



# Christchurch Bay and Harbour Flood and Coastal Erosion Risk Management Strategy

Draft Strategy

June 2023

The logo for AECOM, consisting of the word "AECOM" in a bold, black, sans-serif font.

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The Strategy was produced by Bournemouth, Christchurch and Poole (BCP) Council, New Forest District Council (NFDC) and Environment Agency (EA) with technical assistance from the engineering and environmental consultants AECOM.

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## Baseline:

Defines an existing condition/situation (usually Do Nothing) against which options or scenarios are compared.

## FCERM

Flood and Coastal Erosion Risk Management.

## SMP (Shoreline Management Plan)

A high-level non-statutory planning document which provides a broad scale assessment of the risk associated with coastal flooding and erosion and presents the a long-term policy framework to reduce these risks to people and the developed, historic and natural environment in a sustainable manner.

## Scheme

A measure, or combination of measures undertaken to increase the level of protection against coastal flooding and erosion to a local area (i.e. a new floodwall structure).

## Hold The Line (HTL)

A policy with an overarching intent to build or maintain coastal defences so that the position of the shoreline remains where it currently is.

## Managed Realignment (MR)

Allowing the shoreline to move over time, but managing the process in a controlled manner. Within Christchurch Bay this is usually done to cliffs where erosion is challenging to stop entirely.

## No Active Intervention (NAI) or Do Nothing

No planned investment in defending against flooding or erosion, whether or not a coastal defence has existed previously.

## Sustain

This is a term which refers to upgrading defences to keep pace with change (e.g. sea level rise). This is achieved by raising or upgrading defences over time in successive interventions as sea levels rise.

## Improve

This is term which refers to options that raise defences initially to a defined standard of protection in the future based on estimated rates of sea level rise. It is a more precautionary approach compared to Sustain.

## Strategy Management Zone (SMZ)

A section of coastline with similar characteristics in which strategic options have been developed. The SMZs have been further sub-divided into Option Development Units for option appraisal.

## Option Development Unit (ODU)

A section of the coastline in which local scale options to manage flood and erosion risk have been developed.

## Property Level Resilience (PLR)

A set of modifications added to a building to lower its flood risk. The modifications can help to reduce flood damage and speed up recovery after a flood.

## Standard of Protection (SoP)

The level of flood risk that a coastal defence structure is designed to protect against. The likelihood that a certain level of flooding will occur is described as the 'chance' that a location will flood in any one year. This risk can be expressed as a 1 in 100 (1%) chance of flooding in any one year, or a 1 in 200 (0.5%) chance etc. In any one year a large (0.5%) flood event has less chance of happening than a smaller 1% or 2% flood event.

## Residual life

The time left (typically in years) that a defence structure has before it comes to the end of its service life. The residual life is estimated from a defence condition survey and assumes that no maintenance works will be carried out in the future.

## Adaptive Pathway

The Adaptive Pathway approach provides the delivery with the flexibility to switch between the proposed leading options identified in each part of the Strategy frontage, depending on the onset of risk and the amount of funding that may be available.

## Discounting

Discounting is a term used in the economic appraisal of options and is recommended by the HM Treasury Green Book. Option costs and benefits are discounted into 'Present Values' which take into account society's preference for now compared with the future. Discounting is used to allow for a comparison of future values in terms of their value in the present day.

# Glossary (continued) – types of coastal defences



Beach Recycling



Rock groyne



Embankment



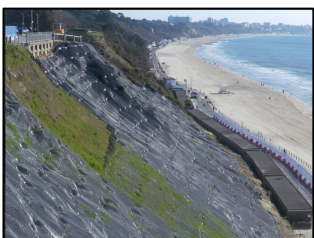
Beach Nourishment



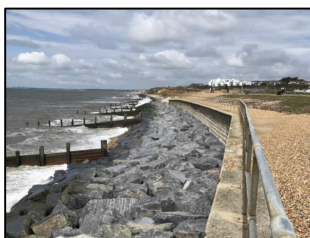
Timber groyne



Setback floodwall



Cliff slope stabilisation



Rock revetment



Slope armour



Deployable defences (e.g. flood gates)



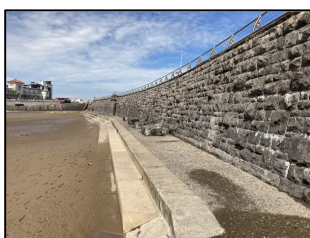
Timber breastwork



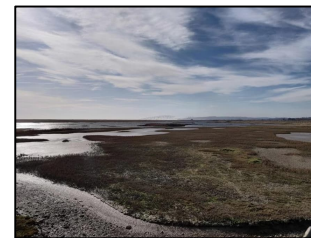
Sand dune enhancements



Gabions



Seawall



Saltmarsh restoration



# Chapter 1: Introduction

Bournemouth, Christchurch and Poole Council (BCP), New Forest District Council (NFDC), the Environment Agency and Engineering and Environmental Consultancy AECOM have developed a draft Flood and Coastal Erosion Risk Management (FCERM) Strategy for Christchurch Bay and Harbour (hereafter referred to as The Strategy).

Christchurch Bay and Harbour is located on the Dorset and Hampshire coast within the local authority areas of Bournemouth, Christchurch and Poole and the New Forest. The coastline is complex with a variety of risks including tidal flood risk around Christchurch Harbour and coastal erosion / landslide risk along parts of the open coast. The population of the strategy area including towns of Christchurch, Highcliffe, Milford-on-sea and New Milton is estimated to be over one hundred thousand.

The Strategy area stretches from immediately east of Hengistbury Head Long Groyne to the western end of Hurst Spit, including Christchurch Harbour. The area contains a mix of residential and commercial properties. There are large areas of open space and sites of significant environmental importance around much of the frontage, including environmental designations and historical landmarks. This diverse and interesting coastal environment provides extensive access and recreation opportunities and is widely used for leisure by a significant number of visitors each year. Christchurch Bay beaches are popular with swimmers, surfers, sailors and walkers alike.

Many parts of the Strategy frontage are already defended; however, the condition, standard of protection (SoP) against coastal flooding and erosion and the expected life of these defences is highly variable. Significant areas of land around Christchurch Harbour are at risk of flooding from large storm events. Parts of the open coast are at threat from coastal erosion.

In the future, with the increased storminess and rising sea levels that are predicted as a consequence of climate change, the risk of coastal flooding and erosion is likely to increase significantly.

Without actively implementing measures to manage coastal flood and erosion risks, over 1,600 properties are likely to be at risk of erosion and over 2,200 properties at risk from coastal flooding by 2123

Coastal defences are owned and maintained by both councils (BCP and NFDC), the Environment Agency and by private landowners. Many of the defences are in poor condition and are close to the end of their residual life. These assets require significant investment to withstand the impacts of climate change in the future.

With the interacting and competing pressures on the coastline the primary objective of The Strategy is to provide a long term plan for a sustainable and integrated approach to reduce the risk of coastal flooding and erosion to people, the developed and natural environment for the next 100 years.

The Strategy has achieved this by identifying a suite of proposed leading options to manage and reduce the coastal risks in a cost effective, holistic and sustainable manner.

Implementation of these options going forward will, however, be subject to funding availability and to gaining the required consents. There is no guarantee that options presented in this strategy will be progressed if funding cannot be secured.

The draft Strategy is now in a three month period of consultation (June – August 2023). During this time key stakeholders and the public are invited to attend a series of exhibitions to review and provide feedback on the proposed leading options for the Strategy.

Please visit [Christchurch Bay and Harbour FCERM Strategy 2021-2024 - Poole & Christchurch Bays Flood & Coastal Erosion Risk Management \(twobays.net\)](https://twobays.net) for further details.



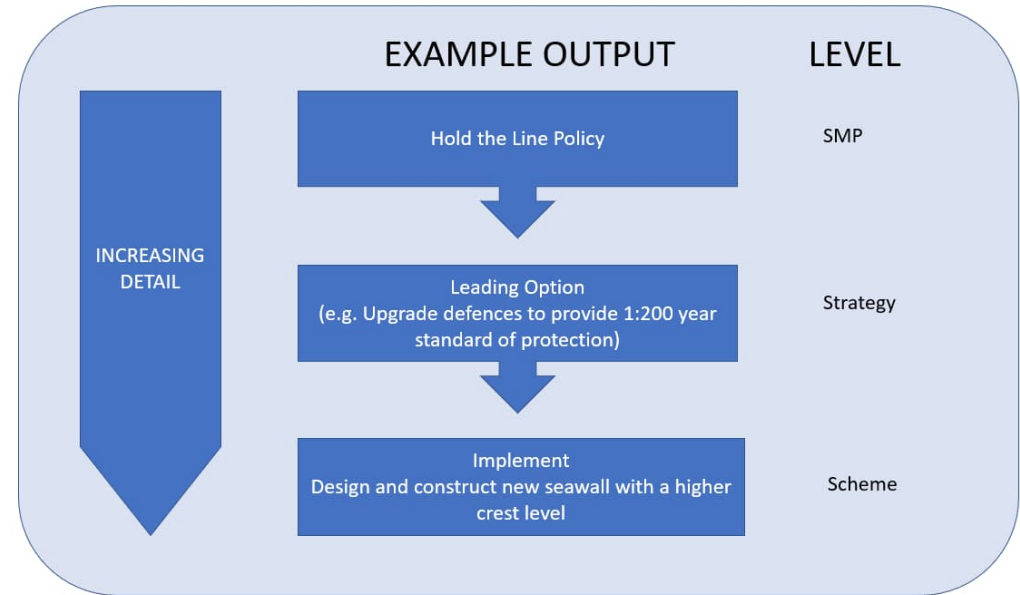
# The Need for a Strategic Approach

Coastal strategies sit at the second tier in the hierarchy of coastal management in England and sit below the high level Shoreline Management Plan policies. It is the role of the strategy to consider how coastal flood and erosion risk is likely to change in the future in response to climate change and to develop sustainable and robust options to manage the risks associated with coastal flooding and erosion. Developing a Strategy ensures that technically feasible, environmentally acceptable and economically viable options are recommended to reduce the risks from coastal flooding and erosion to people, their properties and the environment.

Without such an approach, it is likely that current management approaches would continue in the short term and future coastal defence works would be managed on an 'ad-hoc' or reactive basis which would lead to poor cost efficiency and a general increase in the coastal flood and erosion risk over time. A Strategy is also important to deliver an integrated approach to the management of our coastline. Holistic wider-level thinking behind Strategy decisions ensures that the management options implemented in one area do not increase the coastal flood and erosion risk in adjacent areas, and that opportunities to deliver wider benefits are not missed.

Importantly the strategy is required in order to help gain approval for future schemes and obtaining public funding from central government for coastal defences known as flood and coastal erosion risk management grant in aid (FCERM-GiA).

However, it is important to note that there is no guarantee that any of the options recommended in the strategy will be progressed. Implementation of options will be subject to funding availability and to gaining required consents. Public funds for coastal management are not widely available, so significant funding from a variety of sources will be needed to progress any options in this strategy.



How The Strategy fits in the management of coastal flood and erosion risk

## The outputs

Following a Strategy, a variety of outputs can result, depending on the level of risk and the leading options put forward. To deliver a leading option it may be necessary to implement a scheme (e.g. build new defences) to address coastal flood and erosion risks. Before works happen on the ground, a further element of work is carried out to design the scheme and deliver the business case for funding. BCP / NFDC will work to develop business cases to progress schemes if there is funding and if it is in the public interest, where there is a technical, environmental, social and economic solution.

In other areas, the future action may include maintenance, beach management or even to 'Do Nothing' if appropriate. There may also be actions such as monitoring, planning and further studies in order to gain evidence to help make robust management decisions in the future. This could include the need for adaptation which focusses on adjusting to, and managing, the impacts of coastal flooding and erosion.

# Purpose and Structure of this Document

This document presents a summary of the proposed leading options for public consultation which set out the recommended interventions for managing coastal flood and erosion risk along the study frontage for the next 100 years. In developing The Strategy, an understanding of the present-day risk has been developed along with how it might change in the future and the ways in which we can manage and adapt to these changes. Specifically, this document includes:

## Chapter 2 – Understanding what is at risk

- A summary of what is at risk now and in the future (defining the baseline). Including an assessment of what would happen if we 'do nothing' and how the risks change over time as a result of predicted climate change and sea level rise. This sets the context for why we need The Strategy.

## Chapter 3 – Developing The Strategy

- Overview of the work undertaken to understand the key features, issues and opportunities in the study area.
- A description of the option development and appraisal process. Including a summary of how the proposed leading options were developed and appraised considering their economic and environmental sustainability

## Chapter 4 – Proposed Leading Options

- The proposed leading options by Option Development Unit (ODU). An area-by-area summary of the proposed leading options being put forward to reduce future coastal flood and erosion risk.

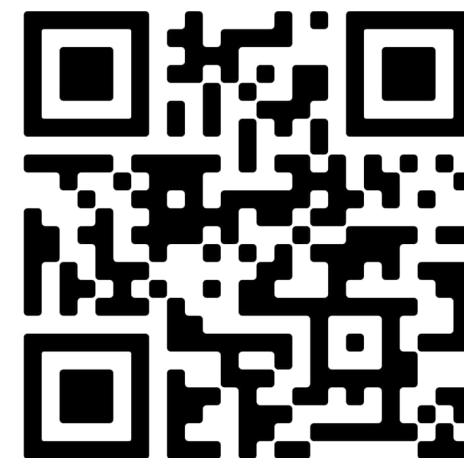
## Chapter 5 – Strategy overview

- A high level overview of the proposed leading options and how they fit together and can be implemented. Including details of the economic costs and benefits of the options.

## Chapter 6 – What next?

- What do we need from you? Engagement and feedback from key stakeholders and the public forms a vital part of shaping the final Strategy. We want to hear your views.
- Next steps following public and stakeholder consultation which will involve considering your feedback and completing the Strategy. It will then be presented to BCP Council and NFDC for adoption before being submitted to the Environment Agency for review and approval.

Have your say on the proposed leading options for the Strategy by completing a survey. Keep up to date on the Christchurch Bay and Harbour Strategy at:  
[www.twobays.net](http://www.twobays.net)





# Chapter 2: What is at Risk if we Do Nothing?

# Baseline Scenario – Do Nothing

Gaining an understanding of the coastal flood and erosion risk along the Strategy frontage is imperative in order to define a baseline for developing The Strategy. It allows comparisons to be made between the potential strategy options and is an essential step in the Strategy development process. The baseline was established by considering a 'Do Nothing' scenario.

The 'Do Nothing' scenario is defined as: *“Where there is no further intervention of any kind, including no emergency response or warning system. Where there are assets at present or where maintenance activities or other interventions are carried out, the option will be to withdraw all activities, allowing nature to take its course”.*

In essence, the 'Do Nothing' scenario represents a hypothetical situation whereby all existing defences are abandoned in terms of maintenance or repair, and no remedial or additional protection works are carried out. In addition, adaptation to sea level rise or other climate change responses are not addressed.

For the purpose of The Strategy, the risks posed by coastal flooding and erosion over the next 100 years have been established using Environment Agency approved numerical flood modelling and the Shoreline Management Plan erosion zones. It should be noted that even with the existing defences in place the future flood risk will increase significantly due to climate change and rising sea levels.

Through determining the present and future coastal flood and erosion risks under a 'Do Nothing' scenario, the properties, features, assets and key infrastructure that are at risk of damage over the next 100 years have been identified and valued, after which the leading options to manage these risks were developed. The assets at risk include (but are not limited to) services as varied as climate regulation, coastal hazards, tourism and recreation, aesthetic values and wild species diversity and habitats. Flooding at the low-lying Christchurch Harbour would affect urban areas of Christchurch and Muford. Erosion of the cliffs along the open coast would impact the urban areas of Highcliffe, Barton on Sea and Milford on Sea.

There are a number of strategic issues for coastal management in Christchurch Bay, including the influence of climate change, complex areas of the coastline e.g., Muford Sandbank, Barton on Sea and Milford on Sea and opportunities for habitat creation. In order to manage and address these issues, it is considered imperative to develop an FCERM Strategy. Joined-up strategic thinking is required to develop a cohesive, efficient, long term plan. The Strategy therefore outlines the forward programme of works to most effectively, holistically and sustainably manage the coastal flood and erosion related risks facing the island over the next 100 years.

Properties at risk of coastal flooding over the coming century if we 'Do Nothing'. Based on 1:200 year (0.5% annual chance) flood event.

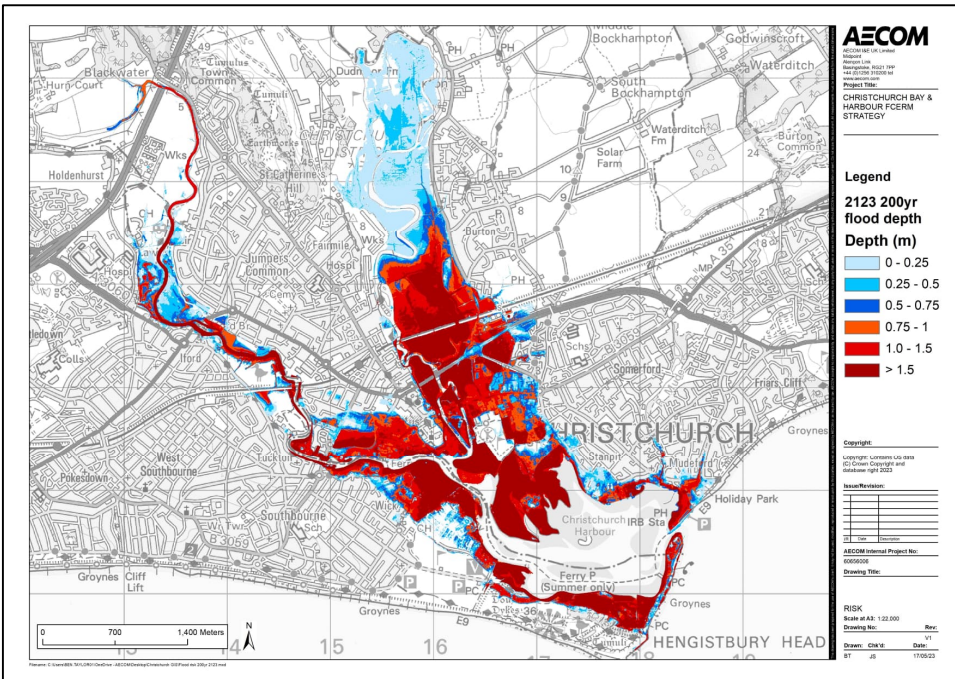
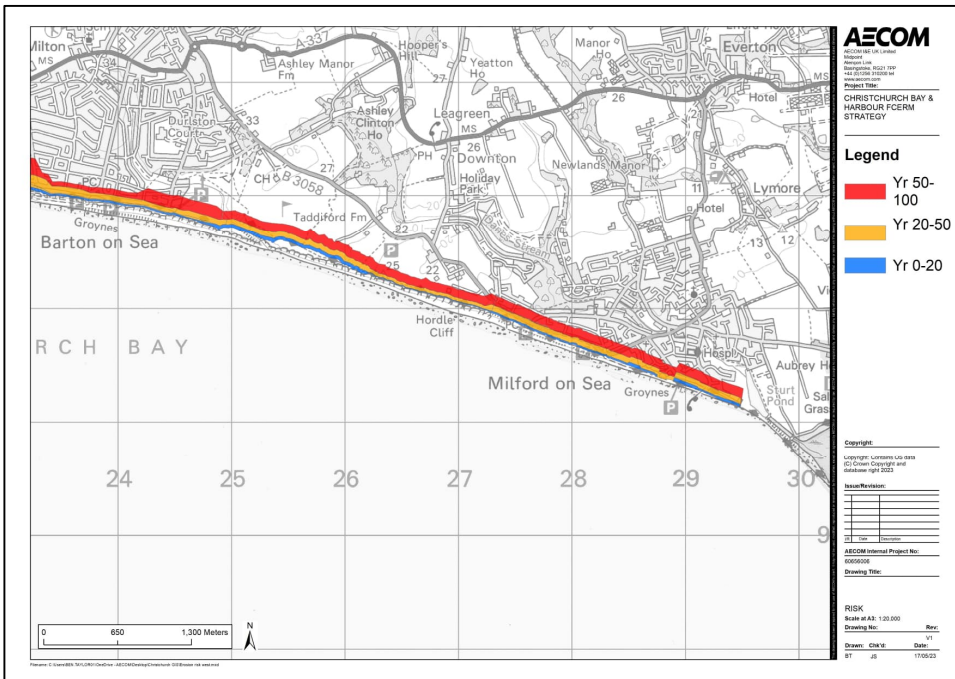
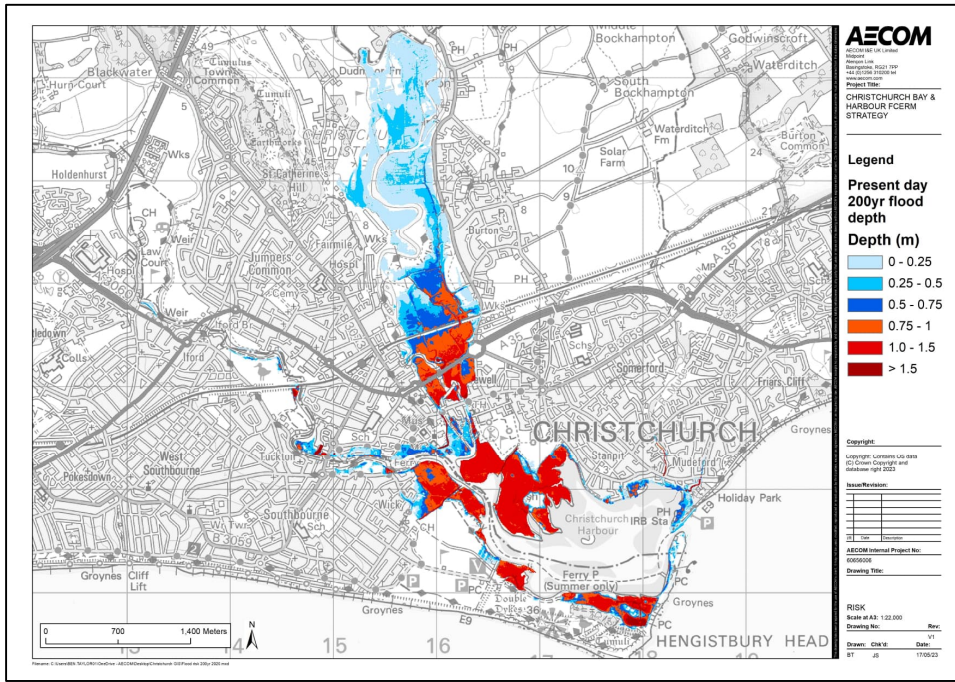
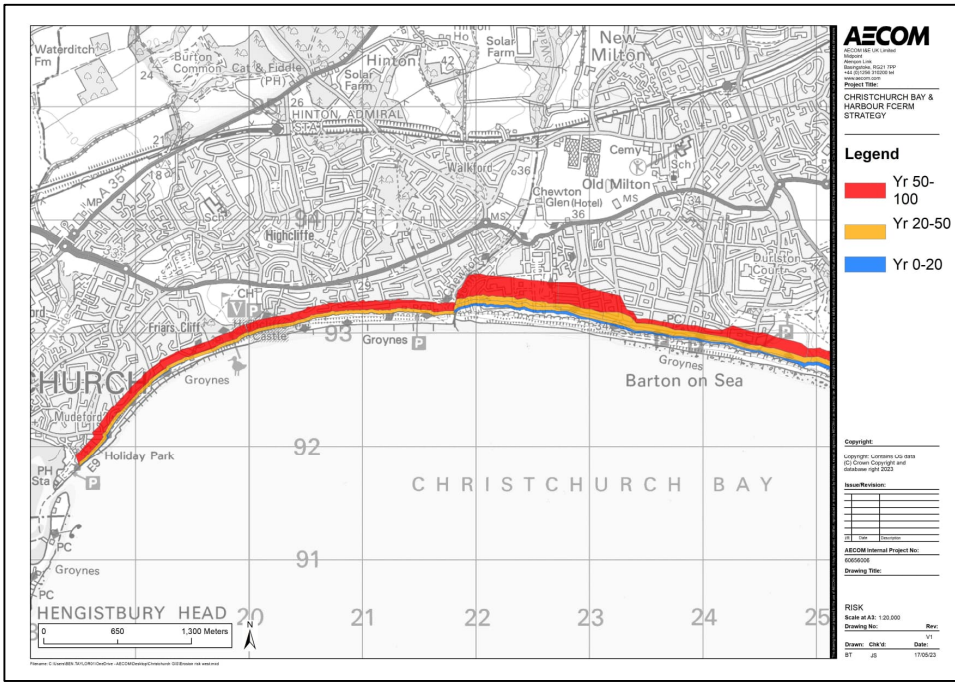
	Time Horizons			
	2023	2043	2073	2123
Residential properties	79	382	917	1816
Non-residential properties	41	170	262	411
Total properties at risk of coastal flooding	120	552	1179	2227

Properties at risk of coastal erosion over the coming century if we 'Do Nothing'.

	Time Horizons		
	Epoch 1 (2023-2043)	Epoch 2 (2043-2073)	Epoch 3 (2073-2123)
Residential properties	8	219	1185
Non-residential properties	17	24	180
Total properties at risk of coastal erosion	25	243	1365

The estimated damage from the risk of coastal flooding and erosion along the strategy frontage over the next century if we do nothing is £1.18 billion (cash) or £182 million (when discounted).

# What is at risk if we Do Nothing?



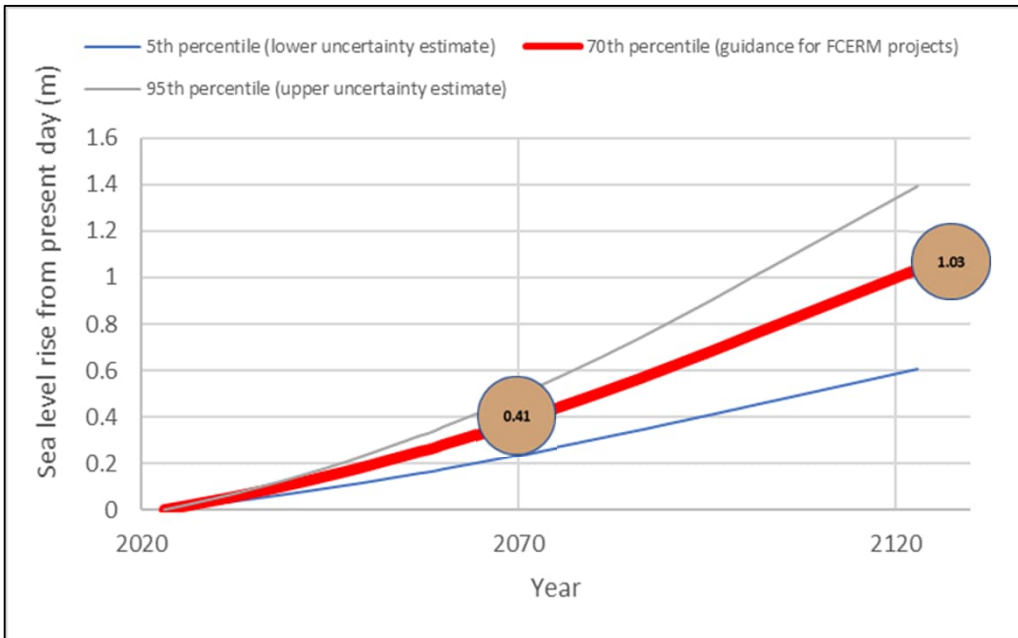
Coastal erosion risk as defined by the SMP along the open coast from Lymore to Hurst Spit.

Coastal flood risk around the harbour area for a 200 year return period (present day and 2123)

# Sea Level Rise and Increasing Flood Risk

As a consequence of climate change and continued warming of the global oceans, sea levels are expected to increase in the future. This will significantly increase coastal flood and erosion risk across The Strategy frontage over the next 100 years.

To consider sea level rise, The Strategy has incorporated the latest sea level rise projections (UK Climate Projections 2018 [UK Climate Projections \(UKCP\) - Met Office](#)) into the flood modelling to produce 'Do Nothing' flood scenarios for 2043, 2073 and 2123. Following the latest guidelines mean sea levels across The Strategy frontage are expected to increase by approximately 1m over the coming century (red line in the figure below).



Projected sea level rise for the coming century based on UKCP18 RCP 8.5 70<sup>th</sup> percentile. The 5<sup>th</sup> percentile and 95<sup>th</sup> percentile are also shown to illustrate range of uncertainty.

As well as properties, there are many other important features and valuable assets at risk such as nationally important environmentally designated sites, heritage assets, key services, infrastructure, major roads, coastal footpaths and cycleways and beaches. There is also a risk of erosion to former landfill sites which could pose a further threat to human health and to the quality of the harbour.

## What is meant by flood risk?

Flood risk refers to the potential for experiencing flooding. This risk is often described by the likelihood or chance that a certain level of flooding will occur at any given location. This risk can be expressed in terms of an average return period in years e.g. as a 1 in 100 (1%) chance of flooding in any one year, or a 1 in 200 (0.5%) chance, and so on.

Chance is also related to the scale of the flooding. In any one year a large (1 in 200 year) flood event has statistically less chance of happening than a smaller 1 in 50 or 1 in 20 yr flood event. It is important to understand that a 1 in 100 chance of flooding does not mean that a flood will only happen once every 100 years. The chance remains the same every year. Throughout this document the scale of flood risk is described in terms of the average return period in years.

The Standard of Protection (SoP) offered by a defence is also described in terms of the event that it is designed to prevent flooding from. For example, if a scheme provides a 1 in 100 year (1% annual chance) Standard of Protection it means it will be designed to prevent flooding from all events up to this magnitude.

# Erosion Risk

Several sites along the coastline are currently eroding, and more sites could become vulnerable during the next 100 years if no action is taken. Without further intervention, as existing defences fail more and more areas will be at risk from erosion.

Some areas are particularly prone to erosion such as Barton on Sea. Here the cliff geology is complex and in undefended sections erosion is driven by wave erosion of the cliff toe and groundwater induced slope instability that can cause land sliding.

In some parts of the Strategy frontage there is evidence of lowering beach levels. For example at Milford on Sea. This increases the pressures on the coastal defences at the back of the beach as a lower beach provides a lower standard of defence toe protection which can leave the defences vulnerable.

In some parts of Christchurch Harbour there are areas of historic landfill sites adjacent to the shoreline. If undefended, erosion of these areas has the potential to release historic landfill material into the environment.

## What is meant by erosion risk?

For the purposes of The Strategy, properties or assets at risk of erosion are those which could potentially be lost to the sea through shoreline retreat due to the action of waves, currents or tides. The risk has been estimated assuming no further works are done to repair or maintain defences which currently provide protection.

Understanding the potential erosion risk under a hypothetical 'Do Nothing' scenario is important for comparing the relative merits of options to maintain or improve protection.

Barton on Sea which is prone to erosion / land sliding



Milford on Sea which has a trend of lowering beach levels





# Chapter 3: How the Strategy has been developed

# Overview of the study area – key features, issues and opportunities

Before strategic approaches to managing coastal flood and erosion risks were identified and evaluated, it was important to understand the key features, issues and opportunities that exist within The Strategy area. In order to achieve this, a number of studies and activities were undertaken during the early stages of developing The Strategy.

These included:

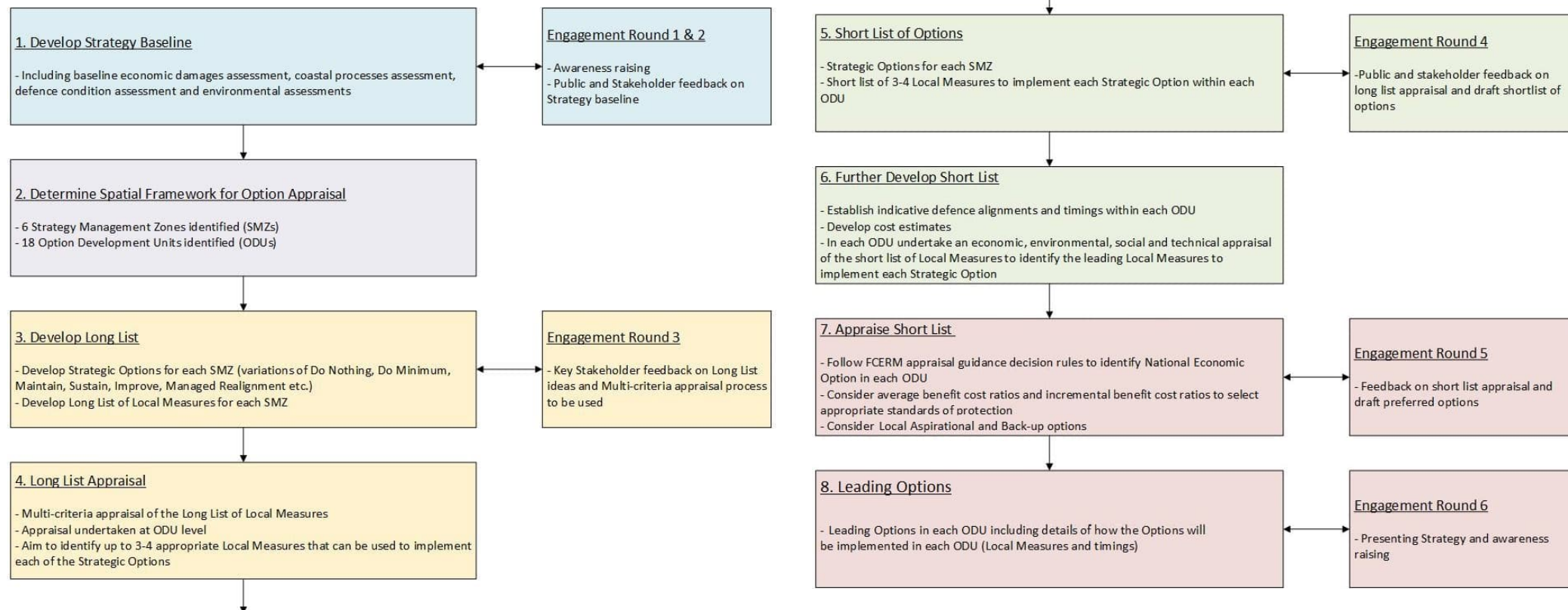
- Engagement with key stakeholders, residents and the wider community – meaningful engagement with landowners, community groups, organisations and individuals to understand their aspirations and concerns, to help shape The Strategy;
- Site walkovers and visual asset inspections – to determine the location, type and condition of coastal defences and assets;
- A study of coastal processes – required to understand waves, tides, sediment movements and to look at the longer-term coastal flood and erosion risk to both the open and harbour coastlines;
- Identification of important environmental and heritage features along the frontage – so that key environmental objectives and legal requirements to protect the environment can be accounted for in The Strategy;
- Baseline economic assessment, including wider benefit assessment such as Gross Value Added assessment;
- Identifying potential broader outcomes and opportunities – in order to capture ideas as to how The Strategy can be funded as well as deliver wider benefits to communities.

A summary of the findings from each of these assessments can be found in the various technical reports and stakeholder feedback reports produced in the development of the Strategy.



The flowchart below outlines the key steps in developing the Strategy and the option appraisal process.

## The Option Appraisal and Strategy Development Process



# Framework for the Appraisal

## Spatial Framework

The option appraisal for the Strategy has been undertaken across a spatial framework consisting of six high level Strategic Management Zones (SMZs). These have been further sub-divided into a total of eighteen smaller Option Development Units (ODUs). By dividing the Strategy frontage into these distinct areas, it has allowed the appraisal to develop options that are strategic in nature, but also consider local risks and opportunities at the ODU level. It also ensures that the Strategy considers the impact of options on nearby and adjacent locations. A map of the Strategy Management Zone locations is provided below.

## Temporal Framework

The options developed for the Strategy outline what the strategic intent of the option is (Do Nothing, Do Minimum, Maintain, Managed Realignment, Sustain or Improve the standard of protection) and the timings of the defence measures that are required to achieve this. The timings of defence measures were developed based on three time epochs in the Strategy:

- Epoch 1 (short term): between 2023-2043
- Epoch 2 (medium term): between 2043-2073
- Epoch 3 (long term): between 2073-2123



Stakeholder Engagement has been an integral aspect in the development of the Strategy. Round 5 of our engagement is a formal public consultation where key stakeholders and the public can give their views on the proposed leading options for managing coastal flood and erosion risk. Previously four rounds of Stakeholder Engagement have been undertaken:

- Engagement round 1 (summer 2021): was undertaken at the start of the Strategy and involved raising awareness of the Strategy and to seek data to inform the Strategy baseline.
- Engagement round 2 (spring/summer 2022): was undertaken during the baseline development. The engagement presented the Strategy baseline findings and sought any further information that could be added to the baseline.
- Engagement round 3 (summer 2022): involved two options identification workshops with key stakeholders to identify and discuss all possible Long List Options, the appraisal process and the criteria by which the Long List would be presented
- Engagement round 4 (winter 2022 / 2023): the proposed Short List options were presented to key stakeholders and the public to seek views on the proposed Short List before undertaking further detailed appraisal. Stakeholders and the public were invited to tell the project team if they thought options that had been discounted from the long list should have been reconsidered.

Each stage of the Stakeholder Engagement has provided valuable information to the project team that has informed and fed into the option development and appraisal process. Since summer 2021, your feedback has been helping us to shape the Strategy. So far nearly 12,000 people have viewed our website information, approximately 5,500 have engaged with our social media posts, around 680 people have attended our face-to-face and online events and over 250 people have completed a survey.



In each ODU, the proposed leading options developed for the Strategy include details on:

- The strategic intent of the Option
- The local defence measures that will likely be used to deliver the Strategic Intent
- The approximate timing of the local defence measures
- The approximate location of the local defence measures

## Strategic Intent of Options

The Strategic Intent of the options varies by location. However, in general the following intents were considered when developing options in each ODU:

- Do Nothing: no planned investment in defending against coastal flooding or erosion, whether or not a defence has existed previously.
- Do Minimum: undertake small scale maintenance aiming to extend the service life of the existing defences by several years. However, over the long term this is unlikely to be sustainable and defences would be expected to fail.
- Maintain: undertake proactive maintenance / refurbishment of defences to extend the service life of the defences for a longer period of time.
- Managed Realignment: allowing the position of the coastline to adjust over time, but managing the process in a controlled manner.
- Sustain: upgrade existing defences or construct new defences to reduce coastal flood and erosion risk and provide a Standard of Protection that keeps pace with sea level rise over time.
- Improve: upgrade existing defences or construct new defences to reduce coastal flood and erosion risk and provide an initial high Standard of Protection through to the end of the Strategy period.

## Local Defence Measures

A list of local defence measures that were considered in the development of the proposed leading options is provided below. Not every defence measure was taken forward for appraisal in each ODU. The long to short list appraisal process identified which local defence measures are appropriate in each of the ODUs and screened out defence measures that were not considered as suitable. See the glossary at the start of the document for examples of the defence measures.

- Patch and repair maintenance
- Capital refurbishment
- Beach recycling
- Beach nourishment
- Timber groynes
- Rock groynes
- Crest raising of defences
- Seawall
- Concrete revetment
- Rock revetment
- Timber breastwork
- Gabions
- Embankment
- Flood storage areas
- Deployable temporary defences
- Deployable permanent defences
- Tidal barrier
- Armoured sand dunes / dune enhancements
- Slope armour and reinforcement
- Cliff slope stabilisation / drainage
- Sheet piling
- Land raising
- Land reclamation
- Offshore breakwater
- Offshore reef
- Saltmarsh restoration / creation
- Property level protection
- Community level resilience and adaptation

## Types of Leading Option

In each ODU, up to three types of proposed leading options have been identified. These include the National Economic leading option, the Local Aspirational option and the Back-up option. Each type of option outlines the planned coastal defence interventions during different periods of time, the short, medium and long term.

A National Economic Option has been identified in each ODU and forms the basis of the appraisal. In some locations a Local Aspirational Option has also been identified. This option delivers wider / local benefits compared to the National Economic Option. In some cases the funding shortfall to deliver either of these options is expected to be large, and therefore a Backup option has also been identified. The Backup option is typically lower cost, has lower investment requirements for capital schemes and should be more deliverable. A breakdown of each option type is shown below:

### *National Economic Leading Option*



This is the leading option which is identified by following the Environment Agency's Flood and Coastal Erosion Risk Management Appraisal Guidance.

### *Local Aspirational Option*



This option considers local opportunities, wants and needs to deliver wider benefits. This option typically costs more than the National Economic leading option.

### *Backup Option*



This option has been identified when there is a large funding shortfall. It is typically a lower cost option that will be more easily delivered if funding is limited.

## Leading Option Appraisal

To identify the proposed leading options in each ODU, a step by step process was followed:

1. This started with an economic analysis. The option with the most favourable economic metrics (Benefit Cost Ratio and/or Net Present Value) were selected as the provisional National Economic leading option.
2. Any uncertainties in the economic appraisal was considered to determine whether the provisional National Economic leading option should be changed.
3. Next, social and environmental impacts were considered to determine whether the choice of the provisional National Economic leading option needed to change. If there were any major negative social or environmental impacts associated with the provisional National Economic leading option that could not be easily mitigated, then the next best choice option without these impacts was identified as the new National Economic leading option. Social and environmental impacts were informed from the Strategic Environmental Appraisal (SEA) that was undertaken to support the appraisal and feedback from stakeholder engagement to date on the Strategy.
4. Local drivers and aspirations were then considered to determine whether a Local Aspirational Option was also needed in an ODU. If so, a Local Aspirational Option was identified.
5. The availability of public funding (FCERM-GiA) was estimated for the National Economic and Local Aspirational options. If a large funding shortfall was identified (i.e. several million £), then a Backup option was identified too. The Backup option is typically lower cost with less capital investment required and has a greater likelihood of being delivered if funding for the National Economic or Local Aspirational option could not be attained.



# Chapter 4: Proposed Leading Options

The following pages introduce the proposed leading options. Each ODU has a 'Roadmap', illustrating a National Economic leading option and in some cases either a Local Aspirational Option and/or Backup Option as a result of the assessments undertaken, described in Chapter 3.

For each ODU, the National Economic Option is considered the 'leading option' on a national basis by following the Environment Agency's Flood and Coastal Erosion Risk Management Appraisal Guidance.

In some cases if additional funding becomes available the Local Aspirational Option that reflects local decisions makers or communities may become the leading option. It is the aspiration of BCP and NFDC to deliver the Local Aspirational Option where possible.

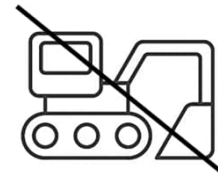
The delivery of either the National Economic or Local Aspirational Options will be subject to securing funding for these works. This is not guaranteed at this stage and further work will be needed with potential funding partners to top up public funding (FCERM-GiA).

If funds cannot be found to deliver the National Economic or the Local Aspirational options, it may be necessary to implement the Backup option instead. There is generally expected to be increased coastal flood and erosion risks to properties and assets with the Backup option but it would represent an improvement comparing to the Do Nothing scenario.

The Roadmap for each ODU presents a visual representation of the strategy option(s) and the pathway approach shows what could be possible over the next 100 yrs. If risks develop over time and funding is found to be available / not available, the delivery team may switch between the three types of leading option over time. This is known as an 'Adaptive Pathway'. The timings set out on the Roadmaps are indicative only and are likely to change as coastal risks develop over time.

The key for the symbols on the Roadmaps is shown to the right and is shown on each Roadmap for reference.

## Key



### Do Nothing

No further investment in existing coastal defences. Defences would be allowed to fail over time and natural processes to continue.



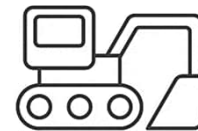
### Small Scale Maintenance

Undertake small scale maintenance to extend the life of existing coastal defences by several years through patch/crack repair and scheduled maintenance.



### Proactive Maintenance

Refurbishment / maintenance of existing coastal defences to extend their service life and / or beach management (recycling)



### Upgrading Defences

Upgrading existing coastal defences by raising the height or constructing additional lengths, to sustain or improve the standard of protection. This could include beach nourishment, raising of crest levels or construction of new hard defences



### Property Level Resilience (PLR) and Adaptation

Aiming to reduce flood risk to assets on a property by property basis. This could include property flood resilience measures, early warning systems, relocation of assets and risk informed land planning.

# SMZ 1 – Mundeford Sandbank



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# ODU 1: Hengistbury Head East

2023 - 2043      2043 - 2073      2073 - 2123

## Key



Do nothing



Proactive maintenance



Upgrade defence

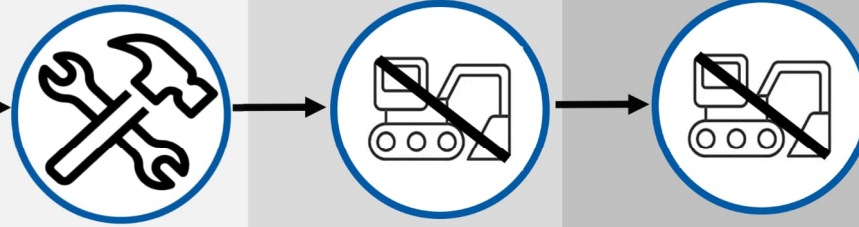


Small scale maintenance

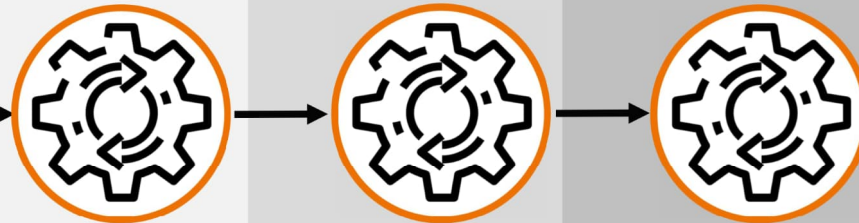


Property Level Resilience (PLR) and adaptation

### National Economic Leading Option



### Local Aspirational Option



Short Term

Medium Term

Long Term

**Do Minimum:** initially extend the life of the defences through small scale maintenance. However, over time the defences will reach the end of their service life and ongoing small scale maintenance would not be sustainable. Once the existing defences fail no further action would be undertaken in the medium and long term (i.e. Do Nothing).

**Managed Realignment:** control the rate of cliff erosion by maintaining / refurbishing existing defences at the toe of the cliff and undertaking beach recycling to help sustain beach levels.

ODU	Estimated number of properties at risk from erosion by 2123 with Do Nothing scenario	Estimated number of properties at risk from coastal flooding (200yr return period) by 2123 with Do Nothing scenario	Estimated Do Nothing cash damage (£million)	Estimated Do Nothing discounted damage (£million)
1	Not calculated	0	0	0

# ODU 2: Mundeford Sandbank

2023 - 2043

2043 - 2073

2073 - 2123

## Key



Do nothing



Proactive maintenance



Upgrade defence

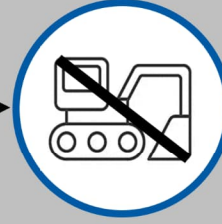
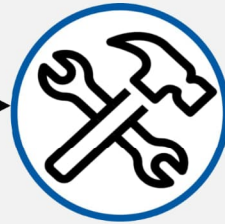


Small scale maintenance

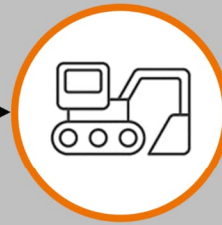


Property Level Resilience (PLR) and adaptation

### National Economic Leading Option



### Local Aspirational Option



Short Term

Medium Term

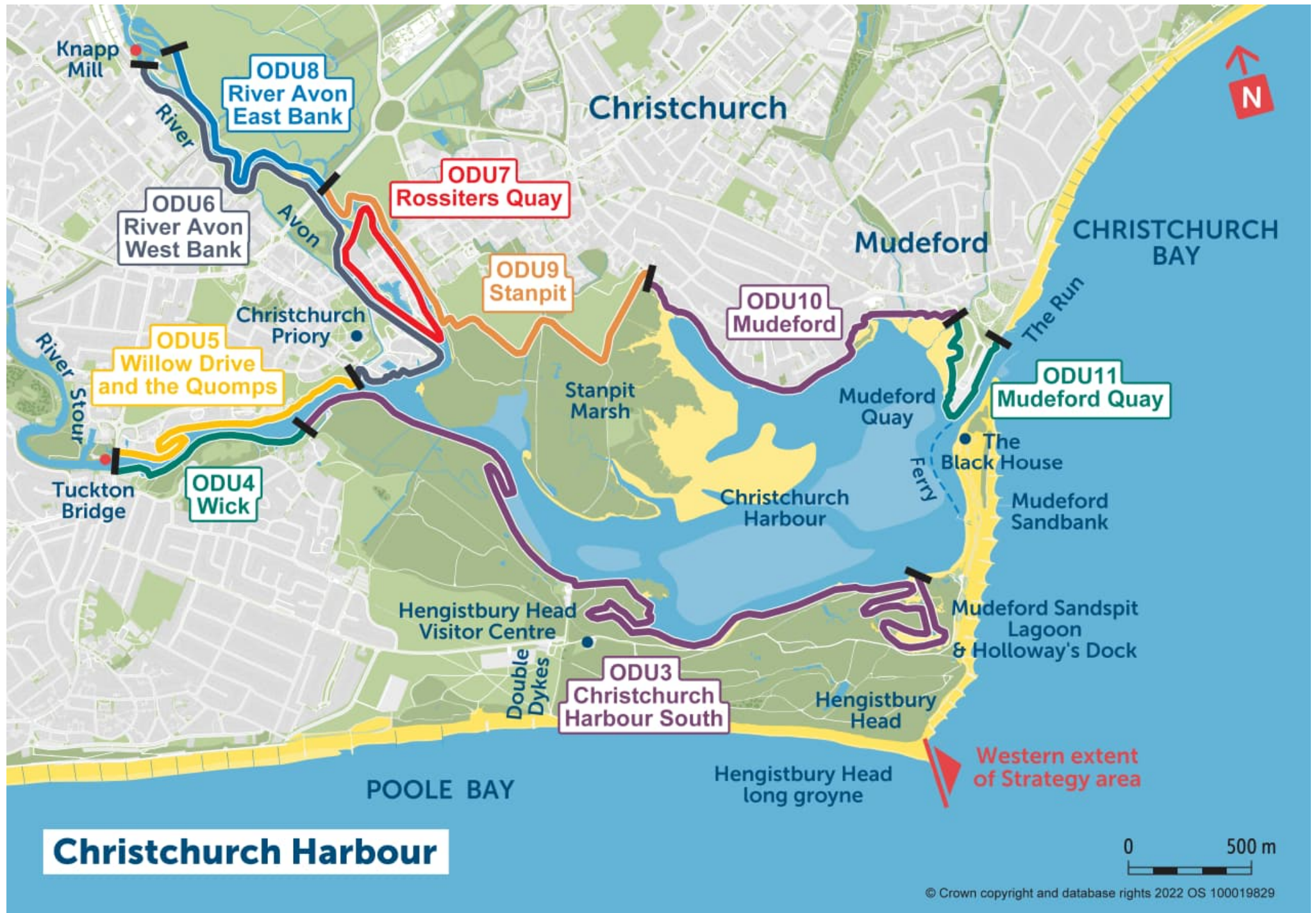
Long Term

**Do Minimum:** initially extend the life of the defences through small scale maintenance. However, over time the defences will reach the end of their service life and ongoing small scale maintenance would not be sustainable. Once the existing defences fail no further action would be undertaken in the medium and long term (i.e. Do Nothing).

**Maintain with Adaptation:** aim to sustain the FCERM service and position of the Sandbank over time. This would be achieved through maintenance / refurbishment of existing defences and beach management (e.g. encouraging sand dune creation). In the long term, with projected sea level rise, a large scale beach nourishment scheme may be required to top-up the beach level of the Sandbank. Property level resilience to permanent properties on the Sandbank may also be undertaken to reduce flood risk.

ODU	Estimated number of properties at risk from erosion by 2123 with Do Nothing scenario	Estimated number of properties at risk from coastal flooding (200yr return period) by 2123 with Do Nothing scenario	Estimated Do Nothing cash damage (£million)	Estimated Do Nothing discounted damage (£million)
2	Not calculated	6	1.1	0.1

# SMZ 2 – Christchurch Harbour



# ODU 3: Christchurch Harbour South

2023 - 2043      2043 - 2073      2073 - 2123

**Key**

-  Do nothing
-  Proactive maintenance
-  Upgrade defence
-  Small scale maintenance
-  Property Level Resilience (PLR) and adaptation

**National Economic Leading Option**  




**Local Aspirational Option**  




Short Term      Medium Term      Long Term

Adaptation / Resilience: undertake property level resilience to properties at risk from flooding in the short, medium and long term. Explore opportunities for saltmarsh restoration / creation. This option is Adaptation / Resilience A in the Leading Options report.

Adaptation and Resilience with erosion defences: In the short term construct erosion defences adjacent to the access road to Hengistbury Head and subject to findings of contaminated land assessments, also construct erosion defences adjacent to Wick historic landfill site. Undertake property level resilience to properties at risk from flooding in the short, medium and long term. This option will also explore opportunities for saltmarsh restoration / creation along the frontage in this location. This option is Adaptation / Resilience C in the Leading Options report.

ODU	Estimated number of properties at risk from erosion by 2123 with Do Nothing scenario	Estimated number of properties at risk from coastal flooding (200yr return period) by 2123 with Do Nothing scenario	Estimated Do Nothing cash damage (£million)	Estimated Do Nothing discounted damage (£million)
3	Not calculated	8	3.9	1.0

# ODU 4: Wick

2023 - 2043

2043 - 2073

2073 - 2123

## Key



Do nothing



Proactive maintenance



Upgrade defence

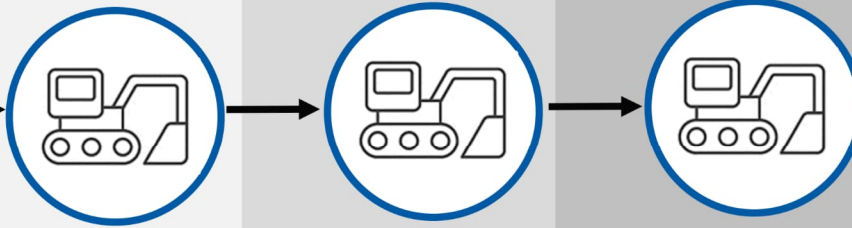


Small scale maintenance

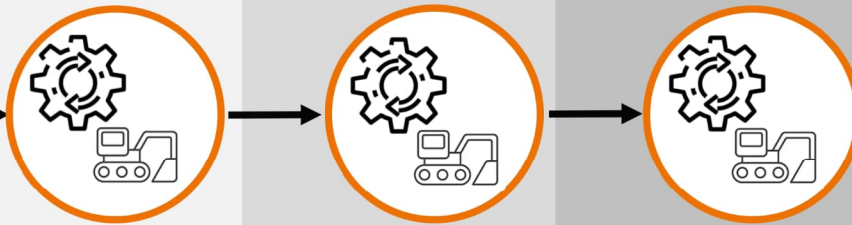


Property Level Resilience (PLR) and adaptation

### National Economic Leading Option



### Local Aspirational Option



Short Term

Medium Term

Long Term

**Sustain:** raise and lengthen the existing flood defence embankment in the east part of the unit over time to improve the standard of protection against flooding and sea level rise. This is the Sustain C option in the Leading Options report.

**Sustain with frontline maintenance:** raise and lengthen the existing flood defence embankment in the east part of the unit over time. In addition, undertake maintenance/ refurbishments on the frontline quay wall to prevent erosion of the land behind (including the historic landfill site). This is the Sustain B option in the Leading Options report.

ODU	Estimated number of properties at risk from erosion by 2123 with Do Nothing scenario	Estimated number of properties at risk from coastal flooding (200yr return period) by 2123 with Do Nothing scenario	Estimated Do Nothing cash damage (£million)	Estimated Do Nothing discounted damage (£million)
4	Not calculated	121	42.3	4.1

# ODU 5: Willow Drive and the Quomps

2023 - 2043      2043 - 2073      2073 - 2123

## Key



Do nothing



Proactive maintenance



Upgrade defence

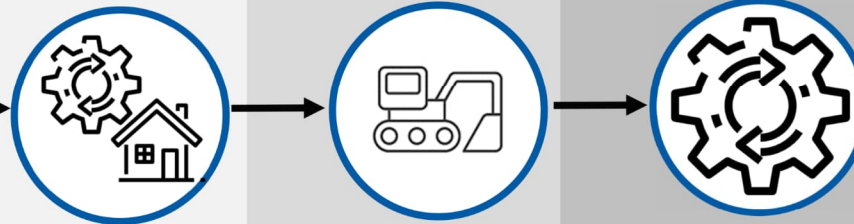


Small scale maintenance

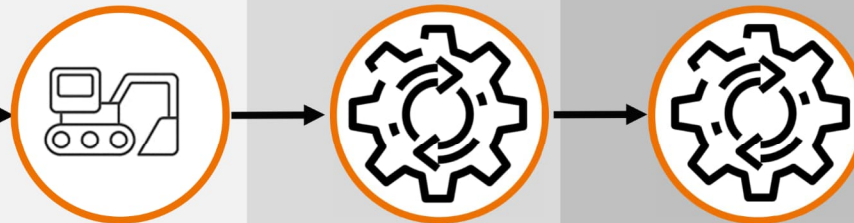


Property Level Resilience (PLR) and adaptation

### National Economic Leading Option



### Local Aspirational Option



### Backup Option



Short Term

Medium Term

Long Term

Improve (intervene later): raise / upgrade the existing defences in the medium term to improve the standard of protection against flooding (the alignment of the defences is still to be determined). Over the short term maintain the existing defences and undertake property level resilience to the properties at risk from flooding. This is the Improve D-F option in the Leading Options report.

Improve (intervene sooner): raise / upgrade the defences in the short term to improve the standard of protection against flooding through to 2123 (the alignment of the defences is still to be determined). Once constructed, maintain the upgraded defences to the end of the strategy period. This is the Improve A-C option in the Leading Options report.

Adaptation / Resilience: maintain frontline defences but do not raise / upgrade the defences. Over time due to sea level rise the standard of protection against flooding would reduce. Undertake property level resilience to properties at risk of flooding throughout the strategy period.

ODU	Estimated number of properties at risk from erosion by 2123 with Do Nothing scenario	Estimated number of properties at risk from coastal flooding (200yr return period) by 2123 with Do Nothing scenario	Estimated Do Nothing cash damage (£million)	Estimated Do Nothing discounted damage (£million)
5	Not calculated	562	221.3	37.1

# ODU 6: River Avon West Bank

2023 - 2043

2043 - 2073

2073 - 2123

## Key



Do nothing



Proactive maintenance



Upgrade defence

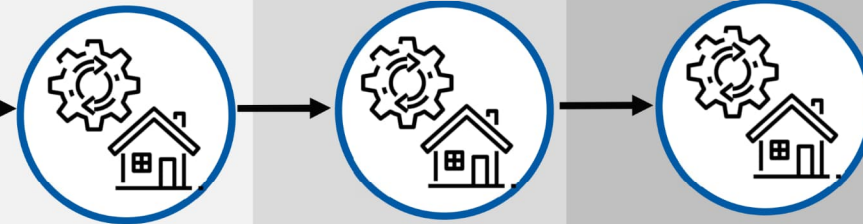


Small scale maintenance



Property Level Resilience (PLR) and adaptation

National Economic Leading Option



Adaptation / Resilience: maintain the frontline quay walls and undertake property level resilience to properties at risk from flooding in this unit. This is primarily at two locations; Priory Quay / Convent Meadows and the area around Castle Street.

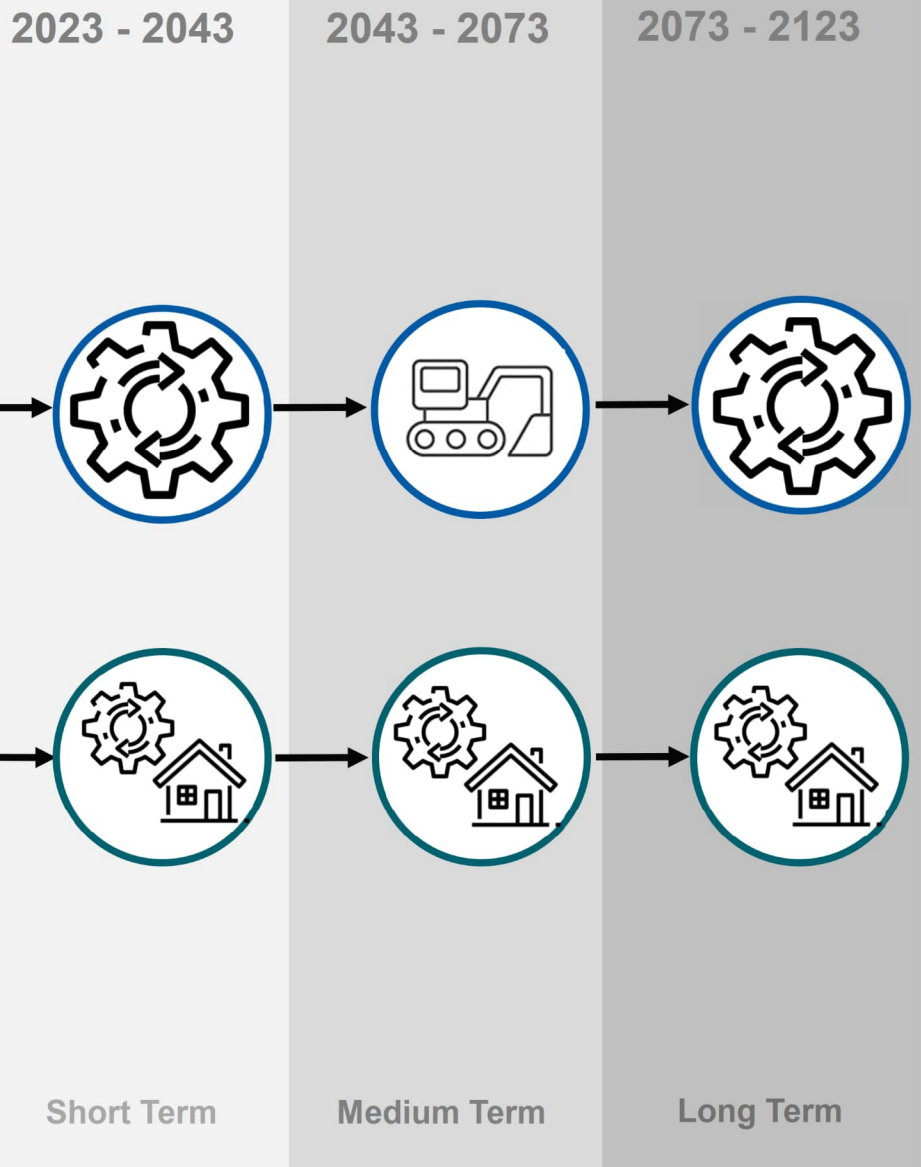
Short Term

Medium Term

Long Term

ODU	Estimated number of properties at risk from erosion by 2123 with Do Nothing scenario	Estimated number of properties at risk from coastal flooding (200yr return period) by 2123 with Do Nothing scenario	Estimated Do Nothing cash damage (£million)	Estimated Do Nothing discounted damage (£million)
6	Not calculated	126	39.2	7.2

# ODU 7: Rossiters Quay



## Key



Do nothing



Proactive maintenance



Upgrade defence



Small scale maintenance



Property Level Resilience (PLR) and adaptation

**Improve (intervene later):** construct new flood defences in the medium term to improve the standard of protection against flooding. In the short term undertake maintenance of existing defences to extend their service life until the medium term construction. This is the Improve A option in the Leading Options report.

**Adaptation / Resilience:** maintenance / refurbish existing defences over the strategy period but do not raise / upgrade the defences. Over time due to sea level rise the standard of protection against flooding would reduce. Undertake property level resilience to properties at risk of flooding throughout the strategy period.

ODU	Estimated number of properties at risk from erosion by 2123 with Do Nothing scenario	Estimated number of properties at risk from coastal flooding (200yr return period) by 2123 with Do Nothing scenario	Estimated Do Nothing cash damage (£million)	Estimated Do Nothing discounted damage (£million)
7	Not calculated	57	18.6	5.2

## ODU 8: River Avon East Bank

Options for ODU 8 have not been developed as part of the Strategy. This area is within the original Strategy boundaries, but through discussions with the Environment Agency Partnership and Strategic Overview Team (who are developing the Lower Avon and Harbour Modelling) it was agreed that the options for managing the flood risk in ODU 8 would be developed through the Lower River Avon project, rather than the Christchurch Bay and Harbour Strategy.

ODU	Estimated number of properties at risk from erosion by 2123 with Do Nothing scenario	Estimated number of properties at risk from coastal flooding (200yr return period) by 2123 with Do Nothing scenario	Estimated Do Nothing cash damage (£million)	Estimated Do Nothing discounted damage (£million)
8	Not calculated	8	9.0	1.4

# ODU 9: Stanpit

2023 - 2043

2043 - 2073

2073 - 2123

## Key



Do nothing



Proactive maintenance



Upgrade defence

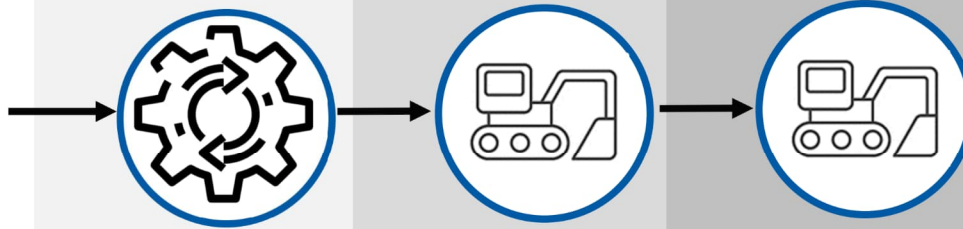


Small scale maintenance

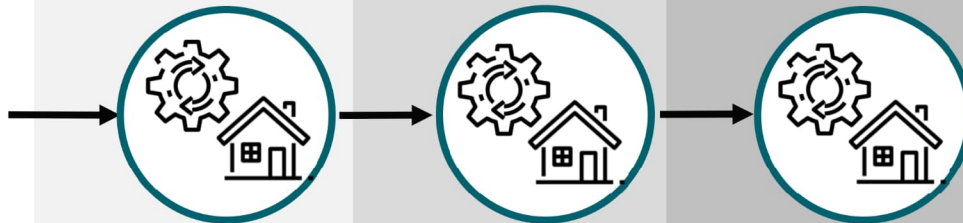


Property Level Resilience (PLR) and adaptation

### National Economic Leading Option



### Backup Option



Short Term

Medium Term

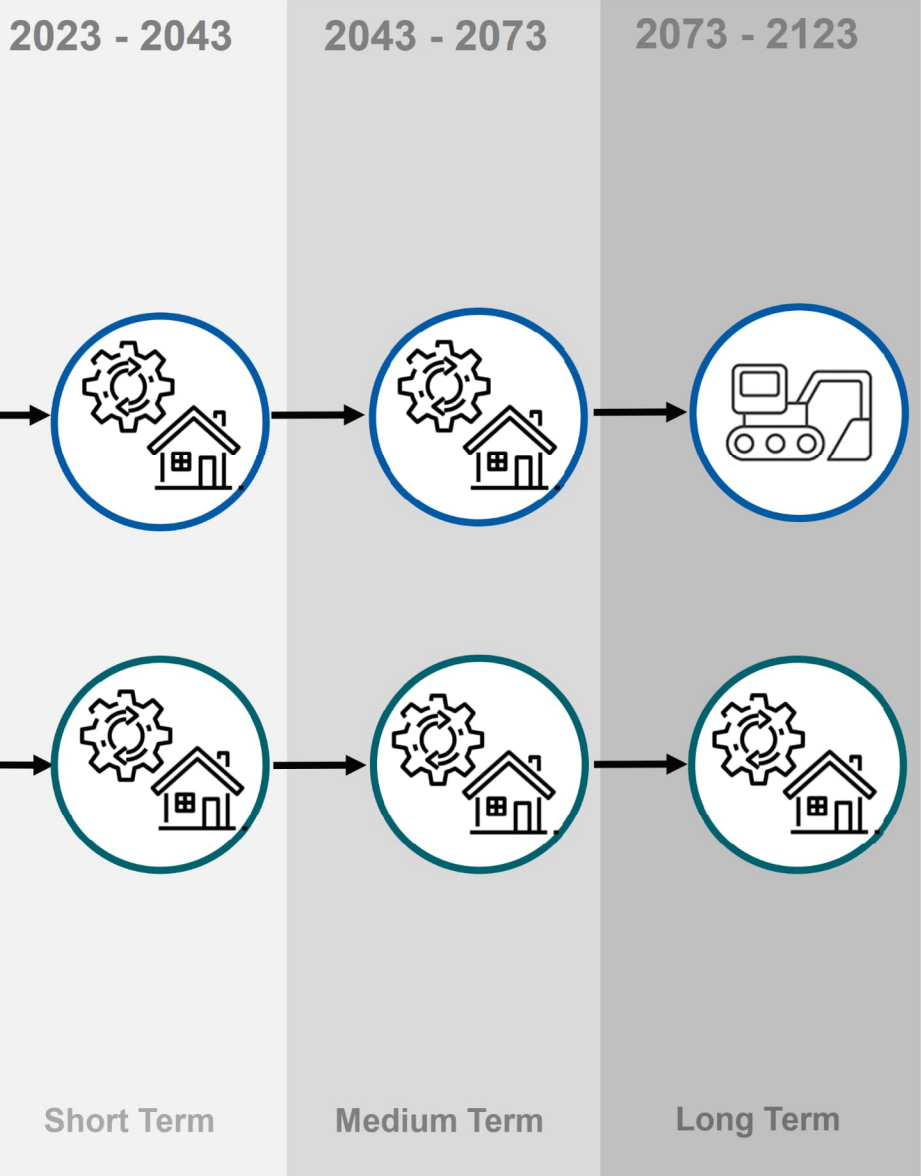
Long Term

Sustain (intervene later): initially carry out proactive maintenance to extend the life of the existing defences in the short term. In the medium term raise / upgrade the defences to improve the standard of protection against flooding. The upgraded defences will be further lengthened and raised over time to keep pace with sea level rise. This option will reduce erosion risk to the historic landfill sites at Stanpit and will also explore opportunities for environmental enhancements, such as opportunities for restoring saltmarsh habitat. This is the Sustain A option in the Leading Options report.

Adaptation / Resilience: maintain / refurbish existing defences over the strategy period but do not raise / upgrade the defences. Over time due to sea level rise the standard of protection against flooding would reduce. Undertake property level resilience to properties at risk of flooding throughout the strategy period.

ODU	Estimated number of properties at risk from erosion by 2123 with Do Nothing scenario	Estimated number of properties at risk from coastal flooding (200yr return period) by 2123 with Do Nothing scenario	Estimated Do Nothing cash damage (£million)	Estimated Do Nothing discounted damage (£million)
9	Not calculated	867	261.0	38.3

# ODU 10: Mundeford



## Key

- Do nothing
- Proactive maintenance
- Upgrade defence
- Small scale maintenance
- Property Level Resilience (PLR) and adaptation

**Improve (intervene later):** in the short and medium term maintain / refurbish existing quay walls to extend their service life and also undertake property level resilience measures to reduce flood risk to properties at risk from flooding. In the long term, construct new flood defences to provide a more robust defence and reduce risk of flooding to properties. This is the Improve A option in the Leading Options report.

**Adaptation / Resilience:** maintain / refurbish existing quay walls over the strategy period but do not raise / upgrade the walls. Over time due to sea level rise the standard of protection against flooding would reduce. Undertake property level resilience to properties at risk of flooding throughout the strategy period.

ODU	Estimated number of properties at risk from erosion by 2123 with Do Nothing scenario	Estimated number of properties at risk from coastal flooding (200yr return period) by 2123 with Do Nothing scenario	Estimated Do Nothing cash damage (£million)	Estimated Do Nothing discounted damage (£million)
10	Not calculated	370	86.7	12.5

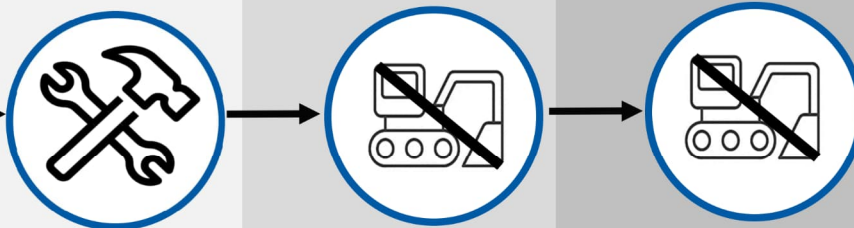
# ODU 11: Mundeford Quay

2023 - 2043      2043 - 2073      2073 - 2123

## Key

	Do nothing		Proactive maintenance		Upgrade defence
	Small scale maintenance		Property Level Resilience (PLR) and adaptation		

### National Economic Leading Option



**Do Minimum:** initially extend the life of the quay walls and defences through small scale maintenance. However, over time the quay walls / defences will reach the end of their service life and ongoing small scale maintenance would not be sustainable. Once the existing defences fail no further action would be undertaken in the medium and long term (i.e. Do Nothing).

### Local Aspirational Option

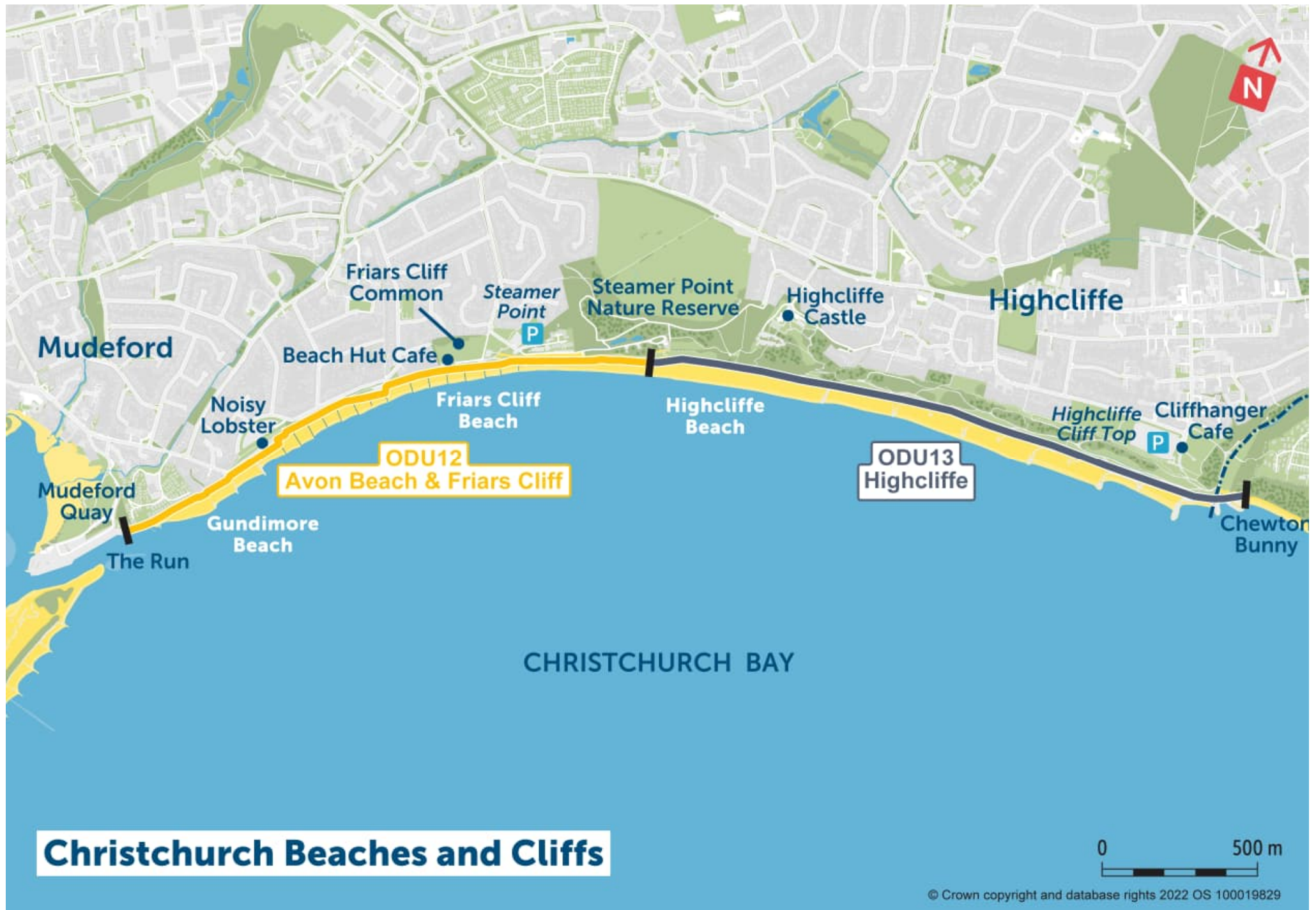


**Adaptation / Resilience:** maintain / refurbish existing quay walls / defences over the strategy period and undertake property level resilience to properties at risk. Property level resilience may not immediately be required in some locations due to buildings already having local flood defences.

Short Term      Medium Term      Long Term

ODU	Estimated number of properties at risk from erosion by 2123 with Do Nothing scenario	Estimated number of properties at risk from coastal flooding (200yr return period) by 2123 with Do Nothing scenario	Estimated Do Nothing cash damage (£million)	Estimated Do Nothing discounted damage (£million)
11	Not calculated	12	5.4	1.3

# SMZ 3 – Christchurch Beaches and Cliffs



# ODU 12: Avon Beach and Friars Cliff

2023 - 2043      2043 - 2073      2073 - 2123

## Key



Do nothing



Proactive maintenance



Upgrade defence



Small scale maintenance



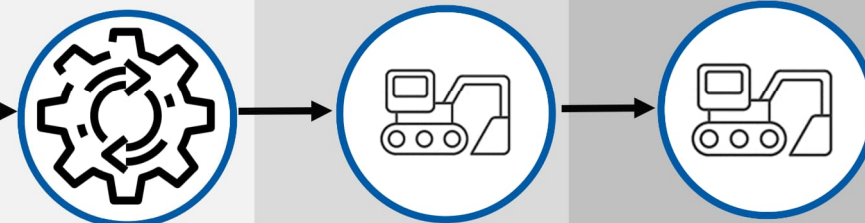
Property Level Resilience (PLR) and adaptation

**Improve (intervene later):** in the short term, maintain / refurbish the existing defences. In the medium term undertake beach nourishment and construct new groynes to retain beach material. In the long term periodic beach nourishments may be required, as well as localised property level resilience to reduce flood risk. This is the Improve A option in the Leading Options report.

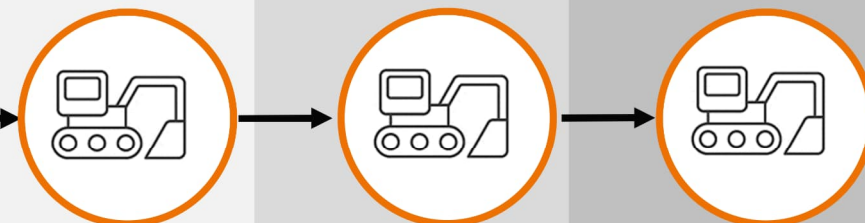
**Improve (intervene sooner):** in the short term undertake beach nourishment and upgrade the defences. When upgrading the defences, incorporate broader public realm improvements such as promenade raising. Periodic beach nourishments may be required in the medium and long term. This is the Improve C option in the Leading Options report.

**'Scaled back' / Lower Cost Improve:** similar to the Improve options but with a reduced beach nourishment volume and scale of defence improvements to reduce cost and improve the affordability.

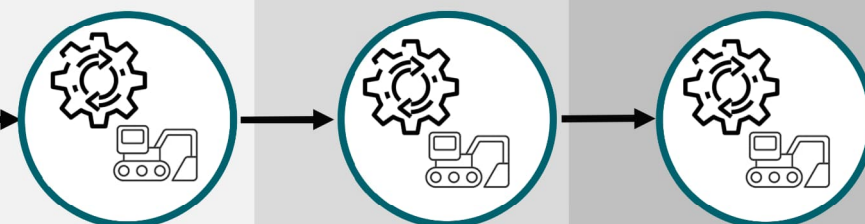
### National Economic Leading Option



### Local Aspirational Option



### Backup Option



Short Term

Medium Term

Long Term

ODU	Estimated number of properties at risk from erosion by 2123 with Do Nothing scenario	Estimated number of properties at risk from coastal flooding (200yr return period) by 2123 with Do Nothing scenario	Estimated Do Nothing cash damage (£million)	Estimated Do Nothing discounted damage (£million)
12	172	12	56.3	8.8

# ODU 13: Highcliffe

2023 - 2043      2043 - 2073      2073 - 2123

## Key

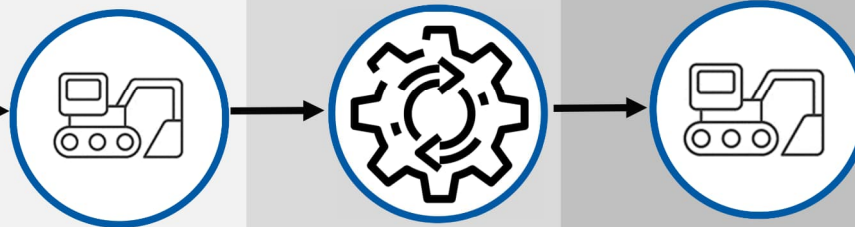
	Do nothing		Proactive maintenance		Upgrade defence
	Small scale maintenance		Property Level Resilience (PLR) and adaptation		

**Improve (beach nourishment in the long term):** in the short term construct outflanking defences at the eastern end of the unit. In the short, medium and long term maintain / refurbish existing defences and beach management. In the long term, a beach nourishment scheme would be undertaken to improve beach levels and to help mitigate sea level rise impacts. This is the Improve C option in the Leading Options report.

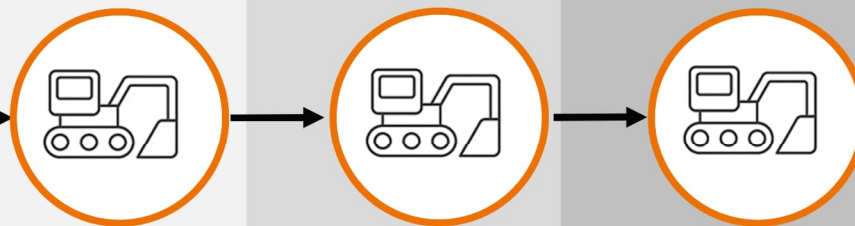
**Improve (beach nourishment in the medium term):** in the short term construct outflanking defences at the eastern end of the unit and maintain existing defences. In the short, medium and long term maintain / refurbish existing defences and beach management. In the medium term undertake a beach nourishment scheme to improve beach levels and in the long term periodic nourishments may be required. This is the Improve A option in the Leading Options report.

**'Scaled back' / Lower Cost Improve:** similar to the Improve options but with a reduced beach nourishment volume to reduce cost and improve affordability.

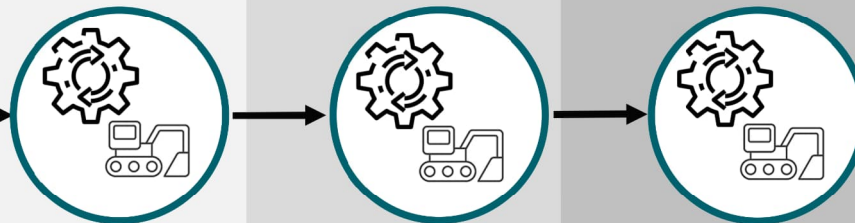
### National Economic Leading Option



### Local Aspirational Option



### Backup Option



Short Term

Medium Term

Long Term

ODU	Estimated number of properties at risk from erosion by 2123 with Do Nothing scenario	Estimated number of properties at risk from coastal flooding (200yr return period) by 2123 with Do Nothing scenario	Estimated Do Nothing cash damage (£million)	Estimated Do Nothing discounted damage (£million)
13	191	0	51.7	6.8

# SMZ 4 – Naish Cliff and Barton on Sea



# ODU 14: Naish Cliff and Barton on Sea

2023 - 2043      2043 - 2073      2073 - 2123

**Key**

-  Do nothing
-  Proactive maintenance
-  Upgrade defence
-  Small scale maintenance
-  Property Level Resilience (PLR) and adaptation

**National Economic Leading Option**  




**Local Aspirational Option**  




**Backup Option**  



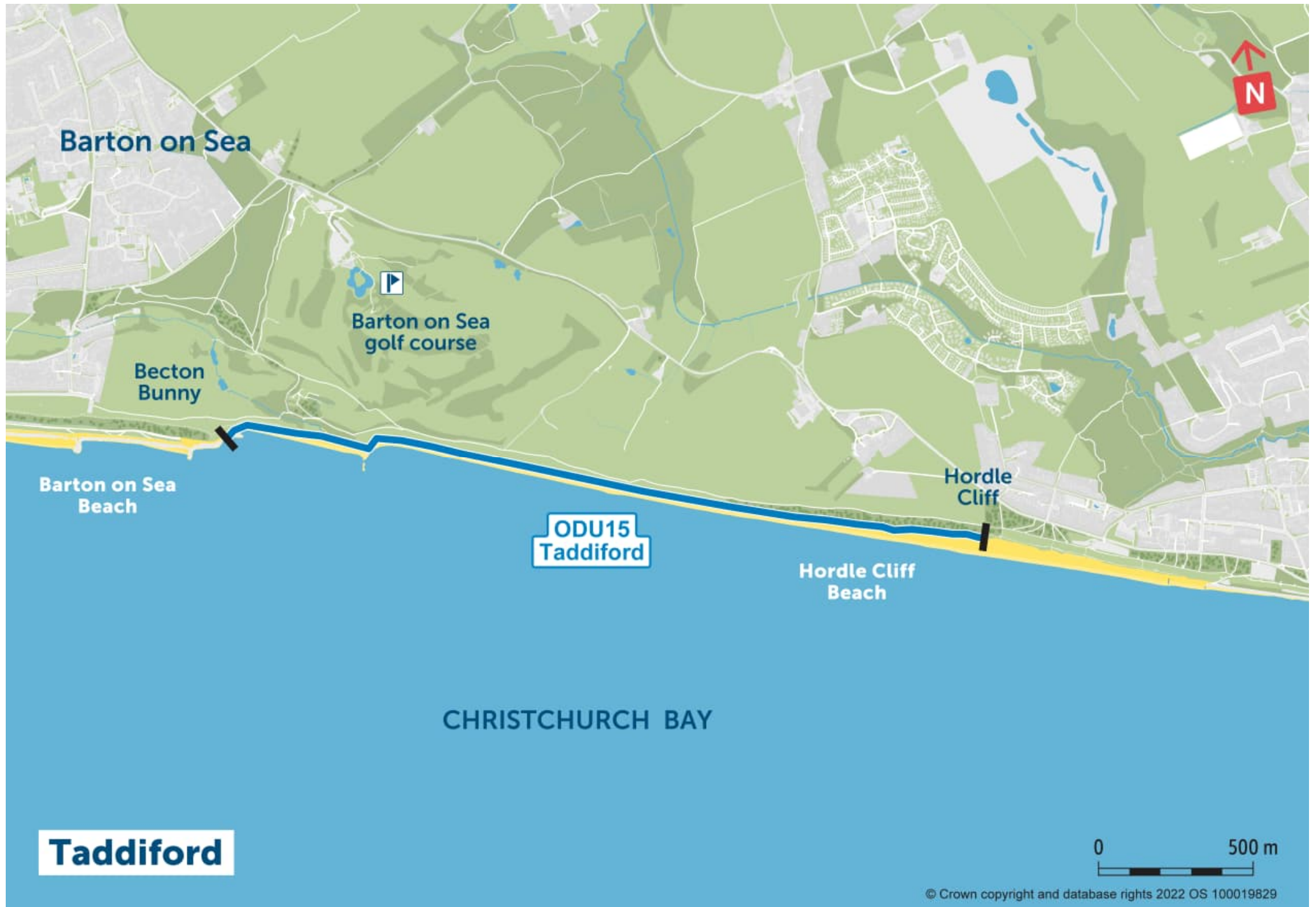

Short Term      Medium Term      Long Term

Managed Realignment (intervene later): in the short term undertake small scale maintenance to extend life of existing defences where possible. In the medium term upgrade the defences and undertake beach nourishment. This would likely include nourishment at Naish beach and a new rock revetment beneath Marine Drive West as well as cliff slope drainage / stabilisation and refurbishing existing toe defences. Cliff top erosion would still occur with this option, but in a controlled manner. Some property loss may occur. This is the Managed Realignment B option in the Leading Options report.

Managed Realignment (intervene sooner): same approach as the Managed Realignment B option above except the defence upgrades / beach nourishment would be undertaken in the short term (rather than waiting until the medium term). Cliff top erosion would still occur with this option, but in a controlled manner. Some property loss may occur. This is the Managed Realignment A option in the Leading Options report.

Maintain: proactive maintenance / refurbishment of the existing defences at the cliff toe to slow erosion rates (but not stop erosion). Small scale maintenance would also be required for the drainage system but this this does not include failed sections. Rates of cliff erosion would be expected to be greater with this option relative to the Managed Realignment A and B, but it is lower cost and may be more achievable to fund / deliver. More property loss would be expected with this option.

ODU	Estimated number of properties at risk from erosion by 2123 with Do Nothing scenario	Estimated number of properties at risk from coastal flooding (200yr return period) by 2123 with Do Nothing scenario	Estimated Do Nothing cash damage (£million)	Estimated Do Nothing discounted damage (£million)
14	607	0	180.8	27.8



# ODU 15: Barton on Sea to Hordle Cliff

2023 - 2043

2043 - 2073

2073 - 2123

## Key



Do nothing



Proactive maintenance



Upgrade defence

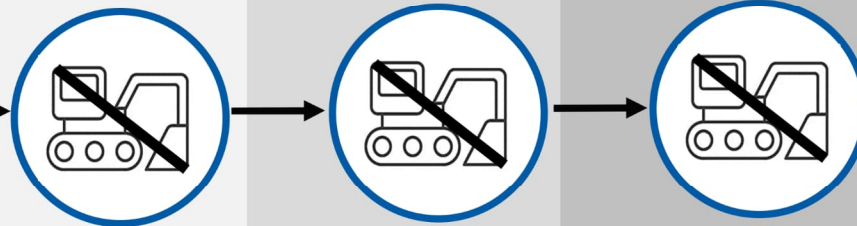


Small scale maintenance



Property Level Resilience (PLR) and adaptation

**National Economic Leading Option**



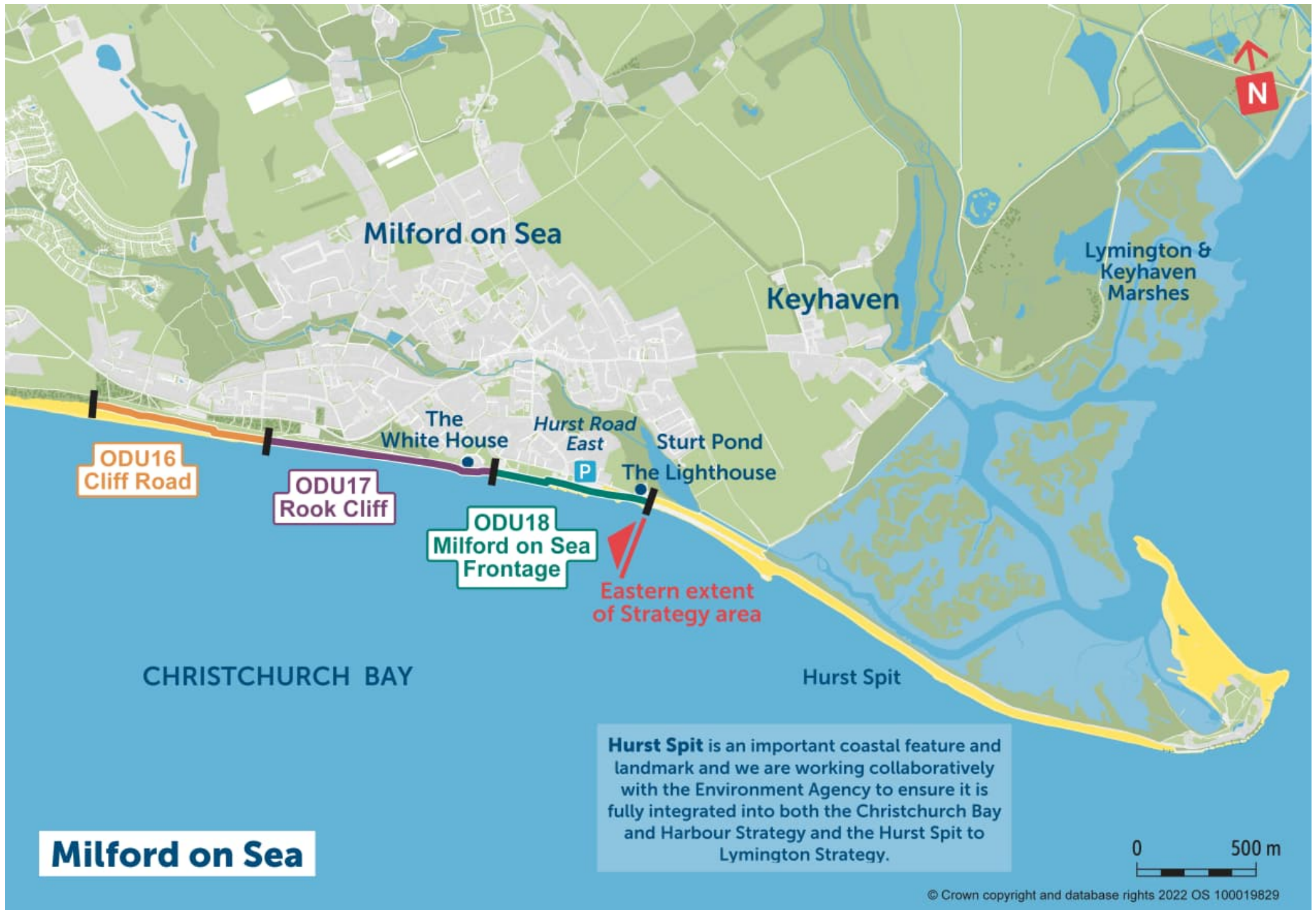
Short Term

Medium Term

Long Term

Do Nothing: no defence maintenance or beach management undertaken. The cliffs will erode over time and more health and safety compliance will be required to make safe public places.

ODU	Estimated number of properties at risk from erosion by 2123 with Do Nothing scenario	Estimated number of properties at risk from coastal flooding (200yr return period) by 2123 with Do Nothing scenario	Estimated Do Nothing cash damage (£million)	Estimated Do Nothing discounted damage (£million)
15	1	0	0.8	0.1






## Milford on Sea

# ODU 16: Cliff Road

2023 - 2043      2043 - 2073      2073 - 2123

## Key

	Do nothing		Proactive maintenance		Upgrade defence
	Small scale maintenance		Property Level Resilience (PLR) and adaptation		

**Managed Realignment (intervene later):** aim to control the rate of cliff erosion and transition the cliff line to a more sustainable position. In the short term this involves small scale maintenance as the cliff erodes. In the medium term a new strong point would be constructed as well as undertaking beach nourishment to increase beach levels and control further cliff erosion. Periodic nourishments may be required in the long term. This is the Managed Realignment C option in the Leading Options report.

**Managed Realignment (intervene sooner):** this is the same approach as the Managed Realignment C option above except the strong point and initial beach nourishment would be undertaken sooner (rather than waiting until the medium term); this would be undertaken in the short term for Managed Realignment A or at the start of the medium term for Managed Realignment B. Periodic beach nourishments may be required in the medium and long term.

**Maintain:** small scale beach management and proactive maintenance / refurbishments to the existing defences in the east of the unit. The rate of cliff erosion is likely to be greater with this option compared to the Managed Realignment Options and could lead to loss of property and key infrastructure.

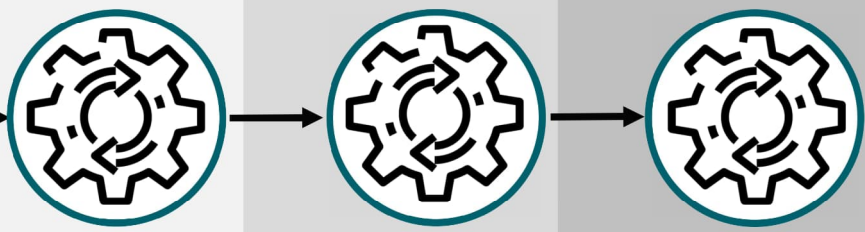
### National Economic Leading Option



### Local Aspirational Option



### Backup Option



Short Term      Medium Term      Long Term

ODU	Estimated number of properties at risk from erosion by 2123 with Do Nothing scenario	Estimated number of properties at risk from coastal flooding (200yr return period) by 2123 with Do Nothing scenario	Estimated Do Nothing cash damage (£million)	Estimated Do Nothing discounted damage (£million)
16	238	0	61.8	7.0

# ODU 17: Rook Cliff

2023 - 2043      2043 - 2073      2073 - 2123

## Key



Do nothing



Proactive maintenance



Upgrade defence

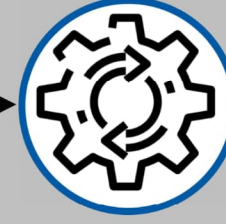
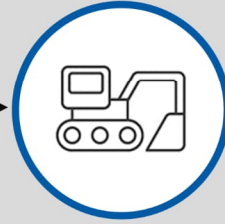
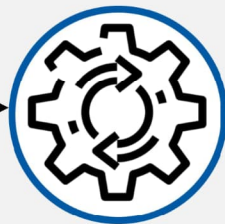


Small scale maintenance

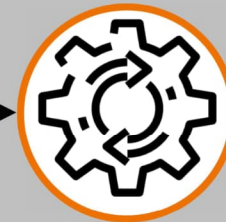
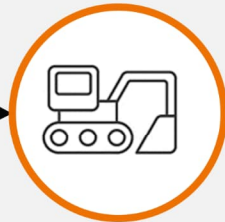


Property Level Resilience (PLR) and adaptation

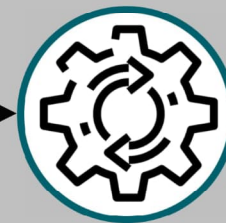
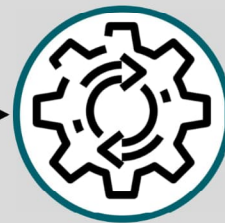
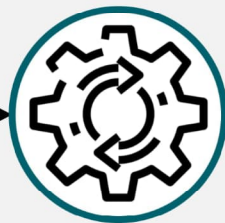
### National Economic Leading Option



### Local Aspirational Option



### Backup Option



Short Term

Medium Term

Long Term

**Improve (intervene later):** aims to minimise erosion of the cliff by upgrading defences at cliff toe in the medium term. In the short term the existing toe defences would be refurbished and then in the medium term the rock structures (revetment / groynes) would be upgraded. This would involve making the structures more robust against sea level rise. This is the Improve C option in the Leading Options report.

**Improve (intervene sooner):** same approach as Improve C option above aiming to minimise erosion of the cliff, except the upgrades to the rock structures at the cliff toe would be undertaken sooner; this would be undertaken in the short term for Improve A or the beginning of the medium term for Improve B. This would provide greater certainty in the short and medium term protection.

**Maintain:** proactive maintenance / refurbishments to the existing defences. Due to falling beach levels in this location there is uncertainty as to how sustainable this approach may be in the future and whether long term protection could be provided.

ODU	Estimated number of properties at risk from erosion by 2123 with Do Nothing scenario	Estimated number of properties at risk from coastal flooding (200yr return period) by 2123 with Do Nothing scenario	Estimated Do Nothing cash damage (£million)	Estimated Do Nothing discounted damage (£million)
17	287	0	81.4	11.5

# ODU 18: Milford on Sea

2023 - 2043      2043 - 2073      2073 - 2123

## Key



Do nothing



Proactive maintenance



Upgrade defence

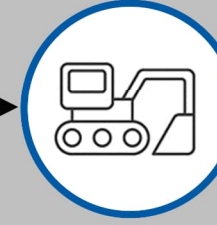
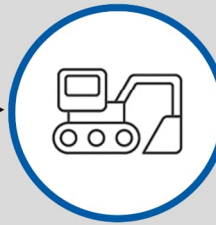
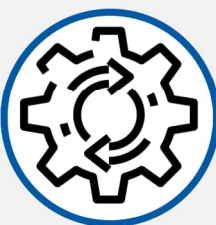


Small scale maintenance

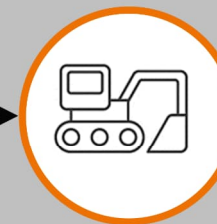


Property Level Resilience (PLR) and adaptation

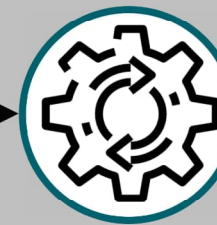
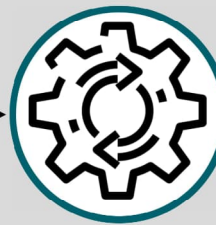
### National Economic Leading Option



### Local Aspirational Option



### Backup Option



Short Term

Medium Term

Long Term

**Improve (intervene later):** in the short term the existing defences would be refurbished and small scale repeat beach nourishments could be undertaken to help sustain beach levels. In the medium term a much larger beach nourishment intervention would be undertaken, new groynes would be installed and the seawall upgraded (e.g. crest raising). In addition, a setback flood defence would be constructed adjacent to Sturt Pond as well as property level resilience. Periodic beach nourishment may be required in the long term. This is the Improve B option in the Leading Options report.

**Improve (intervene sooner):** same approach as the Improve B option above but the major beach nourishment scheme and upgrades to the defences (groynes and seawall) would be undertaken in the short term (rather than waiting until the medium term). The setback defences to reduce flood risk from the Sturt Pond direction would still be undertaken in the medium term. Periodic beach nourishments may be required in the medium and long term. This is the Improve A option in the Leading Options report.

**Maintain:** proactive maintenance / refurbishments of the existing defences. Due to a trend of falling beach levels in this location, this approach is likely to be less effective in the future so there is uncertainty about how long the integrity of the defences can be realistically maintained. In addition, sea level rise would lead to a reduced standard of protection against flooding in the future from wave overtopping and tidal inundation via Sturt Pond / Danes Stream.

ODU	Estimated number of properties at risk from erosion by 2123 with Do Nothing scenario	Estimated number of properties at risk from coastal flooding (200yr return period) by 2123 with Do Nothing scenario	Estimated Do Nothing cash damage (£million)	Estimated Do Nothing discounted damage (£million)
18	137	78	60.0	11.3



# Chapter 5: Strategy Overview

## A phased approach to management based on risk

The Strategy options proportionately address coastal flood and erosion risks with works phased over time depending on the risk-based triggers. As sea levels rise in the future, and existing defences reach the end of their useful service life, new coastal defences will be required. The Strategy has recommended a phased implementation programme for future works, based on when risks materialise.

## Summary of approach

The main risk within Christchurch Harbour is coastal flood risk to low lying areas around the harbour. The proposed leading options therefore specify raising of defences in many locations around the harbour to reduce this risk over time as sea levels rise. The defence upgrades / raising is not needed around the full harbour immediately and the Strategy sets out estimated timeframes in the future for when raising / upgraded defences are likely to be required.

In some areas of the harbour there is not a sufficient economic case to raise the defences and these areas will need to manage increased flood risk through smaller scale property level protection measures.

In addition, within the harbour there are numerous historic landfill sites and the proposed leading options have been developed with these in mind. Where there is an economic case to do so, the proposed leading options recommend defending these areas to prevent erosion of historic landfill materials in the future.

Along the open coast, the main risk is from coastal erosion leading to a loss of properties and assets along the cliff top. The options here focus on maintaining / upgrading existing defences and cliff stabilisation measures, as well as effective beach management (which is discussed in more detail on the next page).

## Adaptive Pathways

The proposed leading options presented in the previous section are illustrated by a Roadmap showing the sequence and estimated timing of interventions that are required. The Roadmap for each ODU presents a visual representation of the strategy option(s) and the pathway approach shows what could be possible over the next 100 yrs. If risks develop over time and funding is found to be available / not available, the delivery team may switch between the three types of leading option over time. This is known as an 'Adaptive Pathway'. For example, in a certain location if more funding becomes available than expected, the delivery team could switch from delivering the National Economic leading option to the Local Aspirational option. The timings set out on the Roadmaps are indicative only and are likely to change as coastal risks develop over time.

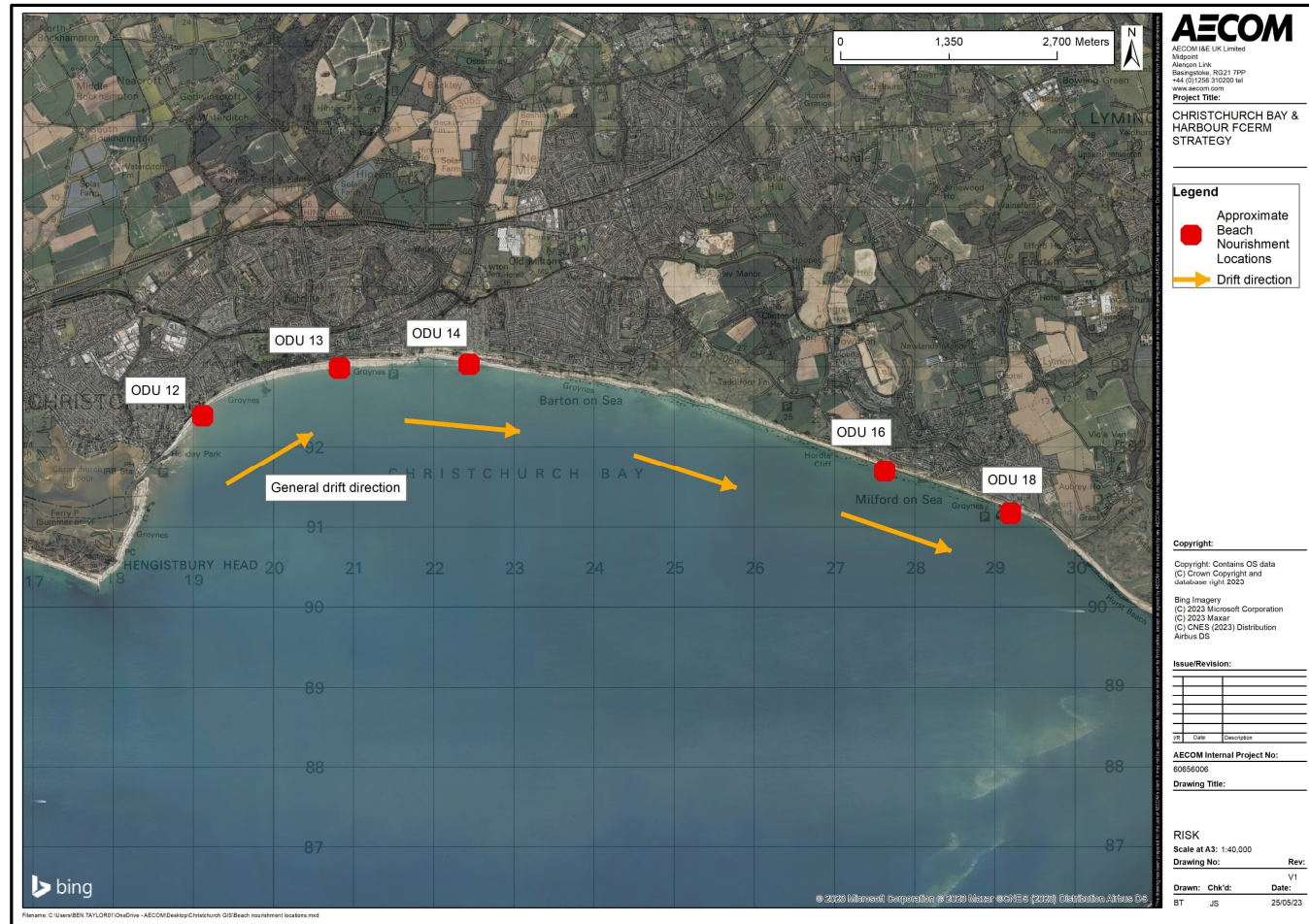
## Strategic links between options in adjacent areas

With the flexibility associated with the Adaptive Pathway approach and with up to three leading options in each ODU, it was important that the Strategy was developed so that delivering any one of the leading options in each unit would not negatively impact the delivery of options in adjacent units.

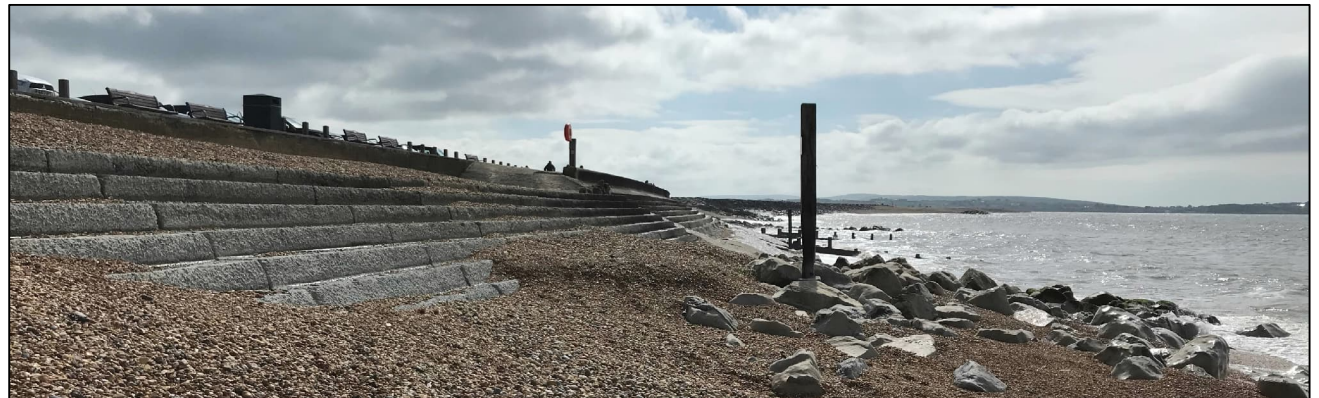
The project team has developed the options with this in mind and generally if any of the leading options in each location are delivered, then the Strategy will form a cohesive long term approach to managing the coastal flooding and erosion risks along the Strategy frontage. However, there are some areas where there are risks with the delivery of the National Economic option as it could potentially have negative knock-on impacts elsewhere. This is the case in ODUs 1, 2 and 11 where delivery of the National Economic Option (Do Minimum) could lead to uncertainty / morphological changes around the entrance to Christchurch Harbour. It is therefore more important for the Local Aspirational option to be delivered in these locations.

## Effective beach management along the open coast

A key theme for the proposed leading options along the Strategy frontage is beach management. Along the open coast sections of the frontage (ODUs 1-2 and 12-18), the leading options are underpinned by a series of strategically placed beach nourishment interventions over time. The placement locations have been identified to provide an immediate benefit to the placement location but also to provide a long term benefit to areas downdrift over the Strategy period, including Hurst Spit. The leading options recommend beach nourishment is undertaken in ODU 12, ODU 13, ODU 14, ODU 16 and ODU 18 at various points over the next 100 years (see the figure to the right). There is an opportunity to explore a joined-up approach to scheme delivery in these locations which could deliver efficiencies and cost-savings that could make the economic case more affordable than currently identified. If a combined source of material could be secured for all or many of the areas, the adaptive pathways between the leading options in the Strategy provides the flexibility in timings of interventions to deliver nourishment schemes for each location simultaneously rather than treating each location individually. The beach nourishment will ensure that the beach can continue to provide an integral part of the overall defence system along the open coast. However, in some locations it would need to be supplemented with additional hard defence structures and cliff slope stabilisation. For example in ODU 14 at Barton on Sea new cliff toe defences and cliff slope drainage is recommended as part of both the National Economic and Local Aspirational options.



Map showing approximate beach nourishment sites as recommended by the leading options (top), beach at Milford on Sea (bottom)



## Economic costs and benefits

The tables below show the estimated costs in cash (undiscounted) and present value (discounted) terms and the benefit cost ratios of the proposed leading options. If the National Economic and Local Aspirational options include a major scheme, then an initial public funding (FCERM-GIA) calculation has been undertaken to estimate the approximate amount of government funding that may be available for the capital costs of the scheme. Typically it is expected that <30% of the scheme costs of the options will be funded through public funding with the remainder of the cost needing to come from alternative sources. The cost estimates are subject to change when more detailed appraisal to develop schemes is undertaken in future years.

Although not shown in the tables below, some of the ODUs also have a Backup option identified. These Backup options typically have lower present value (discounted) costs than the National Economic / Local Aspirational options because the options do not involve large capital schemes and are instead focused on more frequent defence maintenance / refurbishments. It is likely that the Backup options will be easier to deliver than the National / Local Aspirational options as there will not be such a large one-off shortfall in funding associated with a major capital scheme and instead smaller scale and less costly (but more frequent) interventions would be needed. The cash cost (undiscounted) of the Backup options over the course of the next 100 years can sometimes be similar / larger than the National / Local Aspirational options.

SMZ	ODU	Option type	Estimated option cost		Approximate funding available from government for major scheme (cash £million)
			Cash (£million)	Present Value (£million)	
1	1	National	0.5	0.3	0
1	1	Local	6.4	2.0	0
1	2	National	1.0	0.6	0
1	2	Local	15.2	4.0	0
2	3	National	0.3	0.1	Requires further assessment
2	3	Local	2.5	0.7	
2	4	National	3.3	1.3	0.7
2	4	Local	10.1	3.0	0.7
2	5	National	27.0 - 28.7	9.8 - 12.6	Varies ~ 4.0
2	5	Local	27.0 - 27.7	11.7 - 19.3	Varies ~ 4.0
2	6	National	7.8	2.6	Requires further assessment
2	7	National	7.3	3.6	0.6
2	9	National	21.0	8.8	2.9
2	10	National	27.3	7.4	2.1

SMZ	ODU	Option type	Estimated option cost		Approximate funding available from government for major scheme (cash £million)
			Cash (£million)	Present Value (£million)	
2	11	National	0.5	0.3	0
2	11	Local	27.3	8.5	Requires further assessment
3	12	National	17.6	7.0	1.4
3	12	Local	21.4	11.2	1.4
3	13	National	13.0	4.0	2.2
3	13	Local	14.5	5.2	1.5
4	14	National	45.0	16.4	3.5
4	14	Local	45.0	27.0	3.5
5	15	National	0	0	0
6	16	National	12.6	3.2	2.0
6	16	Local	9.4 - 11.8	4.0 - 4.6	1.4 - 1.7
6	17	National	16.8	6.1	3.4
6	17	Local	14.2	6.3 - 10.5	2.4 - 2.6
6	18	National	21.0	10.5	1.7
6	18	Local	18.5	11.0	Requires further assessment

## Delivering More – broader outcomes and contributions

The Strategy primarily presents the leading strategic approaches for managing the risks posed by coastal flooding and erosion. However, in doing this, there are also many other opportunities for The Strategy to protect, support and facilitate wider benefits. This is a key objective of The Strategy.

For example, a new coastal defence to protect an area from flooding can be as simple as a sea wall. Whilst such a defence will serve its purpose, with some joined up thinking there may be opportunities to enhance the defence such as through promenade raising or wider landscaping. Such a scheme could be delivered through redevelopment and provide multiple benefits and not just a flood defence. This could include regeneration, reduce visual impact, improve access to the coast and reduce future maintenance costs. A partnership approach such as this could also help fund defences and ensure that they are approved and built more efficiently.

## How will future coastal defences and management be paid for?

In recent years there has been a change to the way coastal defences are funded. The funding system, referred to as a payment for outcomes approach, rewards partnership funding of schemes and provides many positive benefits with lots more schemes now being built as a result.

The Strategy leading options identify where and when potential defence schemes can be implemented along the frontage. Funding sources for all potential schemes will be assessed using the government's Partnership Funding mechanism for flood and coastal erosion risk management schemes.

With Partnership Funding, the merits of flood and coastal defence schemes are not judged purely on economic terms; the wider outcomes that a scheme delivers are also considered.

## How will future coastal defences and management be paid for (continued)?

For example, if a scheme moves people in highly deprived areas out of significant flood risk, this propels the scheme up the ladder in the bid for public funding.

The Strategy recommends economically sound leading strategic approaches to managing coastal flood and erosion risk. Although future schemes may be able to attract some public (FCERM Grant in Aid) funding, contributions will be required to make up the shortfall to enable schemes to progress. By knowing the potential future costs of works, mechanisms to investigate and secure funding can be developed. The partnership mechanism encourages those benefiting from schemes to contribute to their cost to supplement government grants. By working together, schemes which are still viable but have less economic benefits would still be able to unlock national funding to boost and prioritise schemes to implement the Strategy. Raising funds will allow us to:

- Increase the standard of protection of defences
- Improve the quality of materials used (e.g. to better fit the character of a location)
- Increase certainty and accelerate the delivery of schemes
- Deliver wider benefits to communities associated with schemes, such as improved landscaping, access and public realm
- Deliver environmental enhancements to increase biodiversity

If you can contribute or offer our support to help deliver the Strategy, please email [coastal@bcpcouncil.gov.uk](mailto:coastal@bcpcouncil.gov.uk) or complete the on-line survey to provide your details. You could:

- Work in partnership to deliver combined outcomes
- Provide financial contributions or sponsorship
- Offer access through private land or site setup

## Adaptation

The proposed leading options provide the recommended pathways for managing coastal flooding and erosion in Christchurch Bay and Harbour over the next 100 years. However, the implementation of these options is dependent on funding availability. Without the necessary funding, it may not be possible to construct / maintain the defences / measures recommended by the options. The reality is that we will need to look to adaptation as a realistic response to coastal risks now and into the future.

'...anticipating appropriate action to prevent or minimise the likelihood and consequences of flooding and coastal change, both now and in the future ...'

National FCERM Strategy 2020

Coastal adaptation should be considered in all locations alongside the leading strategic options presented in The Strategy. We need to explore methods to adjust to the reality of present and future coastal flooding and erosion risk.

Adaptation focusses on adjusting to, and managing, the impacts of coastal flooding and erosion, as opposed to the other strategic options which aim to mitigate the impacts through physical flood protection measures.

This can include for example designating areas as Coastal Change Management Areas in the planning process to limit further coastal development. In areas where funding may be limited, adaptation plans can be developed for communities to help manage the impacts of changing risks over time.





# Chapter 6: What Happens Next?

# What Happens Next?

## Consultation Feedback

Engagement and feedback from key stakeholders and the public forms a vital part of shaping the final Strategy. We want to hear your views.

The Strategy consultation period runs for three months from June to August 2023. During this time key stakeholders and the public are invited to attend a series of exhibitions to review and provide feedback on The Strategy proposals. Please visit [haveyoursay.bcpccouncil.gov.uk/christchurchstrategy](https://haveyoursay.bcpccouncil.gov.uk/christchurchstrategy) for further details of the public exhibitions and the ways in which you can provide feedback on The Strategy.

Have your say on the proposed leading options by completing the questionnaire and providing feedback to the project team.

## Strategy updates

The project team will consider all feedback from the local community and key stakeholders and updated the proposed leading options for each area accordingly. Once updated, our project team will then summarise the Strategy and present it for consideration to both BCP Council and NFDC. Following this it will be submitted to the Environment Agency for approval.

It is anticipated that the Strategy will be formally adopted by both councils in Spring 2024 and will set the strategic framework and long term plan for managing the coastal flood and erosion risks along the Strategy frontage.

## TIMELINE



Keep up to date on the Christchurch Bay and Harbour Strategy at:

**[www.twobays.net](http://www.twobays.net)**