



River Tyne to Flamborough Head SMP2 Non Technical Summary for NECAG Area

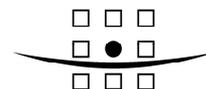
North East Coastal Authorities Group

February 2007

Final Report

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1 INTRODUCTION

1.1 Background

A Shoreline Management Plan (SMP) provides a large-scale assessment of the risks associated with coastal evolution and presents a policy framework to address these risks to people and the developed, historic and natural environment in a sustainable manner. In doing so, an SMP is a high-level document that forms an important part of the Department for Environment, Food and Rural Affairs (Defra) strategy for flood and coastal defence (Defra, 2001). The plan provides both broad scale assessment of these risks but also quite specific advice to operating authorities in their management of defences. Through this and through the identification of issues covering a wide spectrum of coastal interests, the SMP supports the Government's aims, as set out in Defra's strategy "Making Space for Water" (Defra 2005):

- To reduce the threat to people and their property; and
- To deliver the greatest environmental, social and economic benefit, consistent with the Government's sustainable development principles.

This SMP2 is a first revision to the original Shoreline Management Plans for the area of coast extending from the River Tyne south to Flamborough Head (Refer Figure 1.1). This SMP2 collates information from the three original SMPs (SMP1) for sub-cells 1b, 1c and 1d.

1.2 Where are we now?

The development of the River Tyne to Flamborough Head SMP2 has been underway since October 2004. A number of stages of consultation have been undertaken throughout the development process to ensure that stakeholder's views and local knowledge is incorporated into the plan.

The draft SMP2 document was completed in June 2006. Following a period of consultation, a further revision of the SMP2 was carried out; incorporating new information that was made available as a result of the consultation, clarifying sections of text and, in some areas, considering the need to change policy based on the new information. The final SMP2 document has now been completed and is being presented for adoption by the Councils.

1.3 Purpose of this Report

This report provides a non-technical summary of the final SMP2 document to enable the conclusions of the SMP2 document to be readily disseminated.

The contents of this report are as follows:

Section 2 provides an overview of the preferred plan and outlines the implications of the plan with respect to property and land use, nature

conservation, landscape and historic environment. Section 2 also provides strategic recommendations for management of the change that will occur to the coastline.

Section 3 provides summary tables and figures of all of the policies by area.

Section 4 provides a copy of the action plan included as Section 7 in the main SMP2 document.

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2 SUMMARY OF PREFERRED PLAN AND IMPLICATIONS

2.1 Plan for Balanced Sustainability

The SMP is attempting to deliver a balanced plan for the management of defences which will still support the values for each area of coast in terms of its human need, the natural environment and the heritage value, without commitment to ever increasing expenditure on defence.

The objectives against which this is judged are set out in Appendix E and an assessment of how effective the plan has been in achieving this is provided in Appendix G. This assessment is summarised in Figures 2.1 (for the epoch to 2025), 2.2 (for the epoch to 2055) and 2.2 (for the epoch to 2105). Care is needed in considering these figures as the information is presented as percentages and does not fully reveal the actual detail associated with each theme (these being described in the tables in Appendix G). A brief discussion by theme is given in Section 2.2. However, it is useful to consider the overall information and to set this in the context of different sections of the coast as a whole.

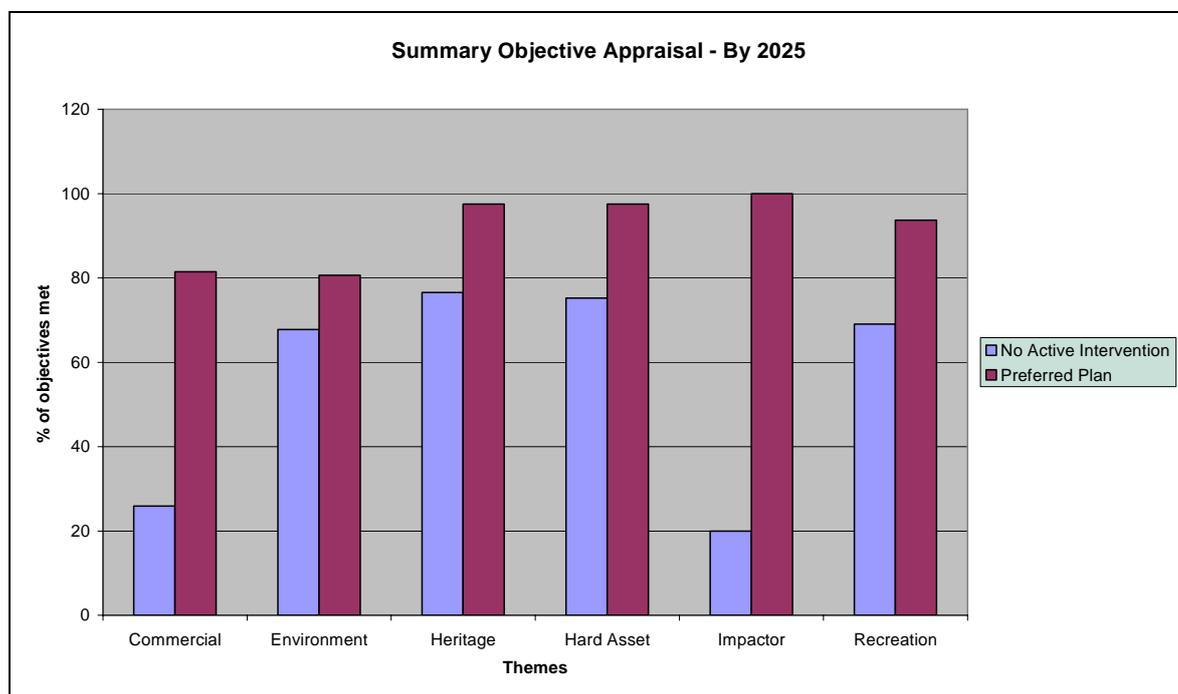


Figure 2.1: Summary Objective Appraisal for epoch to 2025

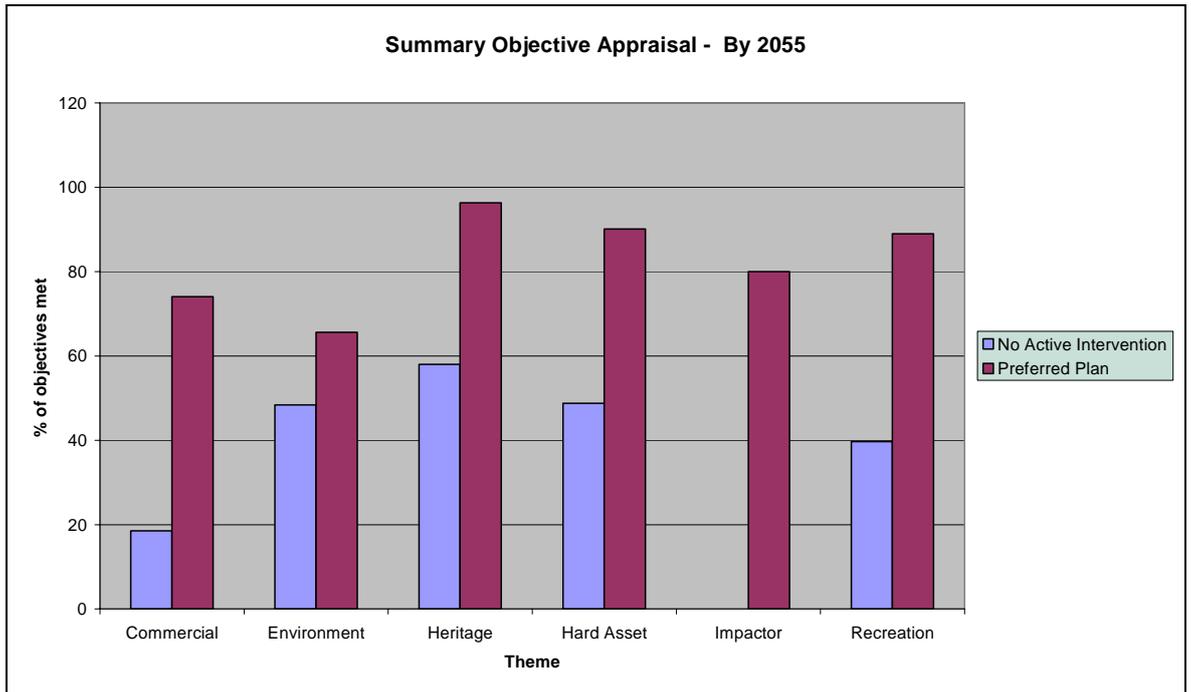


Figure 2.2: Summary Objective Appraisal for epoch to 2055

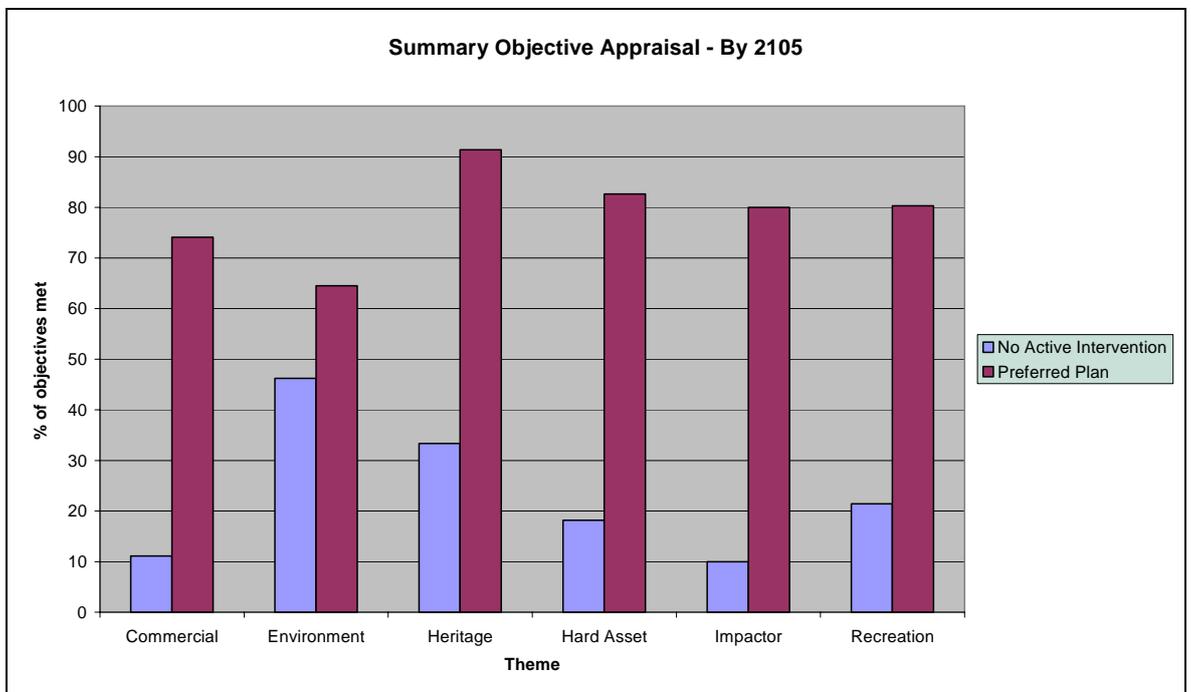


Figure 2.3: Summary Objective Appraisal for epoch to 2105

Considering initially the figures, it may be seen that over the short term, with the specific exceptions of the commercial activities and the 'Impactors' (or risks due to pollution), there is only marginal difference between the preferred plan and that of no active intervention. This reflects the fact that on the whole defences are in reasonable condition and that the coast is functioning relatively well. Over the medium term under no active intervention for all themes there is a general fall off in terms of objectives met. In comparison the preferred plan, while clearly introducing certain changes, maintains a relatively high success in balancing objectives. The same may be seen to apply in the third epoch. Of particular note is the relatively low achievement of environmental objectives overall. This is discussed below. However, it may be seen that this is not specifically as a result of conflict in meeting other objectives.

Considering the Preferred plan by area:

South Tyneside to Sunderland

There is increasing pressure on defences, with the potential threat of the low water moving landward and causing steepening of beaches, increased pressure on defences and loss of amenity. The plan recommends the need to build greater width into the defence systems to take account of this; either, in the case of South Tyneside and areas of Sunderland, by allowing or looking for opportunity to create width for retreat of defences or, in the case of north Sunderland, by attempting to manage the beaches to greater effect. Where feasible, the plan has recommended no further construction of defences, allowing the cliffs to erode naturally, but this requires full involvement with the planning authorities in controlling land use. Only really to the south of Sunderland is a significant change made to policy, where there is both coastal squeeze against the cliffs but also squeeze of the open cliff top land against well established development. Here it is vital that early decisions are made once a better understanding of erosion rates are established, allowing a balanced approach to management which will neither result in major economic loss nor extensive damage to the natural environment.

There is opportunity in all areas for coastal defence policy to be integrated better into the regeneration plans currently being considered. This again relies on coordination between planning authorities and managers of coastal defence.

Seaham to Hartlepool

For much of this coast the policy is self evident, supporting the effort put in to restoring the coast by the Heritage Coastal Management, allowing width for natural development while balancing local use of the area. At Seaham, in many respects the policy is also evident. Despite increasing pressure, the seafront is important to the regeneration of the area and the policy of holding the line is proposed. To the south the policy for hold the line at the Headland at Hartlepool is important in maintaining vital assets, although

here there needs to be further discussion with respect to the impacts on the designated areas. Just north of the Headland, there is an area where the issues move beyond the strict scope of the SMP. There is opportunity to draw upon the natural physical character of the coast to allow both potential environmental enhancement and new development.

Hartlepool to Saltburn

The overall shape of the coast within this area is held by the natural physical features to either end of the frontage and by the breakwaters at the mouth of the Tees. Within this context sustaining the sea front of Hartlepool is appropriate in meeting the aims of the town. However, while it would still be feasible to maintain the sea front at Seaton Carew, there is opportunity as the existing defences deteriorate for some set back of the defence line. This, as in other areas, has to be achieved through overall planned development of the frontage. The important issue is to be thinking in advance so that this opportunity is not lost by inappropriate development.

Because of the control imposed at the mouth of the Tees, by the Gares, the semi-natural dune frontages can be allowed to retreat in a manageable manner. This creates opportunity for habitat development in an area quite unique to this section of the coastline.

At Redcar there are concerns that there will be a loss of beach which will be to the detriment of the town's values. While the present review of the strategy for the area needs to examine this, it is important to learn from the situation that exists there, when considering how to accommodate the new proposed development to the west of the town. To avoid the same inherent problems, the SMP makes recommendations such that without undue constraint on the development, allowance is made now in considering how management of this area provides suitable transition to the natural development of the coast to the west.

There seems little overall pressure at present on the frontage to the east of Redcar, although it will continue to erode. Within this context the defence of Marske and Saltburn would appear sustainable given their local importance.

North Yorkshire

The dominant feature of this area is its superb coastal cliffs. Within this, are the towns and villages of Skinningrove, Staithes, Runswick Bay, Sandsend, Whitby and Robin Hoods Bay. In each of these locations the underlying policy is to maintain the communities. In some areas, in particular at Robin Hoods Bay, but also in the case of individual properties elsewhere along the coast, there may be loss under the preferred policy over the period of the SMP2. In many cases this would not be until towards the end of the SMP2 period; and this being dependent on erosion rates. To take action to defend would be difficult to justify economically and would tend to result in a creeping destruction of the natural environment. Even at Sandsend the SMP2 recommends consideration of alternative routes for the coastal road

rather than unnecessarily allowing ever more hard defence of the shoreline. At Whitby the policy remains to hold the line.

Scarborough to Flamborough

Within North Bay, there is the situation that the Victorian builders created both a much valued coastal infrastructure and sea front but at the expense of a defence line that becomes increasingly difficult to maintain. While the policy remains to hold the line, this needs to be managed in such a manner as to maintain the natural beach defences. At South Bay there is evidence at present of an accreting beach, in part because of the shelter and control provided by the Harbour. The policy here is to hold the line. However, particularly in addressing the severe flooding problem of Foreshore Road, care needs to be taken in not disrupting this valuable sediment system.

South from Scarborough the coast returns to effectively its natural shape. This is maintained over much of the area with a policy of no active intervention. Within Filey Bay, the defence of Filey town is to be held, with the typical concerns as to the manner in which this is achieved. This is considered feasible because of the town's position with respect to the shape of the bay and the proximity of Filey Brigg. Further south within the Bay the SMP accepts the need to allow a natural retreat of the cliff line. There is conflict in this with the objectives to sustain communities such as Flat Cliff. The policy here requires an integrated approach with planning associated with both the community and the major holiday park set further back. While over the short term, over possibly the next twenty years, defence of the area is not likely to cause severe disruption of the coastal system, in the medium to long term such actions would be both more difficult to sustain and have an increasing impact on these processes. In addition, despite the expected loss of property, there is poor justification for public funding of defence. As such, the recommended policy is for No Active Intervention. It is recognised that such a policy requires a plan to manage this.

2.2 Predicted Implications of the Preferred Plan

2.2.1 Implications for Property and Land Use

Overall the main centres of development are maintained. There are recommendations within the detail of the plan for not allowing further extension of defences. This will result in loss of hard assets. In particular as identified above this would include properties around Runswick Bay, Robin Hoods Bay, Cayton Bay and to the communities to the south of Filey Bay.

Generally the transport system would be maintained although the plan recommends examination of re-alignment to the roads at Marsden, at Sandsend and to the back of Cayton Bay. At Cowbar (to the west of Staithes) there is already a policy for retreating the road, as it is affected by erosion.

A significant area of loss is to some of the more mobile or softer commercial activities of the area; the agriculture generally along much of the frontage, the golf courses at Seaton Carew, at Whitby and Filey and the caravan parks to the north of Hartlepool, at Coatham, south of Whitby and again at Filey. The difficulties with managing defence of these frontages to a large degree is in terms of economic justification but also in the very nature of where such activities are situated; on the open coast deriving benefit from the natural coastline. It is important, therefore, that monitoring is put in place, or continued, so as to work with the owners in providing best advice as to when change is occurring. Equally, where there is a policy for no active intervention the planning authorities should work with these organisations and individuals to examine how the impact on businesses of a retreating coast may be mitigated.

In terms of the more major industries the policies generally work to sustain their activities in meeting the objectives of sustaining employment to the region. In none of these areas is there seen to be any great advantage in terms of the natural development of the coast in recommending change in shoreline management.

There are several areas, particularly to the northern half of the frontage, where there is potential for pollution or contamination. These areas are considered individually in the Plan.

2.2.2 Implications for Nature Conservation

Clearly there is concern when considering Figures 2.1, 2.2 and 2.3, showing failure to meet natural conservation objectives. To a large degree, when considered in detail, this is a function of the eroding coast and the nature of the interest. For example, that many of the designated sites include both the aim to allow erosion of a cliff but also to maintain the integrity of the habitat at the crest of the cliff. This is reflected in the specific wording of the objectives; to work within the constraints of a dynamic coastal system. Even so, in assessing the success of the plan it has been highlighted that such a natural development will result in loss of area of the site. While, certainly it would be equally damaging to intervene, by making explicit this loss, it highlights the need to maintain integrity in other ways. There is little scope, unfortunately again because of the character of the coastline, to create major areas of new habitat. The Plan attempts to redress the balance to a degree by recommending restricting the extension of defences further into undeveloped areas of the coast and to take advantage of the basic control imposed by natural or manmade structures to maintain areas of open dune habitat and the potential low lying areas behind.

The Plan highlights this basic problem associated with the coast and recommends that, during detailed examination of sections of the coast, every effort is made to create further opportunity for enhancing nature conservation. The corollary of this is that the understanding this document

hopes to provide, of how the coast behaves and the interdependencies between sections of the coast, may be used to effect by local managers in identifying realistic opportunities for enhancement. This would build on the very valuable work already undertaken by English Nature in their opportunities report.

2.2.3 Implications for Landscape

There are very stark differences in coastal landscape over the length of the SMP shoreline; principally in the change from areas of outstanding natural coastline to the urban areas. Both can have significant value.

The Plan aims to restrict further encroachment of defence over undefended areas. Even so, where defence is in place the plan aims to offer opportunity for less intrusive approaches to defence which helps maintain the important interface between the hinterland and the shoreline. In this the plan highlights the danger of linear defences in some areas where there is evidence that the shore may be steepening, indicating the possibilities of a more controlled approach to engineering. It is understood that, in some areas, councils have a policy to avoid the use of rock armour in amenity beaches. This is understandable in terms of use of massive rock revetments. However, rock is a valuable tool in coastal engineering and where such policies are in force, consideration should be given to the specific use of the material in providing strategic control to beaches, for example, through offshore structures, shore connected structures or reefs. In particular, this latter approach may be an appropriate manner through which both coastal defences may be maintained while substituting for natural rock outcrops which may be lost due to sea level rise.

A key component of landscape value is its enjoyment. Over virtually the entire length of the SMP, a coastal path has been established. In places this is threatened by erosion, in places quite critically, such as in the length to the north of Skinningrove. More typically there is scope for the path to be set back. The SMP should be used to identify where and when negotiations may be required to allow this set back to take place. This is not strictly a role of coast protection.

2.2.4 Implications for Historic Environment

There is a board range of historical and heritage features identified over the full length of the coast. Many of the features identified during consultation are found not to be at specific risk of coastal erosion. Even so there are several areas where features will suffer loss. In many situations, as recognised by the objectives, there is little scope for actual defence to protect these areas of interest. The Plan attempts to identify where there are risks and as suggested by the objectives this will allow prioritisation of recording prior to loss of the feature. Coastal monitoring recommended by the plan will

assist in this. There should be increased co-ordination of this information between coastal managers and those with responsibility for heritage features.

2.3 Managing the Change

2.3.1 Recommendations

The Plan sets out a development of policy over the three epochs from the present forward over 100 years. There are still essential decisions to be made in taking these changes in policy forward.

What has become very evident in developing the plan is the need for better involvement and co-ordination between different departments within authorities and between different authorities and organisations over the coastal zone. The coast cannot be managed by default.

In several areas recommendations have been made for the development of spatial planning of the coastal zone. Without this, the coastal engineering has to be purely based on risk to existing assets. Even taking the far more forward looking approach engendered by SMPs and strategies, the emphasis for defence or engineering management will tend to be responsive to threat rather than opportunity. This will tend to result in decisions being made at a time when options are already constrained.

This is a coastline where, because of the underlying geology, overall change, even given sea level rise, will tend to be manageable. The impetus for management can, therefore, come from coastal management; actual management of many of the broader issues, to deliver benefits, rather than purely from shoreline management delivering the benefits associated with damage and risk avoidance.

In specific areas where there is a short term policy for hold the line with a longer term policy of retreat or no active intervention, this must be taken as an opportunity to allow adaptation, not a policy of delay.

It is recommended that the policies be adopted by all organisations represented on NECAG and that these policies, together with an understanding of their intent, are incorporated as guidance for the development of statutory planning within each area.

The following Section of this document provides an overall summary of policies for the shoreline. This summary should be considered with reference to the detailed development of the plan provided in Section 4.

2.3.2 Funding

Each management area contains a number of policy units. For each management area an outline economic assessment has been provided

based initially on the high level assessment of damages provided by MDSF. Where strategy studies have been undertaken and where appropriate further economic data has been incorporated within each policy statement.

Overall, given the level of detail available to the SMP, the policies are shown or are believed to be cost effective in terms of economics; taking into account the additional information from strategies not specifically evaluated in the SMP. However, it is equally recognised that in many areas direct funding under coast protection may not be available due to the need for prioritisation of this funding at a national level.

The development of policies set out in Section 4 of the main report, highlights the consequences of alternative approaches. In this the SMP aims to identify the specific beneficiaries of the policy. In many cases this is driven by the specific objectives such as maintaining open coastal land as identified in planning documents or maintaining the commercial interests of an area. In line with the Government's strategy "Making Space for Water" co-funding of projects for the coast should be considered.

3 POLICY SUMMARY

3.1 Introduction

This section contains a summary of the policies by area. Further detail of how these policies have been derived can be found in Section 4 of the main SMP2 document. Figures 3.1, 3.2, 3.3 and 3.4 provide a summary of the draft policies notated on mapping.

Management Area		Policy Unit		Policy Plan			
				2025	2055	2105	Comment
MA01	River Tyne to South Pier	1.1	South Groyne	HTL	HTL	HTL	Key control structure
		1.2	Littlehaven	MR	HR*	HR*	Developed in conjunction with land use plan
		1.3	South Pier	HTL	HTL	HTL	Key control structure
MA02	Herd Sand	2.1	Herd Sands North	HTL	HTL	R	Maintain the integrity of the dune defence
		2.2	Herd Sands South	HTL	MR	HR*	Retreat to maintain the value of the beach
		2.3	Trow Point (north)	R	MR	HR*	Maintain longer term control function
MA03	Trow	3.1	Trow Point (south)	R	MR	HR*	As required for management area B1
		3.2	Trow Quarry	HTL	MR	MR	Subject to detailed appraisal.
MA04	Frenchmans Bay to Lizard Point	4.1	North of Lizard Pt.	R	R	NAI	Local protection, road re-alignment, reassess car parking
		4.2	Lizard Pt	NAI	NAI	NAI	Re-align car parking
MA05	Lizard Point to Souter Point	5.1	Harbour Quarry	HTL	R	R	Investigation of potential pollution
		5.2	Harbour Quarry to Souter Point	NAI	NAI	NAI	local management to enhance bio-diversity
MA06	Souter Point to Sunderland Harbour	6.1	Whitburn Cliffs	NAI	NAI	NAI	No change
		6.2	The Bents	MR	MR	HR*	Provide additional nearshore protection
		6.3	South Bent/ Seaburn	HTL	HTL	HTL	Maintain defences and improve beach control.
		6.4	Parson's Rock	HTL	HTL	R	Eventually removing defences
		6.5	Marine Walk	HTL	HTL	HTL	Maintain defences and improve beach control
MA07	Sunderland Harbour	7.1	Main Harbour Piers	HTL	HTL	HTL	Principle benefit to Port operation
		7.2	North Harbour	HTL	HTL	HTL	Improve condition of North Pier
		7.3	South Harbour	HTL	HTL	HTL	Examine opportunity for local retreat
Key: HTL - Hold the line, A - Advance the line, R - Retreat or Realignment, NAI – No active intervention * HR – Hold the Line on a retreated alignment, MR – Managed Realignment							

Management Area		Policy Unit		Policy Plan			
				2025	2055	2105	Comment
MA08	Sunderland Harbour to Pincushion Rocks	8.1	Harbour East Bay	HTL	HTL	HTL	Integrate with land use planning
		8.2	Harbour South Face	HTL	HTL	HTL	
		8.3	Hendon Seawall	HTL	HTL	HTL	Linked benefits with area to south
		8.4	Hendon to Pincushion	R	MR	MR	Hard point control
MA09	Pincushion to Chourdon Point	9.1	Pincushion to Seaham	NAI	NAI	NAI	
		9.2	Seaham North Prom.	HTL	HTL	HTL	
		9.3	Red Acre Cliffs	R	HR*	HR*	
		9.4	Seaham Harbour	HTL	HTL	HTL	Primarily for port activities
		9.5	Seaham South	HTL	HTL	HTL	
		9.6	Dawdon Beach	NAI	NAI	NAI	Subject to potential contamination
		9.7	Blast Beach	NAI	NAI	NAI	
MA10	Chourdon Point to Blackhall Rocks	10.1	Chourdon Point to Blackhall Rocks	NAI	NAI	NAI	Local management in line with objectives of the Durham Coastal Strategy
MA11	Blackhall Rocks to Heugh Breakwater	11.1	Crimdon Valley	NAI	NAI	NAI	Local management to beck may be considered. Possible beneficial use of dredgings for environmental reasons.
		11.2	North Sands	HTL	HTL	MR	Provisional policy of controlled management of the frontage subject long term development master plan. Otherwise the policy reverts to retreat.
		11.3	Headland	HTL	HTL	HTL	Current discussions with EN with respect to impact on the designated area.
MA12	Hartlepool Bay	12.1	Hartlepool	HTL	HTL	HTL	Detailed consideration of Heugh Breakwater.
		12.2	Seaton Carew north	HTL	HTL	HTL	Monitor impact on designated foreshore area.
MA13	Tees Bay	13.1	Seaton Carew	HTL	HTL	HTL	But consider planned retreat
		13.2	Seaton Sands	NAI	NAI	NAI	Possible future feed with dredged material
		13.3	North Gare	HTL	HTL	HTL	
		13.4	North Gare Sands	NAI	R	R	Controlled by structure to south
		13.5	Bran Sands	NAI	NAI	NAI	Investigate use of dredged material
		13.6	South Gare	HTL	HTL	HTL	
		13.7	Coatham Sands	NAI	NAI	NAI	With detailed flood risk assessment of developed areas
Key: HTL - Hold the line, A - Advance the line, R - Retreat or Realignment, NAI – No active intervention * HR – Hold the Line on a retreated alignment, MR – Managed Realignment							

Management Area		Policy Unit		Policy Plan			
				2025	2055	2105	Comment
MA14	Coatham and Redcar	14.1	Coatham East	HTL	HTL	HTL	Consideration of a transition between the development area and Coatham Sands.
		14.2	Redcar	HTL	HTL	HTL	Look to local management to maintain beach.
		14.3	Redcar East	HTL	HTL	MR	Strategic control
MA15	Marske and Saltburn Sands	15.1	Red Howles	NAI	NAI	NAI	
		15.2	Marske	HTL	HTL	MR	Headland control
		15.3	Marske Sands	NAI	NAI	NAI	
		15.4	Saltburn	HTL	HTL	HTL	
MA16	Huntcliffe	16.1	Saltburn/Huntcliff	NAI	NAI	NAI	Investigate potential threat to railway.
MA17	Skinningrove	17.1	Cattersty Sands	R	NAI	NAI	retreat through maintaining inner section of Jetty
		17.2	Skinningrove	HTL	HTL	HTL	Consolidate existing defence approach
		17.3	Hummersea	NAI	NAI	NAI	
MA18	Boulby	18.1	Boulby	NAI	NAI	NAI	Loss of property
MA19	Cowbar and Staithes	19.1	Cowbar Cottages	HTL	HTL	HTL	Continued monitoring determining the need for further intervention.
		19.2	Cowbar Cliffs	NAI	NAI	NAI	
		19.3	Staithes	HTL	HTL	HTL	Develop a detailed strategy for local management of defences, taking in to account works at Cowbar.
MA20	Staithes to Runswick Bay	20.1	Old Nab	NAI	NAI	NAI	
		20.2	Port Mulgrave	R	R	NAI	Subject to further investigation
		20.3	Lingrow	NAI	NAI	NAI	
MA21	Runswick Bay to Sandsend Ness	21.1	Runswick Village	HTL	HTL	HTL	
		21.2	Runswick Bay	NAI	NAI	NAI	Loss of property south of Runswick
		21.3	Kettleness	NAI	NAI	NAI	
MA22	Sandsend Wyke	22.1	Sandsend cliffs	NAI	NAI	NAI	Consideration of works associated with the unit to the east.
		22.2	Sandsend Village	HTL	HTL	HTL	
		22.3	Coastal road	HTL	R	R	Subject to further investigation of options for the road.
		22.4	Uppang Beach	NAI	NAI	NAI	Adaptation of the Golf Course
MA23	Whitby	23.1	Uppang Beck	HTL	R	R	Transition form hard defence
		23.2	West cliff	HTL	HTL	HTL	
		23.3	Harbour and Abbey cliffs	HTL	HTL	HTL	
MA24	Whitby to Saltwick Nab	24.1	The Stray	NAI	NAI	NAI	
Key: HTL - Hold the line, A - Advance the line, R - Retreat or Realignment, NAI – No active intervention * HR – Hold the Line on a retreated alignment, MR – Managed Realignment							

Management Area		Policy Unit		Policy Plan			
				2025	2055	2105	Comment
MA25	Saltwick Nab to Hundale Point (Robin Hoods Bay)	25.1	Saltwick to Hundale	NAI	NAI	NAI	
		25.2	Village of Robin Hood's Bay	HTL	HTL	HTL	This policy is a local exception to the general policy for this larger section of the coast.
MA26	Hundale Point to Scalby Ness	26.1	Burniston	NAI	NAI	NAI	
MA27	Scarborough North Bay and Castle Cliffs	27.1	North Bay	HTL	HTL	HTL	Detailed strategic appraisal of options required.
		27.2	Castle Headland	HTL	HTL	HTL	
MA28	Scarborough South Sands and Harbour	28.1	Harbour	HTL	HTL	HTL	Essential control point
		28.2	Foreshore Road	HTL	HTL	HTL	Improve overtopping risk
		28.3	Spa and access	HTL	HTL	HTL	Consider opportunity for advance
		28.4	Cliff Gardens	HTL	HTL	HTL	Minimise impact on foreshore
		28.5	South Cliffs	NAI	NAI	NAI	
MA29	Black Rocks to Filey Brigg	29.1	Cornelian Bay	NAI	NAI	NAI	
		29.2	Cayton Bay	NAI	NAI	NAI	
		29.3	Cayton Bay Access	MR	MR	MR	Within the broader policy unit of the bay
MA30	Filey	30.1	Gristhorpe Cliff	NAI	NAI	NAI	Provide advice to caravan Parks with respect to retreat.
		30.2	North Cliff	NAI	NAI	NAI	Set back line of Coastal footpath
MA31	South Filey Bay	31.1	North of Filey	NAI	NAI	NAI	Affected by works to stop outflanking of Filey
		31.2	Filey	HTL	HTL	HTL	Looking to long term overall management.
		31.3	Muston Sands	NAI	NAI	NAI	Affected by works to stop outflanking of Filey
MA32	Muston Sands to Speeton Cliffs	32.1	Hunmanby Sands	NAI	NAI	NAI	Consideration of long term management of frontage, access and hinterland.
		32.2	Hunmanby Gap	NAI	NAI	NAI	Consideration of long term management of frontage
		32.3	Reighton	NAI	NAI	NAI	Consideration of long term management of frontage
MA33	Muston Sands to Flamborough Head	33.1	Speeton	NAI	NAI	NAI	Allow natural development of coast.
		33.2	Flamborough Head	NAI	NAI	NAI	Over arching policy for the whole area
		33.3	North Landing	HTL	HTL	HTL	Within the context of the above policy
		33.4	Flamborough	not defined			Reviewed following monitoring.
Key: HTL - Hold the line, A - Advance the line, R - Retreat or Realignment, NAI – No active intervention * HR – Hold the Line on a retreated alignment, MR – Managed Realignment							

Figure 3.1: Draft SMP2 Policies – River Tyne to Hartlepool

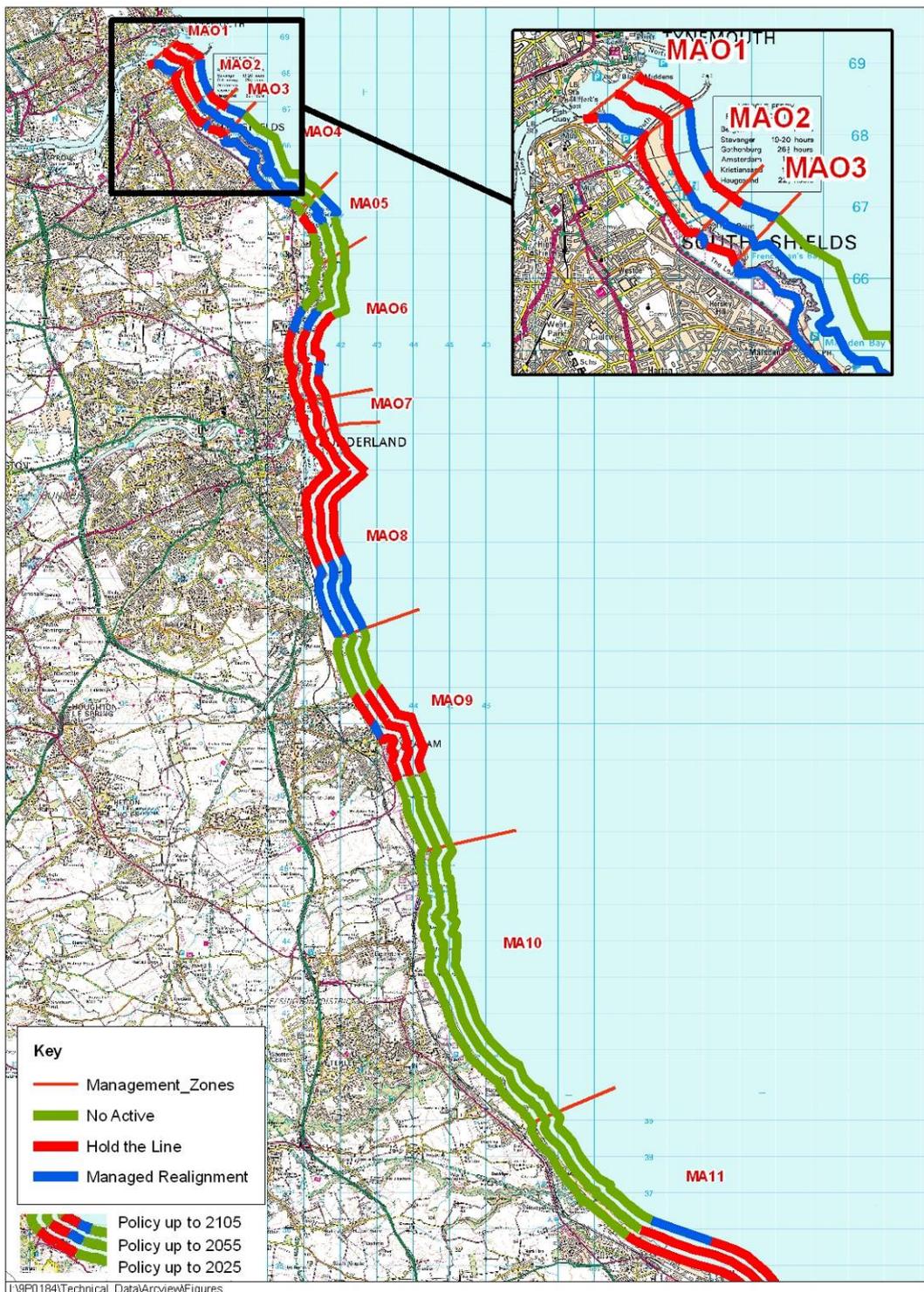


Figure 3.2: Draft SMP2 Policies – Hartlepool to Staithes

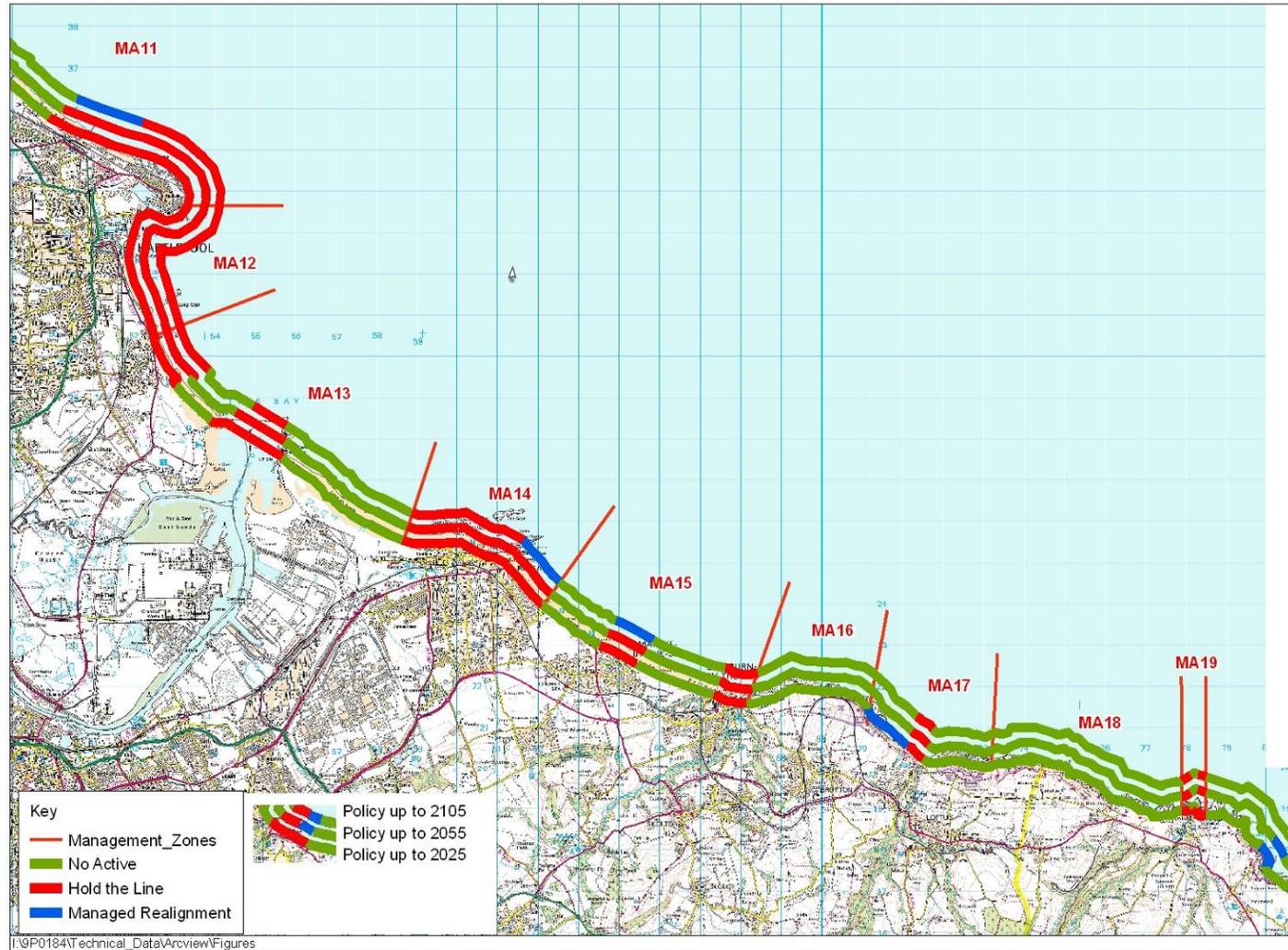


Figure 3.3: Draft SMP2 Policies – Staithes to Scarborough

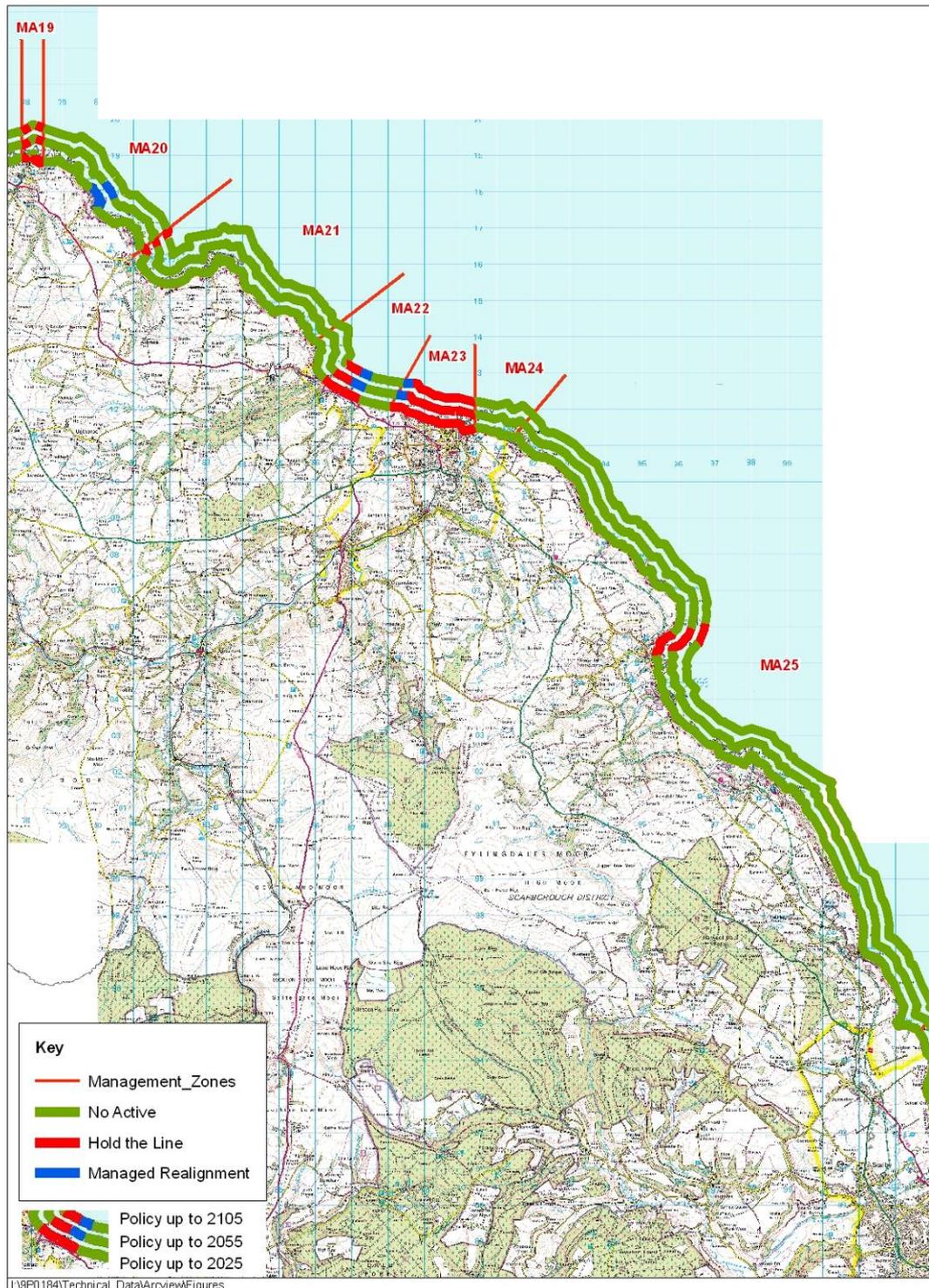
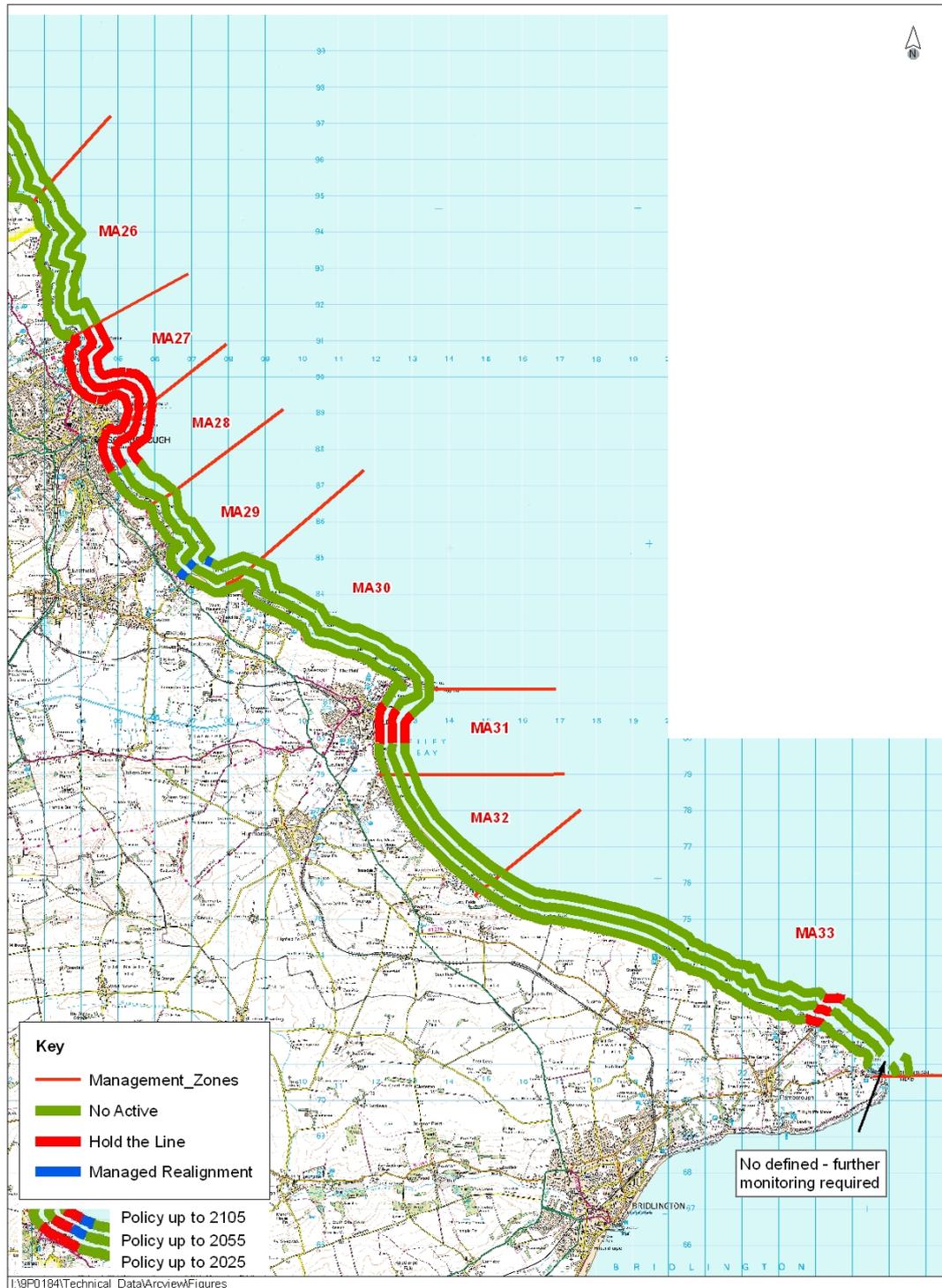


Figure 3.4: Draft SMP2 Policies – Scarborough to Flamborough Head



4 ACTION PLAN

4.1 Introduction

This section outlines further investigation, studies or works which need to be carried out or developed in order to implement policies for each area. The action plan also identifies the monitoring required; in part from the identification of investigations and studies mentioned above, but also with respect, more of the need to gain a better understanding of coastal processes, so as to perform coastal management in an effective manner and to feed back into the shoreline management process. The rationale for both undertaking further investigation and studies and that of monitoring is discussed in Section 7 of the main report and is briefly summarised below.

4.2 Investigations, studies and works.

The need for further work is discussed in the main body of the SMP2 (Section 4) by Management Area. In the following tables the further works are identified in summary.

An indicative cost is shown in the tables, together with an indicative timescale by when the action should be undertaken. The degree of urgency may arise from the condition of defences or from the need to clearly define how defences may best be integrated with land use planning.

4.3 Monitoring

Monitoring is an essential element of good coastal management. However, it is equally important that the purpose of monitoring is clearly understood:

- providing justification for expenditure,
- to ensure that there is an overall coherence between different aspects of the monitoring process, ensuring maximum value is being obtained,
- from the above, scoping what actually needs to be done, and
- in being able to assess whether the overall programme or specific aspects of monitoring is providing the information required, and providing justification for further actions and expenditure.

In the following tables these reasons for monitoring are considered. It may also be appreciated that there are different scales of monitoring and this is similarly identified. It is important that individual authorities are managing their own need for information but at the same time working with the Coastal Group in developing the better understanding over the whole SMP area.

It is also envisaged that there will be a need for regional scale collation, storage and dissemination of data and information collected or derived from monitoring at more a more local level. This function needs to be developed through the Coastal Group, acting as a group and drawing upon information provided by individual Group members.

4.4 Action Plan

The action plan, combining studies, schemes and monitoring, is set out in this sub-section. In general it is the Operating Authorities who, even if not actually managing specific actions, will be promoting or ensuring actions are undertaken in a timely manner. These actions, summarising the information given for each management area (defined in Section 4 of the main report) have been grouped by Operating Authority. A brief overview of the need for these actions covering each Authority's area is also given. Where joint action is required between authorities or between authorities and other organisations, this is identified.

4.4.1 South Tyneside Council (STC)

Overview

The South Tyneside frontage may be considered in two sections: the developed area immediately south of the Tyne and the more natural frontage from south from Trow Point. The principal issues, associated with the first of these, are that of ensuring good integrated management of the frontage in relation to current activities and regeneration plans. Within this is the need to ensure enhancement of the natural ecological features. Over the southern section of coast, the main issues are the management of potential pollution issues and the management of the retreating coastline. Associated with this latter issue is planned relocation of car parks and possibly the coastal road.

The following action plan is recommended.

By When	Action	Management Area	Responsibility	Cost £k
On going	Trow: design development. Establish specific design criteria and undertake design.	MA 03	STC	150
2007	Revise strategy for Littlehaven, with intention to realign defence.	MA 01	STC	30
2007	Establish plan for dune management at Herd Sands, including long term plan for recreation area.	MA 02	STC	10
2007	Risk assessment at harbour Quarry, initial surveys and report	MA 05	STC	5
2008	Marsden Bay, risk assessment of areas of concern, initial surveys and report	MA04	STC	5
2009	Investigation. Examine nature and extent of material in Harbour quarry.	MA 05	STC	50
2010	Assess potential impacts and confirm SMP policy.	MA 05	STC	10
2010	Scheme development. Review strategy and develop appraisal for maintenance and refurbishment plan.	MA 06	SCC/ <i>Co-ordinated with STC</i>	40
2012	Outline strategy for Herd Sands developed in conjunction with land use plan.	MA 02	STC	25
2012	Planning Strategy. Development of realignment strategy for road, car parking and access. Including examination of alternative route for road.	MA 04	STC	50
Schemes				
2008	Dune management	MA 02	STC	200
2008	Short term defence to Trow quarry	MA 03	STC	1600
2009	Develop new promenade on realignment	MA 01	STC	2100
2011	Initial scheme implementation to the south of Herd Sands	MA02	STC	200
2025	Retired defence at Harbour quarry (subject to investigations and plan)	MA 05	STC	240

Associated with these activities are the following monitoring recommendations for the two general areas defined above

Monitoring recommendations for the northern section of coast.

ISSUES			
Performance of the beach after realignment at Littlehaven and identifying the potential roll back and pressure on defences over Herd sand.			
Deterioration of coast protection structures and increasing pressure on defence line.			
Pedestrian damage to dunes			
Influence of Trow Point			
Possible change in nearshore area as identified elsewhere in SMP area.			
OBJECTIVES			
Topographic change over the two beach areas			
Establish erosion rate of Trow point			
Position of defences in relation to beach crest.			
Mapping human pressure on dunes and extent of dunes			
Establish and monitor condition of defences			
Establish reliable record of sea bed change			
MONITORING	SCOPE	FREQUENCY	SCALE
Air photography	Long term background monitoring of shape of beaches and pressures on natural frontages. Detailed examination of erosion of Trow point	Two yearly	Co-ordinated by group
Topographic survey	Survey covering both open beaches and dunes.	yearly	strategy
Crest profiles	Local variation of beaches and vulnerability of defences	quarterly	local
Defence inspection	Visual inspection and record photographs of defences.	After storms/ two yearly	Local, feeding to NFCDD
Bathymetric survey	Corridor survey out to 20m. CD contour, centred on Herd sands.	ten yearly	Regional

Monitoring recommendations for the southern section of coast.

ISSUES			
Influence of Trow Point and Target Rock, with the pressure and extent of erosion within Trow Quarry.			
Threat of loss of car parks and road, associated with loss of footpath.			
Condition of defence at harbour quarry			
OBJECTIVES			
Establish erosion rate of Trow point and target rock			
Erosion of quarry infill.			
Establish and monitor condition of defences at Harbour quarry			
MONITORING	SCOPE	FREQUENCY	SCALE
Air photography	Long term background monitoring of erosion of cliffs.	Two yearly	Co-ordinated by group
Topographic survey	Survey covering Trow Quarry.	yearly	local
Defence inspection	Visual inspection of defences. and record photographs	After storms/ two yearly	Local, feeding to NFCDD

4.4.2 Sunderland City Council (SCC)

Overview

The frontage is covered by the Whitburn Bay to Ryhope Coast Protection Strategy (May 2001). In addressing the immediate issues the SMP confirms the overall approach set out in the strategy. The key elements of this are maintenance and major refurbishment of the linear defences and the actions recommended are summarised in the table below. Towards the end of the first epoch, and depending on monitoring, consideration needs to be given to development of the longer term intents set out in the SMP. Development of initial project appraisal should take account of this.

Along the port area, the developments of the defence actions need to be integrated with the proposed regeneration plan. This will tend to determine the timescale for action.

Over the southern extent of the Council's area both major refurbishment work and reconstruction is to be undertaken. Further south, the investigation into the Halliwell Banks quarry is on-going. The outcome of this investigation together with the development of detailed appraisal of actions along the Hendon area need to take account of the longer term policies of the SMP2.

The following action plan is recommended.

By When	Action	Management Area	Responsibility	Cost £k
2007	Complete Investigation of Halliwell Banks. Management of potential contamination.	MA 08	SCC	80
2007	Longitudinal access study to Hendon Beach.	MA 08	SCC	5
2008	Review strategy priorities against outcome measures.	MA 06 -08	SCC	15
2008	Scheme development for Harbour East Bay. Review and develop defence requirements to port regeneration area.	MA 08	SCC	50
2010	Scheme development. Review strategy and develop appraisal for maintenance and refurbishment plan.	MA 06	SCC/ <i>Co-ordinated with STC</i>	40
2012	Review strategy along Hendon frontage/ Ryhope.	MA 08	SCC	25
2017	Review strategy for port area	MA 07	SCC	30
Schemes				
2009	Scheme under review for Harbour East Bay	MA 08	SCC	6000
2012	Refurbishment of defences to North Sunderland	MA 06	SCC	3000
2012	Potential schemes to South Sunderland	MA 08	SCC	4000
2012	Continued refurbishment of harbour piers	MA 07	SCC	1500

Associated with these activities are the following monitoring recommendations.

Monitoring recommendations for the Sunderland frontage.

ISSUES			
<ul style="list-style-type: none"> Long term steepening of nearshore area. Stability of cliffs Risk at the Bents Erosion of area south of Sunderland and potential impact on transport infrastructure. Potential loss of beaches Defence condition and vulnerability to loss of material at the toe. 			
OBJECTIVES			
<ul style="list-style-type: none"> Topographic change over the two main beach areas and at the Bents Establish erosion rate of Ryhope cliffs Position of defences in relation to beach crest. Mapping human pressure on dunes and extent of dunes Establish and monitor condition of defences Establish reliable record of sea bed change 			
MONITORING	SCOPE	FREQUENCY	SCALE
Air photography	Long term background monitoring of shape of beaches and cliff and foreshore position.	Two yearly	Co-ordinated by group
Topographic survey	Survey covering beaches to north and south of Sunderland with local survey at the Bents	yearly	strategy
Cliff crest profiles	Profiles along the Ryhope cliff	yearly	strategy
Crest profiles	Local variation of beaches and vulnerability of defences along the Seaburn walls	quarterly	local
Defence inspection	Visual inspection and record photographs of defences.	After storms/ two yearly	Local, feeding to NFCDD
Bathymetric survey	Corridor survey out to 10m CD contour at Sunderland North beach.	Five yearly	Strategy
	Corridor survey out to 20m. CD contour	10 yearly	Regional

4.4.3 Easington District Council (EDC)

Overview

The Seaham Strategy Study identified that defences are at present adequate but that deterioration is likely to increase over the next 20 years. There are concerns over potential contamination from erosion of the cliff line to the south of the harbour. This may have implications with respect to continued regeneration of the area. Critical to management of the coast is the change occurring on the shore as mining waste continues to erode. The behaviour of the beaches is, therefore likely to change over the next 20 years. The action plan has to be built from and understanding of this change. Monitoring is, therefore essential in developing the SMP2 policies.

The following action plan is recommended.

By When	Action	Management Area	Responsibility	Cost £k
On going	Local management	MA 10	Durham Heritage Coast	
2009	Management strategy for Crimdon Valley.	MA 11	Co-ordinated by HBC/ EBC /DHC	5
2010	Investigate potential contamination at Dawdon Beach.	MA 09	EDC	50
2014	Review overall coastal strategy	MA 09	EDC	
Schemes				
	No schemes at present.			

The following monitoring recommendations will provide information relevant to the above activities but as importantly providing information for Durham Heritage Coast management.

Monitoring recommendations

ISSUES

- Long term steepening of nearshore area.
- Performance of the beach in relation to maintenance of defences.
- Potential need to stabilise cliff to north of the port.
- Local management and long term evolution of the Durham Coast.
- Potential contamination from erosion south of the port.
- Long term risk to the railway line.
- Access management to the coast.

OBJECTIVES

- Establish erosion trends and vulnerability of defence to North Seaham
- Determine cliff erosion north of port
- Determine cliff erosion south of the port to inform contamination risk.
- Establish erosion trends of mining waste and stability of beaches over the Durham Coast.
- Establish and monitor condition of defences
- Establish reliable record of sea bed change

MONITORING	SCOPE	FREQUENCY	SCALE
Air photography	Long term background monitoring of cliff erosion.	Two yearly	Co-ordinated by group strategy
Beach profiles	Covering areas identified in strategy, establishing both trends and variation.	yearly	local
Crest profiles	Erosion of Cliff crest at Dawdon Beach	yearly	Local, feeding to NFCDD Strategy
Defence inspection	Visual inspection and record photographs of defences.	After storms/ two yearly	Regional
Bathymetric survey	Corridor survey out to 10m CD contour at Seaham.	Five yearly	
	Corridor survey out to 20m. CD contour, centred on bays along frontage.	10 yearly	

4.4.4 Hartlepool Borough Council (HBC)

Overview

The recent strategy study has set out detailed management to the north of Hartlepool and the Headland through to the marina. From this specific schemes are identified at the Headland, in front of the Town walls and the marina defences. In addition to this detailed proposals are being developed for North Sands. To the south of Hartlepool there is concern over condition of defences in front of Seaton Carew, management and maintenance needing to be taken forward with regard to development of the Seaton Carew sea front. There needs to be a management plan for Seaton Dunes to ensure the SMP2 policy for managed realignment is taken forward in an appropriate manner. The action plan and monitoring requirements are as set out covering the three general areas: North Hartlepool, Hartlepool Bay and Seaton Carew.

The following action plan is recommended.

By When	Action	Management Area	Responsibility	Cost £k
On going	Scheme Development for Headland. Detailed appraisal for improving defences.	MA 11	HBC	40
2007	Development strategy for area of North Sands. Develop an integrated approach to defence of the cemetery frontage. Identify potential erosion risk contribution.	MA 11	Co-ordinated by HBC	25
2008	Town walls. Detailed scheme appraisal report	MA 12	Private/ Co-ordinated by HBC	130
2009	Management strategy for Crimdon Valley.	MA 11	Co-ordinated by Hartlepool BC/ Easington DC/ Durham Heritage Coast	5
2009	Middleton Beach. Advise on defence.	MA 12	Co-ordinated by HBC	5
2009	Strategy for Seaton Carew, review of condition and develop management strategy.	MA 13	HBC	80
2010	Marina. Detailed project appraisal report.	MA12	Private/ Co-ordinated by HBC	80
2010	Management plan for Seaton Dunes. Co-ordinate land use and dune management	MA 13	Co-ordinated by HBC/(EA)	5
2012	Heugh Breakwater. Review strategy	MA 12	Private/ Co-ordinated by HBC	30
2012	Review flood defence strategy to Teesmouth	MA13	Environment Agency. (HBC/ RCBC.)	50

Schemes				
	Schemes for North Hartlepool to be identified by strategies	MA 11	HBC	
2009	Town walls	MA 12	HBC	500
2010	Management for Seaton Carew defences determined from strategy.	MA 13	HBC	

Associated with these activities are the following monitoring recommendations.

Monitoring recommendations for North Hartlepool.

ISSUES			
<p>Developing pressures on golf course, access and car park and caravan park at Crimdon Valley as coast erodes. Position of beck.</p> <p>Determining behaviour of foreshore in relation to development and management and risk to LNR and cemetery.</p> <p>Transition from managed realignment to holding the line at the Headland</p> <p>Potential deterioration of exposed rock at Headland.</p> <p>Condition of defences.</p> <p>Possible change in nearshore area as identified elsewhere in SMP area.</p>			
OBJECTIVES			
<p>Overall evolution of foreshore and interaction with beck and dunes. Mapping pressure on dunes and extent of dunes and sand banks.</p> <p>Long terms trends of foreshore levels and interaction between sections of the coast.</p> <p>Determine erosion rates of rock headland.</p> <p>Establish and monitor condition of defences</p>			
MONITORING	SCOPE	FREQUENCY	SCALE
Air photography	Long term background monitoring of shape of beaches and pressures on natural frontages.	Two yearly	Co-ordinated by group
Topographic survey	Survey covering open beaches and back dunes.	Yearly	Strategy
	Survey covering rock headland	Five yearly	local
Defence inspection	Visual inspection and record photographs of defences.	After storms/ two yearly	Local, feeding to NFCDD

Monitoring recommendations for Hartlepool Bay.

ISSUES			
<p>Uncertainty associated with extreme water levels within Hartlepool Bay.</p> <p>Overall change and sediment transport within Hartlepool Bay.</p> <p>Impacts associated with Heugh Breakwater</p> <p>Condition of defences.</p>			
OBJECTIVES			
<p>Establish bathymetric change over the Bay</p> <p>Establish local variation in extreme water levels.</p> <p>Determine trends in local foreshore levels.</p> <p>Establish ornithological value of area in the lee of the Heugh Breakwater.</p> <p>Monitor shoreline use of area in lee of Heugh Breakwater.</p> <p>Monitor condition of defences</p>			

MONITORING	SCOPE	FREQUENCY	SCALE
Topographic survey	Survey covering foreshore levels.	yearly	strategy
Defence inspection	Visual inspection and record photographs of defences.	After storms/ two yearly	Local, feeding to NFCDD
Bird counts	Establish bird use of area in the lee of the Heugh Breakwater. (Co-ordinate with TBC)	As required	local
Bathymetric survey	Co-ordinate monitoring with Tees Port.	Determined by port operations	Strategy
Water levels	Collate local water level data.	Event driven	Strategy

Monitoring recommendations for Seaton Carew and Teesmouth.

<p>ISSUES</p> <p>Uncertainty associated with extreme water levels within Hartlepool Bay.</p> <p>Overall change and sediment transport within Hartlepool Bay.</p> <p>Condition of defences at Seaton Carew associated with long term management of pressure.</p> <p>Management of integrity and retreat of dunes.</p> <p>Management of flood defence within the mouth of the Tees.</p>			
<p>OBJECTIVES</p> <p>Establish bathymetric change over the Bay</p> <p>Establish local variation in extreme water levels.</p> <p>Determine trends in foreshore levels.</p> <p>Establish variation in beach levels in front of defences at Seaton Carew.</p> <p>Establish ornithological value of area of Seaton Dunes.</p> <p>Monitor condition of defences</p>			
MONITORING	SCOPE	FREQUENCY	SCALE
Air photography	Long term background monitoring of the evolution of Tees Bay.	Two yearly	Co-ordinated by group
Topographic survey	Survey covering foreshore and dunes levels. Local survey in front of Seaton Carew	yearly After storms / six monthly	strategy local
Defence inspection	Visual inspection and record photographs of defences.	After storms/ two yearly	Local, feeding to NFCDD
Bird counts	Establish bird use of (Co-ordinate with TBC)	As required	local
Bathymetric survey	Co-ordinate monitoring with Tees Port.	Determined by port operations	Strategy
Water levels	Co-ordinate local water level data.	Event driven	Strategy

4.4.5 Redcar and Cleveland (RCBC)

Overview

The frontage is taken in two sections: from the Tees through to Redcar and the frontages from Marske through to Staithes. In the first, a strategy is being developed for the Redcar frontage in association with the Environment Agency. There are potential flood risks associated with the policies for natural realignment of the dunes at Coatham and within the Tees. Along the Marske to Saltburn frontages there is still uncertainty associated with cliff erosion rates, coupled to foreshore evolution. These uncertainties will determine the timing for intervention at Marske and are critical to the management at Saltburn. There is a more immediate need to develop a strategy for Saltburn, this should include consideration of the longer term development management at Marske. The recently concluded strategy at Skinningrove sets out a plan for refurbishment of defences. Over the coast to the east the rates of erosion of the cliff remains uncertain and requires long term monitoring. This is most critical at Cowbar and links to the management of Staithes.

The following action plan is recommended.

By When	Action	Management Area	Responsibility	Cost £k
On going	Revised scheme and appraisal. Extend scheme to Redcar east and develop detailed works.	MA14	Environment Agency/ RCBC	300
2007	Management review. Review of defence measures associated with development at Coatham.	MA 14	Co-ordinated by RCBC	5
2008	Skinningrove Scheme Development. Define specific works based on strategy.	MA 17	RCBC	50
2009	Develop strategy for Marske and Saltburn	MA 15	RCBC	120
2009	Review Staithes strategy. Review flood risk and set out long term management of harbour and piers.	MA 19	SBC/ RCBC	50
2010	Review flood risk to rear of Coatham dunes. Examine need for retired flood defence	MA 13	Environment Agency. / RCBC	30
2012	Review flood defence strategy to Teesmouth	MA13	Environment Agency. (HBC/ RCBC.)	50
Schemes				
2009	Improved protection to Redcar frontage	MA 14	Environment Agency/ RCBC	12,000
2009	Refurbishment of defences at Skinningrove	MA 17	RCBC	1400
2016	Potential need to relocate Cowbar Lane (not coast protection)	MA 18	RCBC	

Associated with these activities are the following monitoring recommendations.

Monitoring recommendations for the Coatham and Redcar frontages.

ISSUES			
<p>Uncertainty associated with extreme water levels within Hartlepool Bay.</p> <p>Overall change and sediment transport within Hartlepool Bay.</p> <p>Condition of defences at Redcar associated with long term management of pressure and potential beach loss.</p> <p>Transition between defended sections and natural coast.</p> <p>Management of integrity and retreat of dunes.</p> <p>Management of flood defence within the mouth of the Tees.</p>			
OBJECTIVES			
<p>Establish bathymetric change over the Bay</p> <p>Establish local variation in extreme water levels.</p> <p>Determine trends in foreshore levels.</p> <p>Establish variation in beach levels in front of defences at Redcar.</p> <p>Monitor condition of defences</p>			
MONITORING	SCOPE	FREQUENCY	SCALE
Air photography	Long term background monitoring of the evolution of Tees Bay.	Two yearly	Co-ordinated by group
Topographic survey	Survey covering foreshore and dunes levels.	yearly	strategy
	Local survey in front of Coatham, Redcar and Redcar East	After storms / six monthly	local
Defence inspection	Visual inspection and record photographs of defences.	After storms/ two yearly	Local, feeding to NFCDD
Bathymetric survey	Co-ordinate monitoring with Tees Port.	Determined by port operations	Strategy
Water levels	Co-ordinate local water level data.	Event driven	Strategy

Monitoring recommendations for Marske through to Staithes.

ISSUES			
<p>Uncertainty of soft cliff erosion rates.</p> <p>Understanding of erosion of hard cliff frontages.</p> <p>Overall change and sediment transport over eastern section of Tees Bay.</p> <p>Sediment exchange in the offshore area.</p> <p>Erosion rates at Cowbar</p> <p>Condition of defences at Saltburn and Skinninggrove</p> <p>Condition and variation of beaches at Marske, Saltburn and Skinninggrove</p>			
OBJECTIVES			
<p>Determine trends in foreshore levels.</p> <p>Establish variation in beach levels in front of defences at Saltburn and Skinninggrove.</p> <p>Long term understanding of offshore sediment transport.</p> <p>Monitor condition of defences</p>			

MONITORING	SCOPE	FREQUENCY	SCALE
Air photography	Long term background monitoring of the evolution of cliffs.	Two yearly	Co-ordinated by group
Cliff face surveys	Support work by Durham University	Monthly	Local/ regional
Cliff crest profiles	Continue monitoring profiles at Cowbar lane	yearly	local
Topographic survey	Survey covering foreshore and dunes levels.	yearly	strategy
	Local survey in front of Saltburn, Cattersty Sands and Skinningrove.	After storms / six monthly	local
Defence inspection	Visual inspection and record photographs of defences.	After storms/ two yearly	Local, feeding to NFCDD
Bathymetric survey	Corridor survey out to 10m CD contour at Saltburn and Skinningrove.	Five yearly	Strategy
	Corridor survey out to 20m. CD contour, centred on bays along frontage.	10 yearly	Regional
Sea bed sediments	Side scan sonar and initial seismic profiling	Ten yearly	Regional

4.4.6 Scarborough Borough Council (SBC)

Overview

The North Yorkshire frontage naturally divides into three areas, covering: the town of Whitby and the villages over the northern section of the frontage, the areas around Scarborough and Cayton and Filey Bay. Common to each area is the need to better understand and monitor erosion and instability of the coastal cliffs. Following existing strategies, there is on-going concern over condition of defences at Staithes, Runswick Bay and Robin Hood's Bay. At Whitby the condition of the piers, the management of beach levels and the future management at Sandsend all require prompt action.

Strategies have been developed over the Scarborough frontages; these are being reviewed following protection works and building upon existing monitoring. Various actions derive from these and from the SMP2.

Further south the principle issues relate to cliff instability and erosion rates, particularly at Cayton Bay, Filey and the smaller communities in Filey Bay. There are specific concerns at Osgodby Point and Flat Cliffs where the policy is for managed realignment. In these areas there needs to be a co-ordinated plan to address loss of properties, supported by SBC. There is a general erosion of the cliff line which may have long term implications for land management.

The following action plan is recommended.

By When	Action	Management Area	Responsibility	Cost £k
On going	Scarborough - Review Holbeck to Scalby Mills Strategy,	MA 27	SBC	on going
On going pending funding	Whitby - Appraisal of Whitby Harbour Piers, examining condition of Piers and development of management approach.	MA 23	SBC	225
On going	Review of all SBC Coastal Strategies	All	SBC	
2007	Cayton Bay - Cliff stability investigations at Cayton Bay	MA 29	SBC	80
2007	Filey Bay - Management Plan for Flat Cliffs, to support management for realignment.	MA 32	Residents and private sector <i>Supported by SBC</i>	10
2008	Runswick Bay - Scheme appraisal for defence of Runswick Bay. Develop recommendations of strategy	MA 21	SBC	30
2008	Whitby - Strategy study examining flood risk within Whitby harbour.	MA 23	Environment Agency/ SBC	
2008	Cayton Bay - Management plan at Cayton Bay, to review implications of managed realignment.	MA 29	SBC/ NYCC/ National Trust	10

2008	Filey - Investigation to examine stability of coastal slopes at Filey taking account of long term management to main wall.	MA 31	SBC	50
2008	Filey - Scheme appraisal to develop strategy recommendations for outflanking defence.	MA 31	SBC	40
2008	Review strategy priorities against outcome measures.	All	SBC	
2009	Staithes - Review Staithes strategy. Review flood risk and set out long term management of harbour and piers.	MA 19	SBC/ RCBC	50
2009	Sandsend - Strategy Review. Highway investigation and review possible realignment of coastal strategic route.	MA 22	SBC/ NYCC	60
2010	Robin Hoods Bay - Develop Strategy for Robin Hood's Bay, further consideration of cliff stability.	MA 25	SBC	50
2010	Robin Hoods Bay North of Mount Pleasant Study	MA 25	SBC	30
2010	Port Mulgrave - Investigation to examine slope stability and dependency on harbour area at Port Mulgrave.	MA20	SBC	50
2012	Cayton Bay - Realignment strategy at Cayton Bay, develop managed realignment and access strategy plan.	MA 29	SBC	30
2025	Negotiate retreat of the Cleveland Way	MA 24	NYMNPA/ Heritage Coast	
Schemes				
2008	Scarborough South Bay: Spa Chalet Cliff - Rock revetment in front of existing seawall, seawall repairs and slope stabilisation	MA 28	SBC	7,030
2008	Scarborough South Bay: The Spa – Rock revetment in front of existing seawall, seawall repairs and slope stabilisation	MA28	SBC	11,700
2008	Scarborough North Bay: Sea Life Centre – Rock berm and seawall repairs	MA 28	SBC	8,777
2013	Scarborough North Bay: Peasholm Gap and Clarence Gardens - Rock revetment in front of existing seawall, seawall repairs and slope stabilisation	MA28	SBC	17000
2010	Robin Hoods Bay - Preventative maintenance at Robin Hood's Bay as recommended by strategy	MA 25	SBC	150
2010	Whitby - Whitby Harbour Pier improvements	MA 23	SBC	16,000
2010	Scarborough South Bay: South Cliff Gardens – Rock revetment in front of existing seawall, seawall repairs and slope stabilisation	MA 28	SBC	3,654

2010	Filey - Outflanking defence at Filey	MA 31	SBC	500
2010	Filey – Cliff Stabilisation	MA 31	SBC	500
2012	Scarborough South Bay: Foreshore Road and St Nicholas Cliff – Raise height of existing wall, drainage improvement Foreshore Road and slope stabilisation	MA 28	SBC	5,232
2012	Staithe - Potential scheme to improve flood risk to Staithe Harbour	MA 19	SBC	500
2013	Scarborough South Bay: South Bay Pool – Rock revetment in front of existing seawall, seawall repairs and slope stabilisation	MA 28	SBC	5,518
2015	North Bay Cliffs – Seawall repairs and slope stabilisation	MA 28	SBC	4000
2015	Scarborough South Bay: Rose Gardens - Rock revetment in front of existing seawall, seawall repairs and slope stabilisation	MA 28	SBC	6,679

Associated with these activities are the following monitoring recommendations.

Monitoring recommendations for the northern section of the coast.

ISSUES			
<p>Uncertainty of soft cliff erosion rates and stability. Improved understanding of erosion of hard cliff frontages. Potential nearshore steepening. Sediment exchange in the offshore area. Condition of defences at Staithe, Runswick, Robin Hood's Bay, Whitby and Sandsend. Condition and variation of beaches at , Runswick, Robin Hood's Bay, Whitby and Sandsend.</p>			
OBJECTIVES			
<p>Establish mechanisms and cliff erosion rates. Determine trends in foreshore levels. Establish variation in beach levels in front of defences. Long term understanding of offshore sediment transport. Monitor condition of defences</p>			
MONITORING	SCOPE	FREQUENCY	SCALE
Air photography	Long term background monitoring of the evolution of cliffs.	Two yearly	Co-ordinated by Group
Cliff face surveys	Stability issues	Monthly	Local/ regional
Topographic survey	Survey covering foreshore and cliffs in Whitby Bay. Local survey in front of Runswick and Robin Hood's Bay.	yearly After storms / six monthly	strategy local
Defence inspection	Visual inspection and record photographs of defences.	After storms/ annually	Local, feeding to NFCDD
Bathymetric survey	Corridor survey out to 10m CD contour at Whitby. Corridor survey out to 20m. CD contour, centred on bays along frontage.	Five yearly 10 yearly	Strategy Regional
Sea bed sediments	Side scan sonar and initial seismic profiling	Ten yearly	Regional

Monitoring recommendations for the Scarborough frontage

ISSUES Cliff stability. Potential nearshore steepening. Sediment exchange in the offshore area. Long term trends in beach levels. Condition of defences Condition and variation of beaches			
OBJECTIVES Establish mechanisms cliff instability. Determine trends in foreshore levels. Establish variation in beach levels in front of defences. Long term understanding of offshore sediment transport. Monitor condition of defences			
MONITORING	SCOPE	FREQUENCY	SCALE
Air photography	Long term background monitoring of the beach shape and cliffs.	Two yearly	Co-ordinated by group
Cliff stability	Inclinometers and slope movement	Continuous	Local/ regional
Topographic survey	Survey covering foreshore areas. (monitoring linked to beach management) Local survey in front of defences	yearly After storms / six monthly	strategy local
Defence inspection	Visual inspection and record photographs of defences.	After storms/ annually	Local, feeding to NFCDD
Bathymetric survey	Corridor survey out to 10m CD contour. Corridor survey out to 20m. CD contour, centred on bays along frontage.	Five yearly 10 yearly	Strategy Regional
Sea bed sediments	Side scan sonar and initial seismic profiling	Ten yearly	Regional

Monitoring recommendations for the southern section of coast.

ISSUES Uncertainty of cliff stability. Potential nearshore steepening. Sediment exchange in the offshore area. Long term trends in beach levels. Condition of defences Condition and variation of beaches			
OBJECTIVES Establish mechanisms cliff instability.			

<p>Determine trends in foreshore levels. Establish variation in beach levels in front of defences. Long term understanding of offshore sediment transport. Monitor condition of defences</p>			
MONITORING	SCOPE	FREQUENCY	SCALE
Air photography	Long term background monitoring of the beach shape and cliffs.	Two yearly	Co-ordinated by group
Cliff stability	Inclinometers and slope movement	Continuous	Local/ regional
Topographic survey	Survey covering foreshore areas. Local survey in front of defences at Filey	yearly After storms / six monthly	strategy local
Defence inspection	Visual inspection and record photographs of defences.	After storms/ annually	Local, feeding to NFCDD
Bathymetric survey	Corridor survey out to 10m CD contour. Corridor survey out to 20m. CD contour, centred on bays along frontage.	Five yearly 10 yearly	Strategy Regional
Sea bed sediments	Side scan sonar and initial seismic profiling	Ten yearly	Regional

4.4.7 East Riding of Yorkshire Council (ERYC) (Flamborough)

The main issues relate to long term erosion rates of Flamborough, in particular in the area of Flamborough Head. As such there are no specific studies or investigations. The following monitoring is recommended.

Monitoring recommendations

ISSUES			
Uncertainty of cliff erosion rates. Condition of defences			
OBJECTIVES			
Establish erosion in key areas. Monitor condition of defences			
MONITORING	SCOPE	FREQUENCY	SCALE
Air photography	Long term background monitoring of the beach shape and cliffs.	Two yearly	Co-ordinated by group
Defence inspection	Visual inspection and record photographs of defences.	After storms/ two annually	Local, feeding to NFCDD

4.5 General

The above action plan is developed covering each coast protection authority area. Actions associated with the Environment Agency are identified within this. These areas tend to be around the flood risk areas adjacent to the Tees and Esk and would be developed in co-operation with the relevant CPA.

The Action Plan sets out in outline the requirements for studies, investigations and works, together with an identification of overall issues which need to be addressed through monitoring. Based on this, specific strategy and local monitoring needs will be developed in detail. This, together with the regional monitoring programme should be developed further through collaboration at the Coastal Group level. In particular, consideration needs to be given as to how monitoring results may be presented in a consistent format to allow regional information to be collated, exchanged, analysed and interpreted

Erosion and stability of both soft and hard cliffs is an issue common to much of the frontage. As further information is drawn together, there is the potential for this to provide improved understanding of these issues relevant to management of the UK coast in general. It is recommended, through the SMP2, that this necessary effort for local management is brought together as a centre of coastal research into these issues. Consideration should be given to how this can be developed through the valuable work being undertaken by the regional academic institutions and in co-operation with other areas of the UK with similar issues (such as the Isle of Wight, Dorset and the West Coast of Wales).

The Coastal Group should also be aware of national data collection relevant to their frontages on tidal levels, extreme water levels and wave climate. This national data set should be used to provide baseline context for the regional monitoring. This national data may be most appropriately collated through the Environment Agency, feeding information on these underlying processes in to the collation of regional monitoring managed by the Coastal Group.