

# Southend-on-Sea Borough Council

Report of Deputy Chief Executive (Place)

To  
**Cabinet**  
On  
**13 March 2018**

Agenda  
Item No.

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Engineer

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**Southend Shoreline Strategy**  
**Place Scrutiny Committee – Executive Councillor: Cllr Cox**  
***A Part 1 Public Agenda Item***

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## **1. Purpose of Report**

- 1.1. The purpose of this report is to present the draft Southend Shoreline Strategy to Members for approval, to seek approval to submit to Environment Agency (EA) and to establish on-going governance and implementation.

## **2. Recommendation**

- 2.1. **That Members adopt the document, subject to approval by Environment Agency, as its strategy for managing the Borough's coastal defences into the future.**
- 2.2. **Members authorise the Portfolio Holder in Consultation with the Deputy Chief Executive, Place, to approve the final strategy, following Environment Agency approval.**
- 2.3. **That Members note the total value of the Strategy at £410m (Present Value £134m) over a 100 years period, of which part will need to be funded from the Council's Capital programme whilst other funding may include Flood Defence Grant-in-Aid and other external sources.**
- 2.4. **That Members agree that the Strategy will be supported by an appropriate governance process, as set out in Paragraph 6.**
- 2.5. **To approve the submission of the Strategy to the EA Large Project Review Group (LPRG) in June 2018.**

## **3. Background**

- 3.1. The Shoreline Strategy is being developed by the Council in partnership with other organisations which share coastal interests in the area. These include Natural England and the Environment Agency. Participation in the development of the Shoreline Strategy is not limited to these organisations and contributions have and will continue to be welcomed from any organisation or individual with an interest. The Strategy outlines the work undertaken to date for the coast of Southend-on-Sea and the plans to manage flood and coastal erosion risks for the frontage.

- 3.2. The Shoreline Strategy will aim to be sustainable into the future and therefore will consider as far as 100 years ahead. However, the Shoreline Strategy will be regularly reviewed as more information about future conditions becomes available.
- 3.3. The provision and maintenance of flood defences and coast protection works in England fall under the supervision of the Environment Agency (EA). EA has an established procedure to manage investment in such works to provide flood and erosion security at optimum cost to the taxpayer, in the face of high demand on limited resources. The procedure is based on a hierarchy of strategic policy documents and stages:

National Strategy for Flood and Coastal Erosion Risk Management	Overarching national strategy developed by the EA.
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Shoreline Management Plans (SMP)	Regional coastal plans which divide the entire coastline into “Management Units”. Southend falls into the 2010 Essex and South Suffolk Shoreline Management Plan (SMP2), as management unit J, with a “management intent” over the life of the Plan to “Hold the line” and sustain the current Standards of Protection.
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<b>Shoreline Strategies</b>	<b>Management-Unit-scale documents which seek to develop an optimised strategy for tidal flood- and erosion protection to deliver the SMP management policy.</b>
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Projects	Works at individual sections of the frontage which are identified in the Strategy.
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- 3.4. The Essex and South Suffolk Shoreline Management Plan (SMP2) indicates that the coastal defences of the Borough should be retained on their present alignments and enhanced at appropriate times in the future to counter the effects of sea level rise. The time span of the Plan is 100 years, although it will be subject to review at regular intervals.
- 3.5. The Thames Estuary 2100 project (TE2100), published by EA in 2012, overlaps SMP2 at Southend and the entire intertidal area of the coast in Southend is internationally designated for nature conservation purposes.
- 3.6. Within Southend, the majority of the coastal defences are owned and managed by the Council, as an “operating authority”. The current defences are ageing having been constructed largely over 100 years ago. The Standard of Protection (SoP) provided varies massively and will reduce further with sea level rise. Most of the works identified in the Strategy will be their responsibility. In order to implement the SMP2 policy into the future in a manner which the Environment Agency (EA) can accept as technically, environmentally and economically optimum, a draft “Shoreline Strategy” has been developed building on previous strategies which were not formally approved by DEFRA.

- 3.7. The EA has revised downwards their predictions of future sea-level rise. This has an impact on the level of flood risk, existing and into the future, and consequently on many aspects of the economic case for carrying out improvements.
- 3.8. Approval of the Council's strategy by EA will ensure that projects designed in compliance with it will be eligible for public funding on the terms described below. This will ensure that the Council will be in a position to apply for funding from EA.
- 3.9. For the Strategy, the coastal frontage has been divided into 5 "Benefit Areas", based on the type of defence provided and into 3 time periods (Epochs) corresponding to short, medium and long term. These Benefit areas are hydraulically independent, meaning if coastal flooding were to occur within the benefit area, flood waters would not extend into adjacent benefit areas. Each area has been assessed for the standard of protection it enjoys, the residual life of the existing structures, their overtopping performance and the areas and values of hinterland which could suffer flooding on failure ("failure" does not imply collapse, but any degree of overtopping). This assessment has taken into account all normal tidal variations, the statistical probabilities of tidal surges and the projected degree of sea level rise forecast throughout the time frame of the strategy.
- 3.10. For each benefit area, a long list of options was developed and reviewed taking into account the fit with the objectives, technical feasibility, environmental and social impact and cost to produce a short list of options. The short list was then subjected to more detailed appraisal against technical issues, environmental impact, costs and benefits to produce an economic assessment leading to a preferred option.
- 3.11. Within the Strategy, Benefit Area "A" (Two Tree Island) is only considered within the first Epoch up to 2034 because of the significant health risks associated with the legacy landfill. During this time, it is proposed that a working group be established to consider a long term solution.
- 3.12. The long list of options were consulted on in autumn of 2017 with the results of this engagement and all stakeholder consultation used to shape and agree the preferred options of the Shoreline Strategy. The preferred options were not based solely on economic grounds but also considered the views shared by stakeholders.
- 3.13. Finally, a high level programme of works has been developed to maintain the standards of protection throughout the Borough at the optimum level for the risk carried. The process uses discounted cost/benefit analysis to determine the most cost effective times and scales of intervention. The proposals can be "tweaked" as projects come forward for design to optimise the timing of the works.
- 3.14. In all cases, the feasibility of constructing any scheme in the programme will be subject to available finance. Therefore, approval of the Strategy will not commit the Council to adhere absolutely to the programme – it can be progressed or not as finance permits at the appropriate time. However, the EA, who have a statutory role of national oversight of flooding issues, will expect the Council to make all reasonable efforts to maintain the progress of the planned improvements.
- 3.15. The Strategy document is therefore presented herewith for Council to approve. An Executive Summary and the Strategy is provided as **Appendix 1** and copies of the full document including Appendices are available on request and are proposed to be provided in the Member's Room when this Strategy progresses to Cabinet.

## 4. Strategy Overview

4.1. The Strategy has two primary and three secondary objectives:

Primary Objectives	Secondary Objectives
Objective 1: Maximise the reduction of coastal flood and erosion risk to properties and infrastructure at significant or very significant risk of flooding in light of coastal change over the next 100 years.	Objective 3: Support regeneration of Southend-on-Sea and the viability and sustainable development of the tourist industry in accordance with local development policy.
Objective 2: Contribute to a functional, healthy estuary while maintaining and improving the integrity of designated habitats. Aim to offset the impact of coastal squeeze and achieve a net environmental gain in support of the delivery of the Thames River Basin Management Plan.	Objective 4: Align with the objectives of TE2100 and Essex SMP2 to ensure a coherent approach to coastal flood and erosion risk in the region where appropriate.
	Objective 5: Develop a realistic implementation plan that favours options that reduce the whole-life costs and liabilities to the tax payer and utilise partnership funding sources, subject to the consideration of wider community benefits.

4.2. The preferred option to meet the objectives for each of the **5 Benefit Areas** is:

- **Benefit Area A:** Two Tree Island. Patch and repair works undertaken during the first epoch of the Strategy (to 2034 only). During this time a patch and repair approach is proposed and a working group of key stakeholders is proposed to be formed to identify a long term approach to this area. This is critical because of the long term risks to human health and the natural environment posed by the legacy landfill.
- **Benefit Area B:** Old Leigh Port – Hold the Line (HTL) Sustain. Defences raised to provide a consistent Standard of Protection (SoP) against coastal flooding in light of climate change.
- **Benefit Area C:** Cinder Path to Three Shells – HTL Upgrade. Defences upgraded to provide a 0.5% Annual Exceedance Probability (AEP) against coastal flooding in 2116 in light of climate change negating the risk of coastal erosion.
- **Benefit Area D:** Three Shells to the Old Ranges – HTL Upgrade. Defences upgraded to provide a 0.5% AEP against coastal flooding in 2116 in light of climate change negating the risk of coastal erosion.
- **Benefit Area E:** East Beach – HTL Sustain. Defences raised to provide a consistent SoP against coastal flooding in light of climate change negating the risk of coastal erosion.

4.3. The proposed interventions or programme of works is summarised below:

	Benefit Area A	Benefit Area B	Benefit Area C	Benefit Area D	Benefit Area E
<b>Epoch One (2017 – 2034)</b>	<ul style="list-style-type: none"> <li>• Programme of patch and repair works</li> <li>• Working group to define long-term</li> </ul>	<ul style="list-style-type: none"> <li>• Replacement of concrete seawall at Bell Wharf in Y4 to provide protection against 10%</li> </ul>	<ul style="list-style-type: none"> <li>• Replacement of defences at Cinder Path in Y9 to provide protection against 1% AEP coastal flood</li> </ul>	<ul style="list-style-type: none"> <li>• Capital works at Shoebury Common in Y1</li> <li>• New groynes in Section 6 in Y4</li> <li>• Replacement of defences at the</li> </ul>	<ul style="list-style-type: none"> <li>• Replacement of defences in Y4 to provide protection</li> </ul>

	<b>Benefit Area A</b>	<b>Benefit Area B</b>	<b>Benefit Area C</b>	<b>Benefit Area D</b>	<b>Benefit Area E</b>
	management approach to managing the area and historic landfill issue	AEP coastal flood event in 2116	event in 2116 <ul style="list-style-type: none"> <li>Replacement of defences to the west of the Genting Club in Y9 to provide protection against 1% AEP coastal flood event in 2116.</li> </ul> Replacement of timber groynes for the entirety of defence section 5.	base of the pier in Y14 to provide protection against a 1% AEP coastal flood event in 2116 <ul style="list-style-type: none"> <li>Capital maintenance to defences in Section 7 west of Thorpe Bay Yacht Club in Y14 including replacement of groynes</li> </ul>	against a 10% AEP coastal flood event in 2116
<b>Epoch Two (2035 – 2049)</b>		<ul style="list-style-type: none"> <li>Replacement of defences (excluding Bell Wharf) in Y19 to provide protection against 10% AEP coastal flood event in 2116</li> </ul>	<ul style="list-style-type: none"> <li>Replacement of defences at Chalkwell in Y24 to provide protection against 1% AEP coastal flood event in 2116.</li> <li>Replacement of defences to the east of the Genting Club in Y30 to provide protection against 1% AEP coastal flood event in 2116.</li> </ul>	<ul style="list-style-type: none"> <li>New defence in Section 7 and Section 8 in Y30 to provide protection against a 1% AEP coastal flood event in 2116</li> </ul>	
<b>Epoch Three (2050 – 2116)</b>		<ul style="list-style-type: none"> <li>Replacement of defences (excluding Bell Wharf) in Y59 to provide protection against 10% AEP coastal flood event in 2116</li> <li>Replacement of defences (excluding Bell Wharf) in Y99 to provide protection against 10% AEP coastal flood event in 2116</li> </ul>	<ul style="list-style-type: none"> <li>Capital works in Y50 to re-raise all Benefit Area C defences to provide protection against a 0.5% AEP event in 2116.</li> <li>Capital maintenance works on all Benefit Area C defences in Y80.</li> </ul>	<ul style="list-style-type: none"> <li>Replacement of defences in Section 6 (excluding Section 6.1) in Y34 to provide protection against a 1% AEP coastal flood event in 2116</li> <li>Capital works in Y50 to re-raise all Benefit Area D defences to provide protection against a 0.5% AEP event in 2116.</li> <li>Capital maintenance and new groynes in Section 6 and to setback embankment in Section 8 in Y 72</li> <li>Replacement of timber groynes in Section 8 in Y78</li> <li>Capital</li> </ul>	<ul style="list-style-type: none"> <li>Replacement of timber groynes in Y52</li> <li>Capital maintenance including new gabions in Y75</li> </ul>

	Benefit Area A	Benefit Area B	Benefit Area C	Benefit Area D	Benefit Area E
				maintenance to defences in Section 7 and Section 8 in Y90	

- 4.4. The form of construction, defence alignment and other specific details will all be determined through a more detailed defence specific study (Project Appraisal) and will include local consultation.
- 4.5. There will be significant environmental effects of the preferred strategy for which mitigation is proposed:

Key Significant Effects	Proposed Mitigation Actions
Intermittent disturbance (inc. noise, dust, reduced access etc) from maintenance and construction activities to residents, businesses and visitors.	<p>Planning liaison with Public Rights of Way (PRoW) Officer (PRoW / cycle route diversions), Environment Agency (contaminated land); MoD, English Heritage (preservation in situ and / or by record).</p> <p>Provide alternative facilities along the frontage.</p> <p>Sensitive timing and phasing of works to take account of tourist season and environmental sensitivities.</p> <p>Comply with construction best practice in undertaking any works, including maintenance and use construction techniques that minimise ground disturbance.</p> <p>Consult with local residents and businesses in advance of any works.</p> <p>Liaison with the fishing community with regards to sea delivery, such as, importation of rock and beach recharge, to ensure that their operations are not impeded.</p>
Increase in crest levels of defences may result in obstruction to access and sea views which may affect fishing, tourism and recreational activities and visual amenity and landscape character.	<p>Liaise with local societies / associations and provide alternative facilities along the frontage, where feasible.</p> <p>Take setting of Conservation Areas into consideration during detailed design.</p> <p>Liaise with local fisheries community. Provide temporary moorings elsewhere along the frontage. Allow for access in detailed design, through use of a removable defence or alignment of defence landward of processing units.</p>
Beach recharge / recycling activities could damage internationally and nationally designated intertidal habitats as a result of smothering of habitat or via release of fine material into the marine environment.	<p>Liaison with Natural England in matters of nature conservation.</p> <p>Comply with construction best practice and implement effective sediment control measures.</p> <p>Sensitive timing and phasing of works.</p> <p>Ensure that material used for beach recharge is similar to the existing material and free from contaminants.</p>
Coastal squeeze will affect internationally and nationally designated intertidal habitats.	<p>Provide compensatory habitat.</p> <p>Comply with construction best practice. Consult with Natural England.</p>

- 4.6. The expected cash costs of the Strategy for the first four years is £24.0m, for the rest of Epoch One £60.1m, Epoch Two £105.1m and for Epoch Three £220.7m.

4.7. The available Partnership Funding (PF) from Environment Agency is calculated from the PF calculator and is summarised for each Benefit Area with the remaining external contributions that will be required. Financial contributions to make up the Adjusted PF score to 100% will be required before any scheme can proceed. The EA contribution is based upon a benefit/cost ratio. Therefore, if savings to the scheme costs that either do not reduce or increase the benefit cost ratio the level of external contribution will improve. These contributions do not have to come from the Council but can also be sourced from other interested parties such as Network Rail, MoD, private developers, etc. Based on current estimates and predicted cost benefit ratios, EA will contribute to the proposed schemes based on the table below:

<b>Benefit Area</b>	<b>EA Contribution</b>	<b>External Contribution (£k) or saving required to achieve an Adjusted Score of 100%</b>	<b>Benefit Period</b>
A – Two Tree Island	0%	2,133	2017-2034
B – Old Leigh Port	77%	1,936	2017-2117
C - Cinder Path to Three Shells	39%	30,788	2017-2117
D - Three Shells to Old Ranges	38%	31,610	2017-2117
E – Old Ranges to East Beach	12%	5,980	2017-2117
<b>Overall Strategy Area</b>	<b>38%</b>	<b>73,494</b>	<b>2017-2117</b>

4.8. It is accepted that some proposals may be difficult to implement. In these situations, careful consideration of defence locations will be needed, as will consultation with affected frontages and/or the public. It is also accepted that achieving contributions from major beneficiaries of projects, notably Network Rail and the Ministry of Defence (MoD), may be challenging but should be vigorously pursued.

4.9. Costs split by Benefit Area:

<b>Benefit Area</b>	<b>Estimated Costs (£000s)</b>
Benefit Area A	£17,547
Benefit Area B	£33,015
Benefit Area C	£148,165
Benefit Area D	£192,723
Benefit Area E	£18,308

## 5. Other Options

5.1 It is an important element of the assessment process that all relevant works options should be considered. Therefore, the proposals presented are considered to be optimum having been selected by means of a comprehensive process including all options as the starting point leading to a short list of options for detailed analysis.

5.2. The Do-Nothing option is presented within the detailed economic analysis for each short listed option.

## **6. Governance**

6.1. Governance control will be required for implementation and long term operation of the Strategy. The governance will be in line with the principles of PRINCE2 and in accordance with Departmental procedures.

## **7. Reasons for Recommendations**

7.1 There is a clear need to develop the sub-regional elements of the Shoreline Management Plan into a more in-depth strategy for the Borough. This document provides that more detailed approach and sets out the potential funding implications for the Borough and other stakeholders.

7.2 It is a requirement of the process that public consultation was undertaken on a draft document which was completed in autumn 2017. The post-consultation analysis report is available on request.

7.3. Adopting a comprehensive strategy and seeking for this to be approved through the EA Large Project Review Group will enable the Council to maximise access to supporting funds.

## **8. Corporate Implications**

8.1. Contribution to Council's Vision & Corporate Priorities

8.1.1. Establishing a strategy approved by EA will contribute to the "clean and safe" strands of corporate priorities, by ensuring that the town's defences are offering the optimum standard of protection from flooding and erosion at all times and are maintained and upgraded to maintain their ability to function.

8.1.2. It will also contribute to the "excellent" strand by complying fully with the government's established strategic approach to management and funding of the defences.

8.2. Financial Implications

8.2.1. The total estimated cost of the strategy is £410m over 100 years with a Present Value (PV) Cost of £134m. PV value of benefits are estimated at £618m providing for a Benefit Cost Ratio (BCR) of 4.61.

8.2.2. The Government operate a funding regime for Flood and Coastal Erosion Risk Management (FCERM) works which is based on a "payment for outcomes" method. Under this new system the benefits returned by a project are evaluated based on measures of, for example, value for money, the reduction in flood or erosion risk provided to property, the numbers of premises in deprived areas protected and the protection or creation of natural habitat achieved. Fixed sum payments per unit of these benefits are "earned" by the scheme and will be made available from the public purse.

8.2.3. All schemes providing some level of FCERM benefit will generate some support. Some schemes providing substantial benefits will generate enough government support to fully fund the works. Others will have a shortfall in funding, but a wide

range of options will be available to achieve implementation: savings may be made in project cost; the promoting authority may provide its own funding; local businesses or landowners benefitting from the project may be approached for contributions; various government or quasi-government bodies hold funds which it may be appropriate to tap into; the Regional Flood and Coastal Committee may provide support, or the authority may be able to raise local funding by means of levies on development or Council Tax surcharges or a combination of all these methods. The Strategy identifies several potential contributors, Network Rail, the MoD, and the Essex County Council. During the development of each detailed project, possible contributors will be identified and approached.

8.2.4. The Strategy indicates the anticipated level of government support for each benefit area. These levels are based on the current high level assessment of benefits from the planned projects, and from the anticipated output measures (OMs). They may be subject to change when schemes are considered in closer detail at project appraisal stage. Where high annual costs are expected, projects have been staged over two or more years, and the expenditures in each year will vary from the assumptions made.

8.2.5. In order for the EA to approve the Strategy and thereby accept financial obligations, it will require the Council to endorse the document as its future proposals for managing the flood defences in the face of deterioration and increasing flood risk due to sea level rise.

### 8.3. Legal Implications

8.3.1. The legal framework within which coastal defences are managed gives rights of construction and maintenance to coastal operating authorities, who include the EA and some district and unitary authorities, including Southend. It does not impose duties on anyone to do so.

### 8.4. People Implications

8.4.1 The implementation of the Strategy will be met by existing Council resources.

### 8.5. Property Implications

8.5.1. The Strategy will introduce a programme for the future maintenance and/or reconstruction of most of the flood defences owned by the Council. No other impacts on Council property are anticipated.

### 8.6. Consultation

8.6.1. In order to be accepted by EA, the Strategy had to undergo extensive consultation. This involved a number of statutory consultees, a range of local business, leisure and environmental interests and the general public.

8.6.2. In order to facilitate public access and understanding of the proposed Strategy, a Non-Technical Summary (NTS) document was prepared and used within the consultation preparation. This and all the documents forming part of the Strategy documents, which are all included in the appendices to this report, were posted on the Council's website.

## 8.7. Equalities and Diversity Implications

8.7.1. An appraisal has been carried out and all sections of the community will benefit equally from the protection afforded by a planned programme of maintenance and renewal of the Borough's flood defences proposed in the Strategy.

## 8.8. Risk Assessment

8.8.1. A strategic level assessment of physical flood risk has been carried out as a major element of the economic appraisal of this Strategy (Appendix R). This assessment will be refined to higher detail in the appraisal of each improvement project brought forward for design.

8.8.2. The major risk to the successful implementation of the Strategy is anticipated to be a possible lack of funding, combined with a failure to locate external contributors. Whilst much of the funding will be provided by Partnership Funding or Flood Defence Grant-in-Aid, a significant proportion of the funding will need to be provided by other parties or Council resources.

8.8.3. The Strategy is based on forward projections of sea level rise and Climate Change. If these prove to be more severe within the period of the Strategy (our best estimate currently is approximately 0.8m over the next 100 years) additional works may be required at additional cost to achieve the same objectives.

## 8.9. Value for Money

8.9.1. All contractors employed to implement the Strategy will be engaged through processes designed to ensure the programme offers value for money. Working effectively with the EA will also enable delivery of this aim.

## 8.10. Community Safety Implications

8.10.1. The whole purpose of this Strategy is to ensure that the Borough's coastal defences are maintained in optimum condition and offering the appropriate Standard of Protection to all residents and businesses in the flood and erosion risk areas.

8.10.2. Higher sea levels lead to higher risks of flooding, particularly in stormy conditions, together with Climate Change we will see more frequent flood events in the future if nothing is done to manage this risk.

8.10.3. If defences are not maintained, the land behind these becomes vulnerable to erosion, the soft nature of the cliffs may see rapid erosion issues. Rising sea levels increase this risk of erosion.

## 8.11. Environmental Impact

8.11.1. The assessment of the environmental constraints and impacts has been integral to the option review process. A high-level Strategic Environmental Assessment (SEA) has been undertaken to better understand the impact of the short listed options on key receptors within the study area. SEA is a systematic process for evaluating and anticipating the consequences of decision-making, such as policies, plans, programmes prior to the implementation stage, and to identify measures to prevent, reduce and as fully as possible offset any significant adverse effects.

8.11.2. The substantial extent of mudflats fronting the entire borough foreshore is designated “Special Protection Areas” (SPAs) under European legislation, because of their importance as food sources to large populations of overwintering wildfowl. These designations place obligations on the Council to maintain the SPAs in good condition, including preserving their spatial extent. One result of the Hold the Line policy of the SMP, is that in time, with continuing sea level rise, the areas of the mudflats will reduce, and Southend will be liable to provide compensatory habitat for those losses. Currently, no land has been identified in the Borough which could be surrendered for habitat creation. The EA, however, have regional habitat creation plans set up for this purpose, and the Council would be able to contribute financially to the Anglian plan in lieu of providing land.

## **9. Background Papers**

TE2100 Plan:

[https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/558630/TE2100\\_5\\_Year\\_Review.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/558630/TE2100_5_Year_Review.pdf)

Essex and South Suffolk Shoreline Management Plan 2 (SMP2):

<http://www.eacg.org.uk/docs/smp8/essex&southsuffolk%20smp%20final%202.4.pdf>

## **8. Appendices**

**Appendix 1** – Shoreline Strategy apart from Appendices.