Quay and associated front defences is seen as an essential feature of this WPM Scenario.

The main pressure over this eastern section of the coast would be along Mudeford Spit and in particular the interface between the spit and the eastern face of Hengistbury Head. With the present management aim to fix the position of the spit along its whole length, as the cliff line to the south retreats (even under managed realignment), the root of the spit will become increasingly vulnerable. The spit might eventually be held forward of its natural alignment and the interface between spit and cliff will need to be reinforced, creating an artificial promontory. This would tend to isolate the spit, making maintenance of a beach in this area more difficult. Following through the consequence of this scenario, the approach could in effect convert the spit into a breakwater across the mouth of Christchurch Harbour.

To the west of Hengistbury Head, holding the position of the headland will support the intent, further to the west, to maintain defence along the Bournemouth and Poole frontages. Sediment transport studies ((S4, Halcrow 2004 Technical Annex 5) show this area to be very closely aligned to net wave direction but with the potential for significant gross movement depending on the angle of wave approach. The technical annex reports that if wave driven sediment is the sole factor considered, the net movement in the area between Southbourne and Hengistbury Head is from east to west (in comparison to the west to east transfer generally accepted over the main part of Poole Bay). The report indicates that the continued loss of sediment from the Solent Beach area (between Southbourne and Hengistbury Head) is as a result of wave and tide induced currents, forcing net loss of sediment to the east.



This may be further considered in terms of the local variation in coastal orientation at this sensitive location. From the image above it may be seen in general terms that the past erosion of Hengistbury Head, coupled with the influence of protection at Southbourne, has allowed the formation of a slight headland at Southbourne. The line shown on the image projects a smoothed curve based on the extension of the shape of Poole Bay through to the alignment of the relatively stable growth of dune at the toe of Hengistbury Head, retained by the Long Groyne. It is stressed that the line above is not a definitive erosion line but is intended, rather, to highlight the slight unconformity formed at Southbourne with past erosion of Hengistbury Head. This slight unconformity in the coast may be seen also in the photograph along with the protuberance created in the centre of Solent Beach by the defence of the southern end of Double Dykes. It may be seen that Solent Beach is already forming a separate bay.

Critical in assessing this With Present Management scenario is defining the intent of holding the line over this whole section. For this purpose, this is taken as management necessary to limit erosion of the Hengistbury headland, maintain the full integrity of Double Dykes and the car park to the west and retain the integrity of the defence and promenade at Southbourne; and furthermore to provide the necessary control in terms of erosion and coastal alignment of the coast to the west.



In taking this intent, maintaining the position of the promenade at Southbourne is essential. Its current advanced position and the consequential narrower beach make this location relatively vulnerable. To maintain a sustainable width of beach some additional control at this location is likely to be required (the draft strategy (S4, Halcrow 2004) identifies generally that beach recharge without the support of groynes is unlikely to be sustainable). This would tend to reinforce, or make more pronounced, the development of the headland at Southbourne. As such this will tend to emphasise the separation between the shoreline to the west and that to the east. With the further constraint of the movement of sediment between these two sections of the coast there is likely to be increased pressure for the Solent Beach bay to set back further than at present, placing greater pressure on the gabion wall and the southern end of Double Dykes. In line with present management of the coast, in general this would be addressed through beach recharge and imposing further control of potential erosion through the use of rock groynes. The Long Groyne would be reinforced to retain sediment at the eastern end. As shown by past experience, there would be a need to undertake regular recharge to maintain an advanced position of the beach over the frontage. With sea level rise this effort would need to increase over the period of the SMP2.

Over the western section of the Poole Bay frontage, the draft strategy (*S4, Halcrow 2004*) recommends a continued approach of beach recharge and investment in maintaining the groynes. This again will require increased effort either in establishing greater control over the beach recharge or through increasingly frequent recharge of the beaches.

With Present Management of the open coast imposes conditions for management of the flood risk within Christchurch Harbour. This is considered below.

Flood Risk

Based on the draft strategy and the more detailed study of Mudeford, the intent would be to maintain existing standards of defence over the whole area, accepting some degree of higher risk associated with local private defence at Mudeford.

This in general would require defences to be maintained and raised in line with sea level rise. In terms of Christchurch, the aim would be to build upon the existing defence line, which tends to be set back from the exposed estuary shoreline. The draft strategy (*S3, Christchurch Bay Strategy Study 2007*) identifies that many of the existing defences only come into play on more extreme events. However, the draft strategy identifies the intent for new defences at:

- Stanpit in defending against potential contamination due to the landfill site;
- Along the northern edge of the Stour defending the extensive areas of properties in this location;
- Around Wick. It is uncertain as to the exact position of defences and this potentially changes the approach put forward in SMP1 that this area would be allowed to develop naturally.

Neither the SMP1 nor the draft strategy comment on the potential flood risk further north along the Avon valley, although quite extensive areas of grazing marsh are at present within the coastal flood plain and, with sea level rise, these areas may extend to affect transport routes and property to the north of the town. The extent of coastal flood plain only marginally impacts on the Avon Valley SPA, however management of flooding in this area could impact on the SAC designation of the river course and upon the SSSI at Purewell.

At Mudeford Quay and Mudeford Town, extending the implications of present management, the intent would be to support existing private defence of property but to consider some form of set back defence in the longer term, in line with increasing risk due to sea level rise.

Overall Impacts

In terms of sustaining economic viability and communities along the Poole Bay frontage and at Christchurch, Mudeford and Wick, this scenario meets the objectives. It also maintains the heritage value within Christchurch and largely that in the area of Hengistbury Head. There would be some continuing risk as the eastern side of the headland erodes.

The potential economic damages arising from this scenario are identified in Table 1 at the end of this sub-section.

Overall the tourism and recreational facilities of the open coast would be maintained, although there may be greater disruption to this in the long term with increasing need for beach management and more frequent need for recharge. At Mudeford Spit, the increasing need for defence would tend to reduce beach width reducing the attractiveness of the area. Similarly, increasing engineering effort to maintain an advanced beach line along Solent Beach may be considered to reduce the semi-naturalness of this frontage, detracting from the contrasting but complimentary green space offered by

this section of the coast. It is in these two areas in particular that increased control and effective hardening of the shoreline may impact on landscape values associated with Hengistbury Head.

Over the open coast, there would be continuing reduction of exposure of the geology, detracting from this important value. This would not be significantly different from present and it is recognised that within the Bournemouth Seafront Strategy mitigation of impact on this is being put in place.

Within Christchurch Harbour, the main potential concerns are in relation to the impact of increased extent of defences and the potential constraint this imposes on the ability of the mosaic of habitat within the Harbour to adjust to sea level rise. A significant uncertainty in this regard is the capacity for the estuary fringes to accrete with sea level rise without additional width within which to adapt. The principal opportunities for such adaptation are in the areas of Stanpit marshes, constrained by the anticipated need to defend former landfill areas and in the detail of how defence might be provided to the village of Wick. The opportunity to allow adaptation along the Stour frontage to Christchurch is constrained by the development of this area.

Considered as a whole, there is a trend within this scenario for further encroachment of engineering management on the coast and estuary areas which detract from the overall diversity of the area. This relates specifically to the areas of interface between the natural and human zones of activity, in areas such as Solent Beach through to Mudeford Spit and in areas of Christchurch Harbour. This is reflected in the assessment against objectives set out in Table 2 at the end of this subsection.

Table 1. Economic Assessment

The following table provides a brief summary of damages determined by the SMP2 analysis for the whole PDZ. Further details are provided in Appendix H. Where further, more detailed information is provided by studies, this is highlighted. The table aims to provide an initial high level assessment of potential damages occurring under the two baseline scenarios. The damages for each epoch are current values. These are discounted to give present values in the final column. It is important for the reader to note that the loss figures quoted only refer to domestic dwellings and no account has been taken of commercial, industrial or infrastructure property values.

ASSESSMENT OF EROSION DAMAGES

Epoch		0 -20 year		20 – 50 years		50 – 100 years		Present Value Damages (£x1000)
No Active Intervention	SMP1 MU	Number of properties	Value x £1000	Number of properties	Value x £1000	Number of properties	Value x £1000	
Location								
Mudford Quay	CBY2b	3	706	9	2,118	80	18,828	3,305
Mudford Spit	CBY1	0	0	0	0	0	0	0
Hengistbury Head	PBY3	0	0	0	0	0	0	0
Double Dykes	PBY2	0	0	9	1,732	29	5,583	1,224
Bournemouth (BBC)	PB1a	2	385	203	39,081	2483	478,032	66,253
Canford Cliffs (PBC)	PB1b(i)	24	5,915	150	36,969	201	49,538	22,717
Total for PDZ1								93,499
With Present Management	SMP1 MU	No.	x £1000	No.	x £1000	No.	x £1000	Present Value Damages (£x1000)
Location								
Mudford Quay	CBY2b	0	0	0	0	0	0	0
Mudford Spit	CBY1	0	0	0	0	0	0	0
Hengistbury Head	PBY3	0	0	0	0	0	0	0
Double Dykes	PBY2	0	0	0	0	0	0	0
Bournemouth (BBC)	PB1a	0	0	0	0	0	0	0
Canford Cliffs (PBC)	PB1b(i)	0	0	0	0	0	0	0
Total for PDZ1								0
Notes								
Present Value NAI damages are assessed by the Christchurch Bay Coastal strategy as being of the order of £40 million for the length between Mudford Quay and Highcliffe. This includes car parks and recreational value.								
Market value NAI damages are assessed by the Christchurch Bay Coastal strategy as being of the order of £32 million Mudford Spit (£16 million PV based on loss in year 20).								

Analysis of damages in technical Annex 8 of the Poole Bay Strategy Study (2004) gave a NAI present value of £156 million for PBY1. This included loss of recreational value but was only valued over a 50 year period. Subsequent analysis undertaken for the approved project appraisal of the latest beach recharge demonstrated the significant additional damages arising from erosion beyond the 50 year period. The higher values from the appraisal have drawn upon more accurate assessment of property than has been possible in the high level assessment provided by the SMP.

ASSESSMENT OF POTENTIAL FLOOD RISK

		Flood risk total tidal and fluvial 2008		Flood risk total tidal and fluvial 2102		
No Active Intervention	SMP1	Number of properties	Value x £1000	Number of properties	Value x £1000	Averaged PVD (£x1000)
Location	MU					
Mudford Quay	CBY 2	9	£2k to £10k AAD	9	£2k to £10k AAD	184
Mudford Quay inner	CHB5	35	£2k to £10k AAD	124	£2k to £10k AAD	1,200
Mudford	CHB4	47	£2k to £10k AAD	343	£2k to £10k AAD	2,745
Stanpit	CHB3	1	Write off £253K	1	Write off £253K	179
Christchurch (not included within SMP1)		Assessment taken from strategy				88,490
Wick	CHB2	0	0	2	Write off £506K	112
Mudford spit rear	CHB1	1	£2k to £10k AAD	1	£2k to £10k AAD	20
Mudford Sandbanks	CBY1	2	£2k to £10k AAD	2	£2k to £10k AAD	41
With Present Management						
No Active Intervention	SMP1	Number of properties	Value x £1000	Number of properties	Value x £1000	Averaged PVD (£x1000)
Location	MU					
Mudford Quay	CBY 2	0	0	0	0	0
Mudford Quay inner	CHB5	0	0	0	0	0
Mudford	CHB4	0	0	0	0	0
Stanpit	CHB3	0	0	0	0	0
Christchurch (not included within SMP1)						
Wick	CHB2	0	0	0	0	0
Mudford spit rear	CHB1	0	0	0	0	0
Mudford Sandbanks	CBY1	0	0	0	0	0

OTHER INFORMATION:			
Mudford and Stanpit Viability (2008) report assesses Do Nothing Damages of £1.1M over the next 50 years for CHB5 & 4.			
Christchurch Bay Strategy (technical Annex 4, 2008) determines the following potential damages and costs:			
Area	Do Nothing damages (£ x 1000)	With proposed management (£ x 1000)	Notes
CHB 5	4,210	0	Subsequently assessed that flood risk is primarily below threshold of properties
CHB 4	7,610	0	Subsequently assessed that flood risk is primarily below threshold of properties
CHB 3	88,490	0	Includes areas of Christchurch not previous assessed in SMP1. Maintain and raise defences (£7,390k).
CHB2	1,429	0	Extend existing defences (£986k) to protect property in Wick,
CHB 1	707	0	Continued management (£779k), beach huts at risk.

Table 2. General Assessment of Objectives

The following table provides an overall assessment of how the two baseline scenarios impact upon the overall objectives agreed by stakeholders. These objectives are set out in more detail within Appendix E. The table aims to provide an initial high level assessment of the two baseline scenarios, highlighting potential issues of conflict. These issues are discussed in the following section, examining alternative management scenarios from which SMP2 policy is then derived.

OBJECTIVE	NAI				WPM			
	Neutral	Fails	Partial	Positive	Neutral	Fails	Partial	Positive
Protect economic viability of Bournemouth, Poole and Christchurch,								
Maintain important heritage values within Christchurch,								
Support management of heritage interests around Hengistbury Head.								
Reduce flood risk within Christchurch area and Harbour and at Mudeford.								
Retain and improve the width and amenity value of the intertidal (beaches) area in Poole Bay,								
Maintain essential sea front facilities. Maintain the opportunity for commercial, recreational and sports use of the water, in particular the use of shore-based facilities such as Mudeford Quay,								
Manage risk to properties due to erosion and flooding where sustainable,								
Maintain open space and recreational use of such space,								
Minimise net loss of species/habitat (identify compensatory habitat if any net loss occurs),								
Maintain opportunity for natural development of the mosaic of habitats, particularly with Christchurch Harbour,								
Maintain geological exposure of designated cliff line,								
Maintain the outstanding landscape and the views and appreciation of the varied coastal environment,								
Support adaptability of coastal communities,								
Reduce reliance on defences.								

4.3.3 DISCUSSION AND DETAILED POLICY DEVELOPMENT

The discussion provided within the two baseline scenarios highlights the significant economic risk, both at a regional and national level, that continued management of flooding and erosion aims to address. This is quite clearly a major driver for policy development.

However, it also highlights the important interaction and dependency, in meeting these social objectives, of balancing this with sustaining and enhancing the natural environmental values. The importance of this not only relates to the essential inherent value of the natural environment, as recognised through the various environmental designations, but also in achieving the aims for an integrated and diverse setting within which social objectives are delivered; as set within the various local management strategies for the coast.

The overall conclusions that may be drawn are that a policy scenario of NAI (Scenario 1) fails to address the substantial threat to the economic, social and heritage value of the area. While the No Active Intervention scenario could deliver some significant ecological benefits, this scenario fails to deliver a balanced sustainability of values. The identified economic benefits of the With Present Management scenario (Scenario 2) demonstrates the viability of maintaining defences to large areas of the coastline and estuary - but in specific detail potentially fails to take account of the need to sustain nature conservation and landscape values. It is very much, therefore, the detail of delivery of the existing With Present Management approach that needs to be considered rather than a major change from current practice.

As discussed earlier, the key area for control of the zone is the whole frontage around Hengistbury Head, extending from Mudeford Spit through to Southbourne. Management of this area is discussed initially.

Hengistbury Head Frontage.

Despite the significant potential economic damages associated with the loss of Mudeford Spit, the main driver for management of this area is seen as being the areas influenced by management of the frontage, rather than management of the frontage itself. These associated issues are summarised in the following table.

Assessment of Management Influence of Hengistbury Head

Associated Area	Consequential Issues based of withdrawing management along Hengistbury Head Frontage – Mudeford Spit to Southbourne. (Physical impact shown in <i>Blue</i> . Management consequences shown in <i>Red</i>)
Avon Beach	<ul style="list-style-type: none"> Loss of protection from ebb delta, increased drift (epoch2) Increased pressure on Mudeford Quay (epoch 2) Significant additional cost in maintaining amenity beach, transferring control to Mudeford Quay to maintain sustainable management of the area. (epoch 2)
Mudeford Quay and Town	<ul style="list-style-type: none"> Increased wave action at Quay and along low wall to town. (epoch 2) Increased frequency of flooding (epoch 2) Increased erosion pressure (epoch 2) Combined flooding and erosion risk without additional protection provided at Mudeford Quay.(epoch 2) Potentially making maintenance of existing defences and reliance on private defences unsustainable. (epoch 2)
Christchurch	<ul style="list-style-type: none"> Increasing wave action (from epoch 2)

Harbour	<ul style="list-style-type: none"> • Realignment of channels and intertidal areas (from epoch 2) • Potential loss of existing habitat due to wave action. (epoch 3) • Potential opportunity for new habitat associated with wider open estuary, sand banks and saltmarsh. (beyond period of SMP2) • Significant loss of existing boat use and navigation. (epoch 2)
Christchurch and Wick	<ul style="list-style-type: none"> • Potential reduction in extreme water levels. (epoch 2) • Potential minor reduction in cost of defence. (epoch 2) • Loss of boat use and amenity value of the area. (epoch 2)
Poole Bay	<ul style="list-style-type: none"> • Potential increased drift rates. (epoch 2) • Increased pressure on Southbourne. (epoch 1) • Increased frequency or control of beach recharge, resulting in increased cost. (epoch 2) • Significant cost incurred in transfer of defence to Southbourne (epoch 1)
Direct Impacts	<ul style="list-style-type: none"> • Continued erosion of Hengistbury Head. (epoch 1) • Increased pressure and breach of Mudeford Spit. (epoch 1) • Increased pressure for erosion of Solent Beach. (epoch 1) • Management of Mudeford Spit unsustainable, significant amenity and economic loss. (epoch 2) • Loss of SAC and SPA (epoch 2) • Loss of Heritage Value (epoch 2) • Loss of amenity area and car parks (beginning in epoch 1)

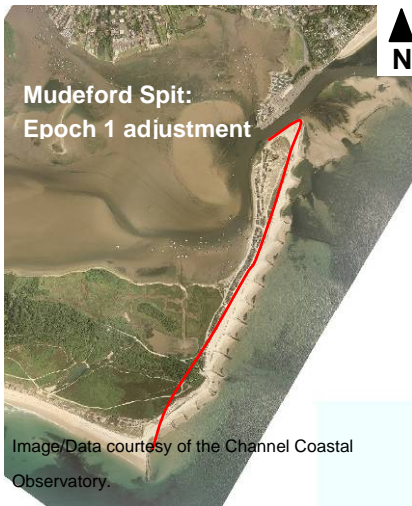
From this there is clearly strong justification for continued management of the frontage, from Mudeford Quay to Southbourne. Certain elements of this derive from aspects such as the continued use of Christchurch Harbour for boat use and might, therefore, be considered outside the direct scope of flood and coastal erosion risk management funding; such activities are recognised as being important to delivering the overall values of the area. The economic justification for management is principally made, therefore, with respect to the additional costs associated with sustainable management of areas remote, geographically, from the Hengistbury Head. These additional costs generally occur within the second epoch and beyond. However, it is a direct consequence of management decisions being made now; it is not a situation where there might be benefit in allowing the Hengistbury Head frontage to erode further over the first epoch. Rather, the frontage is already seen as being in a critical alignment, where further unconstrained erosion would make taking advantage of the underlying control of coastal behaviour less effective.

The key location for management is at Hengistbury Head and the approach to management effects management of the specific frontages to east and west.

To the east, the intent of management is to maintain a functioning spit across the entrance to Christchurch Harbour, providing directly the opportunity to maintain the important amenity value while also retaining the position of the Run and the ebb tide delta and sediment transfer to the northern shoreline. There is also the aim to maintain the potential for erosion of the geologically important cliff.

Present management has been driven by the existing location of assets with little scope to allow the whole frontage to adapt. The southern cliff line is held forward by defences, potentially creating a discontinuity in the shoreline in the future. Under present management, allowing erosion of the cliff but holding the line of the spit, this situation could gradually change, such that the cliff line would retreat further back than the line of

the spit, exacerbating the situation. This area of discontinuity has been highlighted as a section vulnerable to breach. In future management, this needs to be addressed without significantly imposing a managed promontory isolating the spit from the southern headland.



Over the first epoch the intent would be to maintain defence over the length of the spit, gradually allowing erosion of the cliff reducing the discontinuity in the shoreline. Within the second and third epoch the intent would be to allow and facilitate a slow readjustment of the whole frontage. This would need to be managed in steps reflecting any acceleration in sea level rise. This will continue to require recharge to the front face of the spit and maintaining defences to the front face. In the longer term there may also be a need for nourishment to the back of the spit allowing continued width against breach and maintaining the important amenity use of the area.

Maintaining the position of the Long Groyne would be important in this adaptive management. Detailed consideration would need to be given to the orientation and shape of the groyne to prevent outflanking and to provide a more appropriate transition through to managed realignment of the cliff.

At the northern end of the spit, while there would be some potential scope for adjusting the front face, the general position of the spit head would, however, be maintained to manage the flow through the Run, maintaining navigation without imposing significantly greater pressure on the sea wall to the face of Mudeford Quay.

Adopting this adaptive approach will require re-examining the way in which defences along the spit are managed. The aim would be to take an approach where the defence line can be adjusted over time in line with changing pressure, taking account of the monitoring and information on sea level rise. This would need to be approached in a progressive manner with the intent, possibly to adjust existing defences over a 20 to 50 year management review cycle. The initial response would be adjustment of existing defence at the interface between the cliff and the spit. As the coast then adjusts, the new position would be re-assessed and further adaptation allowed as a result. An overall management plan would need to be developed, looking at possible responses to

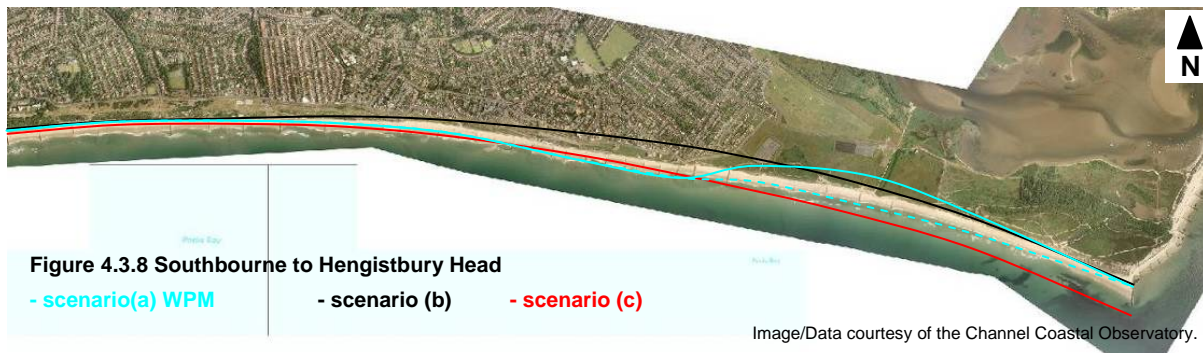


different scenarios. This plan would need to be developed with the involvement of the local community groups, Natural England and the planning authority.

To the west of the headland, the intent of management is to maintain as far as possible the continuity of the shoreline through to the main frontage of Poole Bay. The frontage was considered in some detail in describing the With Present Management scenario. Certain issues were identified, highlighting the difficult decisions needing to be taken:

- Hengistbury Head has already eroded back to such an extent that the emerging Southbourne headland is beginning to act as a significant feature in management of the main Poole Bay frontage.
- This process has resulted in a degree of separation between the main Poole Bay frontage and Solent Beach.
- Present Management, reinforcing the headland at Southbourne and bringing forward the beach line of Solent Beach through recharge and groynes, would tend to reinforce this separation.

The following figure illustrates, in principle the coastal alignment under the With Present Management approach (scenario (a), showing the typical natural alignment of Solent Beach shoreline and the intended line of the beach held forward by recharge and groynes). The figure also illustrates two alternative scenarios (retreat the line at Southbourne – scenario (b), and increase the effective length of the Long Groyne – scenario (c)). These alternatives aim, through realignment, to re-establish the overall continuity of the sediment movement over the coast. In effect these three scenarios bracket the possible approaches to management. These are developed below.



<p>Scenario (a)</p> <p>Description: maintain the Long Groyne, reinforce the headland at Southbourne and hold forward Solent Beach through recharge and Groynes.</p> <p>Rationale: The intent works within the existing constraints defined by holding the existing line at Southbourne, resisting further erosion of the Solent Beach frontage, protecting Double Dykes from further erosion, and maintaining the integrity and position of the Long Groyne. This rationale attempts to restore the continuity between Solent Beach and the main Poole Bay frontage through holding forward the alignment of Solent Beach.</p> <p>Implications: Although the Hengistbury Head headland still provides a beneficial influence on the overall coastal shape, the main effort in this respect is in holding the line at Southbourne. The influence of Hengistbury Head and the Long Groyne are in effect reduced to a role of supporting a beach, and protection, to the east of Southbourne. The Southbourne headland would act to maintain the alignment of the coast to the west. Realigning the beach, forward, over the Solent Beach frontage brings it forward of the local control of the Long Groyne, tending to increase the potential for drift towards the east and increasing the severe response to different wave conditions. As such, a fairly robust control would be required, not just to limit loss of beach recharge, but to actually control the whole shape of the beach and frontage. Typically this would be in the form of substantial rock groynes. In transferring the main effort for management to Southbourne and the groynes along</p>
--

Solent Beach, there would be less justification for works at Hengistbury Head.

With increased pressure from sea level rise, it is probable that the headland at Southbourne would need to be reinforced, potentially with larger control structures. The long term implications of this approach would be to separate management of the two frontages, with the main justification for managing Solent Beach being the management of the new headland. The probable extreme position, given the difficulty of holding forward Solent Beach without reliance on the control imposed by Hengistbury Head, would be that of eventually allowing the retreat of Solent Beach forming a distinct bay through to Hengistbury Head.

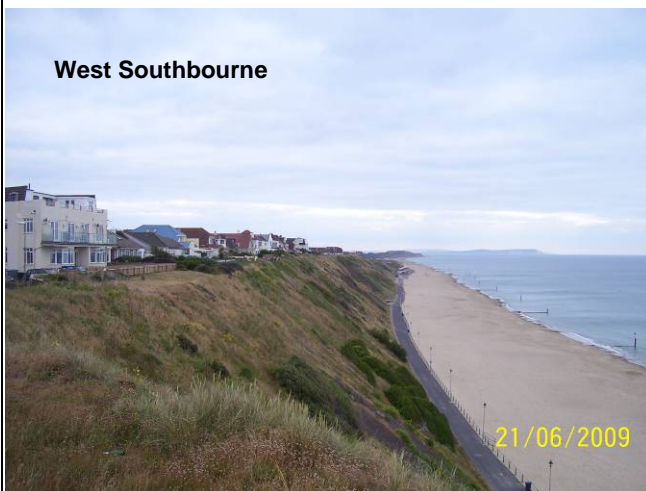
Impacts: The approach would support defence along the main Poole Bay frontage continuing to provide a sustainable context within which this frontage might be managed. Property and the road at Southbourne would be protected. The car park, Double Dykes and the scrubland dune of Solent Beach would be protected over the first and second epochs but, with increasing pressure on the frontage and the need to increase protection at Southbourne it might be expected that eventually Solent Beach would be allowed to set back to a new natural alignment. Generally, with the establishment of a new headland at Southbourne and the intent only to protect Hengistbury Head in its current form, the heritage and nature conservation interest associated with the area would be maintained.

Although as with any of the scenarios being considered, there would be some increased reliance on defence, under this approach, such defence effort would be very apparent, with significant structures required to maintain the Southbourne headland and to control recharge along Solent Beach. This may be considered to be intrusive on the semi-natural environment of the frontage, reducing the landscape and amenity value of the area.

Scenario (b)

Description: maintain the Long Groyne and allow erosion to occur over the Southbourne Frontage.

Rationale: The intent would be to allow the coast to the west to erode back to re-establish a natural



West Southbourne

alignment, with Hengistbury Head being the principle control point. The rationale would be to restore unconstrained movement of sediment along the frontage avoiding, in part, some of the inconsistency in sediment drift presently experienced.

Implications: The importance of Hengistbury Head would increase with respect to long term management of the Poole Bay frontage. The main effort in terms of control would be focussed on management of the Long Groyne, although as at present there

would still be a need for regular sediment recharge and groynes to control drift. The main benefit in taking this approach would be in potentially reducing the severe variation in drift in the area, establishing, overall a more stable alignment and potentially reducing the frequency of recharge in the local area. In the longer term there would be increased pressure on the frontage but this could be addressed in a more consistent manner over the whole length of Poole Bay. The extent of the retreat would typically be some 150m in the area of Southbourne. This might require readjusting the line of the promenade extending west some 1.5km back along the Southbourne frontage. This would result in retreat of the line of the stabilised cliff beneath the Southbourne Coast Road.

Impacts: This scenario is recognised to be an extreme position in terms of realignment of this section of the coast and is based on the typical natural alignment controlled solely by Hengistbury Head. The impact on Southbourne would be significant. There would be loss of in excess of 100 properties, together with the main coastal road. Erosion would affect part, but not all, of the main car park and would result in further loss of Double Dykes. There would not be significantly greater erosion of the main Hengistbury Head cliff and following an initial set back of Solent Beach, the semi-natural dune line would be re-established. As such there would be little substantive loss of the SAC or SPA and the landscape value and open green space would be improved as a result of less defence being required over Solent Beach.

There would be increased reliance on defence at Long Groyne but this would allow less effort in managing the adjacent frontage. With sea level rise there would still be increasing need for recharge or more effort required in retaining sediment along the frontage.

Scenario (c)

Description: extend the Long Groyne and recharge over the whole frontage.

Rationale: The intent would be to increase the influence of the Long Groyne extending its effective length by some 200m to 300m. This would in effect pull the alignment of the coast forward sufficiently to compensate for past retreat that has allowed emergence of the Southbourne Headland. The aim would be to create a new alignment that re-establishes continuity of sediment movement, re-linking processes across the frontages of Poole Bay and Solent Beach. The overall aim would be to retain a protective beach in front of Southbourne and Solent Beach, to ensure no loss or further erosion in the area

Implications: Re-establishing this link would allow a more consistent approach to recharge management of the whole frontage, establishing a more stable overall alignment and potentially avoiding more severe and sudden loss of sediment. The corollary of this would be the need for significant volume of beach recharge to allow such realignment. This would still need to be topped up on a regular basis, in that there would still be some loss to the east. Pressure on the coast is still likely to increase with sea level rise and there would be increasing effort required in managing the situation.

Impacts: This scenario is recognised to be the opposite extreme to scenario (b), proposing a major forward realignment of the eastern end of Poole Bay.



The approach would create significant additional width along Solent Beach and following the initial recharge would create conditions for possible dune development. There would be no loss of assets at Southbourne and no further erosion along the existing line of Solent Beach. There would be a substantial increase of open space. There would be little erosion of the cliff at Hengistbury Head. Although inevitably there would be some initial loss of sediment beyond the new Long Groyne, over time

this approach is likely to reduce feed to Mudeford Spit. This could be mitigated through design of the new structure and this would have to be considered in conjunction with developing the management approach to the northern section of the coast. The approach would have a significant impact on the

landscape tending to reduce the impact of Hengistbury Head.

There would be increased reliance on defence at Long Groyne but this would allow less effort in managing the adjacent frontages. With sea level rise there would still be increasing need for further recharge but the approach establishes a more sustainable frontage for the future. There would be significant additional cost in developing this scenario and much of the benefit of this would be in recreating extensive areas of open space. As such it is unlikely that funding would come solely from flood and erosion risk management.

Scenarios (b) and (c) are recognised as being extreme cases, requiring either major loss of established assets or major investment in coastal realignment, respectively. As such it is unlikely that either approach would be acceptable or viable. Even so they do assist in understanding the potential implications, highlighting the interaction between management of Hengistbury Head and focussing management at Southbourne. In contrast scenario (a) demonstrates the potential problems of taking a purely reactive approach; driven by the intent to address existing local issues and with a consequential shift in management to separating the behaviour of Poole Bay and that of Solent Beach. Unless one of the more extreme approaches were adopted, however, at least in part, it seems inevitable that in the long term (epoch 3 and beyond) greater reliance would be placed on Southbourne as the main control feature of the coast. These options would need to be developed with all appropriate stakeholders.

Potentially, the appropriate management approach lies within these extremes. There is scope for some realignment of the overall frontage through both retreat at Southbourne and increasing the effectiveness of the control point at Hengistbury Head. In the case of the former, the opportunity for retreat needs to be maintained, defining the lower lying area and open ground in front of Southbourne Coast Road in planning terms as a coastal change management area, allowing longer term adaption. This would provide the necessary scope to re-design the defence approach in this area based on the most sustainable position, rather than being constrained by the existing alignment of the promenade and the position of property. Even relatively small scale realignment may provide the opportunity for managing the difficult interface between the two sections of beach in a more sustainable manner. In the case of the latter, developing an approach to replacement of the Long Groyne, potentially extending the influence of this structure, together with some realignment of Solent Beach would allow more effective management of the area.

The role of the SMP in this area is, therefore, more one of providing a broader scale, longer term appreciation of options and general approach to management. It would not be appropriate for it to define an actual shoreline position. The Long Groyne is reported to be in poor condition and, therefore, resolving a more detailed plan for the area is quite critical. In terms of policy it is recommended that although potential realignment at Southbourne may not be critical over the first epoch or potentially the second epoch and, therefore, an initial policy of Hold the Line may be concluded, there may be a need for realignment in the longer term future. In terms of Hengistbury Head, under any of the scenarios, Hold the Line is considered important to sustainable management of the adjacent frontages; but with the option, needing detailed consideration, to extend the effectiveness of the groyne effect.

Between Southbourne and Hengistbury Head, sustainable management should not be dictated by the existing extent of Double Dykes. While it may prove to be appropriate, through extension of the Long Groyne, beach management and management at

Southbourne, to reduce the pressure of erosion on this feature, this would not be the primary consideration in management of Solent Beach. Accordingly the policy in this area should be managed realignment.

Given the condition of the Long Groyne and the need to resolve uncertainty as to management at Southbourne, it would be recommended that a detailed strategy for the area is undertaken as soon as possible. It would be further recommended that such a study takes account quite specifically of management of the Mudeford Spit frontage so that any benefits in redesign of the Long Groyne takes account of issues arising from this northern frontage. It is recognised that justification for management of this overall frontage draws on benefits arising from management of adjacent sections of the coast; i.e. Poole Bay, Avon Beach and within Christchurch Harbour. As a precursor to study of the area, these benefits, (including potential benefits not necessarily directly associated with flood and erosion risk management appraisal) need to be evaluated, based on information from finalised strategies for these areas.

In summary, therefore, the whole area from the northern extent of Mudeford Spit through to Southbourne is considered an important feature in minimising impact on adjacent areas. It is considered important for sustainable flood and erosion management and development of interests of broader coastal management. The intent of the shoreline management plan is, therefore, to sustain the overall influence of this section of the coast, ensuring that over the period of the SMP2 neither the Solent Beach isthmus nor Mudeford Spit breach. Specifically, the aim is to maintain the position of the Long Groyne, with the potential for this structure to be extended and reshaped to allow better management of adjacent sections of the coast. To the east of the headland, the aim is to maintain the integrity of the spit, sustain amenity value of the area, maintain the position of the Run but also facilitate continued exposure of the cliff face. The intent is initially to restore the alignment of the overall section of the coast. The spit would be allowed to roll back in response to increased pressure due to sea level rise, matching erosion of the cliff. This will require development of a management plan allowing continued use of the area, supported by defence and recharge. The intention would be to maintain the position of the Spit Head, maintaining the navigation channel. To the west of the headland, the intent would be to maintain the integrity of the isthmus and defence to the principle assets at Southbourne. At the same time, the aim is to maintain as far as possible, the continuity of shoreline processes between the main section of Poole Bay and those of Solent Beach. To achieve this, consideration needs to be given to potential retreat along the line of the emerging Southbourne headland while examining options for extending the influence of the structure at the toe of Hengistbury Head. Between these two locations, the aim would be to establish a more sustainable position for maintaining a robust semi-natural defence to the isthmus. This would not preclude increasing the beach width in front of Double Dykes, but neither would the defence position of the frontage be determined by defence of this feature's existing extent. The overall aim in this area is to maintain the open space, amenity and nature conservation value of the area by minimising reliance on hard defence to control the frontage.

Based on the recommended policy for this central section of the zone, the adjacent frontages may be considered in detail.

Mudford Quay to Friars Cliff

The No Active Intervention scenario would result in significant loss in terms of built assets as well as important regional amenity value. This would be unacceptable.

The policy approach set for Mudford Spit establishes a position where increased pressure is avoided along the frontage to the north; maintaining the Run and the associated ebb delta provides opportunity for some natural sediment supply as well as providing some protection from wave attack. Therefore, overall present management of the frontage is considered sustainable.



Figure 4.3.9
Avon Beach

Image/Data courtesy of the Channel Coastal Observatory.

Associated with the intent to maintain the channel at its present location is the need to maintain defences from Mudford Quay through to Avon Beach. This section of the frontage acts as an important navigation control. There would be no scope for realignment; however, equally there is little increased pressure from scour as a result of the policy intent to hold the northern end of Mudford Spit. There might be increased overtopping at the Quay due to sea level rise. This might not significantly affect operation on the Quay but could be addressed by increasing the wall height. This would need to be considered at a local scale.



Avon Beach

The overall approach is very much in line with the With Present Management scenario. The frontage is maintained by beach recharge, compensating for a general trend for loss of beach towards the east. This is supported by construction of rock groynes and maintenance of earlier timber groynes further to the east. With increased sea level rise, the current approach recommended in the draft strategy to replace older groynes appears appropriate. At present these structures

do not significantly impact on the amenity value of the area. Unlike areas further east, the groynes and beach do not act as toe support to the coastal slope and the main function of the groynes is merely to provide additional constraint against sediment transport. The beach then provides protection against erosion of the back shore.

The overall intent of management to this area is, therefore, to maintain the alignment of Mudford Quay to maintain the use of this area and to continue to act as a navigation training wall to support continued water use of Christchurch Harbour. The ebb tide delta provides protection to Avon Beach and the aim of management in this area is in taking advantage of this in sustaining a wide amenity beach as protection to extensive areas of housing to the rear. There is little defence advantage in realignment further east along the frontage and maintaining the beach in this area fulfils the aims of the Christchurch Beaches and Hinterland Management Plan. Even with sea level rise this aim is considered sustainable. This policy is in line with policy developed in PDZ1 for Highcliffe but detailed examination would need to be given at a local scale as how best

to manage the transition between the maintained beach and the natural development proposed for Friars Cliff.

Christchurch Harbour

As identified in the assessment of the two baseline scenarios, the key possible conflict is the potential extension of defences in front of Stanpit and at Wick, reducing the ability for natural development of estuary habitat in line with sea level rise. Overall, however, nothing identified in either baseline scenario indicates any major physical interaction between management approaches to different sections of the frontage. Over much of the upper estuary area there is a strong economic argument for continued defence of the main town of Christchurch as identified in the With Present Management scenario.

With a general acceptance of the With Present Management approach, each local area is discussed below.

The policy set out above for Mundeford Quay and Spit, retains the overall shape of the entrance and maintains protection against increased wave action, which would otherwise impact significantly of the Mundeford Town frontage.

At present, policy for the town is one of holding the basic line of defence as defined by the low estuary-side wall. This provides only limited protection against flooding and is regularly over topped. This overtopping only affects a limited number of properties and flooding would only significantly impact on the main old core of Mundeford on exceptional events. Flood protection is provided by local private defences (i.e. garden walls) and this has been assessed as appropriate to the scale of the problem. This may need to be re-assessed in line with sea level rise.

The intent of the Plan is therefore to maintain a general policy of Hold the Line to the frontage, supporting continued maintenance of the low sea wall. This would not involve raising this line of defence and, with sea level rise, areas such as the open area behind the Quay, the car park and boat park behind the Quay and the headland to the north would be subject to increased flooding. Consideration could be given in the area immediately behind the Quay, particularly in the area of open ground, to removal of the low wall, allowing some limited scope for natural habitat development. This would, to a degree, depend upon the capacity for the estuary in this area to accumulate sediment in line with sea level rise. This would need to be monitored. The aim would be to avoid squeeze of habitat against the wall. The intent elsewhere in this area would be to continue to support local private defence, only actively considering more formal set back defence of the main core of the town if the long term need arises with sea level rise. Planning should recognise that the lower lying properties, particularly at the headland, would be at increased risk of flooding. This general approach would apply around the frontage including the road in front of Stanpit.

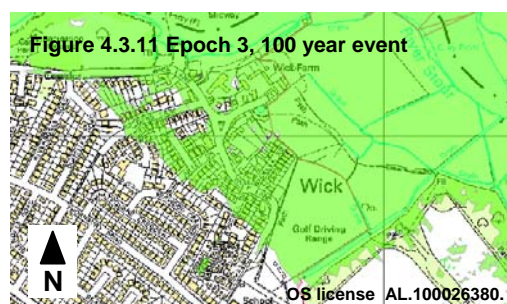
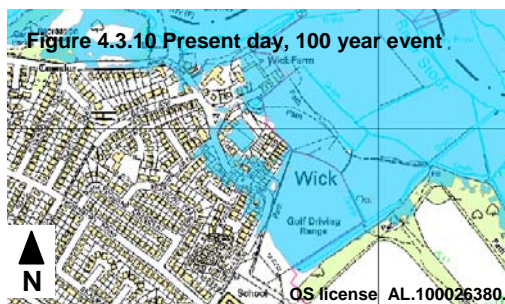
A distinction is made above between policy for the main developed area of Stanpit, landward of the coast road, and Christchurch town centre and the former SMP management unit running around the edge of Stanpit Marshes, in front of the road and the town. The SMP policy was for retreat over the marshes with the intent to maintain defence along the back of the area. This area of marsh, including much of the recreation ground would be at increasing flood risk with sea level rise. The area of the

recreation ground offers potential scope for redevelopment of natural habitat in compensation for loss more generally within the area of the SSSI. The draft strategy, however, identifies the presence of a land fill site as a constraint against such adaptation. Subject to further monitoring of the behaviour of possible accretion or erosion patterns within the Harbour in line with sea level rise, this constraint would need to be reassessed. Potentially, over the long term, should it be identified that the integrity of the SSSI is being damaged due to this constraint and the inability of the estuary to adapt naturally, further consideration should be given to the landfill area to determine whether there is scope to allow natural diffusion of possible pollutants or to the possibility of excavation of material to allow further retreat of defences along the estuary edge. The policy and intent of the plan within the SMP is for managed realignment subject to such further investigation.

There is little scope for managed realignment within the town centre or along the north edge of the Stour valley to the west. The policy over the whole frontage would be to Hold the Line, in line with the draft strategy recommendations. Some local areas potentially fall below the priority scope for funding under flood defence. Even so, the SMP assessment supports the strategy position that these areas are of fundamental importance to the heritage value of the town and to maintain the overall integrity of the community. As such no distinction is made in these areas and the SMP would continue to support of policy for Hold the Line.

Consideration might need to be given to joint funding in such areas, looking to gain additional funding in line with the recommendations of Defra's strategy Making Space for Water.

At Wick, new development in and around the old village centre has resulted in increased flood risk. At present this is not severe, but may substantially increase with sea level rise. This increase in risk is shown in the following figure.



While there seems no benefit in abandoning defence of the community, the manner in which defence might be provided needs to recognise the need to allow space for adaption of the nature conservation interest in the area. Therefore, while the SMP policy for the village would be to Hold the Line of defence, this should be strictly limited to the footprint of the developed area. In particular the marsh land in front of Wick Farm and the area of the golf range should remain undefended, allowing scope for saltmarsh and transitional habitat development.

The section of estuary to the south and east of Wick should be allowed to develop naturally with no active intervention.

The area behind Mudeford Spit should similarly be allowed to develop naturally. However, with managed realignment of the spit to maintain its integrity and width, there

would be a loss of intertidal area. Issues relating to this would need to be considered alongside the detailed long term management plan for the spit.

In considering each local area, recommendations have been made to allow as far as possible future natural development of Christchurch Harbour, retaining the integrity of the mosaic of habitat. However, depending on the future behaviour of the estuary, specifically with respect to its capacity to accrete sediment in line with sea level rise, it is anticipated that there may be loss of saltmarsh area. Although considered outside the direct area of the SMP, the upstream Avon valley does offer potential for conversion to natural estuary conditions. This would principally be outside the area of the Natura 2000 site further upstream, although bordering on this designated area. The Purewell Marsh SSSI lies to the rear of the principal road system which might sensibly be taken as the limit of realignment with low level defences maintained on the estuary side of the various roads. This would also act to protect a range of properties from flooding. Subject to monitoring of estuary behaviour, this upstream area possibly offers compensation for management within the main area of the Harbour.

Main Poole Bay Frontage

The final section of coast within this zone is the main frontage between Poole and Bournemouth extending through to Southbourne. The large scale of damages arising from the No Active Intervention scenario along this section would be unacceptable, having significant national and regional consequences. The key features of management in this area are associated with maintaining the economically important use of the foreshore and backshore width. This would provide protection from erosion to the properties along the cliff behind. Current practice, over the last 30 years, has achieved this through regular beach recharge, with loss of recharge material being reduced by groynes. The original groynes were 70m in length and constructed in timber. Experience gained through this process had confirmed that over filling the beach encouraged higher initial losses, with loss reducing as the effect of the groynes emerged. This process has been the subject of modelling studies (Draft Strategy - Technical Annex 2, 2004) and the results of this used in the Benefit/ Cost analysis (Technical Annex 8). The conclusion of this work was that optimum management would be achieved through replacement of the timber groynes with longer rock groynes and recharge on a typical ten year cycle. In addition, the Poole Harbour Commissioners channel dredging programme produces a subsequent local source of sediment with which to supplement the recharge cycle, improving the overall cost effectiveness of the approach.

This modelling was undertaken over a 50 year period considering existing water level and wave conditions. The results of the economic analysis were updated considering a 100 year period and demonstrated a benefit cost ratio in excess of 20. This reinforces the very strong broader socio-economic argument for continuing this approach to defence, when considered appropriately over the longer period of the SMP2.

With anticipated sea level rise, there is likely to be increased pressure on maintaining the present practice of recharge. Typically, the response to increased water levels and potential increased wave energy would be to increase both the levels of recharge and the length and height of control structures. A further related risk as a result of sea level rise is highlighted in the Bournemouth Seafront Strategy:

“The long term prospect of rising sea levels already determines the Environment Agency’s policy of only advising new coastal building developments with a ground floor level of 4.6 metres above the ordnance datum line. Typically, this translates to around 2 metres above the current Bournemouth promenade level.”

Although this policy advice is updated as better information becomes available through climate change research, this does suggest that in the future there may be a need to re-examine how the use and defence of the frontage is sustained, both in terms of engineering and possibly funding. The attitude of the Council has been to carefully examine, through development of such documents as the Seafront Strategy how best use can be made of its shoreline while maintaining existing overall values. Typical of this is the adaptive redevelopment, or redesign at Boscombe, incorporating aspects such as a surfing reef. This whole area is an example of how alternative funding approaches may be brought in, in an integrated manner, to sustain use of the seafront.

If this general approach were adopted for the frontage, the logical extension of this might be to actually advance the line of defence; the distinction being made that rather than merely increasing the width of the defence zone, positive use is made of control structures in addition to purely their defence function.

Under this scenario, the aim would be to actually reclaim over the foreshore, in effect, constraining sediment movement and retaining local beach areas. This could provide the opportunity to attract inward investment for coastal use development.

Such an approach would radically alter processes along Poole Bay. It is made possible by the central location of the frontage in relation to the overall alignment of the bay. Any works taken to advance the line would have a reducing impact on the adjacent shoreline with distance from the works. Potential impacts that would need to be considered are:

- Some minor influence on the Poole Harbour frontage, potentially influencing sediment supply.
- Reduction of sediment supply to Solent Beach area. This supply at present is again provided by current practice of beach recharge.

Clearly such impacts would need to be considered in detail as part of developing a framework for taking forward an advance the line policy. However, these issues are not considered to be a significant constraint.

In summary, the recommendations from the SMP2 for this frontage would be for Hold the Line over the three epochs. The intent for management is to maintain protection by recharge and sediment movement control, thereby sustaining the essential recreational and amenity benefits along with defence of important infrastructure and properties along the crest of the cliff. The SMP, however, recognises the possible difficulties in terms of the potential increased effort required to maintain the existing practice of regular recharge and maintenance of the groynes in the long term. As such a potential policy, possibly over the third epoch could be to advance the line. This approach would intend to constrain sediment drift so as to retain areas of beach along a redesigned frontage, developing a fully integrated approach to management of the coastal zone. This possible policy would need to be taken forward in partnership within a strong framework for development of the whole frontage. Furthermore, this framework would need to

define acceptable influence or mitigation with respect to maintaining underlying coastal processes and management of the adjacent areas of coast.

PDZ2

Management Area Statements

CBY D - Friars Cliff to Mundeford Quay. (CH. 15 KM TO CH 17 KM.)
Covering previous SMP1 management units CBY2

CBY E and PBY E - Mundeford Spit to Southbourne (CH. 26 KM TO CH 31 KM.)
Covering previous SMP1 management units CBY1, PBY3, 2 and part of PBY1

CBY F - Christchurch Harbour (CH. 17 KM TO CH 26 KM.)
Covering previous SMP1 management units CHB 5 through to CHB 1

PBY G - Southbourne to Flag Head Chine (CH. 31 KM TO CH 41.5 KM.)
Covering previous SMP1 management unit PBY1


Location reference:	Friars Cliff to Mudeford Quay
Management Area reference:	CBY.D
Policy Development Zone:	PDZ2



* Note: Predicted shoreline mapping is based on a combination of monitoring data, analysis of historical maps and geomorphological assessment with allowance for sea level rise. Due to inherent uncertainties in predicting future change, these predictions are necessarily indicative. For use beyond the purpose of the SMP, reference should be made to the baseline data.


The following descriptions are provided to assist interpretation of the map shown overleaf.

100 year shoreline position:


The following maps aim to summarise the anticipated position of the shoreline in 100 years under the two scenarios of "With Present Management" and under the "Preferred Policy" being put forward through the Shoreline Management Plan.


-  In some areas the preferred policy does not change from that under the existing management approach. In some areas where there are hard defences this can be accurately identified. In other areas there is greater uncertainty. Even so, where the shoreline is likely to be quite clearly defined by a change such as the crest of a cliff the estimated position is shown as a single line.
- Where there is a difference between With Present Management and the Preferred Policy this distinction is made in showing two different lines:

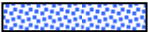
-  With Present Management.
-  Preferred Policy.

-  In some areas, the Preferred Policy either promotes a more adaptive approach to management or recognises that the shoreline is better considered as a width rather than a narrow line. This is represented on the map by a broader zone of management:

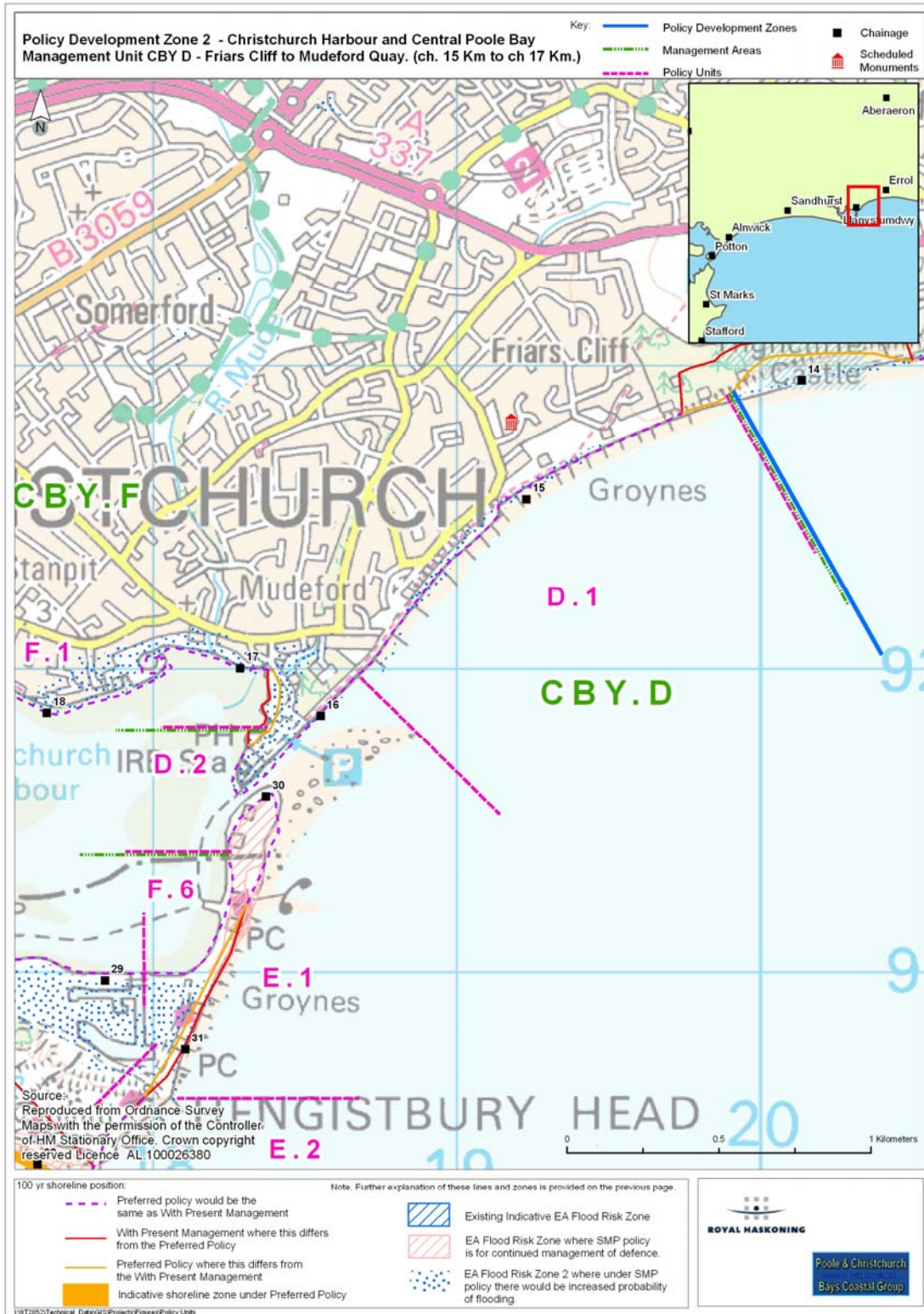
Flood Risk Zones

 General Flood Risk Zones. The explanation of these zones is provided on the Environment Agency's web site www.environment-agency.gov.uk. The maps within this SMP document show where SMP policy might influence the management of flood risk.

 Indicate areas where the intent of the SMP policy is to continue to manage this risk.

 Indicate where over the 100 years the policy would allow increased risk of flooding.

The maps should be read in conjunction with the text within the SMP document.



SUMMARY OF PREFERRED PLAN RECOMMENDATIONS AND JUSTIFICATION

PLAN:

The overall intent of management to this area is to maintain the alignment of Mudeford Quay, to maintain the use of this area and to continue to act as a navigation training wall to support continued water use of Christchurch Harbour. The ebb tide delta provides protection to Avon Beach and the aim of management in this area is in taking advantage of this in sustaining a wide amenity beach as protection to extensive areas of housing to the rear. Maintaining the beach in this area fulfils the aims of the Christchurch Beaches and Hinterland Management Plan. This policy is in line with policy developed in PDZ1 for Highcliffe but detailed examination would need to be given at a local scale as how best to manage the transition between the maintained beach and the natural development proposed for Friars Cliff.

The intention in this Management Area is to implement an approach which will provide a basis for long-term sustainability. Although the NAI damages are exceeded by the plan implementation costs in the first 2 epochs, the longer view is that long term positive benefit / costs ratios are supported by early investment in the frontage and commitment in going forward with the preferred plan. Management of this frontage is also inherently linked to the longer-term viability of Christchurch Harbour (and therefore Christchurch town) and therefore it is felt the intrinsic benefits go beyond simply those indicated by the broad-scale economic assessment. The apparent risk that public funding may be difficult to obtain for this frontage is acknowledged. However it is felt that a more detailed assessment of the benefits would provide a more robust argument of the affordability of continuing to manage this frontage with intent to maintain the position of the Mudeford Run and the wide recreational beach, for both the direct benefits obtained and the wider benefits to Christchurch Harbour. In particular this would provide a more comprehensive assessment of how the Government's Outcome Measures would be delivered through such an approach.

PREFERRED POLICY TO IMPLEMENT PLAN:	
From present day	Maintain existing defences. Consider replacement of timber groyne to rock. Continue regular cycle of beach recharge.
Medium term	Maintain existing defences. Continue regular cycle of beach recharge.
Long term	Maintain existing defences. Potential increase of defence level along Mudeford Quay. Continue regular cycle of beach recharge

SUMMARY OF SPECIFIC POLICIES

Policy Unit		Policy Plan			
		2025	2055	2105	Comment
CBY.D.1	Avon Beach	HTL	HTL	HTL	Maintain integrity of beach through controls structures and recharge.
CBY.D.2	Mudeford Quay	HTL	HTL	HTL	
Key: HTL - Hold the Line, A - Advance the Line, NAI – No Active Intervention MR – Managed Realignment					

CHANGES FROM PRESENT MANAGEMENT

IMPLICATION WITH RESPECT TO BUILT ENVIRONMENT

Economics		by 2025	by 2055	by 2105	Total £k PV
Property	Potential NAI Damages/ Cost £k PV	501	752	2052	3305
	Preferred Plan Damages £k PV	0	0	0	0

	Benefits £k PV	501	752	2052	3305
	Costs of Implementing plan £k PV	685	200	221	1106


Location reference:	Mudford Spit to Southbourne
Management Area reference:	CBY/PBY.E
Policy Development Zone:	PDZ2



* Note: Predicted shoreline mapping is based on a combination of monitoring data, analysis of historical maps and geomorphological assessment with allowance for sea level rise. Due to inherent uncertainties in predicting future change, these predictions are necessarily indicative. For use beyond the purpose of the SMP, reference should be made to the baseline data.


The following descriptions are provided to assist interpretation of the map shown overleaf.

100 year shoreline position:



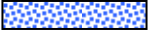
The following maps aim to summarise the anticipated position of the shoreline in 100 years under the two scenarios of "With Present Management" and under the "Preferred Policy" being put forward through the Shoreline Management Plan.

-  In some areas the preferred policy does not change from that under the existing management approach. In some areas where there are hard defences this can be accurately identified. In other areas there is greater uncertainty. Even so, where the shoreline is likely to be quite clearly defined by a change such as the crest of a cliff the estimated position is shown as a single line.
- Where there is a difference between With Present Management and the Preferred Policy this distinction is made in showing two different lines:

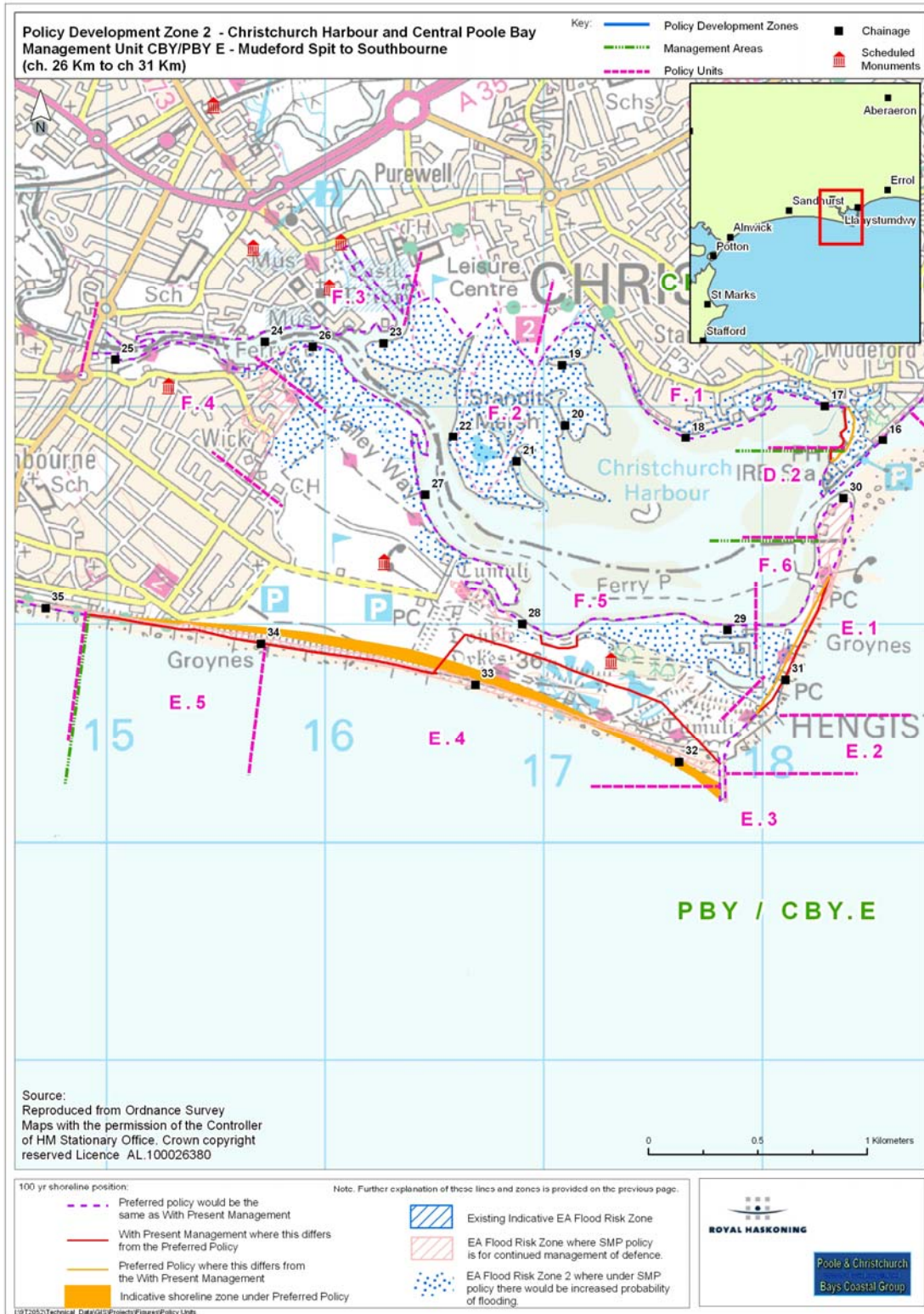
-  With Present Management.
-  Preferred Policy.

-  In some areas, the Preferred Policy either promotes a more adaptive approach to management or recognises that the shoreline is better considered as a width rather than a narrow line. This is represented on the map by a broader zone of management:

Flood Risk Zones

-  General Flood Risk Zones. The explanation of these zones is provided on the Environment Agency's web site www.environment-agency.gov.uk. The maps within this SMP document show where SMP policy might influence the management of flood risk.
-  Indicate areas where the intent of the SMP policy is to continue to manage this risk.
-  Indicate where over the 100 years the policy would allow increased risk of flooding.

The maps should be read in conjunction with the text within the SMP document.



SUMMARY OF PREFERRED PLAN RECOMMENDATIONS AND JUSTIFICATION

PLAN:

The whole area from the northern extent of Mudeford Spit through to Southbourne is considered an important feature in minimising impact on adjacent areas of the coast. It is considered important for sustainable flood and erosion management and development of interests of broader coastal management over the whole zone. The intent of the shoreline management plan is, therefore, to sustain the overall influence of this section of the coast, ensuring that over the period of the SMP2 neither the Solent Beach isthmus nor Mudeford Spit breach. Specifically, the aim is to maintain the position of the Long Groyne, with the potential for this structure to be extended and reshaped to allow better management of adjacent sections of the coast. To the east of the headland, the aim is to maintain the integrity of the spit, sustain amenity value of the area, maintain the position of the Run but also facilitate continued exposure of the cliff face. The intent is initially to restore the alignment of the overall section of the coast. The spit would be allowed to roll back in response to increased pressure due to sea level rise, matching erosion of the cliff. This will require development of a management plan allowing continued use of the area, supported by defence and recharge. The intention would be to maintain the position of the Spit head, maintaining the navigation channel. To the west of the headland, the intent would be to maintain the integrity of the isthmus and defence to the principle assets at Southbourne. At the same time the aim is to maintain as far as possible the continuity of shoreline processes between the main section of Poole Bay and those of Solent Beach. To achieve this, consideration needs to be given to potential realignment along the line of the emerging Southbourne headland while examining options for extending the influence of the structure at the toe of Hengistbury Head, this would be undertaken in the strategy development. The aim at Southbourne would still be to maintain defence to the majority of property and interests. Between these two locations the aim would be to establish a more sustainable position for maintaining a robust semi-natural defence to the isthmus. This would not preclude increasing the beach width in front of Double Dyke, but neither would the defence position of the frontage be determined by defence of this feature's existing extent. The overall aim in this area is to maintain the open space, amenity and nature conservation value of the area by minimising reliance on hard defence to control of the frontage.

It is acknowledged that the low benefit/cost ratio presented in the economics table below indicates a low-level of affordability for the preferred plan along this part of the frontage. However in this location, possibly more than anywhere else along the SMP frontage, the much wider benefits of the intent of management are simply not reflected by identification of the value of the local assets protected. Maintaining the Long Groyne and managing the width of Solent Beach is an inherent part of the strategy to retain Hengistbury Head. This in turn provides essential control of the erosion risk for the whole of Poole Bay to the west and part of Christchurch Bay to the east. It is therefore intrinsically linked to achieving the high level SMP2 objectives throughout the Poole and Christchurch Bays. It is therefore felt that although apparent affordability is very limited, the envisaged investment along this frontage actually represents very wide benefits for relatively limited long-term investment.

PREFERRED POLICY TO IMPLEMENT PLAN:	
From present day	Develop upon existing local management plan of Mudeford spit and establish agreement for relocation of assets. Review shape and extent of Long Groyne in conjunction with strategy for Solent Beach. Allow further erosion of the eastern cliff face. Maintain defence to the spit with recharge. Develop strategy for Solent Beach and confirm management at the Long Groyne and Southbourne.
Medium term	Implement realignment of Mudeford Spit. Maintain replacement of the Long Groyne and implement strategy for Solent Beach, with potential realignment at Southbourne.
Long term	Implement realignment of Mudeford Spit. Maintain replacement of the Long Groyne and implement strategy for Solent Beach.

SUMMARY OF SPECIFIC POLICIES

Policy Unit		Policy Plan			Comment
		2025	2055	2105	
CBY/ PBY.E.1	Mudeford Sandbank, Harbour Side	HTL	MR	MR	Allow gradual rollback in line with sea level rise.
CBY/ PBY.E.2	East of Hengistbury Head	MR	MR	MR	Managed realignment of cliff line.
CBY/ PBY.E.3	Hengistbury Head Long Groyne	HTL	HTL	HTL	Maintain position and influence of the Head on sediment transport.
CBY/ PBY.E.4	Solent Beach	MR	MR	MR	Maintain beach levels as principal defence linked to intent to HTL at Hengistbury Head and potentially extend the influence of Long Groyne. Intent to provide a robust defence of isthmus
CBY/ PBY.E.5	Southbourne	HTL	HTL	MR	Manage to allow transition between main Bournemouth Frontage and Solent Beach
Key: HTL - Hold the Line, A - Advance the Line, NAI – No Active Intervention MR – Managed Realignment					

CHANGES FROM PRESENT MANAGEMENT

IMPLICATION WITH RESPECT TO BUILT ENVIRONMENT

Economics		by 2025	by 2055	by 2105	Total £k PV
Property	Potential NAI Damages/ Cost £k PV	5	636	624	1265
	Preferred Plan Damages £k PV	0	0	0	0
	Benefits £k PV	5	636	624	1265
	Costs of Implementing plan £k PV	842	142	97	1081


Location reference:	Christchurch Harbour
Management Area reference:	CHB.F
Policy Development Zone:	PDZ1



* Note: Predicted shoreline mapping is based on a combination of monitoring data, analysis of historical maps and geomorphological assessment with allowance for sea level rise. Due to inherent uncertainties in predicting future change, these predictions are necessarily indicative. For use beyond the purpose of the SMP, reference should be made to the baseline data.


The following descriptions are provided to assist interpretation of the map shown overleaf.

100 year shoreline position:



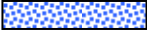
The following maps aim to summarise the anticipated position of the shoreline in 100 years under the two scenarios of "With Present Management" and under the "Preferred Policy" being put forward through the Shoreline Management Plan.

-  In some areas the preferred policy does not change from that under the existing management approach. In some areas where there are hard defences this can be accurately identified. In other areas there is greater uncertainty. Even so, where the shoreline is likely to be quite clearly defined by a change such as the crest of a cliff the estimated position is shown as a single line.
- Where there is a difference between With Present Management and the Preferred Policy this distinction is made in showing two different lines:

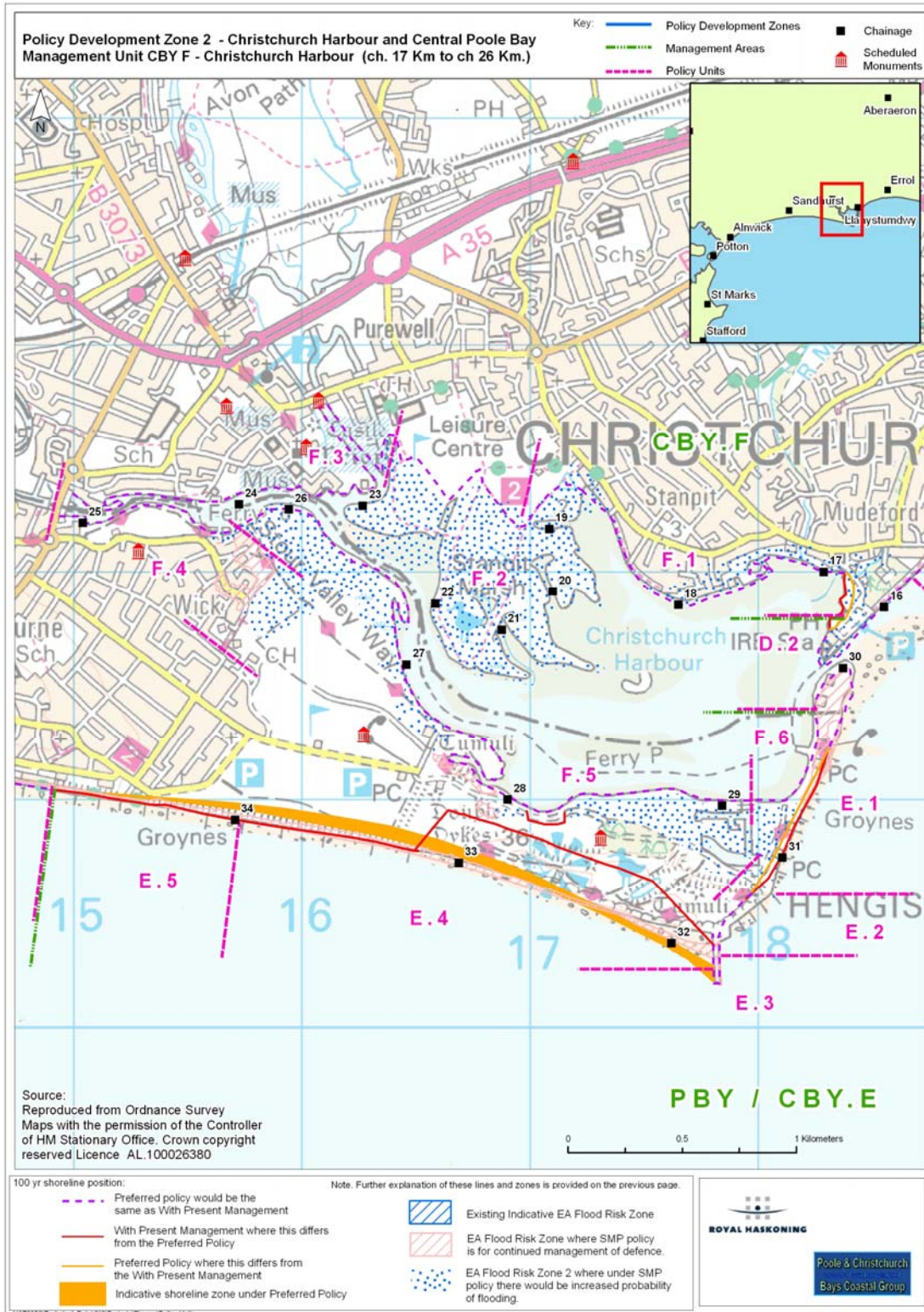
-  With Present Management.
-  Preferred Policy.

-  In some areas, the Preferred Policy either promotes a more adaptive approach to management or recognises that the shoreline is better considered as a width rather than a narrow line. This is represented on the map by a broader zone of management:

Flood Risk Zones

-  General Flood Risk Zones. The explanation of these zones is provided on the Environment Agency's web site www.environment-agency.gov.uk. The maps within this SMP document show where SMP policy might influence the management of flood risk.
-  Indicate areas where the intent of the SMP policy is to continue to manage this risk.
-  Indicate where over the 100 years the policy would allow increased risk of flooding.

The maps should be read in conjunction with the text within the SMP document.



SUMMARY OF PREFERRED PLAN RECOMMENDATIONS AND JUSTIFICATION

PLAN:

The intent of the Plan is to maintain a general policy of Hold the Line to the important areas of development around the Harbour but also to ensure opportunity for natural adaption of the mosaic of habitats.

In the Mudeford and Stanpit area defining policy has to consider quite complex issues of future flood risk due to sea level rise. The recent studies have shown immediate coastal flood risk is limited to five properties. However, future flood risk would substantially increase this number. Therefore, present investment in flood risk management would not be beneficial, but in the future may be likely and justifiable.

Along the Mudeford front the intent would be to support continued maintenance of the low sea wall. The car park and boat park behind the Quay and the headland to the north would be subject to increased flooding. Consideration could be given in the area of open ground, immediately behind the Quay, allowing some limited scope for natural habitat development along side setback defence. This would be subject to further investigations of the landfill. The aim would be to avoid squeeze of habitat against the wall. The intent elsewhere in this area would be to continue to support local private defences (i.e. garden walls), only actively considering more formal set back defences of the main core for the village if the long term need arises with sea level rise. Planning should recognise that the lower lying properties particularly at the headland would be at increased risk of flooding. This general approach would apply around the frontage including the road in front of Stanpit. Even though there is a changing emphasis in the specific way in which risk is managed, the policy for this area during the first epoch is to Hold the Line, realign the shoreline defence during the second epoch and hold this new line through to the third epoch.

The intent for Christchurch is to maintain and improve flood defence to maintain the integrity of the town. Subject to long term monitoring, should it be identified that the integrity of the SSSI is being damaged due to the inability of the estuary to adapt naturally, further consideration should be given to retreating the line behind the Stanpit Marshes. At Wick, the aim of the plan is to restrict defence strictly to the area of development. Natural development of estuary habitat should be encouraged over the existing marsh and rising land. To the south side of the estuary natural development of the estuary would be allowed.

Despite actions recommended above it is recognised that the balance of habitat may not be achieved with Christchurch Harbour. Subject to monitoring of estuary behaviour, the upstream area north of Christchurch possibly offers compensation for management within the main area of the Harbour.

PREFERRED POLICY TO IMPLEMENT PLAN:	
From present day	Maintain and raise defences as set out in the draft strategy taking account of the caveats in relation to habitat creation.
Medium term	Maintain defences and allow adaption of habitat.
Long term	Maintain defences and allow adaption of habitat with potential conversion of the lower Avon valley to saline conditions.

SUMMARY OF SPECIFIC POLICIES

Policy Unit	Policy Plan			
	2025	2055	2105	Comment

CHB.F.1	Mudford	HTL	MR	HTL	Manage flood risk initially through local protection and flood warning. Potential need for a combination of set back defences to compliment existing foreshore structure. Decisions in this area will be influenced by further investigation of the landfill site.
CHB.F.2	Stanpit Marshes	HTL	MR	MR	Maintain opportunity for roll back of marshes with Sea level rise subject to investigation of landfill.
CHB.F.3	Christchurch	HTL	HTL	HTL	Maintain and improve flood defence.
CHB.F.4	Wick	HTL	HTL	HTL	Local improvement to defences in line with sea level rise.
CHB.F.5	Southside of Christchurch Harbour	NAI	NAI	NAI	
CHB.F.6	Rear of Mudford Sandbank	MR	MR	MR	Allow ,managed roll back of Spit as for CBY1.1
Key: HTL - Hold the Line, A - Advance the Line, NAI – No Active Intervention MR – Managed Realignment					

CHANGES FROM PRESENT MANAGEMENT

IMPLICATION WITH RESPECT TO BUILT ENVIRONMENT

Economics		by 2025	by 2055	by 2105	Total £k PV
Property	Potential NAI Damages/ Cost £k PV	387	1331	2525	4243
	Preferred Plan Damages £k PV	0	0	0	0
	Benefits £k PV	387	1331	2525	4243
	Costs of Implementing plan £k PV	1595	389	394	2378


Location reference:	Southbourne to Flag Head Chine
Management Area reference:	PBYG
Policy Development Zone:	PDZ2

* Note: Predicted shoreline mapping is based on a combination of monitoring data, analysis of historical maps and geomorphological assessment with allowance for sea level rise. Due to inherent uncertainties in predicting future change, these predictions are necessarily indicative. For use beyond the purpose of the shoreline management plan, reference should be made to the baseline data.



The following descriptions are provided to assist interpretation of the map shown overleaf.


100 year shoreline position:

The following maps aim to summarise the anticipated position of the shoreline in 100 years under the two scenarios of "With Present Management" and under the "Preferred Policy" being put forward through the Shoreline Management Plan.


-  In some areas the preferred policy does not change from that under the existing management approach. In some areas where there are hard defences this can be accurately identified. In other areas there is greater uncertainty. Even so, where the shoreline is likely to be quite clearly defined by a change such as the crest of a cliff the estimated position is shown as a single line.


- Where there is a difference between With Present Management and the Preferred Policy this distinction is made in showing two different lines:

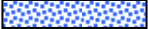
-  With Present Management.
-  Preferred Policy.

-  In some areas, the Preferred Policy either promotes a more adaptive approach to management or recognises that the shoreline is better considered as a width rather than a narrow line. This is represented on the map by a broader zone of management:

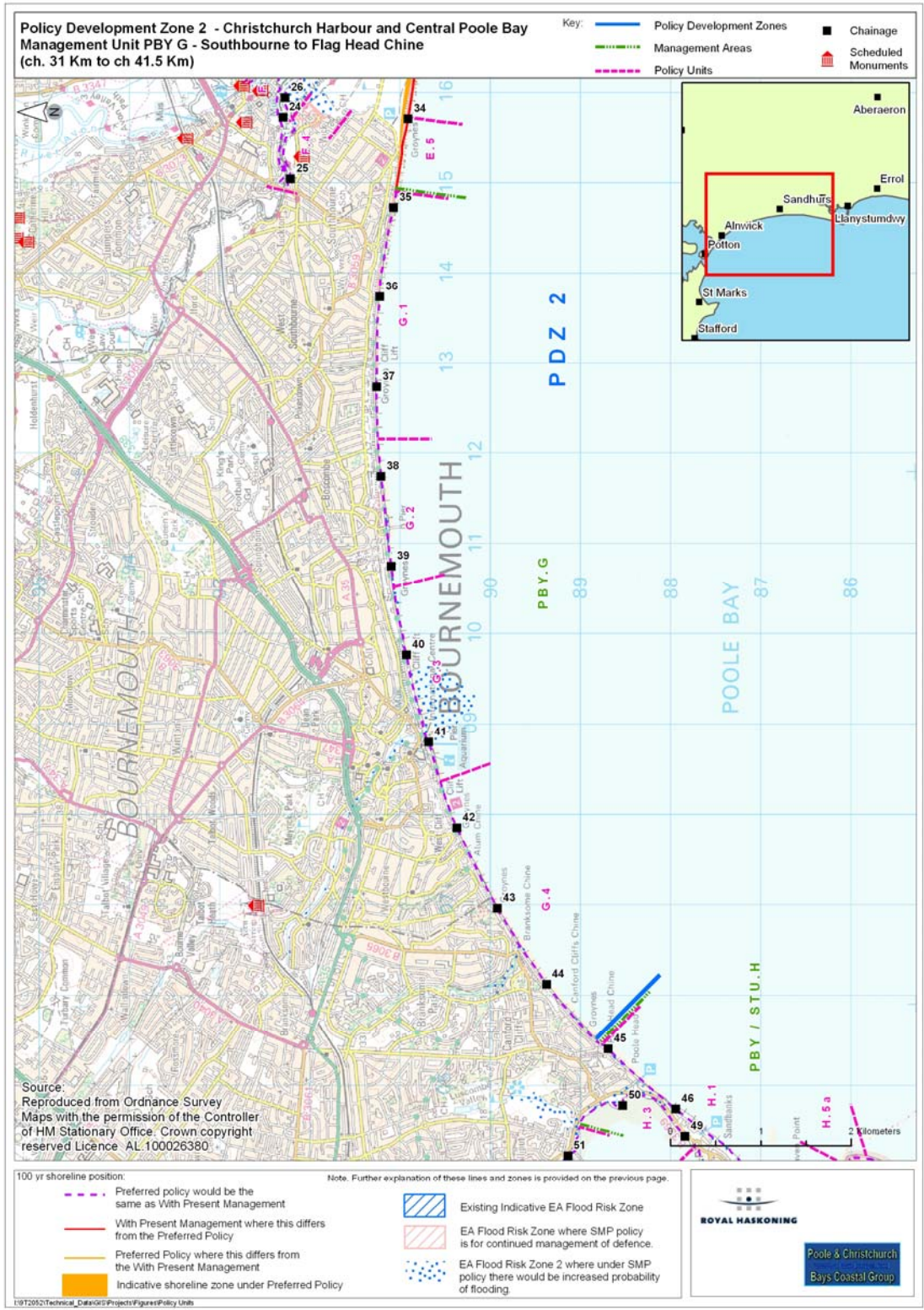
Flood Risk Zones

 General Flood Risk Zones. The explanation of these zones is provided on the Environment Agency's web site www.environment-agency.gov.uk. The maps within this SMP document show where SMP policy might influence the management of flood risk.

 Indicate areas where the intent of the SMP policy is to continue to manage this risk.

 Indicate where over the 100 years the policy would allow increased risk of flooding.

The maps should be read in conjunction with the text within the SMP document.



SUMMARY OF PREFERRED PLAN RECOMMENDATIONS AND JUSTIFICATION

PLAN:

The intent for this frontage would be for Hold the Line over the three epochs, this despite the potential issues of flood and coast protection funding. The intent for management is to maintain protection by recharge and sediment movement control, thereby sustaining the essential recreational and amenity benefits along with defence of important infrastructure and properties along the crest of the cliff. The SMP, however, recognises the possible difficulties in terms of maintaining funding and the potential increased effort required to maintain the existing practice of regular recharge and maintenance of the groynes. As such a potential policy within possibly the third epoch could be to advance the line. This approach would intend to constrain sediment drift so as to retain areas of beach between areas of reclamation. This possible policy would need to be taken forward in partnership within a strong integrated framework for development of the whole frontage. Furthermore, this framework would need to define acceptable influence or mitigation with respect to maintaining underlying coastal processes and management of the adjacent areas of coast.

PREFERRED POLICY TO IMPLEMENT PLAN:	
From present day	Maintain the programme of beach recharge and management of control structures. Reassess this practice and consider development of a framework to attract joint funding.
Medium term	Maintain the programme of beach recharge and management of control structures. Reassess this practice and subject to this consider options for changing policy to Advance the line.
Long term	Maintain the programme of beach recharge and management of control structures. Reassess this practice and subject to this consider options for changing policy to Advance the line.

SUMMARY OF SPECIFIC POLICIES

Policy Unit		Policy Plan			
		2025	2055	2105	Comment
PBY.G.1	Southbourne	HTL	HTL	HTL/A	Maintain foreshore through control and recharge/ consider potential need for increased control of coastline.
PBY.G.2	Boscombe	HTL	HTL	HTL/A	Maintain foreshore through control and recharge/ consider potential need for increased control of coastline.
PBY.G.3	Bournemouth Central	HTL	HTL	HTL/A	Maintain foreshore through control and recharge/ consider potential need for increased control of coastline.
PBY.G.4	West Cliff and Poole	HTL	HTL	HTL/A	Maintain foreshore through control and recharge/ consider potential need for increased control of coastline.
Key: HTL - Hold the Line, A - Advance the Line, NAI – No Active Intervention MR – Managed Realignment					

CHANGES FROM PRESENT MANAGEMENT

IMPLICATION WITH RESPECT TO BUILT ENVIRONMENT

Economics		by 2025	by 2055	by 2105	Total £k PV
Property	Potential NAI Damages/ Cost £k PV	4467	26998	57505	88970
	Preferred Plan Damages £k PV	0	0	0	0
	Benefits £k PV	4467	26998	57505	88970
	Costs of Implementing plan £k PV	28146	14331	15542	58019

=0=0=0



**Poole and Christchurch Bays Shoreline
Management Plan Review Sub-cell 5f**
Section 4. Policy Development Zone 2

Bournemouth Borough Council

2011

Report V4

9T2052

A COMPANY OF



ROYAL HASKONING

HASKONING UK LTD.
COASTAL & RIVERS

Stratus House
Emperor Way
Exeter, Devon EX1 3QS
United Kingdom

+44 (0)1392 447999 Telephone
Fax

info@exeter.royalhaskoning.com E-mail

www.royalhaskoning.com Internet

Document title Poole and Christchurch Bays Shoreline
Management Plan Review Sub-cell 5f
Section 4. Policy Development Zone 2

Document short title PDZ 2

Status Report V4

Date 2011

Project name Poole and Christchurch Bays SMP2

Project number 9T2052


Client Bournemouth Borough Council

Reference 9T2052/R/301164/Exet

Drafted by JGL Guthrie

Checked by J Ridgewell, N Carpenter

Date/initials check

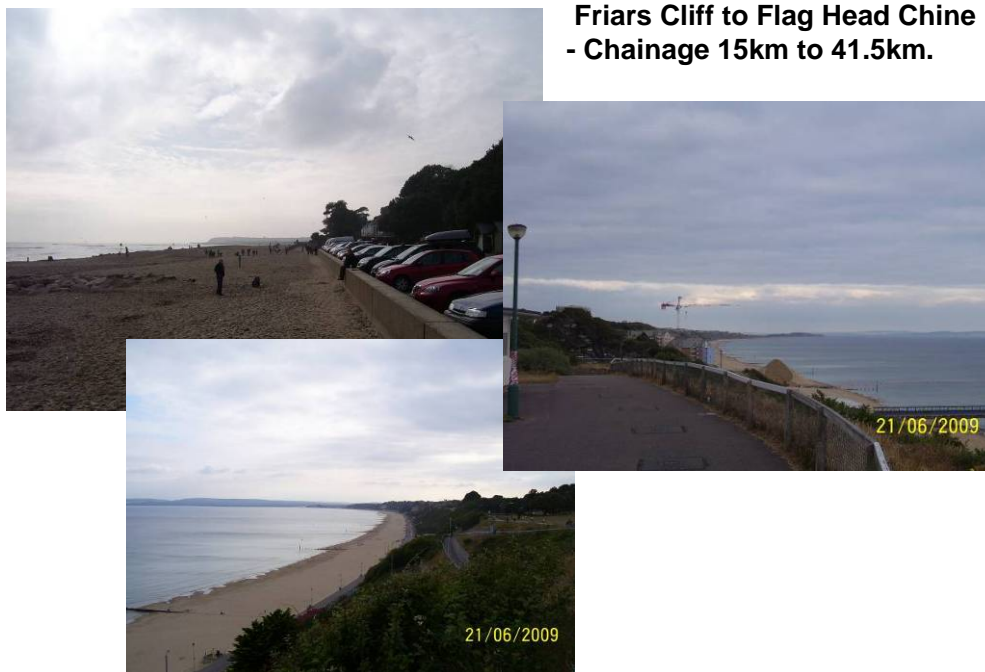
Approved by TL Eggiman, H Hall 

Date/initials approval

CONTENTS

		Page
4.3	PDZ 2 Christchurch Harbour and Central Poole Bay	1
4.3.1	Overview	4
4.3.2	Baseline Management Scenarios	16
4.3.3	Discussion and Detailed Policy Development	31

4.3 PDZ 2 Christchurch Harbour and Central Poole Bay



SMP 1 Management Units

UNIT	LOCATION	CHAINAGE	POLICY
CBY2	Chewton Bunny to Mundeford Sandbank	12.9 – 17.2km	Selectively Hold the Line, short and long term. undefended sections possibly retreat long term.
CHB5	Mundeford Quay	17.2 – 17.8km	Hold the Line, short term and long term
CHB4	Mundeford Town	17.8 – 19km.	Hold the Line, short term and long term
CHB3	Stanpit and Grimbury Marshes	19 – 21km	Do Nothing with long term retreat
Christchurch, not previously included		21 – 23km	
CHB2	Southside	23 – 25.7km	Do Nothing
CHB1	Harbour-side of Mundeford Spit	25.7 – 26.3km	Hold the Line.
CBY1	b) Mundeford Spit.	26.3 – 27km	Hold the Line
	a) Hengistbury East	27 – 28 km	Retreat
PBY3	Warren Hill	28 – 29 km	Allow the backshore to retreat selectively holding the beach width.
PBY2	Point House Café to Warren Hill	29 – 30.4 km	Selectively Hold the Line
PBY1	Sandbanks to Point House Cafe	30.4 – 43.9	Hold the Line

Note: SMP1 policy was set over a 50 year period. Short term refers to immediate approach to management of defences with long term policy being set for the 50 years.

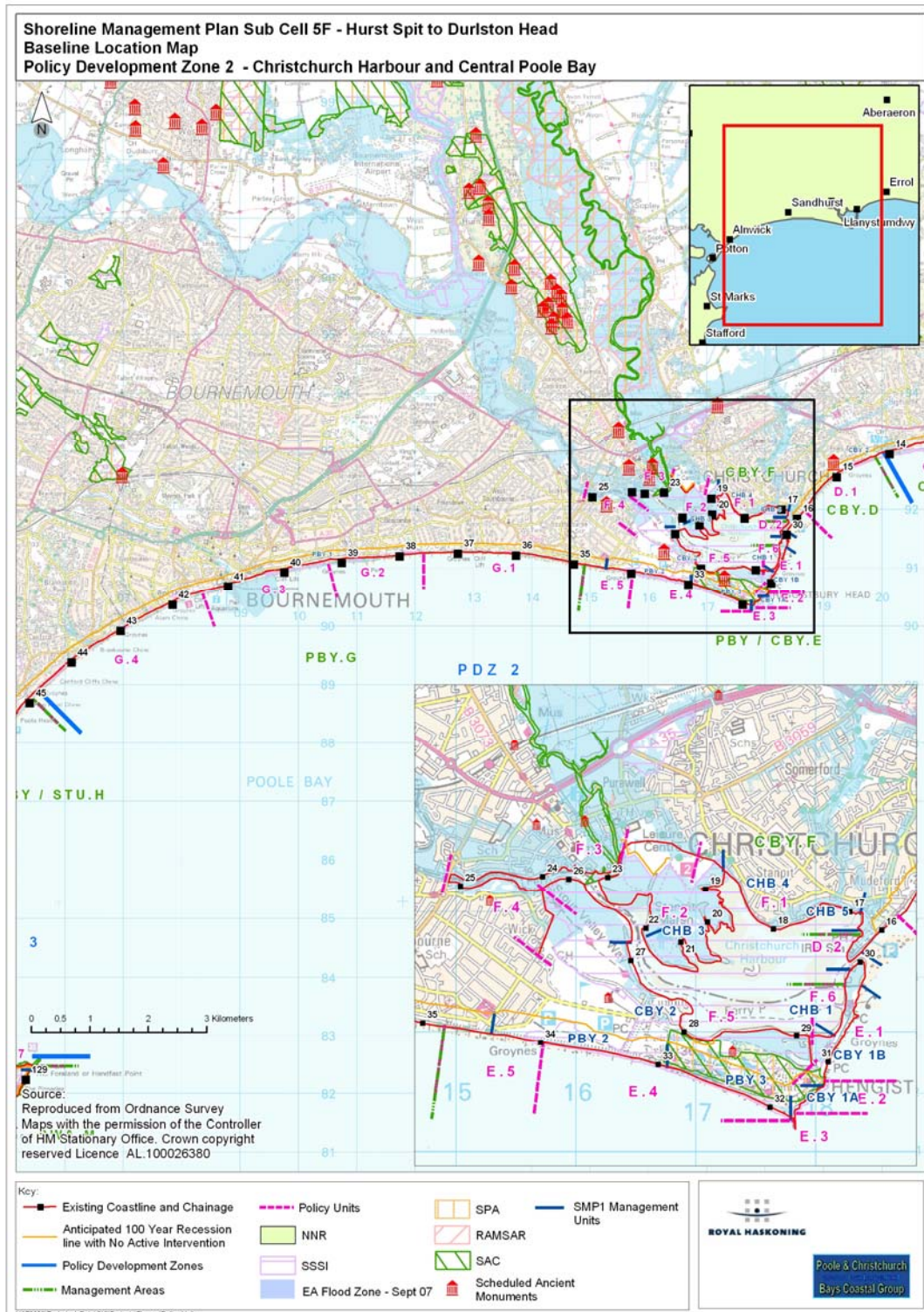


Figure 4.3.1

4.3.1 OVERVIEW

PRINCIPAL FEATURES (further details are provided in Appendix D)

Built Environment:

There are two major conurbation areas: the Bournemouth area; including Southbourne, Boscombe and Westbourne and the centre of Bournemouth itself, and extending through to the area of Canford Cliffs within the Borough of Poole, and the Christchurch area; including Christchurch, Stanpit, Mudeford and Friars Cliff. The two main sea front areas, separated by Hengistbury Head have very different characters but are both seen as being an integral aspect of the built environment with promenades, large numbers of beach huts or sea front chalets as well as commercial and tourism related properties. Although the main trunk roads lie back from the coast, the main A35 runs across the flood plain directly linked to the tidal area of Christchurch Harbour. There are local roads within the Christchurch conurbation lying closer to the shoreline and potentially at risk from flooding. The coastal road linking through the Bournemouth conurbation runs along the crest of the steep coastal cliff. There is an important fishing fleet based within Christchurch Harbour, the RNL station and a ferry service between Mudeford Quay and the Mudeford Sandbanks. There are three funicular railways or Cliff Lifts over the Bournemouth frontage providing access to the promenade and the two piers. Apart from the roads, there is little critical infrastructure within the direct coastal erosion zone, although there are electricity substations, schools and hospitals set a short distance back. There are substations, schools and the main sewage works to Christchurch located in the tidal flood risk zones of the Stour and Avon at the back of Christchurch Harbour.

Heritage and Amenity:

Hengistbury Head and its associated area is an important archaeological area (scheduled monument (SM)), with examples of iron age settlement. This area has various earth works and barrows, including the Double Dykes. There are important SM's within Christchurch, including the Bridge, Monastery and the old town walls.

Amenity, both for local recreation and tourism, underpinning the regional economy, is a very important aspect of the area. There are important recreational moorings and a marina within Christchurch Harbour. Over the whole frontage there are car parks and access points to the coast. A major car park has been developed in the area between Southbourne and Hengistbury Head. The promenades are an essential feature of the coast together with amenity beaches. Access along the sea front is now continuous between Mudeford Quay through to Friars Cliff and along the whole Poole and Bournemouth frontages. In each area there are management plans, zoning use and providing pedestrian, cyclist and disabled access.

The landscape provides an important aspect of the recreational and tourism values, with important longshore views, as well as seascape views to the Isle of Purbeck and the Isle of Wight. Christchurch Harbour provides an essentially different and less developed landscape.

There is a golf course and leisure centre at Christchurch with a golf driving range at Wick.

Nature Conservation:

Christchurch Harbour is an SSSI, with further designation of the River Avon system and the Purewell Meadows. Hengistbury Head is designated SPA and SAC (*Dorset Heathlands and Dorset Heath*), with the River Avon and Avon Valley, extending from Christchurch up river, being SPA, SAC and Ramsar. There are discrete sections of cliff designated SSSI for its geological exposures along the Poole Bay frontage. These include areas at Southbourne, adjacent to Boscombe Pier, along much of the central section of Bournemouth and through to Canford Cliff Chine. There are areas both along the Poole Bay frontage and at Mudeford Spit and Quay designated SNCI for cliff top grasslands and for the dunes and shingle beaches.

Within Christchurch Harbour there is a Field Studies Centre, important for research and monitoring of habitats as well as providing nature conservation educational services. There is also a bird observation and ringing centre to the rear of Hengistbury Head. Christchurch Harbour and the associated area of Hengistbury Head provide a very important nature conservation area generally, contrasting but complementing the more developed open coast sea front.

KEY VALUES

Notwithstanding the major conurbations situated on the coast and within Christchurch Harbour, an essential feature of the area is the varied natural and dynamic value of the coast and harbour area. The open coast represents that quintessence of the British seaside, with the expectation of open access, sea, sand, history and landscape; supported by facilities for recreation, activity and enjoyment.

The different areas of the coast provide emphasis to the varying aspects of this. The Mundeford Quay area aims to provide a generally less intrusive use of the coastal strip benefiting from quiet areas of beach and managed coastal slopes with well defined areas of greater beach use activity and local water sport. Mundeford Spit offers an area of traditional beach use supported by the large number of beach huts.

While varying in character, area by area, the Poole Bay seafront is strongly developed as a high quality seaside attraction, enticing more visitors than any other coastal area of the UK. The vision is that “The seafront will become an environmental showcase for the town, promoting environmental values to our visitors”. (Bournemouth Seafront Strategy 2007 – 2011.) The values of the area are, therefore, as much about the overall setting of the coast and its landscape as it is about maintaining open access and facilities on the sea front. This varied context is provided in the value of the semi-natural cliffs and open space at the cliff crest and in the more natural unobtrusive development of Christchurch Harbour. In many ways Hengistbury Head typifies this interaction as an iconic part of the landscape, valued for both its natural and historic environment. It plays an important role in being the closest and most accessible natural ‘green space’ area for much of the eastern part of the Bournemouth area.

Christchurch and Mundeford add important heritage value to the area and the evidence of man’s early settlement in the area of Hengistbury Head is carried forward in the later historic development of these areas at the mouth of the Avon and Stour.

These local values of the coastal area contribute fundamentally to the regional value of the two conurbations, in maintaining a vibrant sustainable sense of community and economic well-being. While maintaining this economic well-being of the developed coast is seen as a primary driver, this is inextricably linked to maintaining the natural conservation values, the historical perspective and environment, high quality landscape and varied use of the area.

These values are brought together as an interrelated set of management objectives developed from the above, but more specifically from the individual objectives identified in Appendix D and E.

OBJECTIVES (the development of objectives is set out in Appendix D based on objectives listed in Appendix E)

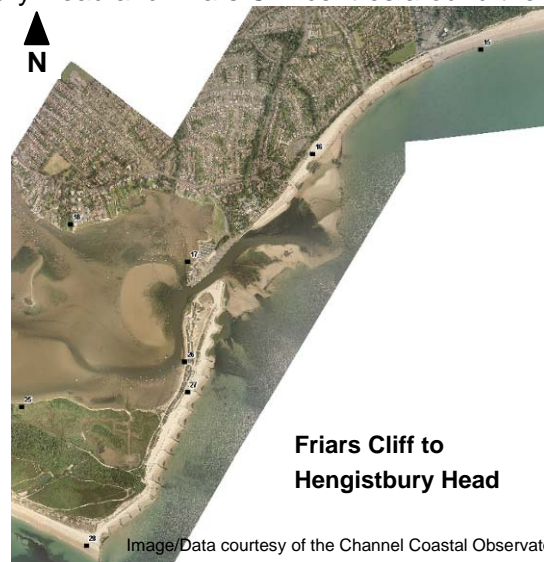
- Protect economic viability of Bournemouth, Poole and Christchurch;
- Maintain important heritage values with Christchurch;

- Support management of heritage interests around Hengistbury Head;
- Reduce flood risk to Christchurch and Mundeford.
- Retain and improve the width and amenity value of the intertidal (beaches) area in Poole Bay;
- Maintain essential sea front facilities.
- Maintain the opportunity for commercial, recreational and sports use of the water, in particular the use of shore-based facilities such as Mundeford Quay;
- Manage risk to properties due to erosion and flooding where sustainable;
- Maintain open space and recreational use of such space;
- Minimise net loss of species/habitat (identify compensatory habitat if any net loss occurs);
- Maintain opportunity for natural development of the mosaic of habitats, particularly within Christchurch Harbour;
- Maintain geological exposure of cliff line;
- Maintain the outstanding landscape and the views and appreciation of the varied coastal environment;
- Support adaptability of coastal communities;
- Reduce reliance on defences.

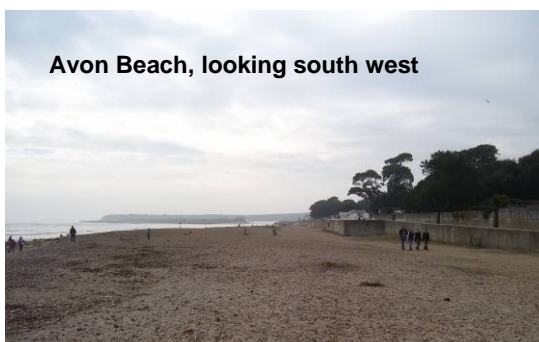
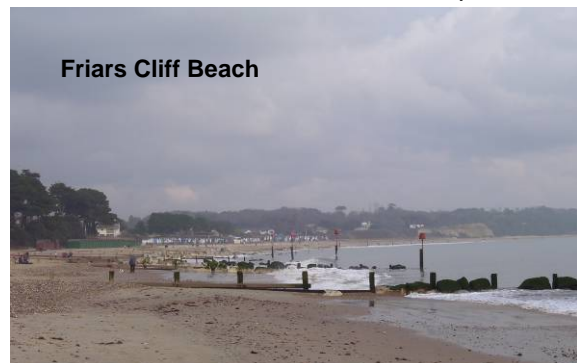
DESCRIPTION

The Policy Development Zone which extends from the western end of Friars Cliffs through to Flag Head Chine at Poole (and including Christchurch Harbour), covers a distance of some 26km.

The open coast section between Hengistbury Head and Friars Cliff centres around the entrance to Christchurch Harbour. To the south, attached to the high ground of the Head, is Mudeford Spit. The spit sets back slightly from the eastern cliff line and is defended by rock groynes and revetment. The Spit is populated by private beach huts and has some limited public facilities. This heavily defended spit closes off the entrance to the harbour, with the narrow channel (the Run) fixed between the end of the spit and the hard defences to Mudeford Quay. The end of the spit overlaps the end of Mudeford Quay and there is an extensive ebb tide delta extending from the end of the spit nearly 1 kilometre further north in front of the open coast.



This northern section of the frontage is defended by sections of sea wall and groynes through to the undefended section of cliff at Steamer Point. The foreshore comprises sand with some areas of shingle. The cliff at Steamer Point is some 20m in height and this reduces in level quite rapidly, such that along much of the frontage the level of the back cliff is of the order of 4m to 5m ODN. This backshore level drops further to Mudeford Quay, with the quay area being around 3m ODN. This frontage is divided into four principal zones within the Christchurch Beaches and Hinterland Management Plan, these being:



- Mudeford Quay, with its car park, boat facilities, RNLI station and ferry terminal to Mudeford Spit;
- Gundimore, defended by a sea wall and linking Mudeford Quay to Avon Beach;
- Avon Beach, the main beach use area backed by its promenade, car parks and commercial facilities, and backed also by the Avon Run Road;
- Friars Cliff beach, protected by

groynes and seawall and backed by open public space, the Maritime and Coastguard Training centre and ending at the undefended section of Friars Cliff.

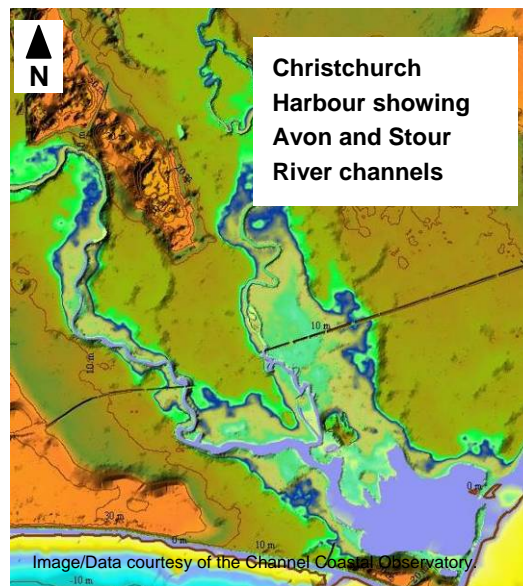
Behind the shoreline is a large area of residential properties, making up the newer part of Mundeford. The town extends down to its older core set back from the shore within the



lee of Mundeford Quay. Here, the frontage comprises low retaining walls backed by generally open grass areas to properties behind. There is a wide expanse of muddy foreshore in front of the wall. The old town and the main road run around the small bay created by the river Mude and the Bure Brooke in the lee of the Quay. Newer development has taken place on the low headland to the west of this small bay. This area is more

densely developed forward of the main core of the town and there are landing stages and slipways servicing the significant boat use of this lower area of Christchurch Harbour.

Further within the Harbour, on its northern side, are large areas of mud flat and saltmarsh, marking the change in character of the estuary, from open intertidal flood plain to that of a more riverine environment. The saltmarsh, though now eroding in areas, is understood to be a past sink for sediment delivered from the two main rivers. The main River Avon channel is held to the western side of the estuary, with the wider valley closed off on its eastern side by higher ground linked to the island forming the centre of Christchurch. There is also a small area of high ground slightly further forward of this at Crouch Hill, within the area of the marsh.



Behind the marshes is reclaimed land in front of Stanpit and the main centre of Christchurch. These areas are defended, typically by embankments and walls set back from the estuary edge. Although Stanpit is largely built upon the rising higher ground to the east of the river valley, with little development to the estuary side of the road, much of the core of Christchurch, to either side of Bridge Street, lies within the larger valley floor of the Avon.

Upstream of the town, the old river valley has not generally been developed. The A35 road and railway line run across the valley on embankments.

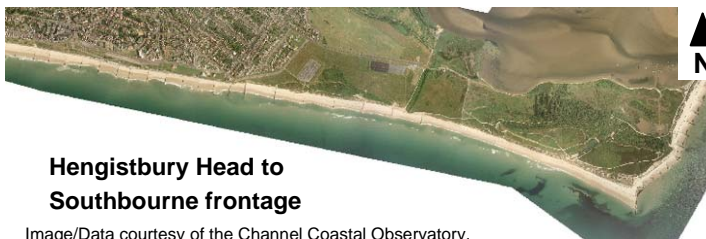
To the western side of the Avon, Christchurch has developed around and out from the ridge upon which sits the Priory and remains of the Castle. Much of the surrounding development is within the potential flood plain of the Avon and the Stour.



Christchurch and Wick

To the southern side of the Stour, the land rises relatively steeply to the rear of Southbourne. The village of Wick extends down to the edge of the estuary with some new development within the old village behind Wick Farm. To the east side of Wick is a golf driving range and golf course, with the range developed over the tidal flood plain but the golf course set further up the slope. Along the southern side of the estuary the land is

undeveloped, sloping down to a saltmarsh area giving out to the mud and sand flats of the wider intertidal harbour area. The Field Study Centre is just to the west of the narrowest neck of land between the Harbour and the open coast. The Iron Age earthworks of Double Dykes are located some 500m to the west of the narrowest part of the neck, cutting across the isthmus from the coast to Christchurch Harbour behind the rising land of Hengistbury Head. The lowest-lying topography of the isthmus coincides with the position of the Double Dykes. The neck of land is littered with evidence of early settlement, with several tumuli over the low lying land and upon the rising land of the headland.



Hengistbury Head to Southbourne frontage

Image/Data courtesy of the Channel Coastal Observatory.



The mature saltmarsh area widens again in the lee of the headland and the shelter of Mudeford Spit.

Along the open coast to the south and west of the Spit,

Hengistbury Head rises steeply with eroding cliffs protected by rock groynes. At the Head is the Long Groyne, holding a wider area of beach and dune against the south face of the headland. There is a shallow bay developed between the headland and the first main section of promenade and coast defence at Southbourne. To the west of the Double Dyke area commences a series of timber groynes which extend through the BBC section of the Poole Bay frontage. The Double Dykes section itself is defended by a gabion wall and three rock groynes.



Double Dykes, looking east toward Warren Hill

The main Poole Bay frontage at the larger scale describes a continuous sweeping arc from Southbourne through to the cliffs at Canford; however it shows considerable variation from this overall alignment at the local scale. This reflects principally the staged construction of the coastal defence.



Southbourne

At the western end of Southbourne, the lower land is held forward by groynes and the promenade. This forms a shallow bay to the higher cliffs at Boscombe Overcliff Drive. The rising cliffs of Southbourne have been graded back with properties close to the crest of the cliff.

Further west, the cliff is more natural, with heavy vegetation on the cliff face and over a good width to the road and properties behind.

This cliff line and groyned sand foreshore curves through to the valley and pier at Boscombe. The pier has recently been refurbished and the area to the rear of the pier largely redeveloped. A surfing reef is under construction in this vicinity, complementing the redevelopment of the area.



To either side of Boscombe Pier there are particular exposures of the coastal slope designated as SSSI. The promenade runs along this entire section of coast, protecting the toe of the cliffs.

The coastal road to the west of Boscombe runs close to the crest of the slope with property directly behind. The promenade continues through some 2.5km to the centre of Bournemouth, with the Bournemouth Pier at the entrance to the Bourne valley. The Bournemouth

International Centre (BIC) is located immediately behind the Pier, together with significant core development of the town.

The pier area tends to locally hold the foreshore area forward, forming a further shallow bay along West Cliff and through to the cliffs at the end of this zone.

The Poole Bay frontage is cut by several valleys, (or chines); some of which are developed as wooded parks and public open space. Areas of both the chines and the coastal slope and crest are locally designated as SSSI.

Along West Cliff and through to Flag Head Chine at the end of the zone, properties tend to be set back from the cliff line, with gardens extending to the cliff crest. In other areas, local roads approach the cliff but, with the notable exception of the Avenue at Branksome Chine, the main through roads lie well back from the coast.



PHYSICAL PROCESSES (further details are provided in Appendix C)

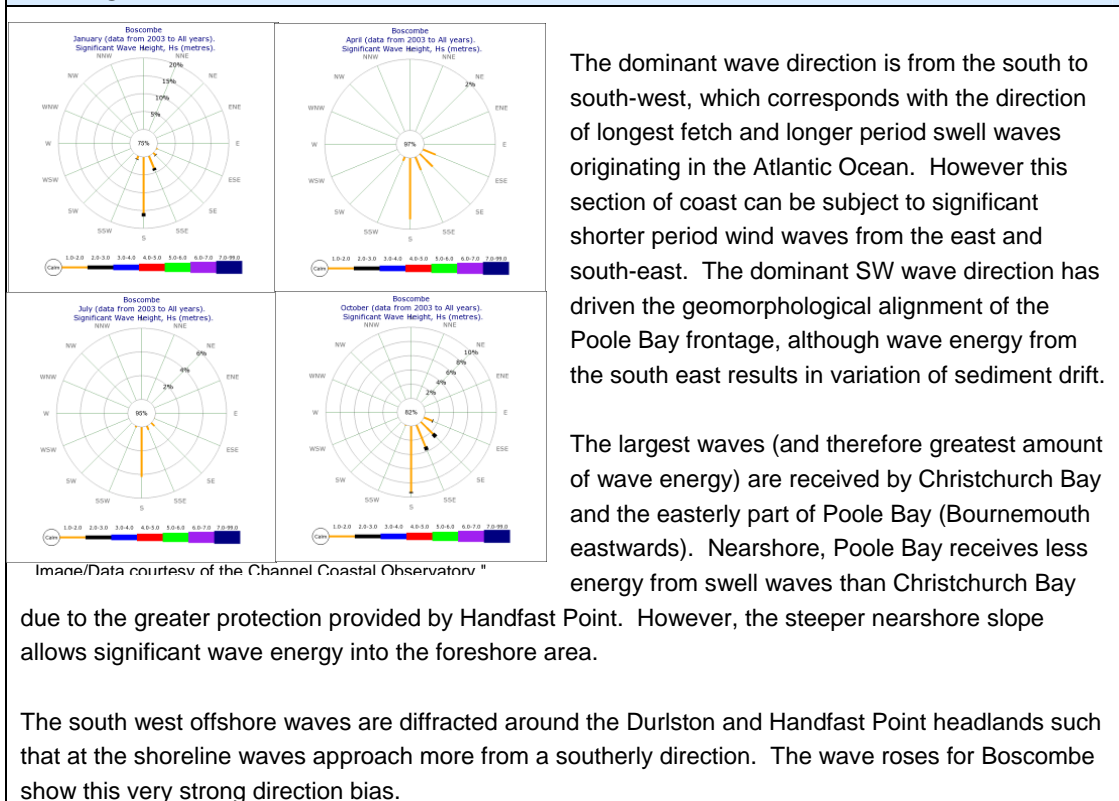
TIDE AND WATER LEVELS (m.ODN)

Location	LAT	MLWS	MLWN	MHWN	MHWS	HAT	Neap range	Spring range	Correction CD/ODN
Christchurch Entrance		-0.31	-0.21	0.49	0.89		0.7	1.2	-0.91
Bournemouth		-0.9	-0.3	0.2	0.6		0.5	1.5	-1.4

Extremes(m.ODN)

Location:	1:1	1:10	1:25	1:50	1:100	1:200	1:500	1:1000
Christchurch Priory Quay	1.39	1.65	1.75	1.83	1.91	1.99	2.09	2.17
Hengistbury Head	1.39	1.65	1.75	1.83	1.91	1.99	2.09	2.17
Bournemouth	1.38	1.63	1.73	1.81	1.88	1.96	2.06	2.14
Sandbanks	1.39	1.63	1.73	1.80	1.88	1.95	2.05	2.12

WAVE CLIMATE



TIDAL FLOW

Currents across the main section of the frontage are relatively low: peak flows less than 0.5 m/sec. Tidal and wave induced currents have been assessed as being a significant factor in biasing west to east sediment transport across Solent Beach and past Hengistbury Head and it is reported that there is a strong southerly current developed off the Head over the ebb tide. Flows through the entrance to Christchurch Harbour, through the Run, are very strong both on flood and ebb.

PROCESSES

Control Features:

The log spiral shape of Poole Bay is controlled by the headland at Handfast Point. The zone overall is then controlled by the presence of Hengistbury Head, acting as a downdrift control to the coast to the west and an updrift headland to the coast to the east. Mudeford Quay provides an anchor for the entrance to Christchurch harbour with flows from the estuary acting to influence development of the Christchurch seafront through the development of the ebb tide delta. Within Christchurch Harbour the areas of high ground upon which Christchurch is built controls the position of the Avon, allowing development of the marshes in front of Stanpit. The high ground ridge at Wick acts to divert the Stour in an easterly direction creating the opportunity for marsh development to the southern side of the estuary. Local to the Poole Bay frontage, the defended ridge coming down from Southbourne acts as a minor headland, tending to create a secondary bay over the frontage between Southbourne and Hengistbury Head (Double Dykes). Along the Poole Bay frontage there is local variation created by defences.

Existing Defences:

Individual defences are identified in Appendix D. The general description of defences is provided above. This is summarised below.

Mudeford Quay is a heavily defended and modified natural landform, with vertical sea walls and quay structures. To the north of Mudeford Quay, sea walls continue beneath the low cliffs, through to Friars Cliff, fronted by timber and rock groynes along the beach. Within lower Christchurch Harbour, along the northern shore, are low front face walls. Local ad-hoc flood defences are provided to properties behind. The main area of Christchurch is defended by embankments and defences generally set back from the waterfront, although there are tidal defences along the rivers. The area of Wick is partially defended. There are no formal defences along the southern side of Christchurch Harbour. Mudeford Spit is heavily defended with rock groynes and rock revetment and the groynes extend in front of the eastern flank of Hengistbury Head.

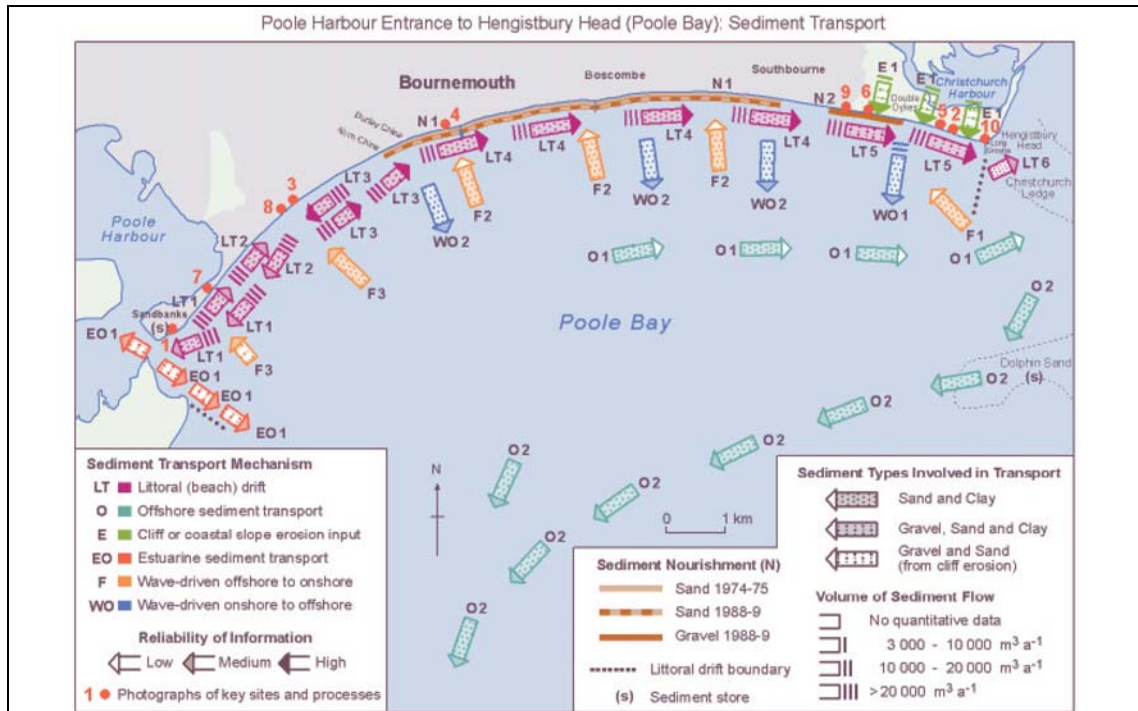
The position of Hengistbury Head is currently held by the Long Groyne. There are a series of groynes along the Solent Beach (3 rock groynes in the area of Double Dykes) and groynes are in place over much of the frontage to the west, as far as Alum Chine. Upgrading of the older timber groynes to rock structures has been recently completed for the Poole Beach section. The main defence however along the Poole Bay frontage is the beach, which is regularly recharged. Behind the beach is a sea wall and promenade, which provides secondary defence to the entire Poole and Bournemouth frontage as far east as Southbourne.

Over the Christchurch frontage defences have been assessed as having a residual life of some 20 to 30 years, although this is very dependent of beach recharge in the area. The defences along Mudeford Spit appear in reasonable condition but again rely on recharge to maintain their integrity. The Poole Bay defences are sustained through regular beach recharge and there is a programme for upgrading groynes from timber to rock. The gabion wall in front of Double Dykes is in poor condition in places and because of its nature is only likely to have a residual life of some 5 years. The Long Groyne is in poor condition.

Within Christchurch Harbour the lower estuary defences are exposed to low energy conditions and with low level maintenance are likely to remain as a competent boundary defence for 20 to 50 years. The local flood defences behind the front line are not formally maintained and in places provide only limited flood defence. The main embankments and defences around Christchurch are infrequently exposed and are reported to be in good condition.

Processes:

The general processes are summarised in the following diagram.



Map courtesy of SCOPAC. 2004

MMIV © SCOPAC Sediment Transport Study

Figure 4.3.2

The main features of this are:

- The net drift along the Poole Bay frontage is from west to east. This however, is very variable and there can be periods of drift reversal from east to west. Under specific storm conditions very high drift rates (in the order of $100,000\text{m}^3$ can be developed). Observation of drift alignment in relation to groynes highlights this variation, showing some areas to be more stable than others;
- There is minimal interchange between the shoreline and the nearshore area, apart from at the eastern end;
- There are both inputs and outputs of sediment at the western end of the zone. This is also a variable supply and loss of sediment from the Canford Cliffs area;
- There is sediment transfer around Hengistbury Head, although with the Long Groyne in place this tends to be through the nearshore area of the Christchurch Ledge;
- Sediment supply to the eastern beaches therefore tends to be through interaction with the nearshore area, associated with the ebb tide delta of the Harbour;
- There is little or no natural sediment supply from the cliffs along Poole Bay due to the defences;
- The low, soft frontage around Double Dykes does provide some sediment to the foreshore, as do the Hengistbury Head cliffs to the east of Double Dykes;
- Historically the cliff face to the east of Hengistbury Head provided sediment to Mudeford Spit, but contemporary trends show no erosion occurring since the installation of groynes in 1986;
- Although nominally ebb dominant, there is a supply of coastal sediment to within Christchurch Harbour;
- Fine sediment supply is provided by fluvial flow from the rivers to Christchurch Harbour.

On the open coast there is a general deficit of sediment and this is compensated for by recharge. With sea level rise, the trend will be for increased drift and loss of sediment. Sediment movement along the shoreline towards Hengistbury Head is reported as being strongly influenced by flows at the coastline

biasing sediment movement towards the east. However, the area of beach and dune immediately to the west of Long Groyne has remained quite stable, showing less drift variation as a result of changes in wave direction and reinforcing the significance of the Long Groyne in controlling sediment to the west more generally.

There is erosion reported to areas of saltmarsh within Christchurch Harbour (Appendix C). There have been no detailed studies to map the extent or location of such erosion.

Unconstrained Scenario:

Although unrealistic, because of the residual impact of defences, this scenario considers how the coast would respond, if all defences were removed. It is useful in examining the pressure along the frontage.

The fundamental change at the shoreline would be the erosion (and eventual loss beyond the period of the SMP2) of the influence of Hengistbury Head. This unconstrained erosion would tend to reduce the width of the isthmus between Southbourne and Hengistbury Head, leading eventually to a breach in this area through to Christchurch Harbour. The Southbourne headland would continue to erode back and associated with this would be a general erosion of the frontage along Poole Bay.

To the east of Hengistbury Head, there may be an increase in sediment supply to Mudeford Spit. However, this Spit would tend to roll back, increasing pressure on the Run. This in turn would result in increased erosion of Mudeford Quay. It seems probable that the overlap between the quay and the spit would become unsustainable. The differential erosion of the Spit, in relation to the erosion of the eastern side of Hengistbury Head, would make it likely that a breach would occur along the Spit. The eastern end of the Spit may well then meld itself to Mudeford Quay, with a new entrance developing closer to Hengistbury Head. A new channel and ebb delta configuration would be established, with the Mudeford Quay Spit rolling back into the Harbour.

The coast to the north of Mudeford Quay would continue to erode back in line with the process described above.

As the influence of Hengistbury Head was lost, the entrance to Christchurch Harbour would become a large delta system with variation in channels and banks. There would be a general infilling of the harbour area system.

To the west of the now lost Hengistbury Head, the Poole Bay frontage would erode back significantly, allowing the Bay to assume a more classic log spiral form, with erosion affecting the frontages of Southbourne, Boscombe, Bournemouth and Poole. In line with the log spiral plan form, the extent of erosion back into the hinterland would increase from east to west, with the West Cliff and Poole frontages likely to undergo the greatest recession.

Potential Baseline Erosion Rates

Base rates have been assessed from monitoring and historical data. The range of potential erosion is assessed in terms of variation from the base rate and sensitivity in potential sea level rise. Further detail on erosion rates is provided in Appendix C. The base rates provided below are taken as an average based on historical records. The rates are a composite value based on erosion of the toe and recession of the crest of the cliff and reflect the erosion rates following failure of defences.

(Sea Level Rise assumed rates: 0.06m to year 2025; 0.34m to year 2055; 1m to year 2105. Baseline date 1990)

Location	Base Rate	Notes	100yr. Erosion / Recession (m)
Highcliffe	1.1m/yr	Erosion resisted by defences and slopes stabilised	120m
Avon Beach	1.4m/yr	Erosion resisted by defences	120m
Hengistbury Head East	1.6m/yr	Erosion partially constrained by defences	160m
Hengistbury Head	1.8m/yr	Erosion partially constrained by defences	180m
Bournemouth Cliffs	1.7m/yr	Erosion resisted by defences and slopes stabilised	150m
Canford Cliffs	1.8m/yr	Erosion resisted by defences and slopes stabilised	180m

4.3.2 BASELINE MANAGEMENT SCENARIOS

PRESENT MANAGEMENT

Present Management is taken as that policy defined by SMP1, modified by subsequent strategies or studies. It should be noted that both in the case of SMP1 and that of many of the strategies undertaken before 2005, the period over which the assessment was carried out tended to be 50 years.

SMP1			MODIFIED POLICY		
MU	LOCATION	POLICY	REF	LOCATION	POLICY
CBY 2	Mudford Quay to Highcliffe	Selectively HTL	S1	Mudford Quay to Friars Cliff	Hold The Line. Replace timber Groynes with rock, beach management.
CHB5	Mudford Quay	HTL	S2	Mudford Quay	Manage Flood Risk. Maintain flood warning, support local resilience/adaptation. Reassess in line with sea level rise.
CHB4	Mudford Town	HTL	S2	Mudford Town	Manage Flood Risk. Maintain flood warning, support local resilience/adaptation. Reassess in line with sea level rise.
CHB3	Stanpit and Grimbury	Do Nothing with Retreat in long term	S3	Purewell	Maintain and raise frontline flood defence.
	Christchurch	Not included in SMP1	S3	Central Christchurch (area 3.4)	Extend frontline defence and raise.
			S3	Mill Race (area 3.3)	Construct frontline defences (low priority score).
			S3	Priory Quay (area 3.2)	Maintain and raise defence (excluding further work to Priory Marina).
			S3	Stour Frontage of Christchurch (area 3.1)	Construct and raise riverside defences.
CHB2	Southside	Do Nothing	S3	Wick	Raise and extend defences.
			S3	Hengistbury to Wick	No Active Intervention.
CHB1	Harbour-side of Mudford Spit	HTL	S3	Harbour-side of Mudford Spit	Hold The Line. Beach recharge to raise level (low priority score).
CBY1	b) Mudford Spit.	HTL	S1	Mudford Spit	Hold The Line.. Beach recharge.
CBY1	a) Hengistbury East	Retreat	S1	Hengistbury	Managed retreat.
PBY3	Warren Hill	Retreat Cliff , HTL to beach width	S4	Not concluded/ based on existing practice *	Current policy for maintaining Long Groyne.
PBY2	Point House Café to Warren Hill	Selectively HTL	S4	Not concluded/ based on existing practice *	Current policy to maintain defence to Double Dykes.
PBY1	Sandbanks to Point House Cafe	HTL	S4	Not concluded/ based on existing practice *	Current policy to maintain recharge with groynes.

References:

- S1 *Christchurch Bay Strategy Study(DRAFT) - April 2007*
S2 *Mudford and Stanpit Feasibility Report (EA November 2008)*
S3 *Christchurch Bay Strategy Study. Christchurch Harbour Benefit Cost Assessment (June 2008)*
S4 *Poole Bay and Harbour Strategy – 2004 (* the policy for these frontages was not conclude in strategy. Current practice is HTL)*

The key objectives determined from the Catchment Flood Management Plan (2008) for the area is set out below.

- Prevent an increase in the number of people affected by river and tidally influenced flooding;
- Prevent an increase in the economic damages to residential, commercial properties and infrastructure caused by river and tidal flooding;
- Prevent an increase in the economic damages to agricultural land caused by river and tidally influenced flooding in the rural areas;
- Where appropriate to ensure the floodplains are utilised for recreational and green space;
- Where appropriate to ensure rivers and floodplains are utilised for the benefit of nature conservation and restore them to their naturally functioning state, particularly in the urban areas;
- To sustain and improve the condition of internationally and nationally designated sites within areas prone to flooding;
- To increase biodiversity, BAP habitats and amenity values of the river-floodplain environment; and
- Protect significant historic environment assets and their settings from flood related deterioration.

BASELINE SCENARIOS FOR THE ZONE

No Active Intervention (Scenario 1, NAI):

Under this scenario, no works would be undertaken to maintain existing defences along the frontage. Because of the residual impact of structures, evolution of the unconstrained scenario would be modified, although in the longer term the development of the coast would be similar.

Under this scenario, there are two underlying influences at work, the change in structure or geomorphology of the coast and the increased risk of flooding. The first impacts on the whole zone, the second is of more significance in terms of the areas around Christchurch Harbour.

Geomorphological Change

Over the time scale of the SMP2, the following sequence would tend to occur. Over the first epoch, groynes would tend to fail through lack of maintenance. This would be associated with, and accelerate the loss of beaches generally over the frontage. Potentially most significant in the longer term would be the failure of the Long Groyne. While this would result in some increase of sediment feed to the east, this would also be at the expense of significant erosion of the Solent Beach area. Erosion of this frontage would only be temporarily held by the defences in front of Double Dykes. As this frontage erodes back there would be increased pressure on the local headland of Southbourne. Loss of this headland, coupled with the more general loss of the foreshore and beach over much of the rest of the Poole Bay frontage, would expose the old sea wall and promenade behind. This wall would fail within the second epoch and erosion would occur to the cliffs behind.

East of Hengistbury Head, the additional sediment would provide a degree of additional protection,

but as exposure to wave action occurred with the loss of the Long Groyne, so sediment drift along the frontage would increase. This sediment would not be retained as defences in this area started to fail and Mudeford Spit would become increasingly vulnerable to breach. The defences to the north of Mudeford Quay would benefit more significantly from the failure of the Long Groyne and loss of control along the spit. However, as the groynes in this area failed during the second epoch so sediment would be carried still further east. Over the second epoch defences generally over Avon Beach to Friars Cliff would fail and erosion would occur along this frontage.

It has been assessed that even under this No active Intervention scenario, the isthmus between Hengistbury Head and Southbourne would remain as a barrier over the period of the SMP. There would be increased probability of a breach occurring but it seems unlikely that this would form a permanent new channel to Christchurch Harbour. More probably a new entrance would form along the length of Mudeford Spit. This would result in a different configuration of the estuary channels and may result in increased saltmarsh development behind the isthmus. The existing saltmarsh behind Mudeford Spit would tend to be eroded. In the longer term, erosion of Hengistbury Head would result in continued erosion of the coast to either side of the headland. Under existing predicted erosion rates, the full width of Hengistbury Head (some 400m) would be lost within some 200 years. This does not take account of sea level rise which would increase erosion rates. On this basis, there would be a full breach at the isthmus within about 150 years, based solely on erosion rates. This might be expected to occur earlier taking account of increased overwash and the potential impact of sea level rise.

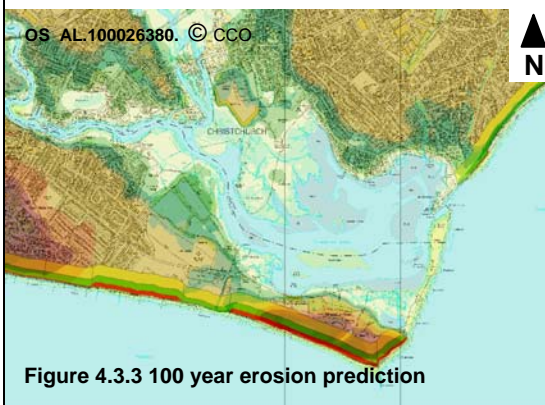


Figure 4.3.3 100 year erosion prediction

It would be the breach of Mudeford Spit, potentially during the second epoch, which would result in increased wave energy within Christchurch Harbour. It seems unlikely, however, that there would be significant increase in wave height over the period of the SMP 2 due to a breach at the isthmus. In the longer term (100 to 150 years) both the reduction in size of Hengistbury head and a breach at the isthmus would contribute to this. The predicted 100 year erosion position under this scenario is shown in the adjacent diagram. This does not make any

prediction as to erosion of Mudeford Spit, this being closely linked to the rate of erosion of Hengistbury Head.

The initial breach at Mudeford Spit would result in increased wave action generally over the Mudeford town frontage, substantially increasing flood risk in this area. The old spit of Mudeford Quay would develop to a degree and this would make navigation of the harbour entrance difficult.

Flood Risk

With sea level rise there would be increased risk of flooding around the shore of Christchurch Harbour. Although it seems unlikely that defences would be under any greater pressure for erosion, without raising defences or raising the existing natural river banks, many areas would suffer from flooding. At Mudeford Quay, the operational area of the quay, (irrespective of the pressure for erosion) may become untenable, with substantially greater overtopping. The main areas of flooding would be within Christchurch. Over the longer term (150 years), there would be significant increase in wave exposure to many of the frontages due to the geomorphological changes discussed above.

Overall Impacts

The potential economic damages arising from projected erosion and flooding are identified in Table 1 at the end of this sub-section.

The impact of this scenario would be substantial and significant. There would be loss of assets all the way along the seafront. Both in

the areas of Bournemouth and Christchurch, there would be little opportunity to maintain the important tourist attraction of the seafront. Not only would facilities be lost but there would also be loss of the beach. It would not be until the third epoch that major damage would occur along the Christchurch frontage in terms of hard assets, although there would be loss much earlier of the important area of beach huts situated on Mundeford Spit. Along the Bournemouth and Poole seafront there would be some £60 million loss of hard assets during the first two epochs with some £5 million lost along the Poole frontage in epoch one. During the third epoch damages would increase by some £550 million as the cliffs erode back. This large increase in damages is highlighted in the comparison between the draft strategy (50 year horizon) and the subsequent project appraisal (100 year horizon).

Flooding to Christchurch and associated areas would be in the order of £100 million over the next 50 years. The potential flood risk would increase significantly with sea level rise, potentially affecting both the centre of Christchurch and areas along the Stour. Landfill sites are also identified within the potential flood risk area in front of Christchurch and Stanpit.

At Mundeford, properties most at risk tend to have some local private defence. Most properties

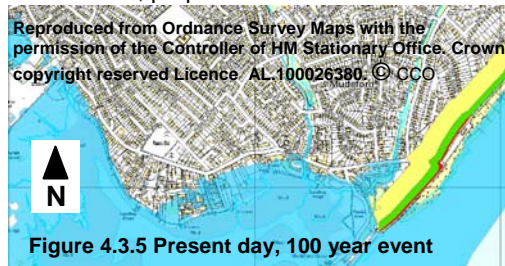


Figure 4.3.5 Present day, 100 year event

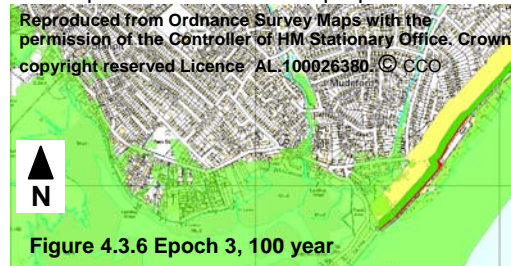


Figure 4.3.6 Epoch 3, 100 year

presently at risk within this area would only suffer inundation on very extreme events. With sea level rise, this situation could change such that a larger number of properties are at direct risk on a more frequent basis. Even so, within the Mundeford area, flood risk tends to be limited to properties seaward of the main road.

Two plots are shown: for the estimated 100 year event (present day) and the estimated 100 year event in 2075, having added an average sea level rise mid-way through epoch 3.

(Note: plots are indicative and further detail of flood risk should be obtained from Environment Agency flood risk mapping.)

On the open coast under this scenario, the ability of the cliffs over the zone to erode would be restored, maintaining new exposures of the cliff face. While this would improve the geological interest of the area, the general and continuing loss of properties and infrastructure along, particularly, the

Poole Bay frontage, would have a negative impact on the landscape associated with the area. There would also be substantial loss of heritage value in terms of important features within Christchurch and the older archaeological interests associated with Hengistbury Head.

There would be some scope for natural development of existing habitat and the mosaic of habitat within Christchurch Harbour. In some areas, however, such habitat may be squeezed against the more steeply rising land around the edge of the Harbour area.

There is likely to be greater saline influence within the upper valley of the Avon, certainly leading to change of habitat at the southern extent of this designated area. In the longer term (100 years to 200 years) the natural habitat development within Christchurch Harbour would radically change. The actual impact, both within the Harbour area and within the Avon valley, would critically depend on the flood or ebb dominance of the estuary processes and upon, therefore, the capacity of the estuary and new estuary areas to accumulate sediment. This would determine whether mud flat and saltmarsh would develop or whether there would be increasing erosion of critical habitat with sea level rise. The scope for replacement of freshwater and brackish habitat within the area would be limited. It could not, therefore, be concluded that there would be no net loss to the ecological system.

Overall, the essential balance and diversity of interests of the zone would suffer, failing to support the interactive value between human, natural and historic interests. This has been identified as an essential quality of the area. This is reflected in the assessment against objectives set out in Table 2 at the end of this subsection.

With Present Management (Scenario 2):

The present management scenario is based on that set by SMP1 and updated through the development of the recent draft strategies (Ref. S1, S3 and S4). Although in draft, these strategies are taken as reflecting the intent of Present Management within this baseline scenario, together with on-going day to day management of the frontages.

Along the open coast the With Present Management (WPM) aims to Hold the Line over all sections, with the exception of Hengistbury Head East. Here the policy would be to allow realignment of the frontage with continued controlled erosion of the cliff. The general practice elsewhere would be to recharge beaches and maintain groynes and control structures. There is the potential for replacement of timber groynes with rock groynes. This is recommended by the draft strategy for the eastern end of the zone, extending the use of rock groynes, replacing timber groynes to the east. Replacement with timber and rock groynes is also being considered along the frontage to the west of Bournemouth.

In the area of Solent Beach, between Southbourne and Hengistbury Head the intent would be to continue defence of Double Dykes and to further groyne the beach frontage. This is all in line with SMP1 policy of selectively hold the line.

Within Christchurch Harbour, the draft strategy recommended maintaining and generally increasing flood defence to assets in the areas of Mundeford, Stanpit, Christchurch and Wick. The principal areas of increased defence under the draft strategy would be at Mundeford, Wick and the Stour frontage of Christchurch. In the case of Wick, this potentially extends defence beyond that envisaged by SMP1. The identification of the landfill site at Stanpit has resulted in recommendations within the draft strategy for maintaining the advanced line of defence, as opposed to the SMP1 policy for potential long term retreat.

Subsequent, more detailed study of the Mudeford Town frontage has shown that the high level strategic assessment of flood risk to properties overestimates the risk. The recommendation from this more detailed study (Mudeford and Stanpit Pre-Feasibility 2008) for this area, is to support maintenance of private flood defences and possible resilience measures to locally reduce flood impact on property.

As with scenario 1 (No Active Intervention), discussed above, the assessment of With Present Management considers first the impact of this scenario on the coastal form and the potential pressures introduced into the coastal system. The discussion then considers the impact of flood defence within the Harbour area and the impacts this might induce.

Geomorphological Change

The intent is to hold the overall position of Hengistbury Head, with the replacement of the Long Groyne. This will to some extent continue to restrict sediment from moving to the east (although to a degree this is mitigated by the continued policy for recharge). However, maintaining the influence of the Head fixes the general shape of the coast to the east and management of this frontage is considered on this basis. Over the short term, holding the alignment of Mudeford Spit maintains the position of the Christchurch Harbour entrance, supported behind by maintaining Mudeford Quay. This in turn supports the development of the ebb tidal delta which in turn provides sediment and protection to the Avon Beach through to Friars Cliff. The management policy for continued recharge to the area, together with imposing slightly greater control using rock groynes, compensates for the potential reduction of sediment. The impact of this on the coast to the east was considered in policy to the management of the coast to the east based on the proposed form of management set out in PDZ1.

Despite sea level rise, maintaining a beach in the area between Mudeford Quay and Friars Cliff is considered appropriate to sustaining the values of the frontage. The existing pressures along the Mudeford Quay frontage will increase in line with sea level rise and there is likely to be increased frequency of sea wall overtopping. However, continued defence of the Quay and associated front defences is seen as an essential feature of this WPM Scenario.

The main pressure over this eastern section of the coast would be along Mudeford Spit and in particular the interface between the spit and the eastern face of Hengistbury Head. With the present management aim to fix the position of the spit along its whole length, as the cliff line to the south retreats (even under managed realignment), the root of the spit will become increasingly vulnerable. The spit might eventually be held forward of its natural alignment and the interface between spit and cliff will need to be reinforced, creating an artificial promontory. This would tend to isolate the spit, making maintenance of a beach in this area more difficult. Following through the consequence of this scenario, the approach could in effect convert the spit into a breakwater across the mouth of Christchurch Harbour.

To the west of Hengistbury Head, holding the position of the headland will support the intent, further to the west, to maintain defence along the Bournemouth and Poole frontages. Sediment transport studies ((S4, Halcrow 2004 Technical Annex 5) show this area to be very closely aligned to net wave direction but with the potential for significant gross movement depending on the angle of wave approach. The technical annex reports that if wave driven sediment is the sole factor considered, the net movement in the area between Southbourne and Hengistbury Head is from east to west (in comparison to the west to east transfer generally accepted over the main part of Poole Bay). The report indicates that the continued loss of sediment from the Solent Beach area (between Southbourne and Hengistbury Head) is as a result of wave and tide induced currents, forcing net loss of sediment to the east.



This may be further considered in terms of the local variation in coastal orientation at this sensitive location. From the image above it may be seen in general terms that the past erosion of Hengistbury Head, coupled with the influence of protection at Southbourne, has allowed the formation of a slight headland at Southbourne. The line shown on the image projects a smoothed curve based on the extension of the shape of Poole Bay through to the alignment of the relatively stable growth of dune at the toe of Hengistbury Head, retained by the Long Groyne. It is stressed that the line above is not a definitive erosion line but is intended, rather, to highlight the slight unconformity formed at Southbourne with past erosion of Hengistbury Head. This slight unconformity in the coast may be seen also in the photograph along with the protuberance created in the centre of Solent Beach by the defence of the southern end of Double Dykes. It may be seen that Solent Beach is already forming a separate bay.

Critical in assessing this With Present Management scenario is defining the intent of holding the line over this whole section. For this purpose, this is taken as management necessary to limit erosion of the Hengistbury headland, maintain the full integrity of Double Dykes and the car park to the west and retain the integrity of the defence and promenade at Southbourne; and furthermore to provide the necessary control in terms of erosion and coastal alignment of the coast to the west.



In taking this intent, maintaining the position of the promenade at Southbourne is essential. Its current advanced position and the consequential narrower beach make this location relatively vulnerable. To maintain a sustainable width of beach some additional control at this location is likely to be required (the draft strategy (S4, Halcrow 2004) identifies generally that beach recharge without the support of groynes is unlikely to be sustainable). This would tend to reinforce, or make more pronounced, the development of the headland at Southbourne. As such this will tend to emphasise the separation between the shoreline to the west and that to the east. With the further constraint of the movement of sediment between these two sections of the coast there is likely to be increased pressure for the Solent Beach bay to set back further than at present, placing greater pressure on the gabion wall and the southern end of Double Dykes. In line with present management of the coast, in general this would be addressed through beach recharge and imposing further control of potential erosion through the use of rock groynes. The Long Groyne would be reinforced to retain sediment at the eastern end. As shown by past experience, there would be a need to undertake regular recharge to maintain an advanced position of the beach over the frontage. With sea level rise this effort would need to increase over the period of the SMP2.

Over the western section of the Poole Bay frontage, the draft strategy (*S4, Halcrow 2004*) recommends a continued approach of beach recharge and investment in maintaining the groynes. This again will require increased effort either in establishing greater control over the beach recharge or through increasingly frequent recharge of the beaches.

With Present Management of the open coast imposes conditions for management of the flood risk within Christchurch Harbour. This is considered below.

Flood Risk

Based on the draft strategy and the more detailed study of Mudeford, the intent would be to maintain existing standards of defence over the whole area, accepting some degree of higher risk associated with local private defence at Mudeford.

This in general would require defences to be maintained and raised in line with sea level rise. In terms of Christchurch, the aim would be to build upon the existing defence line, which tends to be set back from the exposed estuary shoreline. The draft strategy (*S3, Christchurch Bay Strategy Study 2007*) identifies that many of the existing defences only come into play on more extreme events. However, the draft strategy identifies the intent for new defences at:

- Stanpit in defending against potential contamination due to the landfill site;
- Along the northern edge of the Stour defending the extensive areas of properties in this location;
- Around Wick. It is uncertain as to the exact position of defences and this potentially changes the approach put forward in SMP1 that this area would be allowed to develop naturally.

Neither the SMP1 nor the draft strategy comment on the potential flood risk further north along the Avon valley, although quite extensive areas of grazing marsh are at present within the coastal flood plain and, with sea level rise, these areas may extend to affect transport routes and property to the north of the town. The extent of coastal flood plain only marginally impacts on the Avon Valley SPA, however management of flooding in this area could impact on the SAC designation of the river course and upon the SSSI at Purewell.

At Mudeford Quay and Mudeford Town, extending the implications of present management, the intent would be to support existing private defence of property but to consider some form of set back defence in the longer term, in line with increasing risk due to sea level rise.

Overall Impacts

In terms of sustaining economic viability and communities along the Poole Bay frontage and at Christchurch, Mudeford and Wick, this scenario meets the objectives. It also maintains the heritage value within Christchurch and largely that in the area of Hengistbury Head. There would be some continuing risk as the eastern side of the headland erodes.

The potential economic damages arising from this scenario are identified in Table 1 at the end of this sub-section.

Overall the tourism and recreational facilities of the open coast would be maintained, although there may be greater disruption to this in the long term with increasing need for beach management and more frequent need for recharge. At Mudeford Spit, the increasing need for defence would tend to reduce beach width reducing the attractiveness of the area. Similarly, increasing engineering effort to maintain an advanced beach line along Solent Beach may be considered to reduce the semi-naturalness of this frontage, detracting from the contrasting but complimentary green space offered by

this section of the coast. It is in these two areas in particular that increased control and effective hardening of the shoreline may impact on landscape values associated with Hengistbury Head.

Over the open coast, there would be continuing reduction of exposure of the geology, detracting from this important value. This would not be significantly different from present and it is recognised that within the Bournemouth Seafront Strategy mitigation of impact on this is being put in place.

Within Christchurch Harbour, the main potential concerns are in relation to the impact of increased extent of defences and the potential constraint this imposes on the ability of the mosaic of habitat within the Harbour to adjust to sea level rise. A significant uncertainty in this regard is the capacity for the estuary fringes to accrete with sea level rise without additional width within which to adapt. The principal opportunities for such adaptation are in the areas of Stanpit marshes, constrained by the anticipated need to defend former landfill areas and in the detail of how defence might be provided to the village of Wick. The opportunity to allow adaptation along the Stour frontage to Christchurch is constrained by the development of this area.

Considered as a whole, there is a trend within this scenario for further encroachment of engineering management on the coast and estuary areas which detract from the overall diversity of the area. This relates specifically to the areas of interface between the natural and human zones of activity, in areas such as Solent Beach through to Mudeford Spit and in areas of Christchurch Harbour. This is reflected in the assessment against objectives set out in Table 2 at the end of this subsection.

Table 1. Economic Assessment

The following table provides a brief summary of damages determined by the SMP2 analysis for the whole PDZ. Further details are provided in Appendix H. Where further, more detailed information is provided by studies, this is highlighted. The table aims to provide an initial high level assessment of potential damages occurring under the two baseline scenarios. The damages for each epoch are current values. These are discounted to give present values in the final column. It is important for the reader to note that the loss figures quoted only refer to domestic dwellings and no account has been taken of commercial, industrial or infrastructure property values.

ASSESSMENT OF EROSION DAMAGES

Epoch		0 -20 year		20 – 50 years		50 – 100 years		Present Value Damages (£x1000)
No Active Intervention	SMP1 MU	Number of properties	Value x £1000	Number of properties	Value x £1000	Number of properties	Value x £1000	
Location								
Mudford Quay	CBY2b	3	706	9	2,118	80	18,828	3,305
Mudford Spit	CBY1	0	0	0	0	0	0	0
Hengistbury Head	PBY3	0	0	0	0	0	0	0
Double Dykes	PBY2	0	0	9	1,732	29	5,583	1,224
Bournemouth (BBC)	PB1a	2	385	203	39,081	2483	478,032	66,253
Canford Cliffs (PBC)	PB1b(i)	24	5,915	150	36,969	201	49,538	22,717
Total for PDZ1								93,499
With Present Management	SMP1 MU	No.	x £1000	No.	x £1000	No.	x £1000	Present Value Damages (£x1000)
Location								
Mudford Quay	CBY2b	0	0	0	0	0	0	0
Mudford Spit	CBY1	0	0	0	0	0	0	0
Hengistbury Head	PBY3	0	0	0	0	0	0	0
Double Dykes	PBY2	0	0	0	0	0	0	0
Bournemouth (BBC)	PB1a	0	0	0	0	0	0	0
Canford Cliffs (PBC)	PB1b(i)	0	0	0	0	0	0	0
Total for PDZ1								0
Notes								
Present Value NAI damages are assessed by the Christchurch Bay Coastal strategy as being of the order of £40 million for the length between Mudford Quay and Highcliffe. This includes car parks and recreational value.								
Market value NAI damages are assessed by the Christchurch Bay Coastal strategy as being of the order of £32 million Mudford Spit (£16 million PV based on loss in year 20).								

Analysis of damages in technical Annex 8 of the Poole Bay Strategy Study (2004) gave a NAI present value of £156 million for PBY1. This included loss of recreational value but was only valued over a 50 year period. Subsequent analysis undertaken for the approved project appraisal of the latest beach recharge demonstrated the significant additional damages arising from erosion beyond the 50 year period. The higher values from the appraisal have drawn upon more accurate assessment of property than has been possible in the high level assessment provided by the SMP.

ASSESSMENT OF POTENTIAL FLOOD RISK

		Flood risk total tidal and fluvial 2008		Flood risk total tidal and fluvial 2102		
No Active Intervention	SMP1	Number of properties	Value x £1000	Number of properties	Value x £1000	Averaged PVD (£x1000)
Location	MU					
Mudford Quay	CBY 2	9	£2k to £10k AAD	9	£2k to £10k AAD	184
Mudford Quay inner	CHB5	35	£2k to £10k AAD	124	£2k to £10k AAD	1,200
Mudford	CHB4	47	£2k to £10k AAD	343	£2k to £10k AAD	2,745
Stanpit	CHB3	1	Write off £253K	1	Write off £253K	179
Christchurch (not included within SMP1)		Assessment taken from strategy				88,490
Wick	CHB2	0	0	2	Write off £506K	112
Mudford spit rear	CHB1	1	£2k to £10k AAD	1	£2k to £10k AAD	20
Mudford Sandbanks	CBY1	2	£2k to £10k AAD	2	£2k to £10k AAD	41
With Present Management						
No Active Intervention	SMP1	Number of properties	Value x £1000	Number of properties	Value x £1000	Averaged PVD (£x1000)
Location	MU					
Mudford Quay	CBY 2	0	0	0	0	0
Mudford Quay inner	CHB5	0	0	0	0	0
Mudford	CHB4	0	0	0	0	0
Stanpit	CHB3	0	0	0	0	0
Christchurch (not included within SMP1)						
Wick	CHB2	0	0	0	0	0
Mudford spit rear	CHB1	0	0	0	0	0
Mudford Sandbanks	CBY1	0	0	0	0	0

OTHER INFORMATION:			
Mudford and Stanpit Viability (2008) report assesses Do Nothing Damages of £1.1M over the next 50 years for CHB5 & 4.			
Christchurch Bay Strategy (technical Annex 4, 2008) determines the following potential damages and costs:			
Area	Do Nothing damages (£ x 1000)	With proposed management (£ x 1000)	Notes
CHB 5	4,210	0	Subsequently assessed that flood risk is primarily below threshold of properties
CHB 4	7,610	0	Subsequently assessed that flood risk is primarily below threshold of properties
CHB 3	88,490	0	Includes areas of Christchurch not previous assessed in SMP1. Maintain and raise defences (£7,390k).
CHB2	1,429	0	Extend existing defences (£986k) to protect property in Wick,
CHB 1	707	0	Continued management (£779k), beach huts at risk.

Table 2. General Assessment of Objectives

The following table provides an overall assessment of how the two baseline scenarios impact upon the overall objectives agreed by stakeholders. These objectives are set out in more detail within Appendix E. The table aims to provide an initial high level assessment of the two baseline scenarios, highlighting potential issues of conflict. These issues are discussed in the following section, examining alternative management scenarios from which SMP2 policy is then derived.

OBJECTIVE	NAI				WPM			
	Neutral	Fails	Partial	Positive	Neutral	Fails	Partial	Positive
Protect economic viability of Bournemouth, Poole and Christchurch,								
Maintain important heritage values within Christchurch,								
Support management of heritage interests around Hengistbury Head.								
Reduce flood risk within Christchurch area and Harbour and at Mudeford.								
Retain and improve the width and amenity value of the intertidal (beaches) area in Poole Bay,								
Maintain essential sea front facilities. Maintain the opportunity for commercial, recreational and sports use of the water, in particular the use of shore-based facilities such as Mudeford Quay,								
Manage risk to properties due to erosion and flooding where sustainable,								
Maintain open space and recreational use of such space,								
Minimise net loss of species/habitat (identify compensatory habitat if any net loss occurs),								
Maintain opportunity for natural development of the mosaic of habitats, particularly with Christchurch Harbour,								
Maintain geological exposure of designated cliff line,								
Maintain the outstanding landscape and the views and appreciation of the varied coastal environment,								
Support adaptability of coastal communities,								
Reduce reliance on defences.								

4.3.3 DISCUSSION AND DETAILED POLICY DEVELOPMENT

The discussion provided within the two baseline scenarios highlights the significant economic risk, both at a regional and national level, that continued management of flooding and erosion aims to address. This is quite clearly a major driver for policy development.

However, it also highlights the important interaction and dependency, in meeting these social objectives, of balancing this with sustaining and enhancing the natural environmental values. The importance of this not only relates to the essential inherent value of the natural environment, as recognised through the various environmental designations, but also in achieving the aims for an integrated and diverse setting within which social objectives are delivered; as set within the various local management strategies for the coast.

The overall conclusions that may be drawn are that a policy scenario of NAI (Scenario 1) fails to address the substantial threat to the economic, social and heritage value of the area. While the No Active Intervention scenario could deliver some significant ecological benefits, this scenario fails to deliver a balanced sustainability of values. The identified economic benefits of the With Present Management scenario (Scenario 2) demonstrates the viability of maintaining defences to large areas of the coastline and estuary - but in specific detail potentially fails to take account of the need to sustain nature conservation and landscape values. It is very much, therefore, the detail of delivery of the existing With Present Management approach that needs to be considered rather than a major change from current practice.

As discussed earlier, the key area for control of the zone is the whole frontage around Hengistbury Head, extending from Mudeford Spit through to Southbourne. Management of this area is discussed initially.

Hengistbury Head Frontage.

Despite the significant potential economic damages associated with the loss of Mudeford Spit, the main driver for management of this area is seen as being the areas influenced by management of the frontage, rather than management of the frontage itself. These associated issues are summarised in the following table.

Assessment of Management Influence of Hengistbury Head

Associated Area	Consequential Issues based of withdrawing management along Hengistbury Head Frontage – Mudeford Spit to Southbourne. (Physical impact shown in <i>Blue</i> . Management consequences shown in <i>Red</i>)
Avon Beach	<ul style="list-style-type: none"> • Loss of protection from ebb delta, increased drift (epoch2) • Increased pressure on Mudeford Quay (epoch 2) • Significant additional cost in maintaining amenity beach, transferring control to Mudeford Quay to maintain sustainable management of the area. (epoch 2)
Mudeford Quay and Town	<ul style="list-style-type: none"> • Increased wave action at Quay and along low wall to town. (epoch 2) • Increased frequency of flooding (epoch 2) • Increased erosion pressure (epoch 2) • Combined flooding and erosion risk without additional protection provided at Mudeford Quay.(epoch 2) • Potentially making maintenance of existing defences and reliance on private defences unsustainable. (epoch 2)
Christchurch	<ul style="list-style-type: none"> • Increasing wave action (from epoch 2)

Harbour	<ul style="list-style-type: none"> • Realignment of channels and intertidal areas (from epoch 2) • Potential loss of existing habitat due to wave action. (epoch 3) • Potential opportunity for new habitat associated with wider open estuary, sand banks and saltmarsh. (beyond period of SMP2) • Significant loss of existing boat use and navigation. (epoch 2)
Christchurch and Wick	<ul style="list-style-type: none"> • Potential reduction in extreme water levels. (epoch 2) • Potential minor reduction in cost of defence. (epoch 2) • Loss of boat use and amenity value of the area. (epoch 2)
Poole Bay	<ul style="list-style-type: none"> • Potential increased drift rates. (epoch 2) • Increased pressure on Southbourne. (epoch 1) • Increased frequency or control of beach recharge, resulting in increased cost. (epoch 2) • Significant cost incurred in transfer of defence to Southbourne (epoch 1)
Direct Impacts	<ul style="list-style-type: none"> • Continued erosion of Hengistbury Head. (epoch 1) • Increased pressure and breach of Mudeford Spit. (epoch 1) • Increased pressure for erosion of Solent Beach. (epoch 1) • Management of Mudeford Spit unsustainable, significant amenity and economic loss. (epoch 2) • Loss of SAC and SPA (epoch 2) • Loss of Heritage Value (epoch 2) • Loss of amenity area and car parks (beginning in epoch 1)

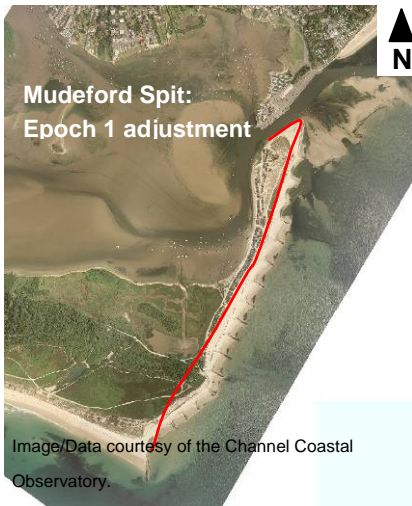
From this there is clearly strong justification for continued management of the frontage, from Mudeford Quay to Southbourne. Certain elements of this derive from aspects such as the continued use of Christchurch Harbour for boat use and might, therefore, be considered outside the direct scope of flood and coastal erosion risk management funding; such activities are recognised as being important to delivering the overall values of the area. The economic justification for management is principally made, therefore, with respect to the additional costs associated with sustainable management of areas remote, geographically, from the Hengistbury Head. These additional costs generally occur within the second epoch and beyond. However, it is a direct consequence of management decisions being made now; it is not a situation where there might be benefit in allowing the Hengistbury Head frontage to erode further over the first epoch. Rather, the frontage is already seen as being in a critical alignment, where further unconstrained erosion would make taking advantage of the underlying control of coastal behaviour less effective.

The key location for management is at Hengistbury Head and the approach to management effects management of the specific frontages to east and west.

To the east, the intent of management is to maintain a functioning spit across the entrance to Christchurch Harbour, providing directly the opportunity to maintain the important amenity value while also retaining the position of the Run and the ebb tide delta and sediment transfer to the northern shoreline. There is also the aim to maintain the potential for erosion of the geologically important cliff.

Present management has been driven by the existing location of assets with little scope to allow the whole frontage to adapt. The southern cliff line is held forward by defences, potentially creating a discontinuity in the shoreline in the future. Under present management, allowing erosion of the cliff but holding the line of the spit, this situation could gradually change, such that the cliff line would retreat further back than the line of

the spit, exacerbating the situation. This area of discontinuity has been highlighted as a section vulnerable to breach. In future management, this needs to be addressed without significantly imposing a managed promontory isolating the spit from the southern headland.



Over the first epoch the intent would be to maintain defence over the length of the spit, gradually allowing erosion of the cliff reducing the discontinuity in the shoreline. Within the second and third epoch the intent would be to allow and facilitate a slow readjustment of the whole frontage. This would need to be managed in steps reflecting any acceleration in sea level rise. This will continue to require recharge to the front face of the spit and maintaining defences to the front face. In the longer term there may also be a need for nourishment to the back of the spit allowing continued width against breach and maintaining the important amenity use of the area.

Maintaining the position of the Long Groyne would be important in this adaptive management. Detailed consideration would need to be given to the orientation and shape of the groyne to prevent outflanking and to provide a more appropriate transition through to managed realignment of the cliff.

At the northern end of the spit, while there would be some potential scope for adjusting the front face, the general position of the spit head would, however, be maintained to manage the flow through the Run, maintaining navigation without imposing significantly greater pressure on the sea wall to the face of Mudeford Quay.

Adopting this adaptive approach will require re-examining the way in which defences along the spit are managed. The aim would be to take an approach where the defence line can be adjusted over time in line with changing pressure, taking account of the monitoring and information on sea level rise. This would need to be approached in a progressive manner with the intent, possibly to adjust existing defences over a 20 to 50 year management review cycle. The initial response would be adjustment of existing defence at the interface between the cliff and the spit. As the coast then adjusts, the new position would be re-assessed and further adaptation allowed as a result. An overall management plan would need to be developed, looking at possible responses to

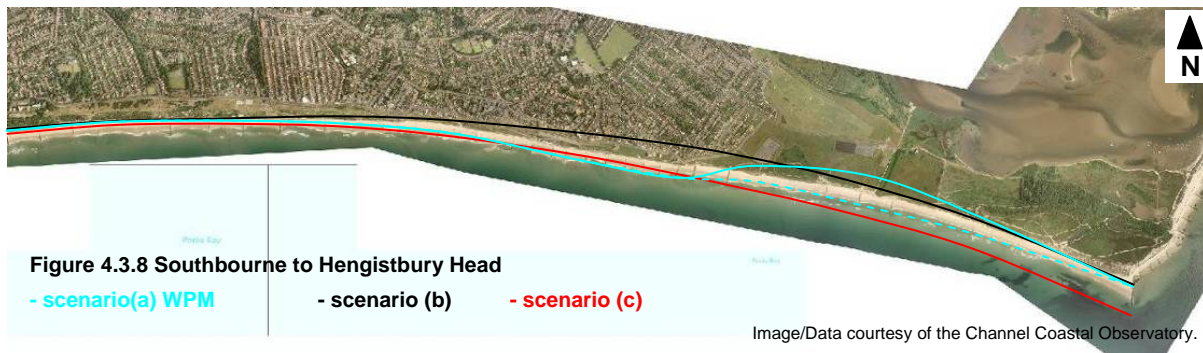


different scenarios. This plan would need to be developed with the involvement of the local community groups, Natural England and the planning authority.

To the west of the headland, the intent of management is to maintain as far as possible the continuity of the shoreline through to the main frontage of Poole Bay. The frontage was considered in some detail in describing the With Present Management scenario. Certain issues were identified, highlighting the difficult decisions needing to be taken:

- Hengistbury Head has already eroded back to such an extent that the emerging Southbourne headland is beginning to act as a significant feature in management of the main Poole Bay frontage.
- This process has resulted in a degree of separation between the main Poole Bay frontage and Solent Beach.
- Present Management, reinforcing the headland at Southbourne and bringing forward the beach line of Solent Beach through recharge and groynes, would tend to reinforce this separation.

The following figure illustrates, in principle the coastal alignment under the With Present Management approach (scenario (a), showing the typical natural alignment of Solent Beach shoreline and the intended line of the beach held forward by recharge and groynes). The figure also illustrates two alternative scenarios (retreat the line at Southbourne – scenario (b), and increase the effective length of the Long Groyne – scenario (c)). These alternatives aim, through realignment, to re-establish the overall continuity of the sediment movement over the coast. In effect these three scenarios bracket the possible approaches to management. These are developed below.



<p>Scenario (a)</p> <p>Description: maintain the Long Groyne, reinforce the headland at Southbourne and hold forward Solent Beach through recharge and Groynes.</p> <p>Rationale: The intent works within the existing constraints defined by holding the existing line at Southbourne, resisting further erosion of the Solent Beach frontage, protecting Double Dykes from further erosion, and maintaining the integrity and position of the Long Groyne. This rationale attempts to restore the continuity between Solent Beach and the main Poole Bay frontage through holding forward the alignment of Solent Beach.</p> <p>Implications: Although the Hengistbury Head headland still provides a beneficial influence on the overall coastal shape, the main effort in this respect is in holding the line at Southbourne. The influence of Hengistbury Head and the Long Groyne are in effect reduced to a role of supporting a beach, and protection, to the east of Southbourne. The Southbourne headland would act to maintain the alignment of the coast to the west. Realigning the beach, forward, over the Solent Beach frontage brings it forward of the local control of the Long Groyne, tending to increase the potential for drift towards the east and increasing the severe response to different wave conditions. As such, a fairly robust control would be required, not just to limit loss of beach recharge, but to actually control the whole shape of the beach and frontage. Typically this would be in the form of substantial rock groynes. In transferring the main effort for management to Southbourne and the groynes along</p>
--

Solent Beach, there would be less justification for works at Hengistbury Head.

With increased pressure from sea level rise, it is probable that the headland at Southbourne would need to be reinforced, potentially with larger control structures. The long term implications of this approach would be to separate management of the two frontages, with the main justification for managing Solent Beach being the management of the new headland. The probable extreme position, given the difficulty of holding forward Solent Beach without reliance on the control imposed by Hengistbury Head, would be that of eventually allowing the retreat of Solent Beach forming a distinct bay through to Hengistbury Head.

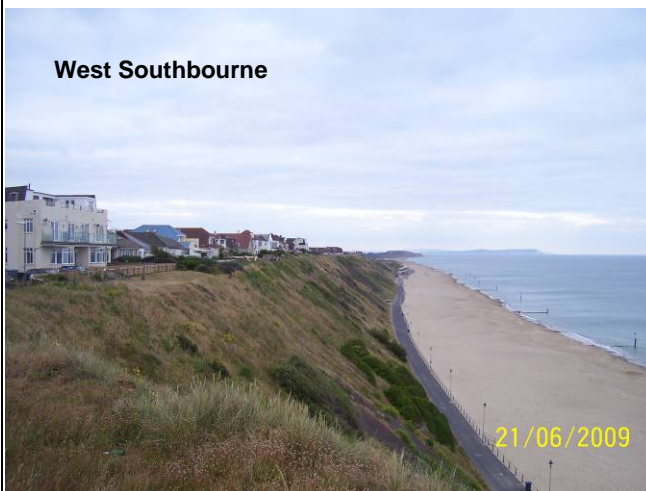
Impacts: The approach would support defence along the main Poole Bay frontage continuing to provide a sustainable context within which this frontage might be managed. Property and the road at Southbourne would be protected. The car park, Double Dykes and the scrubland dune of Solent Beach would be protected over the first and second epochs but, with increasing pressure on the frontage and the need to increase protection at Southbourne it might be expected that eventually Solent Beach would be allowed to set back to a new natural alignment. Generally, with the establishment of a new headland at Southbourne and the intent only to protect Hengistbury Head in its current form, the heritage and nature conservation interest associated with the area would be maintained.

Although as with any of the scenarios being considered, there would be some increased reliance on defence, under this approach, such defence effort would be very apparent, with significant structures required to maintain the Southbourne headland and to control recharge along Solent Beach. This may be considered to be intrusive on the semi-natural environment of the frontage, reducing the landscape and amenity value of the area.

Scenario (b)

Description: maintain the Long Groyne and allow erosion to occur over the Southbourne Frontage.

Rationale: The intent would be to allow the coast to the west to erode back to re-establish a natural



alignment, with Hengistbury Head being the principle control point. The rationale would be to restore unconstrained movement of sediment along the frontage avoiding, in part, some of the inconsistency in sediment drift presently experienced.

Implications: The importance of Hengistbury Head would increase with respect to long term management of the Poole Bay frontage. The main effort in terms of control would be focussed on management of the Long Groyne, although as at present there

would still be a need for regular sediment recharge and groyne to control drift. The main benefit in taking this approach would be in potentially reducing the severe variation in drift in the area, establishing, overall a more stable alignment and potentially reducing the frequency of recharge in the local area. In the longer term there would be increased pressure on the frontage but this could be addressed in a more consistent manner over the whole length of Poole Bay. The extent of the retreat would typically be some 150m in the area of Southbourne. This might require readjusting the line of the promenade extending west some 1.5km back along the Southbourne frontage. This would result in retreat of the line of the stabilised cliff beneath the Southbourne Coast Road.

Impacts: This scenario is recognised to be an extreme position in terms of realignment of this section of the coast and is based on the typical natural alignment controlled solely by Hengistbury Head. The impact on Southbourne would be significant. There would be loss of in excess of 100 properties, together with the main coastal road. Erosion would affect part, but not all, of the main car park and would result in further loss of Double Dykes. There would not be significantly greater erosion of the main Hengistbury Head cliff and following an initial set back of Solent Beach, the semi-natural dune line would be re-established. As such there would be little substantive loss of the SAC or SPA and the landscape value and open green space would be improved as a result of less defence being required over Solent Beach.

There would be increased reliance on defence at Long Groyne but this would allow less effort in managing the adjacent frontage. With sea level rise there would still be increasing need for recharge or more effort required in retaining sediment along the frontage.

Scenario (c)

Description: extend the Long Groyne and recharge over the whole frontage.

Rationale: The intent would be to increase the influence of the Long Groyne extending its effective length by some 200m to 300m. This would in effect pull the alignment of the coast forward sufficiently to compensate for past retreat that has allowed emergence of the Southbourne Headland. The aim would be to create a new alignment that re-establishes continuity of sediment movement, re-linking processes across the frontages of Poole Bay and Solent Beach. The overall aim would be to retain a protective beach in front of Southbourne and Solent Beach, to ensure no loss or further erosion in the area

Implications: Re-establishing this link would allow a more consistent approach to recharge management of the whole frontage, establishing a more stable overall alignment and potentially avoiding more severe and sudden loss of sediment. The corollary of this would be the need for significant volume of beach recharge to allow such realignment. This would still need to be topped up on a regular basis, in that there would still be some loss to the east. Pressure on the coast is still likely to increase with sea level rise and there would be increasing effort required in managing the situation.

Impacts: This scenario is recognised to be the opposite extreme to scenario (b), proposing a major forward realignment of the eastern end of Poole Bay.



The approach would create significant additional width along Solent Beach and following the initial recharge would create conditions for possible dune development. There would be no loss of assets at Southbourne and no further erosion along the existing line of Solent Beach. There would be a substantial increase of open space. There would be little erosion of the cliff at Hengistbury Head. Although inevitably there would be some initial loss of sediment beyond the new Long Groyne, over time

this approach is likely to reduce feed to Mudeford Spit. This could be mitigated through design of the new structure and this would have to be considered in conjunction with developing the management approach to the northern section of the coast. The approach would have a significant impact on the

landscape tending to reduce the impact of Hengistbury Head.

There would be increased reliance on defence at Long Groyne but this would allow less effort in managing the adjacent frontages. With sea level rise there would still be increasing need for further recharge but the approach establishes a more sustainable frontage for the future. There would be significant additional cost in developing this scenario and much of the benefit of this would be in recreating extensive areas of open space. As such it is unlikely that funding would come solely from flood and erosion risk management.

Scenarios (b) and (c) are recognised as being extreme cases, requiring either major loss of established assets or major investment in coastal realignment, respectively. As such it is unlikely that either approach would be acceptable or viable. Even so they do assist in understanding the potential implications, highlighting the interaction between management of Hengistbury Head and focussing management at Southbourne. In contrast scenario (a) demonstrates the potential problems of taking a purely reactive approach; driven by the intent to address existing local issues and with a consequential shift in management to separating the behaviour of Poole Bay and that of Solent Beach. Unless one of the more extreme approaches were adopted, however, at least in part, it seems inevitable that in the long term (epoch 3 and beyond) greater reliance would be placed on Southbourne as the main control feature of the coast. These options would need to be developed with all appropriate stakeholders.

Potentially, the appropriate management approach lies within these extremes. There is scope for some realignment of the overall frontage through both retreat at Southbourne and increasing the effectiveness of the control point at Hengistbury Head. In the case of the former, the opportunity for retreat needs to be maintained, defining the lower lying area and open ground in front of Southbourne Coast Road in planning terms as a coastal change management area, allowing longer term adaption. This would provide the necessary scope to re-design the defence approach in this area based on the most sustainable position, rather than being constrained by the existing alignment of the promenade and the position of property. Even relatively small scale realignment may provide the opportunity for managing the difficult interface between the two sections of beach in a more sustainable manner. In the case of the latter, developing an approach to replacement of the Long Groyne, potentially extending the influence of this structure, together with some realignment of Solent Beach would allow more effective management of the area.

The role of the SMP in this area is, therefore, more one of providing a broader scale, longer term appreciation of options and general approach to management. It would not be appropriate for it to define an actual shoreline position. The Long Groyne is reported to be in poor condition and, therefore, resolving a more detailed plan for the area is quite critical. In terms of policy it is recommended that although potential realignment at Southbourne may not be critical over the first epoch or potentially the second epoch and, therefore, an initial policy of Hold the Line may be concluded, there may be a need for realignment in the longer term future. In terms of Hengistbury Head, under any of the scenarios, Hold the Line is considered important to sustainable management of the adjacent frontages; but with the option, needing detailed consideration, to extend the effectiveness of the groyne effect.

Between Southbourne and Hengistbury Head, sustainable management should not be dictated by the existing extent of Double Dykes. While it may prove to be appropriate, through extension of the Long Groyne, beach management and management at

Southbourne, to reduce the pressure of erosion on this feature, this would not be the primary consideration in management of Solent Beach. Accordingly the policy in this area should be managed realignment.

Given the condition of the Long Groyne and the need to resolve uncertainty as to management at Southbourne, it would be recommended that a detailed strategy for the area is undertaken as soon as possible. It would be further recommended that such a study takes account quite specifically of management of the Mudeford Spit frontage so that any benefits in redesign of the Long Groyne takes account of issues arising from this northern frontage. It is recognised that justification for management of this overall frontage draws on benefits arising from management of adjacent sections of the coast; i.e. Poole Bay, Avon Beach and within Christchurch Harbour. As a precursor to study of the area, these benefits, (including potential benefits not necessarily directly associated with flood and erosion risk management appraisal) need to be evaluated, based on information from finalised strategies for these areas.

In summary, therefore, the whole area from the northern extent of Mudeford Spit through to Southbourne is considered an important feature in minimising impact on adjacent areas. It is considered important for sustainable flood and erosion management and development of interests of broader coastal management. The intent of the shoreline management plan is, therefore, to sustain the overall influence of this section of the coast, ensuring that over the period of the SMP2 neither the Solent Beach isthmus nor Mudeford Spit breach. Specifically, the aim is to maintain the position of the Long Groyne, with the potential for this structure to be extended and reshaped to allow better management of adjacent sections of the coast. To the east of the headland, the aim is to maintain the integrity of the spit, sustain amenity value of the area, maintain the position of the Run but also facilitate continued exposure of the cliff face. The intent is initially to restore the alignment of the overall section of the coast. The spit would be allowed to roll back in response to increased pressure due to sea level rise, matching erosion of the cliff. This will require development of a management plan allowing continued use of the area, supported by defence and recharge. The intention would be to maintain the position of the Spit Head, maintaining the navigation channel. To the west of the headland, the intent would be to maintain the integrity of the isthmus and defence to the principle assets at Southbourne. At the same time, the aim is to maintain as far as possible, the continuity of shoreline processes between the main section of Poole Bay and those of Solent Beach. To achieve this, consideration needs to be given to potential retreat along the line of the emerging Southbourne headland while examining options for extending the influence of the structure at the toe of Hengistbury Head. Between these two locations, the aim would be to establish a more sustainable position for maintaining a robust semi-natural defence to the isthmus. This would not preclude increasing the beach width in front of Double Dykes, but neither would the defence position of the frontage be determined by defence of this feature's existing extent. The overall aim in this area is to maintain the open space, amenity and nature conservation value of the area by minimising reliance on hard defence to control the frontage.

Based on the recommended policy for this central section of the zone, the adjacent frontages may be considered in detail.

Mudford Quay to Friars Cliff

The No Active Intervention scenario would result in significant loss in terms of built assets as well as important regional amenity value. This would be unacceptable.

The policy approach set for Mudford Spit establishes a position where increased pressure is avoided along the frontage to the north; maintaining the Run and the associated ebb delta provides opportunity for some natural sediment supply as well as providing some protection from wave attack. Therefore, overall present management of the frontage is considered sustainable.

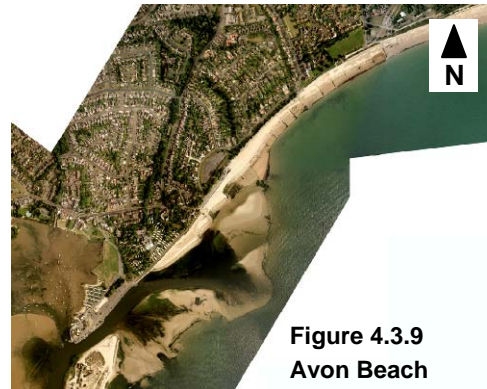


Figure 4.3.9
Avon Beach

Image/Data courtesy of the Channel Coastal Observatory.

Associated with the intent to maintain the channel at its present location is the need to maintain defences from Mudford Quay through to Avon Beach. This section of the frontage acts as an important navigation control. There would be no scope for realignment; however, equally there is little increased pressure from scour as a result of the policy intent to hold the northern end of Mudford Spit. There might be increased overtopping at the Quay due to sea level rise. This might not significantly affect operation on the Quay but could be addressed by increasing the wall height. This would need to be considered at a local scale.



Avon Beach

The overall approach is very much in line with the With Present Management scenario. The frontage is maintained by beach recharge, compensating for a general trend for loss of beach towards the east. This is supported by construction of rock groynes and maintenance of earlier timber groynes further to the east. With increased sea level rise, the current approach recommended in the draft strategy to replace older groynes appears appropriate. At present these structures

do not significantly impact on the amenity value of the area. Unlike areas further east, the groynes and beach do not act as toe support to the coastal slope and the main function of the groynes is merely to provide additional constraint against sediment transport. The beach then provides protection against erosion of the back shore.

The overall intent of management to this area is, therefore, to maintain the alignment of Mudford Quay to maintain the use of this area and to continue to act as a navigation training wall to support continued water use of Christchurch Harbour. The ebb tide delta provides protection to Avon Beach and the aim of management in this area is in taking advantage of this in sustaining a wide amenity beach as protection to extensive areas of housing to the rear. There is little defence advantage in realignment further east along the frontage and maintaining the beach in this area fulfils the aims of the Christchurch Beaches and Hinterland Management Plan. Even with sea level rise this aim is considered sustainable. This policy is in line with policy developed in PDZ1 for Highcliffe but detailed examination would need to be given at a local scale as how best

to manage the transition between the maintained beach and the natural development proposed for Friars Cliff.

Christchurch Harbour

As identified in the assessment of the two baseline scenarios, the key possible conflict is the potential extension of defences in front of Stanpit and at Wick, reducing the ability for natural development of estuary habitat in line with sea level rise. Overall, however, nothing identified in either baseline scenario indicates any major physical interaction between management approaches to different sections of the frontage. Over much of the upper estuary area there is a strong economic argument for continued defence of the main town of Christchurch as identified in the With Present Management scenario.

With a general acceptance of the With Present Management approach, each local area is discussed below.

The policy set out above for Mundeford Quay and Spit, retains the overall shape of the entrance and maintains protection against increased wave action, which would otherwise impact significantly of the Mundeford Town frontage.

At present, policy for the town is one of holding the basic line of defence as defined by the low estuary-side wall. This provides only limited protection against flooding and is regularly over topped. This overtopping only affects a limited number of properties and flooding would only significantly impact on the main old core of Mundeford on exceptional events. Flood protection is provided by local private defences (i.e. garden walls) and this has been assessed as appropriate to the scale of the problem. This may need to be re-assessed in line with sea level rise.

The intent of the Plan is therefore to maintain a general policy of Hold the Line to the frontage, supporting continued maintenance of the low sea wall. This would not involve raising this line of defence and, with sea level rise, areas such as the open area behind the Quay, the car park and boat park behind the Quay and the headland to the north would be subject to increased flooding. Consideration could be given in the area immediately behind the Quay, particularly in the area of open ground, to removal of the low wall, allowing some limited scope for natural habitat development. This would, to a degree, depend upon the capacity for the estuary in this area to accumulate sediment in line with sea level rise. This would need to be monitored. The aim would be to avoid squeeze of habitat against the wall. The intent elsewhere in this area would be to continue to support local private defence, only actively considering more formal set back defence of the main core of the town if the long term need arises with sea level rise. Planning should recognise that the lower lying properties, particularly at the headland, would be at increased risk of flooding. This general approach would apply around the frontage including the road in front of Stanpit.

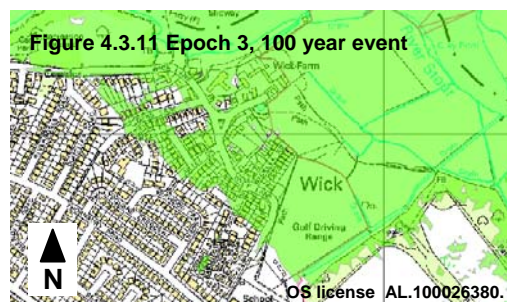
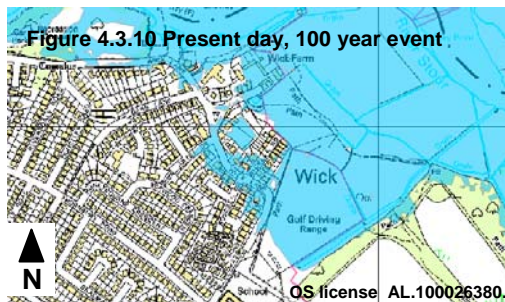
A distinction is made above between policy for the main developed area of Stanpit, landward of the coast road, and Christchurch town centre and the former SMP management unit running around the edge of Stanpit Marshes, in front of the road and the town. The SMP policy was for retreat over the marshes with the intent to maintain defence along the back of the area. This area of marsh, including much of the recreation ground would be at increasing flood risk with sea level rise. The area of the

recreation ground offers potential scope for redevelopment of natural habitat in compensation for loss more generally within the area of the SSSI. The draft strategy, however, identifies the presence of a land fill site as a constraint against such adaptation. Subject to further monitoring of the behaviour of possible accretion or erosion patterns within the Harbour in line with sea level rise, this constraint would need to be reassessed. Potentially, over the long term, should it be identified that the integrity of the SSSI is being damaged due to this constraint and the inability of the estuary to adapt naturally, further consideration should be given to the landfill area to determine whether there is scope to allow natural diffusion of possible pollutants or to the possibility of excavation of material to allow further retreat of defences along the estuary edge. The policy and intent of the plan within the SMP is for managed realignment subject to such further investigation.

There is little scope for managed realignment within the town centre or along the north edge of the Stour valley to the west. The policy over the whole frontage would be to Hold the Line, in line with the draft strategy recommendations. Some local areas potentially fall below the priority scope for funding under flood defence. Even so, the SMP assessment supports the strategy position that these areas are of fundamental importance to the heritage value of the town and to maintain the overall integrity of the community. As such no distinction is made in these areas and the SMP would continue to support of policy for Hold the Line.

Consideration might need to be given to joint funding in such areas, looking to gain additional funding in line with the recommendations of Defra's strategy Making Space for Water.

At Wick, new development in and around the old village centre has resulted in increased flood risk. At present this is not severe, but may substantially increase with sea level rise. This increase in risk is shown in the following figure.



While there seems no benefit in abandoning defence of the community, the manner in which defence might be provided needs to recognise the need to allow space for adaption of the nature conservation interest in the area. Therefore, while the SMP policy for the village would be to Hold the Line of defence, this should be strictly limited to the footprint of the developed area. In particular the marsh land in front of Wick Farm and the area of the golf range should remain undefended, allowing scope for saltmarsh and transitional habitat development.

The section of estuary to the south and east of Wick should be allowed to develop naturally with no active intervention.

The area behind Mudeford Spit should similarly be allowed to develop naturally. However, with managed realignment of the spit to maintain its integrity and width, there

would be a loss of intertidal area. Issues relating to this would need to be considered alongside the detailed long term management plan for the spit.

In considering each local area, recommendations have been made to allow as far as possible future natural development of Christchurch Harbour, retaining the integrity of the mosaic of habitat. However, depending on the future behaviour of the estuary, specifically with respect to its capacity to accrete sediment in line with sea level rise, it is anticipated that there may be loss of saltmarsh area. Although considered outside the direct area of the SMP, the upstream Avon valley does offer potential for conversion to natural estuary conditions. This would principally be outside the area of the Natura 2000 site further upstream, although bordering on this designated area. The Purewell Marsh SSSI lies to the rear of the principal road system which might sensibly be taken as the limit of realignment with low level defences maintained on the estuary side of the various roads. This would also act to protect a range of properties from flooding. Subject to monitoring of estuary behaviour, this upstream area possibly offers compensation for management within the main area of the Harbour.

Main Poole Bay Frontage

The final section of coast within this zone is the main frontage between Poole and Bournemouth extending through to Southbourne. The large scale of damages arising from the No Active Intervention scenario along this section would be unacceptable, having significant national and regional consequences. The key features of management in this area are associated with maintaining the economically important use of the foreshore and backshore width. This would provide protection from erosion to the properties along the cliff behind. Current practice, over the last 30 years, has achieved this through regular beach recharge, with loss of recharge material being reduced by groynes. The original groynes were 70m in length and constructed in timber. Experience gained through this process had confirmed that over filling the beach encouraged higher initial losses, with loss reducing as the effect of the groynes emerged. This process has been the subject of modelling studies (Draft Strategy - Technical Annex 2, 2004) and the results of this used in the Benefit/ Cost analysis (Technical Annex 8). The conclusion of this work was that optimum management would be achieved through replacement of the timber groynes with longer rock groynes and recharge on a typical ten year cycle. In addition, the Poole Harbour Commissioners channel dredging programme produces a subsequent local source of sediment with which to supplement the recharge cycle, improving the overall cost effectiveness of the approach.

This modelling was undertaken over a 50 year period considering existing water level and wave conditions. The results of the economic analysis were updated considering a 100 year period and demonstrated a benefit cost ratio in excess of 20. This reinforces the very strong broader socio-economic argument for continuing this approach to defence, when considered appropriately over the longer period of the SMP2.

With anticipated sea level rise, there is likely to be increased pressure on maintaining the present practice of recharge. Typically, the response to increased water levels and potential increased wave energy would be to increase both the levels of recharge and the length and height of control structures. A further related risk as a result of sea level rise is highlighted in the Bournemouth Seafront Strategy:

“The long term prospect of rising sea levels already determines the Environment Agency’s policy of only advising new coastal building developments with a ground floor level of 4.6 metres above the ordnance datum line. Typically, this translates to around 2 metres above the current Bournemouth promenade level.”

Although this policy advice is updated as better information becomes available through climate change research, this does suggest that in the future there may be a need to re-examine how the use and defence of the frontage is sustained, both in terms of engineering and possibly funding. The attitude of the Council has been to carefully examine, through development of such documents as the Seafront Strategy how best use can be made of its shoreline while maintaining existing overall values. Typical of this is the adaptive redevelopment, or redesign at Boscombe, incorporating aspects such as a surfing reef. This whole area is an example of how alternative funding approaches may be brought in, in an integrated manner, to sustain use of the seafront.

If this general approach were adopted for the frontage, the logical extension of this might be to actually advance the line of defence; the distinction being made that rather than merely increasing the width of the defence zone, positive use is made of control structures in addition to purely their defence function.

Under this scenario, the aim would be to actually reclaim over the foreshore, in effect, constraining sediment movement and retaining local beach areas. This could provide the opportunity to attract inward investment for coastal use development.

Such an approach would radically alter processes along Poole Bay. It is made possible by the central location of the frontage in relation to the overall alignment of the bay. Any works taken to advance the line would have a reducing impact on the adjacent shoreline with distance from the works. Potential impacts that would need to be considered are:

- Some minor influence on the Poole Harbour frontage, potentially influencing sediment supply.
- Reduction of sediment supply to Solent Beach area. This supply at present is again provided by current practice of beach recharge.

Clearly such impacts would need to be considered in detail as part of developing a framework for taking forward an advance the line policy. However, these issues are not considered to be a significant constraint.

In summary, the recommendations from the SMP2 for this frontage would be for Hold the Line over the three epochs. The intent for management is to maintain protection by recharge and sediment movement control, thereby sustaining the essential recreational and amenity benefits along with defence of important infrastructure and properties along the crest of the cliff. The SMP, however, recognises the possible difficulties in terms of the potential increased effort required to maintain the existing practice of regular recharge and maintenance of the groynes in the long term. As such a potential policy, possibly over the third epoch could be to advance the line. This approach would intend to constrain sediment drift so as to retain areas of beach along a redesigned frontage, developing a fully integrated approach to management of the coastal zone. This possible policy would need to be taken forward in partnership within a strong framework for development of the whole frontage. Furthermore, this framework would need to

define acceptable influence or mitigation with respect to maintaining underlying coastal processes and management of the adjacent areas of coast.

PDZ2

Management Area Statements

CBY D - Friars Cliff to Mundeford Quay. (CH. 15 KM TO CH 17 KM.)
Covering previous SMP1 management units CBY2

CBY E and PBY E - Mundeford Spit to Southbourne (CH. 26 KM TO CH 31 KM.)
Covering previous SMP1 management units CBY1, PBY3, 2 and part of PBY1

CBY F - Christchurch Harbour (CH. 17 KM TO CH 26 KM.)
Covering previous SMP1 management units CHB 5 through to CHB 1

PBY G - Southbourne to Flag Head Chine (CH. 31 KM TO CH 41.5 KM.)
Covering previous SMP1 management unit PBY1


Location reference:	Friars Cliff to Mudeford Quay
Management Area reference:	CBY.D
Policy Development Zone:	PDZ2



* Note: Predicted shoreline mapping is based on a combination of monitoring data, analysis of historical maps and geomorphological assessment with allowance for sea level rise. Due to inherent uncertainties in predicting future change, these predictions are necessarily indicative. For use beyond the purpose of the SMP, reference should be made to the baseline data.


The following descriptions are provided to assist interpretation of the map shown overleaf.

100 year shoreline position:


The following maps aim to summarise the anticipated position of the shoreline in 100 years under the two scenarios of "With Present Management" and under the "Preferred Policy" being put forward through the Shoreline Management Plan.


-  In some areas the preferred policy does not change from that under the existing management approach. In some areas where there are hard defences this can be accurately identified. In other areas there is greater uncertainty. Even so, where the shoreline is likely to be quite clearly defined by a change such as the crest of a cliff the estimated position is shown as a single line.
- Where there is a difference between With Present Management and the Preferred Policy this distinction is made in showing two different lines:

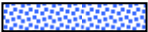
-  With Present Management.
-  Preferred Policy.

-  In some areas, the Preferred Policy either promotes a more adaptive approach to management or recognises that the shoreline is better considered as a width rather than a narrow line. This is represented on the map by a broader zone of management:

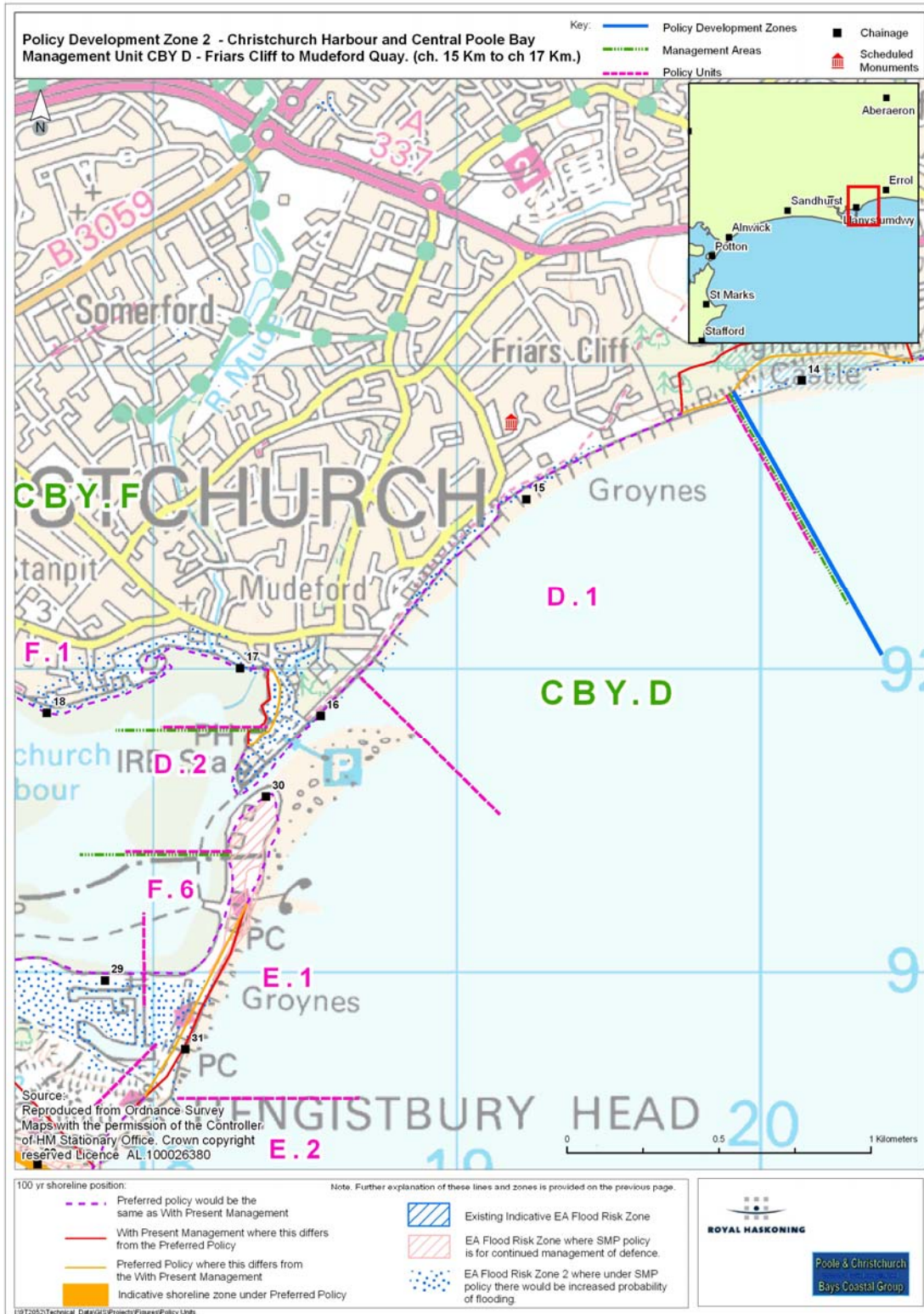
Flood Risk Zones

 General Flood Risk Zones. The explanation of these zones is provided on the Environment Agency's web site www.environment-agency.gov.uk. The maps within this SMP document show where SMP policy might influence the management of flood risk.

 Indicate areas where the intent of the SMP policy is to continue to manage this risk.

 Indicate where over the 100 years the policy would allow increased risk of flooding.

The maps should be read in conjunction with the text within the SMP document.



SUMMARY OF PREFERRED PLAN RECOMMENDATIONS AND JUSTIFICATION

PLAN:

The overall intent of management to this area is to maintain the alignment of Mudeford Quay, to maintain the use of this area and to continue to act as a navigation training wall to support continued water use of Christchurch Harbour. The ebb tide delta provides protection to Avon Beach and the aim of management in this area is in taking advantage of this in sustaining a wide amenity beach as protection to extensive areas of housing to the rear. Maintaining the beach in this area fulfils the aims of the Christchurch Beaches and Hinterland Management Plan. This policy is in line with policy developed in PDZ1 for Highcliffe but detailed examination would need to be given at a local scale as how best to manage the transition between the maintained beach and the natural development proposed for Friars Cliff.

The intention in this Management Area is to implement an approach which will provide a basis for long-term sustainability. Although the NAI damages are exceeded by the plan implementation costs in the first 2 epochs, the longer view is that long term positive benefit / costs ratios are supported by early investment in the frontage and commitment in going forward with the preferred plan. Management of this frontage is also inherently linked to the longer-term viability of Christchurch Harbour (and therefore Christchurch town) and therefore it is felt the intrinsic benefits go beyond simply those indicated by the broad-scale economic assessment. The apparent risk that public funding may be difficult to obtain for this frontage is acknowledged. However it is felt that a more detailed assessment of the benefits would provide a more robust argument of the affordability of continuing to manage this frontage with intent to maintain the position of the Mudeford Run and the wide recreational beach, for both the direct benefits obtained and the wider benefits to Christchurch Harbour. In particular this would provide a more comprehensive assessment of how the Government's Outcome Measures would be delivered through such an approach.

PREFERRED POLICY TO IMPLEMENT PLAN:	
From present day	Maintain existing defences. Consider replacement of timber groyne to rock. Continue regular cycle of beach recharge.
Medium term	Maintain existing defences. Continue regular cycle of beach recharge.
Long term	Maintain existing defences. Potential increase of defence level along Mudeford Quay. Continue regular cycle of beach recharge

SUMMARY OF SPECIFIC POLICIES

Policy Unit		Policy Plan			
		2025	2055	2105	Comment
CBY.D.1	Avon Beach	HTL	HTL	HTL	Maintain integrity of beach through controls structures and recharge.
CBY.D.2	Mudeford Quay	HTL	HTL	HTL	
Key: HTL - Hold the Line, A - Advance the Line, NAI – No Active Intervention MR – Managed Realignment					

CHANGES FROM PRESENT MANAGEMENT

IMPLICATION WITH RESPECT TO BUILT ENVIRONMENT

Economics		by 2025	by 2055	by 2105	Total £k PV
Property	Potential NAI Damages/ Cost £k PV	501	752	2052	3305
	Preferred Plan Damages £k PV	0	0	0	0

	Benefits £k PV	501	752	2052	3305
	Costs of Implementing plan £k PV	685	200	221	1106


Location reference:	Mudford Spit to Southbourne
Management Area reference:	CBY/PBY.E
Policy Development Zone:	PDZ2



* Note: Predicted shoreline mapping is based on a combination of monitoring data, analysis of historical maps and geomorphological assessment with allowance for sea level rise. Due to inherent uncertainties in predicting future change, these predictions are necessarily indicative. For use beyond the purpose of the SMP, reference should be made to the baseline data.


The following descriptions are provided to assist interpretation of the map shown overleaf.

100 year shoreline position:



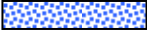
The following maps aim to summarise the anticipated position of the shoreline in 100 years under the two scenarios of "With Present Management" and under the "Preferred Policy" being put forward through the Shoreline Management Plan.

-  In some areas the preferred policy does not change from that under the existing management approach. In some areas where there are hard defences this can be accurately identified. In other areas there is greater uncertainty. Even so, where the shoreline is likely to be quite clearly defined by a change such as the crest of a cliff the estimated position is shown as a single line.
- Where there is a difference between With Present Management and the Preferred Policy this distinction is made in showing two different lines:

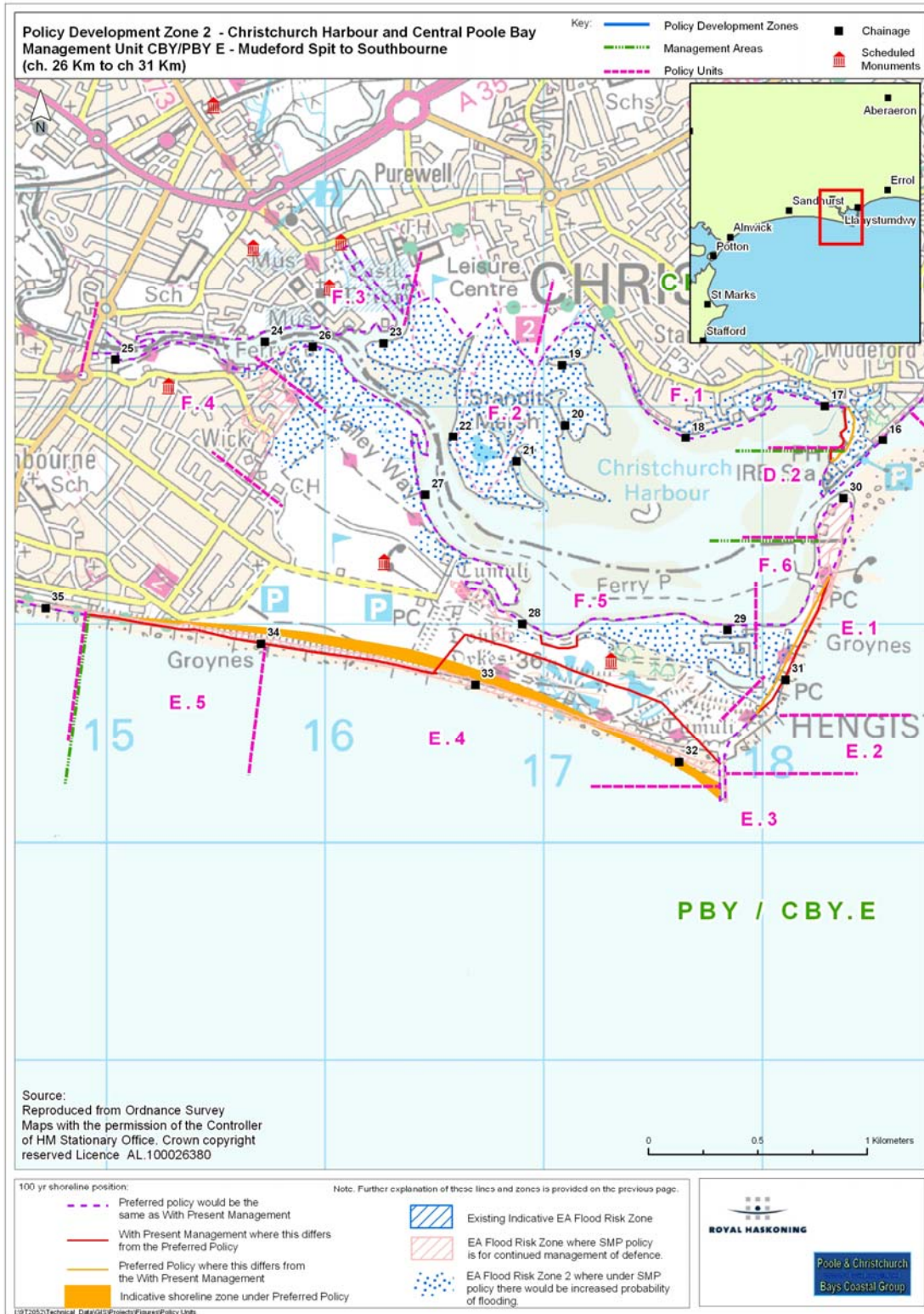
-  With Present Management.
-  Preferred Policy.

-  In some areas, the Preferred Policy either promotes a more adaptive approach to management or recognises that the shoreline is better considered as a width rather than a narrow line. This is represented on the map by a broader zone of management:

Flood Risk Zones

-  General Flood Risk Zones. The explanation of these zones is provided on the Environment Agency's web site www.environment-agency.gov.uk. The maps within this SMP document show where SMP policy might influence the management of flood risk.
-  Indicate areas where the intent of the SMP policy is to continue to manage this risk.
-  Indicate where over the 100 years the policy would allow increased risk of flooding.

The maps should be read in conjunction with the text within the SMP document.



SUMMARY OF PREFERRED PLAN RECOMMENDATIONS AND JUSTIFICATION

PLAN:

The whole area from the northern extent of Mudeford Spit through to Southbourne is considered an important feature in minimising impact on adjacent areas of the coast. It is considered important for sustainable flood and erosion management and development of interests of broader coastal management over the whole zone. The intent of the shoreline management plan is, therefore, to sustain the overall influence of this section of the coast, ensuring that over the period of the SMP2 neither the Solent Beach isthmus nor Mudeford Spit breach. Specifically, the aim is to maintain the position of the Long Groyne, with the potential for this structure to be extended and reshaped to allow better management of adjacent sections of the coast. To the east of the headland, the aim is to maintain the integrity of the spit, sustain amenity value of the area, maintain the position of the Run but also facilitate continued exposure of the cliff face. The intent is initially to restore the alignment of the overall section of the coast. The spit would be allowed to roll back in response to increased pressure due to sea level rise, matching erosion of the cliff. This will require development of a management plan allowing continued use of the area, supported by defence and recharge. The intention would be to maintain the position of the Spit head, maintaining the navigation channel. To the west of the headland, the intent would be to maintain the integrity of the isthmus and defence to the principle assets at Southbourne. At the same time the aim is to maintain as far as possible the continuity of shoreline processes between the main section of Poole Bay and those of Solent Beach. To achieve this, consideration needs to be given to potential realignment along the line of the emerging Southbourne headland while examining options for extending the influence of the structure at the toe of Hengistbury Head, this would be undertaken in the strategy development. The aim at Southbourne would still be to maintain defence to the majority of property and interests. Between these two locations the aim would be to establish a more sustainable position for maintaining a robust semi-natural defence to the isthmus. This would not preclude increasing the beach width in front of Double Dyke, but neither would the defence position of the frontage be determined by defence of this feature's existing extent. The overall aim in this area is to maintain the open space, amenity and nature conservation value of the area by minimising reliance on hard defence to control of the frontage.

It is acknowledged that the low benefit/cost ratio presented in the economics table below indicates a low-level of affordability for the preferred plan along this part of the frontage. However in this location, possibly more than anywhere else along the SMP frontage, the much wider benefits of the intent of management are simply not reflected by identification of the value of the local assets protected. Maintaining the Long Groyne and managing the width of Solent Beach is an inherent part of the strategy to retain Hengistbury Head. This in turn provides essential control of the erosion risk for the whole of Poole Bay to the west and part of Christchurch Bay to the east. It is therefore intrinsically linked to achieving the high level SMP2 objectives throughout the Poole and Christchurch Bays. It is therefore felt that although apparent affordability is very limited, the envisaged investment along this frontage actually represents very wide benefits for relatively limited long-term investment.

PREFERRED POLICY TO IMPLEMENT PLAN:	
From present day	Develop upon existing local management plan of Mudeford spit and establish agreement for relocation of assets. Review shape and extent of Long Groyne in conjunction with strategy for Solent Beach. Allow further erosion of the eastern cliff face. Maintain defence to the spit with recharge. Develop strategy for Solent Beach and confirm management at the Long Groyne and Southbourne.
Medium term	Implement realignment of Mudeford Spit. Maintain replacement of the Long Groyne and implement strategy for Solent Beach, with potential realignment at Southbourne.
Long term	Implement realignment of Mudeford Spit. Maintain replacement of the Long Groyne and implement strategy for Solent Beach.

SUMMARY OF SPECIFIC POLICIES

Policy Unit		Policy Plan			Comment
		2025	2055	2105	
CBY/ PBY.E.1	Mudeford Sandbank, Harbour Side	HTL	MR	MR	Allow gradual rollback in line with sea level rise.
CBY/ PBY.E.2	East of Hengistbury Head	MR	MR	MR	Managed realignment of cliff line.
CBY/ PBY.E.3	Hengistbury Head Long Groyne	HTL	HTL	HTL	Maintain position and influence of the Head on sediment transport.
CBY/ PBY.E.4	Solent Beach	MR	MR	MR	Maintain beach levels as principal defence linked to intent to HTL at Hengistbury Head and potentially extend the influence of Long Groyne. Intent to provide a robust defence of isthmus
CBY/ PBY.E.5	Southbourne	HTL	HTL	MR	Manage to allow transition between main Bournemouth Frontage and Solent Beach
Key: HTL - Hold the Line, A - Advance the Line, NAI – No Active Intervention MR – Managed Realignment					

CHANGES FROM PRESENT MANAGEMENT

IMPLICATION WITH RESPECT TO BUILT ENVIRONMENT

Economics		by 2025	by 2055	by 2105	Total £k PV
Property	Potential NAI Damages/ Cost £k PV	5	636	624	1265
	Preferred Plan Damages £k PV	0	0	0	0
	Benefits £k PV	5	636	624	1265
	Costs of Implementing plan £k PV	842	142	97	1081


Location reference:	Christchurch Harbour
Management Area reference:	CHB.F
Policy Development Zone:	PDZ1



* Note: Predicted shoreline mapping is based on a combination of monitoring data, analysis of historical maps and geomorphological assessment with allowance for sea level rise. Due to inherent uncertainties in predicting future change, these predictions are necessarily indicative. For use beyond the purpose of the SMP, reference should be made to the baseline data.


The following descriptions are provided to assist interpretation of the map shown overleaf.

100 year shoreline position:



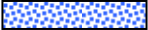
The following maps aim to summarise the anticipated position of the shoreline in 100 years under the two scenarios of “With Present Management” and under the “Preferred Policy” being put forward through the Shoreline Management Plan.

-  In some areas the preferred policy does not change from that under the existing management approach. In some areas where there are hard defences this can be accurately identified. In other areas there is greater uncertainty. Even so, where the shoreline is likely to be quite clearly defined by a change such as the crest of a cliff the estimated position is shown as a single line.
- Where there is a difference between With Present Management and the Preferred Policy this distinction is made in showing two different lines:

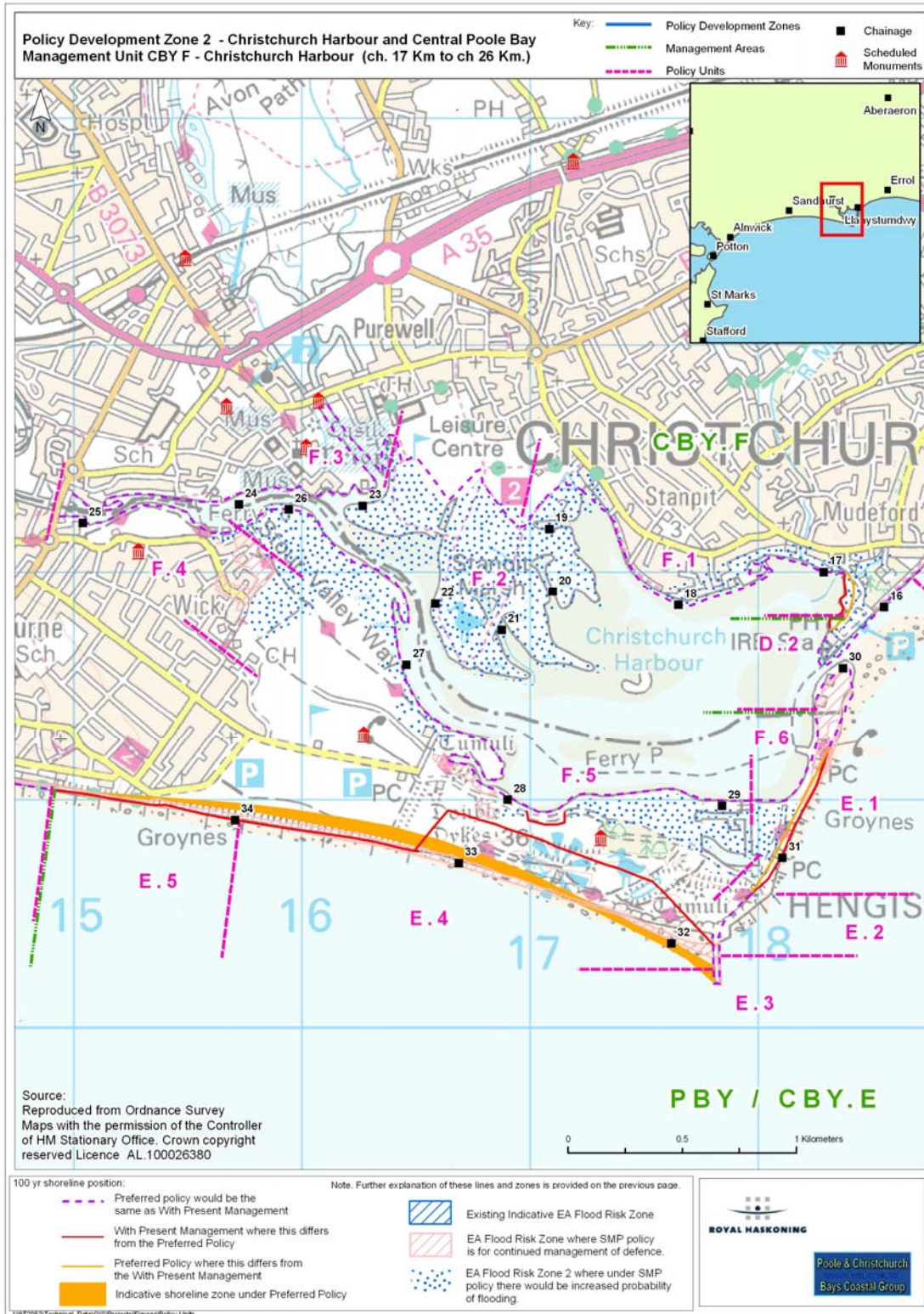
-  With Present Management.
-  Preferred Policy.

-  In some areas, the Preferred Policy either promotes a more adaptive approach to management or recognises that the shoreline is better considered as a width rather than a narrow line. This is represented on the map by a broader zone of management:

Flood Risk Zones

-  General Flood Risk Zones. The explanation of these zones is provided on the Environment Agency’s web site www.environment-agency.gov.uk. The maps within this SMP document show where SMP policy might influence the management of flood risk.
-  Indicate areas where the intent of the SMP policy is to continue to manage this risk.
-  Indicate where over the 100 years the policy would allow increased risk of flooding.

The maps should be read in conjunction with the text within the SMP document.



SUMMARY OF PREFERRED PLAN RECOMMENDATIONS AND JUSTIFICATION

PLAN:

The intent of the Plan is to maintain a general policy of Hold the Line to the important areas of development around the Harbour but also to ensure opportunity for natural adaption of the mosaic of habitats.

In the Mudeford and Stanpit area defining policy has to consider quite complex issues of future flood risk due to sea level rise. The recent studies have shown immediate coastal flood risk is limited to five properties. However, future flood risk would substantially increase this number. Therefore, present investment in flood risk management would not be beneficial, but in the future may be likely and justifiable.

Along the Mudeford front the intent would be to support continued maintenance of the low sea wall. The car park and boat park behind the Quay and the headland to the north would be subject to increased flooding. Consideration could be given in the area of open ground, immediately behind the Quay, allowing some limited scope for natural habitat development along side setback defence. This would be subject to further investigations of the landfill. The aim would be to avoid squeeze of habitat against the wall. The intent elsewhere in this area would be to continue to support local private defences (i.e. garden walls), only actively considering more formal set back defences of the main core for the village if the long term need arises with sea level rise. Planning should recognise that the lower lying properties particularly at the headland would be at increased risk of flooding. This general approach would apply around the frontage including the road in front of Stanpit. Even though there is a changing emphasis in the specific way in which risk is managed, the policy for this area during the first epoch is to Hold the Line, realign the shoreline defence during the second epoch and hold this new line through to the third epoch.

The intent for Christchurch is to maintain and improve flood defence to maintain the integrity of the town. Subject to long term monitoring, should it be identified that the integrity of the SSSI is being damaged due to the inability of the estuary to adapt naturally, further consideration should be given to retreating the line behind the Stanpit Marshes. At Wick, the aim of the plan is to restrict defence strictly to the area of development. Natural development of estuary habitat should be encouraged over the existing marsh and rising land. To the south side of the estuary natural development of the estuary would be allowed.

Despite actions recommended above it is recognised that the balance of habitat may not be achieved with Christchurch Harbour. Subject to monitoring of estuary behaviour, the upstream area north of Christchurch possibly offers compensation for management within the main area of the Harbour.

PREFERRED POLICY TO IMPLEMENT PLAN:	
From present day	Maintain and raise defences as set out in the draft strategy taking account of the caveats in relation to habitat creation.
Medium term	Maintain defences and allow adaption of habitat.
Long term	Maintain defences and allow adaption of habitat with potential conversion of the lower Avon valley to saline conditions.

SUMMARY OF SPECIFIC POLICIES

Policy Unit	Policy Plan			
	2025	2055	2105	Comment

CHB.F.1	Mudford	HTL	MR	HTL	Manage flood risk initially through local protection and flood warning. Potential need for a combination of set back defences to compliment existing foreshore structure. Decisions in this area will be influenced by further investigation of the landfill site.
CHB.F.2	Stanpit Marshes	HTL	MR	MR	Maintain opportunity for roll back of marshes with Sea level rise subject to investigation of landfill.
CHB.F.3	Christchurch	HTL	HTL	HTL	Maintain and improve flood defence.
CHB.F.4	Wick	HTL	HTL	HTL	Local improvement to defences in line with sea level rise.
CHB.F.5	Southside of Christchurch Harbour	NAI	NAI	NAI	
CHB.F.6	Rear of Mudford Sandbank	MR	MR	MR	Allow ,managed roll back of Spit as for CBY1.1
Key: HTL - Hold the Line, A - Advance the Line, NAI – No Active Intervention MR – Managed Realignment					

CHANGES FROM PRESENT MANAGEMENT

IMPLICATION WITH RESPECT TO BUILT ENVIRONMENT

Economics		by 2025	by 2055	by 2105	Total £k PV
Property	Potential NAI Damages/ Cost £k PV	387	1331	2525	4243
	Preferred Plan Damages £k PV	0	0	0	0
	Benefits £k PV	387	1331	2525	4243
	Costs of Implementing plan £k PV	1595	389	394	2378





Location reference:	Southbourne to Flag Head Chine
Management Area reference:	PBYG
Policy Development Zone:	PDZ2

* Note: Predicted shoreline mapping is based on a combination of monitoring data, analysis of historical maps and geomorphological assessment with allowance for sea level rise. Due to inherent uncertainties in predicting future change, these predictions are necessarily indicative. For use beyond the purpose of the shoreline management plan, reference should be made to the baseline data.



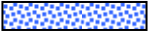
The following descriptions are provided to assist interpretation of the map shown overleaf.

100 year shoreline position:

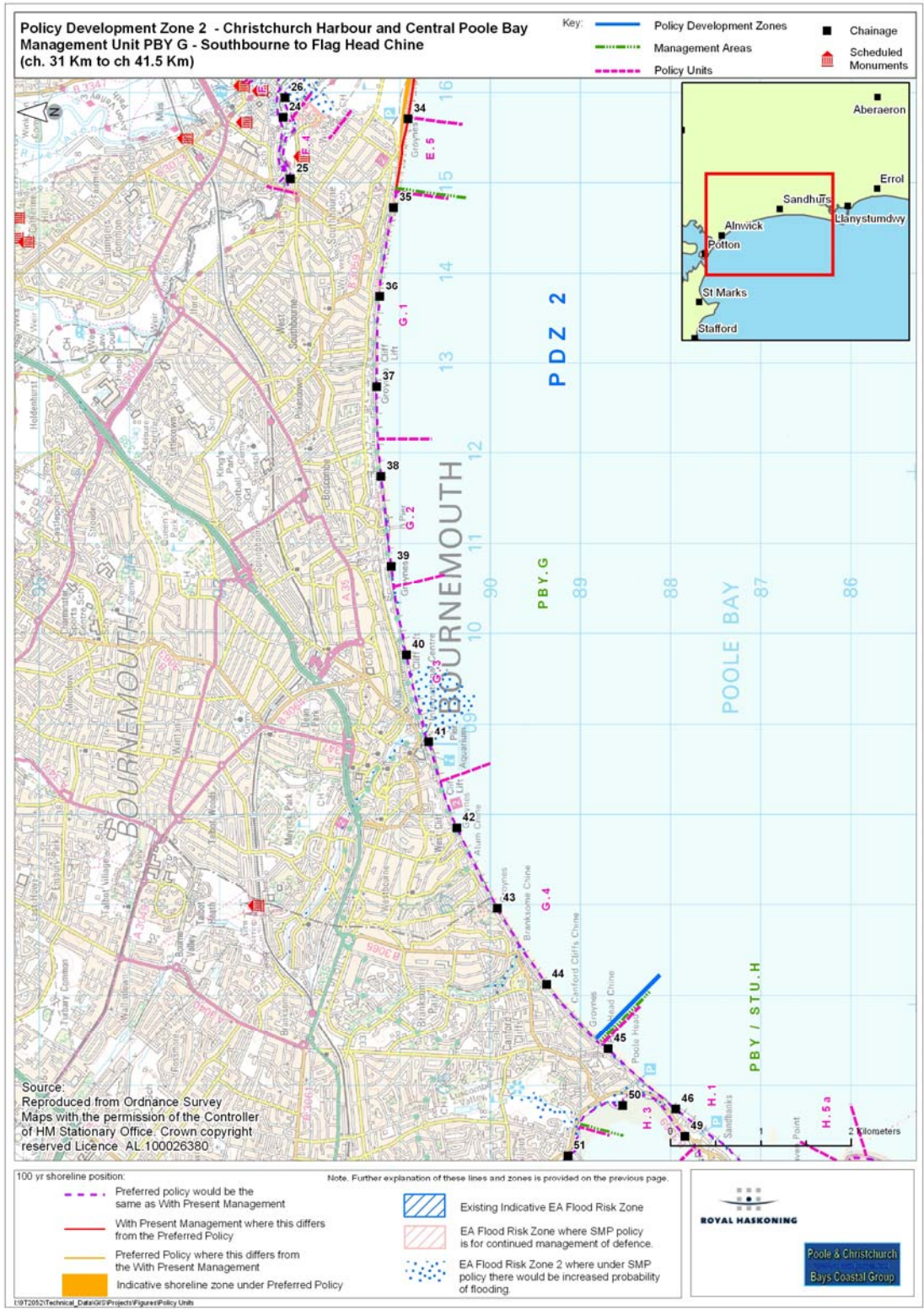
The following maps aim to summarise the anticipated position of the shoreline in 100 years under the two scenarios of "With Present Management" and under the "Preferred Policy" being put forward through the Shoreline Management Plan.

-  In some areas the preferred policy does not change from that under the existing management approach. In some areas where there are hard defences this can be accurately identified. In other areas there is greater uncertainty. Even so, where the shoreline is likely to be quite clearly defined by a change such as the crest of a cliff the estimated position is shown as a single line.
- Where there is a difference between With Present Management and the Preferred Policy this distinction is made in showing two different lines:
 -  With Present Management.
 -  Preferred Policy.
-  In some areas, the Preferred Policy either promotes a more adaptive approach to management or recognises that the shoreline is better considered as a width rather than a narrow line. This is represented on the map by a broader zone of management:

Flood Risk Zones

-  General Flood Risk Zones. The explanation of these zones is provided on the Environment Agency's web site www.environment-agency.gov.uk. The maps within this SMP document show where SMP policy might influence the management of flood risk.
-  Indicate areas where the intent of the SMP policy is to continue to manage this risk.
-  Indicate where over the 100 years the policy would allow increased risk of flooding.

The maps should be read in conjunction with the text within the SMP document.



SUMMARY OF PREFERRED PLAN RECOMMENDATIONS AND JUSTIFICATION

PLAN:

The intent for this frontage would be for Hold the Line over the three epochs, this despite the potential issues of flood and coast protection funding. The intent for management is to maintain protection by recharge and sediment movement control, thereby sustaining the essential recreational and amenity benefits along with defence of important infrastructure and properties along the crest of the cliff. The SMP, however, recognises the possible difficulties in terms of maintaining funding and the potential increased effort required to maintain the existing practice of regular recharge and maintenance of the groynes. As such a potential policy within possibly the third epoch could be to advance the line. This approach would intend to constrain sediment drift so as to retain areas of beach between areas of reclamation. This possible policy would need to be taken forward in partnership within a strong integrated framework for development of the whole frontage. Furthermore, this framework would need to define acceptable influence or mitigation with respect to maintaining underlying coastal processes and management of the adjacent areas of coast.

PREFERRED POLICY TO IMPLEMENT PLAN:	
From present day	Maintain the programme of beach recharge and management of control structures. Reassess this practice and consider development of a framework to attract joint funding.
Medium term	Maintain the programme of beach recharge and management of control structures. Reassess this practice and subject to this consider options for changing policy to Advance the line.
Long term	Maintain the programme of beach recharge and management of control structures. Reassess this practice and subject to this consider options for changing policy to Advance the line.

SUMMARY OF SPECIFIC POLICIES

Policy Unit		Policy Plan			
		2025	2055	2105	Comment
PBY.G.1	Southbourne	HTL	HTL	HTL/A	Maintain foreshore through control and recharge/ consider potential need for increased control of coastline.
PBY.G.2	Boscombe	HTL	HTL	HTL/A	Maintain foreshore through control and recharge/ consider potential need for increased control of coastline.
PBY.G.3	Bournemouth Central	HTL	HTL	HTL/A	Maintain foreshore through control and recharge/ consider potential need for increased control of coastline.
PBY.G.4	West Cliff and Poole	HTL	HTL	HTL/A	Maintain foreshore through control and recharge/ consider potential need for increased control of coastline.
Key: HTL - Hold the Line, A - Advance the Line, NAI – No Active Intervention MR – Managed Realignment					

CHANGES FROM PRESENT MANAGEMENT

IMPLICATION WITH RESPECT TO BUILT ENVIRONMENT

Economics		by 2025	by 2055	by 2105	Total £k PV
Property	Potential NAI Damages/ Cost £k PV	4467	26998	57505	88970
	Preferred Plan Damages £k PV	0	0	0	0
	Benefits £k PV	4467	26998	57505	88970
	Costs of Implementing plan £k PV	28146	14331	15542	58019

=0=0=0



Poole and Christchurch Bays Shoreline Management Plan Review Sub-cell 5f

Section 4. Policy Development Zone 3

Bournemouth Borough Council

2011

Report V3

9T2052

A COMPANY OF



ROYAL HASKONING

HASKONING UK LTD.
COASTAL & RIVERS

Stratus House
Emperor Way
Exeter, Devon EX1 3QS
United Kingdom
+44 (0)1392 447999 Telephone
Fax
info@exeter.royalhaskoning.com E-mail
www.royalhaskoning.com Internet

Document title Poole and Christchurch Bays Shoreline
Management Plan Review Sub-cell 5f
Section 4. Policy Development Zone 3
Document short title PDZ 3
Status Report V3
Date 2011
Project name Poole and Christchurch Bays SMP2
Project number 9T2052
Client Bournemouth Borough Council
Reference 9T2052/R/301164/Exet

Drafted by JGL Guthrie
Checked by TL Eggiman
Date/initials check
Approved by H Hall *HTH*
Date/initials approval

CONTENTS

		Page
4.4	PDZ 3 Poole Harbour and Associated Coastline	1
4.4.1	Overview	4
4.4.2	Baseline Management Scenarios	17
4.4.3	Discussion And Detailed Policy Development	28

4.4 PDZ 3 Poole Harbour and Associated Coastline

Flag Head Chine to Handfast Point, including Poole Harbour - Chainage 41.5 km to 123km.



SMP 1 Management Units

UNIT	LOCATION	CHAINAGE KM.	POLICY
PBY1	Sandbanks Ferry Slipway to Point House Café	30.4 – 43.9	Hold the Line in the Short and Long Term.
PHB17	North Haven Point to Sandbanks Ferry Slipway	43.9 – 44.2	Hold the Line in the Short and Long Term.
PHB16	Whitley Lake to North Haven Point	44.2 – 45.2	Hold the Line in the Short and Long Term.
PHB15	Whitley Lake	45.2 – 47.2	Hold the Line in the Short and Long Term.
PHB14	Salterns Marina to East Dorset Sailing club	47.2 – 48.5	Hold the Line in the Short and Long Term.
PHB13	Parkstone Yacht Club to Salterns Marina	48.5 – 50.3	Hold the Line in the Short and Long Term
PHB12	Parkstone Bay and Baiter Park	50.3 – 52.7	Hold the Line in the Short and Long Term
PHB11	Town Quay	52.7 – 54.5	Hold the Existing Line in the Short and Long Term.
PHB10	Holes Bay (E,N & W)	54.5 – 62	Selectively Hold the Existing Line in the Short and Long Term.
PHB9	Hamworthy Quays	62 – 64.7	Hold the Line in the Short and Long Term.
PHB8	Defence 681/2442 to Hamworthy Quay	64.7 – 66.8	Hold the Line in the Short and Long Term.
PHB7	Rockley Viaduct/Ham Common	66.8 – 68.1	Do Nothing in the Short Term and to Selectively Retreat in the Long Term.
PHB6	Lytchett Bay	68.1 – 73	Do Nothing in the Short Term, Long Term Selectively Retreat.
PHB5	Hyde's Quay to Holton Point	73 – 82.7	Selectively Hold the Existing Line.
PHB4	South Haven Point to Hyde's Quay	82.7 – 117	Do Nothing (with possible selective retreat).
PHB3	Brownsea Island West	-	Do Nothing in the Short and Long Term (Local maintenance).
PHB2	Brownsea Island East	-	Selectively Hold the Line.
PHB1	The Islands Furzey, Green, Round, Long Islands	-	Do Nothing in the Short and Long Term (allowing for maintenance of slipways and access points).
STU4	Shell Bay	117 – 118.4	Selectively Hold the Line, protect from breach.
STU3	Studland Sandspit	118.4 – 121	Selectively Hold the Line, dune management.
STU2	The Warren to Studland Sandspit	121 – 122.5	Do Nothing short term, Retreat Long term.
STU1	Handfast Point to the Warren	122.5 – 123	Do Nothing

Note: SMP1 policy was set over a 50 year period. Short term refers to immediate approach to management of defences with long term policy being set for the 50 years.

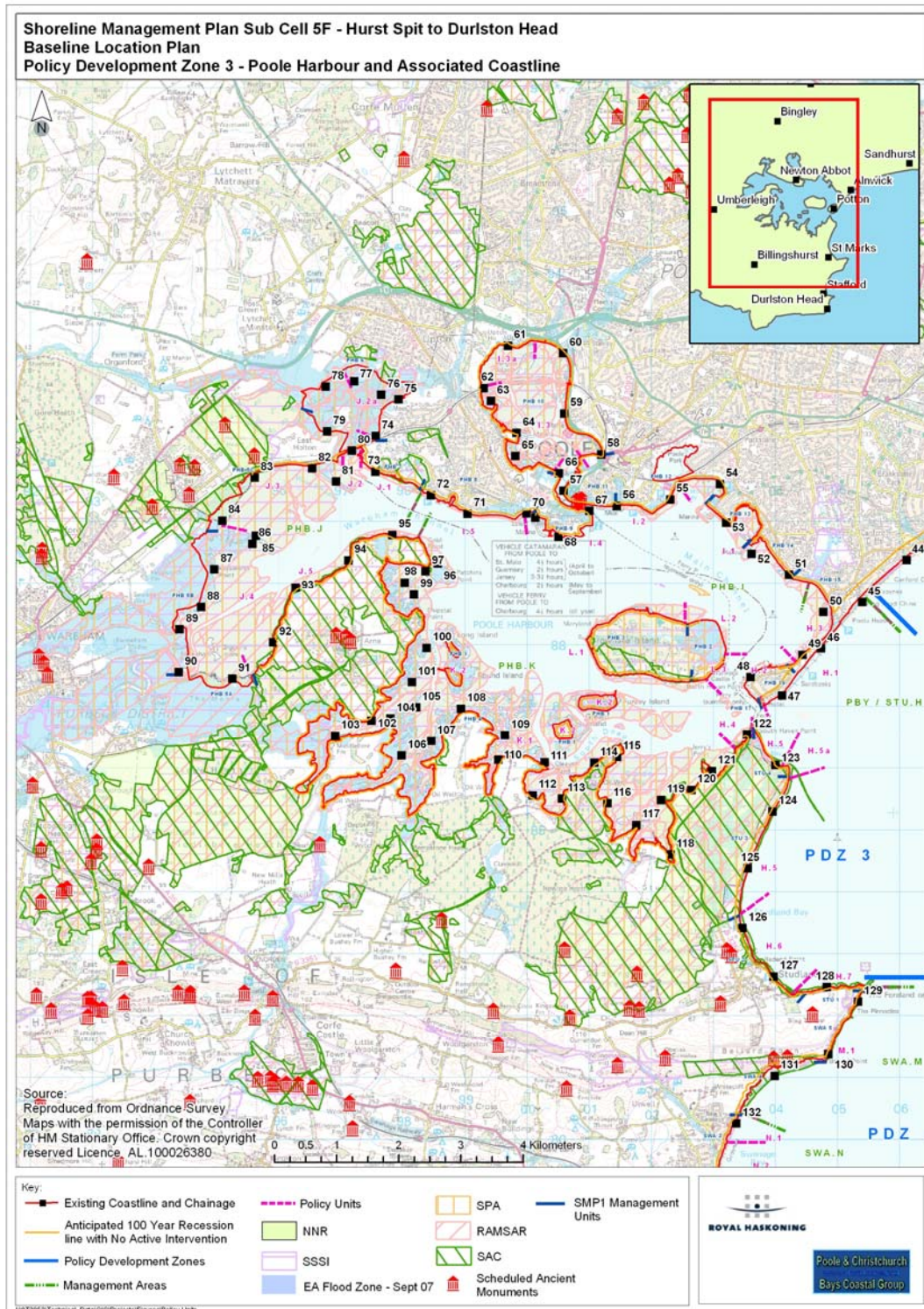


Figure 4.4.1

4.4.1 OVERVIEW

PRINCIPAL FEATURES (further details are provided in Appendix D)

Built Environment:

The main development within the zone is that of Poole, including the core of the town, harbour area and Hamworthy and the associated local communities of Lower Parkstone, Lilliput and Canford Cliffs, running to the east to the open coast, with the development of Sandbanks along the shoreline. This major conurbation lies to the north east side of Poole Harbour. To the western limits of Poole Harbour is the town of Wareham, which is located on the Frome River, along with various local communities generally around Poole Harbour shoreline. On the open coast to the south of the zone is the village of Studland. Poole Harbour contains a conventional freight and Ro-Ro Ferry Port. The main A35 runs to the north of the Harbour area with the A350 running down to Poole centre and the A351 running through to Wareham. A railway links through from Bournemouth to Poole, after Poole it cuts across the northern bays and along the western edge of the Harbour through to Weymouth. There is another railway line to Corfe Castle and Swanage on the Isle of Purbeck, but this is preserved and not part of the National network. There are schools at Turlin Moor, Lower Hamworthy and Poole along with two sewage works and several pump stations within the potential flood plain. There are also several electricity sub stations principally in the Poole Quays area of Lower Hamworthy. There are several oil well installations in the Wytch Farm area south of Poole and on Furzey Island. There are major marinas in Poole and Wareham.

Heritage and Amenity:

Poole Harbour has been identified by English Heritage as one of the most important areas for coastal archaeology in England. Its continuous use, from prehistoric times to present, means that structures of almost any date could survive. Poole Harbour has been historically important as a commercial harbour since pre-Roman times. The area has been inhabited since before the Iron Age and it contains a network of settlements, such as those located on Furzey and Green islands, which were exploiting mineral resources both within Poole Harbour and the Isle of Purbeck. The historic importance of the harbour is reflected in the number of Conservation Areas that border the coast here. These areas span Victorian and Edwardian eras in addition to some inter-war development. There are over 200 'Listed' Buildings of special architectural or historic interest and 13 Scheduled Monuments (SM) within the Borough of Poole (BoP). Most are located in the Old Town, Quay and High Street Conservation Areas.

The Sandbanks area of Poole Harbour also falls within an Area of High Archaeological Potential.

Wareham is also a town of considerable historic interest, situated on a site that was established as far back as the Iron Age. The 'Wareham and Stoborough Conservation Area' covers a large amount of the old part of the town and the surrounding land. There are approximately 250 Listed Buildings in the town of Wareham and the local parishes. There are several areas of historic landscape interest that require protection. Those of relevance include Poole Park on the northern shore of Poole Harbour and Upton House on the shore of Holes Bay. In addition Compton Acres, off Canford Cliffs Road, has been designated as a Historic Park and Garden under the National Heritage Act, 1983.

There are numerous records of shipwrecks within Poole Harbour including a large iron-age log boat. As well as wrecked ships, Holes Bay was traditionally used as a dumping ground for old vessels and the remains of many ships can be found there.

There is also a Conservation Area at Studland. There are a number of known wrecks and potential wreck sites that lie within the area. Of particular interest is a 16th century

vessels in Studland Bay and the Swash Channel.

The whole area is one of high amenity and tourism value. Particular value is given to the high level of recreational water use and value of the open coast along Sandbanks Peninsula and Studland Bay. The heritage and conservation status of the area is a major attraction. There is a major holiday park at Rockley Park.

Nature Conservation:

Poole Harbour is designated a SPA site for the bird populations and species that visit the area and also a Ramsar site due to fringes of saltmarsh and reedbed, the lagoons and birds that use these areas. There are also extensive tidal mudflats. Parts of the area around the Harbour are designated Ramsar sites, Dorset Heathland SPA and SAC for the heathland, which fringes the southern shore. Wet heathland with Dorset heath, cross-leaved heath and coastal dune heathland are priority habitats and are recognised as being particularly rare within the European context. The majority of the Harbour foreshore has been designated a SSSI for its varied habitats and associated flora and fauna. The Arne reedbeds have been designated an NNR, as have the shores of Holton Heath and Studland Heath. The north shore, at Ham Common and Luscombe Valley, has been designated LNRs as well as SSSIs. The Arne peninsula is a RSPB reserve. There are also a number of SINCs. Part of Poole Harbour is included in the Poole Bay and Isle of Purbeck SMA. The intertidal areas of Poole Harbour between mean high water and mean low water plus all of the islands and some of the surrounding areas of terrestrial habitat have been designated a SSSI for the extensive intertidal mudflats and associated marine animals. The southern shore of Poole Harbour is designated both Heritage Coast and AONB. Ham Common is an area of national geological importance and is designated a SSSI.

The coastline between South Haven Point and Handfast Point is considered to be of national and international landscape importance and is within Dorset AONB. The World Heritage Site starts at Old Harry. The coastline was awarded the coveted Diploma for landscape, awarded by the Council of Europe, in 1984. The coast from Studland Cliffs to Durlston Head (and beyond) is a SAC (Isle of Portland to Studland Cliffs SAC). The coast is part of the Dorset Heathland SPA, Dorset Heaths and Studland Dunes SAC and Ramsar site. Studland and Godlington Heaths are designated as a SSSI and a National Nature Reserve (NNR) for their range of habitats. It was the third most visited NNR in the UK in 2005/06 with 1 million visitors. The site also includes six British reptile species, including strong populations of the sand lizard and smooth snake. The subtidal area from South Haven Point to Handfast Point is contained in the Poole Bay to the Isle of Purbeck SMA for its marine ecology, which includes important algal communities and eel grass beds in Studland Bay. The eelgrass beds are now known to be the habitat of two species of seahorse native to the UK. Studland Cliffs are an outstanding stratigraphic and structural site of national significance and an important location for paleontological studies. At the Bay's southern end, Ballard Down is a key site for coastal geomorphology, best known for the stacks, arches and caves at Handfast Point, such as Old Harry Rocks. Old Harry Rocks is part of the World Heritage Site for its important Cretaceous exposures.

KEY VALUES.

This zone is probably the most complex within the SMP in terms of its values. There are a wide variety of specific drivers - natural, social, economic, landscape, mineral (oil), but it is through their interaction that the character of the area can best be described. Each area and each specific interest adds to the whole. The recreational water use, which is such an important aspect of the economic viability of the area, draws benefit from the

outstanding landscape and the natural diversity of individual areas within the zone as a whole. This recreational use is supported by the infrastructure and facilities provided in areas principally along the northern shoreline. The structured, intensive use of open coast shoreline at Sandbanks is complemented by the more natural casual facility of the Studland beach and dunes, linked by the Ferry at the mouth of the Harbour. The residential value of the whole area is enhanced by its setting and overall vitality, within an area that contributes to the economic wellbeing of the region. The port and quays contribute significantly to this. The heritage value is also a major factor in this overall value, particularly reflecting the continuous use of the area, which in itself is perpetuated by its current use. The full value of the natural environment is in the range of habitat from mud flat to saltmarsh, to reedbeds, heathland and dunes. The area is, therefore, one of continuing balance between the past and the future and between human use and nature conservation. This balance is emphasised as the strategic aim set out in the Poole Harbour Aquatic Management Plan 2006.

“To promote the safe and sustainable use of Poole Harbour, balancing the demands on its natural resources, minimising risk and resolving conflicts of interest”

To a degree this balance is supported by the zoning that has naturally developed, with the focus of human land and water use to the northeast of the area, the relatively natural development to the southern shoreline and the change in character moving up the harbour to Wareham. There are threats to this balance with the loss of saltmarsh, due in part to die back of spartina, the deterioration of the defences at Brownsea Island, the increased flood risk and pressure on defences and potential for higher rates of erosion resulting from anticipated sea level rise. While in some specific areas, such as the potential for a breach of the Sandbanks peninsula, there could be very direct consequences, over much of the zone it is disruption of interests in one area that could lead to the loss of interrelated value of the zone as a whole. It is this overall interaction which makes it important that the zone is considered as one overall unit.

These values are, therefore, brought together as an interrelated set of management objectives developed from the above, but more specifically from the individual objectives identified in Appendix B and E.

OBJECTIVES (the development of objectives is set out in Appendix D based on objectives listed in Appendix E)

- Support the overall integrated diversity of use and interests in the area as a whole.
- Protect the economic viability of Poole
- Maintain operational viability of Harbour & Port, including dredging and navigation.
- Reduce flood risk to Poole.
- Reduce flood risk to Wareham and Stoborough.
- Maintain the opportunity for commercial, recreational and sports use of the water, in particular the use of critical shore-based facilities,
- Maintain the variety of beach use over the area,
- Manage risk to properties due to erosion and flooding where sustainable,
- Minimise net loss of species/habitat (identify compensatory habitat if any net loss occurs),
- Maintain opportunity for natural development of the mosaic of habitats,
- Maintain the outstanding landscape and the views and appreciation of the varied coastal environment,
- Support the recording of historic environment and maintain heritage values.

- Support adaptability of coastal communities,
- Reduce reliance on defences.

DESCRIPTION

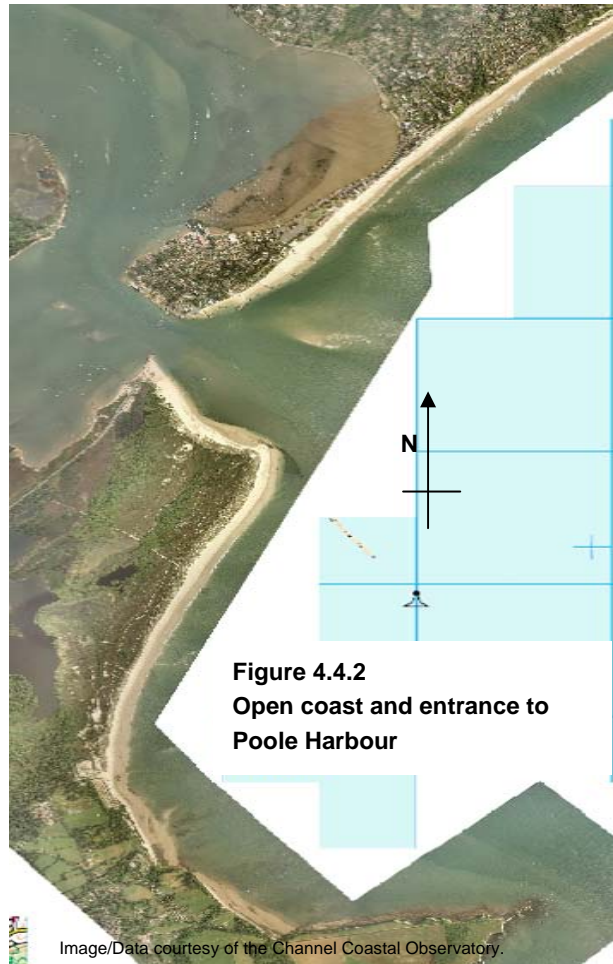
The zone relates to the whole area of Poole Harbour, including its bar-built open coastal area, the wide drowned valley of the Harbour and the upper estuary to the west of the Arne Headland. The following description provides an overview of these three areas.

Open Coast.

This area centres on the entrance to the Harbour. This entrance channel is fixed on its northern side by the relatively wide head of the Sandbanks Spit and on the southern side by the Chain Ferry Terminal on the Studland Dunes at South Haven Point. The channel is controlled by the training bank extending in a south easterly direction at the end of Shell Bay. There is a distinct step in the coast, between the shoreline to the south and that to the north.

The Harbour entrance is located within the much wider Harbour valley, cutting between the clay cliffs at the southern end of Studland Bay and the cliffs forming the start of the northern curve of Poole Bay. The wider entrance has been narrowed by the development of the two spits.

The southern extent of the whole zone consists of chalk cliffs forming the headland of Handfast Point. Within the very direct shelter of this are the cliffs below the village of Studland. The main village is set back some 300m from the cliff line, although there are some properties within 200m. There is a small rock outcrop in the centre of this cliffed section at Redend Point, and the lower cliff to the north sets back here as a small but distinct headland. A wider upper beach is formed at the toe of the lower set back cliff line and there are beach huts and car parks in this area. This frontage has been protected with gabion defences. South Beach to the south-east of Redend Point also has defences in the form of a timber revetment and gabions.



Image/Data courtesy of the Channel Coastal Observatory.



Redend Point

South Beach to the south-east of Redend Point also has defences in the form of a timber revetment and gabions.

The wider upper beach is retained at its northern end by a far less prominent headland and this is protected by gabions. Beyond this headland is the main spit. This comprises

a relatively wide sandy beach backed by dunes forming the main ridge. Behind these dunes the land becomes scrub heathland, through to Poole Harbour behind. In the centre of the heathland is a large lake, the Little Sea, which extends for some of the length behind the dune ridge. The road to the Chain Ferry terminal lies to the Harbour side of the heath.



**Shell Bay
looking from
South Haven
Point.**

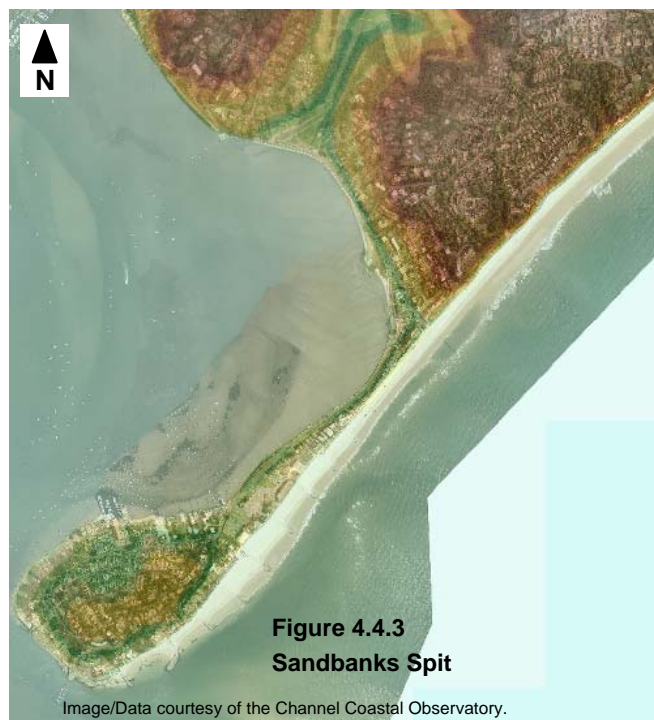
At the northern end of the spit, the dune ridge is wider and held forward at the root of the training bank but then ends abruptly with the slightly curved, concave Shell Bay running through to the ferry. The concrete wall defending the ferry slipway and access road extends some way around on the western side of the spit. However, within 250m of the head, saltmarsh and mud flats are developed against the inner side of the Studland Heath.

The northern Sandbanks spit is fronted by a relatively wide beach that is controlled by rock groyne strong points, with a promenade running along most of the length. The groyne have been specifically designed with walkways to enhance use of the area. The beach width has been maintained with sediment recharge. The beach narrows slightly at its northern end, where the only control has been old timber groyne. The cliffs rise gradually from the spit to a level of some 20m and there are properties and gardens close to the crest. The northern end of the spit forms its narrowest section with a strip of only about 50m between the back of the beach and the harbour side of the road behind.

The road runs the full length of the spit to the ferry terminal. There are properties, shops or beach facilities between the road and the seaward beach. The main community of Sandbanks is situated on the slightly higher and significantly wider southern head of the spit.

Within the inner Harbour, the road hugs the edge of the shoreline and the Luscombe Valley runs inland from the shoreline behind Canford Cliffs to the east of Lilliput Pier.

The foreshore of the Bay comprises sandy mud and, in places there is a narrow strip of saltmarsh fronting on to the road wall. The road is at a low level (2m ODN over most of its length), with the land rising quite steeply behind.



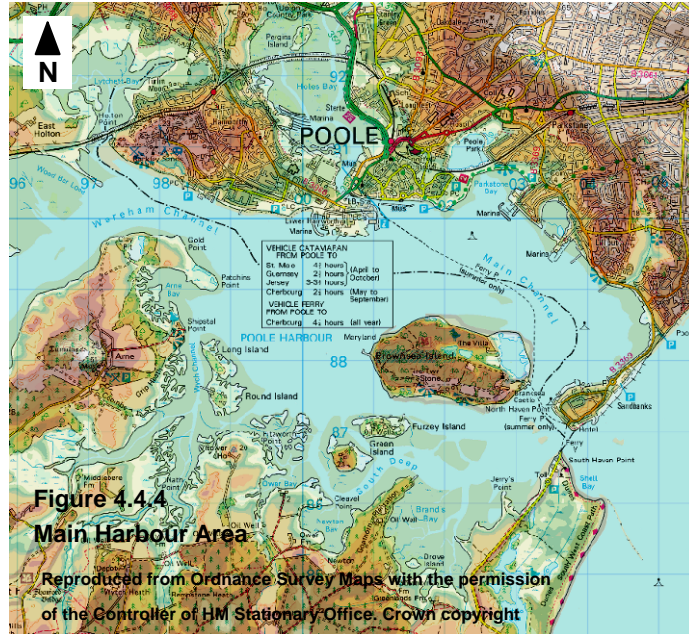
**Figure 4.4.3
Sandbanks Spit**

Image/Data courtesy of the Channel Coastal Observatory.

Main Harbour Area.

A striking feature of the main inner harbour is the relatively steeply rising land within which the harbour area is formed. This is effectively an enclosed lagoon, rather than an active estuary system, as described in the Estuary Assessment provided as Appendix I.

On the northern shore of this area, the high ground falls steeply, with a principal ridge running down through the centre of Poole and with Hamworthy sat on, in effect, a small island. Between these two areas of high ground lies the Holes Bay inlet.



To the southern side the high ground runs into the harbour as a series of ridges and infilled creeks. It is only on this southern side that a more typical estuary system, (associated with the Corfe River and the Hartland Moor to the south of the Arne Peninsula), is formed.

The islands of Brownsea, Furzey, Green, Round and Long Island protrude above water level as relict hill tops, anchored by soft sandstone cliffs, rather than as features formed by estuary processes.

Some reshaping of the system occurs in local erosion of cliffs, some pressure on the main channels to change but also infilling of channels, but, while recognising the local changes and the strong local flows in areas such as the entrance, this is not a typical dynamic estuary system as a whole; at the larger scale the Harbour is geomorphically quite static.



Lilliput and Evening Hill

Along the northern flank of the Harbour, picking up from the Luscombe Valley and Whitley Lake described above, the Sandbanks Road moves slightly away from the coast, over Evening Hill through the settlement of Lilliput. The coastal fringe is protected by a low sea wall and by various private defences to the back of gardens.

This form of private defence is continued through to Lower

Parkstone. Within this section is the small Blue Lagoon, almost entirely enclosed by low breakwaters extending from either side of the inlet mouth. There are relatively new marinas constructed out over the foreshore in various locations. To the west is the larger cove of Poole Park, enclosed by the railway line and embankment and in front of this open, reclaimed land, understood to be in part land fill. This reclaimed area is to the front of quite large areas of property within the potential flood plain and acts as a defence to these. The Baiter recreation ground had within it a gallows, suggesting that this ground was historically relatively high, even before reclamation.

Further west lies the main high ground ridge of Poole. Quite a wide area at the head of the ridge is much lower lying, with areas of the Old Town, waterside and quay within the existing flood plain. This area is the main heart of the town, with significant heritage value, public buildings, the RNLI headquarters and new moorings and hotels. This headland forms one side of the entrance to Holes Bay.

Across the main channel, in Lower Hamworthy, is the main port area, which also lies on low lying land partially within the flood plain. This area, as with the area of the Old Town, is protected by quay walls.

Within Holes Bay, there has been further historical reclamation over the foreshore in the area of Sterte and this has been developed as housing and as an industrial park. The main A350 runs along the edge of the reclamation and is protected over its full length by a rock revetment. Behind the reclaimed land runs the railway line and the Poole station. An area of saltmarsh lies directly seaward of the revetment at this point. The A350 continues along the edge of Holes Bay and cuts across the top of the bay where it joins the A35 running to the west. There are small areas of properties within the potential flood plain in this area at Marshes End.

The railway line then cuts directly across Holes Bay on an embankment with two short bridges. Saltmarsh and mud flat make up most of the bay foreshore to the north of the railway line with deeper larger channels to the south.

On the western side of the Bay there is a major marina and properties built over the slightly higher ground to the edge of the bay. To the north of the main port area at the entrance to the bay is the site of the former power station. This area is under consideration for development.

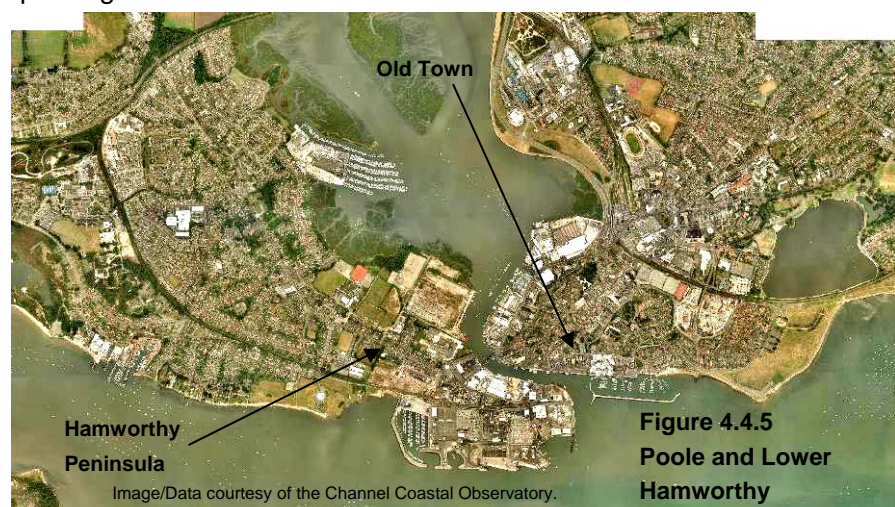


Figure 4.4.5
Poole and Lower
Hamworthy

The port area extends a further 1km along the open shore of the harbour and the railway line to the port acts as a defence for a short section beyond within a small bay. On the

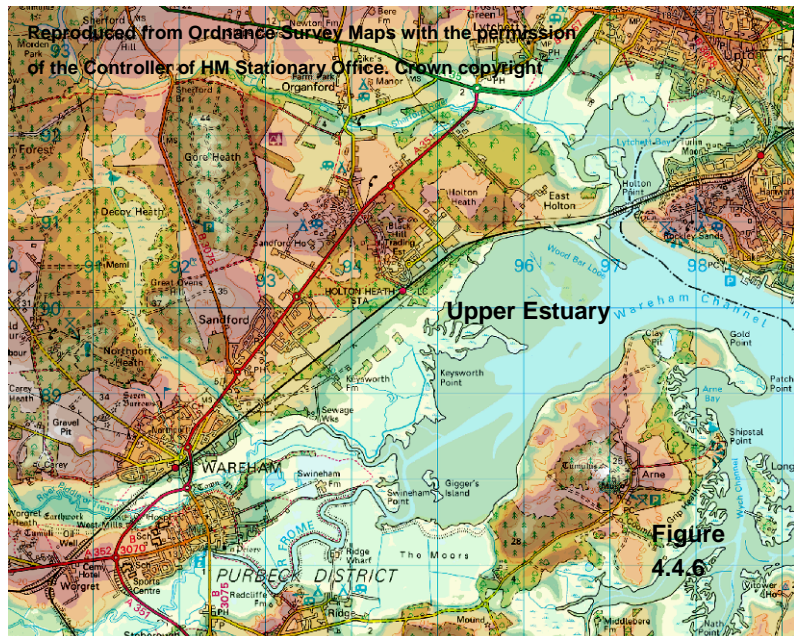
western side of the bay is Hamworthy Park, with a promenade and beach controlled by groynes, along with Environment Agency maintained flood defences. This then leads through to a further area of ad-hoc private defences, a marina and jetties. Further west is Hamworthy Common, described later.

Across the estuary from Hamworthy is the Arne Peninsula. Between here and the back of Studland Heath, is the area of ridges and creeks described earlier. The land is principally agricultural or forestry, although on both the edge of the rising land and on Furzey Island are various oil wells, forming part of the Wytch Farm oil field. There are also small communities such as Goathorn.

On Furzey, Green and Round Island there are properties and several slipways and jetties. On the larger Brownsea Island, there are a larger number of properties and a church. There are local defences in a few locations. To the south east of the island is the site of Branksea Castle, with a small quay and associated properties as well as the National Trust visitor centre. The largest extent of defence on the island is that maintained around the lagoon at the eastern end of the Island. This wall is in moderate condition based on visual inspections and protects important brackish features of the designated SPA and Ramsar site.

Upper Estuary

This section of Poole Harbour is seen as being the only large, truly estuarial part of the system. The two large rivers (Rivers Frome and Piddle) run down either side of the ridge of higher ground upon which Wareham is situated. They then meander out across largely reclaimed marsh to feed into the main Wareham Channel. To the north is the smaller Lytchett Bay fed by the Sherford River.



The entrance to this area is formed between the northern end of the Arne Peninsula and the higher ground of Hamworthy Common. Along the Hamworthy frontage, to the back of the narrow foreshore, is a slowly eroding, low cliff. This is defended along its western end by gabions protecting the Rockley Park Holiday Park. These defences are privately maintained. To the western end of this is a sailing school, before the frontage runs through to where the railway line and embankment crosses the entrance to the Lytchett Bay. The short Rockley Viaduct controls the flow into and from the bay, potentially, also controlling the position of the channel into the main Wareham Channel. Flows within this channel can be strong.

Within the Bay, on its eastern side is the community of Turlin Moor. This community lies principally on land above the existing flood plain. The northern and western frontages comprise of mudflat and salt marsh extending up to more gradually rising land to the south of Lytchett Minster. The A35 cuts in part across the flood plain on an embankment in this area, potentially defending the land to the north.

To the south east of the bay, north of the railway, is the former naval munitions site of Holton Heath. This site lies mainly on the higher ground forming the ridge separating the Lytchett Bay from the estuary to the south. The railway runs to the south of this high ground, very close to the edge of the southern estuary. Its embankment is protected over a considerable length to the west of the Lytchett Viaduct and this embankment is protected by the shallow foreshore and marshes in front.

The two main rivers enter the estuary, to the north (the Piddle) and to the south (the Frome) of the high ground upon which sits the town of Wareham. The whole area is one of deposition, with the rivers meandering between marsh and mud flats. Much of the area has been reclaimed with sea defences fringing the eastern edges of the marsh and with flood embankments along the meandering channels.

The Piddle lies in a relatively narrow channel between Northport and the older centre of Wareham. The main A351 lies within this valley and there are properties and the defended Ryan Business Park within the potential flood plain. The Frome lies in a wider valley to the south of the town, with local areas of the quay around St Mary's Priory, grazing marsh, the south causeway and local areas of Stoborough and Ridge all within the potential tidal flood plain.

The main Frome channel is important for recreational moorings.

The main road to the Arne Peninsula runs from Stoborough, behind Ridge, and in areas cuts across the tidally influenced flood plain.

The Arne Peninsula rises to a level of some 30m ODN (53m ODN the highest) at the village and the area is an important bird reserve, sloping down to a natural foreshore to the estuary and main harbour area.

PHYSICAL PROCESSES (further details are provided in Appendix C)

TIDE AND WATER LEVELS (mODN)

Location	LAT	MLWS	MLWN	MHWN	MHWS	HAT	Neap range	Spring range	Correction CD/ODN
Bournemouth		-0.9	-0.3	0.2	0.6		0.5	1.5	-1.4
Poole harbour Entrance		-0.8	-0.2	0.3	0.8		0.5	1.6	-1.4

Extremes(mODN)

Location:	1:1	1:10	1:25	1:50	1:100	1:200	1:500	1:1000
Bournemouth	1.38	1.63	1.73	1.81	1.88	1.96	2.06	2.14
Sandbanks	1.39	1.63	1.73	1.80	1.88	1.95	2.05	2.12

WAVE CLIMATE

The dominant wave direction is from the south to south-west, which corresponds with the direction of longest fetch and longer period swell waves, originating in the Atlantic Ocean. This direction and the wave energy is substantially changed by the protection afforded by Handfast Point to the extent that waves along the open coast section approach in a curve from the south east. The shoreline can be subject to significant shorter period wind waves from the east and south-east.

Waves in Poole Harbour are generated locally and are limited by the depth and short fetch of the harbour. The largest waves occur along the northern side of Poole Harbour from local south-westerly storm events. Wave heights at Poole Quay can be in the order of 0.9m.

TIDAL FLOW

Generally, within the harbour, flows are relatively low. The obvious exceptions to this are at the entrance to the harbour where flows reach 2m/sec to 3m/sec, with flow in the main channel within the harbour reaching 1m/sec. In other areas the main channels flows are more typically 0.5m/sec, decreasing over the shallow areas to 0.1m/sec. There is a strong tidal race through the constrained entrance to Lytchett Bay. The flow pattern within the Harbour is complex with areas of flood tide continuing to the south of Brownsea while the ebb tide develops through the main channel to the north. The flow patterns are described in detail in Appendix C. It is important to note that Poole Bay and Poole Harbour experience a double high tide.

PROCESSES

Control Features:

At the open coast the dominant control feature is that of Handfast Point. The entrance channel to the harbour, controlled by the training bank, has a strong influence locally on the behaviour of the coast within the shelter of Handfast Point. Locally Redend Point acts to control development of the southern Studland shoreline.

Within the Harbour, there is local influence of the various islands, ridges and the defended northern shoreline but, with the generally low energy environment, such controls are only locally significant. The main features of the harbour are therefore the channels. The open coast spits and entrance are the dominant control features of the Harbour. The behaviour of the entrance and the open coast is influenced by the training banks.

Existing Defences:

Existing defences have been described above. In summary:

- The defences along Sandbanks are generally in good condition with groyne and recharge forming a competent defence.

- Along the northern frontage of the Harbour there are a mixture of private and public defences in various condition. The main road defences are maintained in good condition. Along the main Quays the defences are in good condition with set back flood defence to the main town area of Poole. The main defences within Holes Bay are in good condition.
- To the western end of Hamworthy there are private toe works to the cliff that are deteriorating.
- The flood embankments in front of the Wareham Marshes are maintained and are in moderate condition.
- To the south of the harbour there are local flood defences particularly as bunds around some of the oil wells, although these are principally designed to contain potential pollutants.
- There are also local causeways across many of the creeks to the southern side of the Harbour at Hartland Moor, Rempston and Ower Bay.
- The defences at Brownsea Quay are in reasonable condition but only provide limited level of flood defence. The defence around the Lagoon is low and in only moderate condition. Regular overtopping of the Lagoon could result in its long term failure.
- There are defences in poor condition to the south side of Brownsea Island, with the proposal to remove these defences.
- There are local private rock defences at Goathorn and Shipstall.
- Along the Studland Peninsula there are local defences at the southern end, generally in the form of gabion baskets. These are deteriorating.
- The defence at South Haven Point appears to be in reasonable condition.

Processes:

The processes along the open coast are complex with a relatively enclosed system of sediment feed along the Sandbank Spit into the ebb tide delta of Hook Sands. This feed is variable with potential feed from the Sands back along the Spit. There is reported to be feed both to and from the main frontage of

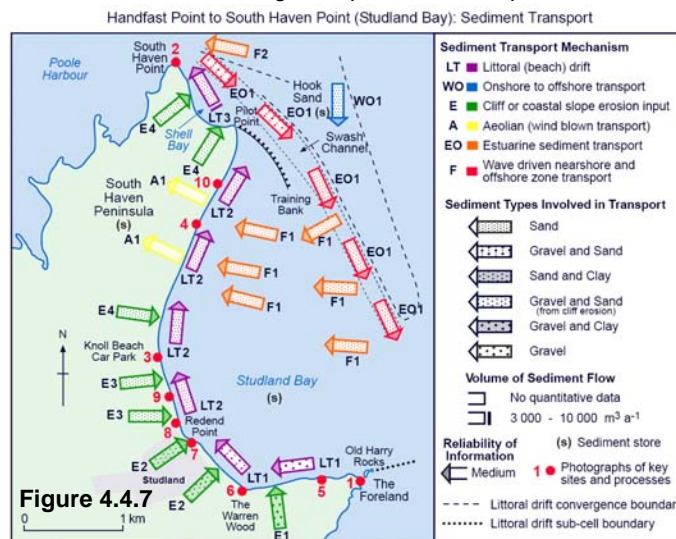


Figure 4.4.7 Map courtesy of SCOPAC, 2004

tends to deposit in the channels and there is a need for dredging to maintain navigation depths.

Poole Bay. Hook Sands provides an important feed to Studland and it is important to maintain this overall circulation of sediment within this local system. The general processes associated with the Studland area are summarised in the adjacent diagram (a larger reproduction of this figure can be found in Appendix C.)

Within Poole Harbour there is a low level of sediment movement, with slow erosion of some of the areas of cliff and low input of fine material from the river systems. Sediment

There remains a considerable degree of uncertainty as to the overall response of the Harbour to sea level rise; whether there is likely to be adequate sediment and width at the fringe of the harbour to allow growth and adaption of saltmarsh and development of transitional habitat. Present studies have identified an overall trend for loss of saltmarsh. This is explained in part due to reclamation in the past and may also be a result of die back of spartina. Even so the risk remains that sea level rise may well result in squeeze of the upper intertidal range of saltmarsh accelerating loss.

Unconstrained Scenario:

Although unrealistic, because of the residual impact of defences, this scenario considers how the coast would respond, if all defences were removed. It is useful in examining the pressure along the frontage.

At the open coast, there would be continued erosion of the shoreline. In the absence of the training bank there would be erosion of the sand dunes along Studland, particularly at the northern end, and potential regular overtopping and potential exposure of Little Sea to regular inundation. It seems unlikely even if the Studland dunes were to be regularly breached or overtopped that there would be development of a new entrance channel in this area. However, along the Sandbanks frontage, breaching of this bank could, in time, create a new more northerly entrance to the harbour. There is little evidence to suggest that this would become a naturally preferred entrance; although equally, there is no geotechnical evidence to indicate any substantially harder geology preventing this. Creation of a permanent entrance across the Sandbanks Spit has the potential to allow creation of distinct flood and ebb dominant channels. This could result in significant change to the configuration of Hook Sands, with further consequential impacts on Studland Bay and dune system. The trend would be for a reduction in the size and influence of the ebb delta, resulting in greater exposure and erosion along the coast. This may provide greater feed of material to the north but with a tendency for material to be taken into the estuary. Such change would have major impacts on the operation of the Harbour, management of the Studland Peninsula and the important aspects of use of the coast. There is a small potential for increased sediment along the Bournemouth frontage but this is unlikely to be significant in terms of management.

Within the Main Harbour, the absence of defences along the northern frontage would result in regular flooding of the narrow coastal plain. There would be a local increase in erosion, within the area of Ham Common the cliffs would continue to erode, providing increased sediment to the system. In the absence of dredging the main channels would tend to infill from their current navigational depths and potentially there would be a degree of slow infill of the whole area. It seems most probable that accretion would tend to further infill the upper estuary around Wareham.

POTENTIAL BASELINE EROSION RATES

Base rates have been assessed from monitoring and historical data. The range of potential erosion is assessed in terms of variation from the base rate and sensitivity in potential sea level rise. Further detail on erosion rates is provided in Appendix C. The base rates provided below are taken as an average based on historical records. The rates are a composite value based on erosion of the toe and recession of the crest of the cliff and reflect the erosion rates following failure of defences.

(Sea Level Rise assumed rates: 0.06m to year 2025; 0.34m to year 2055; 1m to year 2105. Baseline date 1990.)

Location	Base Rate	Notes	100yr. Erosion / Recession (m)
Canford Cliffs	1.8m/yr	Erosion resisted by defences and slopes stabilised	180m
Sandbanks	1.6m/yr	Erosion resisted by defences.	150m
Poole Harbour North	0.2 to 0.5m/yr	Erosion rate difficult to estimate due to existing defences	50m in areas
Upper Estuary		Potential accretion	
Poole Harbour South	0.2 to 0.5m/ yr	Little existing data	50m in areas
Studland Spit	0.6m/yr	Areas of accretion held by training bank	60m
Studland Cliffs	0.4m/yr	Influenced by Redend Point	45m
Handfast Point	0.3m/yr	General erosion of the chalk cliff	30m

4.4.2 BASELINE MANAGEMENT SCENARIOS

PRESENT MANAGEMENT

Present Management is taken as that policy defined by SMP1, modified by subsequent strategies or studies. It should be noted that both in the case of SMP1 and the strategies undertaken before 2005, the period over which the assessment was carried out was 50 years.

SMP1			MODIFIED POLICY		
MU	LOCATION	POLICY	REF	LOCATION	POLICY
PBY1 Open Coast	Sandbanks Ferry Slipway to Point House Café	Hold the Line in the Short and Long Term and control structures.	S4	Sandbanks Ferry Slipway to Point House Café	Hold the line through beach recharge.
PHB 17	North Haven Point to Sandbanks Ferry Slipway	Hold the Line in the Short and Long Term.	S5	North Haven Point to Sandbanks Ferry Slipway	Hold the Existing Line.
PHB 16	Whitley Lake to North Haven Point	Hold the Line in the Short and Long Term.	S5	Whitley Lake to North Haven Point	Hold the Existing Line.
PHB 15	Whitley Lake	Hold the Line in the Short and Long Term.	S5	Whitley Lake	Hold the Existing Line.
PHB 14	Salterns Marina to East Dorset Sailing Club	Hold the Line in the Short and Long Term.	S5	Salterns Marina to Lilliput Pier	Hold the Existing Line.
PHB 13	Parkstone Yacht Club to Salterns Marina	Hold the Line in the Short and Long Term (with possible intervention on the Banks of the Blue Lagoon)	S5	Parkstone Yacht Club to Salterns Marina	Hold the Existing Line.
PHB 12	Parkstone Bay and Baiter Park	Hold the Line in the Short and Long Term	S5	Parkstone Bay and Baiter Park	Hold the Existing Line.
PHB 11	Town Quay	Hold the Existing Line in the Short and Long Term.	S5	Town Quay	Hold the Existing Line.
PHB 10	Holes Bay (E,N & W)	Selectively Hold the Existing Line in the Short and Long Term.	S5	Holes Bay (E,N & W)	Hold the Existing Line.
PHB9	Hamworthy Quays	Hold the Line in the Short and Long Term.	S5	Hamworthy Quays	Hold the Existing Line.
PHB8	Defence 681/2442 to Hamworthy Quay	Hold the Line in the Short and Long Term.	S5	Ham Common to Hamworthy Quays	Hold the Existing Line.
PHB7	Rockley Viaduct /Ham Common	Do Nothing in the Short Term and to Selectively Retreat in the Long Term	S5	Rockley Viaduct to Ham Common	Limited Intervention.
PHB6	Lytchett Bay	Do Nothing in the Short Term (but establish suitable Managed Retreat sites) and in the Long Term to Selectively Retreat the Existing Line	S5	Lytchett Bay	Do Nothing.
PHB5	Hyde's Quay to Holton Point	Selectively Hold the Existing Line (whilst establishing suitable Managed Retreat Sites) in the Short and Long Term.	S5	The Moors - PHB 5a	Hold the Line in the short term until the Poole Bay and Harbour Strategy review outcomes are known. Then implement the measures validated by the strategy within the short term.
			S5	River Frome to Keyworth – PHB 5b	Hold the Line in the short term until the Poole Bay and Harbour Strategy review outcomes are known. Then implement the measures validated by the strategy within the short term.
			S5	Keyworth to Lytchett Bay Bridge – PHB 5c	Hold the Existing Line.

PHB4	South Haven Point to Hyde's Quay	Do Nothing (with Selective Retreat at Slepe Moor) in the Short Term and Do Nothing (with possible selective retreat)	S5	South Haven Point to Hyde's Quay	Limited Intervention, restricted to localised intervention at individual properties.
PHB3	Brownsea Island West	Do Nothing in the Short and Long Term (Local maintenance)	S5	Brownsea Island (Undefended Western Sector)	Limited Intervention (removal of localised defences).
PHB2	Brownsea Island East	Selectively Hold the Line in the Short Term and Selectively Hold the Line in the Long Term.	S5	Brownsea Island (East) – Lagoon – PHB 2a	Hold the Line in the short-term and Managed Realignment in the long term.
			S5	Brownsea Island (East) – Castle -PHB 2b	Hold the Line.
			S5	Brownsea Island (East) – South Shore – PHB 2c	Limited Intervention.
PHB1	The Islands Furzey, Green, Round, Long Islands	Do Nothing in the Short and Long Term (allowing for maintenance of slipways and access points)	S5	The Islands (excluding Brownsea) Furzey, Green, Round, Long Islands	Limited Intervention, restricted to localised intervention at individual properties
STU4	Shell Bay	Selectively Hold the Line, protect from breach.	S6	Shell Bay	Limited Intervention.
STU3	Studland Sandspit	Selectively Hold the Line, dune management	S6	Knoll Beach to Pilot Point	Limited Intervention.
STU2	The Warren to Studland Sandspit	Do Nothing short term, Retreat Long term	S6	Redend Point to Knoll Beach (2b)	Limited Intervention leading to Managed Realignment.
			S6	The Warren to Redend Point (2a)	Limited Intervention.
STU1	Handfast Point to the Warren	Do Nothing	S6	Handfast Point to the Warren	No Active Intervention.

Note: Open coast highlighted in yellow.

References:

S4	<i>Poole Bay and Harbour Strategy – Poole Bay 2004</i>
S5	<i>Poole Bay & Harbour Strategy Study – Poole Harbour 2004</i>
S6	<i>Poole Bay & Harbour Strategy Study – Studland Bay 2004</i>

The key objectives determined from the Catchment Flood Management Plan (2008) for the area are set out below.

- Prevent an increase in the number of people affected by river and tidally influenced flooding;
- Prevent an increase in the economic damages to residential, commercial properties and infrastructure caused by river and tidal flooding;
- Prevent an increase in the economic damages to agricultural land caused by river and tidally influenced flooding in the rural areas;
- Where appropriate to ensure the floodplains are utilised for recreational and green space;

- Where appropriate to ensure rivers and floodplains are utilised for the benefit of nature conservation and restore them to their naturally functioning state, particularly in the urban areas;
- To sustain and improve the condition of internationally and nationally designated sites within areas prone to flooding;
- To increase biodiversity, BAP habitats and amenity values of the river-floodplain environment; and
- Protect significant historic environment assets and their settings from flood related deterioration.

BASELINE SCENARIOS FOR THE ZONE

No Active Intervention (Scenario 1):



Figure 4.4.8

Under this scenario no works would be taken to maintain existing defences along the frontage. Because of the residual impact of structures, evolution of the unconstrained scenario would be modified, although in the longer term the development of the coast would be similar.

Along the open coast the most significant change would be along the Sandbanks Peninsula. Erosion and overtopping would be anticipated to result in a breach of the spit within the second epoch. There would be loss of the beach and property along the whole frontage including the area of the cliffs at the northern end of the zone. The extent of the erosion under this scenario is shown in the adjacent figure.

As a result of this erosion, access to Sandbanks would be cut and there would be increased exposure to the northern defences within the main Harbour. The loss of control along the shoreline would disrupt navigation through the entrance channel.

Along the Studland frontage, erosion would initially be less severe, although this would change significantly as the training bank was lost due to lack of maintenance and outflanking at the root of the bank.

At the northern end, South Haven Point defences would fail but as the control of the main frontage is lost there would be greater volume of sediment carried north towards the entrance.

At the southern end of Studland, erosion would occur, impacting on use of the area but with no anticipated loss of property.

Within the Harbour, to the north, as defence failed the road would be lost and there would be a slight increase in flood risk. The main impact would be in the area of Poole. The condition of defences in this area and along the eastern flank of Holes Bay, may very well survive over much of the SMP period. The main threat would come from increased flood risk. This would result in substantial inundation of the area of Old Town.

There would be a similar response over the area of Lower Hamworthy and the area of the port.

The loss of defences and regular inundation would provide only a limited width for adaption of habitat

with sea level rise, with potential for increased fringe saltmarsh, but this would be restricted due to rising land behind.

To the south of Poole Harbour, there are only local defences and there would be some increased flooding as these failed and as other low lying areas were inundated due to sea level rise. This would provide some additional width for habitat adaption but, as with the northern area, this would be restricted due to rising land levels.

At Brownsea, the failure of the Lagoon defences would result in significant change from the designated features of the lagoon but with the opportunity for creation of a more natural transitional saline habitat. This would however be threatened by the eventual failure of the defences in the area of the Quay. There would be increased erosion at this point of the island and increased exposure of the back shore within the Lagoon. Potentially this would constrain development of saltmarsh. This could be used as mitigation against the benefit of abandoning defence of the Lagoon. Failure of the Lagoon defences would also be likely to affect tidal flows in the major navigational channels to the north-east of Brownsea.

Along the Rockley Park and Hamworthy Common area, erosion would continue. Without some form of management, the process would result in increased instability of the cliff line under the Holiday Park. This would affect assets along this frontage.

Only in the longer term with sea level rise would there be substantially greater flood risk to assets within Lytchett Bay.

Within the upper Estuary around Wareham, unmanaged failure of defences would result in extensive flooding of the marshes, property around Wareham and Stoborough and to the local access roads. The area exhibits good potential for accretion with sea level rise and it is anticipated that there would be significant growth in saltmarsh. Under this scenario, where defences were merely abandoned there would be an impact on the recreational boat use of the river channels, flooding well upstream within the valley of the Frome, which would significantly affect amenity, tourism and nature conservation interests within the area.

The potential economic damages arising from projected erosion and flooding are identified in Table 1 at the end of this sub-section. The potential impacts on the area are assessed in Table 2. These are discussed below.

The overall integrated value of the area would suffer. The balance in values would shift towards those provided by natural development of the zone but even here there could be loss in several areas of saltmarsh, depending on the response of the system to sea level rise. The operation of the Port would be severely affected and the important economic viability of the whole area would be questionable.

With Present Management (Scenario 2):

The present management scenario is based on that set by SMP1 and updated through the development of the recent strategy.

Defence of Sandbanks would be maintained. Through present practice of controlled recharge both the fixed assets and the amenity value of the area would be sustained. This would require increasing effort (more frequent and higher volume recharging) in the future with the impact of sea level rise.

Along the Studland frontage the existing policy of limited intervention would maintain the use of the area. It would however be important to allow a more natural development of the frontage with some acceptance of change in use. Alongside this would be the intent to maintain the training bank. The danger in this and the specific intent of preventing a breach behind the training bank and along Shell Bay would be the potential for extending hard defence in a linear manner along the line of the natural dune.

Within the Main Harbour area, defences would be maintained over the whole northern frontage. This would prevent erosion and manage the risk of flooding. The shift of policy, particularly in the area of Parkstone Bay, from SMP1 policy for potential set back of defences would constrain possible habitat adaption. This shift in policy arises from the identification of risk due to landfill. There is recognised to be limited scope for such adaption but this may be a constraint at a larger scale in meeting the need for nature conservation values over the whole area. The overall policy to maintain the harbour entrance is essential for maintaining use of the Harbour.

The existing policy for holding the line throughout Poole, Holes Bay and Lower Hamworthy addresses the flood risk and maintains the important economic viability of Poole.

The policy for limited intervention over the southern section of the Main harbour, and with respect to the smaller islands, allows continued opportunity for adaption of habitat. At Brownsea, the policy is to allow eventual failure of the defences around the Lagoon and this supports similar adaption. Holding the line at Brownsea Quay would maintain control of the frontage but there is a continued risk of flooding to the properties. This flood risk management is likely to be untenable in the long term.

Along the Hamworthy common frontage through to Rockley Viaduct, the policy is for limited intervention. This provides the opportunity for continued management of defences in front of the Holiday Park. The key issue in this area is the manner in which this might be achieved and the longer term impact and transition between this frontage and the more naturally developing frontage to the east.

The do nothing policy within Lytchett Bay is based on a period of 50 years. The flood and erosion mapping has identified potential flood risk in the area as sea level rises. This needs to be addressed further in a Strategy Study.

Under existing approach, the strategy clarifies the policy of selectively hold the line to the shoreline marshes at Wareham, recognising the legal constraints for defences to be maintained. The policy is for managed realignment with the intent of providing defence to key areas within the valleys associated with Wareham. This provides important scope for habitat adaption.

The potential economic damages arising from projected erosion and flooding are identified in Table 1 at the end of this sub-section. The potential impacts on the area are assessed in Table 2. These are discussed below.

The main concern under this scenario is in relation to potential for adequate adaption of habitat. To a large extent this would depend on the response of existing natural areas to adapt to sea level rise and the potential created by managed realignment at Wareham. Associated with this is the concern with respect to such areas as the Brownsea Island Lagoon, that in allowing defences to fail, there would be a loss of specific features of the internationally designated sites.

Overall, but notwithstanding the above issues, this scenario offers greater potential to provide a more balanced integrated use of the whole zone.

Table 1. Economic Assessment

The following table provides a brief summary of damages determined by the SMP2 analysis for the whole PDZ. Further details are provided in Appendix H. Where further, more detailed information is provided by studies, this is highlighted. The table aims to provide an initial high level assessment of potential damages occurring under the two baseline scenarios. The damages for each epoch are current values. These are discounted to give present values in the final column. It is important for the reader to note that the loss figures quoted only refer to domestic dwellings and no account has been taken of commercial, industrial or infrastructure property values.

ASSESSMENT OF EROSION DAMAGES

Epoch		0 -20 year		20 – 50 years		50 – 100 years		Present Value Damages (£x1000)
No Active Intervention	SMP1 MU	Number of properties	Value x £1000	Number of properties	Value x £1000	Number of properties	Value x £1000	
Location								
Flag Head Chine to Sandbanks	PBY1b	108	18,872	200	17,499	202	5,427	41,797
Sandbanks Head	PHB 16,17	0		10	875	27	725	1,600
Whitley Lake	PHB 15	0		0		9	242	242
Lilliput	PHB14	0		0	175	13	349	524
Blue Lagoon	PHB13	0		3	262	119	3,197	3,459
Parkstone Bay	PHB12	0		0		5	134	134
Poole	PHB11	0		8	700	77	2,069	2,768
Holes Bay	PHB10	0		4	350	118	3,170	3,520
Port of Poole	PHB9	0		2	175	40	1,075	1,250
Lower Hamworthy	PHB8	0		67	5,862	78	2,095	7,957
Rockley/Ham Common	PHB7	0		0		1	27	27
Lytchett Bay	PHB6	0		0		0		
Wareham	PHB5	0		0		0		
Poole Harbour South	PHB4	0		1	89	2	55	143
Brownsea Island East	PHB2	0		6	533	4	109	643
Studland Peninsular	STU4 to 1	0		0		0		
Total for PDZ3								64,065

With Present Management	SMP1 MU							Present Value Damages (£x1000)
<i>Location</i>		<i>No.</i>	<i>x £1000</i>	<i>No.</i>	<i>x £1000</i>	<i>No.</i>	<i>x £1000</i>	
Flag Head Chine to Sandbanks	PBY1b							
Sandbanks Head	PHB 16,17							
Whitley Lake	PHB 15							
Lilliput	PHB14							
Blue Lagoon	PHB13							
Parkstone Bay	PHB12							
Poole	PHB11							
Holes Bay	PHB10			4	350	7	188	538
Port of Poole	PHB9							
Lower Hamworthy	PHB8							
Rockley/Ham Common	PHB7							
Lytchett Bay	PHB6							
Wareham	PHB5							
Poole Harbour South	PHB4			1	89	2	55	143
Brownsea Island East	PHB2							
Studland Peninsular	STU4 to 1							
Total for PDZ3								682
Notes								
Analysis of damages in technical Annex 8 of the Poole Bay Strategy Study (2004) gave a NAI present value of £156 million for PBY1. This included loss of recreational value but was only valued over a 50 year period. Erosion damages within the harbour area are not recorded within the strategy								

ASSESSMENT OF POTENTIAL FLOOD RISK*

		Flood risk total tidal and fluvial 2008		Flood risk total tidal and fluvial 2102		
No Active Intervention	<i>SMP1</i>	Number of properties	Value x £1000	Number of properties	Value x £1000	Averaged PVD (£x1000)
<i>Location</i>	<i>MU</i>					
Poole Harbour North	PHB 6 to 17	967	251,420	5076	64,049,440	415,016
Wareham	PHB5	20	1,770	163	40,750	1,277
Poole Harbour South	PHB4	1	250	6	1,500	588
Brownsea Island	PHB2	12	3000	12	3000	2,152
With Present Management						
With Present Management	<i>SMP1</i>	Number of properties	Value x £1000	Number of properties	Value x £1000	Averaged PVD (£x1000)
<i>Location</i>	<i>MU</i>					
Poole Harbour North	PHB 6 to 17	0	0	0	0	0
Wareham	PHB5	0	0	0	0	0
Poole Harbour South	PHB4	1	250	6	1,500	588
Brownsea Island	PHB2	12	3000	12	3000	2,152

OTHER INFORMATION:

The Poole Harbour Strategy study identified 50 yr Net Present Damages of £46 Million from residential flood damages. The difference between the basic assessment carried out for the SMP2 and that of the more detailed appraisal within the strategy study differentiates between an assumption of general flooding and damages from more extreme (less frequent) events. Damages would increase significantly with sea level rise over the period beyond epoch 2.

* The assessment of potential flood risk bases the number of properties at risk upon the flood zone affected by the 0.5% event (1:200) at the end of each epoch.

Table 2. General Assessment of Objectives

The following table provides an overall assessment of how the two baseline scenarios impact upon the overall objectives agreed by stakeholders. These objectives are set out in more detail within Appendix E. The table aims to provide an initial high level assessment of the two baseline scenarios, highlighting potential issues of conflict. These issues are discussed in the following section, examining alternative management scenarios from which SMP2 policy is then derived.

OBJECTIVE	NAI				WPM			
	Neutral	Fails	Partial	Positive	Neutral	Fails	Partial	Positive
Support the overall integrated diversity of use and interests in the area as a whole.								
Protect the economic viability of Poole								
Maintain operational viability of Harbour & Port, including navigation								
Reduce flood risk to Poole.								
Reduce flood risk to Wareham and Stoborough								
Maintain the opportunity for commercial, recreational and sports use of the water, in particular the use of critical shore-based facilities,								
Maintain the variety of beach use over the area,								
Manage risk to properties due to erosion and flooding where sustainable								
Minimise net loss of species/habitat (identify compensatory habitat if any net loss occurs),								
Maintain opportunity for natural development of the mosaic of habitats,								
Maintain the outstanding landscape and the views and appreciation of the varied coastal environment,								
Support the recording of historic environment and maintain heritage values.								
Support adaptability of coastal communities								
Reduce reliance on defences.								

4.4.3 DISCUSSION AND DETAILED POLICY DEVELOPMENT

In assessing the delivery of objectives under the two baseline scenarios, it is seen that there is quite a stark contrast between the delivery of those aspects relating to the built environment and those relating to nature conservation interests. This is felt to apply more in the medium to long term rather than at present; although these pressures threatening to disrupt the existing balance are starting to become apparent already.

Possibly one of the most significant concerns is the lack of adjustment space available to the natural environment in response to anticipated sea level rise. This is as much a natural phenomenon as it is due to potential future maintenance of defences. The southern shore of the main harbour area provides limited space to allow any progression of mudflat, saltmarsh to transitional habitat; without squeeze of the lower habitats against the naturally rising land. To the northern side of the main harbour, while past reclamation has obviously removed some of this accommodation space, largely the even steeper rising hinterland constrains any useful opportunity to remove defences which could allow future saltmarsh development. There might be scope for some realignment at the Whitecliff Harbourside Park but the strategy has raised concerns that landfill in this area would make this difficult.

Where there is scope for change, on Brownsea Island there are legislative concerns in relation to manage, as opposed to natural change, in terms of loss of brackish habitat, to that of fully saline conditions.

The previous strategy studies of the area, as recorded in the Estuary Assessment (Appendix I), have identified the declining area of saltmarsh over the last few decades. This analysis is unable, however, to make confident predictions as to future behaviour. The strategy studies identify three scenarios based on possible sediment response to sea level rise. In principle, this says that if the conditions are right and there is adequate sediment in the system, there could be accretion of the harbour fringes, maintaining saltmarsh development in line with sea level rise. If this does not occur, then there would be overall squeeze of this habitat against defences and against rising ground, such that there would be accelerated further loss. Clearly this is an area for important monitoring in the future. However, it does not really provide guidance as to how management should be planned to deal with any opportunity.

From the perspective of the SMP, the clear message is that in all areas, where possible, there needs to be an intent to look for opportunity to allow unconstrained width and support development of conditions that encourage natural adaptation of the ecological system. It is recommended that even with the uncertainties and even where there is an overall policy of hold the line, this is still, at the local level, an underlying intent within the plan.

It is only in the area of the upper estuary that there exists a major opportunity to address some part of this general concern. Here there is the unusual constraint that agreements to maintain defences are in place. This potentially constrains the managed realignment options that could be considered and further developed. Notwithstanding these legal constraints, the above intent should apply; that in this area the aim should be to allow natural development of the marshes to address the threat of coastal squeeze elsewhere. Similarly, at Brownsea Island, the underlying intent should be to abandon management

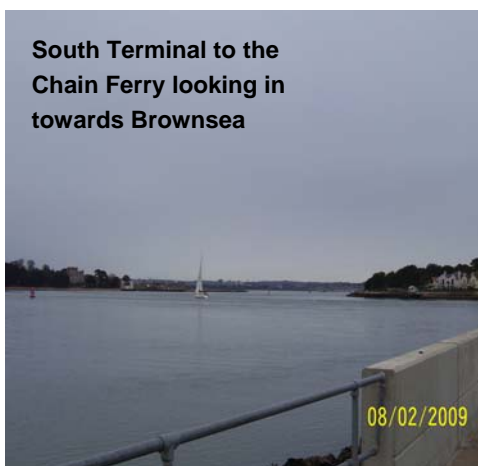
of the Lagoon defences in order to allow natural adaptation, subject to full understanding of the effect on the flows in the Harbour.

The other major issues or areas of difference between the two baseline scenarios are more defined. Under no active intervention, there would be massive disruption of the economic viability of the Port, the central Poole area and extensive damage to properties. At a wider level, the threat of this would be from the breach of the Sandbanks Spit or the unconstrained behaviour of the existing harbour entrance. At a local level this comes from local flooding occurring regularly, as a result of failure of specific flood defences. Without the infrastructure support of the Port and Poole itself, the recreational value of the harbour would be severely damaged.

From these general positions it is possible to consider policy in the specific areas in more detail.

Open Coast.

From the above, the underlying intent of management may be understood as maintaining the integrity of the Sandbanks Spit and harbour entrance, while also maintaining the natural ability of the coast to the south to adapt. These underlying aims are not seen as being in conflict.



Maintaining the northern spit preserves Hook Sands and the circulation of sediment onto the southern shore. The potential area of contention in this could be the training bank to Poole Harbour entrance. This structure impacts on the natural behaviour of Shell Bay and pulls the alignment of the Studland shoreline more seaward of where it might more naturally lie. It is possible that without the training bank in position, there would be erosion of the northern part of Studland Heath and that both Hook Sands and the extent of the dunes would push further to the west. While this could result in some increased supply of sediment to the southern end of Studland, there would be substantial loss or set back of the dune line and significant loss of area of the Ramsar and SAC sites. Associated with this would be the significant disruption to navigational access and egress to Poole Harbour. However historical accretion occurred along this part of the frontage long before the training bank was in place and seaward advance of the dune ridges resulted. It could therefore be argued that the beneficial effects of the training bank to the Studland frontage are minimal (or indeed detrimental), as that part of the frontage is now effectively 'fixed'.

On balance however, it is considered that given the existing designated boundaries of the area, and the substantial economic impact of use of the Harbour, the management of the entrance channel area is best achieved through continued maintenance of the training bank.

There is little threat identified in studies of the area for substantial increase of tidal prism within Poole Harbour and the width of the entrance; although constrained at present, it is not considered to be under any significant additional threat in the future.

Policy along the whole frontage is discussed in detail below.

The open coast to the north (Sandbanks) is integrally linked in plan shape and to a lesser degree by sediment exchange with the main frontage of Poole Bay. There are important local assets at risk over the full length of the cliff to the north, both along and at the head of the spit. Maintaining the spit also secures the important coastal road to the rear and therefore both the essential access to the Sandbanks community and ferry which provides the local population as well as many tourists access to the natural Studland Peninsula area. Maintaining the spit also maintains the important recreational use of the frontage. As a complete unit, the policy for this frontage is, therefore, hold the line. As previously discussed in PDZ2, there is a significant risk that this will be more difficult in the future with sea level rise. The existing approach of controlling the beach with rock groynes and recharge would become increasingly expensive. There is, however, little scope for retreating the line due both to the present level of development and ultimately due to the narrowness of the spit. Inevitably, the control of the frontage would need to be more robust.

Recognising this potential conflict, the local authority has already worked to design defences that actually add value rather than impose constraint of use of the frontage. An example of this is the manner in which the rock groynes have been used to provide additional effective promenade space and the variation of the shape of the rock structures to enhance natural dune and vegetation growth. This approach may be argued to be more akin to an Advance the Line (ATL) policy to develop amenity use of the area beyond that merely of coastal defence. In the future, to maintain the overall value of the area, such an approach may need to be developed further, with scope for attracting joint funding for the frontage management. As such within the third epoch, although the intent of the policy may be said to be fundamentally to maintain the defence, the actual policy could beneficially be developed as one which will actually increase the foreshore area and result in an advance of the mean low water position.

Clearly this would need to be approached within a careful development framework, with the important constraints placed upon impact on the adjacent areas. Specifically:

- Consideration would need to be given in integrating the management with the approach along the rest of Poole Bay;
- Works must take account of and not substantially impact upon the Hook Sands and the consequential supply of sediment to the Studland foreshore; and
- An essential aspect of management would be the continued policy of developing amenity and nature conservation benefits to the area.

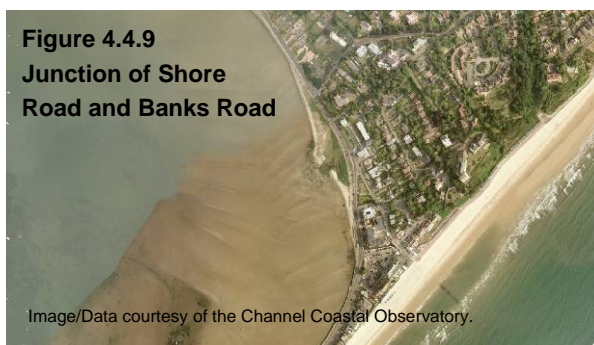
Around the headland of Sandbanks, with the exception of the area of the ferry, much of the frontage is private defences. The overall intent of management, from a public point

of view would be to hold the line to sustain, overall, the integrity of the community, the control of the harbour entrance and access to the ferry and spit head. The policy would be to hold the line, although locally this would be working with private owners to achieve this.

Consistent with the policy for maintaining the neck of the spit and access to the community the policy for defence to the inner face of the spit would also be to hold the line. This policy unit might sensibly be considered to extend all the way around the shore to the Luscombe Valley, in that this maintains important use of the coastal road around the area, maintaining the access link between Sandbanks, Canford Cliffs and to Lilliput. The road at present runs along a very narrow coastal ledge, with rising ground behind. There is no scope for realignment of the road and very little benefit in terms of reducing potential coastal squeeze.

The main issues are at present overtopping and potentially in the future, direct flooding on more extreme events. To maintain the important access route, this risk would need to be considered in detail but is likely to involve raising the level of the front of the defence.

This whole inner length is an area where the future behaviour of the foreshore will be critical. Should sedimentation occur in line with sea level rise, there may be increased areas of saltmarsh along this frontage. This potential is seen very locally where Shore



Road and Banks Road join and where a small occurrence draws forward the shoreline. The important intent in managing the overtopping and flood risk would therefore be to maintain the opportunity for increased sedimentation and even, potentially, in managing the risk to encourage deposition and habitat growth in the area. This latter opportunity would need to be developed in discussion

with conservation bodies, in attempting to rebalance future habitat diversity in a comprehensive manner for the whole area.

Along the Studland frontage, the overall intent would be to allow and encourage the natural development of the coast (notwithstanding the retention of the training bank to the south of the harbour entrance). In detail, the southern cliff to Handfast Point has to be no active intervention. The longer term intent with respect to the soft cliff between along the Studland Village frontage (and to include the north car parks and beach huts) would similarly be no active intervention. This will require some adaptation from the current position of local defences and as such would sensibly be a short term policy of managed realignment, with the longer term intent to allow current use of the area to adapt to the longer term policy. Such a transition of policy would quite specifically be within that longer term intent, such that the aim would not be to maintain defences over a twenty year period but to use the first epoch to allow appropriate withdrawal of defence.

To the north of this frontage, beyond the developed area (beach huts, car parks etc), it is considered more appropriate to treat the whole frontage through to South Haven Point as one unit, rather than as the three strategy level units defined at present. The intent of this is to reinforce the approach that the frontage needs to be managed in a continuous manner. The overriding aim is to allow the frontage to develop, within very local constraints, in a natural manner to maintain the important continuation of coastal processes and natural development of the dune and heathland. As such the preferred policy over the three epochs would be for no Active intervention. Integrated within this unit would be the management objective to maintain the continuity of the training bank, but in such a manner that it assists with control and natural variation and adaption of the whole section of coast. This would impose conditions upon the level and shape of the root of the structure, such that it aims to influence retention of the dune line, rather than there be a need to extend defence linearly over the dune to either side.

South Haven Point would become a management unit in its own right. The policy would be to hold the line and maintain the constraint of the entrance and to provide access to, and maintain use of, the ferry. This unit would extend along the inner shore sufficiently to achieve these aims. Further west, the policy is discussed within the section covering the inner harbour.

In summary, the area described above should be considered as a complete management zone, although within this there are two distinct sub-zones. Over the northern part the intent is to maintain the integrity of Sandbanks, looking potentially to a long term policy which may involve advance the line to enhance the amenity and resilience of the defences. Underlying that intent is to maintain the value and reduce risk to properties along the whole frontage and the cliffs at the northern end. This would include maintaining the coastal roads; Banks Road and Shore Road, extending this whole sub-zone around to the Luscombe Valley. There is little scope within this area to address the concern of possible coastal squeeze resulting from sea level rise within Poole Harbour. However, this issue needs to be borne in mind in developing future approaches to flood risk management of the road and in maintaining the low water use of the bay within the lee of the spit.

Over the southern sub zone, the overall intent is one of managing the natural adaption of the cliff line and the important natural dune and heath system of Studland. The aim is to minimise management, gradually allowing the system to adapt naturally. While policy is defined by epoch, this should not be seen as a step change defined by periods of time. The aim is to continuously move forward from present to the longer term intent. The policies developed would ensure that the overall integrity of Studland Heath is maintained and that there is no risk of breaching the spit.

Underlying the management of the whole area would be the intent to maintain the basic open coast defence to Poole Harbour and the existing entrance. This would necessitate maintaining the training bank which is seen as essential for navigation. This imposes some control on the development of the Studland frontage, which is seen as contributing to the policy of allowing the rest of the frontage to adapt naturally. In maintaining the training bank, particularly at the root of the structure, it is seen as important that this is achieved in a manner consistent with the use of natural processes rather than a linear extension of defence along the line of the dunes. The ferry terminal and access road at

South Haven Point would have a policy of hold the line. This is not seen as conflicting with the aims set out above.

Main Harbour Area.

Within the overall context discussed earlier, the main harbour area may be sub-divided into three principle areas. To the north is the relatively steeply rising, developed land around Poole, with the inlet of Holes Bay set back into the Poole area. To the south is the predominantly natural area of Purbeck, with its ridges of high ground interspersed by small valleys, within which there are local areas of agricultural land, mudflat, saltmarsh and heathland. This area is also seen as containing the group of smaller islands. Between these two major sub-zones is the larger island of Brownsea, which is discussed separately.

Along the northern shore the area is heavily developed both in terms of the numerous marinas and associated facilities and in terms of residential and commercial development. The most significant area of development is the town of Poole and the Port area. Although at a strategy or scheme level, the northern frontage has to be subdivided into many discrete sections, in trying to provide a more comprehensive framework for shoreline management it is considered more appropriate to consider the whole area as five units.

From the Luscombe Valley through to Baiter recreation ground (to the west of Poole Park Lake), the frontage is characterised predominantly by private defences to property and waterside use. There is a short section of road wall at the eastern end, protection to open ground at Whitecliff Harbourside Park and protection to the railway line in front of Poole Park Lake. The road wall is an essential defence in maintaining a principal access route and there is no scope for setting back or re-routing the main road. The railway line is an essential aspect of maintaining the economic viability of the area and the intent here would be to maintain the defence. Along with this, there is not seen to be any significant advantage in allowing open tidal incursion to the lake, as this would increase the severity of flooding to local property, the cricket ground and the amenity facilities. There may, however, be scope in the future for considering adaption of the lake area to allow development of a more natural fringe and development of brackish conditions in compensation for loss elsewhere within Poole Harbour. The detail of this falls below the level of the SMP and is identified purely as a potential opportunity for adaption.

The area of Whitecliff Harbourside Park was considered in SMP1 as having potential for future realignment. This was considered within the strategy and the concern over potential contamination due to landfill sites was felt to rule this out. Without further detailed assessment, SMP2 has to concur with this. However, subject to further investigation and with respect to potential habitat loss throughout the area, this needs to be highlighted as an option for consideration in the future.

Over the rest of the frontage, private defences locally defend gardens and individual properties. There is little overall threat to community assets, except possibly in the long term very locally at the back of the Blue Lagoon. Here, with projected sea level rise there may be a flood risk to the main road and a collection of properties. The whole area is an important resource and collectively the policy may be seen as being appropriately that of hold the line. However, it is unlikely that individually there would be

significant public funding for defence. The intent would therefore be for continued support for management of private defences. In taking this approach, private land owners should be encouraged to consider the possibilities of local setback, where this did not result in instability of the low cliffs supporting hard assets. This might allow some response of the natural system. In many areas of the frontage, this would appear to be in line with the approach already being taken by individual owners.

In the area of the Old Town, there has been a long history of flood risk, potentially affecting many of the well established residential and commercial properties. The quay area provides flood defence as does the frontage of West Quay. This defence is integrated with the use of the Quay, enhancing separation of traffic and pedestrian use of the working area of the Quay. There is scope within this approach for increasing the level of the defence. The potential flood risk area would extend further inland with sea level rise, affecting the newer town centre to the rear. The economic risk to the area, together with the impact on the social and economic viability of the area, is such that the policy for this unit can only be hold the line. Realistically there is no scope for realignment within this area.

Situated on the western bank of the mouth to Holes Bay is the main port area. This is subject to historic flood risk but is also of such social and economic value that a policy for continued defence is the only appropriate action. This area has open ground under consideration for development and is recognised to be of significant benefit in contributing to the economic well being of the town. The area is subject to flood risk but would have little scope for adaptation to natural conditions. While it may be sensible to extend the policy of hold the line over this area, the management details for flood risk needs to be embedded within the future development planning. This general approach should be taken also to future development of the whole port area, such that, although line of the frontage is maintained, the development of facilities within the port needs to take account of present and future flood risk. This should be done in an integrated manner, thereby reducing the overall risk or need for raising of front line defences.

Such an approach would aim to provide reduction in flood risk to the property and community of Lower Hamworthy behind.

This community is at potential longer term risk from flooding from its southern shoreline. This section of the coast is quite similar to that to the east of Poole. There are large areas of private frontages and defences all the way through to the Royal Marine's Amphibious Training Unit at the western end. These defences, the marina and various jetties do extend over a potentially more actively eroding headland; the erosion and whole frontage is controlled by the various structures. This acts to provide some degree of control to the open area of the Hamworthy promenade to the east. Along the promenade frontage, there is a narrow beach controlled by groynes. As a policy, hold the line would deliver the principle local objectives, as well as providing long term flood risk reduction to Lower Hamworthy behind. However, as with the area to the east of Poole, the policy is seen as being delivered in part by support of local private defence in conjunction with public investment in maintaining the promenade.

The final section of this northern zone is Holes Bay. At present even under no active intervention, there is little short term flood risk because of the residual life of defence to the main area of reclamation. The main risk area would be to the northern end around

Marshes End where there is already an identified risk of high tide levels causing flooding problems through backing up of the local sewerage systems; the land to the west of the Bay is relatively high. In the future there is greater flood risk, with sea level rise potentially affecting large areas of Poole and on more extreme conditions, the western side of the bay. Due to the reclamation and the higher levels of the shore to the west, there is generally little scope for increasing intertidal width to allow habitat adaption. However, the shoreline section running west from the Holes Bay North Roundabout to the point at which the railway line intersects the shoreline does provide some opportunity to allow the inundation of lower-lying areas adjacent to Upton Country Park. This may provide an opportunity for the creation of intertidal habitat in the longer term. Although this opportunity at Upton should be taken forward, future management of flood risk would require higher defences around much of the remainder of the bays shoreline. This is likely to be justified given the extensive economic risk which appears to be only a result of more extreme events in the future. As such, future management might be more effectively achieved by a flood barrier at the entrance to the Bay. This possibility would need to be considered at a level beyond the scope of the SMP and would in any event need to be integrated with the defence approach taken within the areas of the port and the Old Town.

The southern side of the Main Harbour area extends from the northern end of the Arne Peninsula through to the western side of the Studland Heath. In principle, the approach to the area would be to allow natural development of the shoreline, quite specifically to allow adaption of habitat with respect to sea level rise. This overall policy would apply equally to the small islands within this zone of the Harbour. It is recognised that locally there are farm properties and development associated with the oil field. Maintaining or improving local defence to such features would not be precluded within the larger intent of the policy, although clearly any works would need to recognise the potential impact on environmental designations. This caveat would apply to the ability to maintain jetties and local shore installations essential for operation of the oil field.

Despite the policy for no active intervention, potentially, there may still be inadequate width to maintain the area of saltmarsh within Poole Harbour. While the response of the whole Harbour to sea level rise needs to be monitored, this concern triggers the need to look for areas of habitat creation, as discussed above in relation to the northern shore and in considering other areas of Poole Harbour discussed below.

The final sub-zone within the Main Harbour is Brownsea Island. The majority of the island's shoreline is undefended with small areas having local defences. The intent of the SMP plan would be to maintain this natural shoreline and as suggested by the strategy, the intent would be to remove defences progressively from around the island. It is at the eastern end and over the south eastern corner of the island that the more significant management issues arise. In the case of the Lagoon, with the deteriorating condition of the defence and the impact of sea level rise, there appears to be a general consensus that maintaining the defence is unsustainable. It is not possible to say with any precision as to when maintenance should be stopped, this being a function of the rate of deterioration which should be monitored. However, the likelihood is that over the first epoch this defence will fail. This raises issues of loss of important designated features within the SPA and Ramsar site. Despite this, given the significant constraint imposed on natural development of nature conservation value, to have other than an overall policy of no active intervention is considered unsuitable. Therefore essentially the

wider approach would be to allow the longer term failure of defences without intervention that seeks to maintain the current habitat status. This general approach should not preclude localised management of the lagoon defences taking place in the short term to address health and safety concerns.

The attitude of the SMP2 in considering Brownsea Island as a whole rather than as distinct sections, immediately highlights the interrelationship between management of the Lagoon and management of the main defended section around Brownsea Castle. This south east section of the island is significantly exposed to wave energy through the entrance to Poole Harbour. As such, maintaining this section of defended coast is seen as being strategically important in allowing a controlled no active intervention to take place within the Lagoon and to a degree in allowing a controlled no active intervention to take place along the southern shoreline of the Island. The defended section also provides local protection to important landing facilities, heritage site and the visitor centre to the island. These local assets are at flood risk and it is accepted that in terms of flood defence, maintaining flood defence of the property is likely to be untenable, possibly beyond 30 years. There will need to be an exit strategy for those quayside buildings as they become untenable and this indicates that managed realignment would be the preferred option in the 2nd epoch. The need to readjust the remains of the lagoon wall for ecological and navigational reasons would suggest that managed realignment is also the correct option for the third epoch.

Upper Estuary

This section of the zone comprises three specific areas: the Ham Common area between the railway embankment at the mouth of Lytchett Bay, Lytchett Bay itself and the upper section of the Wareham Channel and marshes around Wareham.

To the eastern end of the first of these areas, there is the open ground of Ham Common, within which is a lake and open heath land. The area is part of the SPA. To the east of the Common there is a car park and jetty. Sections of this frontage have been defended but the policy now is to progressively reduce defence, allowing natural behaviour of the narrow foreshore. To the western end is the Rockley Holiday Park, which has a more continuous defence. The area is subject to slow erosion pressure but is unlikely to impact significantly on hard assets over the period of the SMP. The overall policy for the frontage would be one of managed realignment over the period of the SMP. The current defences do maintain the coast to some degree in front of what might appear to be the natural line of the coast and this potentially does provide a degree of control on the adjacent frontages. The current defence is not seen, however, as having a major impact on processes and the intent of the plan would be to allow a gradual change back to a more natural response of the shoreline. Potentially this might be staged such that failing defences might initially be maintained and that, possibly over the first epoch, the approach to defence may change from a linear defence to focus on reinforcing local sections. This would gradually reduce the impact of defences in keeping with the use of the area. This might have the benefit of creating small pockets of upper beach. It would be intended that beyond epoch 1 and during epoch 2, defence may actually be stopped, allowing the approach to defence to adapt to management of a more natural coastal edge. This would need to be assessed in relation to the willingness of the caravan park owners to finance the costs of defence.

To maintain the function of the railway line to the west, the embankment would be held and the defence of Ham Common adjusted to maintain processes through to this section.

At present there is some local flood risk to properties around the edge of Lytchett Bay and to the property around North Holton Farm; this latter area is possibly defended by the embankment of the A35 road. In the longer term, there is an increased risk to property, including, potentially, part of the school at Turlin Moor. On a broad scale the aim within this area is to allow overall natural development of the shoreline and habitat. Given that property flooding would appear to be associated with higher return period events, it would seem appropriate that the continuing risk is managed by set back defence minimising incursion on the more normal flood plain of the bay. It is uncertain to what degree the A35 acts a competent defacto defence of the area to the north. Notwithstanding this, and following appropriate numerical modelling studies, consideration should be given to allowing increased flooding to the open land and providing only local defence to property around the fringe. Around Turlin Moor there is a greater requirement to manage the flood risks more robustly. It is proposed that some realignment takes place during epoch one to set back the defensive line to a more sustainable position, followed by a hold the line policy during epochs two and three.

The railway line continues to run a distance of some 600m along the side of the estuary to the west of the Rockley Viaduct. There is some concern with respect to potential contaminated land associated with the old Holton Heath Cordite Factory. The foreshore in areas is narrow against the railway line. The policy in the area would be to hold the line, with the intent of maintaining the important transport link.

Further up stream, the large area of reclaimed land either side of and in front of Wareham, is cut by the two largest rivers in the Poole Harbour system. There are several existing legal agreements between the Environment Agency and relevant landowners for the Environment Agency to maintain existing defences for land drainage purposes in these areas. The presence on the River Frome of the tidal defences prevents the evacuation of drainage and river flood water in low lying agricultural areas on high tide and that this may get more pronounced over time.

There is scope on the River Piddle defended area as having the best potential within the system to provide replacement saltmarsh habitat for that which may be lost elsewhere as a result of sea level rise. Certainly this upper estuary shows characteristics of having been an area of sediment retention and this would support the conclusion. The policy unit indicating the preferred area for realignment (on the west bank) would be located to the north of Keyworth Point and include the large area of saltmarsh which extends eastwards out into the estuary.

The Environment Agency are currently developing a strategy for the area and, depending on the outcome of this, the SMP can only consider high level policy for the area in relation to an overall sustainable approach to management.

Despite the existing commitment to defence, the long term intent of management should be for managed realignment. Defences would need to be set back to ensure that defence to properties further back towards the town was maintained. The lower defended marshes and areas upstream are designated SPA and SAC and compensatory habitat for areas affected by saline flooding would need to be identified.

The SMP anticipates withdrawing management to the front line defences over the first epoch, this being subject to resolution of legal issues with respect to defence and in relation to identifying suitable compensatory habitat during discussions with the appropriate stakeholders. However, the policy of managed realignment is proposed for all three epochs.

It is recognised that there are several different independent flood cells and therefore there is the potential for the above managed realignment to be achieved through a staged approach. This needs to recognise the important water use amenity provided by the river and such a staged approach could provide opportunity for use of the rivers to adjust to change. It would also be seen as a means to optimise development of intertidal habitat as a progressive process over the first epoch, with the potential to restore the balance of natural habitats within the Poole Harbour area over the first epoch. This process is recognised to take time and needs to be managed within a broad level plan for habitat replacement.

To the eastern side of the upper estuary, along the Arne Peninsula, the policy would be for no active intervention. This will continue the present policy from the with present management Scenario. There is some indication that the main road to Arne might be within the long term extreme water level flood plain. This is a longer term risk but it might be concluded that in future, some set back defence may be required to maintain this transport link.

Management Areas

In summary, therefore, although the zone has been described in three principal sections policy may be better defined with five management areas. In the case of PDZ3 there are issues that cut across these areas.

- Management of the whole open coast area aims to maintain the barrier across the wider Poole Harbour valley, while also maintaining the existing harbour entrance.
- There is a potential risk of long term saltmarsh loss within Poole Harbour; in all areas, even where the general policy is for hold the line, local opportunity should be sought to address this threat to the integrity of the designated site. The potential for loss and coastal squeeze should be investigated through on-going monitoring.
- Navigation throughout the Harbour area is an essential value of the zone and this needs to be supported through appropriate management of all areas.

PDZ3

Management Area Statements

PBY/STU H – Open Coast - Flag Head Chine to Luscombe Valley (CH. 41 TO –CH 47 KM.) **and South Haven Point to Handfast Point** (CH. 117 TO –CH 123.8 KM.)

Covering previous SMP1 management units PBY1(part), PHB17, PHB16, PHB15 and STU4, STU3, STU2, STU1

PHB I – Luscombe Valley to Ham Common (Poole Harbour North) (CH. 47- TO –CH 66.7 KM.)

Covering previous SMP1 management units PHB14 to PHB8

PHB J – Ham Common to Arne Peninsula (Upper Estuary) (CH.66.7 - TO – CH 87 KM.)

Covering previous SMP1 management units PHB7 to PHB5

PHB K –Arne Peninsula to South Haven Point (Poole Harbour South) (CH.87 - TO – CH 117 KM.)

Covering previous SMP1 management units PHB1 and PHB4

PHB L –Brownsea Island

Covering previous SMP1 management units PHB2 and PHB3


Location reference:	Flag Head Chine to Luscombe Valley and South Haven Point to Handfast Point
Management Area reference:	PBY/STU H
Policy Development Zone:	PDZ3

* Note: Predicted shoreline mapping is based on a combination of monitoring data, analysis of historical maps and geomorphological assessment with allowance for sea level rise. Due to inherent uncertainties in predicting future change, these predictions are necessarily indicative. For use beyond the purpose of the shoreline management plan, reference should be made to the baseline data.



The following descriptions are provided to assist interpretation of the map shown overleaf.


100 year shoreline position:

The following maps aim to summarise the anticipated position of the shoreline in 100 years under the two scenarios of "With Present Management" and under the "Preferred Policy" being put forward through the Shoreline Management Plan.


-  In some areas the preferred policy does not change from that under the existing management approach. In some areas where there are hard defences this can be accurately identified. In other areas there is greater uncertainty. Even so, where the shoreline is likely to be quite clearly defined by a change such as the crest of a cliff the estimated position is shown as a single line.


- Where there is a difference between With Present Management and the Preferred Policy this distinction is made in showing two different lines:


-  With Present Management.
-  Preferred Policy.

-  In some areas, the Preferred Policy either promotes a more adaptive approach to management or recognises that the shoreline is better considered as a width rather than a narrow line. This is represented on the map by a broader zone of management:

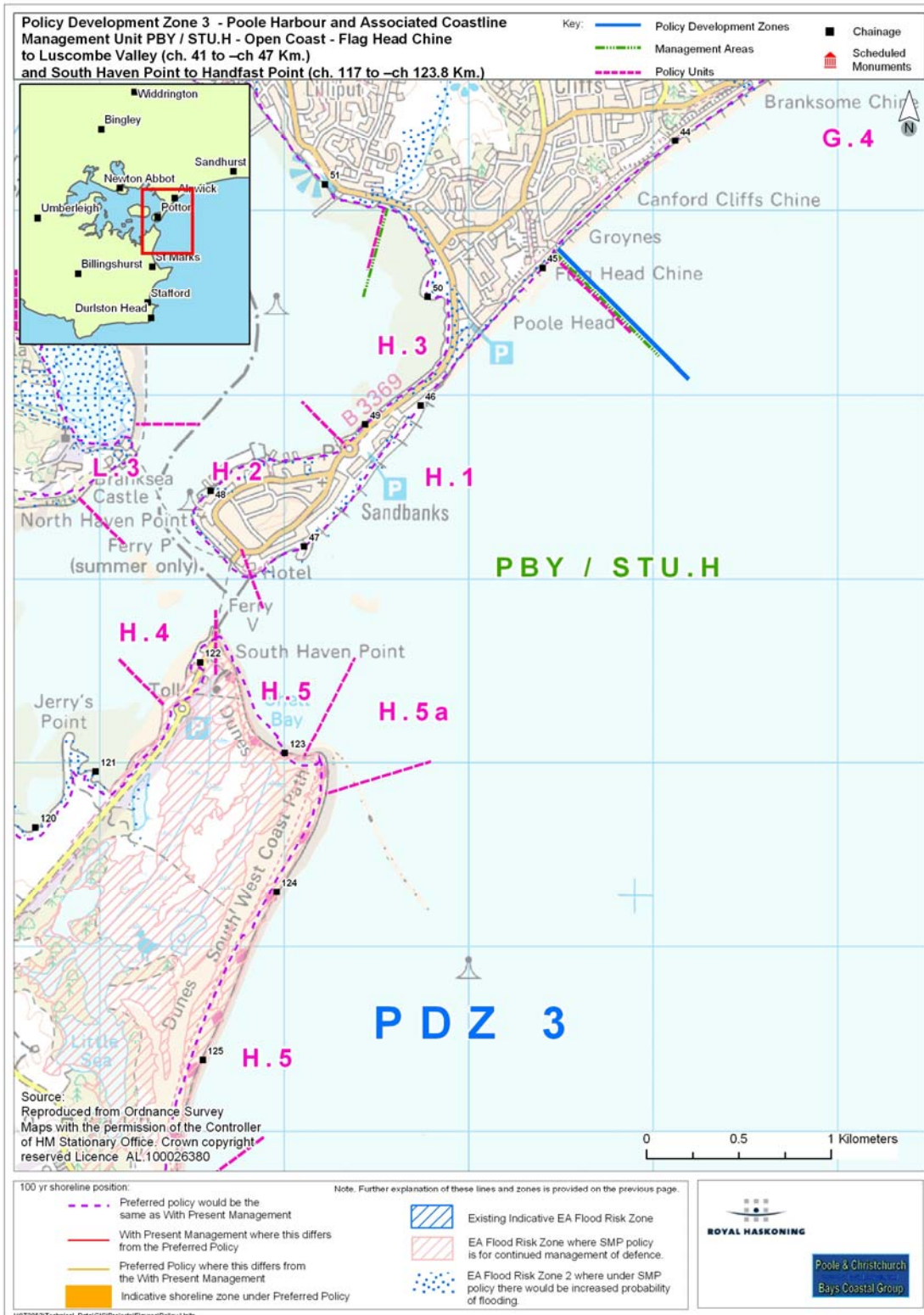
Flood Risk Zones

 General Flood Risk Zones. The explanation of these zones is provided on the Environment Agency's web site www.environment-agency.gov.uk. The maps within this SMP document show where SMP policy might influence the management of flood risk.

 Indicate areas where the intent of the SMP policy is to continue to manage this risk.

 Indicate where over the 100 years the policy would allow increased risk of flooding.

The maps should be read in conjunction with the text within the SMP document.



SUMMARY OF PREFERRED PLAN RECOMMENDATIONS AND JUSTIFICATION

PLAN:

This section of the coast has to be considered as management of the whole open coast barrier system to Poole Harbour, although management of different areas varies considerably to reflect the local values. The underlying intent of the plan is, therefore, to maintain a competent coastal barrier, with the entrance to the harbour maintained in its present position. In terms of on-going management this intent is met by the need to maintain the defence of the Sandbanks peninsula and maintain control of the Harbour entrance at the head of this peninsula and on the southern side at South Haven Point. Over the northern half of the area the more local intent is to maintain sandbanks through control of the drift locally to the shore and to provide recharge as necessary. The aim is to develop the approach being taken at present such that the frontage continues to provide both protection and amenity value. The pressure on the frontage will increase with sea level rise but the outlined approach is considered sustainable.

An important consideration in management is to maintain a degree of sediment supply to the wider area, particularly through the ebb system of Hook Sands through to Studland. There is a constraint on management, therefore that works undertaken to maintain Sandbanks should not detrimentally impact on this entrance system. There may be a need in the final epoch, as pressure grows on the coast, to further develop the present approach of using coastal defence structures for amenity purposes. This would need to be taken forward within a broader framework of management so that the overall system is not disrupted. The aim for this northern section would also be to maintain defence around Sandbank Village through private and public collaboration to maintain the integrity of the village. The Management area extends within the Harbour to include the inner face of the peninsula and to maintain protection to the main shore road.

On the southern side of the entrance, the dominant feature is the natural value of the Studland Peninsula, reflected in the conservation designations. The long term aim is to restore the natural functioning of coast within the area. It is accepted that this function is modified by the control of the entrance channel, particularly in relation to the training banks. These artificial constraints are not seen as being in conflict with the aim to deliver a more naturally functioning coastline. The aim or intent of the plan is, therefore, to adapt use of the frontage so that there is no requirement for hard management of the coast. This will mean that existing defences are allowed to fail or are actively removed and the local fixed assets such as beach huts, car parks are moved. This will require co-operation between various interest groups and development of a shoreline use plan. Maintaining the training bank does influence the frontage providing a degree of control to the northern end. This is seen as an important structure in providing a transition between the harder control of the Harbour entrance and the natural management of the main beach area.

PREFERRED POLICY TO IMPLEMENT PLAN:	
From present day	Maintain defences to Sandbanks through shoreline structures and beach recharge. Maintain defences with the harbour. Work towards removal of defences to the southern end of Studland and manage use of the main beach so as to reduce conflict with a policy of NAI.
Medium term	Maintain defences to Sandbanks as above. Monitor NAI approach at Studland
Long term	Maintain defences to Sandbanks as above. Monitor NAI approach at Studland

SUMMARY OF SPECIFIC POLICIES

Policy Unit		Policy Plan			Comment
		2025	2055	2105	
PBY/STU . H.1	Flag Head Cliff to Sandbanks Head	HTL	HTL	HTL/A	Maintain amenity and opportunity for habitat enhancement.
PBY/STU H.2	Sandbanks Village	HTL	HTL	HTL	Private and public collaboration.
PBY/STU .H.3	Sandbanks Inner Face	HTL	HTL	HTL	Need to maintain low use of foreshore with the potential opportunity for Habitat management.
PBY/STU . H.4	South Haven Pt.	HTL	HTL	HTL	Maintain access to Ferry.
PBY/STU . H.5	Studland Dunes	NAI	NAI	NAI	Managed adaption to naturally functioning shoreline. This would not preclude local management.
PBY/STU . H.5a	Training Bank	HTL	HTL	HTL	Managed as part of overall unit PBY/STU. H.5 within which this sub-unit sits.
PBY/STU . H.6	Studland Village	MR	NAI	NAI	Maintain existing defences within the context of longer term NAI.
PBY/STU .H.7	The Warren to Handfast Point	NAI	NAI	NAI	
Key: HTL - Hold the Line, A - Advance the Line, NAI – No Active Intervention MR – Managed Realignment					

CHANGES FROM PRESENT MANAGEMENT

The overall intent of management has not changed substantially from SMP1. The shoreline has been defined by different unit boundaries to better achieve the approach to NAI along the Studland area.

IMPLICATION WITH RESPECT TO BUILT ENVIRONMENT

Economics		by 2025	By 2055	by 2105	Total £k PV
Property	Potential NAI Damages/ Cost £k PV	18885	18415	6432	43732
	Preferred Plan Damages £k PV	13	41	38	92
	Benefits £k PV	18872	18374	0	43640
	Costs of Implementing plan £k PV	2091	1671	1242	5004


Location reference:	Luscombe Valley to Ham Common
Management Area reference:	PHB I
Policy Development Zone:	PDZ3

* Note: Predicted shoreline mapping is based on a combination of monitoring data, analysis of historical maps and geomorphological assessment with allowance for sea level rise. Due to inherent uncertainties in predicting future change, these predictions are necessarily indicative. For use beyond the purpose of the shoreline management plan, reference should be made to the baseline data.



The following descriptions are provided to assist interpretation of the map shown overleaf.


100 year shoreline position:

The following maps aim to summarise the anticipated position of the shoreline in 100 years under the two scenarios of “With Present Management” and under the “Preferred Policy” being put forward through the Shoreline Management Plan.


-  In some areas the preferred policy does not change from that under the existing management approach. In some areas where there are hard defences this can be accurately identified. In other areas there is greater uncertainty. Even so, where the shoreline is likely to be quite clearly defined by a change such as the crest of a cliff the estimated position is shown as a single line.


- Where there is a difference between With Present Management and the Preferred Policy this distinction is made in showing two different lines:

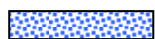
-  With Present Management.
-  Preferred Policy.

-  In some areas, the Preferred Policy either promotes a more adaptive approach to management or recognises that the shoreline is better considered as a width rather than a narrow line. This is represented on the map by a broader zone of management:

Flood Risk Zones

 General Flood Risk Zones. The explanation of these zones is provided on the Environment Agency’s web site www.environment-agency.gov.uk. The maps within this SMP document show where SMP policy might influence the management of flood risk.

 Indicate areas where the intent of the SMP policy is to continue to manage this risk.

 Indicate where over the 100 years the policy would allow increased risk of flooding.

The maps should be read in conjunction with the text within the SMP document.



SUMMARY OF PREFERRED PLAN RECOMMENDATIONS AND JUSTIFICATION

PLAN:

This area includes the core residential, commercial and heritage centre of Poole. The principal aim over the whole area is to maintain the important regional and national economic viability of the area. As such the policy throughout the area is to continue to defend the built and recreational assets. There are, however, important broader issues for the whole of Poole Bay due to the potential squeeze of habitat and the inability for the Harbour to respond to sea level rise without loss of important nature conservation interest.

Therefore, while the need to defend the existing shoreline is well established, there needs to be an underlying aim to consider any opportunity, locally to allow adjustment of the specific line of these defences. Specific areas that would need further consideration would be within Parkstone Bay. However, there may be smaller scale opportunity in the manner in which private defences are managed over the whole area.

Within Holes Bay, the main defence is along the southern and eastern side of the bay. There is little anticipated risk to the area of the Upton Country Park and this area has in fact been identified as an area of opportunity for the creation of intertidal habitat, through a local policy of non-intervention in this specific area. This is consistent with the overall intent to maintain existing defences but to encourage an approach which looks for nature conservation gains.

PREFERRED POLICY TO IMPLEMENT PLAN:	
From present day	Maintain existing defences.
Medium term	Maintain and raise existing defences, but working locally to allow scope of some readjustment of defences.
Long term	Maintain and raise existing defences, but working locally to allow scope of some readjustment of defences.

SUMMARY OF SPECIFIC POLICIES

Policy Unit		Policy Plan			
		2025	2055	2105	Comment
PHB. I.1	Luscombe Valley to Parkstone Bay	HTL	HTL	HTL	Private and Public collaboration, further examination of potential habitat adaption.
PHB. I.2	Poole Quay	HTL	HTL	HTL	
PHB. I.3	Holes Bay	HTL	HTL	HTL	Possible investigation of barrier and adaption through development framework
PHB. I.3a	North-west Holes Bay	NAI	NAI	NAI	Opportunity to gain additional intertidal habitat.
PHB. I.4	Port Area	HTL	HTL	HTL	Adaption through development framework
PHB. I.5	Lower Hamworthy	HTL	HTL	HTL	Private and Public collaboration
Key: HTL - Hold the Line, A - Advance the Line, NAI – No Active Intervention MR – Managed Realignment					

CHANGES FROM PRESENT MANAGEMENT

No significant change from SMP1 policy. However, locally the approach to defence should look for opportunities for habitat enhancement.

IMPLICATION WITH RESPECT TO BUILT ENVIRONMENT

Economics		by 2025	by 2055	by 2105	Total £k PV
Property	Potential NAI Damages/ Cost £k PV	178236	142882	113241	434359
	Preferred Plan Damages £k PV	0	350	188	538
	Benefits £k PV	178236	142532	113053	433821
	Costs of Implementing plan £k PV	10634	2138	2777	15549


Location reference:	Ham Common to Arne Peninsula
Management Area reference:	PHB J
Policy Development Zone:	PDZ3

* Note: Predicted shoreline mapping is based on a combination of monitoring data, analysis of historical maps and geomorphological assessment with allowance for sea level rise. Due to inherent uncertainties in predicting future change, these predictions are necessarily indicative. For use beyond the purpose of the shoreline management plan, reference should be made to the baseline data.



The following descriptions are provided to assist interpretation of the map shown overleaf.


100 year shoreline position:

The following maps aim to summarise the anticipated position of the shoreline in 100 years under the two scenarios of “With Present Management” and under the “Preferred Policy” being put forward through the Shoreline Management Plan.


-  In some areas the preferred policy does not change from that under the existing management approach. In some areas where there are hard defences this can be accurately identified. In other areas there is greater uncertainty. Even so, where the shoreline is likely to be quite clearly defined by a change such as the crest of a cliff the estimated position is shown as a single line.


- Where there is a difference between With Present Management and the Preferred Policy this distinction is made in showing two different lines:


-  With Present Management.
-  Preferred Policy.

-  In some areas, the Preferred Policy either promotes a more adaptive approach to management or recognises that the shoreline is better considered as a width rather than a narrow line. This is represented on the map by a broader zone of management:

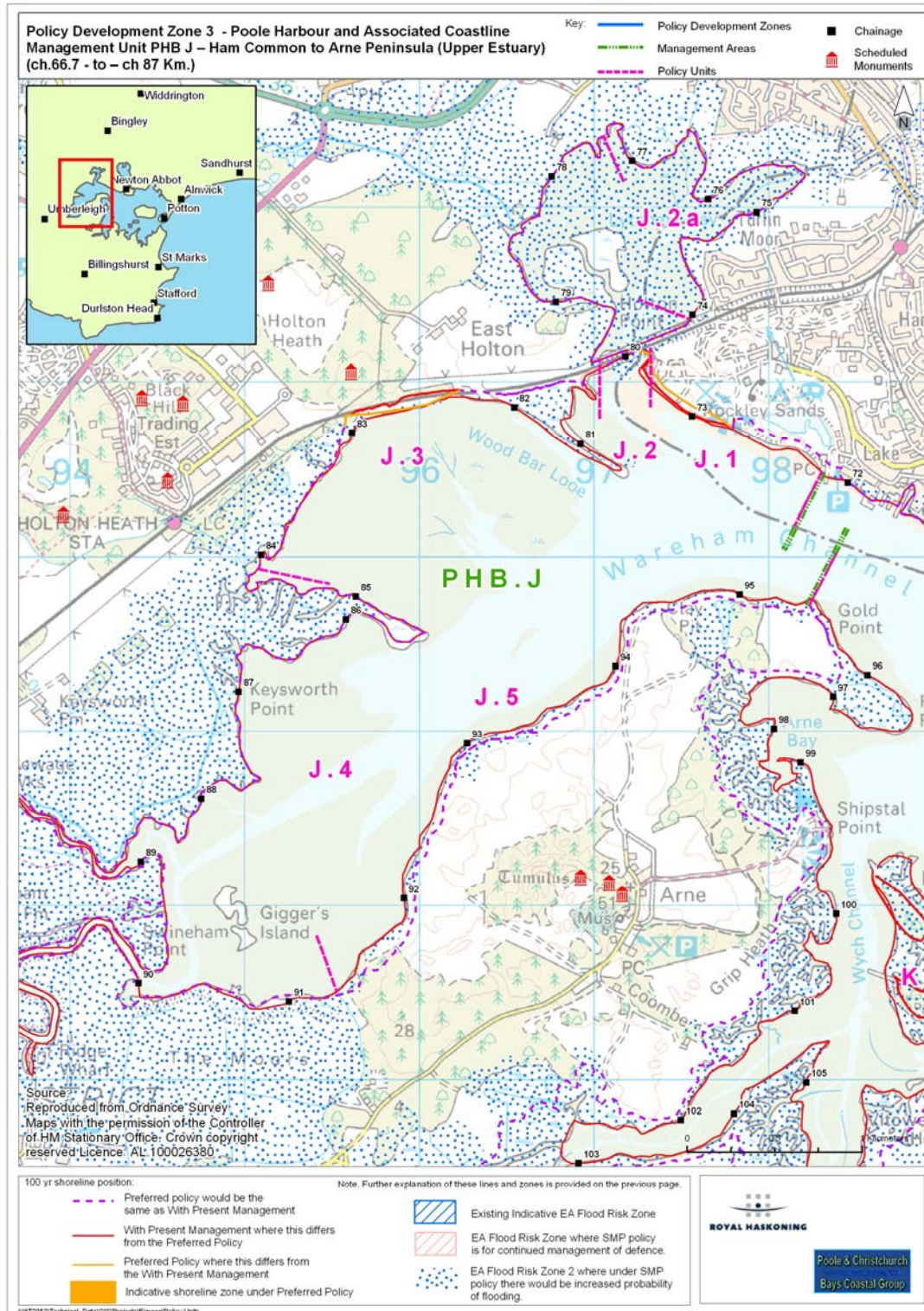
Flood Risk Zones

 General Flood Risk Zones. The explanation of these zones is provided on the Environment Agency’s web site www.environment-agency.gov.uk. The maps within this SMP document show where SMP policy might influence the management of flood risk.

 Indicate areas where the intent of the SMP policy is to continue to manage this risk.

 Indicate where over the 100 years the policy would allow increased risk of flooding.

The maps should be read in conjunction with the text within the SMP document.



SUMMARY OF PREFERRED PLAN RECOMMENDATIONS AND JUSTIFICATION

PLAN:

This area provides the greatest opportunity for adjustment of defences, allowing for improvement and adaptation of the vital nature conservation interest of Poole Harbour, in line with sea level rise. This forms a primary intent for the area. The intent, however, is also to continue to manage key areas of the built environment, specifically areas of Turlin Moor, the railway line and the centres of Wareham and Stoborough.

Along the Ham Common frontage the aim of the plan is to increasingly manage defences to allow a more natural response of the coast in keeping with the designated value of the area. this needs to be developed in conjunction with the owners of the Holiday Park.

In the Wareham area, despite constraints imposed by agreements for continued defence, the intent would be to allow increased inundation of land currently defended, with the aim to restore a more naturally functioning system. This approach is being examined in more detail through the Environment Agency's emerging strategy.

There would still be the intent to defend core areas of Wareham and Stoborough and to support adaption of amenity resources within the two rivers.

The aim would be to maintain defence to the railways but this should be undertaken in a manner to minimise impact on the natural development of intertidal habitat in the area. There is recognised to be a potential issue of contamination in this area around Holton Heath and this needs further examination.

PREFERRED POLICY TO IMPLEMENT PLAN:	
From present day	Maintain defences in the area, while developing a more adaptive approach which would be followed during the first epoch.
Medium term	Maintain defences to core areas of residential and commercial value and to the railway line.
Long term	Maintain defences to core areas of residential and commercial value and to the railway line.

SUMMARY OF SPECIFIC POLICIES

Policy Unit		Policy Plan			Comment
		2025	2055	2105	
PBH.J.1	Hamworthy Common	MR	MR	NAI	The policy would allow local management and maintenance by the Caravan park's owners on the existing defences. However it is important to note that this option would not be supported by government funding. If the caravan park ceases to exist or the owners no longer undertake the maintenance of the defences the government will not fill the funding gap. In long term the intent would be to gradually remove the influence of management.
PBH.J.2	Lytchett Bay	NAI	NAI	MR	Set back defence subject to impact of sea level rise.

PBH.J.2 a	Eastern Lytchett Bay	MR	HTL	HTL	Establish new defence line to hold into future epochs
PBH.J.3	Holton Railway Line	HTL	HTL	HTL	
PBH.J.4	Wareham	MR	MR	MR	Subject to strategy study outcome.
PBH.J.5	Arne Peninsula	NAI	NAI	NAI	
Key: HTL - Hold the Line, A - Advance the Line, NAI – No Active Intervention MR – Managed Realignment					

CHANGES FROM PRESENT MANAGEMENT

There are significant changes from SMP1 in terms of policy, although SMP2 is developing on approaches identified in subsequent strategy for an overall approach of managed realignment. The most significant areas of change are at Ham Common, where the plan is for progressive realignment of the defences, and in the area of Wareham and Stoborough, where a policy of managed realignment is actively encouraged.

IMPLICATION WITH RESPECT TO BUILT ENVIRONMENT

Economics		by 2025	by 2055	by 2105	Total £k PV
Property	Potential NAI Damages/ Cost £k PV	161	705	1053	1919
	Preferred Plan Damages £k PV	110	409	213	732
	Benefits £k PV	51	296	840	1187
	Costs of Implementing plan £k PV	0	0	0	0**

**Managed realignment costs complex and require further study


Location reference:	Arne Peninsula to South Haven Point
Management Area reference:	PHB K
Policy Development Zone:	PDZ3

* Note: Predicted shoreline mapping is based on a combination of monitoring data, analysis of historical maps and geomorphological assessment with allowance for sea level rise. Due to inherent uncertainties in predicting future change, these predictions are necessarily indicative. For use beyond the purpose of the shoreline management plan, reference should be made to the baseline data.



The following descriptions are provided to assist interpretation of the map shown overleaf.


100 year shoreline position:

The following maps aim to summarise the anticipated position of the shoreline in 100 years under the two scenarios of “With Present Management” and under the “Preferred Policy” being put forward through the Shoreline Management Plan.


-  In some areas the preferred policy does not change from that under the existing management approach. In some areas where there are hard defences this can be accurately identified. In other areas there is greater uncertainty. Even so, where the shoreline is likely to be quite clearly defined by a change such as the crest of a cliff the estimated position is shown as a single line.


- Where there is a difference between With Present Management and the Preferred Policy this distinction is made in showing two different lines:


-  With Present Management.
-  Preferred Policy.

-  In some areas, the Preferred Policy either promotes a more adaptive approach to management or recognises that the shoreline is better considered as a width rather than a narrow line. This is represented on the map by a broader zone of management:

Flood Risk Zones

 General Flood Risk Zones. The explanation of these zones is provided on the Environment Agency’s web site www.environment-agency.gov.uk. The maps within this SMP document show where SMP policy might influence the management of flood risk.

 Indicate areas where the intent of the SMP policy is to continue to manage this risk.

 Indicate where over the 100 years the policy would allow increased risk of flooding.

The maps should be read in conjunction with the text within the SMP document.



SUMMARY OF PREFERRED PLAN RECOMMENDATIONS AND JUSTIFICATION

PLAN:

While this area is the most natural of the main frontages within the Poole Harbour system, due to the relatively steeply rising hinterland, there are concerns that the full variety and extent of significant habitat will not be maintained with sea level rise. The overall intent within the area is to allow natural processes to dominate and for maximum adjustment of the coastal fringe.

It is recognised that there are important oil field installations in the area and that there are local jetties and, in some areas, local sections of defence. The long term intent would be that where such features impact on coastal processes or on the natural development of the shoreline, these man-made features would be removed or their impact reduced. This would, however, not necessarily preclude maintenance of such structures supporting essential use of the area in the short to medium term.

PREFERRED POLICY TO IMPLEMENT PLAN:	
From present day	No Active Intervention
Medium term	No Active Intervention
Long term	No Active Intervention

SUMMARY OF SPECIFIC POLICIES

Policy Unit		Policy Plan			
		2025	2055	2105	Comment
PHB. K.1	Poole Harbour South	NAI	NAI	NAI	This would not preclude local management.
PHB. K.2	Furzey, Round, Long and Green Islands	NAI	NAI	NAI	This would not preclude local management
Key: HTL - Hold the Line, A - Advance the Line, NAI – No Active Intervention MR – Managed Realignment					

CHANGES FROM PRESENT MANAGEMENT

No substantial change

IMPLICATION WITH RESPECT TO BUILT ENVIRONMENT

Economics		by 2025	by 2055	by 2105	Total £k PV
Property	Potential NAI Damages/ Cost £k PV	110	409	213	732
	Preferred Plan Damages £k PV	110	409	213	732
	Benefits £k PV	0	0	0	0
	Costs of Implementing plan £k PV	0	0	0	0


Location reference:	Brownsea Island
Management Area reference:	PHB L
Policy Development Zone:	PDZ3



* Note: Predicted shoreline mapping is based on a combination of monitoring data, analysis of historical maps and geomorphological assessment with allowance for sea level rise. Due to inherent uncertainties in predicting future change, these predictions are necessarily indicative. For use beyond the purpose of the shoreline management plan, reference should be made to the baseline data.


The following descriptions are provided to assist interpretation of the map shown overleaf.

100 year shoreline position:




The following maps aim to summarise the anticipated position of the shoreline in 100 years under the two scenarios of "With Present Management" and under the "Preferred Policy" being put forward through the Shoreline Management Plan.

-  In some areas the preferred policy does not change from that under the existing management approach. In some areas where there are hard defences this can be accurately identified. In other areas there is greater uncertainty. Even so, where the shoreline is likely to be quite clearly defined by a change such as the crest of a cliff the estimated position is shown as a single line.
- Where there is a difference between With Present Management and the Preferred Policy this distinction is made in showing two different lines:

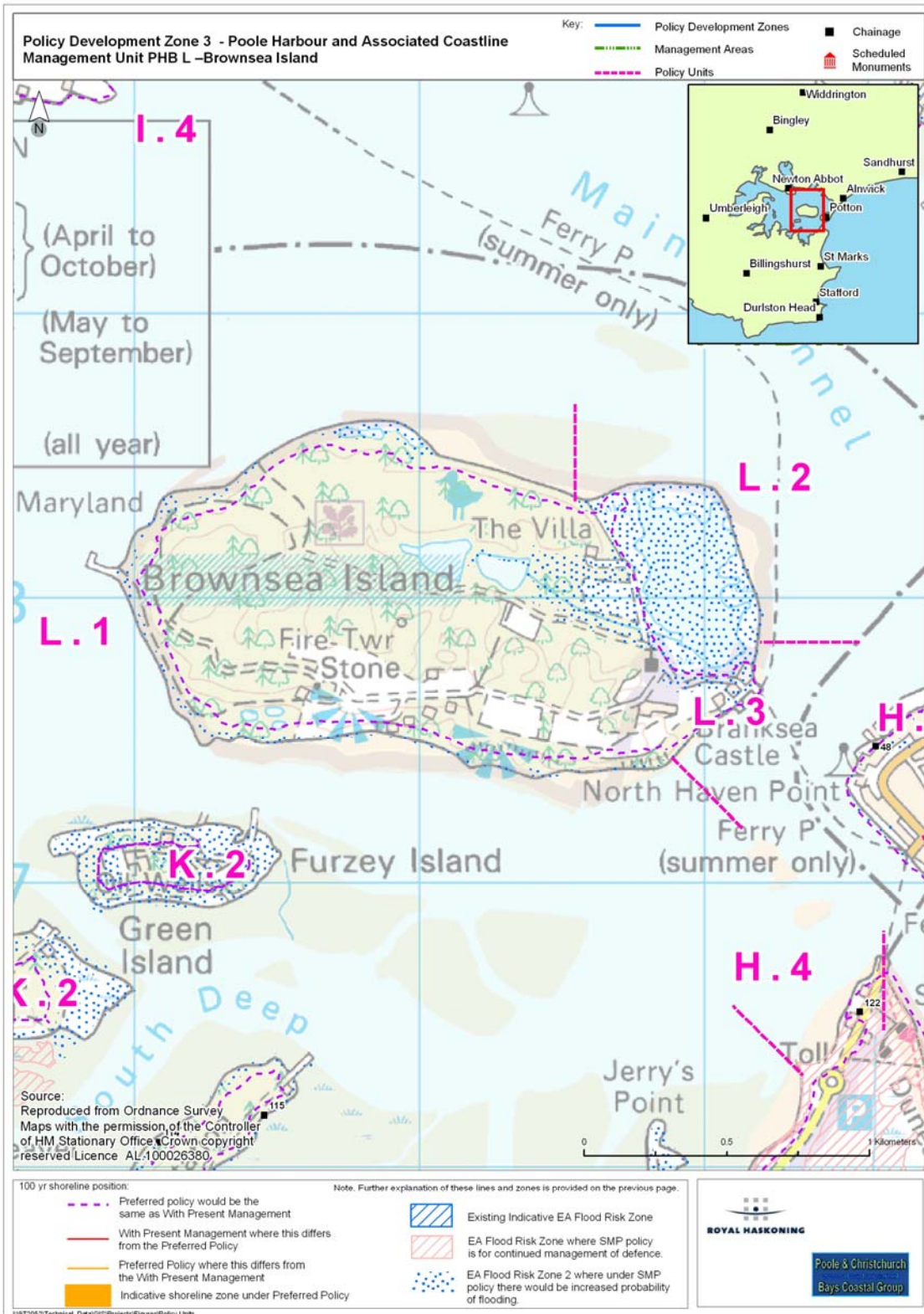
-  With Present Management.
-  Preferred Policy.

-  In some areas, the Preferred Policy either promotes a more adaptive approach to management or recognises that the shoreline is better considered as a width rather than a narrow line. This is represented on the map by a broader zone of management:

Flood Risk Zones

-  General Flood Risk Zones. The explanation of these zones is provided on the Environment Agency's web site www.environment-agency.gov.uk. The maps within this SMP document show where SMP policy might influence the management of flood risk.
-  Indicate areas where the intent of the SMP policy is to continue to manage this risk.
-  Indicate where over the 100 years the policy would allow increased risk of flooding.

The maps should be read in conjunction with the text within the SMP document.



SUMMARY OF PREFERRED PLAN RECOMMENDATIONS AND JUSTIFICATION

PLAN:

The overall intent for the management of Brownsea Island is to reduce the influence and impact of defences. Over much of the island the local defences are deteriorating and the longer term plan would be to re-establish a more natural shoreline. This is in line with the landowner's wish to restore natural processes wherever possible.

The preferred plan is to allow natural processes to operate in the area of Brownsea Lagoon and the Quay. It needs to be clearly recognised that this approach will eventually lead to the loss of the artificially sustained habitat* behind the Lagoon defences. However, the sustainable approach that supports natural processes is to decrease the levels of maintenance, undertaking only minor works, until management of the defences or the use of the area behind the quay buildings is untenable. This complex area will need to be further examined in the imminent Strategy Study where the responsibility of commissioning these works can be determined.

Before the end of the first epoch, prior to the deterioration of the seawall (to the extent that the lagoon's designated interest is degraded or the buildings become unusable), investigations will need to be undertaken to determine the consequences of losing the Lagoon. The Habitats Directive Member (Article 6(2)) states that appropriate steps must be taken to avoid the deterioration of natural habitats and the habitats of species for which the areas have been designated. A plan is therefore needed to ensure that the function that the Lagoon provides to the bird interest of the SPA continues to exist within the SPA. In addition an exit strategy that deals with the removal of the infrastructure remains (for both health and safety and navigational reasons) will need to be developed.

* The Lagoon is a designated feature and supports a significant proportion of the feeding and roosting bird interest of Poole Harbour SPA (including the majority of the avocet population) and is the only known site for the breeding common tern interest.

PREFERRED POLICY TO IMPLEMENT PLAN:	
From present day	
Medium term	
Long term	

SUMMARY OF SPECIFIC POLICIES

Policy Unit		Policy Plan			Comment
		2025	2055	2105	
PBH.L.1	Western Island	NAI	NAI	NAI	Local management to remove defences.
PBH.L.2	Brownsea Lagoon	NAI	NAI	NAI	This would not preclude local management or maintenance.
PBH.L.3	Brownsea Quay	HTL	MR	MR	Subject to discussions with the private landowners (National Trust).
Key: HTL - Hold the Line, A - Advance the Line, NAI – No Active Intervention MR – Managed Realignment					

CHANGES FROM PRESENT MANAGEMENT

The specific policies, for both the Lagoon and the Quay, have changed from SMP1. This reflects the longer timescale taken within the SMP2 and further information on sea level rise. It is in the medium to long term that the policy changes in both areas to realignment and establishing a more natural behaviour of the frontage.

IMPLICATION WITH RESPECT TO BUILT ENVIRONMENT

Economics		by 2025	by 2055	by 2105	Total £k PV
Property	Potential NAI Damages/ Cost £k PV	2152	533	109	2794
	Preferred Plan Damages £k PV	0	0	27	27
	Benefits £k PV	2152	533	0	2767
	Costs of Implementing plan £k PV	232	116	106	454

=0=0=0=



**Poole and Christchurch Bays Shoreline
Management Plan Review Sub-cell 5f**
Section 4. Policy Development Zone 4

Bournemouth Borough Council

2011

Report V3

9T2052

HASKONING UK LTD.
COASTAL & RIVERS

Stratus House
Emperor Way
Exeter, Devon EX1 3QS
United Kingdom
+44 (0)1392 447999 Telephone
Fax
info@exeter.royalhaskoning.com E-mail
www.royalhaskoning.com Internet

Document title Poole and Christchurch Bays Shoreline
Management Plan Review Sub-cell 5f
Section 4. Policy Development Zone 4
Document short title PDZ 4
Status Report V3
Date 2011
Project name Poole and Christchurch Bays SMP2
Project number 9T2052
Client Bournemouth Borough Council
Reference 9T2052/R/301164/Exet

Drafted by JGL Guthrie
Checked by J Ridgewell
Date/initials check
Approved by H Hall, TL Eggiman 
Date/initials approval

CONTENTS

		Page
4.5	PDZ 4 Swanage	1
4.5.1	Overview	3
4.5.2	Baseline Management Scenarios	11
4.5.3	Discussion And Detailed Policy Development	19

4.5 PDZ 4 Swanage

Handfast Point to Durlston Head - Chainage 123.6km to 131km.



SMP 1 Management Units

UNIT	LOCATION	CHAINAGE	POLICY
SWA5	Handfast Point to Ballard Point	123.6 to 125	Do Nothing
SWA4	Ballard Point to Sheps Hollow	125 to 126.8	Do Nothing
SWA3	Sheps Hollow to Outfall Jetty	126.8 to 128	Hold the Line
SWA2	Outfall Jetty to Swanage Pier	128 to 128.7	Hold the Line
SWA1	Swanage Pier to Peveril Point	128.7 to 129.3	Selectively Hold the Line
DUR3	Durlston Flats to Peveril Point	129.3 to 129.9	Do Nothing
DUR2	Durlston Cliff Flats	129.9 to 130.1	Hold the Line short term, Do Nothing long term
DUR1	Durlston Head to Durlston Cliff Flats	130.1 to 131	Do Nothing with long term retreat

Note: SMP1 policy was set over a 50 year period. Short term refers to immediate approach to management of defences with long term policy being set for the 50 years.

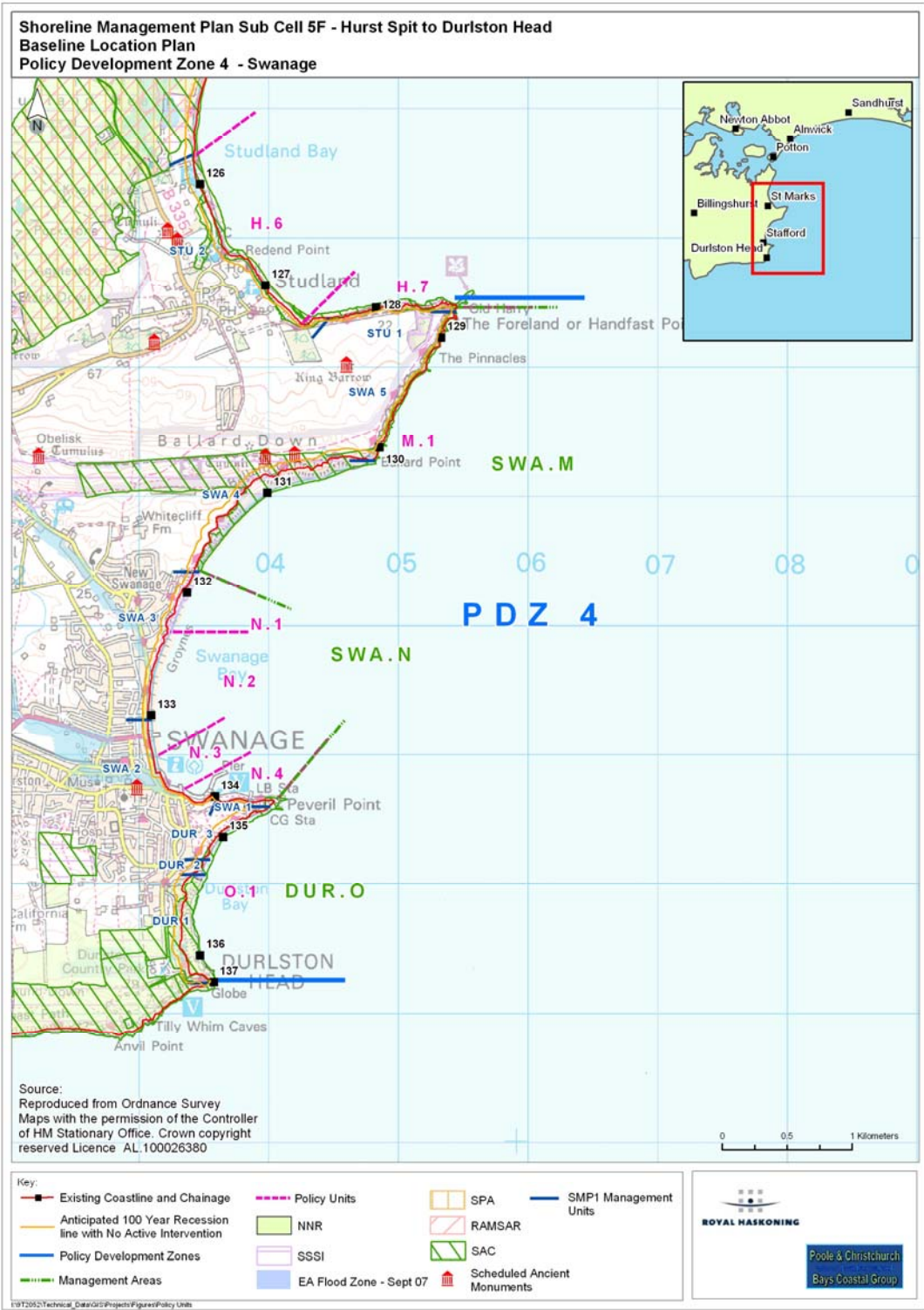


Figure 4.5.1

4.5.1 OVERVIEW

PRINCIPAL FEATURES (further details are provided in Appendix D)

Built Environment:

The main settlement is the town of Swanage. The town has developed within the Swan Brook valley to the west of Swanage Bay, with development along the shoreline to the north to New Swanage and across the Peveril headland and behind Durlston Bay to the south. The main A351 road in to the town is down the main valley, the road along the sea front links areas of the town. The railway line also follows the valley and the railway station is set back from the sea front. There is a small jetty constructed across the foreshore. On the northern side of Peveril Point there is a small boat launching area and associated with this the RNLI station. There is a sewage treatment works in the area of Peveril Point with a main sewer running along Shore Road and an outfall pipe extending from Peveril Point itself. Swanage Pier has recently been restored. Durlston Head Castle lies to the south of the town on the Cliffs of Durlston Head.

Heritage and Amenity:

There are a number of Grade I and II Listed Buildings within the area in addition to a Conservation Area at Swanage. A major enhancement scheme has also been proposed for Swanage seafront to restore and maintain its special and unique historic character. Scheduled Monument's in this area consist of two barrows on Ballard Down and the old prison and pump in Swanage. The entire area from South Haven Point to Durlston Head also falls within one of known 'high archaeological potential', as detailed in the Purbeck District Local Plan. Swanage is popular for boating, fishing, diving and climbing, and the area draws a number of visitors. The beach is an important attraction and there are a number of huts along the beach to the northern end of the town. The castle is currently being renovated to house the Jurassic Coast Visitor Centre.

Nature Conservation:

The coastal cliffs and fossiliferous rocks around Durlston Bay are of international geological importance; specifically, the Purbeck Beds at Durlston Head have yielded one of the most important collections of Mesozoic mammals found anywhere in the world. Durlston Bay is also the most important late Jurassic-Early Cretaceous fossil insect site in Europe. Due to its high importance for geological conservation the area has been designated an SSSI and is part of the World Heritage Site for Jurassic and Cretaceous geology. The coastline between Handfast Point and Durlston Head is considered to be of national landscape importance and lies within the Dorset AONB. The entire coast, with the exception of Swanage, is designated World Heritage site. The coastline was awarded the coveted Diploma for landscape, awarded by the Council of Europe, in 1984. The coastline between Handfast Point and Durlston Head is designated for its nationally and internationally important habitats. The coast from Studland Cliffs to Durlston Head (and beyond) is a SAC (Isle of Portland to Studland Cliffs SAC). Studland Cliffs and Purbeck Ridge (East) have been designated a SSSI. The subtidal area from Handfast Point to Durlston Head is contained in the Poole Bay to the Isle of Purbeck SMA for its marine ecology. The subtidal zone of Durlston Bay (Peveril Point to Durlston Head) is part of a VMNR, which has been designated due to the presence of diverse marine communities and relatively common cetacean sightings, particularly of bottle-nosed dolphins.

KEY VALUES

These values are brought together as an interrelated set of management objectives developed from the above, but more specifically from the individual objectives identified in Appendix D and E.

The dominant characteristic of the area is its international, national and regional importance for landscape; its natural cliff line, with associated geology and nature conservation interests, the open ground to the crest of the cliffs and its marine heritage values. It is important to note that this important landscape is maintained from the ongoing erosion processes along the coastline. At a more local level, but still of significant importance and adding to the general character of the area, is the town of Swanage, with its unique historical context, its open beaches and recreational land. Enjoyment of the exceptional quality of the area is supported by the facilities offered by the town and by aspects such as the intention to renovate the Castle as the Jurassic Coast visitor centre. Maintaining the unspoilt and semi-rural character of Swanage and Durlston Bays is important in providing support to cohesion of the community and as an asset to the region as a whole.

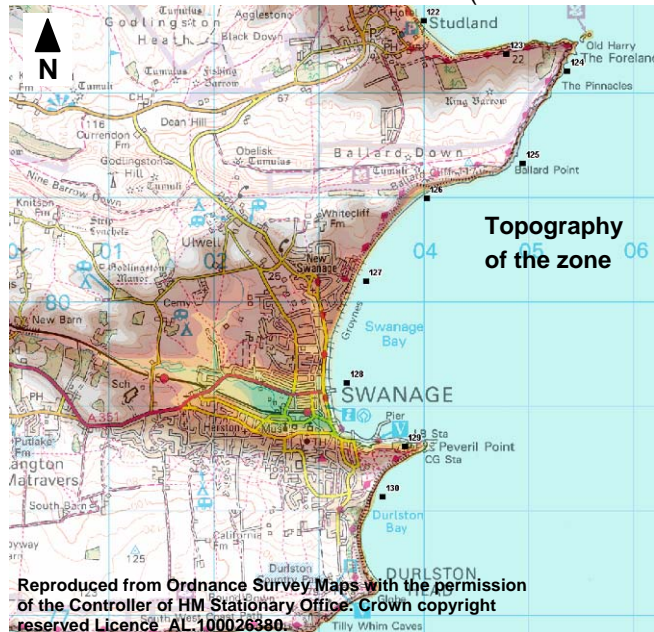
OBJECTIVES (the development of objectives is set out in Appendix D based on objectives listed in Appendix E.

- Protect the economic viability of Swanage;
- Protect core values & character of the centre of Swanage;
- Reduce flood risk to Swanage;
- Maintain beach widths and beach use;
- Manage risk to properties due to erosion and flooding where sustainable;
- Minimise net loss of species/habitat (identify compensatory habitat if any net loss occurs);
- Maintain geological exposures, in relation to World Heritage and SSSI status;
- Maintain the outstanding landscape and the views and appreciation of the varied coastal environment;
- Support adaptability of coastal communities;
- Reduce reliance on defences.

DESCRIPTION

The zone covers a distance of some 7km and includes the two bays of Swanage and Durlston. The bays are formed between the headlands of Ballard Point (with Handfast point to the northeast) to Peveril Point and Peveril Point to Durlston Head, forming the southwest limit of the SMP area.

Handfast Point through to Ballard Point and continuing along the southern flank of Ballard point comprises high, relatively erosion resistant Chalk cliffs. Erosion does occur along this frontage with irregular cliff falls characteristic of the chalk, particularly on this southern flank to the headland, where the Chalk is overlain with Upper Greensands and Gault Clay. Between Ballard and Handfast points the cliffs are near vertical with virtually no intertidal foreshore. To the southern flank of the headland is a narrow boulder strewn beach, beneath the sloping cliff line.



To the south of the headland the nature of the coastal slope changes, reflecting its lower level, softer composition of Wealden Clays, infilling the main valley of Swanage Bay. The change in cliff also marks the change in coastal form, beginning the more



unconstrained spiral of Swanage Bay through to its updrift (southern) control headland of Peveril Point. Over half the length of this northern section of the spiral bay remains undefended, with a relatively wide intertidal beach; the greater erosion of the softer cliffs having created a width and alignment such that finer sediment can be



retained. Over the southern section of this northern end of the bay, the beach is maintained by a series of groynes, with then a length of sea wall to the back of the beach protecting the cliffs in front of New Swanage. There is a low lying platform of intertidal rock towards the northern end of the sea wall. An entire row of properties are situated close to the crest of the steep coastal slope and there are beach huts situated along the platform of the sea wall.

Further south, the level of the coastal slope continues to drop to the south of New Swanage, where the Ulwell Road and Ulwell Valley arrive at the coast. From here the road runs south just to the back of a more formal promenade and sea wall. The beach to the front of the promenade is groyned, with the recently recharged beach forming a narrow strip above normal high tide.

The typical level of the road is between 3m to 4m ODN. Behind the road the land rises slightly, with properties to the north and then open space and the recreation ground and memorial to the south.

The A351 joins the Shore Road just north of the Memorial and there is a substantial jetty cutting across the foreshore at this point.



Outfall Jetty

Both the beach and promenade continue south beyond the Jetty, which appears to have only limited influence on the width and shape of the beach, although retaining some additional upper beach on its southern side. It is noted that the jetty had a more prominent effect prior to the construction of the new groynes and beach recharge.

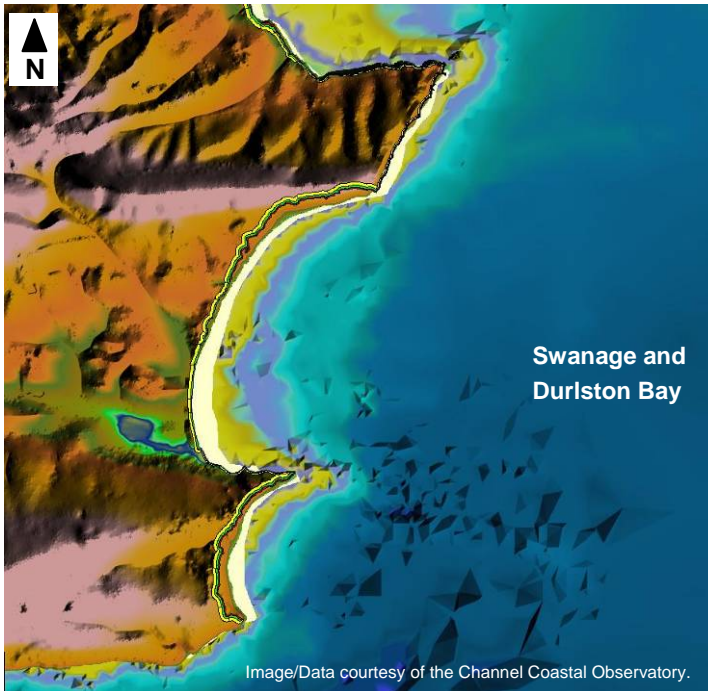
Some 300m south of the jetty the shore road cuts slightly away from the coast into the centre of the town. Properties infill the area between the road and the seawall over this section and the general line of the defences is slightly advanced preventing the development of an upper foreshore. There is a wide promenade here, in the area of the Mowlem, with car parking above the sea wall.

The defence line curves around to the east towards a small headland and jetty (locally known as Stone Quay). The intertidal beach becomes stonier in the lee of the Jetty. To the east of the jetty is a small bay, curving around to a further headland from which extends the Swanage Pier. Beyond the Pier the defences round out to the hard limestone Headland of Peveril Point. A sewage outfall runs beyond the headland. The shoreline between the pier and the point has a narrow stony foreshore, except immediately to the east of the Pier, where there is a small beach. The length of coast has several slipways, including that for the RNLI. The area is also important locally for boat use.



Peveril Point

The nearshore sea bed around the whole of Swanage Bay falls away quite steeply to



deep water, particularly at the northern end and offshore from Ballard Point. The Peveril Point ridge runs out as an extended feature of irregular sea bed that also lies seaward of Durlston Bay.

The cliff line to the back of Durlston Bay remains high over the whole frontage rising typically from 15m to 40m at the southern end. The nature of the back shore slope varies in composition between the two limestone headlands of Peveril Point and Durlston Head, being formed of sections of outcropping

limestone and mudstone. At the southern end areas of overlying clay are also present.

There are several areas where there have been landslides and rock falls and the narrow foreshore is strewn with boulders and smaller talus at the toe of the cliff.

There are two areas where property comes close to the crest of the cliff; at Belle Vue Road and further south at Durlston Road. A short section of rock revetment has been placed beneath Belle Vue Road and the slope behind has been partially reconstructed.



Durlston Castle lies close to the point of Durlston Head and the Country Park and its existing visitor centre is located some distance in land.

PHYSICAL PROCESSES (further details are provided in Appendix C)

TIDE AND WATER LEVELS (mODN)

Location	LAT	MLWS	MLWN	MHWN	MHWS	HAT	Neap range	Spring range	Correction CD/ODN
Swanage		-0.9	-0.2	0.2	0.6		0.4	1.5	-1.4

Extremes(mODN)

Location:	1:1	1:10	1:25	1:50	1:100	1:200	1:500	1:1000
Swanage	1.41	1.65	1.75	1.82	1.90	1.97	2.07	2.14

WAVE CLIMATE

The dominant wave direction is from the south to south-west, which corresponds with the direction of longest fetch and longer period swell waves originating in the Atlantic Ocean. However due to its south-east facing nature, this section of coast can be subject to significant shorter period wind waves originating from the south-east, being generated over a fetch of some 250km. These can be influential in terms of short-term sediment movement.

Due to diffraction of waves around Durlston Head and Peveril Point, the dominant south-westerly waves also tend to approach the Swanage Bay shoreline from the southeast. Durlston Bay is less protected than Swanage Bay from the south-westerly wave climate and has an inshore wave direction more aligned to the south.

TIDAL FLOW

Generally tidal flows are low inshore along the Swanage Bay frontage. Slightly greater flows are experienced inshore along Durlston Bay. There are, however strong, rip currents, particularly on the ebb past Handfast Point, Peveril Point and Durlston Head. There is generally a strong south west dominant flow field over the deep water offshore of Durlston Bay during the ebb.

PROCESSES

Control Features:

The main control features are the major headlands at Ballard Point and the southern flank of this headland, Peveril Point and Durlston Head. However, although each of these headlands anchor the coast to north and south and influence wave climate, neither of the down drift headlands (Ballard point in the case of Swanage Bay and Peveril Point in the case of Durlston Bay), due to their respective orientations really act to retain sediment fully within the bays. As such the beaches tend to run out to an intersection of the hard cliff and the softer coastal slope at the northern end. The bays tend, therefore to leak sediment, to the offshore zone.

Within Swanage Bay there are local control features at the Pier and just to the west of the Pier. Rocky outcrops present in the southern part of the bay known as the Tanville Ledges and Phippards Ledge exert some local control on foreshore sediment distribution.

Existing Defences:

Individual defences are identified in Appendix C. The general description of defences is provided in the description above. This is summarised below.

Defences commence part way along the soft coastal slope at the northern extent of Swanage Bay. The defence comprises a groyned beach with a sea wall starting at the southern end of the first groyne system. The main section of Swanage Bay has a recently replaced timber groyne field and recharged beach with a promenade behind. This is considered to be in good condition. To the south of Swanage Bay defences comprise a series of varied seawall sections in reasonable condition. Defences along all sections of the bay can be severely overtopped on extreme water levels.

There is only one section of defence in Durlston Bay, this being the rock revetment below Belle Vue Road. This is in a moderate condition although subject to some loss of rock and with the potential to be

outflanked.

Processes:

The general processes are summarised in the following diagram.

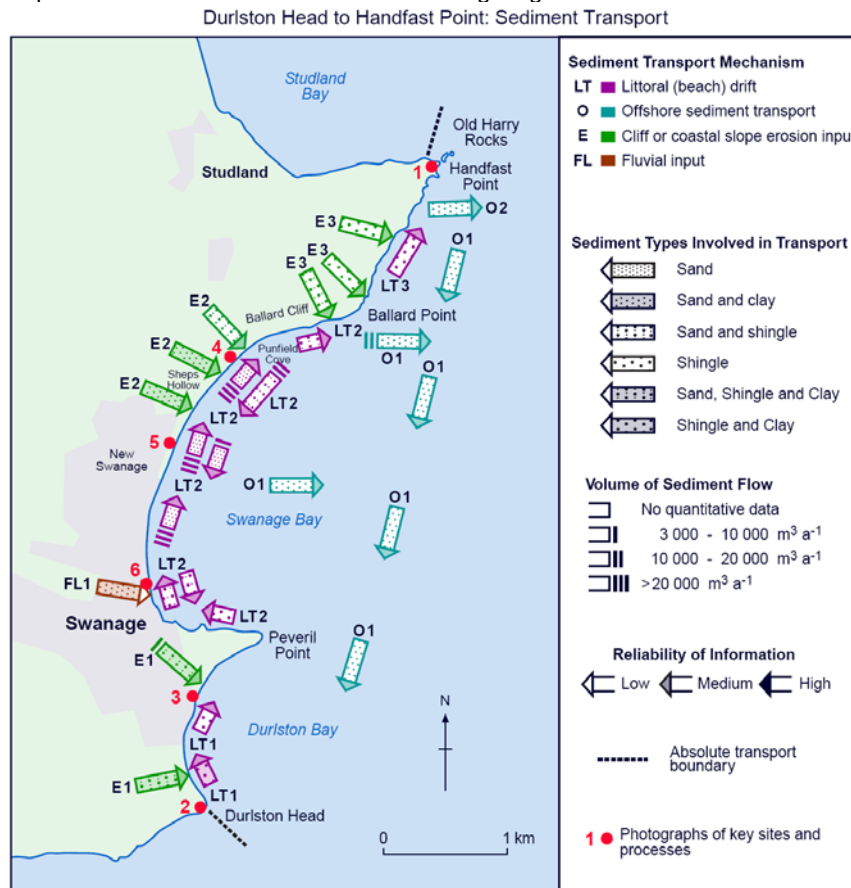


Figure 4.5.2 Map courtesy of SCOPAC, 2004 (www.scopac.org.uk).

Modelling has identified a net sediment drift from south to north along both bays. In the case of Swanage Bay this drift tends to work along a fairly narrow section of the intertidal beach. There is also considered to be some drawdown of the upper beach. The Swanage Bay Strategy study suggests that there can be sediment feed to the bay from the offshore (at the southern end of the bay in particular) with this then being fed along the frontage in a northerly direction. This occurs on major storms capable of mobilising sediment from the deep offshore area. This, it is suggested, may explain periods in the past when there has apparently been accretion along the frontage.

Due to the near continuous northerly drift, sediment from the cliffs to the north is unlikely to provide significant sediment input to the frontage.

The slightly advanced position of the hard defences at the southern end of the bay constrain any opportunity for retaining sediment along the southern shoreline. However, the slightly deeper bay to the east of the Pier does trap sediment as a beach.

In Durlston Bay there is no opportunity for sediment to build along the shore. Any material eroded from the cliffs is carried along shore by wave action. Only larger boulders are retained on the narrow intertidal foreshore. It would be anticipated that the southern end of the bay will benefit from some

greater degree of protection from wave action and although sediment movement would still occur the drift here would be less.

Unconstrained Scenario:

Although unrealistic, because of the residual impact of defences, this scenario considers how the coast would evolve in the absence of defences.

At present there is no control fully retaining sediment within either bay. The bays would tend therefore to erode back further until a fully swash aligned shape is achieved. In the case of Durlston Bay the harder coastal slope acts to resist this to a degree, meaning that erosion along this frontage is relatively slow.

In the case of Swanage Bay, the net alignment of the frontage is quite stable but with the loss of sediment continuing to the north. The frontage still therefore has pressure on it to erode.

POTENTIAL BASELINE EROSION RATES

Base rates have been assessed from monitoring and historical data. The range of potential erosion is assessed in terms of variation from the base rate and sensitivity in potential sea level rise. Further detail on erosion rates is provided in Appendix C. The base rates provided below are taken as an average based on historical records. The rates are a composite value based on erosion of the toe and recession of the crest of the cliff and reflect the erosion rates following failure of defences.

(Sea Level Rise assumed rates: 0.06m to year 2025; 0.34m to year 2055; 1m to year 2105. Baseline date 1990)

Location	Base Rate	Notes	100yr. Erosion / Recession (m)
Handfast Point	0.3m/yr	General erosion of the chalk cliff	30m
Ballard Down	0.7m/yr	Erosion and cliff recession	70m
Central Swanage	0.6m/yr	Erosion and cliff recession held be defences	40m
South Swanage	0.2m/yr	Held by defences	20m
Durlston Bay	0.65m/yr	Erosion and cliff recession	65m

4.5.2 BASELINE MANAGEMENT SCENARIOS

PRESENT MANAGEMENT

Present Management is taken as that policy defined by SMP1, modified by subsequent strategies or studies. It should be noted that both in the case of SMP1 and that of many of the strategies undertaken before 2005, the period over which the assessment was carried out tended to be 50 years.

SMP1			MODIFIED POLICY		
MU	LOCATION	POLICY	REF	LOCATION	POLICY
SWA 5	Handfast Point to Ballard Point	Do Nothing	S6	Handfast Point to Sheps Hollow	No active intervention.
SWA 4	Ballard Point to Sheps Hollow	Do Nothing			
SWA 3	Sheps Hollow to Outfall Jetty	Hold the Line	S6	Sheps Hollow to Outfall Jetty	Hold the Line with groynes and recharge.
SWA 2	Outfall Jetty to Swanage Pier	Hold the Line	S6	Outfall Jetty to Swanage Pier	Do minimum Hold the Line.
SWA 1	Swanage Pier to Peveril Point	Selectively Hold the Line	S6	Swanage Pier to Peveril Point	Do minimum Hold the Line.
DUR 3	Durlston Flats to Peveril Point	Do Nothing	S7	Peveril Point (3c)	No active intervention.
			S7	Swanage Town Park (3b)	No active Intervention.
			S7	Durlston Wall (3a)	Limited invention in the form of local maintenance works (i.e. patch up works)
DUR 2	Durlston Cliff Flats	Hold the Line short term, Do Nothing long term	S7	Durlston Cliff Flats	No Active Intervention.
DUR 1	Durlston Head to Durlston Cliff Flats	Do Nothing with long term retreat	S7	Purbeck Heights (1f)	No active intervention.
			S7	Pinecliff Walk (1e)	Localised works to stabilise cliff, without hard engineering and investment into long term slope defence.
			S7	Old Slip (1d)	No active intervention.
			S7	Durlston Road (1c)	No active intervention.
			S7	Country Park (1b)	No active intervention.
			S7	Durlston Head (1a)	No active intervention/ with potential reactive stabilisation in the long term.

References:

S6

Poole Bay and Harbour Strategy Study Swanage (Purbeck DC 2004)

S7

*Durlston Bay Coastal Strategy (Purbeck DC 2004) * Strategy work did not deviate greatly from SMP1 policies, rather, it identified areas within the lengths of coastline (covered by a 'Do Nothing' policy) where localised maintenance works could be undertaken.*

BASELINE SCENARIOS FOR THE ZONE

Introduction

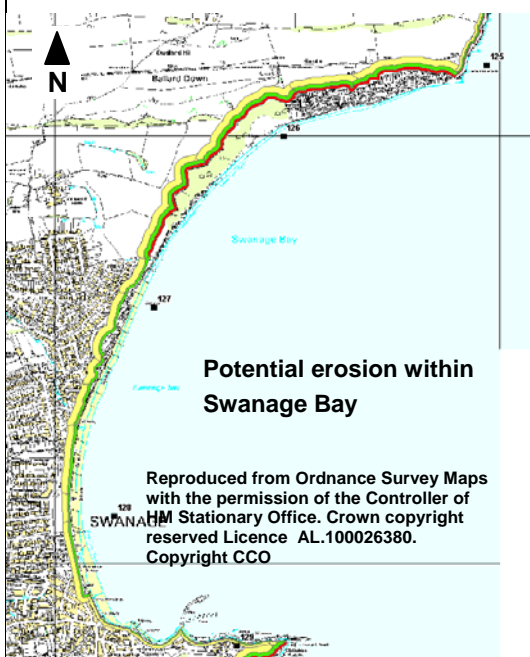
Two baseline scenarios are developed below: assuming that no further action is taken to defend the coast, No Active Intervention, and that developing the With Present Management approach defined by SMP1 and subsequent strategies. In the latter case the approach defined for the next 50 years is extended over the next 100 years.

In examining these scenarios the SMP2 has initially considered the whole frontage as one, considering how management and behaviour of different sections of the coast may influence one another (e.g. if one section of the coast is held by defence, how will this impact upon the development of other sections of the frontage). This establishes the various links between sections of the coast and provides a context for examining more specific sections of coast in greater detail.

No Active Intervention (Scenario 1):

Under this scenario no works would be taken to maintain existing defences along the frontage. Because of the residual impact of structures, evolution of the unconstrained scenario would be modified although in the longer term the development of the coast would be similar.

Defences within Swanage Bay are in reasonable condition. However, over the main beach frontage the basic integrity of the sea walls are maintained through having a certain width of beach maintained by recharge. It would be anticipated that over the first epoch this would reduce and effectively expose the walls to direct wave attack. There would be increased overtopping such that both the seawalls and the road would suffer damage. To the northern end of the beach, overtopping would tend to impact on the coastal slope such that this would erode further and become unstable. Uncontrolled failure of this slope would cause potential failure of the sea wall below. During the second epoch, defences would have failed and wholesale erosion of the frontage would occur.



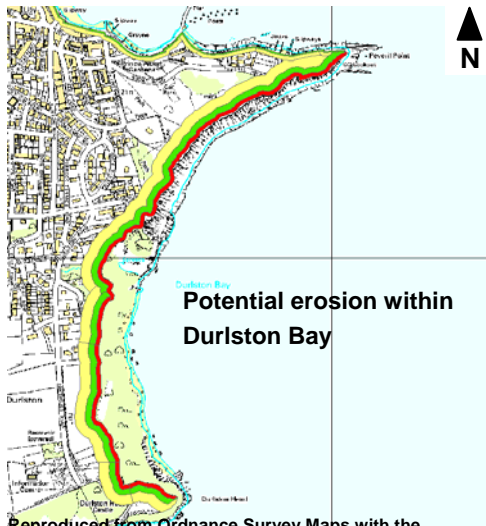
The cliff line to the north would continue to erode back.

To the southern end and along the defence to the centre of the town, failure of the defences, without maintenance would occur over the same sort of period and, although erosion may be less, it would more directly affect properties and assets within the town. Typical erosion lines are shown on the figure.

Although there is little threat of flooding to the centre of the town due directly to sea level, there would be substantially greater overtopping at the shoreline, resulting in significant damage to assets adjacent to it. This could impact on properties and shops. Only where flooding affected the whole town centre would the station and railway line be

affected.

The potential erosion within Durlston Bay is shown in the following figure.



Reproduced from Ordnance Survey Maps with the permission of the Controller of HM Stationary Office. Crown copyright reserved Licence AL.100026380. Copyright CCO

Erosion rates taken for this frontage are quite generalised. Potentially rates at the southern end of the bay, specifically in the area of Durlston Castle are considered to be high.

The existing rock mound at the foot of the cliff in front of Belle Vue Road is likely to act to stabilise this slope over the first epoch. Deterioration and potential outflanking would eventually reduce the effectiveness of this defence. Over much of the central and southern part of the bay, cliff instability is associated with drainage from the cliff crest and within the cliff, due to erosion having removed the pre-existing cliff.

Even so, loss of property during the second and third epochs would be anticipated.

The damages assessed by the SMP are shown in table 1 at the end of this subsection. These damages do not reflect fully the potential disruption to the town centre due to wave overtopping

The potential impacts on the area are assessed in table 2 at the end of this subsection. These are discussed below.

The important geological exposure and the objective to maintain overall natural response of the coastline would be maintained. There would, however, be very significant loss to the town centre of Swanage and to use of the coast. Without defence the main transport routes would be severely affected, together with loss of the main sewer running along the promenade. Possibly more significant would be the loss due to erosion and regular wave overtopping at the core of the town. This would in effect destroy the character of the town.

To the northern end of the town, a significant number of newer properties would be affected, causing significant economic loss as well as loss of hotels supporting the town's attraction as a tourist centre for the whole of the Purbeck area.

Along Durlston Bay, a substantial number of properties might be lost over the three epochs. Although very important to individuals, this area is less associated with the overall value of the town as a regional centre. The impact locally would however be significant.

Overall the scenario fails to meet the objectives reflecting the combined aspirations for the area.

With Present Management (Scenario 2):

The present management scenario is based on that set by SMP1 and updated through the development of the recent draft strategy. Although in draft, this strategy is taken as reflecting the intent of Present Management within this baseline scenario. In particular, the recommendations within the draft strategy have been taken forward as a scheme for groyne replacement and beach recharge and as such are confirmed as being the With Present management approach.

Within Durlston Bay, the draft strategy recommends limited intervention to stabilise the cliff line. This would include significant sheet piling work to the area adjacent to the existing revetment. Additional works would be undertaken further along the frontage to stabilise the cliff. At the southern end the intent would be to defend the Castle in the long term if this were found to be necessary.

With increasing sea level, it would be anticipated that there would be a need for increased frequency for beach recharge within Swanage Bay, to maintain the beach or a need to impose greater control of sediment movement along the frontage. Under this scenario, this would suggest that more substantial



**Swanage
Beach
Recharge**

defences would be extended along the frontage to the north. The recent recharge scheme provided beach material over the full length of the beach extending beyond the extent of the existing sea wall, beneath the cliff in front of properties to the northern end of New Swanage. If this approach were taken in the future, with the anticipated need for greater control of sediment loss, particularly at this northern end, then the influence of defence works could significantly infringe on to the natural coast impacting on the geological value of the area. In addition, with any

increase in scale of structures controlling a recharged beach may start to affect the overall landscape quality of the bay.

In front of the main town, the approach to maintaining the existing walls would appear sustainable, given the protection already afforded to this area by the headland and existing structures. There would be a need to increase the height of the walls in line with the increased wave height due to sea level rise. This would have some impact on the area but may not be considered to be excessive.

In assessing damages under this option, it has been assumed that schemes would be put in place to resist erosion to all property in Swanage Bay. In Durlston Bay, minor intervention is assumed to only delay the loss of property and damages are recorded as for NAI. These economic damages are shown in table 1 and the impacts are assessed in table 2.

In terms of these impacts, the major affect is on the nature conservation value associated with the internationally important geological interest of the area. The ecological value of the area is not seen as being a major issue, accepting gradual natural change to the designated habitats of the Handfast Point headland.

Table 1. Economic Assessment

The following table provides a brief summary of damages determined by the SMP2 analysis for the whole PDZ. Further details are provided in Appendix H. Where further, more detailed information is provided by studies, this is highlighted. The table aims to provide an initial high level assessment of potential damages occurring under the two baseline scenarios. The damages for each epoch are current values. These are discounted to give present values in the final column. It is important for the reader to note that the loss figures quoted only refer to domestic dwellings and no account has been taken of commercial, industrial or infrastructure property values.

ASSESSMENT OF EROSION DAMAGES

Epoch		0 -20 year		20 – 50 years		50 – 100 years		Present Value Damages (£x1000)
No Active Intervention	SMP1 MU	Number of properties	Value x £1000	Number of properties	Value x £1000	Number of properties	Value x £1000	
<i>Location</i>								
New Swanage	SWA 3	0	0	5	1252	97	24292	3,092
Town Centre	SWA 2	0	0	13	3256	44	11,019	2,357
Peveril Point North	SWA 1	0	0	10	2504	3	751	971
Peveril Point South	DUR 3	0	0	0	0	24	6010	655
Durlston Flats	DUR 2	0	0	2	501	3	751	260
Durlston Head	DUR 1	0	0	28	7,012	20	5009	3,035
Total for PDZ4								10,370
With Present Management	SMP1 MU	No.	x £1000	No.	x £1000	No.	x £1000	Present Value Damages (£x1000)
<i>Location</i>								
New Swanage	SWA 3	0	0	0	0	0	0	
Town Centre	SWA 2	0	0	0	0	0	0	
Peveril Point North	SWA 1	0	0	0	0	0	0	
Peveril Point South	DUR 3	0	0	0	0	24	6010	655
Durlston Flats	DUR 2	0	0	2	501	3	751	260
Durlston Head	DUR 1	0	0	28	7,012	20	5009	3,035
Total for PDZ4								3,950
Notes								
Poole Bay & Harbour Draft Strategy-Technical Annex 8 identifies damages over a 50 year period of £24 million for Swanage.								



ASSESSMENT OF POTENTIAL FLOOD RISK

		Flood risk total tidal and fluvial 2008		Flood risk total tidal and fluvial 2102		Averaged PVD (£x1000)
No Active Intervention	SMP1 MU	Number of properties	Value x £1000	Number of properties	Value x £1000	
Location						
Town centre	SWA 2	4	1000	4	1000	1000
With Present Management						
Location	SMP1 MU	Number of properties	Value x £1000	Number of properties	Value x £1000	Averaged PVD (£x1000)
Town centre	SWA 2	0		0		0

OTHER INFORMATION:

It has been taken that under NAI property would be written off due to regular flooding. No account is taken of persistent overtopping damages affecting the town centre under NAI.

Table 2. General Assessment of Objectives

The following table provides an overall assessment of how the two baseline scenarios impact upon the overall objectives agreed by stakeholders. These objectives are set out in more detail within Appendix E. The table aims to provide an initial high level assessment of the two baseline scenarios, highlighting potential issues of conflict. These issues are discussed in the following section, examining alternative management scenarios from which SMP2 policy is then derived.

OBJECTIVE	NAI				WPM			
	Neutral	FAILS	Partial	Positive	Neutral	FAILS	Partial	Positive
Protect the economic viability of Swanage		FAILS						Positive
Protect core values & character of the centre of Swanage		FAILS						Positive
Reduce flood risk to Swanage		FAILS						Positive
Maintain beach widths and beach use.		FAILS						Positive
Manage risk to properties due to erosion and flooding where sustainable		FAILS					Partial	
Minimise net loss of species/habitat (identify compensatory habitat if any net loss occurs),				Positive			Partial	
Maintain geological exposures, in relation to World Heritage and SSSI status.				Positive		FAILS		
Maintain the outstanding landscape and the views and appreciation of the varied coastal environment,		FAILS					Partial	
Support adaptability of coastal communities		FAILS					Partial	
Reduce reliance on defences.				Positive		FAILS		

4.5.3 DISCUSSION AND DETAILED POLICY DEVELOPMENT

In assessing the two baseline scenarios, the main area of conflict is seen between the wish to maintain the full length of defence over the Swanage frontage, compared to the equally important aim of maintaining the exceptional landscape and geological value of the area. In economic terms, the value of assets at risk and the socio-economic impact of No Active Intervention on sustaining the town of Swanage would justify continued defence of the main Swanage frontage. The problem arises at the northern extent of the developed hinterland, with the potential threat of extending an ever more robust defence to the north.

Following the general intent of defending the northern end under With Present Management, there would be the need to increase both the extent of defence and potentially the height of defence. The trend might potentially be to replace the existing timber groynes with rock structures, terminating the defence with a significant end structure to retain sediment along the beach to the south.

Without such an escalation of defence in this area, with sea level rise, there would be increased beach loss and increased wave exposure on the back sea wall, which in turn is likely to give rise to increased slope instability and endanger property at the crest of the cliff.



At present, there is an apparent slight realignment of the coast towards the centre of this northern frontage, possibly caused by the outcrops of rock (Phippards Ledge and the Tanville Ledges) at this location. The coast is held slightly forward at the point of the Tanville Ledges. With the intent of reducing visual impact on overall landscape value of the area, there seems scope to define this overall area as a transition zone between Hold the Line to the south and the obvious No Active Intervention in front of Ballard Estate. The aim would be that defences might be developed over this section of the coast, centred on the Tanville Ledges area of rock outcrop, developing the slight headland, possibly by use of reefs or similar less obtrusive structures.

The approach outlined above would still be reliant on beach recharge to sustain protection of the cliff. The cliff immediately behind this extended headland, however, may come under increased pressure during extreme events. As such there may be a need, locally to reinforce the toe and splash protection to the coastal slope. In effect the approach might be seen as increasing the foreshore width, and providing control to the sediment drift. However, this would have to accept that the beach levels may not be sufficient to maintain full protection against extreme wave attack. The corollary of this would be that there would be increased erosion further north as sediment drift is

reduced. The intent would be to allow erosion to occur to a greater extent, without direct protection of the coastal slope in this final section. The SMP is only able to provide a basic conceptual approach defining a policy of Hold the Line as far north as the point where the northerly part of the Tanville Ledges intercept the shoreline. Beyond this location a policy of realignment would apply to the end of the properties. The realignment would typically provide protection over much of the length currently defended by the sea wall, but then reducing protection beyond the area of rock outcrop. This might result in loss of potentially 10 properties over the period of the SMP2. In terms of planning, the area could be defined within a coastal change management area and detailed examination of possible impacts would need to be undertaken to advise residents of property likely to be affected.

Further south over the main frontage of the town, the intent of the shoreline management plan would be to maintain the standard of defence and protect the coast from erosion. Over the existing beach area, this would typically be seen as through an approach of continued beach recharge and groynes and to other areas as maintenance of existing sea walls. It should be noted that current residual life of defences along this frontage is generally low (this is based upon local knowledge and visual inspection) and therefore there is a cost implication. However the overriding justification for the intent of management is the perceived sustainability of managing the frontage and importantly in protecting the core values of Swanage.

Along the area of the Mowlem through to the Pier there are current concerns about the level of overtopping, with water flowing down the road in to the town. There is likely to be a need to provide additional defence, especially as overtopping would increase with sea level rise. This would be consistent with a policy of Hold the Line. There may also be scope for considering reinforcement of the small headlands to the south, to provide increased wave protection to the core of the town and to assist in maintaining the small beach area to the east of the Pier. This would protect the various usage of the frontage and potentially enhance boat use in terms of protection to moorings and launching facilities.

Within Durlston Bay, both the SMP1 and the draft strategy recommend only minor intervention. In effect this might delay the loss of property, but would be very similar to the No Active Intervention scenario. The performance of the existing limited extent of rock protection to the cliff toe in the centre of the bay highlights the difficulty of providing any sustainable approach to long term management of the erosion risk. While the existing structure has been quite effective in reducing the risk to the property behind, it is showing signs of loss of integrity. Furthermore, as the coast to either side continues to erode, the structure will become outflanked. In addition, the



degree of protection necessary to stabilise the slope, highlights the risk this approach to defence would have on the important geological value of the area.

Over the long term, to continue to protect properties, both here and in other adjacent sections of the bay, would require a far more comprehensive approach to management extending over a significant length of the bay. This encroachment on the nature conservation and geological value would be unacceptable.

The strategy study does suggest that less intrusive management could be achieved through improved drainage and management of the stream issuing to the south of the revetment. Such management approaches may be acceptable. However taking this further forward to undertake physical stabilisation of the slope is still likely to be ineffective in the long term, without erosion protection.

In terms of policy for coastal defence, the baseline recommendation of the SMP would be for no active intervention. However, even though surface water drainage is unlikely to attract coast protection funding the SMP2 recognises that management of drainage could delay loss of assets without significant impact on the overall natural value of the area. This policy could be expressed as managed realignment over the first 2 epochs. Potential cliff-top drainage measures dictates the difference between managed realignment and no active intervention within Durlston Bay but such measures could be considered non-strategic and are likely to be assessed at virtually individual property level. As such, providing realistic costs for these measures is outside the scope of the SMP. Inclusion of the measures is felt to be important in assisting with delivery of the SMP at the local level and particularly in assisting property owners with adaptation. This managed realignment policy would apply over the whole frontage and as such the previous distinction between different lengths of the bay is not felt to be valid. Management needs to include addressing the concerns of individuals with property in the area. Part of this would be to improve monitoring of erosion and cliff instability, as recommended by the strategy study.

PDZ4

Management Area Statements

SWA M – Handfast Point to and including Ballard Common (CH. 124 TO –CH 127 KM.)

Covering previous SMP1 management units SWA5 and SWA 4

SWA N – Ballard Common to Peveril Point (CH. 127- TO –CH 129 KM.)

Covering previous SMP1 management units SWA3 to SWA1

DUR O – Peveril Bay to Durlston Head (CH.129 - TO – CH 131 KM.)

Covering previous SMP1 management units DUR1 to DUR3


Location reference:	Handfast Point to and including Ballard Common
Management Area reference:	SWA M
Policy Development Zone:	PDZ4



* Note: Predicted shoreline mapping is based on a combination of monitoring data, analysis of historical maps and geomorphological assessment with allowance for sea level rise. Due to inherent uncertainties in predicting future change, these predictions are necessarily indicative. For use beyond the purpose of the shoreline management plan, reference should be made to the baseline data.


The following descriptions are provided to assist interpretation of the map shown overleaf.

100 year shoreline position:


The following maps aim to summarise the anticipated position of the shoreline in 100 years under the two scenarios of "With Present Management" and under the "Preferred Policy" being put forward through the Shoreline Management Plan.


-  In some areas the preferred policy does not change from that under the existing management approach. In some areas where there are hard defences this can be accurately identified. In other areas there is greater uncertainty. Even so, where the shoreline is likely to be quite clearly defined by a change such as the crest of a cliff the estimated position is shown as a single line.
- Where there is a difference between With Present Management and the Preferred Policy this distinction is made in showing two different lines:


-  With Present Management.
-  Preferred Policy.

-  In some areas, the Preferred Policy either promotes a more adaptive approach to management or recognises that the shoreline is better considered as a width rather than a narrow line. This is represented on the map by a broader zone of management:

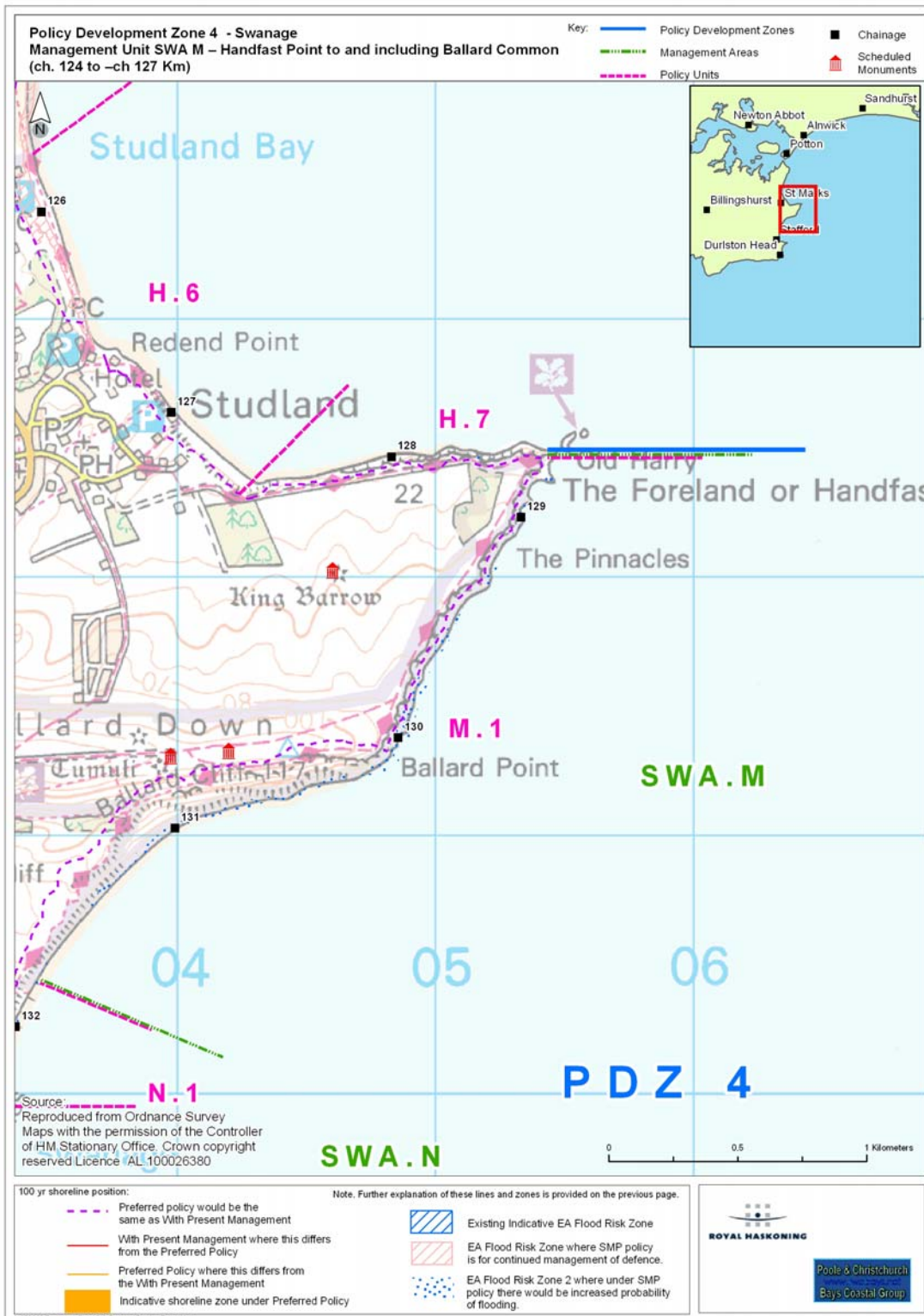
Flood Risk Zones

 General Flood Risk Zones. The explanation of these zones is provided on the Environment Agency's web site www.environment-agency.gov.uk. The maps within this SMP document show where SMP policy might influence the management of flood risk.

 Indicate areas where the intent of the SMP policy is to continue to manage this risk.

 Indicate where over the 100 years the policy would allow increased risk of flooding.

The maps should be read in conjunction with the text within the SMP document.



SUMMARY OF PREFERRED PLAN RECOMMENDATIONS AND JUSTIFICATION

PLAN:

The overriding intent of the plan is to maintain the important nature conservation, and geological and exceptional landscape quality of the area. The policy for the frontage is for No Active Intervention. There are no issues that conflict with this approach.

PREFERRED POLICY TO IMPLEMENT PLAN:	
From present day	No Active Intervention
Medium term	No Active Intervention
Long term	No Active Intervention

SUMMARY OF SPECIFIC POLICIES

Policy Unit		Policy Plan			Comment
		2025	2055	2105	
SWA.M.1	Handfast to Ballard Estate	NAI	NAI	NAI	
Key: HTL - Hold the Line, A - Advance the Line, NAI – No Active Intervention MR – Managed Realignment					

CHANGES FROM PRESENT MANAGEMENT

No Change.

IMPLICATION WITH RESPECT TO BUILT ENVIRONMENT

Economics		by 2025	by 2055	by 2105	Total £k PV
Property	Potential NAI Damages/ Cost £k PV	0	0	0	0
	Preferred Plan Damages £k PV	0	0	0	0
	Benefits £k PV	0	0	0	0
	Costs of Implementing plan £k PV	0	0	0	0


Location reference:	Ballard Common to Peveril Point
Management Area reference:	SWA N
Policy Development Zone:	PDZ4


* Note: Predicted shoreline mapping is based on a combination of monitoring data, analysis of historical maps and geomorphological assessment with allowance for sea level rise. Due to inherent uncertainties in predicting future change, these predictions are necessarily indicative. For use beyond the purpose of the shoreline management plan, reference should be made to the baseline data.


The following descriptions are provided to assist interpretation of the map shown overleaf.

100 year shoreline position:


The following maps aim to summarise the anticipated position of the shoreline in 100 years under the two scenarios of "With Present Management" and under the "Preferred Policy" being put forward through the Shoreline Management Plan.


-  In some areas the preferred policy does not change from that under the existing management approach. In some areas where there are hard defences this can be accurately identified. In other areas there is greater uncertainty. Even so, where the shoreline is likely to be quite clearly defined by a change such as the crest of a cliff the estimated position is shown as a single line.
- Where there is a difference between With Present Management and the Preferred Policy this distinction is made in showing two different lines:


-  With Present Management.
-  Preferred Policy.

-  In some areas, the Preferred Policy either promotes a more adaptive approach to management or recognises that the shoreline is better considered as a width rather than a narrow line. This is represented on the map by a broader zone of management:

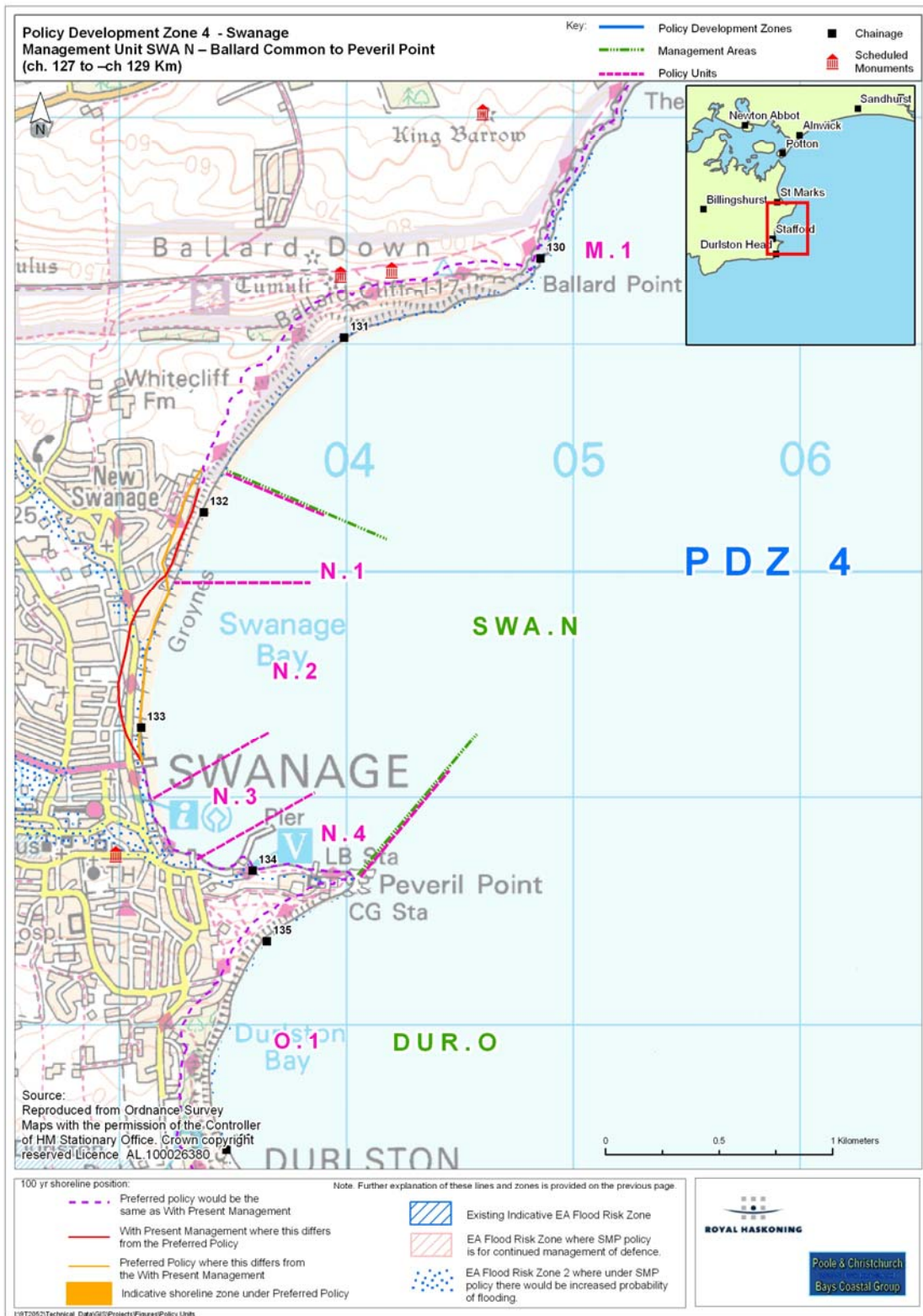
Flood Risk Zones

 General Flood Risk Zones. The explanation of these zones is provided on the Environment Agency's web site www.environment-agency.gov.uk. The maps within this SMP document show where SMP policy might influence the management of flood risk.

 Indicate areas where the intent of the SMP policy is to continue to manage this risk.

 Indicate where over the 100 years the policy would allow increased risk of flooding.

The maps should be read in conjunction with the text within the SMP document.



SUMMARY OF PREFERRED PLAN RECOMMENDATIONS AND JUSTIFICATION

PLAN:

The intent of the plan is to maintain the viability and important heritage and community aspects of Swanage. This includes reducing flooding and providing protection to the town centre, maintaining access along and use of the coastal road, promenade and beach and sustaining important local use of the headland to Peveril Point. This includes all essential infrastructure. However, this has to recognise the important landscape setting of the town and seafront and the important geological value of the coast. To this end, the intent of the plan is to limit further extension of defences, particularly further north along the shore and to recommend approaches which may minimise landscape impact. Within this intent therefore, the recommendation is that the northern section of the existing defence line (north of the Tanville Ledges – SWA.N.1)) is managed more as a transitional area between a firmer policy to Hold the Line of defence to the south and the No Active Intervention policy within MA SWA.M

PREFERRED POLICY TO IMPLEMENT PLAN:	
From present day	Maintain all defences
Medium term	Maintain all existing defences but to develop a scheme for transitional management of the northern frontage.
Long term	Maintain all defences, with the implementation of the above transitional approach and to consider the possible benefits in reinforcing the local headlands between the town and Peveril Point

SUMMARY OF SPECIFIC POLICIES

Policy Unit		Policy Plan			Comment
		2025	2055	2105	
SWA.N.1	New Swanage	HTL	HTL	MR	Approach to provide suitable transition to NAI in policy unit SWA.M.1
SWA.N.2	Promenade	HTL	HTL	HTL	
SWA.N.3	Town Centre	HTL	HTL	HTL	Potential need to raise defences
SWA.N.4	Town Centre to Peveril Point	HTL	HTL	HTL	Potential opportunity to reinforce local headlands
Key: HTL - Hold the Line, A - Advance the Line, NAI – No Active Intervention MR – Managed Realignment					

CHANGES FROM PRESENT MANAGEMENT

Change in policy unit frontages and adoption of a managed realignment approach to the northern end.

IMPLICATION WITH RESPECT TO BUILT ENVIRONMENT

Economics		by 2025	by 2055	by 2105	Total £k PV
Property	Potential NAI Damages/ Cost £k PV	10	2522	3961	6493
	Preferred Plan Damages £k PV	0	0	0	0
	Benefits £k PV	10	2522	0	6493
	Costs of Implementing plan £k PV	948	382	382	1712


Location reference:	Peveril Bay to Durlston Head
Management Area reference:	DUR O
Policy Development Zone:	PDZ4



* Note: Predicted shoreline mapping is based on a combination of monitoring data, analysis of historical maps and geomorphological assessment with allowance for sea level rise. Due to inherent uncertainties in predicting future change, these predictions are necessarily indicative. For use beyond the purpose of the shoreline management plan, reference should be made to the baseline data.


The following descriptions are provided to assist interpretation of the map shown overleaf.

100 year shoreline position:




The following maps aim to summarise the anticipated position of the shoreline in 100 years under the two scenarios of “With Present Management” and under the “Preferred Policy” being put forward through the Shoreline Management Plan.

-  In some areas the preferred policy does not change from that under the existing management approach. In some areas where there are hard defences this can be accurately identified. In other areas there is greater uncertainty. Even so, where the shoreline is likely to be quite clearly defined by a change such as the crest of a cliff the estimated position is shown as a single line.
- Where there is a difference between With Present Management and the Preferred Policy this distinction is made in showing two different lines:

-  With Present Management.
-  Preferred Policy.

-  In some areas, the Preferred Policy either promotes a more adaptive approach to management or recognises that the shoreline is better considered as a width rather than a narrow line. This is represented on the map by a broader zone of management:

Flood Risk Zones

-  General Flood Risk Zones. The explanation of these zones is provided on the Environment Agency’s web site www.environment-agency.gov.uk. The maps within this SMP document show where SMP policy might influence the management of flood risk.
-  Indicate areas where the intent of the SMP policy is to continue to manage this risk.
-  Indicate where over the 100 years the policy would allow increased risk of flooding.

The maps should be read in conjunction with the text within the SMP document.



SUMMARY OF PREFERRED PLAN RECOMMENDATIONS AND JUSTIFICATION

PLAN:

The overriding intent of the plan is to maintain the geological value through allowing natural coastal evolution. It is recognised that there will be property at risk in the medium to long term along the frontage and the plan acknowledges the contribution that basic drainage systems can provide in slowing the recession of the cliff line. This would be assumed to be simple drainage which addresses run off at the cliff top, preventing excessive flow over the crest and down the slope. Acknowledging this dictates the difference between managed realignment and no active intervention at this policy unit. However this is seen as a non-strategic measure which needs to be assessed at local level (virtually at individual property level) and therefore associated costs are specific to those circumstances. Following local assessment this would only be recommended under the overall plan if it could be demonstrated that it did not impact significantly on the opportunity to maintain the natural coastal change. The more strategic intent of the plan at this location would be not to remove existing defences or slope stabilisation measures but to allow such works to deteriorate over time.

Measures need to be considered as how best to assist individuals with property at risk through discussion and through the planning process. To inform this, it is essential that monitoring of the frontage is continued and improved. The long term aim is to be in a position during the final epoch to adopt more fully a policy of No Active Intervention.

PREFERRED POLICY TO IMPLEMENT PLAN:	
From present day	Undertake no maintenance of existing defences. Support consideration of improved cliff-top drainage measures. Develop adaption plans with property owners.
Medium term	Undertake no maintenance of existing defences. Support consideration of improved cliff-top drainage measures. Develop adaption plans with property owners
Long term	No Active Intervention

SUMMARY OF SPECIFIC POLICIES

Policy Unit		Policy Plan			
		2025	2055	2105	Comment
DUR.O.1	Durlston Bay	MR	MR	NAI	This policy would not preclude local drainage improvements.
Key: HTL - Hold the Line, A - Advance the Line, NAI – No Active Intervention MR – Managed Realignment					

CHANGES FROM PRESENT MANAGEMENT

Change in policy unit frontages and adoption of a managed realignment approach to the northern end.

IMPLICATION WITH RESPECT TO BUILT ENVIRONMENT

Economics		by 2025	by 2055	by 2105	Total £k PV
Property	Potential NAI Damages/ Cost £k PV	0	2667	1283	3950
	Preferred Plan Damages £k PV	0	2667	1283	3950
	Benefits £k PV	0	0	0	0
	Costs of Implementing plan £k PV	0	0	0	0

=0=0=0=