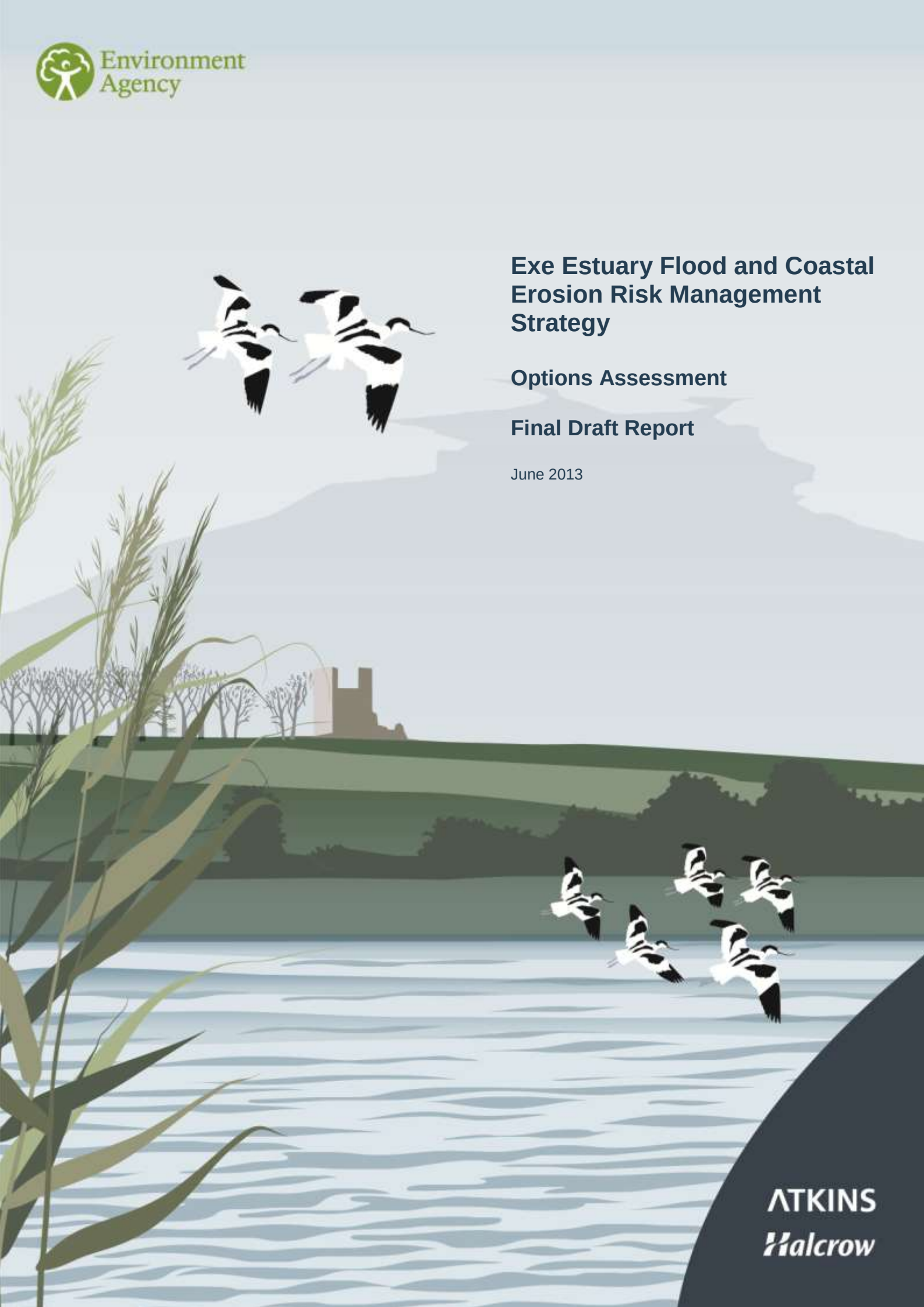


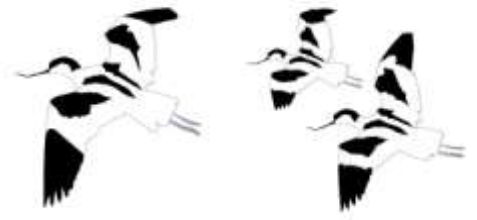


Exe Estuary Flood and Coastal Erosion Risk Management Strategy

Options Assessment

Final Draft Report

June 2013





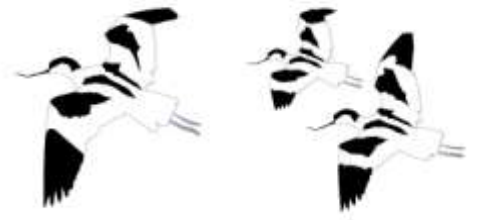
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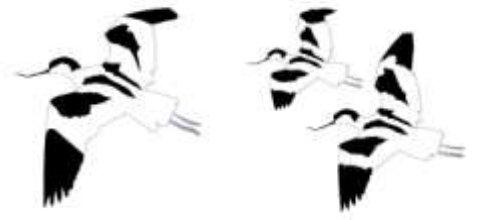
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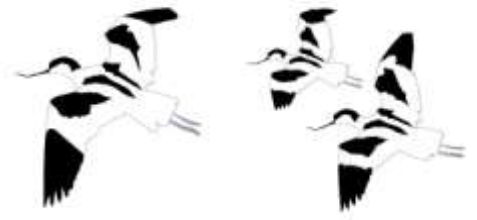
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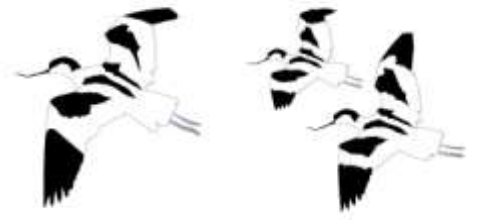
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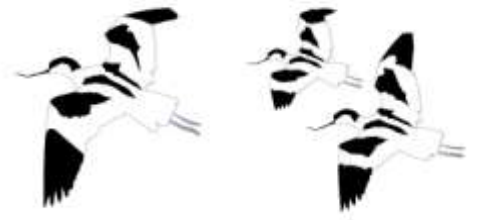




Glossary of Terms

Term	Meaning / Definition
EEFCERMS	Exe Estuary Flood and Coastal Erosion Risk Management Strategy
SoP	Standard of Protection
AEP	Annual Exceedance Probability
SMP	Shoreline Management Plan
CFMP	Catchment Flood Management Plan
EA	Environment Agency
SEA	Strategic Environmental assessment
LPRG	Large Projects Review Group
StAR	Strategic Appraisal Report
Defra	Department for Environment, Food and Rural Affairs
FCERM-AG	Flood and Coastal Erosion Risk Management Appraisal Guidance
PVd	Present Value damages
PVb	Present Value benefits
PVc	Present Value costs
BCR	Benefit-Cost Ratio
HRA	Habitat Regulations Assessment





Executive Summary

The Environment Agency commissioned a strategic study for the Exe Estuary to examine the current and future coastal flood risk and habitat evolution, and develop, assess and select strategic options to manage flood and coastal risks, and habitats. This report documents the range of technical analyses carried out to support option development and selection, and the staged option selection process.

The draft strategic options can be grouped into three main themes:

- Potential schemes in the next 20 years to improve flood and coastal risk management (FCRM) asset weak spots and reduce flood and coastal risk at a flood cell level.
- The wider 100 year programme of incremental improvements in response to predicted climate change.
- The programme of managed realignments to ensure zero net loss of area or ecological functionality to the Exe Estuary SPA and Dawlish Warren SAC.

Potential FCRM schemes in the next 20 years have been identified for The Maer, Exmouth, Topsham, Powderham Banks and Starcross. The Exmouth and Starcross schemes would provide a 0.1%AEP Standard of Protection against tidal flooding, with a strong case for full FDGiA funding. It is recommended that studies to progress and deliver these schemes occur within the next 5 years.

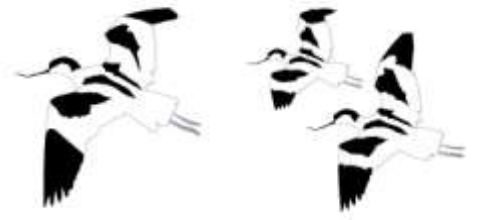
The Maer, Topsham and Powderham Banks schemes would likely only receive partial FDGiA funding, and have engineering and environmental uncertainties that require further assessment to proceed. It is recommended that these schemes are delivered in the next 5-15 years.

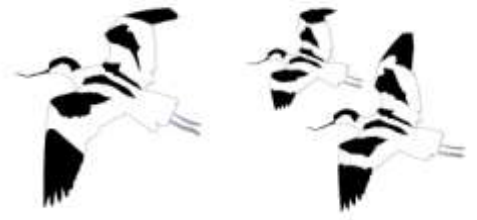
Potential managed realignment schemes in the next 20 years have been identified for the east and west bank of the Lower Clyst, and Kenn Valley. The west bank of the Lower Clyst, and Kenn Valley, schemes are deemed more readily deliverable, with a strong case for full FDGiA funding. It is recommended that studies to progress and deliver these schemes occur within the next 5 years.

The east bank of the Lower Clyst scheme would likely only receive partial FDGiA funding, and has landowner, infrastructure, engineering and environmental complexities that require further assessment to proceed. Responses from the public consultation identified that landowner support would be unlikely to be forthcoming.

The short term management of FCRM and habitats at Dawlish Warren sand spit, SAC and village is complex. Progressive technical assessment and discussions with affected parties has identified a potential way forward to enable continued FCRM to the village of Dawlish Warren and provide storm sheltering to the wider estuary, whilst enabling natural processes to occur at the SAC. It is recommended that studies to progress this scheme occur within the next 5 years, with phased delivery within the next 15 years.

The possible wider 100 year programme of managing FCRM and habitats is sensitive to climate change predictions (Environment Agency, 2011). Assessment has identified that under the low 50%ile and medium 95%ile emissions scenarios conventional raising of the various existing FCRM assets is technically achievable and economically justifiable. However under the upper end, and upper end plus surge, emissions scenarios this approach may become difficult to achieve towards 2110. Alternative options could consist of community level property resilience and realignment on FCRM grounds.





1. Framework for Responding to Climate Change

1.1 Use of Previous and Ongoing Studies

A large number of strategic and local studies have previously been carried out within the Exe Estuary. The Exe Estuary Flood and Coastal Erosion Risk Management Strategy (EEFCERMS) drew on these studies to make best use of pre-existing work. Salient studies covering development of FCERM options include:

- South Devon and Dorset SMP2 (Halcrow, 2010).
- Exe CFMP (Environment Agency, 2008).
- Exe Estuary Coastal Management Study (Halcrow, 2008a and b).
- Dawlish Warren and Exmouth beach recharge study (Halcrow, ongoing).
- Lower Clyst Intertidal Habitat Creation (Halcrow, 2009).
- Exeter PAR (AHA, ongoing).
- Countess Wear Pre-Feasibility (Black and Veatch, 2003).
- Powderham Banks Pre-Feasibility (Jacobs, 2007).
- Lypstone PAR (Atkins, 2008).

The above studies represent a comprehensive source of information, both as regards the range of options considered (from local to large scale options) and geographic coverage.

1.2 Objectives and Drivers

The over-arching aim of the EEFCERMS is *'to produce a long-term plan for sustainable flood risk management in the Exe Estuary that takes full account of the Habitat Regulation requirements and provides appropriate levels of protection to all flood risk areas'*. SMP2 level objectives were considered further within the EEFCERMS, with the objectives for particular FCRM units given in Appendix A.

1.3 Option Development Process

Consideration of the key issues of increasing flood risk and estuary-wide habitat evolution highlighted the following need to:

- Ensure a coherent policy framework drawing on the relevant SMP2/CFMPs.
- Ensure the legal requirements of EU directives are met in light of habitat evolution.
- Develop policies through to optimised adaptation responses in light of socio-economic, technical and environmental constraints, in a transparent and robust manner.



To assess the potential for habitat creation within the Exe Estuary, a filtering process was carried out. This used a range of criteria to select viable habitat creation sites around the Exe Estuary, defining potential viable sites, their maximum spatial area, and a broad hierarchy. This fed into a three stage option appraisal process, outlined as:

- High Level Options. These are akin to CFMP policies but are additionally considered in light of SMP2 policies (McCue et al, 2009). High Level Options were assessed based on the baseline scenario and high level policy drivers at an estuary-wide level, such as the need for habitat creation to address climate change impacts.
- Alignments and Types. The selection of preferred High Level Options acted as a filter for the Alignments and Types. These were quantitatively assessed based on addressing the drivers and achieving the objectives of each FCRM unit. Alignments were based on the broad habitat opportunities and required extent at an estuary-wide scale for each epoch, whilst types of FCRM were predominantly based on technical appropriateness.
- Responses. The selection of preferred Alignment and Types acts as a filter for the Responses. These were quantitatively assessed based on optimising the type and SoP. At this stage, preferred Responses define alignment, SoP and solution type.

This framework is shown in Figure 1.1. Conceptually, this framework enables habitat and environmental concerns to have equal or greater weighting than technical and socio-economic concerns at the Policy, High Level Option and Alignment and Type phases, with technical and socio-economic concerns becoming increasingly dominant in the Response stage. All these stages were undertaken in parallel with the SEA, WFD and HRA processes.

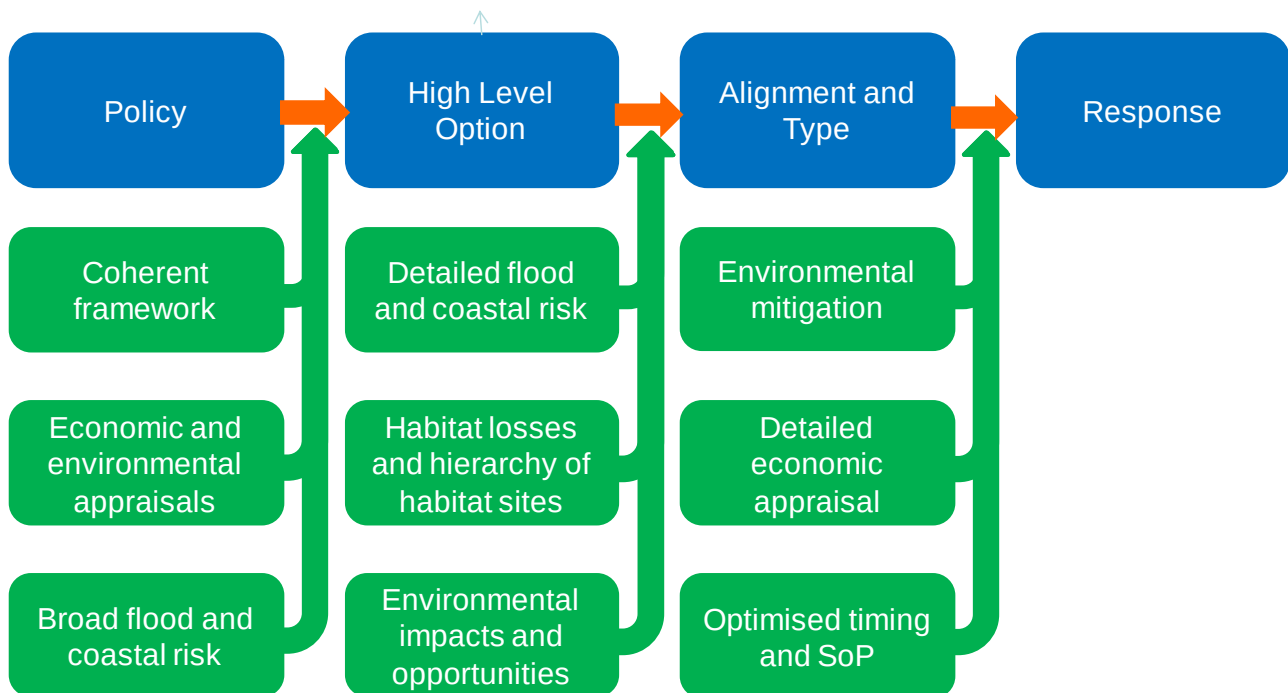
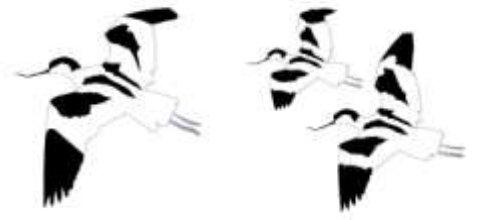


Figure 1.1 – Development from policy through to response.



1.4 Scale of Assessment

Development and assessment of options has been carried out at a range of scales, described in Table 1.1. The estuary wide Natura 2000 site was the focus of the general consideration of site integrity. FCRM units, defined as areas with differing flood and coastal risks, formed the basis of the consideration of environmental issues, flood and coastal risk management and socio-economic viability. Sub-reaches, defined by consistent asset type, geometry and exposure, formed the basis of the detailed assessment of options, specifically related to habitat creation and engineering. The various scales of assessment are shown in Appendix B.

Scale	Option stage	Assessment
Estuary wide (and regional if necessary) and FCRM units	Habitat search and High Level Options	Consideration of integrity of relevant SPA, Ramsar and SAC designated sites, environmental issues, flood and coastal risk management and socio-economic viability.
Sub reaches	Alignment and Types Responses	Consideration of detailed technical issues related to habitat creation, environmental issues and engineering solutions.

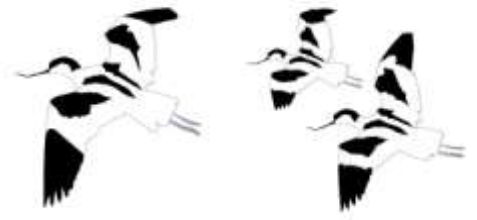
Table 1.1 – Range of assessment scales.

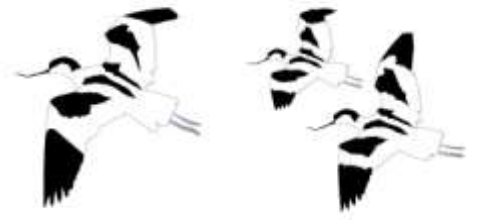
1.5 Existing Policy

Shoreline Management Plan 2 (Defra, 2006) and Catchment Flood Management Plan (Environment Agency et al, 2004) guidance sets out policies focussed on management of the shoreline and flood risk respectively. Estuaries represent transitional regions where both shoreline and flood risk management is required, and consequently where SMP2 and CFMP policies may significantly overlap. The relevant management plans for the EEFCERMS are:

- South Devon and Dorset SMP2 (Halcrow, 2010).
- Exe CFMP (Environment Agency, 2008).

The policy units and preferred policies for the SMP2 and CFMP were reviewed to assess their coherency. This assessment is provided in detail in Appendix C. In summary the CFMP policy units are much more spatially generic than for the SMP2s, however spatial mismatch is limited between CFMP and SMP2 policy units.





2. Technical Framework

2.1 Introduction

The development of options and their potential impacts on the estuary system were assessed via a wide range of analyses and associated tools. An overview of the technical framework is given in Figure 2.1, set within the context of the source-pathway-receptor approach. The analyses and tools are described in the subsequent sections, with further details in AHA (2013).

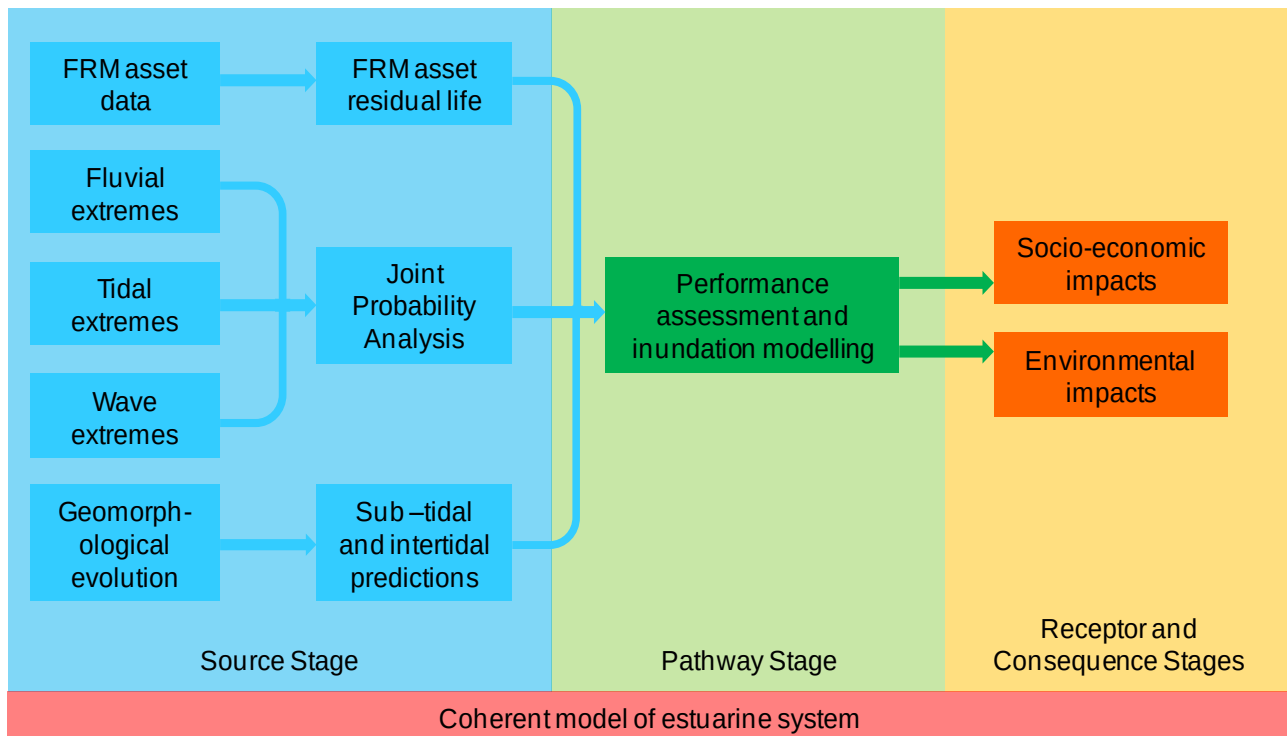


Figure 2.1 – Overview of technical framework.

2.2 Range of Assessments

The technical assessment techniques described in the subsequent sections were carried out for a wide range of parameters. All techniques were applied for 100% to 0.1% Annual Exceedance Probability (AEP), as well as astronomic tide levels, where appropriate. This included all potential joint probability occurrences for wave and tidal processes, and fluvial processes for the rivers Exe and Clyst. The techniques were also applied for the time horizons of 2010, 2030, 2060 and 2110.

2.3 Hydrodynamic and Geomorphological Analysis

The extreme hydrodynamic climate in the Exe Estuary was assessed via a range of tools. MIKE21NSW and DAWN software was used to define the extreme wave climate (both swell and wind) in the outer estuary. For the rivers Exe and Clyst, Environment Agency ISIS-TUFLOW models were used to define EWLs, updated with tidal boundaries from DAWN. The DAWN and ISIS models were also used to assess the impact of managed realignment, where identified by the options development. DAWN modelling identified that in-estuary EWLs would be insensitive to



variations in FCRM asset position. Summary results from this modelling are provided in Appendix D. Geomorphological evolution of the estuary was assessed via Expert Geomorphological Assessment (AHA, 2013), specifically providing information on evolution at the dynamic estuary mouth, and also on potential for accretion in the inner estuary.

2.4 Performance Assessment and Design

The FCRM structures around the Exe Estuary experience wave, tidal and fluvial impacts depending on their location within the estuary. To assess the performance of the FCRM assets and potential options, three critical datasets were required: hydrodynamic and geomorphological inputs, asset geometry, and asset condition and type.

The approach used to assess damage and breach to FCRM assets within the Exe Estuary follows the general approach described by the Integrated Project FLOODsite (EC, 2009). Four principal sources of loading are considered:

- Fluvial-tidal weiring over the assets.
- Wave loading (overtopping) on the assets.
- Failure related to direct erosion of the assets.
- Structural degradation of the assets.

The response to wave-tide overtopping was based on the guidance given in the EuroTOP manual (EU, 2007). The response to tidal-fluvial overtopping (weiring) is defined using the broad-crested weir equation (which is indirectly supported by guidance in the EuroTOP manual). Failure related to erosion was based on the EGA findings (AHA, 2012). Failure related to structural degradation was based on R&D project 'Assessment and measurement of asset deterioration including whole life costing' (Environment Agency, 2009).

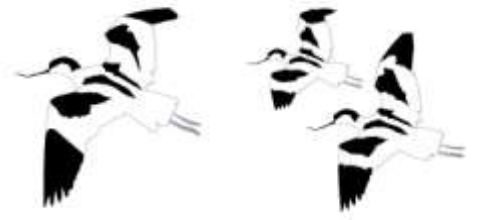
Conceptual design of options was also developed, relating to:

- Primary, secondary and managed realignments
- Type of construction (e.g. earth embankment, rock armouring, revetment, wave recurve wall or other)
- Outline geometry (e.g. foreshore elevation, front slope angle, crest level and width, roughness and other)

Where necessary, other forms of option were assessed via design codes, existing field knowledge and engineering judgement.

2.5 Flood and Coastal Risk Assessment

Assessment of floodplain inundation and erosion risk was assessed via a range of tools. Physical appropriateness calculations and simple 1D ISIS models were used to check that over-design weiring and breach would result in total inundation to the occurring EWL. If this was found not to be the case (generally for the larger coastal floodplains), ISIS-TUFLOW and DAWN models were developed and run to assess the extent of partial inundation. DAWN was also used to assess locations of potentially increased erosion risk due to realignments and predicted change at Dawlish Warren sand spit, whilst the NCERM erosion zones were used where present along the coast.



2.6 Environmental and Habitat Assessment

Environmental assessment was carried out as documented in AHA (2013). Assessment of habitat and functionality changes, impacts and opportunities, were drawn from the geomorphological and hydrodynamic work, specifically relating to:

- Future evolution of Dawlish Warren sand spit and potential impacts on the wave and tide climate.
- Future evolution of the inner estuary, specifically relating to bathymetry changes into the future.
- Future habitat extents, based on historic and present day observations, expert judgement, predicted geomorphological and hydrodynamic changes, and broad zoning of intertidal habitats via astronomic tide levels (RSPB, 2005) and ground-truthing of existing habitat.
- Functionality, based on the predicted future habitat extents, mapping and interpretation of WEBS data, wider literature review and expert judgement.

2.7 Socio-Economic and Carbon Assessment

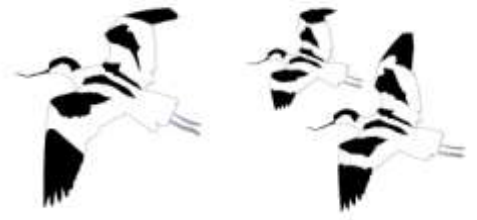
2.7.1 Methodology for Estimating Damages and Benefits

The economic damage and benefit assessment was produced in accordance with HM Treasury Guidance, the FCERM-AG, the Flood Hazard Research Centre's Multi-Coloured Manual (2005) and the latest Defra guidance. Assets considered in the assessment where relevant included properties (residential and non-residential), agricultural land, transport links (roads and railways), caravan parks, receptors vulnerable to flooding, as well as strategic assets such as power transmission lines, stations and docks. All damages and benefits were generated from a Quarter 4, 2012-13 basis.

2.7.2 Methodology for Estimating Cost

Costs for options development were based on a range of appropriate data sources, and assessment via Atkins, Halcrow and Environment Agency engineers. The costs were drawn from actual construction costs for FCRM schemes from internal Environment Agency national records, and the consolidated representative costs reviewed for strategic appropriateness, in light of relevant datasets held in the following projects. All costs were generated from a Quarter 4, 2012-13 basis.

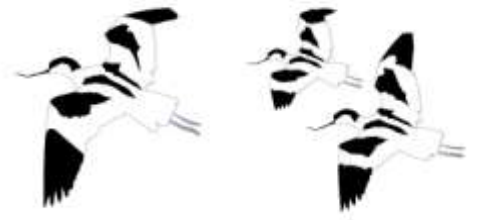
- Unit cost database (Environment Agency, 2007)
- Countess Wear Pre-Feasibility (Black and Veatch, 2003)
- Powderham Banks Pre-Feasibility (Jacobs, 2007)
- Lympstone PAR (Atkins, 2008)
- Parrett Estuary FRM Strategy (Black and Veatch, 2009)
- Avonmouth to Aust Tidal Defence Scheme (Atkins, 2006a)
- Steart Peninsula Managed Realignment (Halcrow, 2009)
- Rumney Great Wharf Flood Defence Scheme (Atkins, 2004)



Whole life costs were developed for options by applying the unit costs and relating these to the extent (width, length, type, number, etc), and applying a range of percentage uplifts to account for local context, optimism bias, as well as design, supervision and construction costs. The cost database and further details are given in Appendix E.

2.7.3 Carbon Assessment

The carbon assessment of options was carried out at the Response stage, to inform a preferred option if there were two closely matched options. This was carried out using the Atkins carbon calculator (Canning et al, 2011), which applies the same values as the Environment Agency carbon calculator spreadsheet.



3. High Level Options

3.1 Introduction

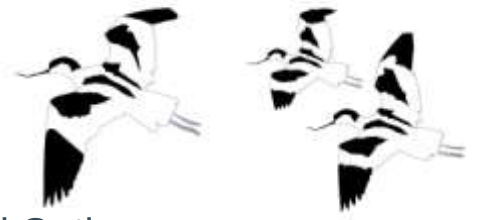
As a large proportion of the EEFCERMS study area is covered by both the Exe CFMP and SDAD SMP2, a system was applied to consider both sets of policies, and come to a merged view of how to manage flood and coastal risk, as well as habitats. This enabled a translation from shoreline-focussed SMP2 policies to flood and coastal risk-focussed High Level Options.

The intention of the HLOs is to identify the broad management approach at FCRM unit scale. The extent of intervention is not specified, and it may be that the preferred HLO may only require a localised amount of intervention. For example, with a preferred HLO of Improve, this may only require significant intervention at a localised sub-reach of FCRM asset, which defines the flood risk to the whole flood cell. Conversely, Manage would not necessarily refer to managed realignment of the whole FCRM unit, but the potential for realignment within the FCRM unit. The Alignments and Types options stage will identify the extent of intervention required for the preferred HLOs set out below.

3.2 Range of High Level Options

The range of High Level Options were defined as:

- **No Active Intervention.** This is similar to the SMP2 policy, and means that no further works would be carried out to manage flood risk, except relating to legal compliance such as public health and safety.
- **Maintain FCRM.** This refers to maintenance of assets that would be carried out to manage flood risk, ensuring the asset structural integrity is maintained. This may require significant activity, such as toe protection, in the longer term due to climate change impacts. However, this would not include for more extensive foreshore management activities.
- **Sustain FCRM.** This refers to small scale improvements to assets that would be carried out to ensure the Standard of Protection remains consistent, and keeps pace with climate change. In detail, the actual SoP would exhibit a small-scale 'saw-tooth' pattern over time. This would also include continuation of the existing foreshore management activities.
- **Improve FCRM.** This refers to larger, capital scheme, improvements to assets would be carried out (or new assets constructed). The Standard of Protection would be increased significantly, over and above climate change impacts, as a one-off intervention. This would also include greater or optimised foreshore management in comparison to existing activities.
- **Manage FCRM.** This refers to managed realignment of assets, and also the wider range of non-structural measures that can be undertaken such as property resilience. It can also refer to flow control and storage methods.



3.3 Methodology for Assessment of High Level Options

High Level Options were assessed at a FCRM unit level via:

- Policy context. This was reviewed, and if agreed with set the initial direction of activity.
- Present day and future level of flood and coastal erosion probability and extent. This indicated whether and when (as regards epochs) there was any technical need to consider FCRM improvements.
- Appropriateness for habitat creation. This indicated the general viability for habitat creation at each FCRM unit. Further to this, functionality impacts and opportunities were assessed.
- Environmental issues, covered in the WFD, HRA and SEA analyses.
- Overall socio-economic viability, based on the baseline damages (AHA, 2013), costs from the SMP2 (Halcrow, 2010) and further internal review and development of costs.

It is noted that this report does not consider what effects climate change and sea level rise will have on fluvial tributaries, other than the rivers Exe and Clyst, entering the Exe Estuary. This is likely to have an effect on the surface water flows entering the tributaries and directly into the Exe Estuary. Such effects will need to be considered further for any future schemes and detailed assessments that are proposed or carried out within the catchment of the Exe Estuary. Greater artesian pressures may well increase the height of the water table in this area resulting in a higher risk of groundwater flooding. This will also need to be considered for any future proposals

3.4 Overview of Assessment

A description of the draft High Level Option (HLO) assessment is given below, along with issues to be resolved or assessed in further detail at the next options stage. The detailed assessment matrices for all the HLOs are given in Appendix G. The SEA HLO matrices also assessed the High Level Options and set out environmentally preferred options, with a summary given in Appendix F. At a number of locations, whilst the SEA preferred option is Improve, the overall draft option is Maintain or Sustain due to either socio-economic limitations, or lack of technical need to improve SoP (i.e. the SoP is already at 0.1% AEP or greater); this is noted where relevant. Of further note is that the management of Dawlish Warren sand spit has an estuary-wide influence on flood and coastal risk, as well as potentially on the SPA. Again, this is noted in the description below, where necessary.

3.5 Sandy Bay

The FCRM unit of Sandy Bay is bounded by Straight Point to the east and Orcombe Point and Rocks to the west, shown in Figure 3.1. There are no FCRM assets present, with the cliff and beach system able to respond to sea level rise and increased storminess, resulting in continued recession of the cliff. Flood risk to the human environment is non-existent. Erosion risk is also very limited, with the potential for around 60 caravans to be at erosion risk after 2060, if still present at that time. As a consequence, the potential Present Value benefit (PVb) of avoiding the predicted erosion is approximately zero. Sensitivity to climate change scenarios is low. The environment assessment identified the preferred HLO of NAI on the grounds of enabling a naturally functioning system and maintaining the geological interest features of the Dorset and East Devon World Heritage Site.

As such, the draft HLO is NAI in the short to long term.

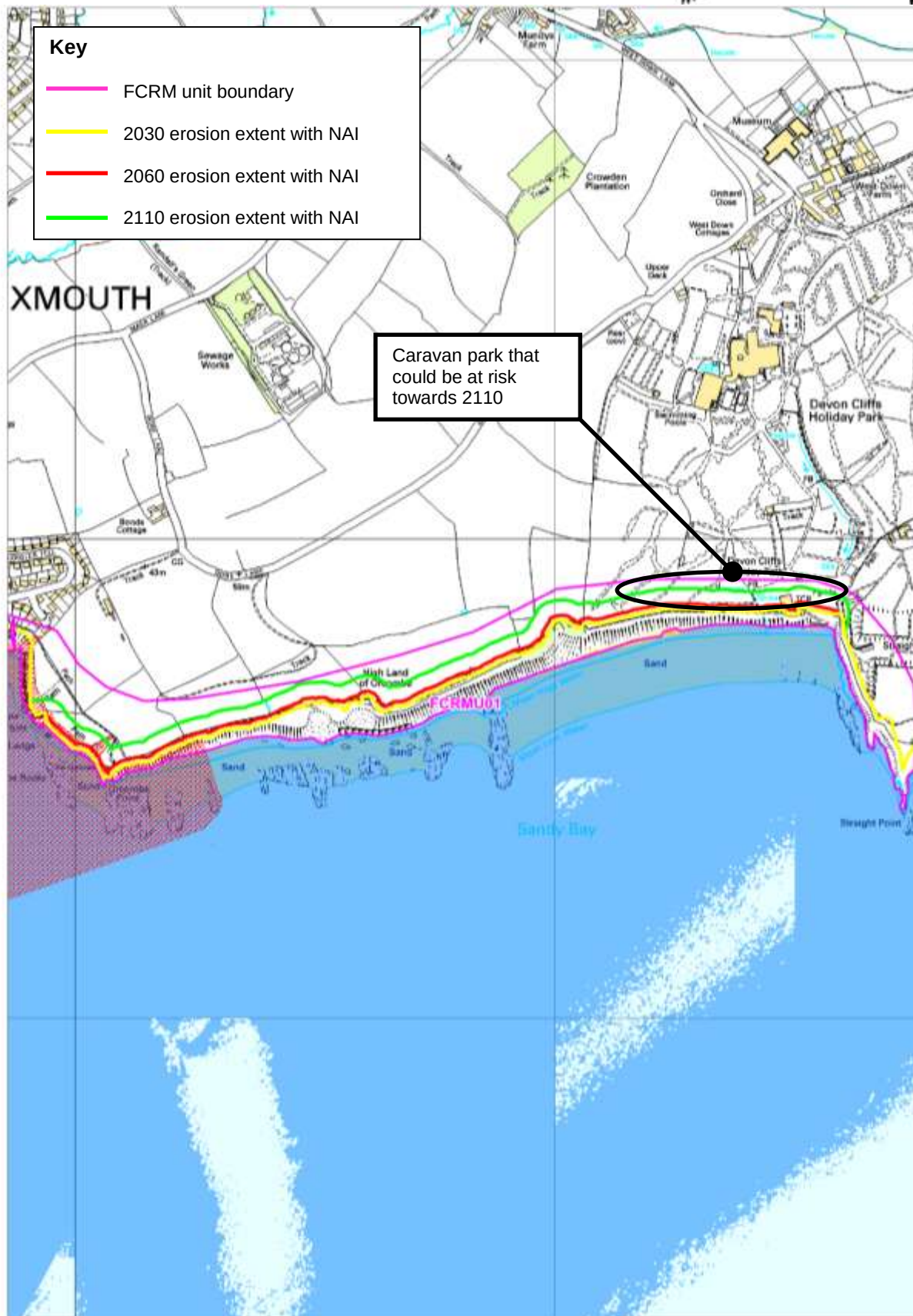
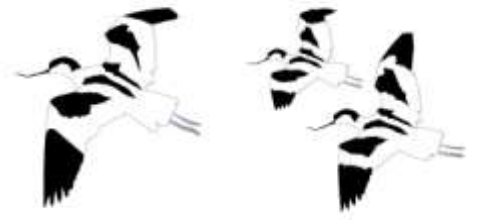


Figure 3.1 – Sandy Bay.



3.6 The Maer

The FCRM unit of The Maer is bounded by Orcombe Point and Rocks to the east and Exmouth Beach Gardens to the west, shown in Figure 3.2. The existing beach, sand dune and sea wall system provides a FCRM function by avoiding direct erosion of the local promenade and road, although there is an alternative, parallel road route approximately 200m inland. As ground levels landward of the seawall are above the 0.1% AEP EWL until 2110, flood risks to the wider human environment are also limited. As a consequence the maximum potential PVb if all risk is avoided is estimated at £0.01M. Broad level costing to maintain the existing beach, dune and seawall system estimates a Present Value cost (PVC) of £0.5M, giving a benefit cost ratio (BCR) well below unity. There is low sensitivity to climate change scenarios, as whilst the potential PVb would vary between £0-0.01M and PVC between £0.3M to £1.2M, the BCR would still be well below unity. The environmental assessment identified that NAI would be the preferred option on the grounds of enabling a naturally functioning system.

However, early discussions with East Devon District Council (EDCC) has identified that the Maer has significant amenity benefit and development potential, and that if NAI or Manage were pursued as options there may be significant costs relating to proactive or reactive removal of the seawall, promenade, road and associated infrastructure. Early discussions with Devon County Council (DCC) suggest that investment in the long-term could only be justified by a very compelling economic case. Potential costs relating to this will be considered at the next options stage. In addition to this the issue of very low potential for FDGiA funding was identified, suggesting that non-central funding and contributions would be required to enable the beach, dune and seawall system would be maintained into the future.

As such, the draft HLO is Maintain in the short term and then Sustain in the medium to long term, if non-central funding and contributions become available. If this cannot be achieved, then the preferred HLO may be NAI in the short to long term.

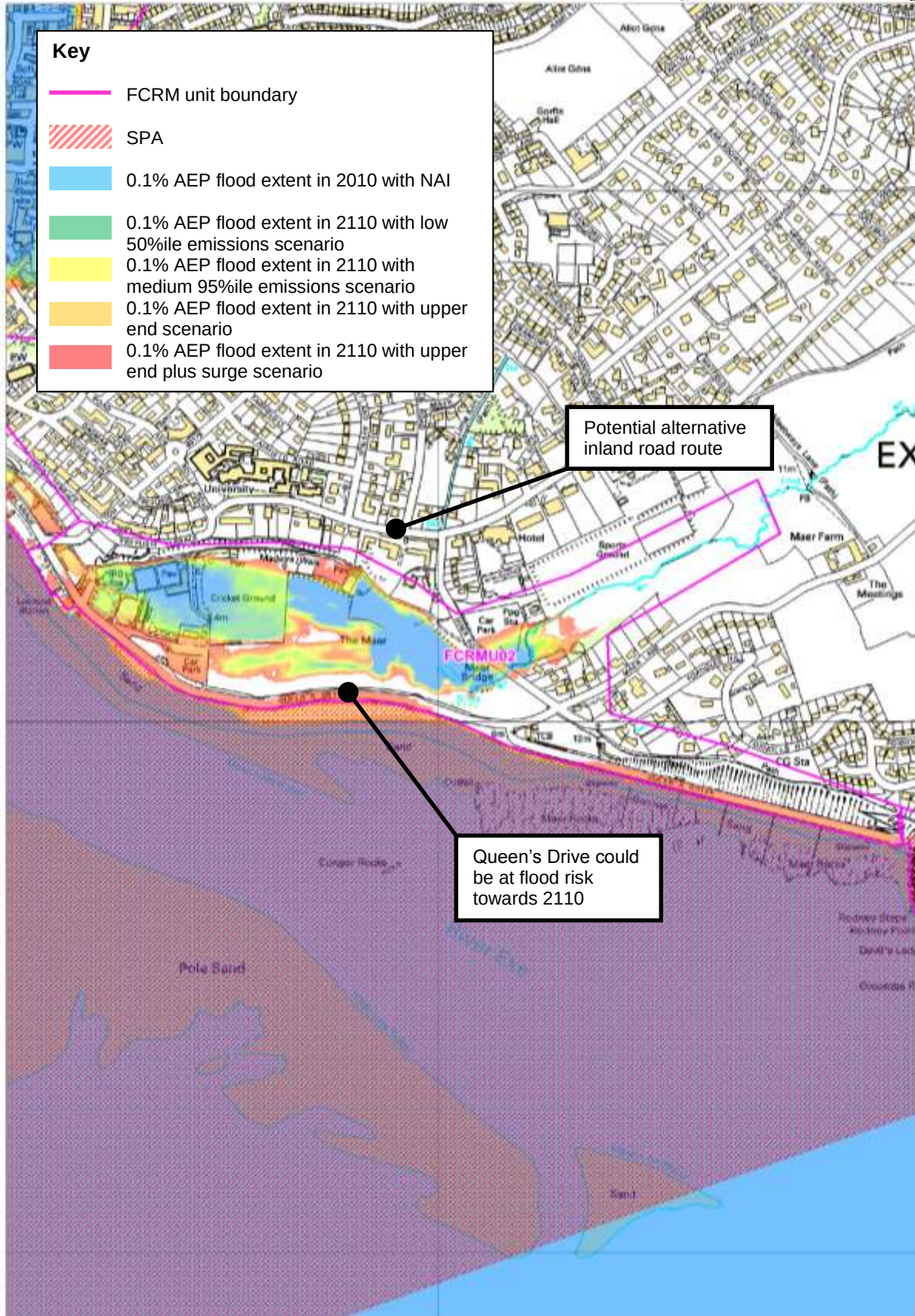
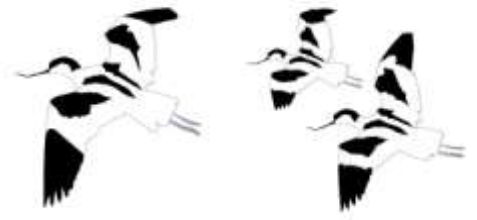


Figure 3.2 – The Maer.



3.7 Exmouth

The FCRM unit of Exmouth is bounded by Exmouth Beach Gardens to the east and Withycombe Brook to the north, shown in Figure 3.3. The existing FCRM system includes the beach and various types of walls and revetments. Flood and coastal risk to the human environment is relatively high, with an existing breach SoP of 4% AEP related to the FCRM assets around Exmouth Dock, The Point and Camperdown Terrace. In addition the Preliminary Flood Risk Assessment has identified that Exmouth is at high risk of surface water flooding, indicating that improvement works should consider wider flooding impacts. The associated maximum potential PVb is estimated at £355M, with broad level costing for maintaining and improvement of the FCRM assets estimating a PVc of £4.3M, resulting in a very high BCR. There is low sensitivity to climate change scenarios, as whilst the potential PVb would vary between £281-560M and PVc between £3.1-9.1M, the BCR would still be well above unity with potential for FDGiA funding. The environmental assessment identified that Improve would be the preferred option on the grounds of continuing protection to the built environment of Exmouth.

As such, the draft HLOs are Improve in the short term, with Sustain in the medium to long term, to continue the increased SoP into the future regardless of climate change scenario.

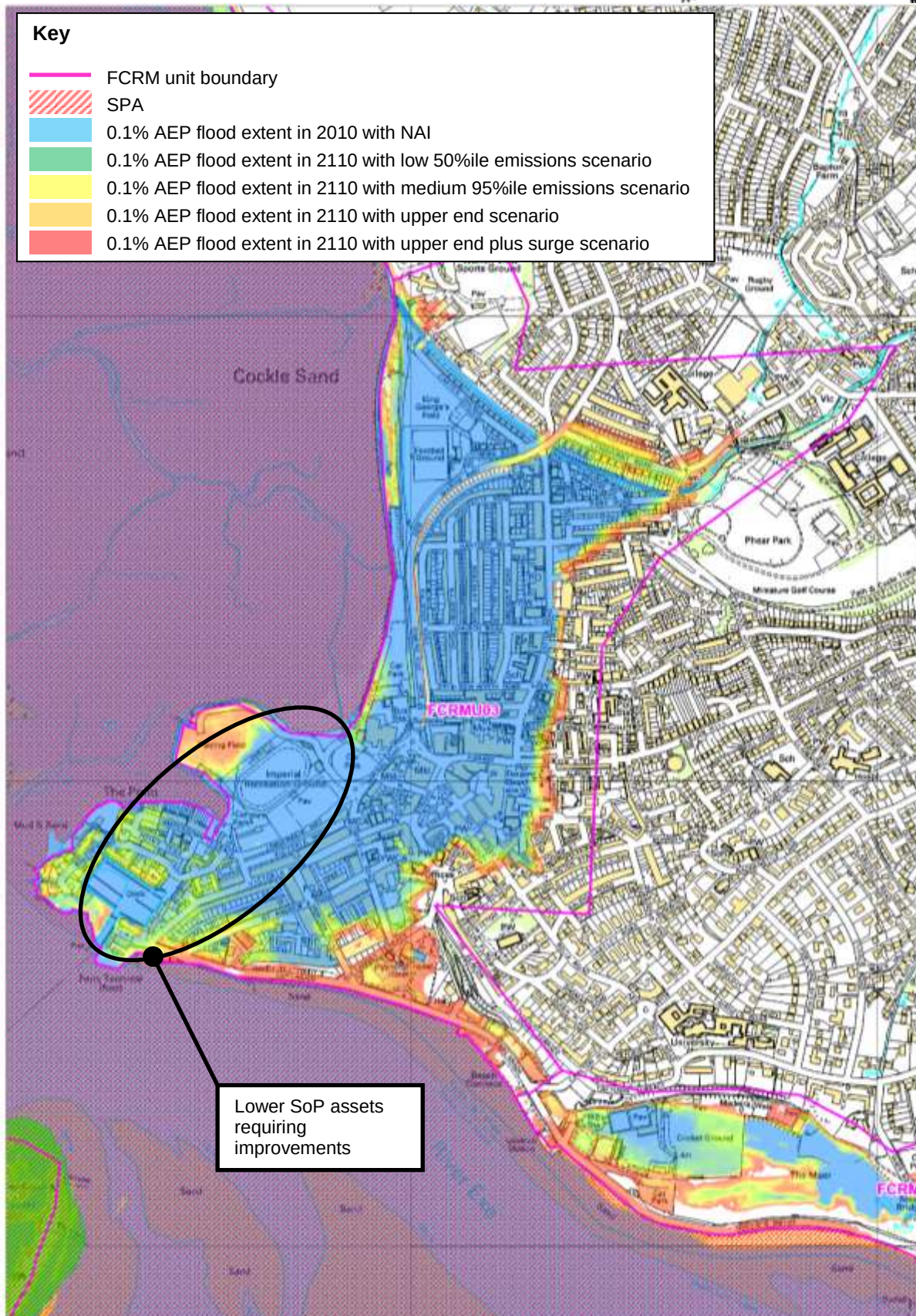
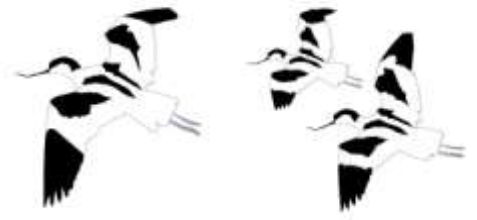


Figure 3.3 – Exmouth.



3.8 Courtlands, Lypstone Commando and Exton

The FCRM unit of Courtlands is bounded by Withycombe Brook to the south and near Sowden Lane to the north, whilst the FCRM units of Lypstone Commando and Exton are bounded by Nutwell Park to the south and the mouth of the Lower Clyst to the north. These FCRM units, whilst having separate flood risk issues, are socio-economically linked due to the branchline railway forming the de facto FCRM asset along the majority of the shoreline. The area of interest is shown in Figure 3.4. Flood and coastal risk to the human environment is focussed predominantly on the railway line itself, with an existing breach SoP of above 0.1% AEP. The maximum potential PVb, over 90% of which relates to the railway line itself, is estimated as a total of £22M, with a broad level costing for maintenance and improvement of the FCRM assets estimating a PVc of £1.2M, resulting in a BCR well above unity. There is low sensitivity to climate change scenarios, as the potential PVb varies between £22-24M and PVc between £1-3M, with the BCR remaining above unity. The environmental assessment identified that Improve and Maintain would be the preferred options on the grounds of continuing protection to the branchline railway and high quality agricultural land.

Early discussion with Network Rail has identified the potential issue of limited FDGiA funding, relating to their view that the railway line would be engineered to continue to have a high SoP. This may require non-central funding and contributions to be implemented.

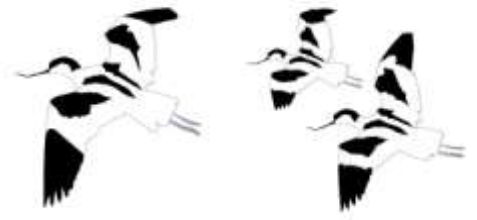
As such, the draft HLOs of Maintain in the short to medium term and then Sustain in the long term, to continue the existing high SoP into the future regardless of climate change scenario.



Key

- FCRM unit boundary
- ▨ SPA
- 0.1% AEP flood extent in 2010 with NAI
- 0.1% AEP flood extent in 2110 with low 50%ile emissions scenario
- 0.1% AEP flood extent in 2110 with medium 95%ile emissions scenario
- 0.1% AEP flood extent in 2110 with upper end scenario
- 0.1% AEP flood extent in 2110 with upper end plus surge scenario

Figure 3.4 – Courtlands, Lymington Commando and Exton.



3.9 Lympstone

The FCRM unit of Lympstone is bounded near Sowden Lane to the south and Nutwell Park to the north. The area of interest is shown in Figure 3.5. Flood risk to the human environment is relatively low due to the recent construction of tidal flood gates and associated wall improvements, with an existing breach SoP of 1% AEP. The associated maximum potential PVb is estimated at £21M, with broad level costing estimating a PVc of £0.3M for maintaining and improving the FCRM assets, resulting in a very high BCR. There is low sensitivity to climate change scenarios, as whilst the potential PVb would vary between £13-29M and PVc between £0.2-0.8M, the BCR would still be well above unity, with potential for FDGiA funding.

This area is also influenced by the future management of Dawlish Warren sandspit; if the distal section flattens towards 2060 the increased extreme wave and tide climate may require small scale further FCRM asset improvements. The environmental assessment identified that Maintain, Sustain and/or Improve would be the preferred options on the grounds of continuing protection to the built environment of Lympstone.

Early discussions with Devon County Council have identified that any potential management of FCRM assets would preferably continue to manage flood risk to the branchline railway and cycleway

As such, the draft HLOs are Maintain or Sustain in the short term, with Sustain in the medium to long term, to continue the existing SoP into the future regardless of climate change scenario.

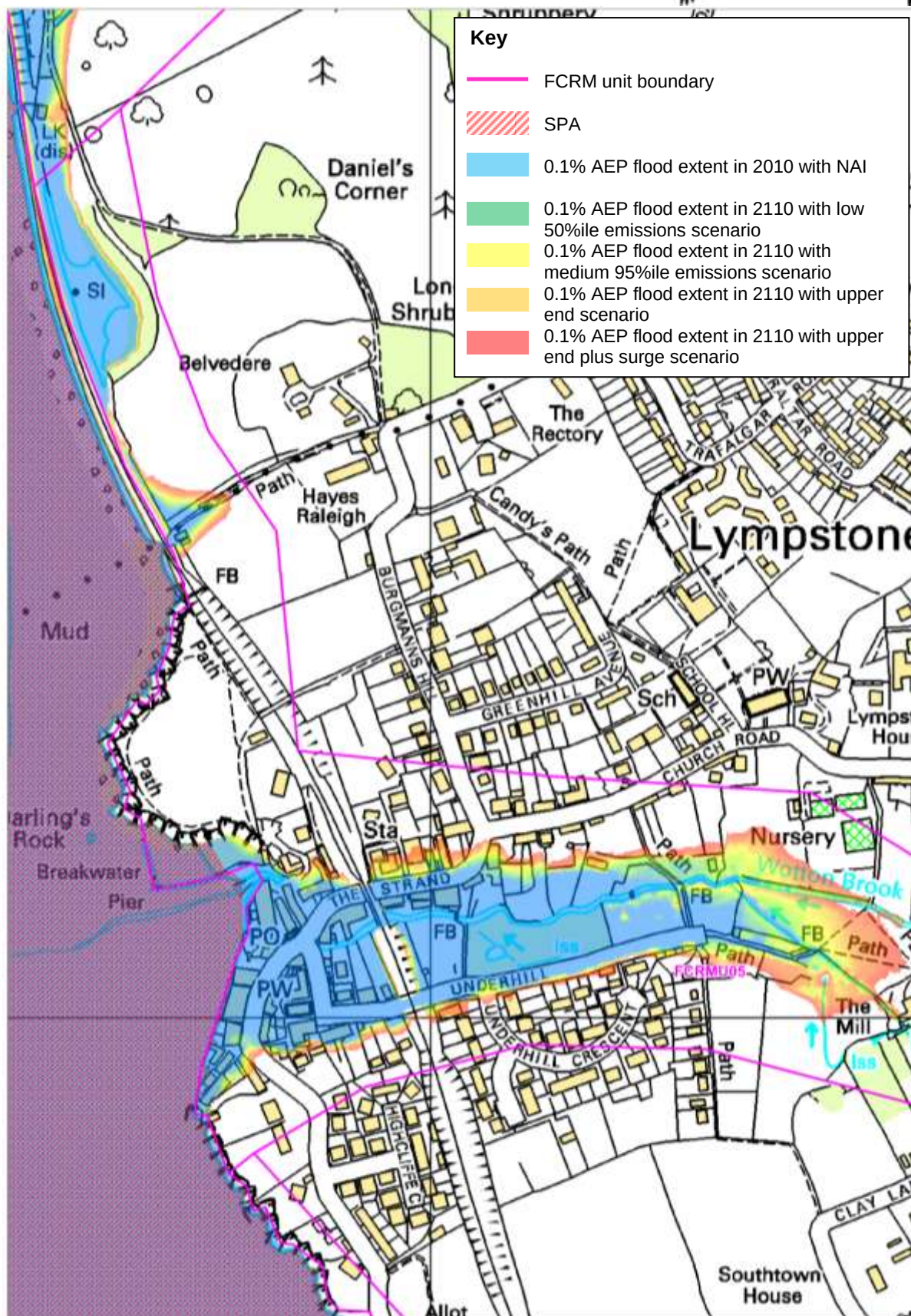
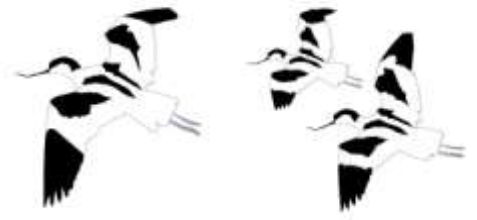


Figure 3.5 – Lymington.



3.10 The east bank of the Lower Clyst

The FCRM unit relating to the east bank of the Lower Clyst is bounded by the mouth of the Lower Clyst in the south and the Frying Pan to the north. The area of interest is shown in Figure 3.6. Flood risk to the human environment is dominated by tidal processes, and is relatively high with an existing breach SoP of 20% AEP. The associated maximum potential PVb is estimated at £4.9M, with broad level costing estimating a PVc of £5.0M for maintaining and improving the FCRM assets, resulting in a BCR around unity. There is low sensitivity to climate change scenarios, as whilst the potential PVb would vary between £3.8-7.2M and PVc between £4.6-7.1M, the BCR would still be around unity with low potential for FDGiA funding.

This area was identified (AHA, 2010) as providing good short term potential for intertidal habitat creation to offset habitat change caused by FCRM assets elsewhere in the Exe Estuary. The environmental assessment identified that Manage in the short term, and then Improve in the medium to long term, would be the preferred options on the grounds of enabling a naturally functioning system and intertidal habitat creation, whilst protecting the C527 road and local properties. Modelling of potential realignment (Appendix D) has identified that there could be associated erosion risks at the mouth of the Clyst which could specifically impact on the road and rail bridge abutments. The requirement for erosion protection around the bridge abutments will be assessed at the next option stage.

Early discussions with Devon County Council have suggested that the investment required for an extensive scheme would require a compelling economic case, and have identified that any potential realignment of FCRM assets would preferably continue to manage flood risk to the branchline railway and cycleway. In addition to this, the potential issue of limited FDGiA funding has identified the need for non-central funding and contributions to enable intervention.

As such, the draft HLOs are Manage (whilst protecting the C527 road and local properties) in the short term, and then Sustain along a realigned position in the medium to long term.

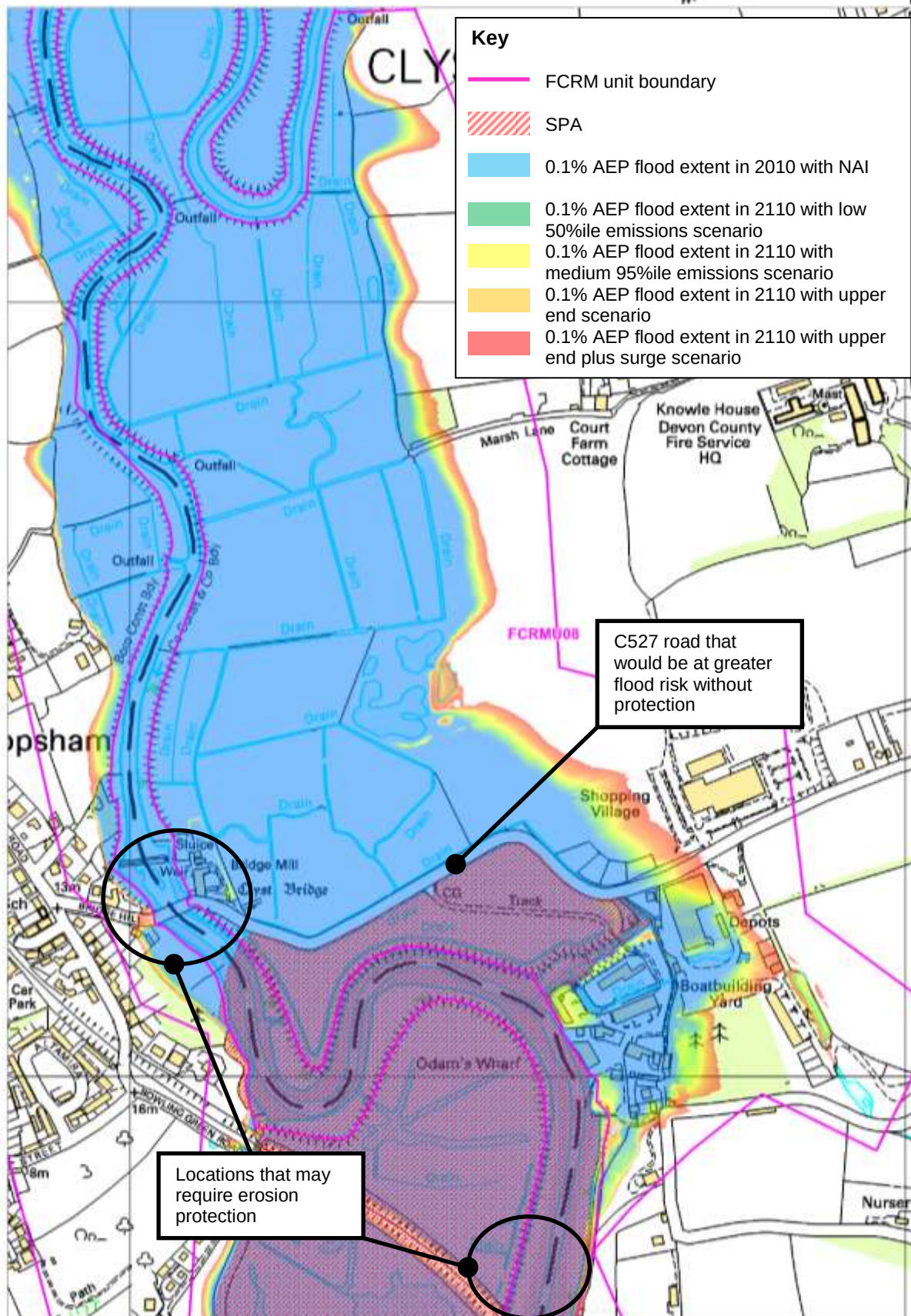
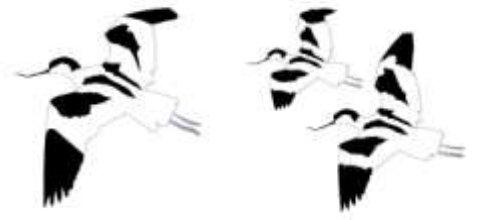


Figure 3.6 – The east bank of the Lower Clyst.



3.11 Clyst St. Mary

The FCRM unit relating to Clyst St. Mary is bounded by the Frying Pan to the south and the extent of tidal flooding dominance to the north. The area of interest is shown in Figure 3.7. Flood risk to the human environment is caused by both tidal and fluvial processes. To the south of the Grindle Brook, flood risk is relatively high with an existing breach SoP of 20% AEP. North of the Grindle Brook, flood risk from tidal events is low (existing breach SoP of 0.1% AEP), whilst flood risk to Frog Lane and surrounding properties from fluvial events is higher, with flooding occurring during the floods of November 2012. The associated maximum potential PVb is estimated at £4.0M, with broad level costing estimating a PVc of £1.3M for maintaining and improving the FCRM assets, resulting in a BCR above unity. There is significant sensitivity to climate change scenarios, as the potential PVb would vary between £1.0-13.7M and PVc between £0.9-2.8M, resulting in variable BCR and potential FDGiA funding. This is dependent on the level of risk in the medium to long term for properties located along and near Frog Lane, as well as the A376.

This area was identified (AHA, 2010) as providing good potential for brackish habitat creation to offset habitat change caused by FCRM assets elsewhere in the Exe Estuary, although further consideration of ecological functionality issues at the next options stage is required. The environmental assessment identified that Manage in the short term, and then Improve in the medium to long term, would be the preferred options on the grounds of enabling a naturally functioning system and intertidal habitat creation, whilst protecting the A376 and properties located around Frog Lane.

Early discussions with Devon County Council have identified the potential issue of limited FDGiA funding, and the need for non-central funding and contributions to enable any intervention.

As such, the draft HLOs in the short to long term are NAI or Manage to the south of Grindle Brook (relating to lack of economic justification for management, and ecological functionality issues), and Maintain and/or Sustain to the north of Grindle Brook (relating to risks locally around Frog Lane and the A376). The preferred option out of these HLOs will be determined at the next options stage.

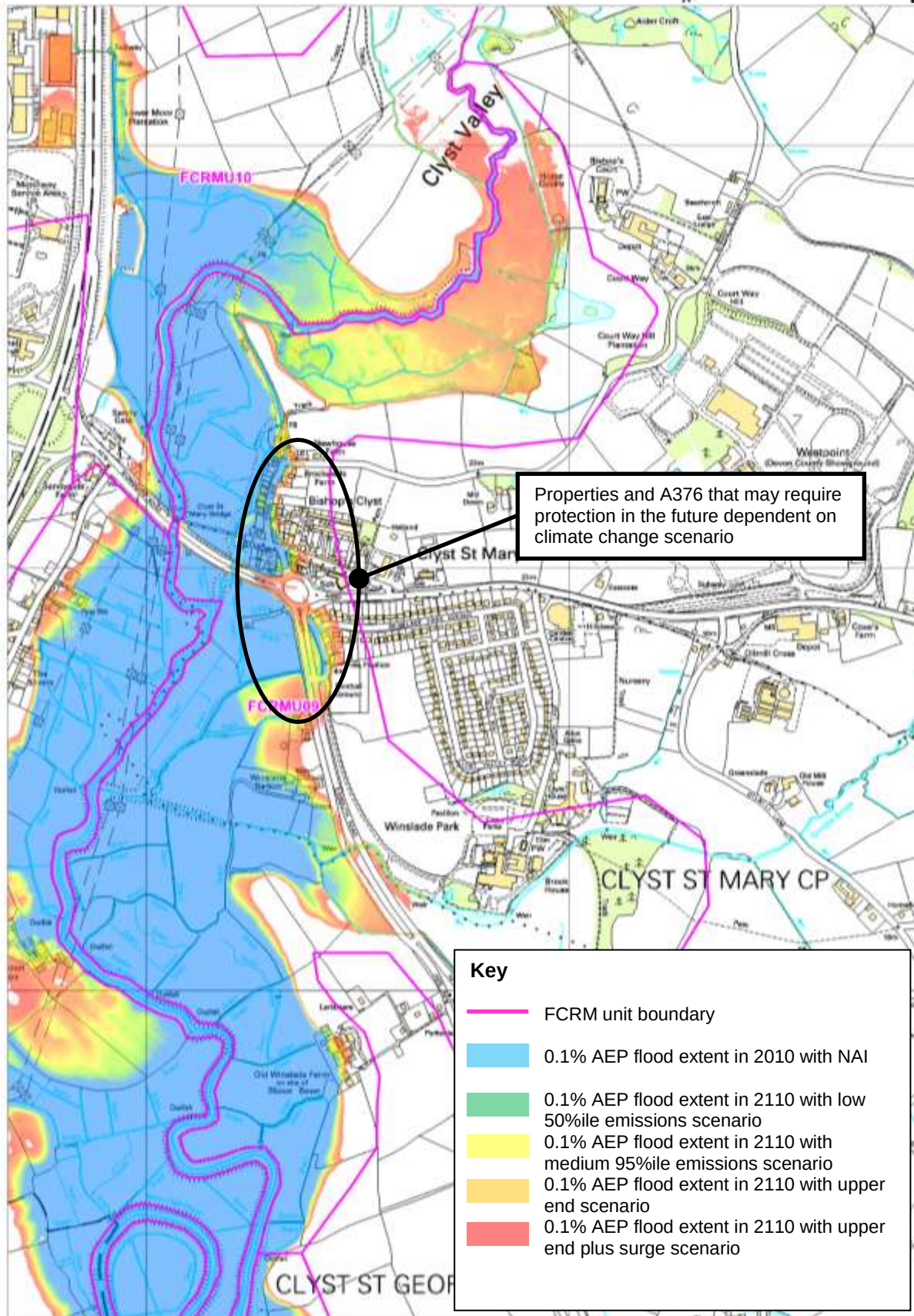
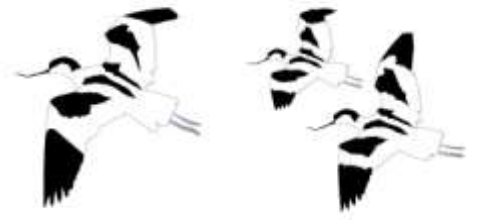


Figure 3.7 – Clyst St. Mary.



3.12 West bank of the Lower Clyst

The FCRM units relating to the west bank of the Lower Clyst are bounded by the extent of tidal flooding dominance to the north and near Bowling Green Road to the south. The area of interest is shown in Figure 3.8. Flood risk to the human environment is low with a variable existing breach SoP and very limited assets at risk. The associated maximum potential PVb is estimated at £0.7M, with a broad level costing estimating a PVc of £1.6M for maintaining and improving the FCRM assets, resulting in a BCR below unity. There is low sensitivity to climate change scenarios, as whilst the potential PVb would vary between £0.7-3.2M and PVc between £1.1-3.7M, the BCR would still be below unity. This area was identified (AHA, 2010) as providing good short term potential for saline and brackish habitat creation to offset habitat change caused by FCRM assets elsewhere in the Exe Estuary, although further consideration of ecological functionality issues is required at the next options stage, particularly relating to Bowling Green Marsh and the Goosemoor reserve. The environmental assessment identified that Manage in the short term, and then Improve along a realigned position in the medium to long term, would be the preferred options on the grounds of enabling a naturally functioning system and intertidal habitat creation, although again noting that further consideration would be required at Bowling Green Marsh.

Early discussions with Devon County Council have identified that any potential realignment of FCRM assets would preferably continue to manage flood risk to the branchline railway and cycleway. In addition to this, the potential issue of limited FDGiA funding has identified the need for non-central funding and contributions to enable intervention. Further early discussions with Natural England and RSPB have highlighted the sensitive nature of the Bowling Green Marsh and Goosemoor areas, and the need to consider their ecological functionality in the context of the wider SPA designated site.

As such, the draft HLOs are NAI, Maintain (relating to Bowling Green Marsh) or Manage. The preferred option out of these HLOs will be determined at the next options stage.

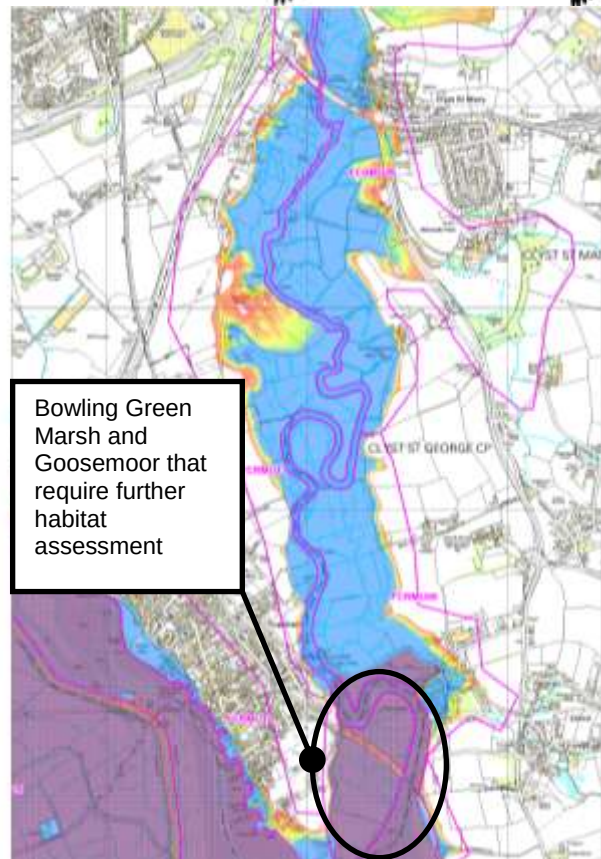
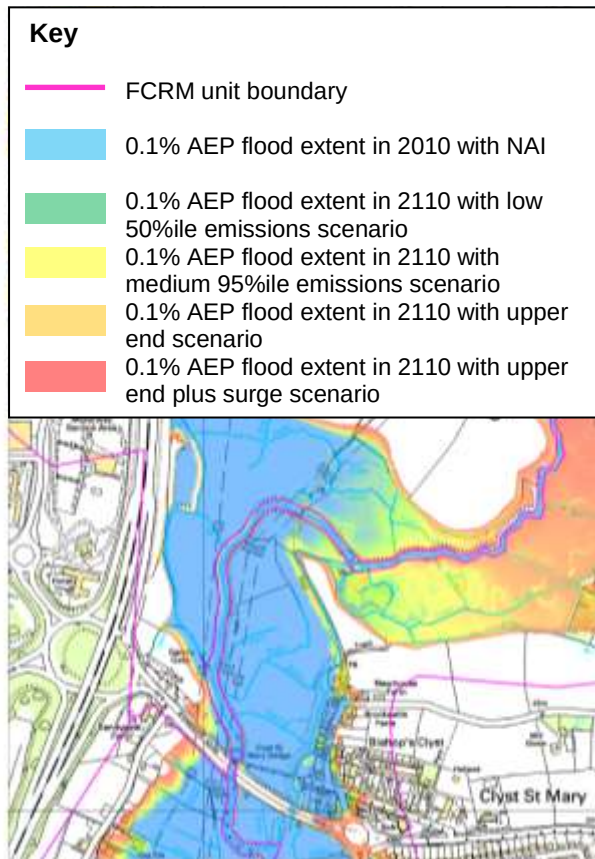
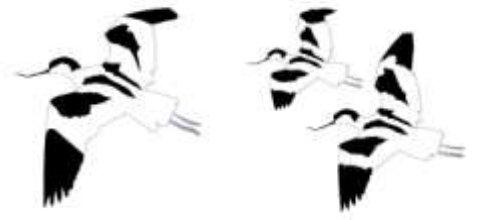


Figure 3.8 – West bank of the Lower Clyst.



3.13 Topsham and Countess Wear

The FCRM units relating to Topsham and Countess Wear are bounded near Bowling Green Road in the east and St. James Weir to the north. The area of interest is shown in Figure 3.9. Flood risk to the human environment is high but spatially constrained with a variable existing breach SoP.

For Topsham, the associated maximum potential PVb is estimated at £16M, with broad level costing estimating a PVc of £7.0M for maintaining and improving the FCRM assets, resulting in a BCR above unity. There is some sensitivity to climate change scenarios, as the potential PVb would vary between £7-45M and PVc between £6.7-8.7M, with the BCR and potential for FDGiA funding varying. The environmental assessment identified that Maintain and Improve would be the preferred options on the grounds of continuing protection to the built environment of Topsham.

As such, the draft HLOs are Sustain or Improve in the short term, and Sustain into the medium to long term.

For Countess Wear (including the sewage treatment works), the associated maximum potential PVb is estimated at £0.9M, with broad level costing estimating a PVc of £1.0M for maintaining and improving the FCRM assets, resulting in a BCR around unity. There is sensitivity to climate change scenarios, as the potential PVb would vary between £0.3-8.9M and PVc between £0.7-2.3M, with the BCR and potential for FDGiA funding varying significantly. The in-channel islands in this area were identified (AHA, 2010) as providing good short term potential for saline and brackish habitat creation to offset habitat change caused by FCRM assets elsewhere in the Exe Estuary, although further consideration of ecological functionality issues is required. The environmental assessment identified that Maintain, Manage and/or Improve would be the preferred options on the grounds of continuing protection to the limited built environment at risk, whilst enabling a naturally functioning system and intertidal habitat creation.

Early discussions with Exeter City Council have identified the potential issue of limited FDGiA funding, and the need for non-central funding and contributions to enable any intervention. Early discussions with Devon County Council have indicated that implications and investment for non strategic highways would require a good economic case to be made to be justified.

As such, the draft HLOs are Sustain in the short to long term (referring to Countess Wear and the sewage treatment works), with potential for Manage at the in-channel islands (to be determined at the next options stage).

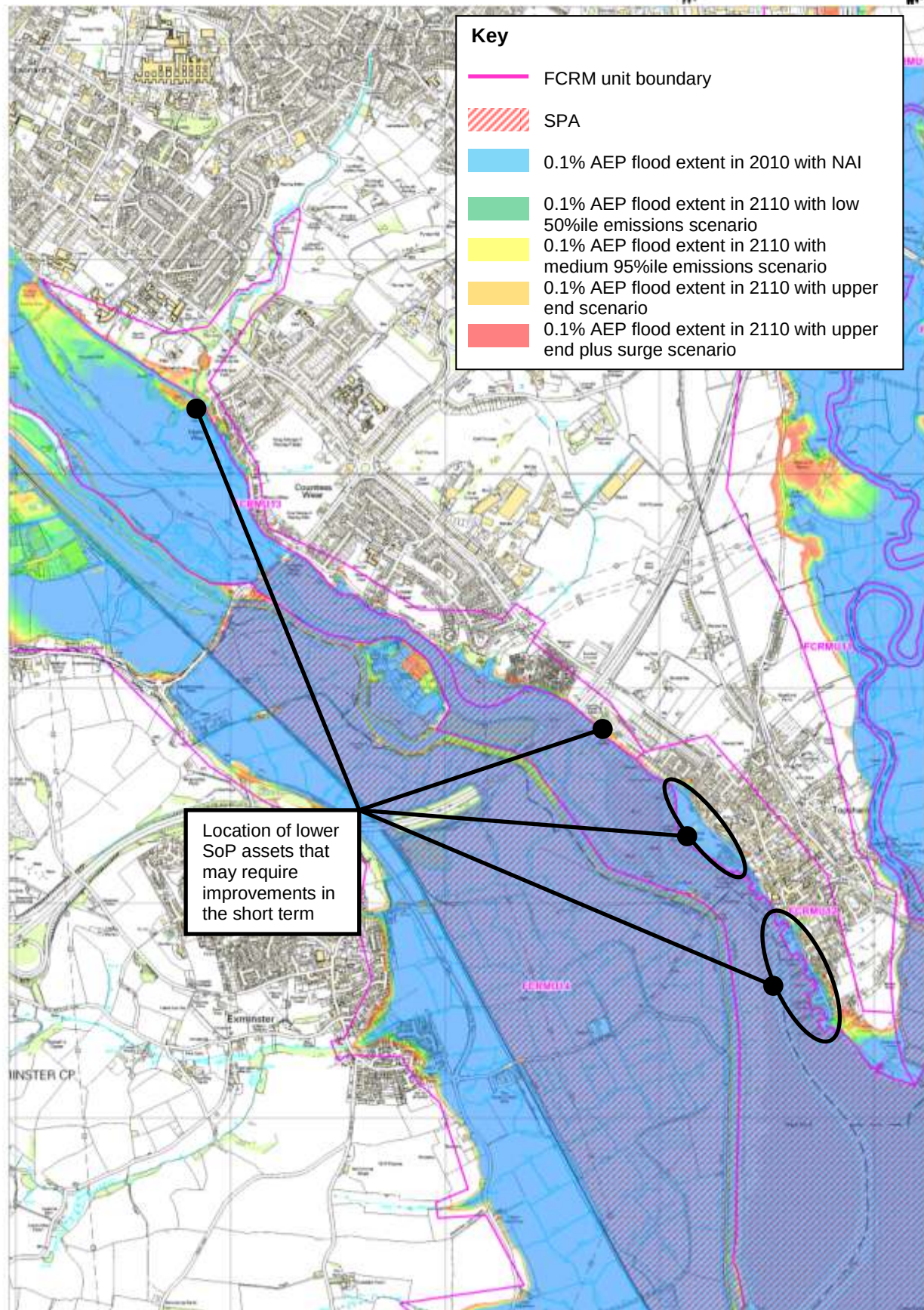
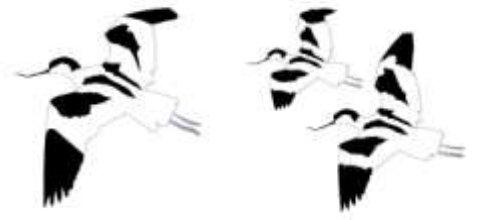


Figure 3.9 – Topsham and Countess Wear.



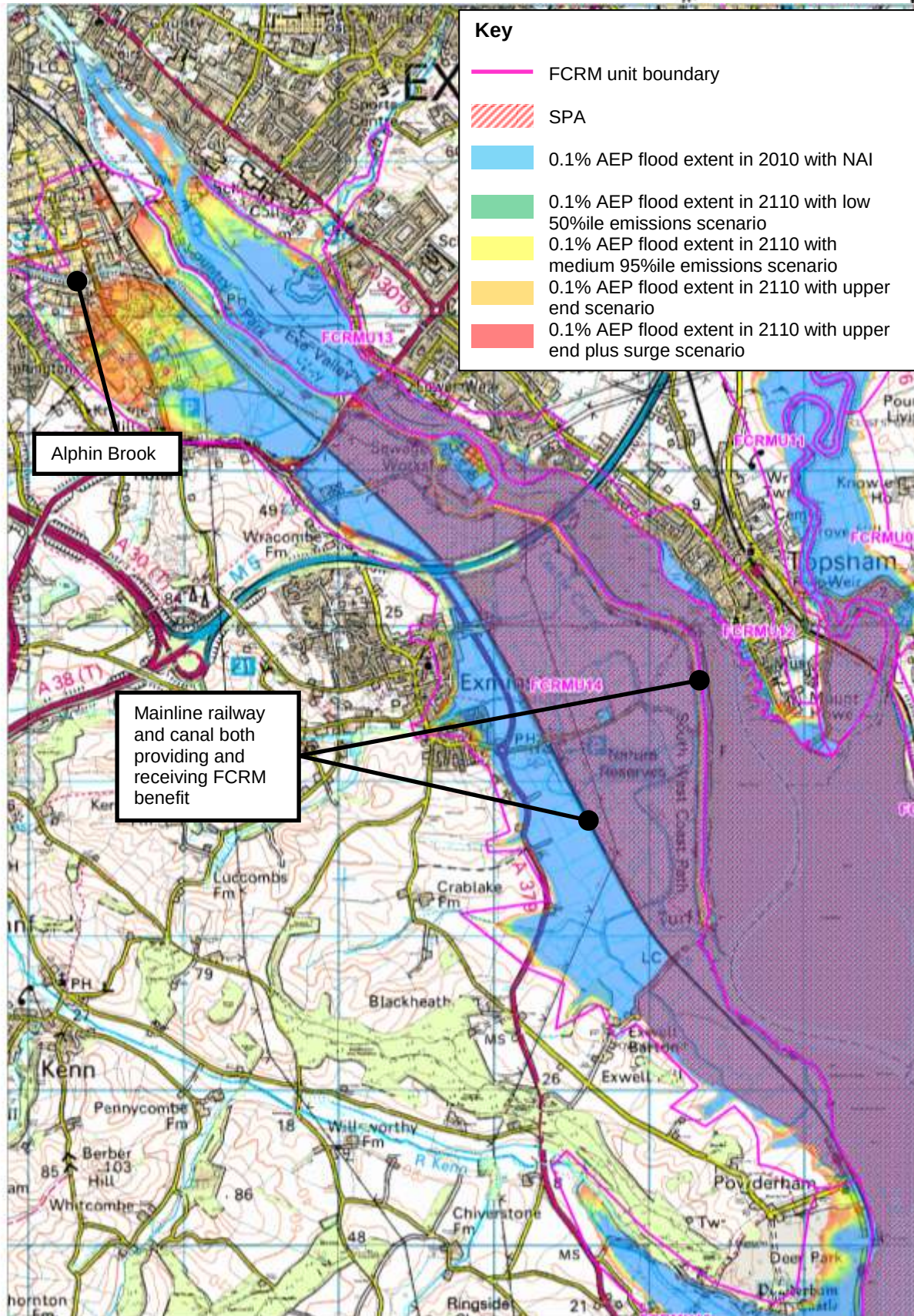
3.14 Exminster Marshes and Powderham Banks

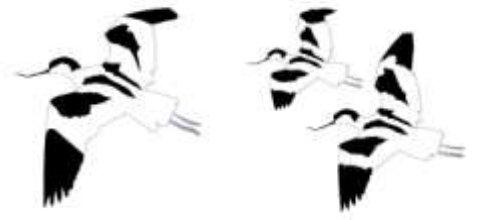
The FCRM unit of Exminster is bounded by St. James Weir to the north and the hamlet of Powderham to the south. The area of interest is shown in Figure 3.10. Flood risk to the human environment is relatively low with an existing breach SoP of 0.1% AEP (and a local weak spot with 2% AEP towards Powderham Banks). The associated maximum potential PVb is estimated at £37M, 26% of which relates to the mainline railway, with broad level costing estimating a PVc of £2.0M for maintaining and improving the FCRM assets, resulting in a high BCR. There is low sensitivity to climate change scenarios, as whilst the potential PVb would vary between £27-97M and PVc between £1.2-5.1M, the BCR would still be well above unity, with potential for FDGiA funding.

This area was identified (AHA, 2010) as providing good potential for intertidal habitat creation to offset habitat change caused by FCRM assets elsewhere in the Exe Estuary, although further consideration of ecological functionality issues is required. Modelling of potential realignment (Appendix D) has identified that there could be associated erosion risks at any controlled local breach of the banks, which could specifically impact on the surrounding embankments. The requirement for erosion protection around any controlled local breach will be assessed at the next option stage. The environmental assessment identified that Manage in the short term, then Improve on a realigned position, would be the preferred options on the grounds of continuing protection to the limited built environment at risk, whilst enabling a naturally functioning system and intertidal habitat creation.

Early discussions with Exeter City Council, Devon County Council and Network Rail have identified the potential issue of contributions relating to the benefit that FCRM provides to the cycleway, canal and mainline railway, as well as the lengthy planning period required to set out railway improvements, which could influence the timing of any potential realignment. In addition to this, discussions with the Environment Agency and Exeter City Council have identified the need to consider any impact that may occur to the Alphin Brook flood storage scheme if managed realignment occurred, and also the flood risks related to catastrophic emptying of the canal if a breach occurred. These issues will be considered at the next options stage as necessary. Furthermore, early discussions with Devon County Council have identified that any potential realignment of FCRM assets would preferably continue to manage flood risk to the mainline railway and cycleway.

As such, the draft HLOs are Sustain in the short to long term, to continue the existing SoP into the future regardless of climate change scenario. There is potential for Manage towards the long term, dependent on determining ecological functionality issues at the next options stage.





3.15 Kenn Valley

The FCRM unit of Kenn Valley is bounded by the village of Powderham to the north and Southtown Road to the south. The area of interest is shown in Figure 3.11. Flood risk to the human environment is relatively low with an existing breach SoP of 0.1% AEP. The associated maximum potential PVb is estimated at £11M, 70% of which relates to the mainline railway, with broad level costing estimating a PVc of £0.6M for maintaining and improving the FCRM assets, resulting in a high BCR. There is low sensitivity to climate change scenarios, as whilst the potential PVb would vary between £10-15M and PVc between £0.3-1.5M, the BCR would remain well above unity.

This area was identified (AHA, 2010) as providing some potential for intertidal habitat creation to offset habitat change caused by FCRM assets elsewhere in the Exe Estuary, although further consideration of ecological functionality issues is required. This area is also influenced by the future management of Dawlish Warren sandspit; if the distal section flattens towards 2060 the increased extreme wave and tide climate may require small scale further FCRM asset improvements. The environmental assessment identified that Manage in the short term, then Improve on a realigned position, would be the preferred options on the grounds of enabling a naturally functioning system and intertidal habitat creation, whilst continuing protection to the built environment at risk.

Early discussion with Network Rail has identified the potential issue of limited FDGiA funding, relating to their view that the railway line would be engineered to continue to have a high SoP. This may require non-central funding and contributions to enable interventions. Similarly, the future management of Dawlish Warren sand spit could influence the timing and extent of any railway improvements, in relation to the lengthy planning period required to set out railway improvements.

As such, the draft HLOs are Maintain in the short term, and Sustain in the medium to long term, to continue the existing SoP into the future regardless of climate change scenario. There is potential for Manage whilst continuing protection to the built environment, dependent on determining ecological functionality issues at the next options stage.

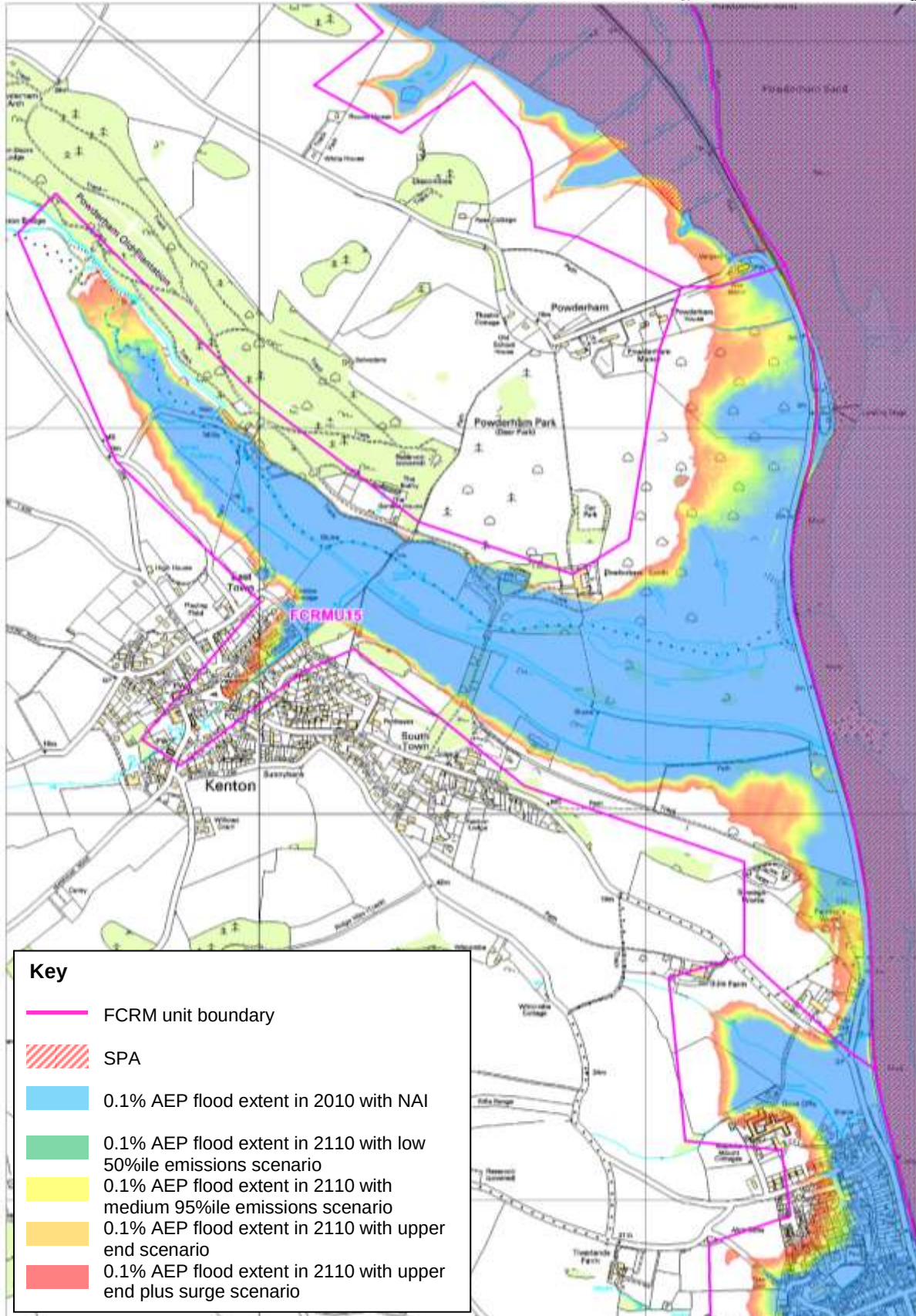
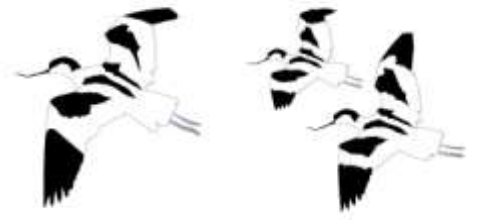


Figure 3.11 – Kenn Valley.



3.16 Starcross

The FCRM unit of Starcross is bounded by Southtown Road to the north and near School Hill to the south. The area of interest is shown in Figure 3.12. Flood risk to the human environment is relatively low with an existing breach SoP of 0.1% AEP (although there is a local weak spot with 4% AEP at Cockwood Harbour). The associated maximum potential PVb is estimated at £146M, 12% of which relates to the mainline railway, with broad level costing for FCRM asset improvement estimating a PVc of £0.6M for maintaining and improving the FCRM assets, resulting in a high BCR. There is low sensitivity to climate change scenarios, as whilst the potential PVb would vary between £112-205M and PVc between £0.3-1.5M, the BCR would still be very high, with potential for FDGiA funding.

This area is also influenced by the future management of Dawlish Warren sandspit; if the distal section flattens towards 2060 the increased extreme wave and tide climate may require significant further FCRM asset improvements. The environmental assessment identified that Improve would be the preferred option on the grounds of continuing protection to the built environment of Starcross.

Early discussion with Network Rail has identified the potential issue that the future management of Dawlish Warren sand spit could influence the timing and extent of any railway improvements, in relation to the lengthy planning period required to set out railway improvements.

As such, the draft HLOs are Sustain or Improve in the short term, and Sustain in the medium to long term.

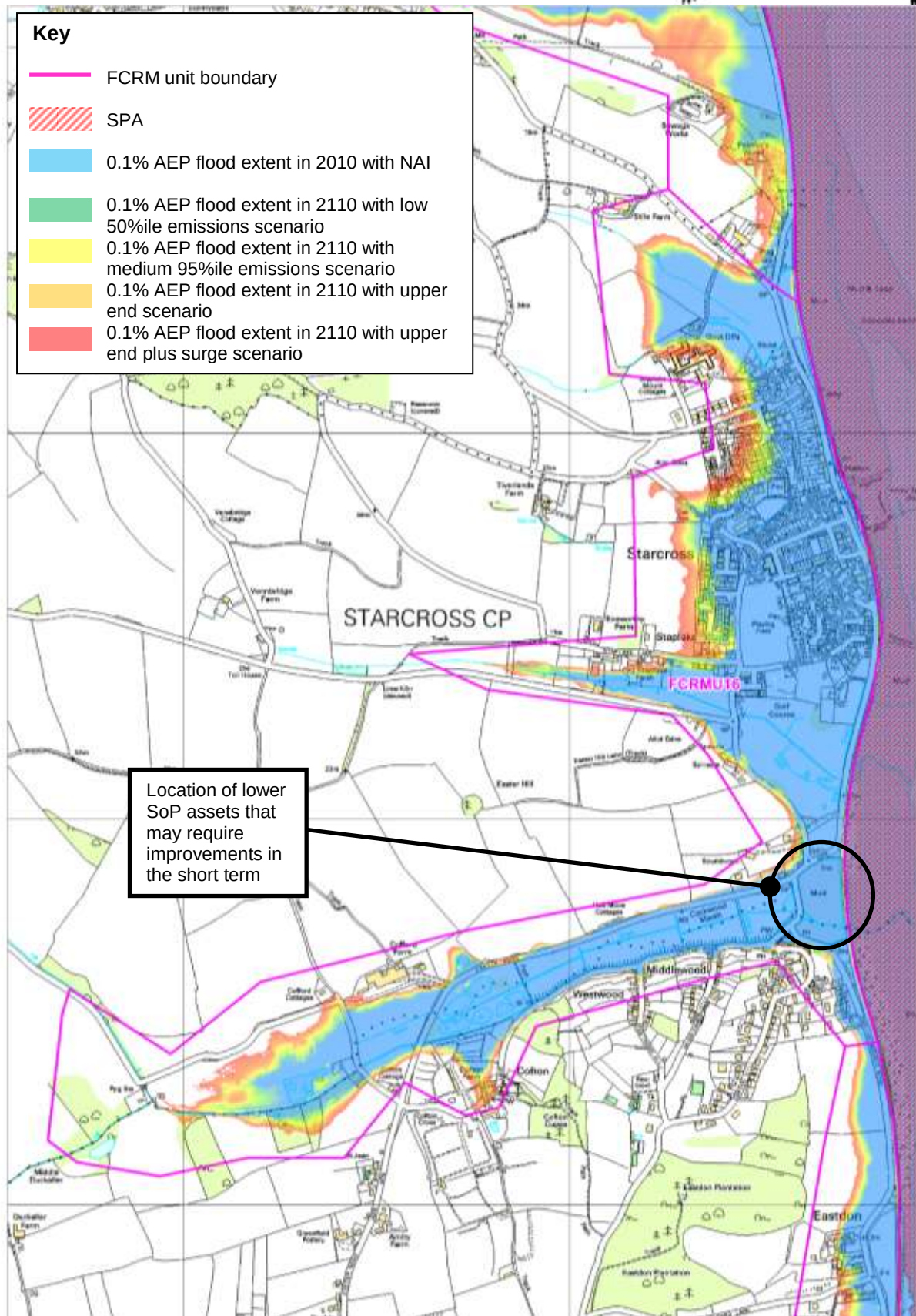
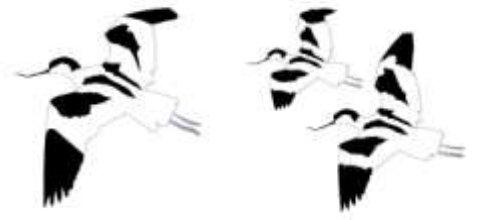


Figure 3.12 – Starcross.



3.17 Dawlish Warren

The FCRM unit of Dawlish Warren is bounded near School Hill to the north, and Langstone Rock and groyne to the south. The area of interest is shown in Figure 3.13. Flood risk to the human environment is variable with an existing breach SoP between 4-0.1% AEP. The associated local maximum potential PVb is estimated at £13M, 25% of which relates to the mainline railway, with broad level costing estimating a PVc of £2.4M for maintaining the FCRM assets specifically relevant to managing flood risk to Dawlish Warren village. There is some sensitivity to climate change scenarios, as the potential PVb would vary between £8-25M and PVc between £1.6-5.4M, with the result that the BCR would vary above unity, with variable potential for FDGiA funding.

However, Dawlish Warren sand spit provides a FCRM benefit to the wider Exe Estuary. If these socio-economic benefits are included, the estuary-wide maximum potential PVb is estimated at £93M (AHA, 2012). Continuation of the sand spit FCRM function, including for beach recharge-recycling and groyne maintenance, would result in a broad level PVc of up to £23M. This indicates that the BCR could be above unity, but would still have variable potential for FDGiA funding. However, in addition this option may also require sand dune habitat compensation, which could cost of the order of £10M, and more importantly would be extremely difficult to physically achieve in practice. Alternatively, NAI of the existing FCRM assets along the sand spit in the short term would have a significantly lower PVc of less than £10M and potentially have reduced sand dune compensation requirements, but would achieve no estuary-wide FCRM benefit. The environmental assessment identified a similar scale of uncertainty.

Early discussion with Teignbridge District Council have identified that flood risk to Dawlish Warren village should not be increased, and that any strategic options developed should integrate with the Dawlish Warren and Exmouth beach recharge study.

In summary, consideration of the Dawlish Warren FCRM unit as a whole does not indicate a clear preferred option at HLO stage. However, in the medium to long term it is apparent that Maintain and Improve would not be preferred HLOs. This is because with maintenance, the FCRM assets would have very limited FCRM benefit (with SoPs still reducing to less than 10% AEP after 2030), and be progressively physically difficult to achieve as asset failure becomes more frequent. Conversely, if significant improvements are not made in the short term then the significant opportunity for FCRM benefit would be missed, resulting in much less efficient FCRM investment if the Improve HLO was pursued in the medium to long term.

In light of this uncertainty the options will be considered further at a more detailed scale at the next options stage. To support this process the Dawlish Warren FCRM unit has been split into the sub-sections, identified in Figure 3.13, defined as the proximal (headland to groyne 2), central seaward facing (groyne 2 to 12), neck (groyne 12-14), distal (groyne 14 north-eastwards) and central estuary facing (whole of inner face except distal section).

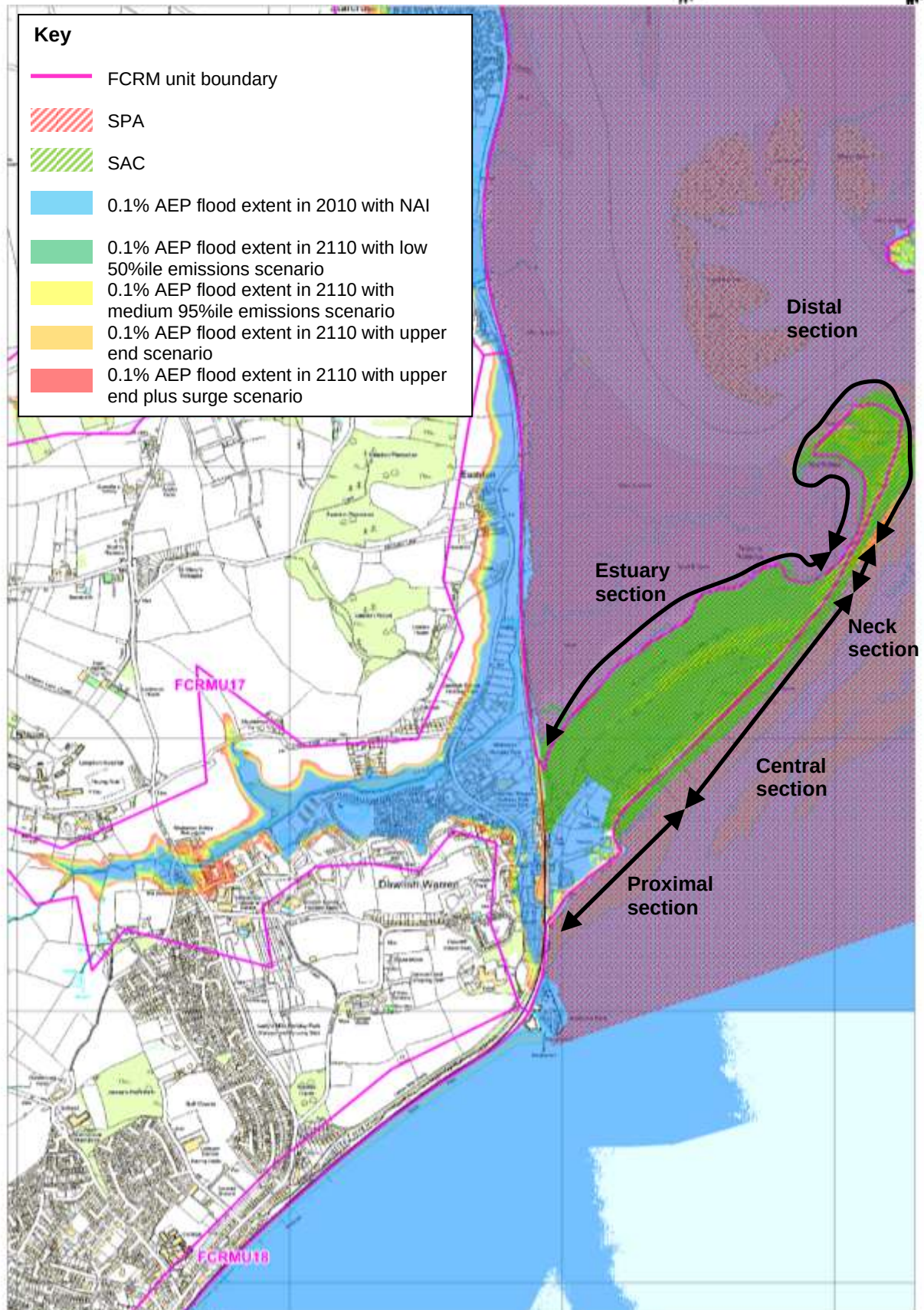
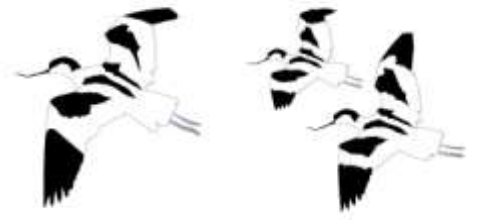


Figure 3.13 – Dawlish Warren.



3.18 Dawlish to Holcombe

The FCRM unit of Dawlish to Holcombe is bounded by Langstone Rock and groyne to the east and Holcombe to the west. The area of interest is shown in Figure 3.14. Flood risk to the human environment is present with an existing breach SoP of 4% AEP. The associated maximum potential PVb is estimated at £21M, 84% of which relates to the mainline railway, with broad level costing estimating a PVc of £3.1M for maintaining and improving the FCRM assets, resulting in a high BCR. There is some sensitivity to climate change scenarios, as the potential PVb would vary between £3-34M and PVc between £3-5M, with variable BCR and potential FDGiA funding.

The environmental assessment identified that NAI would be the preferred option on the grounds of enabling natural processes and benefitting geological conservation features, although consideration would be required for protection to the mainline railway.

Early discussion with Network Rail has identified the potential issue of limited FDGiA funding, with the view that the railway line would be engineered to continue to have a high SoP. This may require non-central funding and contributions to be implemented.

As such, the draft HLOs are Sustain or Improve in the short term and then Sustain in the medium to long term.

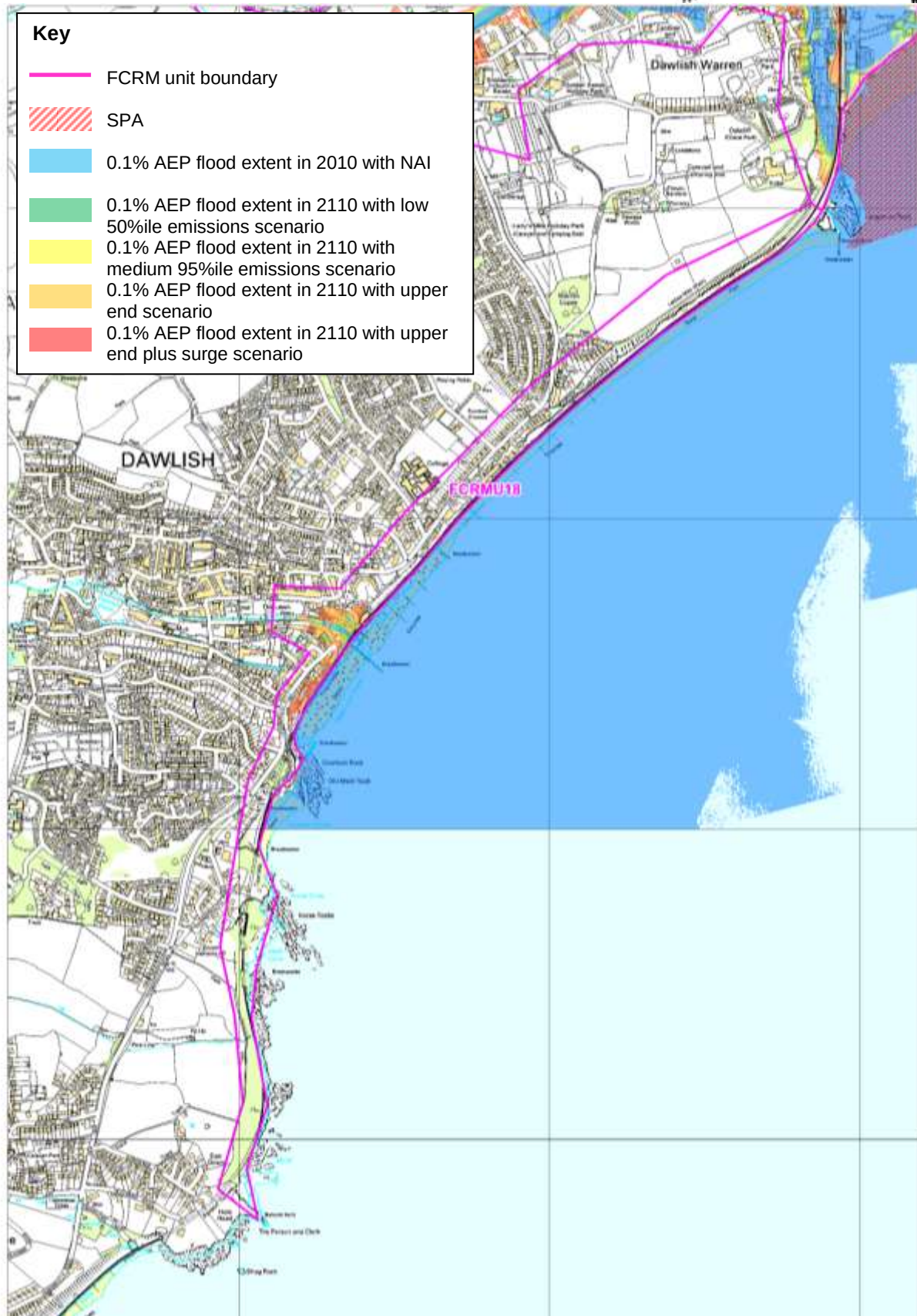
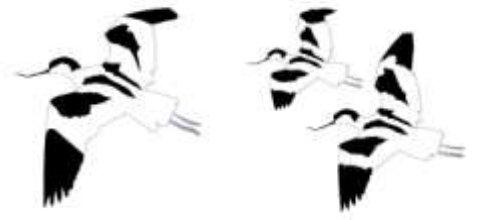
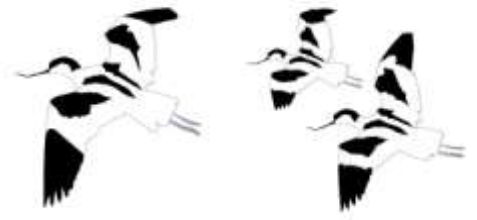


Figure 3.14 – Dawlish to Holcombe.



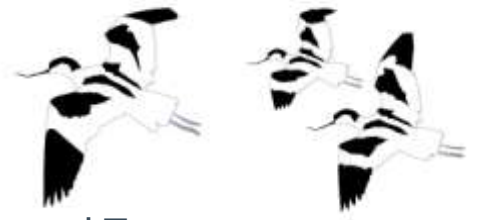


4. Alignments and Types

4.1 Introduction and Range of Alignments and Types

The preferred High Level Options were used as the starting point for considering Alignments and Types of FCRM intervention. The range of alignments is defined by whether the preferred High Level Policies include Manage FCRM or not. With Manage FCRM, potential alignments and related non-structural methods, if relevant, were considered. With other High Level Options, there is minimal choice in the alignment. The range of types considered as relevant was as given below:

- Do Nothing.
- Monitoring, covering the full range of potential techniques.
- Flood and coastal risk awareness, including education, forecasting and warning.
- Land management, relating to development control, agricultural practice and also aggregate dredging.
- Maintenance, covering both reactive and proactive activities.
- Soft or hard foreshore management, such as sediment recharge and recycling, and methods such as polders to accrete sediment, and also groynes, breakwaters, toe protection and similar works.
- Improvements to existing assets, relating to optimising the geometry, or reinforcement, to improve SoP.
- New linear assets, covering the full range of potential new capital works from earth embankments to heavily engineered revetments and walls.
- Secondary assets, relating to secondary alignment structures. These would tend to be less heavily engineered as they would not be completely exposed to the extreme climate.
- Point structures, relating to refurbishment and improvement of pumping stations, outfalls, RTE or breaches.
- Demountable or temporary defences.
- Property resilience of any description.
- Flow control, to slow or speed conveyance to reduce flood risk.
- Flood storage.
- Drainage improvements, such as SUDs and ditches.



4.2 Methodology for Assessment of Alignments and Types

Alignments and Types were assessed at a sub-reach level via:

- High Level Option context. This set the direction of FCRM activity at a FCRM unit level. Where High Level options were not resolved previously, further work was undertaken to provide greater certainty.
- Present day and future level of flood risk and erosion pressure for sub-reaches within FCRM units. This indicated whether and when there was any technical need to consider FCRM improvements. Within each FCRM unit different sub-reaches will require different levels of activity to provide a consistent SoP, dependent on the specific SoP for each sub-reach. The range of generic types of FCRM were also assessed based on the local context and the ability and appropriateness of the solution type in addressing the flood and coastal risk driver.
- Most appropriate alignment for environmental (habitat) reasons, and FCRM where secondary alignments were considered. This investigated potential realignments related to habitat creation for each site identified at the High Level Options stage. In addition to this, secondary alignments (in conjunction with existing 'primary' alignments) were investigated where relevant. A habitat balance account was kept for this stage, to ensure that at an estuary wide level the preferred alignments complied with the requirement for no net loss of area. Similarly, functionality opportunities and impacts were also considered in more detail to ensure no net loss of functionality.
- Option sensitivity to the range of climate change scenarios defined in Environment Agency (2010) was assessed. Details of this assessment are given in Appendix L, indicating the potential for option variation.
- Overall economic viability and potential for FDGiA funding, based on the baseline damages (AHA, 2013) and more detailed costs generated from the cost database.

4.3 Overview of Assessment

A description of the draft Alignment and Type options assessment is given below, along with any issues to be resolved or assessed in further detail at the next options stage. Alignment and Type options that were considered relevant and technically effective were assessed through the SEA and HRA process, with a summary given in Appendix I. Within the subsequent sections, more detail is given for potential short term options than for medium to long term options, due to the larger uncertainties in magnitude of climate change. The overall assessment matrices are given in Appendix J, with the outline design and costs for options given in Appendix K. The use of the detailed assessments in the appendices to support option decision making is given in Figure 4.1.

Management of the Dawlish Warren SAC, and Exe Estuary SPA and Ramsar site, are concerns that have varying levels of estuary-wide impacts that affect the assessment of FCRM options at a FCRM unit level. Therefore, the assessment and broad preference of options for managing the SAC and SPA were considered prior to the FCRM unit analyses, and are presented herein prior to the FCRM unit analyses also.

From the total range of options, those options that were assumed to occur for wider FCRM reasons include monitoring, flood and coastal risk awareness (education, forecasting and warning), development control and maintenance activities. In the assessment below, these activities are assumed to occur unless noted otherwise. Other options that were assessed as



generally less relevant to the strategy include flow control and flood storage, due to the tidal nature of the flood risks rendering these ineffective.

Further to this, drainage improvements were included conceptually within the development and costing of options where relevant. The Devon Preliminary Flood Risk Assessment (Devon County Council, 2011) identifies the conurbations of Starcross and Dawlish as susceptible to groundwater flooding, and Exmouth and Exeter as susceptible to surface water flooding. Whilst not directly considered by this study, the groundwater and surface water flood risks and how these interact with wave, tidal and fluvial flood risks would need to be considered prior to any scheme level appraisal.

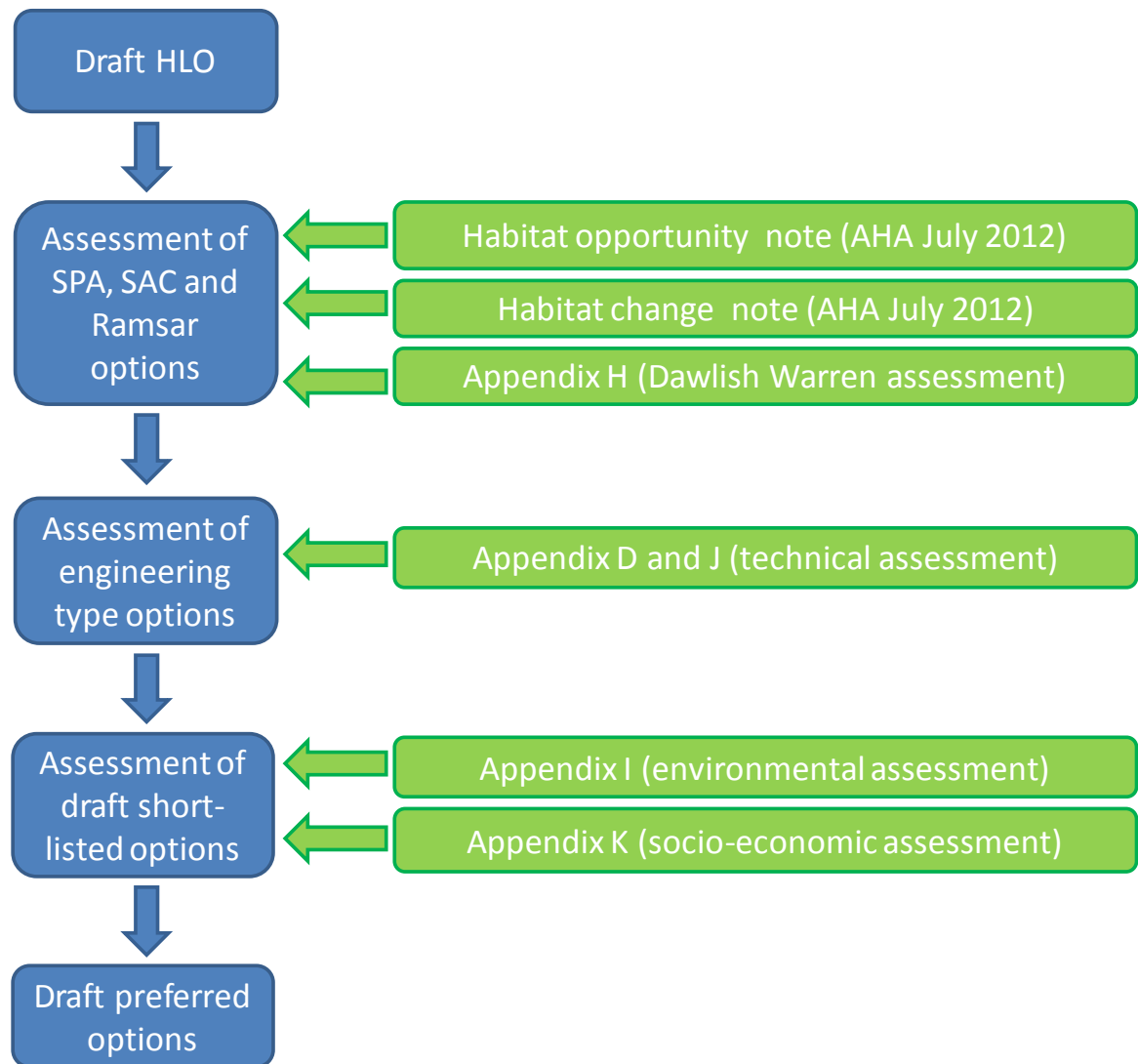


Figure 4.1 – Flow of technical assessment and decision-making.



4.4 Dawlish Warren SAC, sand spit and village

As identified in section 3, further analysis was carried out to resolve the draft options for management at the SAC, sand spit and village of Dawlish Warren. A range of 15 options were identified as technically possible prior to any socio-economic, environmental or habitat assessment. These are shown graphically in Figure 4.2.

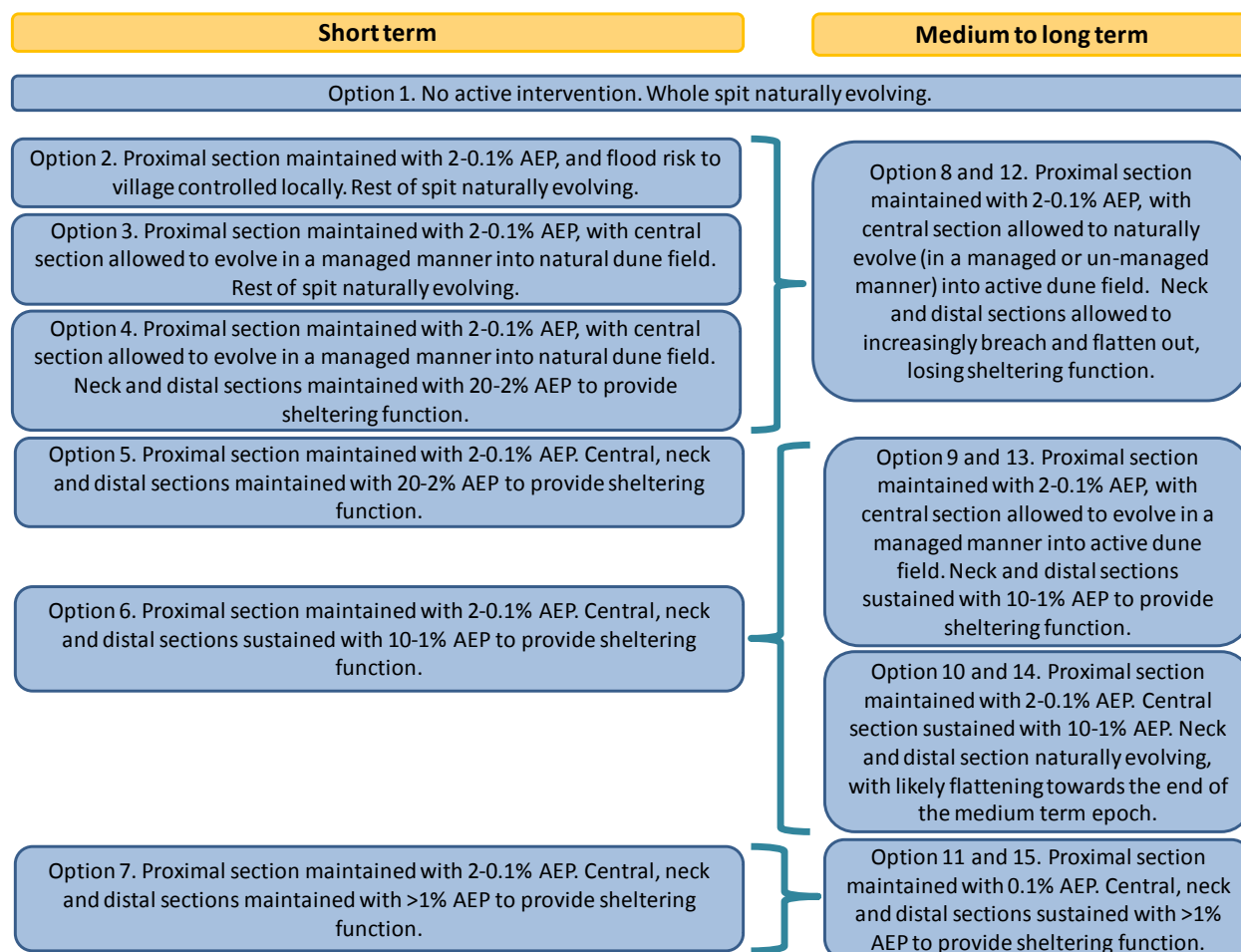
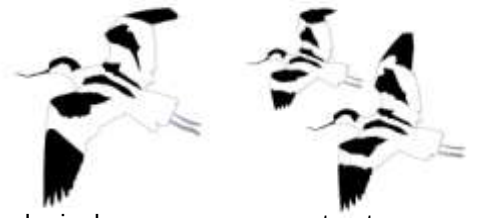


Figure 4.2 – Range of options at Dawlish Warren SAC, sand spit and village.

These options were assessed on habitat, environmental, engineering and socio-economic grounds, with the detailed analysis given in Appendix H. The habitat and environmental analyses identified that the broad preference would be to enable the central, neck, distal and estuary sections (covering the SAC designated area) of the sand spit to become a naturally functioning system by 2030. This would avoid the need to find compensatory sand dune habitat elsewhere in the estuary (such as at The Maer as considered in previous studies) or further afield.

The socio-economic and engineering analysis also broadly supports the findings of the habitat and environment analysis. Socio-economically, the optimal time for the sheltering function of the sand spit to translate to wider up-engineering of the inner estuary FCRM assets would be between the years 2035 and 2045. This conceptually includes for the cost of SAC sand dune compensation, although it is noted that sand dune compensation may be physically very difficult to achieve. In the engineering analysis this would identify a broad preference for active management of the sand



spit to stop by 2030, as the baseline understanding of geomorphological processes suggests at least a 10 year lag until increasingly regular over-washing and breaching of the sand spit would lead to permanent flattening of the sand spit distal section, requiring wider up-engineering of the inner estuary FCRM assets.

Meetings were held with the Environment Agency in March 2012, Natural England and Teignbridge District Council in June 2012, and Network Rail in July 2012 (as the key organisations with assets that could be significantly affected by management options), to discuss and present the technical assessment of the range of options, and come to agreement on the way forward at this stage for managing flood and coastal risks and habitat at the SAC, sand spit and Dawlish Warren village.

The preferred alignment and type option at this stage for managing flood and coastal risks and habitats at Dawlish Warren SAC, sand spit and village is shown in Figure 4.3, and summarised as:

- Along the proximal section, continued maintenance and improvement of the existing wave recurve and revetment assets would occur. In addition, local ground raising, embankment or wall construction at the car park of up to 0.5m would occur, to cut off existing potential flood routes through the sand spit, under the railway bridge and through to Dawlish Warren village. This would continue through the short to long term, continuing to provide a SoP between 2-0.1% AEP. The optimal SoP will be determined at the next options stage.
- Along the central section, beach recharge and recycling with groyne maintenance in the short term, to establish natural processes. This would also minimise continued erosion at the neck section, the risk of over-washing and/or breach at this location, and the potential for permanent flattening of the distal section in the short term. Gabion removal would be completed in the short term, further enabling a naturally functioning system. In the medium to long term, there would be no active intervention, with the intention that a natural sand dune system would function. More detail around the timing and location of interventions will be determined at the next options stage.
- Along the neck and distal sections, gabion removal would occur in the short term, with no active intervention in the medium to long term. However, as erosion occurs any further buried assets would be removed.

The broad intention of this option would be to enable continued flood and coastal risk management to the property, infrastructure and amenity around Dawlish Warren village, whilst enabling the sand spit to function naturally.

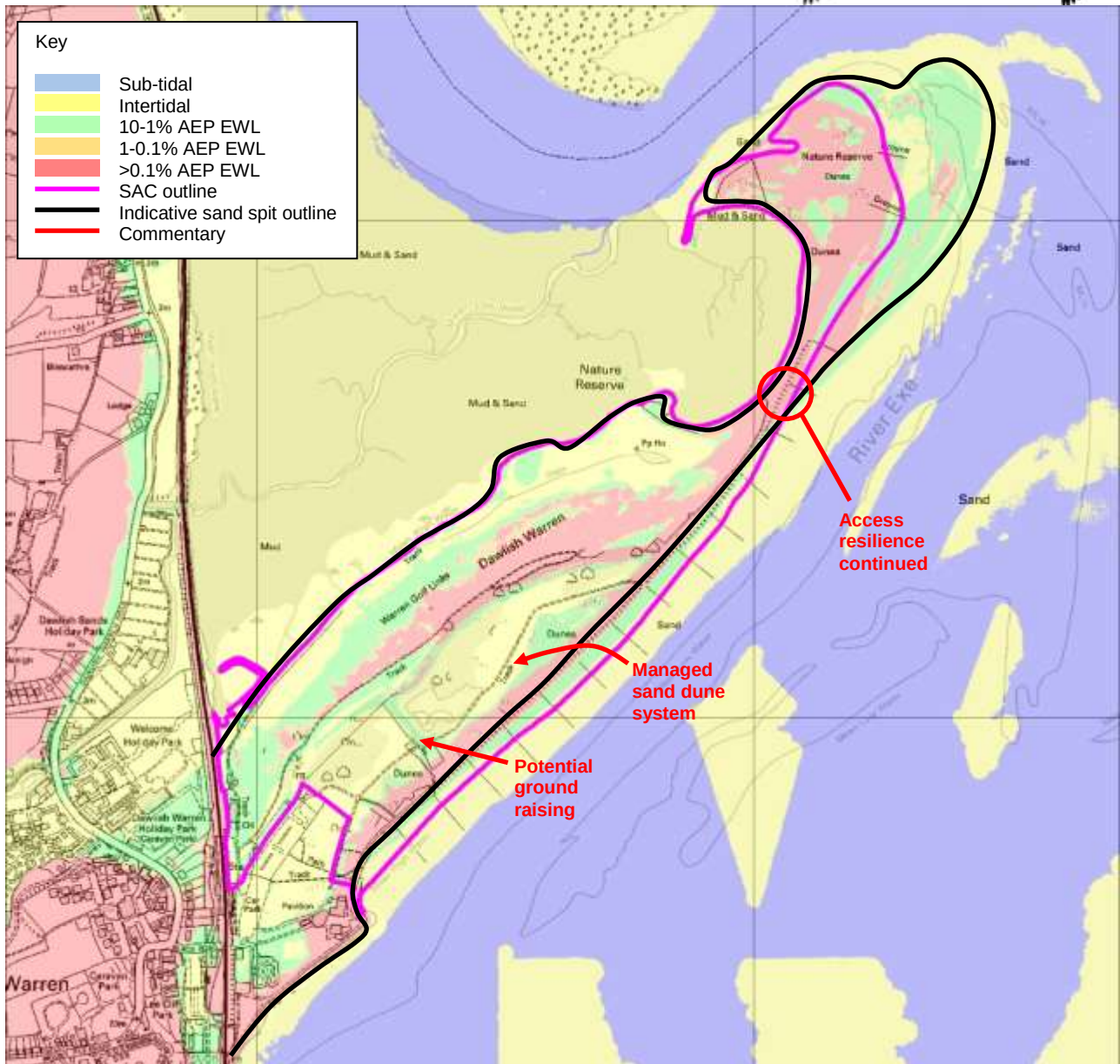
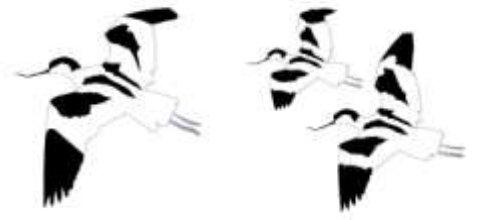


Figure 4.3 – Draft short term alignment and type option at Dawlish Warren SAC, sand spit and village.



4.5 Exe Estuary SPA

As identified in section 3, a number of FCRM units could provide potential habitat to compensate for habitat losses within the SPA. A detailed assessment of the viability and preference for realignment to compensate for SPA habitat losses was carried out in AHA (July 2012).

In addition to this, an assessment of the predicted habitat change in the estuary due to sea level rise is given in AHA (July 2012). This indicates the amount of different habitat change that would be attributable to man-made (FCRM asset) influences, natural influences, and also uncertain influences where more complex or combined natural and man-made influences occur. Meetings were held with the Environment Agency, Natural England, East Devon District Council and Teignbridge District Council in June 2012, and Network Rail, Natural England and Devon County Council in July 2012 (as the key organisations with interests that could be significantly affected by management options), to discuss and present the technical assessment of the range of options, and come to agreement on the way forward at this stage for managing the SPA to ensure no net loss of habitat area or functionality now and into the future, accounting for man-made and uncertain changes in the short term, and solely man-made changes in the medium to long term. In conjunction with the technical findings, this identified the following sites as offering an acceptable way forward in the short to long term:

- Lower Clyst Valley
- Kenn Valley

In addition to these two sites, the broad preference at Dawlish Warren sand spit for enabling a naturally function system significantly reduces the extent of FCRM influence in the estuary mouth, and avoids around 6Ha of intertidal habitat impact.

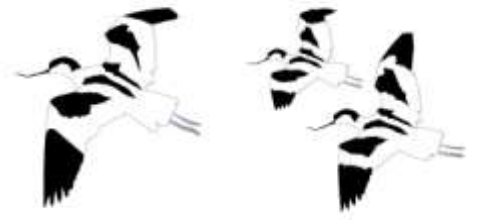
The broad ability and preference for these sites to ensure no net loss of habitat area is indicated in Table 4.1, showing an overall positive balance of habitat types. In detail, there are potential losses still predicted in the short and long term for non-vegetated intertidal habitat. However, in the short term these losses are related to the sandy ebb delta of Pole Sands, and there are no opportunities for creation of sandflats in any managed realignment areas. In the long term, it is likely that the Lower Clyst Valley and Kenn Valley sites would provide a greater amount of mudflat than in the short term. Habitat areas and ecological functionality will be assessed in further detail in the continued HRA process through the next options stage.



Item	Habitats	Cumulative habitat change (Ha) since 2010		
		2030	2060	2110
Uncertain SPA change	Sub-tidal	36		
	Intertidal (rock, boulders, mud and sandflats)	-35		
	Saltmarsh and transitional saltmarsh	2		
	Sand dunes and other littoral sediment	1		
Man-made SPA change	Sub-tidal	5	9	50
	Intertidal (rock, boulders, mud and sandflats)	-3	-2	-31
	Saltmarsh and transitional saltmarsh	15	12	-3
	Grazing marsh, other neutral grassland and non-designated habitat	-16	-16	-16
Lower Clyst Valley	Sub-tidal	0	0	0
managed realignment	Intertidal (rock, boulders, mud and sandflats)	1	1	1
	Saltmarsh and transitional saltmarsh	104	104	104
	Grazing marsh, other neutral grassland and non-designated habitat	15	15	15
Kenn Valley	Sub-tidal	0	0	0
managed realignment	Intertidal (rock, boulders, mud and sandflats)	15	15	15
	Saltmarsh and transitional saltmarsh	30	30	30
	Grazing marsh, other neutral grassland and non-designated habitat	5	5	5
Balance	Sub-tidal	41	9	50
	Intertidal (rock, boulders, mud and sandflats)	-16	14	-15
	Saltmarsh and transitional saltmarsh	151	146	131
	Grazing marsh, other neutral grassland and non-designated habitat	5	4	4

Note: Habitat areas in the possible realignment sites are the maximum possible extent. The actual extent will be constrained by the engineering works to enable the realignments.

Table 4.1 – Habitat balance including proposed managed realignment sites.



4.6 Sandy Bay

4.6.1 Overview

The Sandy Bay area is shown in Figure 4.4. As identified in section 3.5, the draft HLO at Sandy Bay is No Active Intervention.

Further consideration of the coastal risks identifies that Do Nothing is the only relevant option. Any required monitoring activities would be covered by the Plymouth Coastal Observatory activities, as well as the approximate 10 year review period for Shoreline Management Plans and FCRM Strategies. Sensitivity to climate change scenarios in Environment Agency (2010) is low, with the draft option of Do Nothing being robust.



Figure 4.4 – Photograph of Sandy Bay area, showing the caravan park.



4.7 The Maer

4.7.1 Overview

The Maer area is shown in Figure 4.5. As identified in section 3.6, the draft HLOs at The Maer are Maintain and Sustain in the short to long term. At HLO stage it was noted that NAI or Manage would require removal of the seawall, promenade, road and associated infrastructure. Broad costing of these activities indicates a PVC of approximately £13-20M, which in comparison to the lower estimated PVC for the options below, supports the draft HLOs of Maintain and Sustain. Further to this, the option development at Dawlish Warren sand spit (summarised in section 4.4) currently indicates that sand dune compensation at The Maer, considered by the SDAD SMP2 (Halcrow, 2010) as possible but noted as likely to be of poor environmental quality and technically challenging to achieve, would no longer be required. The above findings support the draft preferred HLO of Maintain and Sustain in the short to long term.

The sources of flood and coastal risk, and the potential options for addressing these risks were discussed and agreed in meetings with East Devon District Council and the Environment Agency in June 2012, and Devon County Council in July 2012. Discussions with Devon County Council suggest that investment in the long-term could only be justified by a very compelling economic case.



Figure 4.5 – Photograph of The Maer area, showing sand dunes against the seawall, promenade and road.



4.7.2 Short to Long Term Options

An initial consideration of the appropriateness of the various engineering types was carried out to identify a short list of options. This is given in Table 4.2.

Type	Appropriateness	Short-listed
Do Nothing	Not relevant within the draft HLO of Maintain and Sustain. Only relevant for comparative purposes.	N
Soft or hard foreshore management	Relevant within the draft HLO of Maintain and Sustain. Appropriate technically as existing and future risks relate solely to beach erosion.	Y
Improvements to existing assets	Relevant within the draft HLO of Maintain and Sustain. Not appropriate technically as the existing and future risk is solely related to beach erosion.	N
New linear assets		
Secondary assets		
Point structures (pumping stations, outfalls, RTE or breaches)		
Demountable or temporary defences		
Property resilience		

Table 4.2 – Assessment of appropriateness of all engineering types at The Maer.

As the source of flood and coastal risk is solely from ongoing beach erosion, the short-list of technically effective options would consist of the following.

Option 1. Soft foreshore management, consisting of beach recharge and recycling, with groyne maintenance. The Pvc of this option in the short term is estimated as £4.5M, increasing to £9.1M in the medium to long term. The environmental assessment identified that beach recharge and recycling would encourage natural processes to operate, and that beach amenity value would be continued.

Option 2. Hard foreshore management, consisting of toe protection to the seawall towards the end of the short term as beach erosion continues. The Pvc of this option in the short term is estimated as £4.8M, increasing to £5.0M in the medium to long term. The environmental assessment identified that beach amenity value would be significantly reduced.

Option 3. Hard foreshore management, consisting of breakwater construction to control sediment transport. The Pvc of this option in the short term is estimated as £6.8M, increasing to £12M in the medium to long term. The environmental assessment identified that there would be increased SPA footprint impacts from the breakwaters themselves, and a permanent change to the landscape character and visual amenity.

The draft preferred option is Option 1 on socio-economic (continued beach amenity) and environmental (reduced SPA footprint, landscape and visual amenity impacts) grounds. Sensitivity to climate change scenarios in Environment Agency (2010) is low. This option will be taken forward to the next option stage to consider in further detail. Teignbridge District Council is currently considering potential options for coastal management at the estuary mouth, including the coastline adjacent to The Maer. Interim findings from this study identify a range of potential options, at least one of which broadly concurs with the short-listed options above.



4.8 Exmouth

4.8.1 Overview

As identified in section 3.7, the draft HLOs at Exmouth are Improve in the short term, with Sustain in the medium to long term. Assessment of the FCRM assets at a sub-reach level identifies that improvement works in the short term would be required at Exmouth Docks, the Sailing Club Access, Camperdown Terrace, the slipway and boatyard to the east of Camperdown Terrace, and immediately to the north-east of the Imperial Recreation Ground. These locations, the sources of flood risk, and the potential options for addressing the flood risks were discussed and agreed in meetings with East Devon District Council and the Environment Agency in June 2012, and Devon County Council in July 2012.

The subsequent sections give a summary of the flood risks in the short term, technically effective options for addressing these risks, and the assessment of these options. In the medium to long term a wider programme of improvement works would be required to manage increasing flood risk. This is assessed in detail in Appendix I, and summarised below.

4.8.2 Short Term Options

Exmouth Docks and Sailing Club Access

The Exmouth Docks area is shown in Figure 4.6. The source of flood and coastal flood risk at Exmouth Docks is due to the potential for localised promenade flooding (and pedestrian safety risk) in the 0.5% AEP event, potential damage to the quay walls in the 4% AEP event due to excessive wave overtopping, and the onset of a flood route through to Shelly Road, Point Terrace and Camperdown Terrace in the 0.1% AEP event, as indicated in Figure 4.8. Flood risk to properties around the Exmouth Docks is currently negligible due to floor levels being well above the 0.1% AEP event. The Sailing Club access is shown in Figure 4.7. The source of flood and coastal risk at the Sailing Club access consists of the onset of flooding to Shelly Road in the 1% AEP event, with the onset of a flood route through to Camperdown Terrace in the 0.1% AEP event, as indicated in Figure 4.8. An initial consideration of the appropriateness of the various engineering types was carried out to identify a short list of options. This is given in Table 4.3.

Whilst PVb would be negligible and improvement works be unlikely to receive central FDGiA funding, technically effective options to minimise the above risks would consist of:

At Exmouth Docks, new linear assets along the existing quay walls: either vertical or wave recurve walls of less than 0.5m height. The Pvc of these options in the short term is estimated as £0.21-0.27M.

At the Shelly Road entrance to the Sailing Club, demountable/temporary defences or local road/pavement raising of less than 0.5m height. The Pvc of these options in the short term is estimated as £0.03-0.04M.

The extent and location of these options is identified in Figure 4.8. Due to the non-critical nature of this flood risk, these options will not be considered any further at the next options stage.



Figure 4.6 – Photograph of Exmouth Docks area, showing quay walls and residential developments.



Figure 4.7 – Photograph of Sailing Club access area.



Type	Appropriateness	Short-listed
Do Nothing	Not relevant within the draft HLO of Improve. Only relevant for comparative purposes.	N
Soft or hard foreshore management	Relevant within the draft HLO of Improve. Not appropriate technically as existing and future risks relate solely to flood risk rather than erosion risk.	N
Improvements to existing assets	Relevant within the draft HLO of Improve. Appropriate technically as this would address the risk of quay wall damage and local overtopping in the immediate vicinity of Exmouth Docks, Shelly Road and the Sailing Club.	Y
New linear assets	Relevant within the draft HLO of Improve. Appropriate technically as this would address the risk of quay wall damage and local overtopping in the immediate vicinity of Exmouth Docks, Shelly Road and the Sailing Club.	Y
Secondary assets	Relevant within the draft HLO of Improve. Not appropriate technically as existing and future flood risks at this location relate to local overtopping and quay wall damage in the immediate vicinity of Exmouth Docks and Shelly Road and the Sailing Club.	N
Point structures (pumping stations, outfalls, RTE or breaches)	Relevant within the draft HLO of Improve. Not appropriate technically as existing and future flood risks at this location relate to local overtopping/quay wall damage in the immediate vicinity, and ground levels should enable natural drainage locally.	N
Demountable or temporary defences	Relevant within the draft short term HLO of Improve. Appropriate technically as new linear assets would address the local overtopping in the immediate vicinity of the Sailing Club and Shelly Road.	Y
Property resilience	Not relevant within the draft HLO of Improve. Not appropriate technically as existing and future flood risks at this location relate to local road flooding and quay wall damage rather than property damage.	N

Table 4.3 – Assessment of appropriateness of all engineering types at Exmouth Docks.

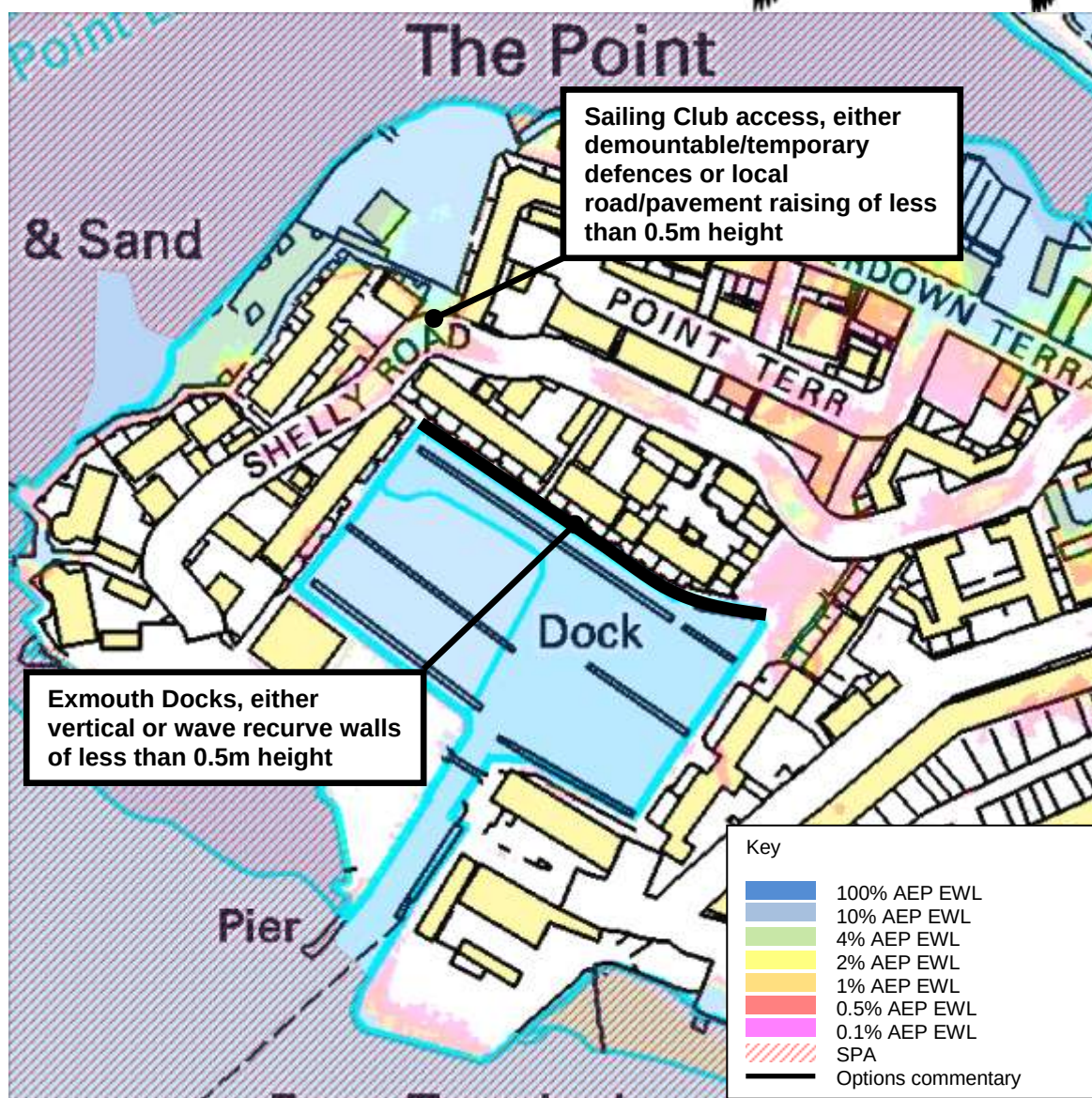


Figure 4.8 – Sources of flood risk and improvement options at Exmouth Docks and the Sailing Club access.



Camperdown Terrace, slipway and boatyard

The Camperdown Terrace, slipway and boat yard areas are shown in Figure 4.9. The source of flood and coastal risk along Camperdown Terrace consists of the onset of flooding over informal back garden walls into back gardens regularly, with the onset of flooding to properties along Camperdown Terrace (at the eastern end) in the 1% AEP event. At the slipway and boatyard, the onset of a wider flood route through to Victoria/Imperial Road and through to the large 'bowl' to the east could occur in the 4% AEP event, via lower ground levels. This is indicated in Figure 4.10. An initial consideration of the appropriateness of the various engineering types was carried out to identify a short list of options. This is given in Table 4.4.



Figure 4.9 – Photographs of Camperdown Terrace, slipway and boatyard area.



Type	Appropriateness	Short-listed
Do Nothing	Not relevant within the draft short term HLO of Improve. Only relevant for comparative purposes.	N
Soft or hard foreshore management	Relevant within the draft short term HLO of Improve. Not appropriate technically as existing and future risks relate solely to flood risk.	N
Improvements to existing assets	Relevant within the draft short term HLO of Improve. Appropriate technically as improvements to existing back garden walls would address the risk of flooding to local and wider property.	Y
New linear assets	Relevant within the draft short term HLO of Improve. Appropriate technically as improvements to existing back garden walls would address the risk of flooding to local and wider property.	Y
Secondary assets	Relevant within the draft short term HLO of Improve. Not appropriate technically as existing and future flood risks at this location relate to local overtopping in the immediate vicinity of the Sailing Club and Shelly Road.	N
Point structures (pumping stations, outfalls, RTE or breaches)	Relevant within the draft short term HLO of Improve. Not appropriate technically as existing and future flood risks at this location relate to local overtopping in the immediate vicinity of the Sailing Club and Shelly Road.	N
Demountable or temporary defences	Relevant within the draft short term HLO of Improve. Not appropriate technically at Camperdown Terrace or boatyard due to potential required size, as well as access and spatial constraints. However, technically appropriate at the slipway entrance.	Y
Property resilience	Relevant within the draft short term HLO of Improve. Appropriate technically at Camperdown Terrace as risks to local property would be addressed, but not at the slipway and boatyard as the wider flood route would not be addressed.	Y

Table 4.4 – Assessment of appropriateness of all engineering types at Camperdown Terrace, slipway and boatyard.



From the short-listed engineering types, technically effective groups of options would consist of the following.

Option 1. Wall raising and reconstruction (potentially of up to 2-3m) along Camperdown Terrace and the boatyard, with local road/pavement raising or demountable/temporary defences of less than 0.5m in height at the slipway entrance at the eastern end of Camperdown Terrace. The PVC of this option in the short term is estimated as £1.41M, but this could be significantly more if extensive wall reconstruction is required. The environmental assessment identified that in comparison to option 2 there would be increased SPA footprint impacts from any wall reconstruction, and a permanent change to the landscape character and visual amenity, although properties and infrastructure could benefit from greater flood protection than with option 2.

Option 2. Property resilience for the properties at the eastern end of Camperdown Terrace, wall or embankment raising along the boatyard of up to 0.5m, and local road/pavement raising or demountable/temporary defences of less than 0.5m in height at the slipway entrance at the eastern end of Camperdown Terrace. The PVC of this option in the short term is estimated as £0.58M, dependent on the exact number of properties provided with resilience measures. The environmental assessment identified that in comparison to option 1, there would be reduced SPA footprint impacts, changes to landscape character and visual amenity. However, the extent of flood protection may not be as significant as for option 1.

The extent and location of these options is identified in Figure 4.10. The environmental assessment of the short-listed options identified that all of the above options would continue coastal squeeze of SPA habitats, therefore requiring compensation as described in section 4.5.

The draft preferred option is Option 2 on socio-economic (lower cost) and environmental (reduced SPA footprint, landscape and visual amenity impacts) grounds. In addition, this option also may be more amenable to local residents, who have previously expressed concerns about the concept of providing a flood defence wall to the rear of their properties (Halcrow, 2008). This option will be taken forward to the next option stage to optimise the standard of protection. Sensitivity to climate change scenarios in Environment Agency (2011) is low in the short term.

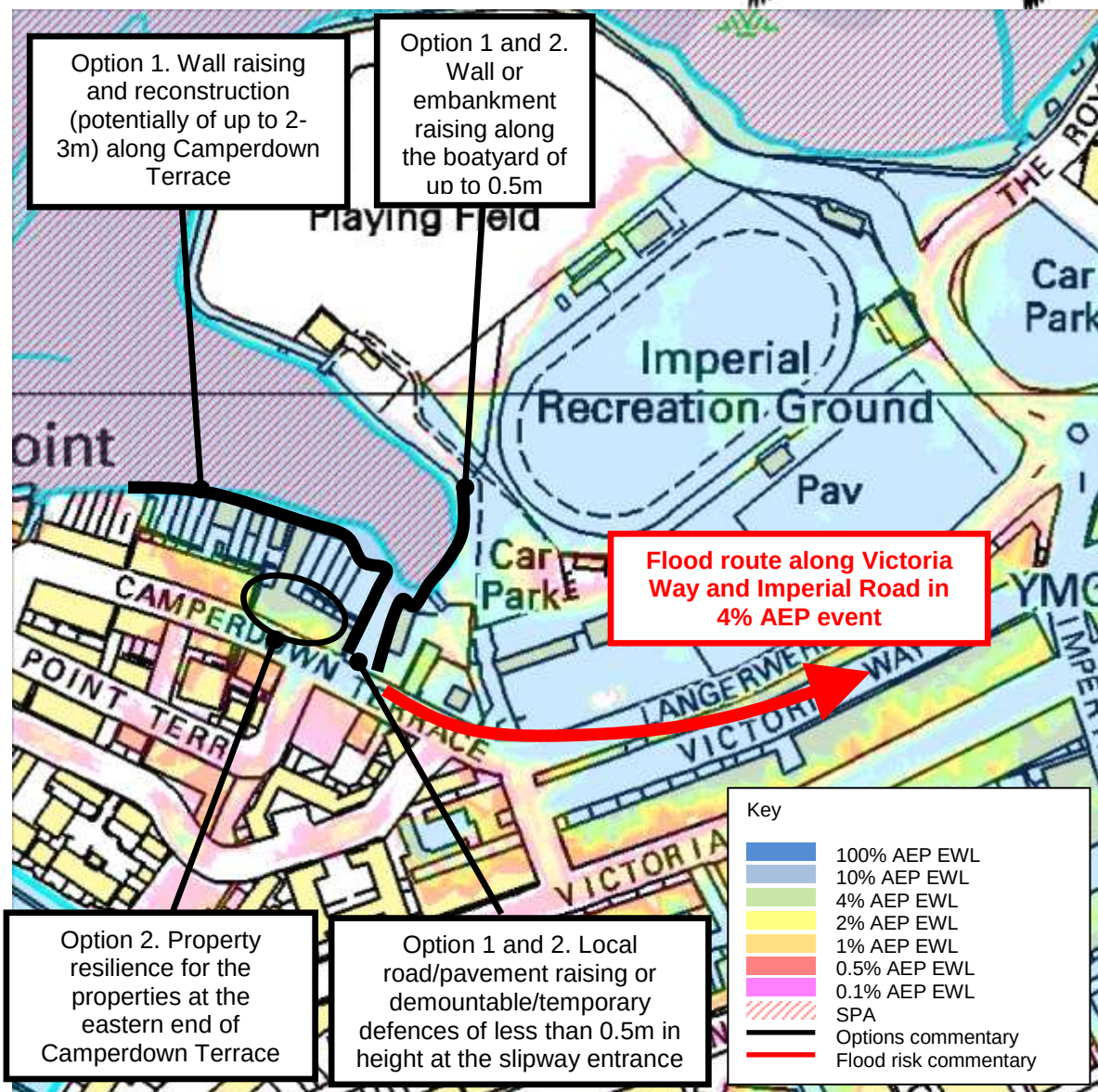
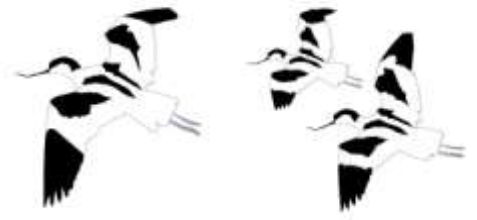


Figure 4.10 – Sources of flood risk and improvement options at Camperdown Terrace, slipway and boatyard area.



North-East of the Imperial Recreation Ground

The area to the north-east of the Imperial recreation Ground is shown in Figure 4.11. The source of flood risk immediately north-east of the Imperial Recreation Ground consists of tidal overtopping of the existing revetment in the 4% AEP event. A flood route through to the Imperial Road area and the large 'bowl' to the east could also occur in the 4% AEP event. This is indicated in Figure 4.12. An initial consideration of the appropriateness of the various engineering types was carried out to identify a short list of options. This is given in Table 4.5.



Figure 4.11 – Photograph of area to north-east of the Imperial Recreation Ground.

From the short-listed engineering types, technically effective options would consist of the following.

Option 1. Improvements to existing assets, consisting of vertical or wave recurve walls located along the crest of the existing revetment of up to 0.75m height. The Pvc of this option in the short term is estimated as £0.17M. The environmental assessment identified that in comparison to option 2 there would be increased wave scour issues, and a permanent change to the landscape character and visual amenity (sea views).

Option 2. Secondary assets, consisting of a vertical wall located along the access road to the playing field of up to 0.5m height, tying in to relatively high ground (around 0.5% AEP EWL) opposite the local car park. The Pvc of this option in the short term is estimated as £0.36M. The environmental assessment identified that in comparison to option 1 there would be reduced impact to the landscape character and visual amenity (sea views). However, in the medium to long term this option would require more extensive road raising to connect to the adjacent seaward alignments.

The extent and location of these options is identified in Figure 4.12.

The draft preferred option at this location is Option 1, on socio-economic (lower cost) grounds. This option will be taken forward to the next option stage to optimise the standard of protection. Sensitivity to climate change scenarios in Environment Agency (2011) is low in the short term.



Type	Appropriateness	Short-listed
Do Nothing	Not relevant within the draft short term HLO of Improve. Only relevant for comparative purposes.	N
Soft or hard foreshore management	Relevant within the draft short term HLO of Improve. Not appropriate technically as existing and future risks relate solely to flood risk.	N
Improvements to existing assets	Relevant within the draft short term HLO of Improve. Appropriate technically as improvements to existing assets would address the risk of flooding to local and wider property.	Y
New linear assets	Relevant within the draft short term HLO of Improve. Not relevant technically as there is an existing revetment that can be improved.	N
Secondary assets	Relevant within the draft short term HLO of Improve. Appropriate technically as opportunities exist landward to cut off local and wider flood routes.	Y
Point structures (pumping stations, outfalls, RTE or breaches)	Relevant within the draft short term HLO of Improve. Not appropriate technically as existing and future flood risks at this location relate to local overtopping in the immediate vicinity of the Sailing Club and Shelly Road.	N
Demountable or temporary defences	Relevant within the draft short term HLO of Improve. Not appropriate technically as flood risks can be effectively addressed with improvements to existing or secondary assets.	N
Property resilience	Relevant within the draft short term HLO of Improve. Not appropriate technically as existing and future flood routes would not be addressed.	N

Table 4.5 – Assessment of appropriateness of all engineering types north-east of the Imperial recreation Ground.

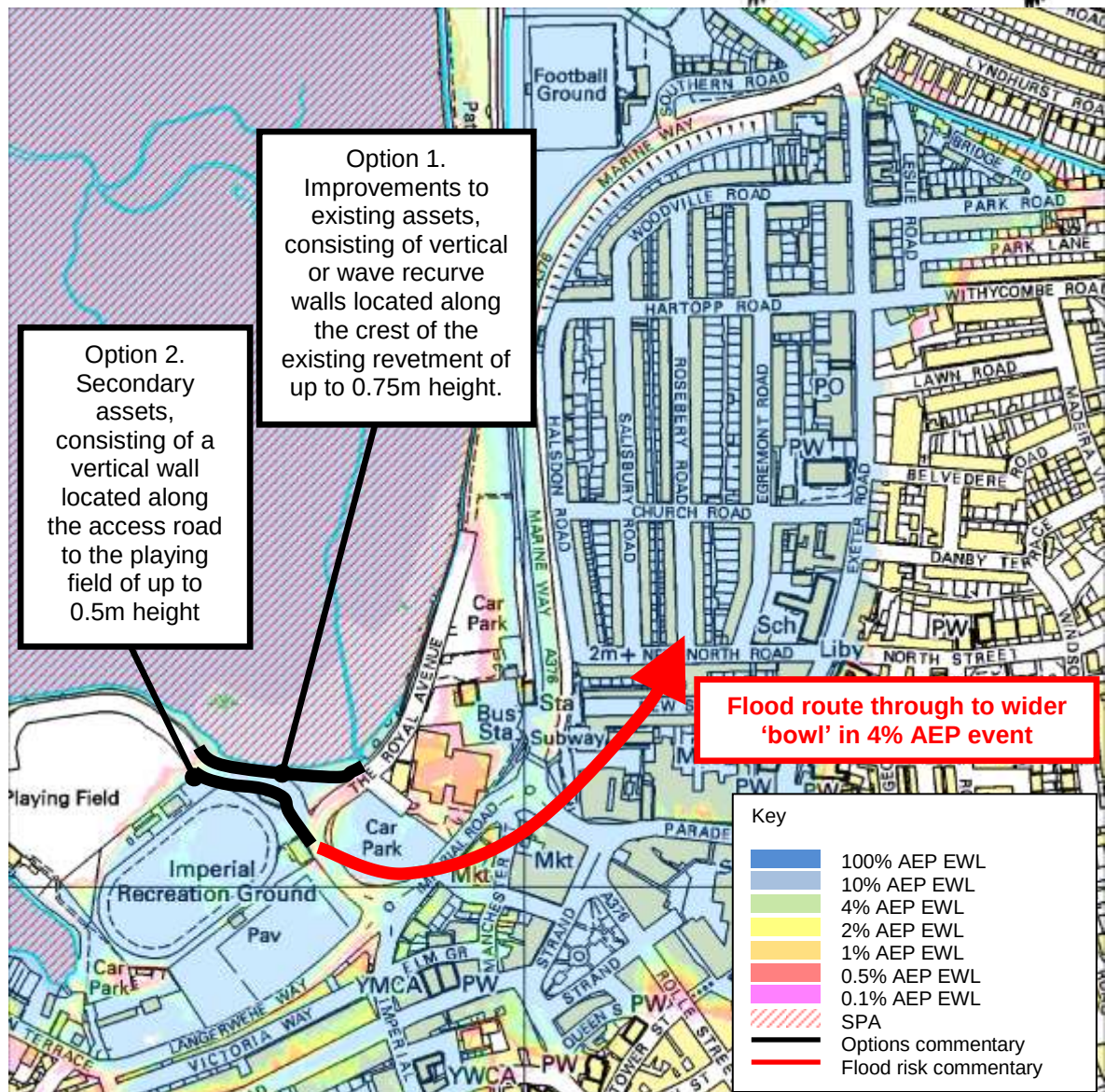


Figure 4.12 – Sources of flood risk and improvement options north-east of the Imperial Recreation Ground.

Summary

The PVb over the short term epoch of carrying out the above works would be between £154M and £222M with a PVc of between £0.9M and £2.1M, dependent on SoP, and providing a very high BCR. The above group of options could move up to 2,000 residential and commercial properties from the 'significant risk' band to either 'moderate risk' or negligible risk. Assessment of this information within the FDGiA Calculator indicates that these works could receive complete FDGiA funding, and be a Candidate for the National Priority Programme subject to EA and RFCC approval.



4.8.3 Medium to Long Term Options

As predicted climate change impacts occur increasingly into the medium to long term, a wider programme of FCRM asset improvements would be required to manage flood risks. Engineering design sensitivity to climate change scenarios is significant in the medium to long term, and could vary the potential raising of the existing structures as identified below. An initial consideration of the appropriateness of the various engineering types was carried out to identify a short list of options. This is given in Table 4.6.

Type	Appropriateness	Short-listed
Do Nothing	Not relevant within the draft HLO of Sustain. Only relevant for comparative purposes.	N
Soft or hard foreshore management	Relevant within the draft HLO of Sustain. Not appropriate technically as existing and future risks relate solely to flood risk.	N
Improvements to existing assets	Relevant within the draft HLO of Sustain. Appropriate technically as improvements to existing assets would address the risk of flooding to local and wider property.	Y
New linear assets	Relevant within the draft HLO of Sustain. Appropriate technically as increasing flood risk may require new assets along the seaward frontage of Shelly Road.	Y
Secondary assets	Relevant within the draft HLO of Sustain. Appropriate technically as opportunities exist landward to cut off local and wider flood routes.	Y
Point structures (pumping stations, outfalls, RTE or breaches)	Relevant within the draft HLO of Sustain. Not appropriate technically as existing and future flood risks at this location relate to tidal overtopping and flood routes through to the wider area.	N
Demountable or temporary defences	Relevant within the draft HLO of Sustain. Not appropriate technically due to potential required size, as well as access and spatial constraints.	N
Property resilience	Relevant within the draft HLO of Sustain. Appropriate technically at Camperdown Terrace and Shelly Road, as seaward frontage assets may become excessive in size.	Y

Table 4.6 – Assessment of appropriateness of all engineering types in the medium to long term at Exmouth.



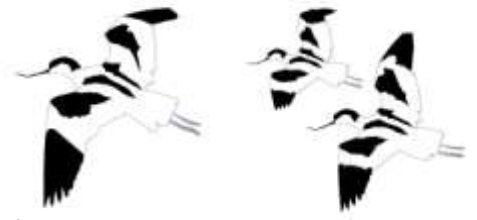
From the short-listed engineering types, technically effective options, assuming the above short term works occur, would consist of the following.

Option 1. Further improvements along the existing seaward alignment. This would consist of wider raising of quay walls along Exmouth Docks, of between 0.5-1.5m. New linear assets along the seaward frontage of Shelly Road properties, of between 0-1m. New revetments or wall raising/reconstruction along Camperdown Terrace seaward frontage of between 1-3m, if property resilience becomes increasingly ineffective. Wider raising of walls along the slipway and boatyard of between 0.5-1.5m. Wider raising of the seaward wall alignment north-east of the Imperial Recreation Ground, of between 0.5-1.5m.

Option 2. Improvements along a mixture of the seaward alignment and landward alignments. Wider raising of quay walls along Exmouth Docks, of between 0.5-1.5m. Wide-scale property resilience for Shelly Road and Camperdown Terrace properties, with 0.5-1m of road raising along Shelly Road and Camperdown Terrace roads. Wider raising of walls along the slipway and boatyard of between 0.5-1.5m. Wider raising of the seaward wall alignment north-east of the Imperial Recreation Ground, of between 0.5-1.5m.

The environmental assessment identified no clear preference between these two options. The PVb over the short to long term of carrying out the above works would be between £322M-£355M (dependent on SoP), and the PVc of the short to long programme of works would be between £3.4-5.2M (dependent on the form of future engineering improvements and SoP), resulting in a high BCR. Lower costs would be related to Option 2 and more efficient wave recurve wall options, and higher costs to Option 1 and continuation of raised vertical walls or sloped revetments and rock armouring. However, this may be dependent on the optimised SoP. As identified at HLO stage, there is strong socio-economic justification to carry out improvements into the medium to long term.

Both these options will be taken forward to the next option stage to optimise the standard of protection. Sensitivity to climate change scenarios in Environment Agency (2011) is significant in the medium to long term, described in Appendix L.



4.9 Courtlands, Lymestone Commando and Exton

4.9.1 Overview

As identified in section 3.8, the draft HLOs at Courtlands, Lymestone Commando and Exton are Maintain in the short to medium term, with Sustain in the long term. Assessment of the FCRM assets at a sub-reach level identifies that improvement works in the long term would only be required on the branchline railway along Lymestone Commando and Exton. These locations, the sources of flood risk, and the potential options for addressing the flood risks were discussed and agreed in meetings with Network Rail in July 2012. The subsequent sections give a summary of the flood risks in the short to long term, technically effective options for addressing these risks, and the assessment of these options.

4.9.2 Short to Long Term Options

An indication of the Courtlands, Lymestone Commando and Exton area is shown in Figure 4.13, located at Exton. As the draft HLO is Maintain in the short to medium term along Lymestone Commando and Exton, and in the short to long term at Courtlands, the technically effective option in the short to medium term is solely continued maintenance works. The source of flood risk along Lymestone Commando and Exton in the long term is potential breach from excessive wave overtopping, and tidal weiring of the branchline railway, in the 2% AEP and 0.1% AEP events respectively. Engineering design sensitivity to climate change scenarios is significant in the long term, and could vary the potential raising of the existing structures as identified below. An initial consideration of the appropriateness of the various engineering types was carried out to identify a short list of options. This is given in Table 4.7.



Figure 4.13 – Photograph of railway line at Exton.



Type	Appropriateness	Short-listed
Do Nothing	Not relevant within the draft HLO of Sustain. Only relevant for comparative purposes.	N
Soft or hard foreshore management	Relevant within the draft HLO of Sustain. Not appropriate technically as existing and future risks relate solely to flood risk.	N
Improvements to existing assets	Relevant within the draft HLO of Sustain. Appropriate technically as improvements to existing assets would address the risk of flooding to the branchline railway and local property.	Y
New linear assets	Relevant within the draft HLO of Sustain. Not appropriate technically as improvements would be required at the branchline railway itself, to address the risk of flooding to the branchline railway.	N
Secondary assets	Relevant within the draft HLO of Sustain. Not appropriate technically as improvements would be required at the branchline railway itself, to address the risk of flooding to the branchline railway.	N
Point structures (pumping stations, outfalls, RTE or breaches)	Relevant within the draft HLO of Sustain. Not appropriate technically as improvements would be required at the branchline railway itself, to address the risk of flooding to the branchline railway.	N
Demountable or temporary defences	Relevant within the draft HLO of Sustain. Not appropriate technically due to potential required size, as well as access and spatial constraints.	N
Property resilience	Relevant within the draft HLO of Sustain. Not appropriate technically as this would not address the risk of flooding to the branchline railway.	N

Table 4.7 – Assessment of appropriateness of all engineering types in the long term at Courtlands, Lymestone Commando and Exton.

From the short-listed engineering types, technically effective options in the long term would consist of improvements to existing assets. This could be achieved by the following options.

Option 1. Rock armouring or revetment raising (to dissipate wave energy) of up to 0.5m to the existing structure. The PVC of this option in the short to long term is estimated as up to £3.1M, dependent on SoP.

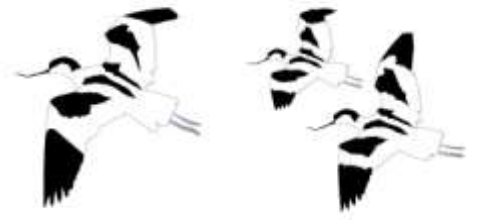
Option 2. Vertical or wave recurve wall additions of up to 0.5m to the existing structure. The PVC of this option in the short to long term is estimated as up to £2.4M, dependent on SoP.

The environmental assessment identified no preference between option 1 and 2. The PVb over the short to long term of carrying out the above works would be between £21-£22M dependent on SoP (90% of which relates to the railway line itself), and the PVC of the short to long programme of works would be between £1.7-2.4M (dependent on the form of future engineering improvements).



and SoP), resulting in a BCR around 10. Whilst the economic assessment indicates that Option 2 would be the lower cost option, this may be dependent on the optimised SoP.

Both these options will be taken forward to the next option stage to optimise the standard of protection. Sensitivity to climate change scenarios in Environment Agency (2011) is significant in the long term, as shown in Appendix L.



4.10 Lympstone

4.10.1 Overview

As identified in section 3.9, the draft HLOs at Lympstone are Maintain or Sustain in the short term, and Sustain in the medium to long term. The sources of flood risk, and the potential options for addressing the flood risks were discussed and agreed in meetings with East Devon County Council and the Environment Agency in June 2012. The subsequent sections give a summary of the flood risks in the short to long term, technically effective options for addressing these risks, and the assessment of these options.

4.10.2 Short to Long Term Options

The Lympstone area is shown in Figure 4.14. Assessment of the FCRM assets at a sub-reach level identifies that improvement works in the short to medium term would be very limited, relating to potential damage of the building walls just to the south of Wotton Brook. As such, the technical effective option would be to continue maintaining the existing structures in the short to medium term. Engineering design sensitivity to climate change scenarios is moderate in the long term, and could vary the potential raising of the existing structures as identified below. An initial consideration of the appropriateness of the various engineering types in the long term was carried out to identify a short list of options. This is given in Table 4.8.



Figure 4.14 – Photograph of Lympstone area.



Type	Appropriateness	Short-listed
Do Nothing	Not relevant within the draft HLO of Sustain. Only relevant for comparative purposes.	N
Soft or hard foreshore management	Relevant within the draft HLO of Sustain. Not appropriate technically as existing and future risks relate solely to flood risk.	N
Improvements to existing assets	Relevant within the draft HLO of Sustain. Appropriate technically as improvements to existing assets would address the risk of flooding to properties.	Y
New linear assets	Relevant within the draft HLO of Sustain. Not appropriate technically as improvements would be required at the existing assets, to address the risk of flooding to local property.	N
Secondary assets	Relevant within the draft HLO of Sustain. Not appropriate technically as improvements would be required at the existing assets, to address the risk of flooding to local property.	N
Point structures (pumping stations, outfalls, RTE or breaches)	Relevant within the draft HLO of Sustain. Not appropriate technically as existing and future flood risks at this location can be effectively addressed by improvement to existing assets.	N
Demountable or temporary defences	Relevant within the draft HLO of Sustain. Appropriate technically as existing assets are partly temporary defences.	Y
Property resilience	Relevant within the draft HLO of Sustain. Appropriate technically as existing defences are partly building walls.	Y

Table 4.8 – Assessment of appropriateness of all engineering types in the long term at Lymptone.

From the short-listed engineering types, technically effective options in the long term would consist of the following.

Option 1. Further reconstruction and/or raising of building walls, and reconstruction of the existing flood gates of 0-0.7m by 2110. The PVC of this option in the short to long term is estimated as up to £2.6M, dependent on SoP. The environmental assessment identified that this option would continue the constraint on coastal processes and hydromorphological pressure on the Exe transitional water body, and that any works would need to consider the Lymptone Coastal Preservation Area.

The PVb over the short to long term of carrying out the above works would be between £20M-£21M (dependent on SoP), and the PVC of the short to long programme of works would be up to £2.6M (dependent on the optimised SoP), resulting in a high BCR of around 8.



Option 1 will be taken forward to the next option stage to optimise the standard of protection. Sensitivity to climate change scenarios in Environment Agency (2011) is significant in the long term, as shown in Appendix L.

4.11 East bank of the Lower Clyst

4.11.1 Overview

As identified in section 3.10, the draft HLOs at the east bank of the Lower Clyst are Manage in the short term, and Sustain along the realigned position in the medium to long term. The sources of flood risk, opportunities for habitat compensation, and the potential options for addressing the flood risks and habitat opportunities were discussed and agreed in meetings with East Devon District Council and the Environment Agency in June 2012, and Devon County Council and Natural England in July 2012. The subsequent sections give a summary of the flood risks and habitat opportunities in the short to long term, technically effective options for addressing these risks and opportunities, and the assessment of these options.

4.11.2 Short Term Options

The source of flood and coastal flood risk is due to the potential for regular tidal flooding over the existing embankments, with the onset of flooding to the C527 and around 20 properties in the 20% AEP event. The assessment of habitat change and compensation opportunities (described in AHA, June 2012 and July 2012), identified this location as a preferred managed realignment opportunity in the short term. In addition to the erosion risks highlighted by modelling at the HLO stage, further ISIS-TUFLOW modelling of a realignment with an embankment protecting the C527 road has indicated that EWLs (whether fluvial or tidal) could be increased locally by up to 0.5m downstream of the C527 bridge, and by less than 0.25m upstream of the A376 bridge in the Clyst St. Mary area. This is due to the hydraulic constraint caused by the road embankment, which would throttle the tidal and fluvial flows by stopping wider flow through the floodplain in extreme events. However, if the C527 road was raised itself, with culverts provided underneath to replicate the existing floodplain flow capacity, these wider erosion and hydraulic impacts would be avoided.

An initial consideration of the appropriateness of the various engineering types was carried out to identify a short list of options. This is given in Table 4.9.

Type	Appropriateness	Short-listed
Do Nothing	Not relevant within the draft HLO of Manage. Only relevant for comparative purposes.	N
Soft or hard foreshore management	Relevant within the draft HLO of Manage. Appropriate technically as DAWN modelling indicates potential erosion risks around bridge abutments.	Y
Improvements to existing assets	Relevant within the draft HLO of Manage. Appropriate technically as ISIS-TUFLOW modelling indicates potential local increases in EWLs.	Y
New linear assets	Relevant within the draft HLO of Manage. Appropriate technically to enable continued	Y



	functioning of the C527 road.	
Secondary assets	Relevant within the draft HLO of Manage. Not relevant technically as some primary assets (existing river-side embankments) would lose their flood risk function.	N
Point structures (pumping stations, outfalls, RTE or breaches)	Relevant within the draft HLO of Manage. Appropriate technically to enable inundation of the potential habitat compensation area.	Y
Demountable or temporary defences	Relevant within the draft HLO of Manage. Not appropriate technically due to potential required size, as well as access and spatial constraints.	N
Property resilience	Relevant within the draft HLO of Manage. Not appropriate technically as existing linear assets provide protection from flooding for local properties.	N

Table 4.9 – Assessment of appropriateness of all engineering types in the short term at the east bank of the Lower Clyst.

From the short-listed engineering types, technically effective options to minimise the above risks would consist of the following.

Option 1. Breach of 100m length in the existing embankment, a new embankment along the north side of the C527 of up to 1.5m to provide continued or improve flood protection to the road and local properties, rock armour protection to the C527 and railway bridges to address erosion risk, and raising of the assets downstream of the C527 bridge (up to 0.5m). Rising ground levels at the landward extent would naturally constrain the extent of inundation. The PVc of this option in the short term is estimated as up to £4.8M, dependent on SoP and extent of realignment. The environmental assessment identified that this option is not preferred in comparison to option 2.

Option 2. Breach of 100m length in the existing embankments, and raising of the C527 road with culverts. Rising ground levels at the landward extent would naturally constrain the extent of inundation. The PVc of this option in the short term is estimated as up to £9.4M, dependent on SoP, extent of realignment and the form of the road raising. The environmental assessment identified that this option is preferred in comparison to option 1.

The extent and location of these options is identified in Figure 4.15. The PVb over the short term of carrying out the above works would be up to £2.9M (dependent on SoP and extent of realignment), highlighting that either option would have a BCR below unity. Assessment of this information within the FDGiA Calculator indicates that these works could receive partial FDGiA funding (including for habitat creation), and would be Deferred – unless costs are reduced and/or additional contributions/RFCC levy secured.

Both options will be taken forward, as further discussions are required with Devon County Council and local landowners to develop the preferred option. Sensitivity to climate change scenarios in Environment Agency (2011) is low in the short term.

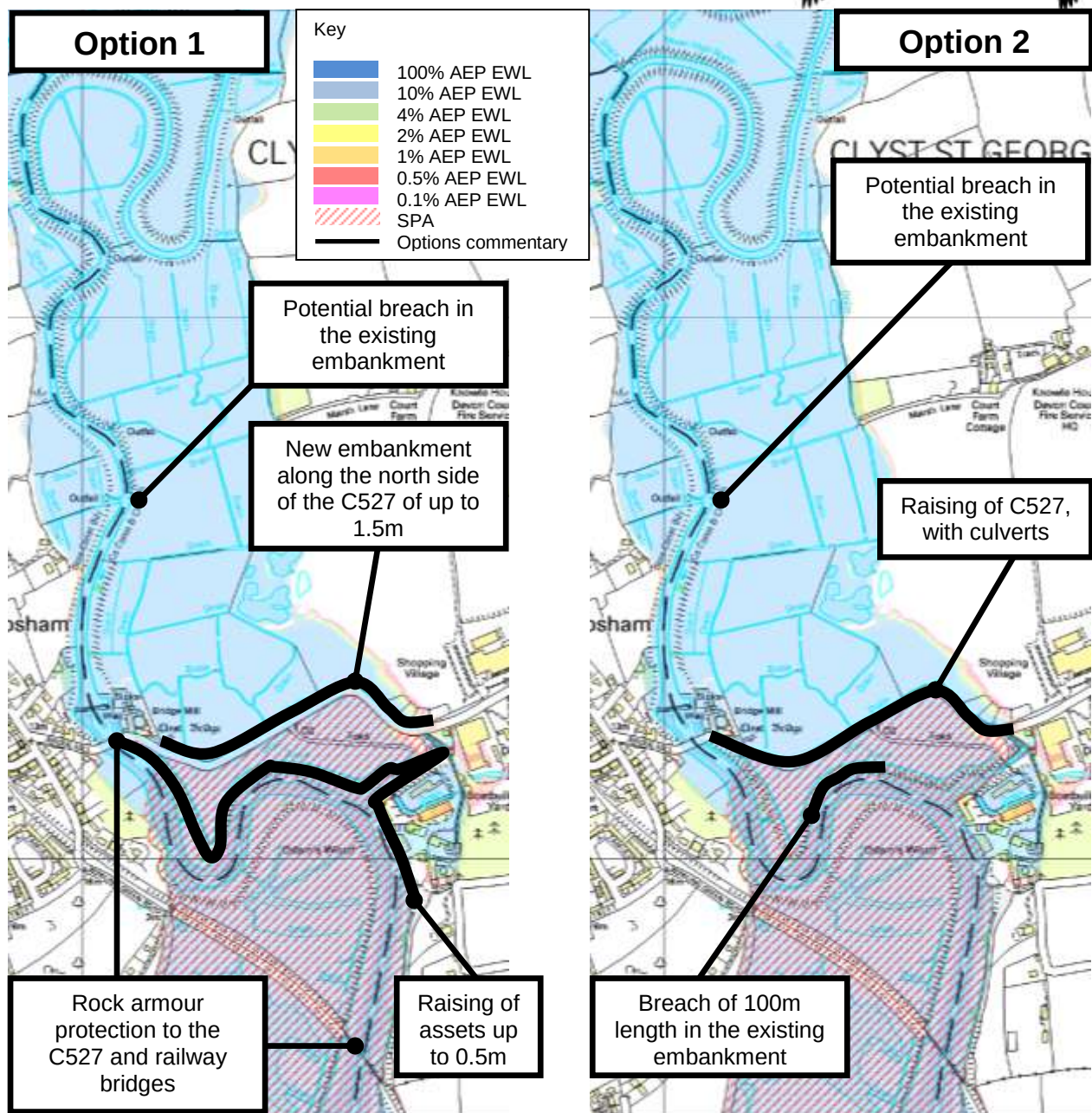


Figure 4.15 – Short term managed realignment options at the east bank of the Lower Clyst.



4.11.3 Medium to Long Term Options

As predicted climate change impacts occur increasingly into the medium to long term, a wider programme of FCRM asset improvements would be required to manage flood risks. Engineering design sensitivity to climate change scenarios is significant in the medium to long term, and could vary the potential raising of the existing structures as identified below. An initial consideration of the appropriateness of the various engineering types was carried out to identify a short list of options. This is given in Table 4.10.

Type	Appropriateness	Short-listed
Do Nothing	Not relevant within the draft HLO of Sustain. Only relevant for comparative purposes.	N
Soft or hard foreshore management	Relevant within the draft HLO of Sustain. Appropriate technically as DAWN modelling indicates potential erosion risks around bridge abutments.	Y
Improvements to existing assets	Relevant within the draft HLO of Sustain. Appropriate technically as ISIS-TUFLOW modelling indicates potential local increases in EWLs.	Y
New linear assets	Relevant within the draft HLO of Sustain. Appropriate technically where existing assets, and short term options, would not continue management of flood risks (possibly along the C527 road).	Y
Secondary assets	Relevant within the draft HLO of Sustain. Not relevant technically as some primary assets (existing river-side embankments) would lose their flood risk function.	N
Point structures (pumping stations, outfalls, RTE or breaches)	Relevant within the draft HLO of Sustain. Not relevant technically as breaches will have occurred in the short term.	N
Demountable or temporary defences	Relevant within the draft HLO of Manage. Not appropriate technically due to potential required size, as well as access and spatial constraints.	N
Property resilience	Relevant within the draft HLO of Sustain. Not appropriate technically as existing linear assets provide protection from flooding for local properties.	N

Table 4.10 – Assessment of appropriateness of all engineering types in the medium to long term at the east bank of the Lower Clyst.

From the short-listed engineering types, technically effective options, assuming the above short term works occur, would consist of the following.

Option 1. Raising of the embankment along the north side of the C527, and the existing embankments and walls south of the C527 road, of between 0-1.5m to provide continued or



improved flood protection to the road and local properties. Rising ground levels at the landward extent would still naturally constrain the extent of inundation. The PVc of this option in the short to long term is estimated as up to £4.9M, dependent on SoP and extent of realignment. The environmental assessment identified that this option is not preferred in comparison to option 2.

Option 2. Further raising of the C527 road (or alternatively wall raising along the northern side of the road), and the existing embankments and walls south of the C527 road, of between 0-1.5m. Rising ground levels at the landward extent would naturally constrain the extent of inundation. The PVc of this option in the short to long term is estimated as up to £9.6M, dependent on SoP and extent of realignment. The environmental assessment identified that this option is preferred in comparison to option 1.

The PVb over the short to long term of carrying out the above works would be up to £8.4M (dependent on SoP and extent of realignment), highlighting that either option would have a BCR between 1 and 2.

Both options will be taken forward, as further discussions are required with Devon County Council and local landowners to develop the preferred option. Sensitivity to climate change scenarios in Environment Agency (2011) is significant in the medium to long term, as shown in Appendix L.

4.12 Clyst St. Mary

4.12.1 Overview

As identified in section 3.11, the draft HLOs at Clyst St. Mary are NAI or Manage (relating to the embankments south of Grindle Brook), or Improve (relating to risks locally around Frog Lane and the A376 to the north of Grindle Brook). The sources of flood risk, opportunities for habitat compensation, and the potential options for addressing the flood risks and habitat opportunities were discussed and agreed in meetings with East Devon County Council and the Environment Agency in June 2012, and Devon County Council and Natural England in July 2012. The subsequent sections give a summary of the flood risks and habitat opportunities in the short to long term, technically effective options for addressing these risks and opportunities, and the assessment of these options.

4.12.2 Short to Long Term Options

The source of flood risk is caused by both tidal and fluvial processes. To the south of the Grindle Brook, flood risk is relatively high with an existing breach SoP of 20% AEP. North of the Grindle Brook, flood risk from tidal events is low (existing breach SoP of 0.1% AEP), whilst flood risk to Frog Lane and surrounding properties from fluvial events is higher, with flooding occurring during the floods of November 2012. Further ISIS-TUFLOW modelling of the potential east bank of the Lower Clyst options has indicated that EWLs (whether fluvial or tidal) could be increased locally by less than 0.25m upstream of the A376 bridge in the Clyst St. Mary area.

An initial consideration of the appropriateness of the various engineering types was carried out to identify a short list of options. This is given in Table 4.11.



Type	Appropriateness	Short-listed
Do Nothing	Relevant within the draft HLO of NAI and Improve. Relevant for comparative purposes.	Y
Soft or hard foreshore management	Relevant within the draft HLO of NAI and Improve. Not appropriate technically as DAWN modelling indicates no potential erosion risks.	N
Improvements to existing assets	Relevant within the draft HLO of NAI and Improve. Appropriate technically as ISIS-TUFLOW modelling indicates potential local increases in EWLs around Frog Lane.	Y
New linear assets	Relevant within the draft HLO of NAI and Improve. Not appropriate technically as existing assets can be effectively improved.	N
Secondary assets	Relevant within the draft HLO of NAI and Improve. Not relevant technically as some primary assets (existing river-side embankments) would lose their flood risk function.	N
Point structures (pumping stations, outfalls, RTE or breaches)	Not relevant within the draft HLO of NAI and Improve.	N
Demountable or temporary defences	Relevant within the draft HLO of NAI and Improve. Not appropriate technically due to existing assets, potential required size, as well as access and spatial constraints.	N
Property resilience	Relevant within the draft HLO of NAI and Improve. Not appropriate technically as existing linear assets provide protection from flooding for local properties around Frog Lane.	N

Table 4.11 – Assessment of appropriateness of all engineering types in the short to long term at Clyst St. Mary.

From the short-listed engineering types, technically effective options to minimise the above risks would consist of the following.

Option 1. Continued maintenance and raising of the Frog Lane and Winslade Barton embankments by between 0-1.5m in the medium to long term. The remaining embankments would continue to be unmaintained. The PVc of this option in the short to long term is estimated as up to £1.2M, dependent on SoP. The environmental assessment identified that this option would partially continue existing natural process constraints, and hydromorphological pressure on Clyst river water body.

The extent and location of this option is identified in Figure 4.16. The PVb over the short to long term of carrying out the above works would be up to £3.3M-£4.0M (dependent on SoP), highlighting that this option would have a BCR of around 3.



Option 1 will be taken forward to the next option stage to optimise the standard of protection. Sensitivity to climate change scenarios in Environment Agency (2011) is significant in the medium to long term, as shown in Appendix L.

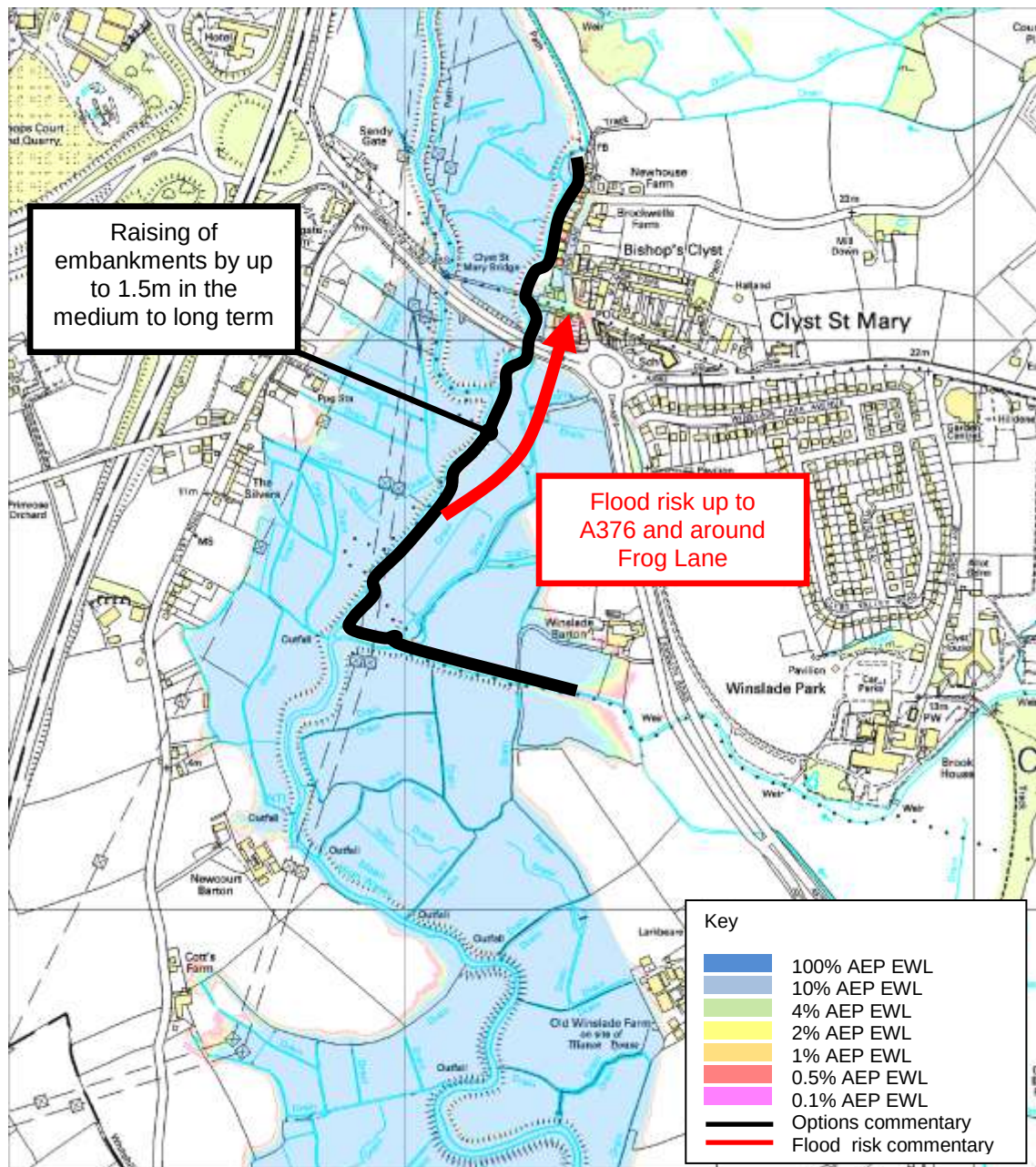


Figure 4.16 – Sources of flood risk and options around Clyst St. Mary.



4.13 West bank of the Lower Clyst

4.13.1 Overview

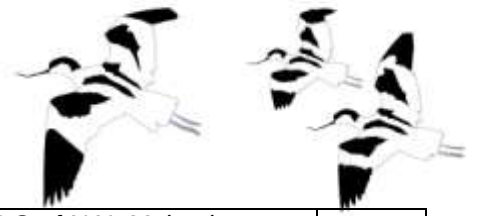
As identified in section 3.12, the draft HLOs along the west bank of the Clyst are NAI, Maintain (relating to Bowling Green Marsh) or Manage. The sources of flood risk, opportunities for habitat compensation, and the potential options for addressing the flood risks and habitat opportunities were discussed and agreed in meetings with East Devon County Council and the Environment Agency in June 2012, and Devon County Council and Natural England in July 2012. The subsequent sections give a summary of the flood risks and habitat opportunities in the short to long term, technically effective options for addressing these risks and opportunities, and the assessment of these options.

4.13.2 Short to Long Term Options

The source of flood and coastal flood risk is due to the potential for regular tidal flooding over the existing embankments, with the onset of flooding to agricultural land in the 20% AEP event. The assessment of habitat change and compensation opportunities (described in AHA, June 2012 and July 2012), identified part of this area as a preferred managed realignment opportunity in the short term.

An initial consideration of the appropriateness of the various engineering types was carried out to identify a short list of options. This is given in Table 4.12.

Type	Appropriateness	Short-listed
Do Nothing	Relevant within the draft HLO of NAI, Maintain or Manage. Relevant for comparative purposes.	Y
Soft or hard foreshore management	Relevant within the draft HLO of NAI, Maintain or Manage. Not appropriate technically as risks relate solely to flood risk.	N
Improvements to existing assets	Not relevant within the draft HLO of NAI, Maintain or Manage. Not appropriate technically as whilst ISIS-TUFLOW modelling indicates potential local increases in EWLS, no property or infrastructure would be at increased risk.	N
New linear assets	Relevant within the draft HLO of NAI, Maintain or Manage. Appropriate technically to constrain landward extent of potential habitat compensation area.	Y
Secondary assets	Relevant within the draft HLO of NAI, Maintain or Manage. Not relevant technically as no property or infrastructure is at increased risk.	N
Point structures (pumping stations, outfalls, RTE or breaches)	Relevant within the draft HLO of NAI, Maintain or Manage. Appropriate technically to enable inundation of the potential habitat compensation area.	Y



Demountable or temporary defences	Relevant within the draft HLO of NAI, Maintain or Manage. Not appropriate technically due to existing assets, potential required size, as well as access and spatial constraints.	N
Property resilience	Relevant within the draft HLO of NAI, Maintain or Manage. Not appropriate technically as no property or infrastructure would be at increased risk.	N

Table 4.12 – Assessment of appropriateness of all engineering types in the short to long term along the west bank of the Clyst.

From the short-listed engineering types, technically effective options to achieve the draft HLOs would consist of the following.

Option 1. 100m breaches in the existing embankments, from the Frying Pan to the C527 bridge, with rising ground levels naturally constraining inundation, with the potential for a cut-off embankment at 'the foot' or local property resilience. Maintenance of the existing embankment around Bowling Green Marsh, with raising of between 0-1.5m in the medium to long term. The remaining embankments would continue to be unmaintained. The PVc of this option in the short term is estimated as up to £1.6M and up to £2.2M in the long term, dependent on SoP and extent of realignment. The environmental assessment identified that this option would partially continue existing natural process constraints, and hydromorphological pressure on Clyst river water body.

The extent and location of these options is identified in Figure 4.17. The PVb over the short term of carrying out the above works would be up to £1.2M (dependent on SoP and extent of realignment), highlighting that this option would have a BCR below unity. Assessment of this information within the FDGiA Calculator indicates that these works could receive full FDGiA funding (due to the potential habitat creation), and be a Candidate for the National Priority Programme subject to EA and RFCC approval. The PVb over the short to long term of carrying out the above works would be up to £3.4M (dependent on SoP and extent of realignment), highlighting that this option would have a BCR above unity.

Option 1 will be taken forward to the next option stage to optimise the standard of protection and extent of realignment. Sensitivity to climate change scenarios in Environment Agency (2011) is low in the medium to long term.

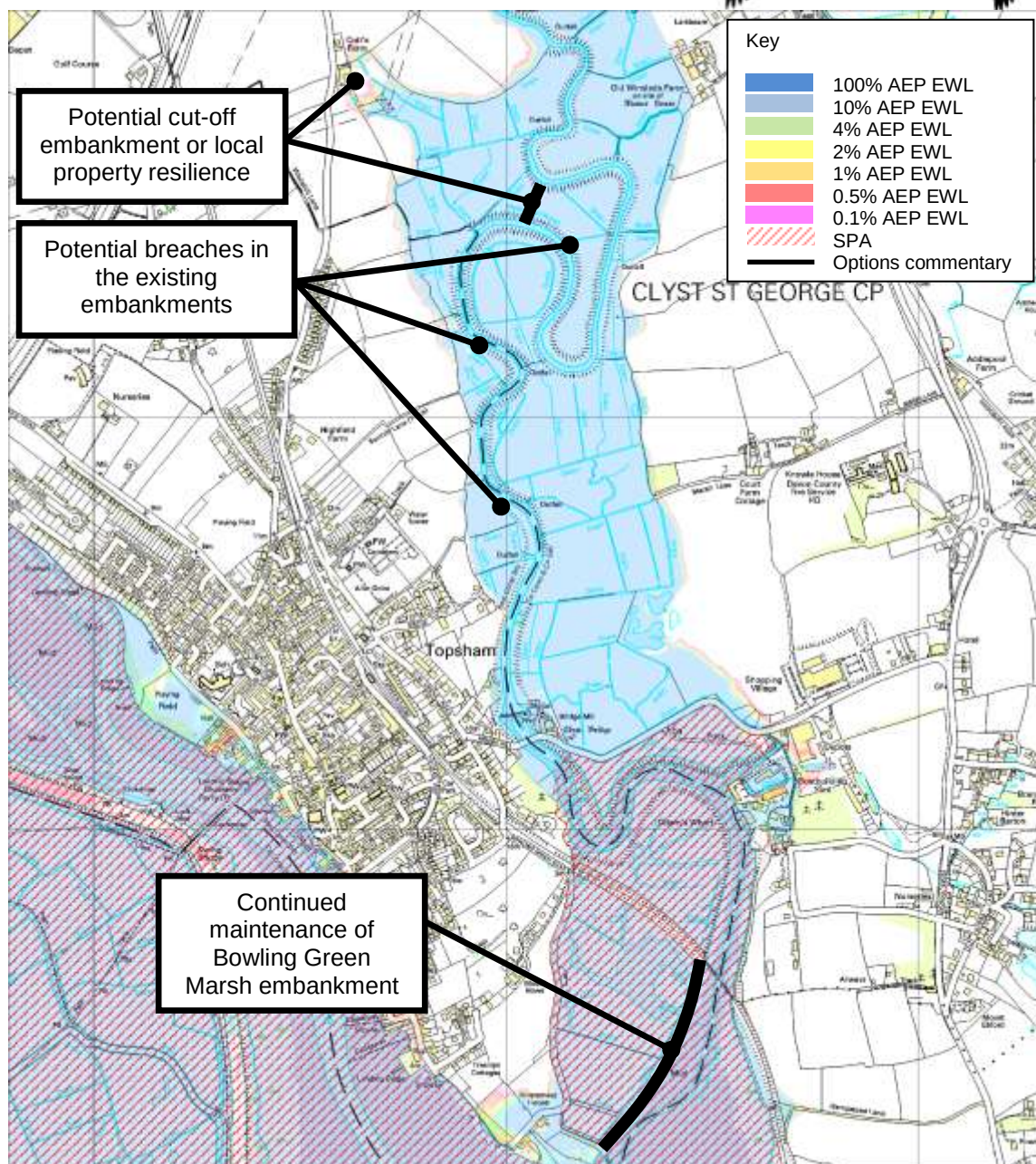
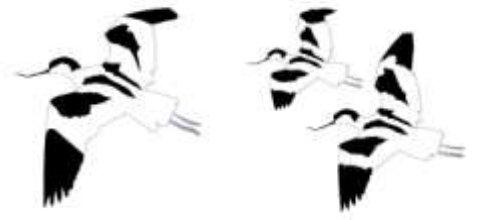


Figure 4.17 – Managed realignment option along the west bank of the Lower Clyst.



4.14 Topsham and Countess Wear

4.14.1 Overview

As identified in section 3.13, the draft HLOs are Sustain or Improve in the short term at Topsham, Sustain in the short term at Countess Wear, and Sustain in the medium to long term in both areas. Assessment of the FCRM assets at a sub-reach level identifies that improvement works in the short term are limited and would be focussed at the Topsham playing field and surrounding properties. Of further note is that tidal and wave overtopping can cause nuisance flooding to properties on Topsham Quay and along the Strand in Topsham, and that fluvial overtopping and groundwater can cause flooding of properties at Mill Lane in Countess Wear as shown in the Exeter PAR studies (Halcrow, 2010). These locations, the sources of flood risk, and the potential options for addressing the flood risks were discussed and agreed in meetings with Exeter City Council and the Environment Agency in June 2012. Early discussions with Devon County Council have indicated that the implications and investment for non strategic highways would require a good economic case to be made to be justified. Further to this, the potential for management of the habitats present on the in-channel islands was discussed with the Environment Agency in June 2012. This identified that the Exeter PAR has proposed potential enhancements for the islands north of the SPA boundary; the strategy studies have identified that some of these enhancement would occur naturally over time with more frequent inundation. However, in relation to the strategic objective of ensuring no net loss of habitat area or functionality, it was agreed that management of the in-channel islands would not be preferable. The subsequent sections give a summary of the flood risks in the short to long term, technically effective options for addressing these risks, and the assessment of these options.

4.14.2 Short Term Options at Topsham Playing Field

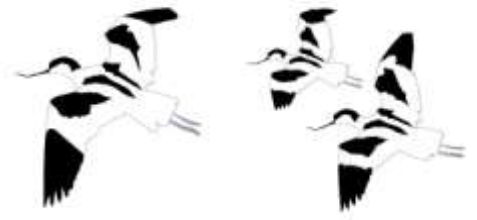
The Topsham playing field area is shown in Figure 4.18. The source of flood and coastal flood risk is due to the potential for regular tidal flooding over the playing field, with the onset of flooding to properties along the periphery of the playing fields in the 10% AEP event, and a flood route along Ferry Road to the south in the 1% AEP event, as indicated in Figure 4.19. An initial consideration of the appropriateness of the various engineering types was carried out to identify a short list of options. This is given in Table 4.13.



Figure 4.18 – Photograph of properties, near Topsham playing field area to the right.

Type	Appropriateness	Short-listed
Do Nothing	Not relevant within the draft HLO of Sustain. Only relevant for comparative purposes.	Y
Soft or hard foreshore management	Relevant within the draft HLO of Sustain. Not appropriate technically as risks are solely relating to flooding processes.	N
Improvements to existing assets	Relevant within the draft HLO of Sustain. Not appropriate technically as there are no existing assets in this locality.	N
New linear assets	Relevant within the draft HLO of Sustain. Appropriate technically to manage flood risks as no existing assets are present.	Y
Secondary assets	Relevant within the draft HLO of Sustain. Not relevant technically as no primary assets are present.	N
Point structures (pumping stations, outfalls, RTE or breaches)	Not relevant within the draft HLO of Sustain.	N
Demountable or temporary defences	Relevant within the draft HLO of Sustain. Not appropriate technically due to potential required size, as well as access and spatial constraints.	N
Property resilience	Relevant within the draft HLO of Sustain. Appropriate technically due to the localised nature of flood risk.	Y

Table 4.13 – Assessment of appropriateness of all engineering types in the short term at Topsham playing fields.



From the short-listed engineering types, technically effective options to minimise the above risks would consist of the following.

Option 1. New walls or embankments along the playing field periphery, of up to 0.5m in height. The PVc of this option in the short term is estimated as £0.45M. The environmental assessment identified that this option would impact on the landscape character and the playing field area, and may experience local opposition.

Option 2. Property resilience for around 10 properties located along the periphery of the playing field. Local road/pavement raising on Ferry Road of up to 0.25m. The PVc of this option in the short term is estimated as £0.34M. The environmental assessment identified that this option would impact on the landscape character and the playing field area, and may experience local opposition.

Option 3. Property resilience for around 20 properties located along the periphery of the playing field and along Ferry Road. The PVc of this option in the short term is estimated as £0.65M. The environmental assessment identified that this option would avoid impact on the landscape character and the playing field area compared to options 1 and 2, and may experience local opposition.

The extent and location of these options is identified in Figure 4.19. The PVb over the short term of carrying out the above works would be between £0.5M-£1.9M (dependent on SoP), highlighting that these options would have a BCR above unity. Assessment of this information within the FDGiA Calculator indicates that these options could receive partial FDGiA funding, and therefore sensitive to further option development.

All these options will be taken forward, as whilst the environmentally preferred option is option 3, socio-economic preference may be dependent on optimised SoP. Sensitivity to climate change scenarios in Environment Agency (2011) is low in the short term.

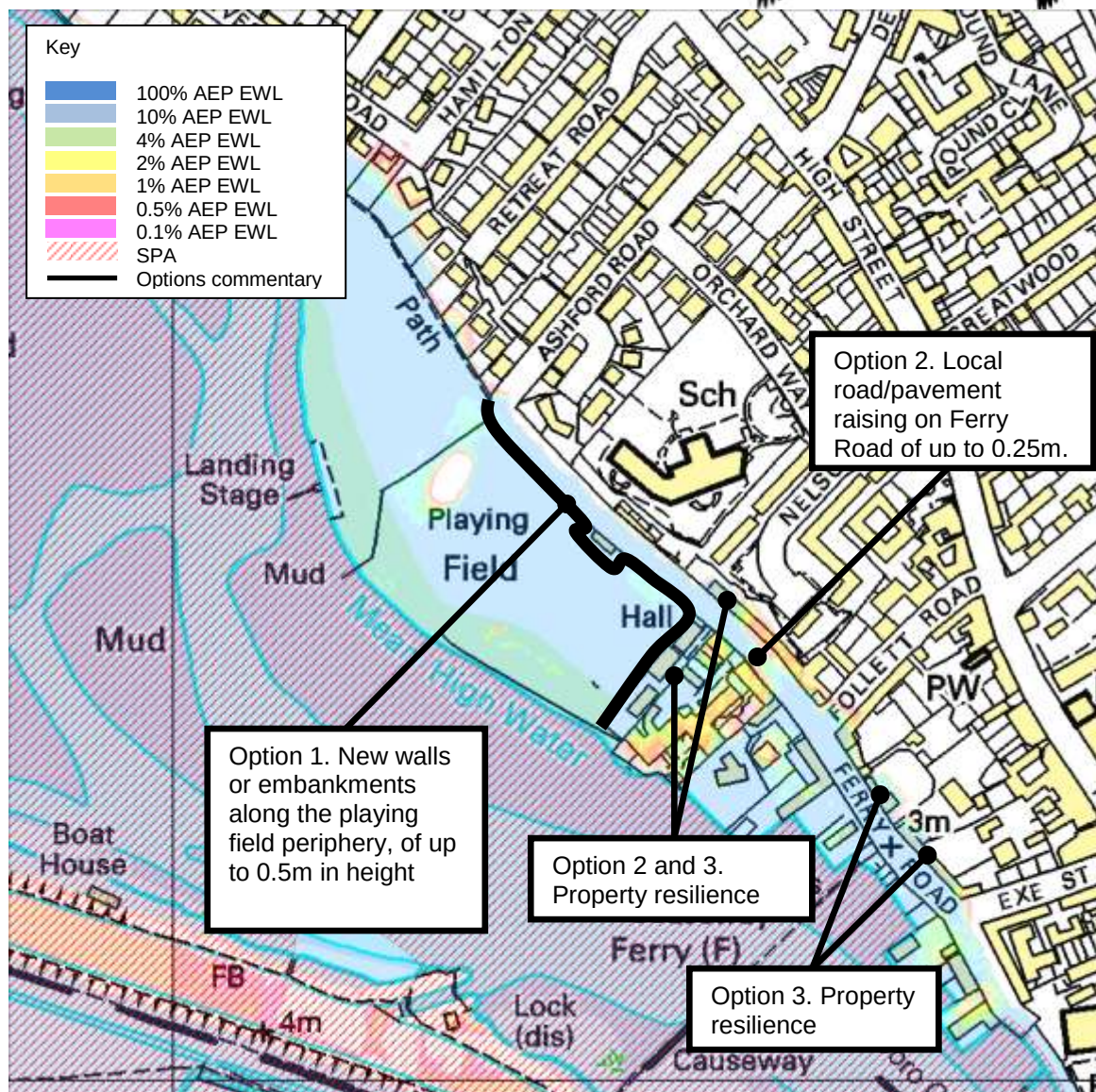


Figure 4.19 – Sources of flood risk and improvement options at Topsham playing field and surrounding area.

4.14.3 Medium to Long Term Options

As predicted climate change impacts occur increasingly into the medium to long term, a wider programme of FCRM asset improvements would be required to manage flood risks. Engineering design sensitivity to climate change scenarios is significant in the medium to long term, and could vary the potential raising of the existing structures as identified below. An initial consideration of the appropriateness of the various engineering types was carried out to identify a short list of options. This is given in Table 4.14.



Type	Appropriateness	Short-listed
Do Nothing	Not relevant within the draft HLO of Sustain. Only relevant for comparative purposes.	Y
Soft or hard foreshore management	Relevant within the draft HLO of Sustain. Not appropriate technically as risks are solely relating to flooding processes.	N
Improvements to existing assets	Relevant within the draft HLO of Sustain. Appropriate technically as existing assets could be effectively improved.	Y
New linear assets	Relevant within the draft HLO of Sustain. Not appropriate technically as existing assets could be effectively improved.	N
Secondary assets	Relevant within the draft HLO of Sustain. Not relevant technically due to potential required size, as well as access and spatial constraints.	N
Point structures (pumping stations, outfalls, RTE or breaches)	Not relevant within the draft HLO of Sustain.	N
Demountable or temporary defences	Relevant within the draft HLO of Sustain. Not appropriate technically due to potential required size, as well as access and spatial constraints.	N
Property resilience	Relevant within the draft HLO of Sustain. Appropriate technically due to the localised nature of flood risk.	Y

Table 4.14 – Assessment of appropriateness of all engineering types in the medium to long term at Topsham and Countess Wear.

From the short-listed engineering types, technically effective options, assuming the above short term works occur, would consist of the following.

Option 1. Wider raising of quay walls in Topsham (along The Strand) of between 0-2m dependent on climate change scenario. The upper limit of raising would be unlikely to be viable on engineering, landscape and operational grounds. The PVc of this option in the short to long term is estimated as up to £4.0M, dependent on SoP and short term preferences. The environmental assessment identified no clear preference between option 1 and 2.

Option 2. An extensive programme of property resilience works for around 150-200 properties progressively at flood risk in the Topsham and Countess Wear communities. The PVc of this option in the short to long term is estimated as up to £5.1M, dependent on SoP and short term preferences. The environmental assessment identified no clear preference between option 1 and 2.

The PVb over the short to long term of carrying out the above works would be up to £16.3M-£17.3M (dependent on SoP and form of intervention), highlighting that these options would have a BCR of between 4 to 5.



Both options will be taken forward, as further analysis and discussion is required to determine the potential acceptability of option 2, and socio-economic preference may be sensitive to the optimised SoP. Sensitivity to climate change scenarios in Environment Agency (2011) is significant in the medium to long term, as shown in Appendix L.

Exminster Marshes and Powderham Banks

4.15.1 Overview

As identified in section 3.14, the draft HLOs are Sustain in the short to long term. The potential for managed realignment that was noted in the long term is now not preferred as explained in section 4.5. Assessment of the FCRM assets at a sub-reach level identifies that improvement works in the short term are focussed at Powderham Banks. These locations, the sources of flood risk, and the potential options for addressing the flood risks were discussed and agreed in meetings with Teignbridge District Council, Exeter City Council and the Environment Agency in June 2012, and Network Rail in July 2012. The subsequent sections give a summary of the flood risks in the short to long term, technically effective options for addressing these risks, and the assessment of these options.

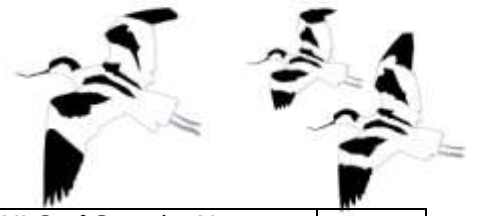
4.15.2 Short Term Options at Powderham Banks

The Powderham Banks area is shown in Figure 4.20. The source of flood risk is due to the close proximity of the deep water channel at the toe of the revetments representing an erosion risk, tidal overtopping in the 0.1% AEP event, and the potential for damage and breach of the assets in the 2% AEP event due to excessive wave overtopping. In addition this there is concern regarding the geotechnical stability of the Powderham Banks, which are not designed to present day standard practice, with studies underway by the Environment Agency to assess and propose options to address this risk. These risks would result in the mainline railway being put at risk, as well as Exminster Marshes, properties distributed within the floodplain and properties in Exminster, as indicated in Figure 4.21. An initial consideration of the appropriateness of the various engineering types was carried out to identify a short list of options. This is given in Table 4.15.



Figure 4.20 – Photograph of Powderham Banks.

Type	Appropriateness	Short-listed
Do Nothing	Not relevant within the draft HLO of Sustain. Only relevant for comparative purposes.	Y
Soft or hard foreshore management	Relevant within the draft HLO of Sustain. Appropriate technically as erosion risks exist where the main estuary channel flows adjacent to the embankment.	Y
Improvements to existing assets	Relevant within the draft HLO of Sustain. Appropriate technically as existing assets could be effectively improved.	Y
New linear assets	Relevant within the draft HLO of Sustain. Not appropriate technically as existing assets could be effectively improved, and the potential required size of new assets.	N
Secondary assets	Relevant within the draft HLO of Sustain. Not appropriate technically due to potential required size of secondary assets.	N
Point structures (pumping stations, outfalls, RTE or breaches)	Not relevant within the draft HLO of Sustain.	N
Demountable or temporary defences	Relevant within the draft HLO of Sustain. Not appropriate technically due to potential required size, as well as access and spatial constraints.	N



Property resilience	Relevant within the draft HLO of Sustain. Not appropriate technically as existing linear assets provide protection from flooding.	N

Table 4.15 – Assessment of appropriateness of all engineering types in the short term at Powderham Banks.

From the short-listed engineering types, technically effective options to minimise the above risks would consist of the following.

Option 1. Hard foreshore management, consisting of sheet piling along the revetment toe or through the revetment itself, or rock armouring at the toe. The PVc for these options in the short term is estimated as £1.2M (rock armouring) to £1.7M (sheet piling). Whilst the environmental assessment identified that sheet piling may be preferred as impacts on the SPA could be reduced. More widely, this option would still allow the SoP to reduce to 20% AEP by 2030, with significant increased flood risk to the railway line, freshwater SPA and RSPB reserve compared to options 2 and 3.

Option 2. Revetment, vertical or wave recurve wall raising of up to 0.5m. The PVc for these options in the short term is estimated as £1.2M (wall raising) to £3.9M (revetment raising). The environmental assessment identified that this option would result in increased flood protection to the railway line, freshwater SPA and landward RSPB reserve compared to option 1, although the risk of undermining would remain.

Option 3. A combination of both options 1 and 2. The PVc for these options in the short term would be between £3.3M (rock armouring with wall raising) to £5.4M (sheet piling with revetment raising). The environmental assessment identified that this option would result in increased flood protection to the railway line, freshwater SPA and landward RSPB reserve compared to option 1, and avoid the risk of undermining compared to option 2.

The extent and location of these options is identified in Figure 4.21. The PVb over the short term of carrying out the above works would be between £9.4M-£13.3M dependent on SoP and form of intervention (over 90% of which is directly related to the railway line), highlighting that these options would have a BCR varying above unity. Assessment of this information within the FDGiA Calculator indicates that these works could receive partial FDGiA funding, and would be Deferred – unless costs are reduced and/or additional contributions/RFCC levy secured.

The draft preferred option at this location is Option 3, on technical (reduced risk to the mainline railway) and environmental (reduced risk to freshwater SPA and the RSPB reserve) grounds. This option will be taken forward to the next option stage to optimise the standard of protection. Sensitivity to climate change scenarios in Environment Agency (2011) is low in the short term.

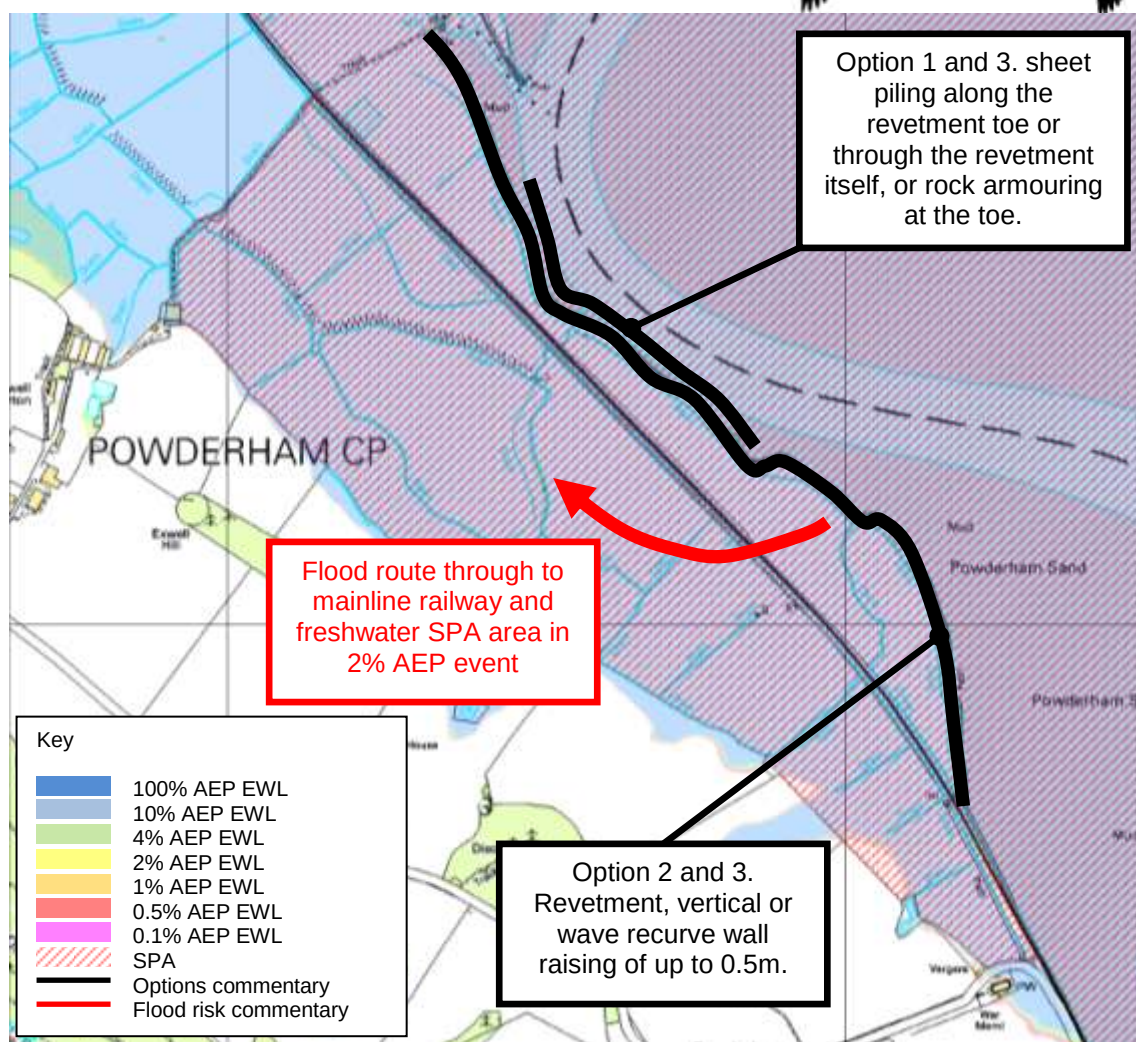


Figure 4.21 – Sources of flood risk and improvement options at Powderham Banks.

4.15.3 Medium to Long Term Options

As predicted climate change impacts occur increasingly into the medium to long term, a wider programme of FCRM asset improvements would be required to manage flood risks. Engineering design sensitivity to climate change scenarios is significant in the medium to long term, and could vary the potential raising of the existing structures as identified below. An initial consideration of the appropriateness of the various engineering types was carried out to identify a short list of options. This is given in Table 4.16.

Type	Appropriateness	Short-listed
Do Nothing	Not relevant within the draft HLO of Sustain. Only relevant for comparative purposes.	Y
Soft or hard foreshore management	Relevant within the draft HLO of Sustain. Appropriate technically as erosion risks exist where the main estuary channel flows adjacent to the	Y



	embankment.	
Improvements to existing assets	Relevant within the draft HLO of Sustain. Appropriate technically as existing assets could be effectively improved.	Y
New linear assets	Relevant within the draft HLO of Sustain. Not appropriate technically as existing assets could be effectively improved, and the potential required size of new assets.	N
Secondary assets	Relevant within the draft HLO of Sustain. Not appropriate technically due to potential required size of secondary assets.	N
Point structures (pumping stations, outfalls, RTE or breaches)	Not relevant within the draft HLO of Sustain.	N
Demountable or temporary defences	Relevant within the draft HLO of Sustain. Not appropriate technically due to potential required size, as well as access and spatial constraints.	N
Property resilience	Relevant within the draft HLO of Sustain. Not appropriate technically as existing linear assets provide protection from flooding.	N

Table 4.16 – Assessment of appropriateness of all engineering types in the medium to long term along Exminster Marshes and Powderham Banks.

From the short-listed engineering types, technically effective options, assuming the above short term works occur, would consist of the following.

Option 1. Canal bank raising of between 0-0.75m in the long term, dependent on climate change scenario. Further raising of Powderham Banks in the medium to long term, of between 0.5-1.5m. The upper limit of raising would be unlikely to be viable on engineering grounds. An alternative to this would be to harden the revetment to avoid breach during increasingly regular overtopping, accepting a lower SoP against tidal overtopping. The PVc for this option in the short to long term is estimated as up to £7.7M, dependent on SoP. The environmental assessment identified that this option would provide flood protection to properties and historic assets in Exminster, continue flood protection to the railway line, freshwater SPA and landward RSPB reserve, but would also continue the constraints on natural processes and hydromorphological pressure on the Exe transitional water body.

The PVb over the short to long term of carrying out the above works would be up to £32M-£37M dependent on SoP and form of intervention (25% of which relates to the mainline railway), highlighting that these options would have a BCR of around 5.

Option 1 will be taken forward to the next option stage to optimise the form of intervention and standard of protection. Sensitivity to climate change scenarios in Environment Agency (2011) is significant in the medium to long term, as shown in Appendix L.



4.16 Kenn Valley

4.16.1 Overview

As identified in section 3.15, the draft HLOs are Maintain in the short term, and Sustain in the medium to long term. The potential for managed realignment that was noted is now preferred as explained in section 4.5. The sources of flood risk, and the potential options for addressing the flood risks were discussed and agreed in meetings with Teignbridge District Council, Network Rail and the Environment Agency in June 2012. The subsequent sections give a summary of the flood risks in the short to long term, technically effective options for addressing these risks, and the assessment of these options.

4.16.2 Short Term Options

The Kenn Valley area is shown in Figure 4.22. Flood risk is limited with the existing railway revetments providing a SoP of 0.1% AEP against breach. The assessment of habitat change and compensation opportunities (described in AHA, June 2012 and July 2012), identified part of this area as a preferred managed realignment opportunity in the short term. An initial consideration of the appropriateness of the various engineering types was carried out to identify a short list of options. This is given in Table 4.17.



Figure 4.22 – Photograph of Kenn Valley area near Powderham bridge.



Type	Appropriateness	Short-listed
Do Nothing	Not relevant within the draft HLO of Maintain and Manage. Only relevant for comparative purposes.	Y
Soft or hard foreshore management	Relevant within the draft HLO of Maintain and Manage. Not appropriate technical as only flood risks are present.	N
Improvements to existing assets	Relevant within the draft HLO of Maintain and Manage. Not appropriate technically as existing assets as flood risks are adequately managed.	N
New linear assets	Relevant within the draft HLO of Maintain and Manage. Not appropriate technically as primary assets would be maintained.	N
Secondary assets	Relevant within the draft HLO of Sustain. Appropriate technically if inundation to enable habitat compensation requires local protection to properties.	Y
Point structures (pumping stations, outfalls, RTE or breaches)	Relevant within the draft HLO of Maintain and Manage. Appropriate technically to enable controlled inundation and habitat compensation.	Y
Demountable or temporary defences	Not relevant within the draft HLO of Maintain and Manage.	N
Property resilience	Relevant within the draft HLO of Maintain and Manage. Appropriate technically if inundation to enable habitat compensation requires local protection to properties.	Y

Table 4.17 – Assessment of appropriateness of all engineering types in the short term at Kenn Valley.

From the short-listed engineering types, the potential for habitat creation in the short term, to compensate for predicted SPA habitat losses, could be achieved via the following technically effective options.

Option 1. Regulated Tidal Exchange, with a RTE device attached to the existing culvert and the tide flap removed. The Pvc in the short term for this option is estimated as up to £1.4M. The environment assessment identified that in comparison to option 2, this option would be preferred as landscape character impacts related to embankments would be avoided.

Option 2. Extensive secondary embankments along the fringes of the habitat creation area, with the culvert tide flap removed. The Pvc in the short term for this option is estimated as £3.4M if focussed on areas with property present, but would be much higher if more extensive embankments were required for areas with no property. The environment assessment identified that in comparison to option 1, this option would have greater landscape character impacts related to the secondary embankments.



The extent and location of these options is identified in Figure 4.23. The PVb of the above options in the short term would be up to £8.1M-£8.6M (dependent on SoP). Assessment of this information within the FDGiA Calculator indicates that these works could receive partial to full FDGiA funding (dependent on the extent of realignment and form of intervention).

The draft preferred option at this location is Option 1, on socio-economic (lower cost) and environmental (reduced landscape character impacts) grounds. This option will be taken forward to the next option stage to optimise the standard of protection. Sensitivity to climate change scenarios in Environment Agency (2011) is low in the short term.

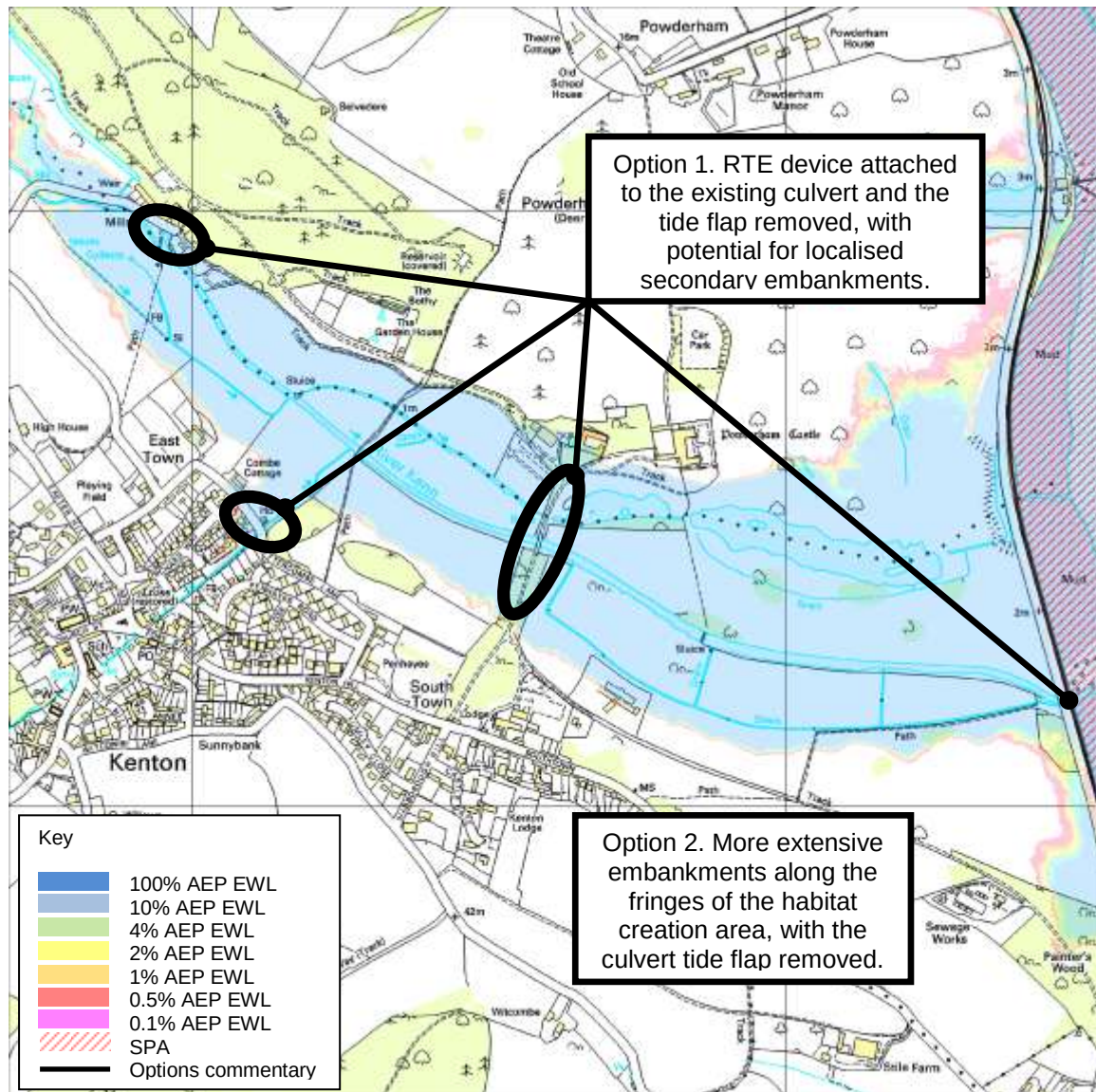


Figure 4.23 – Managed realignment options at Kenn Valley.



4.16.3 Medium to Long Term Options

As predicted climate change impacts occur increasingly into the medium to long term, a wider programme of FCRM asset improvements would be required to manage flood risks. In addition to this, the likely evolution of Dawlish Warren sand spit would result in a locally increased wave and tide climate towards 2060. Engineering design sensitivity to the climate change scenarios and the evolution of the sand spit is significant in the medium to long term, and could vary the potential raising of the existing structures as identified below. An initial consideration of the appropriateness of the various engineering types was carried out to identify a short list of options. This is given in Table 4.18.

Type	Appropriateness	Short-listed
Do Nothing	Not relevant within the draft HLO of Maintain and Manage. Only relevant for comparative purposes.	Y
Soft or hard foreshore management	Relevant within the draft HLO of Maintain and Manage. Not appropriate technically as only flood risks are present.	N
Improvements to existing assets	Relevant within the draft HLO of Maintain and Manage. Appropriate technically as existing assets, and short term options, could effectively be improved to manage increasing flood risks.	Y
New linear assets	Relevant within the draft HLO of Maintain and Manage. Not appropriate technically as primary assets would be maintained.	N
Secondary assets	Relevant within the draft HLO of Sustain. Not appropriate technically as no further habitat compensation proposed.	N
Point structures (pumping stations, outfalls, RTE or breaches)	Relevant within the draft HLO of Maintain and Manage. Not appropriate technically as no further habitat compensation proposed.	N
Demountable or temporary defences	Not relevant within the draft HLO of Maintain and Manage.	N
Property resilience	Relevant within the draft HLO of Maintain and Manage. Not appropriate technically as no further habitat compensation proposed.	N

Table 4.18 – Assessment of appropriateness of all engineering types in the medium to long term at Kenn Valley.

From the short-listed engineering types, technically effective options, assuming the above short term works occur, would consist of the following.

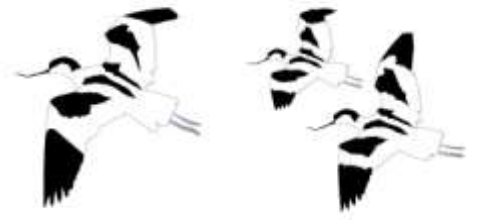
Option 1. Vertical or wave recurve wall raising of between 0-1.5m in the medium to long term. The PVC in the short to long term for this option is estimated as up to £2.9M.



Option 2. Rock armouring or revetment raising of between 0-1.5m in the medium to long term. The PVc in the short to long term for this option is estimated as up to £6.1M.

The environment assessment identified no preference between options 1 and 2. The PVb over the short to long term of carrying out the above works would be between £13.5M-£14.1M dependent on SoP (40% of which relates to the mainline railway), highlighting that these options would have a BCR of between 2 and 4.

The draft preferred option at this location is Option 1, on socio-economic (lower cost) grounds. This option will be taken forward to the next option stage to optimise the standard of protection. Sensitivity to climate change scenarios in Environment Agency (2011) is significant in the medium to long term, as shown in Appendix L.



4.17 Starcross

4.17.1 Overview

As identified in section 3.16, the draft HLOs are Sustain or Improve in the short term, and Sustain in the medium to long term. Assessment of the FCRM assets at a sub-reach level identifies that improvement works in the short term are focussed at Cockwood Harbour. The sources of flood risk, and the potential options for addressing the flood risks were discussed and agreed in meetings with Teignbridge District Council, Network Rail and the Environment Agency in June 2012. Further potential local areas of concern as regards flood risk were identified at Eales Dock, the flood gate at Generals Lane, the access opposite the jetty, and the tidal inlet at the northern extent of The Strand; these locations would require topographic survey to confirm the level of flood risk, and the draft HLO would support local improvement works at these locations if necessary. The subsequent sections give a summary of the flood risks in the short to long term, technically effective options for addressing these risks, and the assessment of these options.

4.17.2 Short Term Options at Cockwood Harbour

The Cockwood Harbour area is shown in Figure 4.24. The source of flood and coastal flood risk is due to tidal overtopping of the Cockwood harbour walls in the 4% AEP event, with flooding of local properties and a flood route through to the wider community of Starcross, as indicated in Figure 4.25. The wider railway revetments have a SoP of 0.1% AEP or above. An initial consideration of the appropriateness of the various engineering types was carried out to identify a short list of options. This is given in Table 4.19.



Figure 4.24 – Photograph of Cockwood Harbour area.



Type	Appropriateness	Short-listed
Do Nothing	Not relevant within the draft HLO of Improve. Only relevant for comparative purposes.	Y
Soft or hard foreshore management	Relevant within the draft HLO of Improve. Not appropriate technical as only flood risks are present.	N
Improvements to existing assets	Relevant within the draft HLO of Improve. Appropriate technically as existing assets could effectively be improved to manage increasing flood risks.	Y
New linear assets	Relevant within the draft HLO of Improve. Not appropriate technically as primary assets would be maintained.	N
Secondary assets	Relevant within the draft HLO of Improve. Appropriate technically as flood route through to wider floodplain could be effectively managed.	Y
Point structures (pumping stations, outfalls, RTE or breaches)	Relevant within the draft HLO of Improve. Not appropriate technically as no habitat compensation proposed.	N
Demountable or temporary defences	Relevant within the draft HLO of Improve. Appropriate technically as flood route through to wider floodplain could be effectively managed.	Y
Property resilience	Not relevant within the draft HLO of Improve.	N

Table 4.19 – Assessment of appropriateness of all engineering types in the short term at Cockwood Harbour.

From the short-listed engineering types, technically effective options to minimise the above risks would consist of the following.

Option 1. Vertical or wave recurve wall raising of up to 0.5m along the harbour walls. The PVc in the short term for this option is estimated as up to £1.1M. The environment assessment identified that this option would be preferred in comparison to option 2, although impacts are similar.

Option 2. Road and wall raising along the north of Cockwood Harbour, to cut off the flood route to Starcross, and road and wall raising along the south of Cockwood Harbour, of up to 0.5m in height. The PVc in the short term for this option is estimated as up to £0.7M. The environment assessment identified that this option would not be preferred in comparison to option 1, although impacts are similar.

The extent and location of these options is identified in Figure 4.25. The PVb of the above options in the short term would be between £56M-£80M dependent on SoP, providing a very high BCR. The above works could move around 650 residential and commercial properties from the 'moderate risk' band to negligible risk. Assessment of this information within the FDGiA Calculator



indicates that these works could receive complete FDGiA funding, and be a Candidate for the National Priority Programme subject to EA and RFCC approval.

Both options will be taken forward, as socio-economic and environmental preference may be sensitive to optimised SoP, and further discussions would be required with Teignbridge District Council and locally affected parties. Sensitivity to climate change scenarios in Environment Agency (2011) is low in the short term.

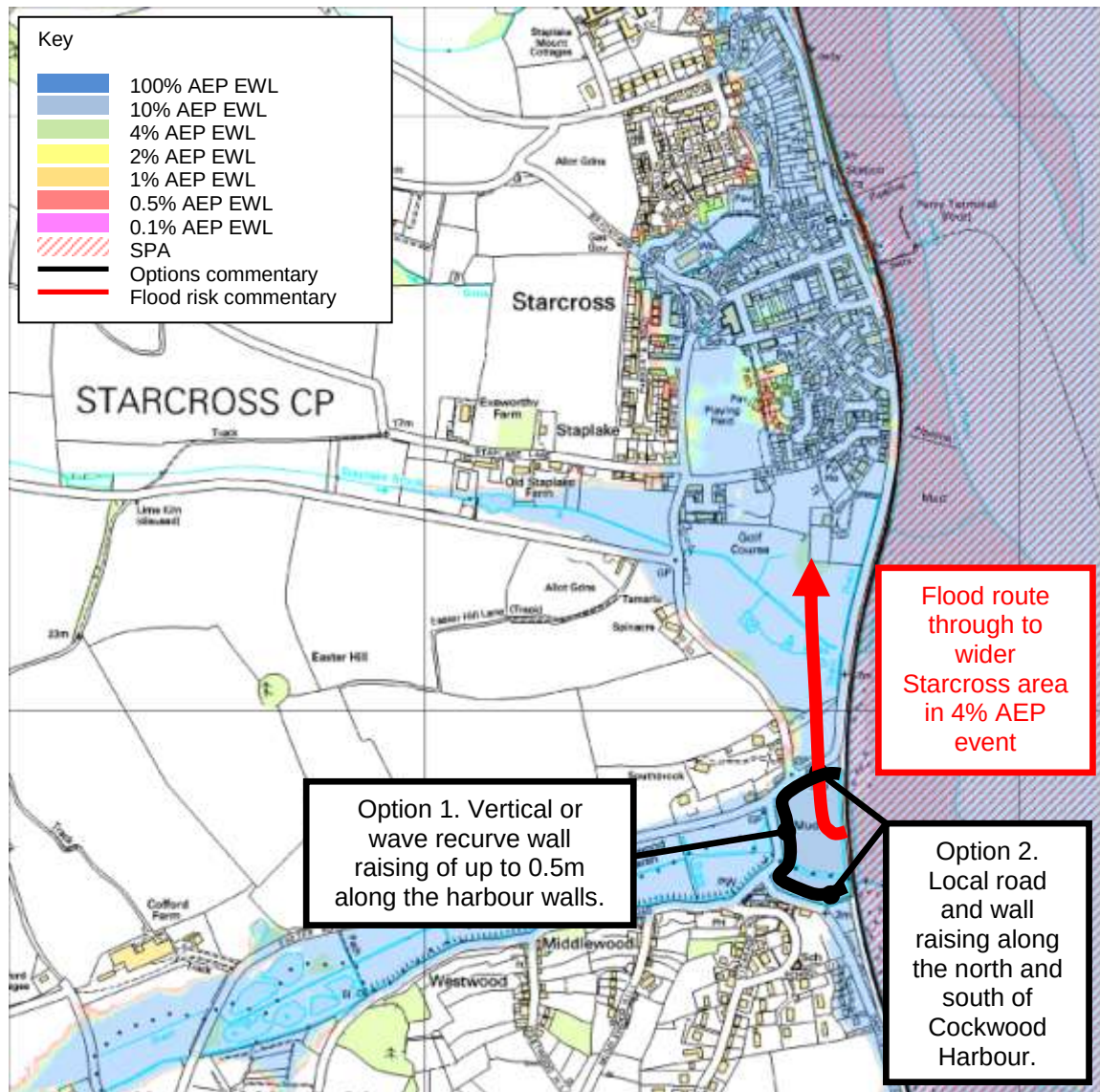


Figure 4.25 – Sources of flood risk and improvement options at Cockwood Harbour.



4.17.3 Medium to Long Term Options

As predicted climate change impacts occur increasingly into the medium to long term, a wider programme of FCRM asset improvements would be required to manage flood risks. In addition to this, the likely evolution of Dawlish Warren sand spit would result in a locally increased wave and tide climate towards 2060. Engineering design sensitivity to the climate change scenarios and the evolution of the sand spit is significant in the medium to long term, and could vary the potential raising of the existing structures as identified below. An initial consideration of the appropriateness of the various engineering types was carried out to identify a short list of options. This is given in Table 4.20.

Type	Appropriateness	Short-listed
Do Nothing	Not relevant within the draft HLO of Sustain. Only relevant for comparative purposes.	Y
Soft or hard foreshore management	Relevant within the draft HLO of Sustain. Not appropriate technical as only flood risks are present.	N
Improvements to existing assets	Relevant within the draft HLO of Sustain. Appropriate technically as existing assets could effectively be improved to manage increasing flood risks.	Y
New linear assets	Relevant within the draft HLO of Sustain. Not appropriate technically as primary assets would be maintained.	N
Secondary assets	Relevant within the draft HLO of Sustain. Not appropriate technically as primary assets would be maintained.	N
Point structures (pumping stations, outfalls, RTE or breaches)	Relevant within the draft HLO of Improve. Not appropriate technically as no habitat compensation proposed.	N
Demountable or temporary defences	Relevant within the draft HLO of Sustain. Not appropriate technically as primary assets would be maintained.	N
Property resilience	Not relevant within the draft HLO of Sustain.	N

Table 4.20 – Assessment of appropriateness of all engineering types in the medium to long term along Starcross and Cockwood.

From the short-listed engineering types, technically effective options, assuming the above short term works occur, would consist of the following.

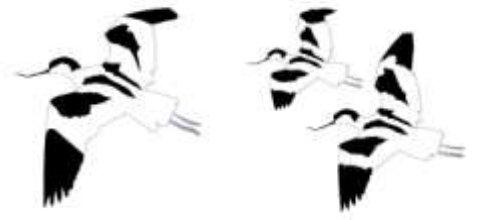
Option 1. Vertical or wave recurve wall raising of between 0-1.5m in the medium to long term. Further raising of the short term Cockwood Harbour works of between 0-1m. The PVC in the short to long term for this option is estimated as up to £3.9M.



Option 2. Rock armouring or revetment raising of between 0-1.5m in the medium to long term. Further raising of the short term Cockwood Harbour works of between 0-1m. The PVc in the short to long term for this option is estimated as up to £9.6M.

The environment assessment identified no preference between options 1 and 2. The PVb over the short to long term of carrying out the above works would be between £135M-£146M dependent on SoP (14% of which relates to the mainline railway), highlighting that these options would have a high BCR.

The draft preferred option at this location is Option 1, on socio-economic (lower cost) grounds. This option will be taken forward to the next option stage to optimise the standard of protection. Sensitivity to climate change scenarios in Environment Agency (2011) is significant in the medium to long term, as shown in Appendix L.



4.18 Dawlish to Holcombe

4.18.1 Overview

As identified in section 3.17, the draft HLOs are Sustain or Improve in the short term, and Sustain in the medium to long term. Assessment of the FCRM assets at a sub-reach level identifies that improvement works in the short term are focussed on the mainline railway, with very limited risk to other infrastructure or properties. The sources of flood risk, and the potential options for addressing the flood risks were discussed and agreed in meetings with Teignbridge District Council, Network Rail and the Environment Agency in June 2012. The subsequent sections give a summary of the flood risks in the short to long term, technically effective options for addressing these risks, and the assessment of these options.

4.18.2 Short Term Options

The Dawlish to Holcombe area is shown in Figure 4.26. The source of flood and coastal flood risk is due to damage to the railway revetment in the 20% AEP event due to excessive wave overtopping, and breach of the railway revetment in the 4% AEP event. An initial consideration of the appropriateness of the various engineering types was carried out to identify a short list of options. This is given in Table 4.21.



Figure 4.26 – Photograph of Dawlish area.



Type	Appropriateness	Short-listed
Do Nothing	Not relevant within the draft HLO of Sustain or Improve. Only relevant for comparative purposes.	Y
Soft or hard foreshore management	Relevant within the draft HLO of Sustain or Improve. Appropriate technically as both erosion and flood risks are present.	Y
Improvements to existing assets	Relevant within the draft HLO of Sustain or Improve. Appropriate technically as existing assets could effectively be improved to manage increasing flood risks.	Y
New linear assets	Relevant within the draft HLO of Sustain or Improve. Not appropriate technically as primary assets would be maintained.	N
Secondary assets	Relevant within the draft HLO of Sustain or Improve. Not appropriate technically as primary assets would be maintained.	N
Point structures (pumping stations, outfalls, RTE or breaches)	Relevant within the draft HLO of Sustain or Improve. Not appropriate technically as would not manage flood risk to the mainline railway.	N
Demountable or temporary defences	Relevant within the draft HLO of Sustain or Improve. Not appropriate technically as would not manage flood risk to the mainline railway.	N
Property resilience	Not relevant within the draft HLO of Sustain or Improve.	N

Table 4.21 – Assessment of appropriateness of all engineering types in the short term along Dawlish to Holcombe.

From the short-listed engineering types, technically effective options would consist of the following.

Option 1. Vertical or wave recurve wall raising of up to 0.5m. The Pvc in the short term for this option is estimated as up to £0.9M.

Option 2. Rock armouring or revetment raising of up to 0.5m. The Pvc in the short term for this option is estimated as up to £3.8M.

These options would extend between Langstone Rock and Kennaway Tunnel. The environmental assessment identified no preference between option 1 and 2. The PVb of the above options in the short term would be up to £0.3M dependent on SoP (completely relating to the railway line), indicating a BCR of below unity. Assessment of this information within the FDGiA Calculator indicates that these works could receive no FDGiA funding (dependent on the extent of realignment and form of intervention), and would be Deferred – unless costs are reduced and/or additional contributions/RFCC levy secured.

Network Rail is currently considering potential works for improving the mainline railway, described in Halcrow (2009). This identifies a wider range of options that broadly concur with the short-listed options above, and are more detailed, extensive and costly. As flood



risks in the short term relate completely to the mainline railway, the above short-listed options will not be developed any further at the responses option stage, but do support the Halcrow (2009) options for this coastline.

4.18.3 Medium to Long Term Options

As predicted climate change impacts occur increasingly into the medium to long term, a wider programme of FCRM asset improvements would be required to manage flood risks. Engineering design sensitivity to the climate change scenarios in the medium to long term, and could vary the potential raising of the existing structures as identified below. An initial consideration of the appropriateness of the various engineering types was carried out to identify a short list of options. This is given in Table 4.22.

Type	Appropriateness	Short-listed
Do Nothing	Not relevant within the draft HLO of Sustain. Only relevant for comparative purposes.	Y
Soft or hard foreshore management	Relevant within the draft HLO of Sustain. Appropriate technically as both erosion and flood risks are present.	Y
Improvements to existing assets	Relevant within the draft HLO of Sustain. Appropriate technically as existing assets could effectively be improved to manage increasing flood risks.	Y
New linear assets	Relevant within the draft HLO of Sustain. Not appropriate technically as primary assets would be maintained.	N
Secondary assets	Relevant within the draft HLO of Sustain. Not appropriate technically as primary assets would be maintained.	N
Point structures (pumping stations, outfalls, RTE or breaches)	Relevant within the draft HLO of Sustain. Not appropriate technically as would not manage flood risk to the mainline railway.	N
Demountable or temporary defences	Relevant within the draft HLO of Sustain. Not appropriate technically as would not manage flood risk to the mainline railway.	N
Property resilience	Relevant within the draft HLO of Sustain. Appropriate technically due to the localised nature of flooding and spatial constraints for new linear or secondary assets.	Y

Table 4.22 – Assessment of appropriateness of all engineering types in the medium to long term along Dawlish to Holcombe.



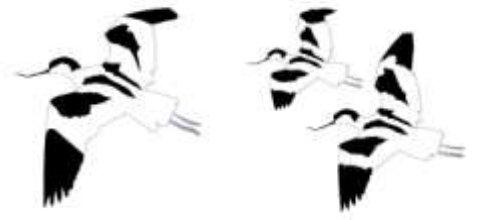
From the short-listed engineering types, technically effective options, assuming the above short term works occur, would consist of:

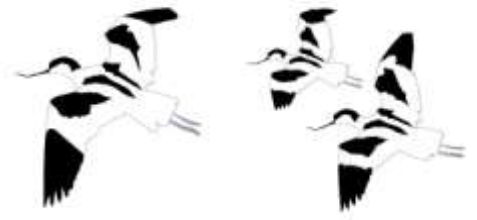
Option 1. Vertical or wave recurve wall raising along the railway embankment of between 0.5-2m. Local property resilience for properties adjacent to where Dawlish Water discharges under the railway bridge. The PVc in the short term for this option is estimated as up to £2.1M.

Option 2. Rock armouring or revetment raising along the railway embankment of between 0.5-2m. Local property resilience for properties adjacent to where Dawlish Water discharges under the railway bridge. The PVc in the short term for this option is estimated as up to £6.2M.

The environment assessment identified no preference between options 1 and 2. The PVb over the short to long term of carrying out the above works would be around £21M dependent on SoP (75-100% of which relates to the mainline railway), highlighting that these options would have a BCR between 3 to 10.

In light of the potential short term works Network Rail is currently considering, these options will not be developed any further as they will be sensitive to the eventual short term works.



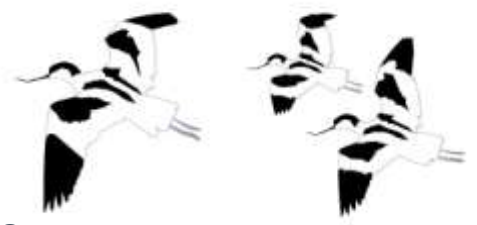


5. Responses

5.1 Introduction and Range of Responses

The preferred Alignments and Types were used as the starting point for considering relevant Responses. Potential Responses ranged from do nothing and non-structural measures through to heavily engineered structural measures. They included:

- Do Nothing
- Visual inspection, and survey
- Education and awareness
- Forecasting and warning
- Reactive maintenance
- Proactive maintenance
- Sediment recharge
- Polder fields
- Groynes
- Breakwaters
- Toe protection
- Reinforcement
- Optimised geometry
- Earth embankment
- Revetment
- Rock armouring
- Wave recurve wall
- Concrete/masonry wall
- Secondary alignments
- Ground, road and pavement raising
- Regulated Tidal Exchange
- Demountable and temporary defences
- Property resilience



5.2 Methodology for Assessment of Responses

Responses were assessed at a sub-reach level through the following process:

- Alignments and Types context. This set the direction of FCRM activity at a sub-reach level.
- Technical and economic optimisation of the option. This was achieved via more detailed assessment of the technical appropriateness of the relevant responses, and also took into account the relative cost of those responses. The FCERM-AG rules relating to iBCR were applied to optimise the SoP. As the FCRM unit level of assessment is the prime control on flood and coastal risk management, the final consideration of responses was carried out at this level. However, costs were developed in detail at a sub-reach level for each relevant range of responses and SoPs.
- Potential for funding was assessed for the duration of benefits of initial capital works. This generally was the short term period (2010-2030), where the effects of climate change have much higher certainty than later in the century. Potential for funding was assessed via the FCRM GiA calculator. Optimisation was also carried out for the whole 100 year lifetime of proposed responses for the medium 95%ile emissions scenario.
- Environmental assessment of the preferred Response was undertaken and is documented in the SEA and HRA reports. Detailed assessment of the footprint impact of the optimised responses was carried out at a sub-reach level. This ensured that the footprint impacts, in combination with the realignment gains and predicted 'coastal squeeze' losses, would still ensure a positive habitat balance. Within this assessment, optimised technical solutions were strongly driven to ensure avoidance of footprint impact on the Exe Estuary Natura 2000 site i.e. generally seaward works were avoided unless technically critical.

5.3 Overview of Assessment

A description of the draft Response options assessment is given below, along with any issues to be resolved or assessed in further detail, subsequent to the strategy process. Response options that were considered were assessed through the SEA and HRA process. Within the subsequent sections, more detail is given for potential short term options than for medium to long term options, due to the larger uncertainties in magnitude of climate change. The overall assessment matrices are given in Appendix M, with the design and costs for options given in Appendix N and the FCERM-AG optimisation process in Appendix O. The use of the detailed assessments in the appendices to support option decision making is given in Figure 5.1.

As in the previous chapter, the assessment and broad preference of options for managing the SAC, SPA and Ramsar were considered prior to the FCRM unit analyses, and are presented herein prior to the FCRM unit analyses also.

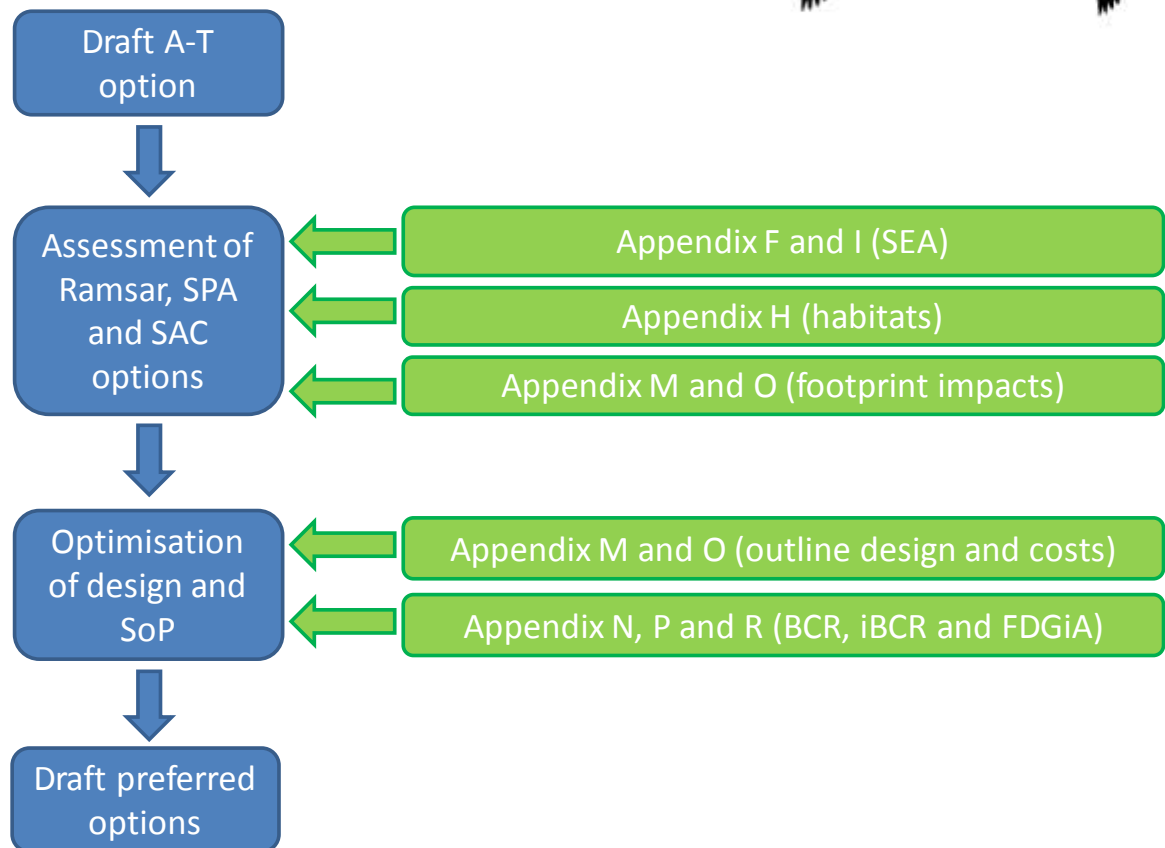
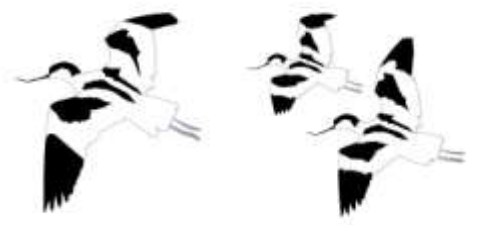


Figure 5.1 – Flow of outline design and SoP decision-making.

5.4 Dawlish Warren SAC, sand spit and village

5.4.1 Overview

Based on the analysis in section 4.4, further detailed options were assessed. Meetings were held with the Environment Agency, Teignbridge District Council and Natural England in August to October 2012, to confirm the practicalities of constructing the broad management approach, and discuss and identify further detailed options. Detailed options considered were:

- Location of the flood risk management structure to limit flood risk through to the village of Dawlish Warren, and maximise wider social, amenity and environmental benefits.
- Potential order and timing of coastal management, consisting of beach recharge/recycling, groyne maintenance, and gabion removal.

The location of these activities is given in Figure 5.2.

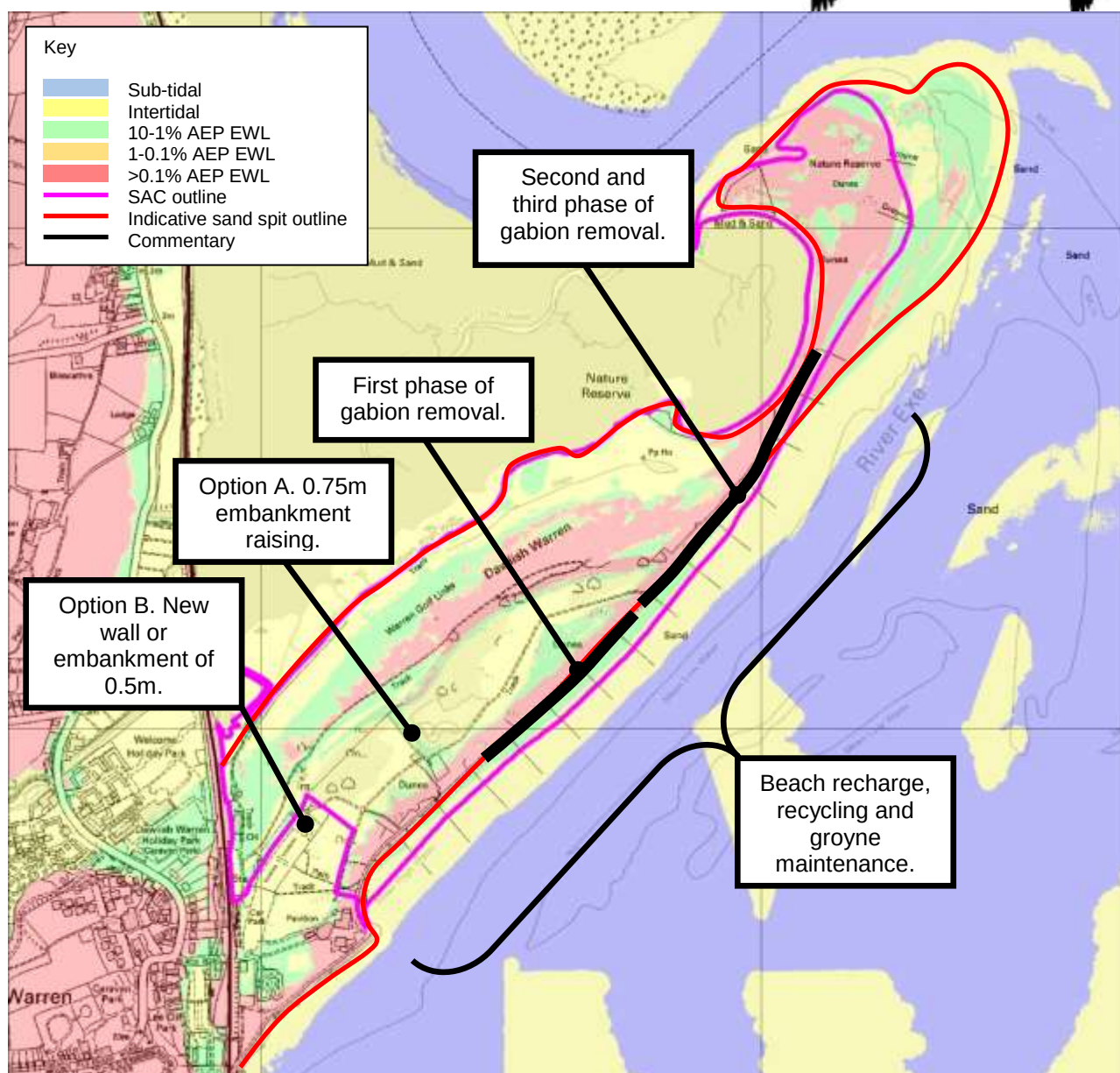
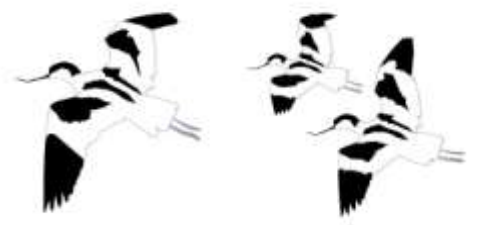


Figure 5.2 – Location of short term activities at Dawlish Warren sand spit.

5.4.2 Flood Risk Management

Three potential locations were considered for the cut-off structure. Assessment of these options identifies that:

- Option A (adjacent to the Visitor Centre), would be located along an existing wide grassed embankment. The form of this structure could be raising of the existing grassed embankment by up to 0.75m height.
- Option B would be located adjacent to the car park. The form of this structure could either be a wall or embankment of up to 0.5m height.



5.4.3 Beach Recharge, Recycling and Groyne Maintenance

The potential amount of sediment and balance of recharge/recycling frequency will need to be determined at scheme level investigation. However, from the geomorphological work in AHA (2013) and Halcrow (2011), the bounding limits would be $\sim 10,000\text{m}^3$ annually recycled, through to $250,000\text{m}^3$ as a one off recharge in the short term. Further to this, consideration of the existing groynes and their required maintenance to effectively support the beach recharge, will be required.

Potential sources of sediment for beach recharge/recycling would need primarily to a) have an appropriate Particle Size Distribution (PSD) curve to broadly match the existing sediment at Dawlish Warren sand spit, and b) be available in a timely manner to enable the broad management approach. An initial consideration of potential dredging sites suggests:

- Pole Sands ebb delta. From geomorphological work in AHA (2013), Pole Sands appears to be broadly stable (with an indicative sediment volume of $2,700,000\text{m}^3$), and receives a portion of sediment from the sand spit itself. This would suggest that the sediment on Pole Sands may be appropriate for the sand spit, that the cumulative recharge volume could amount to $\sim 7\%$ of the total feature volume, and the process of dredging and beach recharge could be designed to effectively work with the ongoing sediment transfers.
- Bull Hill Banks flood delta, or entrance channel. From AHA (2013), Bull Hill Banks (with an indicative sediment volume of $1,600,000\text{m}^3$) and the entrance channel appear to be accreting, and again is indicated to receive sediment from the sand spit. The cumulative recharge volume could amount to $\sim 13\%$ of the total feature volume. However, the process of dredging and beach recharge would tend to redistribute material away from the inner estuary, back to the coastal system.
- A remote source of sediment from already licensed locations along the southern UK coast. The British Geological Survey (BGS) has begun detailed mapping of the marine sand and gravel resource, with the UK East coast mapped to date (Crown Estate, 2011); as this mapping expands to cover the wider UK resource this will provide further useful information.

Recent experience in the UK of the potential timescale to move from initial investigations through to licensing of a new dredge site suggests a 5 year duration as a minimum. This process would include geophysical sampling to identify sediment resource, as well as SEA, HRA and Coastal Impact studies. This 5 year timescale is practicable within the broad management approach for the sand spit. However, if the duration extends significantly to over 10 years, this would not be supportive of the sand spit management approach, and may require consideration of less preferred, but possibly more timely, existing dredge license sites.

5.4.4 Phased Gabion Removal

The removal of gabions will need to be carried out in a phased manner to ensure the sand spit evolves as broadly predicted, and that unforeseen impacts in both FCRM and SAC/SPA terms are avoided.

Consideration of the most effective phasing of gabion removal identifies that:

- The first phase of gabion removal would most effectively be located between groynes 3-7. This would enable tying in of the concrete revetment to the location of the raised earth embankment, avoiding uncontrolled outflanking of end structures. Additionally, the sand dunes and ground levels, 50-100m landward along this shoreline, are slightly elevated above MHWS (and above or similar to the 100%AEP EWL), reducing the potential for a rapid local



change in intertidal form of the sand spit. Existing Environment Agency access to the eastwards gabions and groynes 8-14 would still be possible as this is located at groyne 8.

- The second phase of gabion removal would be located between groynes 7-11. This would represent removal of the gabions up to, but not including, the critical neck section. This would enable continued removal of gabions, whilst minimising the potential FCRM and SPA impact (predominantly in the lee of the sand spit between Dawlish Warren and Kenn Valley) of losing control of the neck and distal sections earlier than anticipated.
- The third phase of gabion removal would cover the remaining exposed gabions from groyne 11 eastwards. As currently buried gabions become exposed over time, these would be removed also.

5.4.5 Timing, Optimised Standard of Protection and Funding

The various activities described above would need to occur in a planned manner. Consideration of the above activities as a whole suggests the order and timescale given below. However, if wider funding opportunities are forthcoming, this programme could be reviewed and accelerated. Of particular note is that first phase of removal of the gabions is dependent on licensing timescales for the beach recharge/recycling. Discussions with Natural England have highlighted the need for a) the licensing process to be progressed as efficiently as possible to avoid continued impacts on the natural functioning of the sand spit, and b) a plan for managing public access and the ecological interests at the sand spit.

- Groyne maintenance (particularly after storm events) should continue over the next 5 years to enable the wider strategic approach.
- Monitoring of the wave and tidal climate, and beach profiling, should continue (carried out by the Plymouth Coastal Observatory), to provide a baseline of existing trends.
- Initial investigations and PARs to progress the proposed beach recharge/recycling should begin immediately.
- PAR studies for the embankment raising should begin immediately, with the intention for construction within the next 5 years.
- The first phase of gabion removal (between groynes 3-7) and the onset of beach recharge/recycling should begin in tandem, as soon as possible (dependent on licensing timescales). Monitoring of the sand spit form should be carried out over a period of 5 years to confirm sand spit evolution within the broad geomorphological range identified by AHA (2013).
- It is likely that 10 years from now the Shoreline Management Plan and FCRM Strategy will be reviewed. This will provide an important opportunity to review and confirm the continued management of the sand spit.
- The second and third phases of gabion removal (from groyne 7 eastwards) would likely occur in the next 10-20 years. Monitoring of the sand spit form should be carried out over a period of 5 years to confirm sand spit evolution within the broad geomorphological range identified by AHA (2013).

Assessment of the PVB, PVB, BCR and iBCR, and application of the FCRM-AG rules identifies that the optimised SoP would be 0.1%AEP up to 2040-50, requiring embankment raising of 0.75m adjacent to the visitor centre. This is predominantly based on the likely 10-20 year delay in



permanent separation and flattening of the sand spit distal section providing approximately £42M to £79M PVb estuary-wide, as well as the local PVb arising from Dawlish Warren town itself.

Assessment for the potential for FDGiA funding indicates that between 80% and 120% of the scheme cost could be FDGiA funded. Any remaining cost (£1.4M or less) may need to be found via partnership funding. The sources of socio-economic and wider benefits are various, and primary beneficiaries include local tourism businesses, Teignbridge District Council, and Network Rail.

Assessment of the 100 year timescale identifies that the optimised SoP would continue to be 0.1%AEP for the town of Dawlish Warren, requiring continued maintenance (but no improvements) to the concrete revetment and wave recurve wall structures at the proximal end, and a further 0.7m raising of the embankment adjacent to the visitor centre. The central, neck and distal sections of the sand spit would be evolving naturally.

5.5 Exe Estuary SPA

As noted in section 4.5, the Lower Clyst Valley and Kenn Valley were identified as potential managed realignment sites. Detailed analysis of the likely extent of the realignments has refined the habitat balance assessment, taking into account engineering and other constraints, along with estimation of footprint impacts from the short to long term programme of FCRM improvements. These are summarised in Table 5.1.

In the short term, the predicted loss of up to 28Ha of non-vegetated intertidal habitat represents a less than 3% loss of the existing extent. The predicted gain of up to 96Ha of saltmarsh and transitional saltmarsh represents a 130% gain of the existing extent. In the medium to long term, the proposed managed realignment sites would continue result in a positive balance for overall intertidal habitats (whether vegetated or otherwise). The intertidal habitat types are grouped as one due to the uncertainties around sedimentation rates in the realignment sites, although there is potential for the realignment sites to have an increasing amount of mudflat. The ecological functionality and ability to support the integrity of the SPA will be documented in the HRA.



Item	Habitats	Cumulative habitat change (Ha) since 2010		
		2030	2060	2110
Uncertain SPA change	Sub-tidal	32 to 36		
	Intertidal (rock, boulders, mud and sandflats)	-35 to -34		
	Saltmarsh and transitional saltmarsh	1 to 2		
	Sand dunes and other littoral sediment	0 to 1		
Man-made SPA change	Sub-tidal	4 to 5	6 to 9	12 to 50
	Intertidal (rock, boulders, mud and sandflats)	-3	-2	-29 to -4
	Saltmarsh and transitional saltmarsh	13 to 15	9 to 12	-5 to 8
	Grazing marsh, other neutral grassland and non-designated habitat	-16 to -15	-16	-16 to -15
Lower Clyst Valley (west bank) managed realignment	Sub-tidal	0	0	0
	Intertidal (rock, boulders, mud and sandflats)	0	21	21
	Saltmarsh and transitional saltmarsh	21		
	Grazing marsh, other neutral grassland and non-designated habitat	0		
Kenn Valley managed realignment	Sub-tidal	0	0	0
	Intertidal (rock, boulders, mud and sandflats)	10	35	35
	Saltmarsh and transitional saltmarsh	20		
	Grazing marsh, other neutral grassland and non-designated habitat	5		
Lower Clyst Valley (east bank) managed realignment	Sub-tidal	0	0	0
	Intertidal (rock, boulders, mud and sandflats)	0	34 to 38	34 to 38
	Saltmarsh and transitional saltmarsh	34 to 38		
	Grazing marsh, other neutral grassland and non-designated habitat	0		
Footprint impact		-2	-2	-4
Balance	Sub-tidal	36 to 41	6 to 9	12 to 50
	Intertidal (rock, boulders, mud and sandflats)	-28 to -27	79 to 82	36 to 74
	Saltmarsh and transitional saltmarsh	89 to 96		
	Grazing marsh, other neutral grassland and non-designated habitat	-18 to -17		

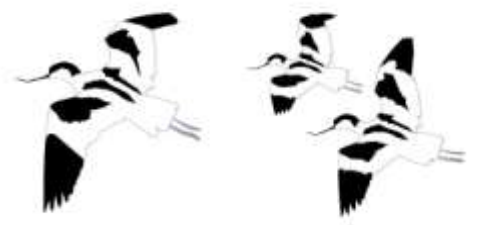
Table 5.1 – Habitat balance accounting for proposed extent of realignment areas and FCRM improvement footprint impacts.

5.6 The Maer

5.6.1 Short Term Assessment

Option 1 (beach recharge/recycling with groyne maintenance) in section 4.7 was assessed in further detail. From the geomorphological work in AHA (2013) and Halcrow (2011), the bounding limits would be ~4,000m³ annually recycled, through to 80,000m³ as a one off recharge in the short term. Costing of the short term operations at both strategy and scheme level of detail indicate a PVc of £4.3M. As larger scale beach recharge/recycling operations are being considered for Dawlish Warren sand spit, there is an opportunity to efficiently carry out recharge/recycling operations at Dawlish Warren sand spit and The Maer concurrently.

Beach recharge, recycling and groyne maintenance would avoid the greater costs under the Do Nothing option for public health and safety reasons, of removal of the existing seawall, promenade, road and associated infrastructure as they are exposed and fail structurally within the short term. There would be negligible socio-economic benefit related to these works in FCRM terms, and therefore no potential for FCRM GiA funding. It is apparent that this would require partnership contributions to be progressed in the short term.



5.6.2 Medium to Long Term Assessment

To continue the structural integrity of the seawall, promenade, road and associated infrastructure in the medium to long term would require further beach recharge, recycling and groyne maintenance. It is predicted that beach recharge and recycling operations would need to increase in magnitude and/or frequency as the wave and tidal climate becomes more energetic. Costing of the short to long term operations indicates the PVc would be £9.8M. There would continue to be negligible socio-economic benefit in FCRM terms. Early discussions with Devon County Council suggest that investment in the long-term could only be justified by a very compelling economic case.

5.7 Exmouth

5.7.1 Short Term Assessment

From the draft options in section 4.8, a detailed assessment of the options indicates that they would require:

- Property resilience works for around 20 properties at the eastern end of Camperdown Terrace.
- Pavement/road, wall and embankment raising along the slipway and boatyard of 0.5m.
- To the north-east of the Imperial Recreation Ground, a 0.5m wave recurve wall addition to the existing revetment.

The location and extent of these works is shown in Figure 5.3. Assessment for the potential for FCRM GiA funding indicates well over 100% of the scheme cost could be FCRM GiA funded.

5.7.2 Medium to Long Term Assessment

Option 1 (improvements along the seaward alignment) and Option 2 (improvements along a mixture of seaward and landward alignments) from section 4.8 were assessed in further detail.

Assessment of the PVb, PVc, BCR and iBCR, and application of the FCERM-AG rules identifies that the optimised SoP would be 0.1%AEP. This would require:

- Between Exmouth Docks and the Sailing Club, variable revetment and wall raising of between 0.5-1m by 2110.
- Along Camperdown Terrace, further property resilience and 0.7m of road raising by 2110.
- Along the slipway and boatyard, further variable embankment and wall raising of between 0.7-1.2m.
- Along the Imperial Recreation Ground to Withycoombe Brook, further variable revetment raising of 0.1-1.1m.

The location and extent of these options are shown in Figure 5.4.

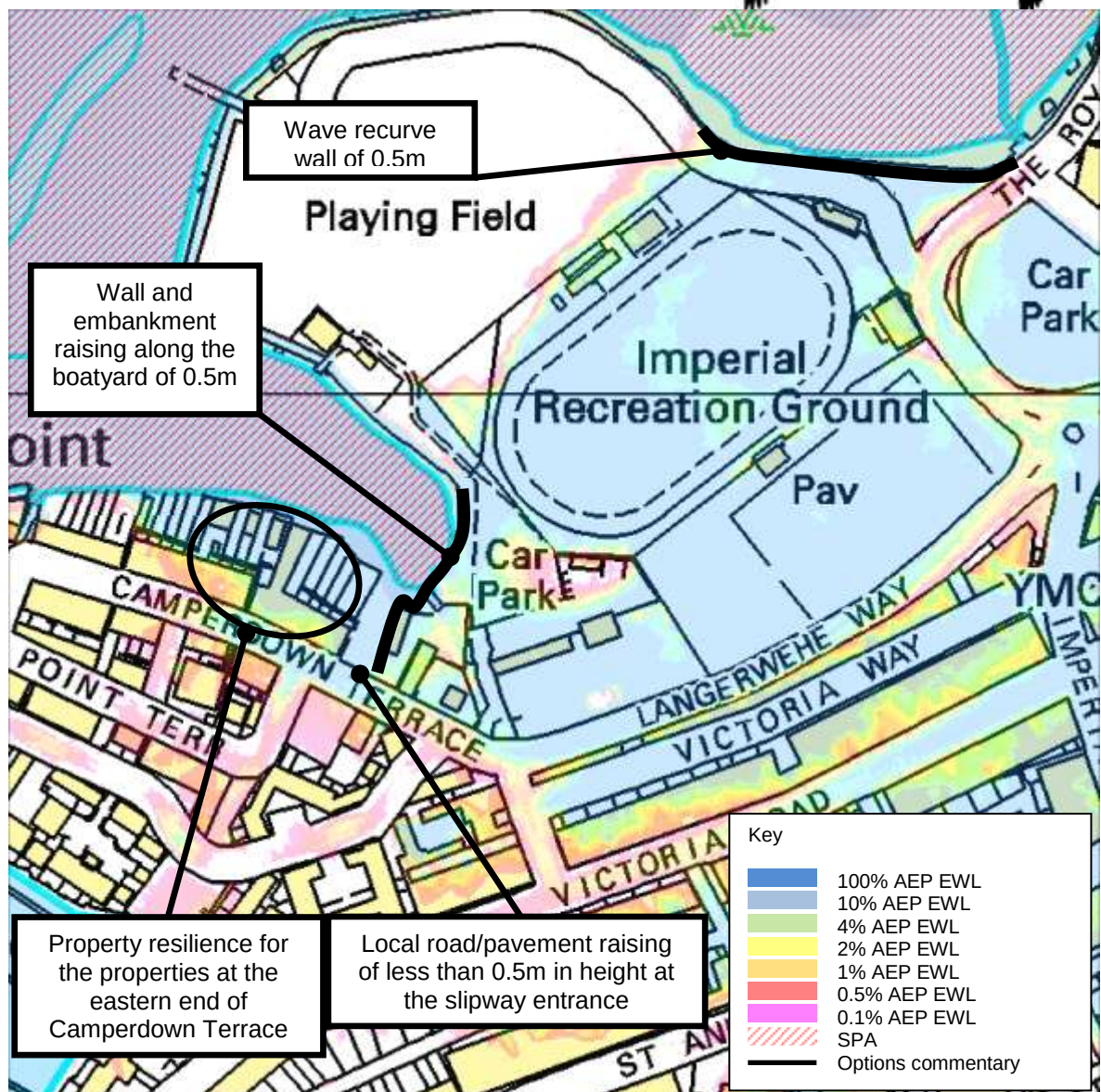


Figure 5.3 – Optimised design of short term improvements at Exmouth.

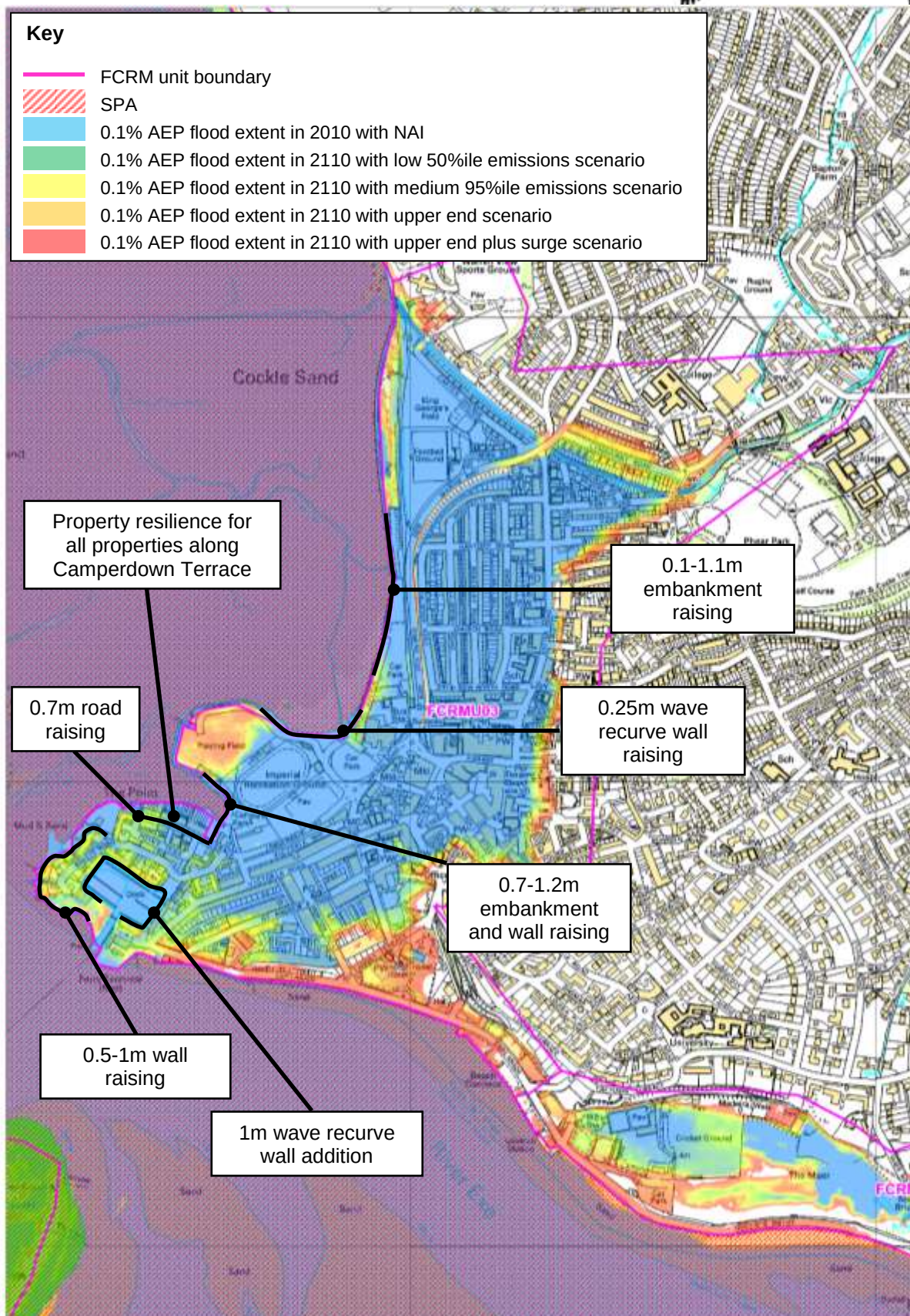


Figure 5.4 – Optimised design of medium to long term improvements at Exmouth.



5.8 Courtlands, Lymptone Commando and Exton

5.8.1 Short Term Assessment.

The estimated SoP of the railway revetment is 0.1%AEP or above in the short term. This SoP complies with Network Rail policy (CIRIA, 2010). Continued maintenance is the only required activity in the short term.

5.8.2 Medium to Long Term Assessment

The estimated SoP of the railway revetment by 2110 is estimated to be 2% AEP (breach from excessive wave overtopping) to 0.1% AEP (tidal weiring) along Lymptone Commando and Exton, and an overall SoP along Courtlands of 0.1%AEP or above by 2110. Option 1 (rock armouring or revetment raising) and Option 2 (vertical or wave recurve wall raising) from section 4.9 were assessed in further detail.

Assessment of the PVb, PVc, BCR and iBCR, and application of the FCERM-AG rules identifies that the optimised SoP would be 2%AEP, requiring no raising of the existing structures. However, there is economic viability for a wave recurve wall addition of 0.25m along Lymptone Commando and Exton to provide a SoP of 0.1%AEP and comply with Network Rail policy (CIRIA, 2010).

5.9 Lymptone

5.9.1 Short Term Assessment

The estimated SoP for the recently constructed flood gates is 0.1%AEP against breach from excessive wave overtopping, with the potential for the improved building walls to be damaged in the 2% AEP event. Continued maintenance is the only required activity in the short term.

5.9.2 Medium to Long Term Assessment

Option 1 (reconstruction/raising of the flood gates and building walls) from section 4.10 was assessed in further detail.

Assessment of the PVb, PVc, BCR and iBCR, and application of the FCERM-AG rules identifies that the optimised SoP would be 0.5 to 0.1%AEP, requiring variable raising of 0.6-1.4m of the existing building walls, and 1m raising of the flood gates.

5.10 East bank of the Lower Clyst

5.10.1 Short Term Assessment

Option 1 (realignment and associated works with a new embankment along the C527 road) and Option 2 (realignment and associated works with raising of the C527 road as a causeway with culverts) from section 4.11 were assessed in further detail.

Assessment of the PVc indicates that the lower cost solution would be Option 1, requiring:

- Continued maintenance of the embankments and walls south of the C527 road bridge.
- Local breaching (extent and location in detail to be determined by further studies) between the C527 road bridge and Frying Pan.



- Construction of a c0.5m high earth embankment along the northern side of the C527 road.
- Rock armour protection to the C527 and railway bridge abutments.

However, discussions with Environment Agency Area staff in October 2012 identified that:

- Option 1 could result in significant concerns relating to the health and safety of pedestrians and vehicle drivers present along the C527 road during extreme events. Over-design events could result in either cutting off of escape routes from the C527, or breach and rapid inundation of the road. Option 2 would appreciably reduce this risk by avoiding breach and rapid inundation of the C527 road in over-design events.
- Option 2 may be preferable on WFD, SEA and HRA grounds, enabling more natural connectivity of tidal/fluvial flows between the River Clyst and the Exe Estuary, and improved ecological connectivity and SPA condition to the south of the C527 road. In addition to this, rock armouring of the road and bridge abutments would not be required, as extreme events would be able to discharge across the wider floodplain rather than being discharged solely under the C527 road bridge.

The provision of compensatory intertidal habitat is a legal requirement for the Environment Agency, and therefore may not be reliant on the standard FDGiA funding rules. However, assessment for the potential for FCRM GiA funding regardless of the option, indicates approximately £1.75M of funding would potentially be available if 34-38Ha of intertidal habitat is created. For Option 1 this would amount to approximately 80% of the scheme costs, and for Option 2 approximately 30% of the scheme costs. It is apparent that Option 2 would require partnership contributions to be progressed in preference to Option 1.

Early discussions with Devon County Council suggest that investment in Option 2 could only be justified by a very compelling economic case. Progression and refinement of either Option 1 or 2 will require further discussions at scheme level with locally affected parties and Devon County Council as the highways authority. Subsequent to public consultation in January-February 2013, landowner discussions identified that managed realignment would be unlikely to be supported.

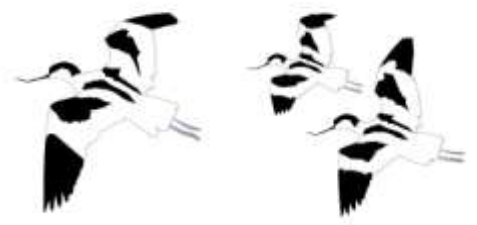
5.10.2 Medium to Long Term Assessment

The optimised solution in the medium to long term will be dependent on the short term option that is taken forward. However, assessment of the PVb, PVc, BCR and iBCR, and application of the FCERM-AG rules identifies that the optimised SoP for any realignment scheme would be 2% AEP, requiring a further 0.5m raising by 2110 of either an earth embankment or causeway.

5.11 Clyst St. Mary

5.11.1 Short Term Assessment

The estimated SoP for the existing earth embankments is 0.1%AEP or above against tidal weiring, providing protection to properties in Winslade Barton and Frog Lane in Clyst St. Mary, and the A376 road. Continued maintenance is the only required activity in the short term. However, the floods of November 2012 and discussions with the Environment Agency have highlighted that there may be greater risks associated with fluvial flooding. Further studies to assess this risk in detail are proposed, which may result in a review of the current recommendations.



5.11.2 Medium to Long Term Assessment

Option 1 (raising of the embankments) from section 4.12 was assessed in further detail. Assessment of the PVb, PVc, BCR and iBCR, and application of the FCERM-AG rules identifies that the optimised SoP would be 2%AEP, requiring no raising of the existing structures.

5.12 West bank of the Lower Clyst

5.12.1 Short Term Assessment

Option 1 (local breaching of embankments) from section 4.13 was assessed in further detail. Assessment of the flood risks related to this identified that localised property resilience works along the extreme fringe of the floodplain at Cotts Farm would be required.

The provision of compensatory intertidal habitat is a legal requirement for the Environment Agency, and therefore may not be reliant on the standard FCRM GiA funding rules. However, assessment for the potential for funding indicates over 100% of the scheme cost could be FCRM GiA funded (predominantly relating to the creation of 21Ha of intertidal habitat).

Progression and refinement of this option will require further discussions at scheme level with locally affected parties.

5.12.2 Medium to Long Term Assessment

Assessment of the PVb, PVc, BCR and iBCR, and application of the FCERM-AG rules identifies that the optimised SoP for the realignment scheme would be 0.1% AEP, requiring property resilience works towards 2110 to a further 16 properties around Cotts Farm and Newcourt Barton.

5.13 Topsham and Countess Wear

5.13.1 Short Term Assessment

Option 1 (new walls or embankments), Option 2 (property resilience and road/pavement raising) and Option 3 (property resilience only) from section 4.14 were assessed in further detail. Assessment of the PVc identifies that Option 2 would be the least cost solution, and would consist of:

- Property resilience works for around 9 properties along the playing field and Ferry Road.
- Local road/pavement raising of 0.1m.

The location and extent of these works is shown in Figure 5.5. Assessment for the potential for FCRM GiA funding indicates approximately 40% of the scheme costs could be FCRM GiA funded. It is apparent that this would require partnership contributions to be progressed.

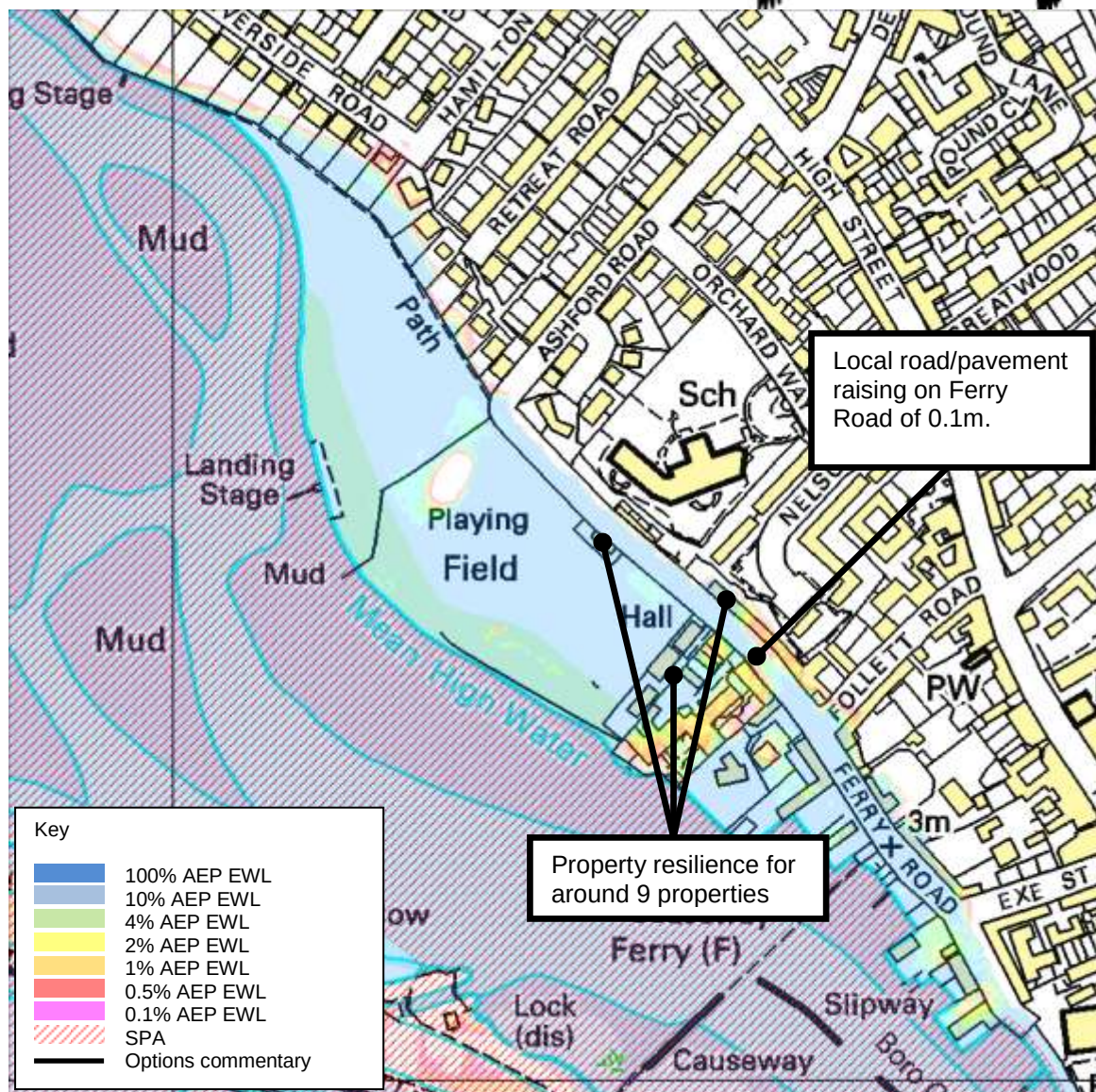
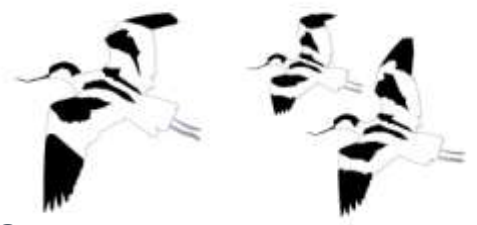


Figure 5.5 – Optimised design of short term improvements at Topsham.

5.13.2 Medium to Long Term Assessment

Option 1 (wider raising of quay walls) and Option 2 (community level property resilience) from section 4.14 were assessed in further detail. Assessment of the PVb, PVc, BCR and iBCR, and application of the FCERM-AG rules identifies that Option 1 would be the least cost solution, with an optimised SoP of 2%AEP. This would require general raising of existing quay walls of between 0-0.3m towards 2110. It is considered that this magnitude of raising would be practicable within the constrained landscapes of Topsham and Countess Wear. However, if this was found to be impractical, community level property resilience would be required for around 250 properties between 2030 and 2110. Early discussions with Devon County Council have indicated that implications and investment for non strategic highways would require a good economic case to be made to be justified.



5.14 Exminster Marshes and Powderham Banks

5.14.1 Short Term Assessment

Option 3 (toe protection, embankment widening and raising) from section 4.14 was assessed in further detail. Compliance with Network Rail policy (CIRIA, 2010) would support a 0.1%AEP SoP, relating to the mainline railway 50-150m landward of Powderham Banks. This would require:

- Works to ensure that the low water channel that is located at the toe of the defence would not pose an erosion risk. This could be achieved via up to 700m of rock armouring.
- Works to ensure the continued stability of the existing embankments. This could be achieved via landward widening of the banks, potentially incorporating the pedestrian and cycle path networks. The exact nature and extent of the widening will require further geotechnical investigation.
- Raising of the existing embankment by 0.5m, preferably with a wave recurve wall.

The location and extent of these works is shown in Figure 5.6. Assessment for the potential for funding indicates approximately 10% of the scheme costs could be FCRM GiA funded. The socio-economic benefits for the short term improvements predominantly relate to the mainline railway, and it is apparent that this would require partnership contributions to be progressed.

5.14.2 Medium to Long Term Assessment

Option 1 (wider raising or hardening of embankments) from section 4.15 was assessed in further detail. Assessment of the PVb, PVC, BCR and iBCR, and application of the FCERM-AG rules identifies that the optimised SoP could be 0.1%AEP, complying with Network Rail policy (CIRIA, 2010). This would require wider raising towards 2110 of the canal banks of up to 0.3m, and a further 0.7m raising of the Powderham Banks.

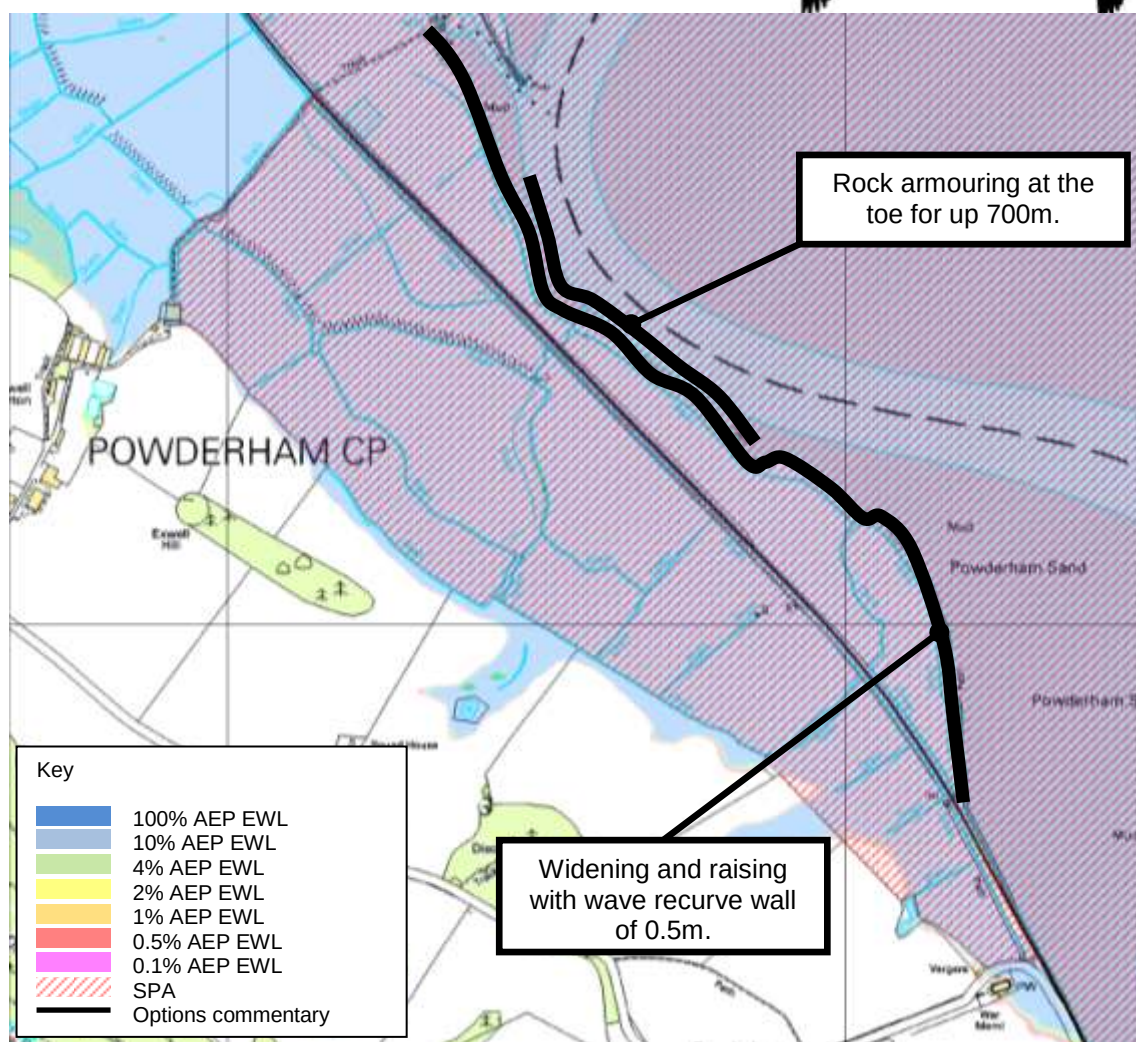


Figure 5.6 – Optimised design of short term improvements at Powderham Banks.

5.15 Kenn Valley

5.15.1 Short Term Assessment

Option 1 (RTE with localised embankments) from section 4.16 was assessed in further detail. Assessment of the flood risks solely relating to the access road to Powderham Castle, properties at Kanton at the extreme fringe of the floodplain, and properties at the mill upstream, indicates that this option could require construction of local embankments or walls potentially of up to 0.75m height. These are shown in Figure 5.7. The railway embankments located along the shoreline would only require maintenance to continue to have an SoP of 0.1% AEP, complying with Network Rail policy (CIRIA, 2010).

The provision of compensatory intertidal habitat is a legal requirement for the Environment Agency, and therefore may not be reliant on the standard FCRM GiA funding rules. However, assessment for the potential for funding indicates over 100% of the scheme cost could be FCRM GiA funded (predominantly relating to the creation of 35Ha of intertidal and terrestrial habitat).

Progression and refinement of this option will require further discussions at scheme level with locally affected parties, and further consideration of the possible impact on extreme fluvial events on the River Kenn.

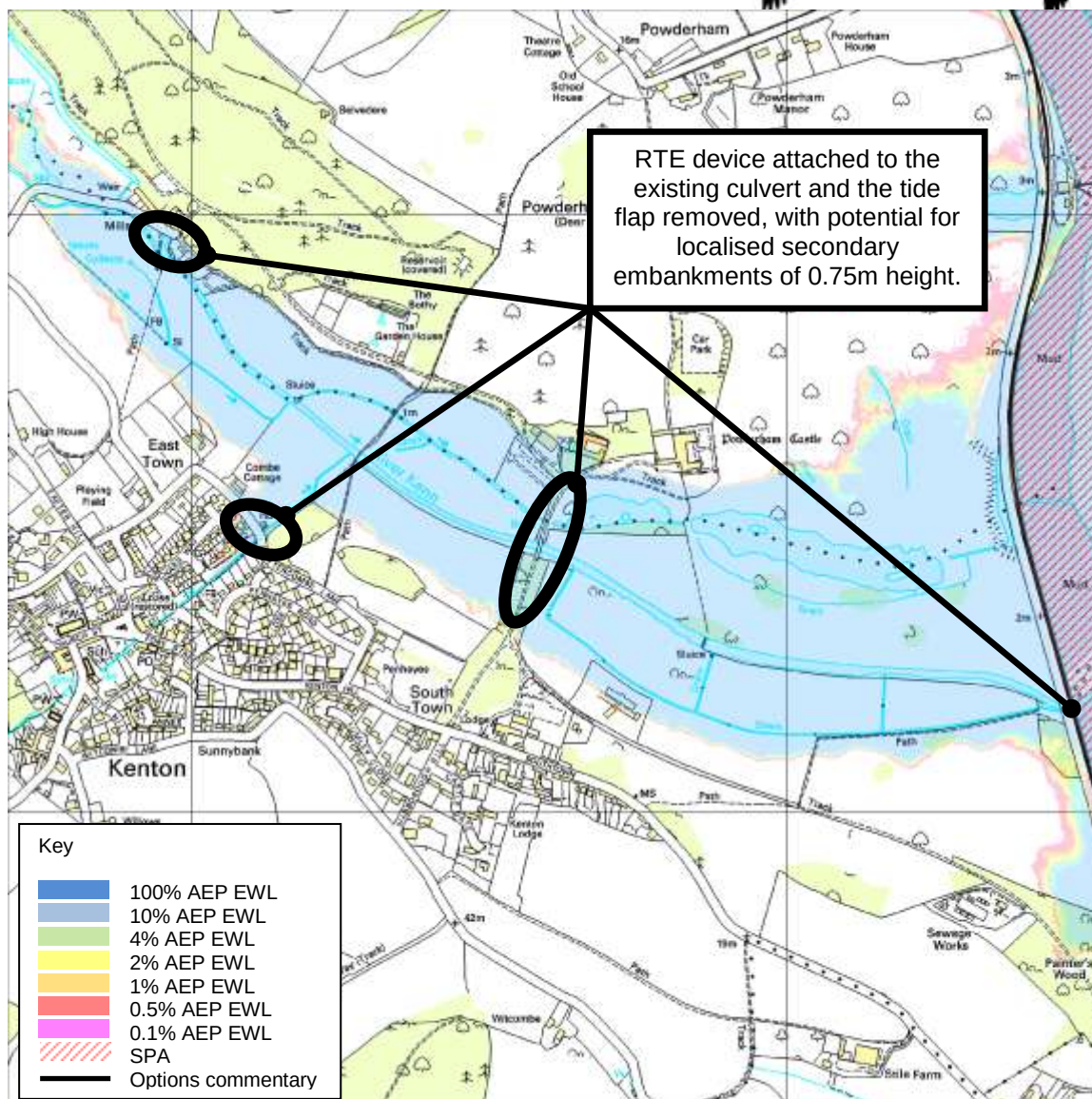


Figure 5.7 – Optimised design of short term realignment at Kenn Valley.

5.15.2 Medium to Long Term Assessment

Assessment of the PVB, PVC, BCR and iBCR, and application of the FCERM-AG rules identifies that the optimised SoP for the realignment scheme would be 1% AEP, requiring a further raising of local embankments of up to 1m by 2110. Further to this, the addition of a 0.2-1.1m high wave recurve wall to the existing railway embankments would be required.

5.16 Starcross

5.16.1 Short Term Assessment

From the draft options in section 4.17, a detailed assessment of the options indicates that they would require:

- For Option 1, general harbour wall raising at Cockwood of between 0.3-0.5m.



- For Option 2, local raising of 0.5m of the northern and southern harbour walls and adjacent road/pavement.

The location and extent of these works is shown in Figure 5.8. In addition a number of local low spots have been identified that would require raising. Further to this Shutterton Brook has been identified as a rapid response catchment. Assessment for the potential for FCRM GiA funding indicates well over 100% of the scheme cost could be FCRM GiA funded. Progression and refinement of Option 1 and 2 will require further discussions at scheme level with locally affected parties, and further consideration of fluvial (Shutterton Brook) and surface water flood risks.

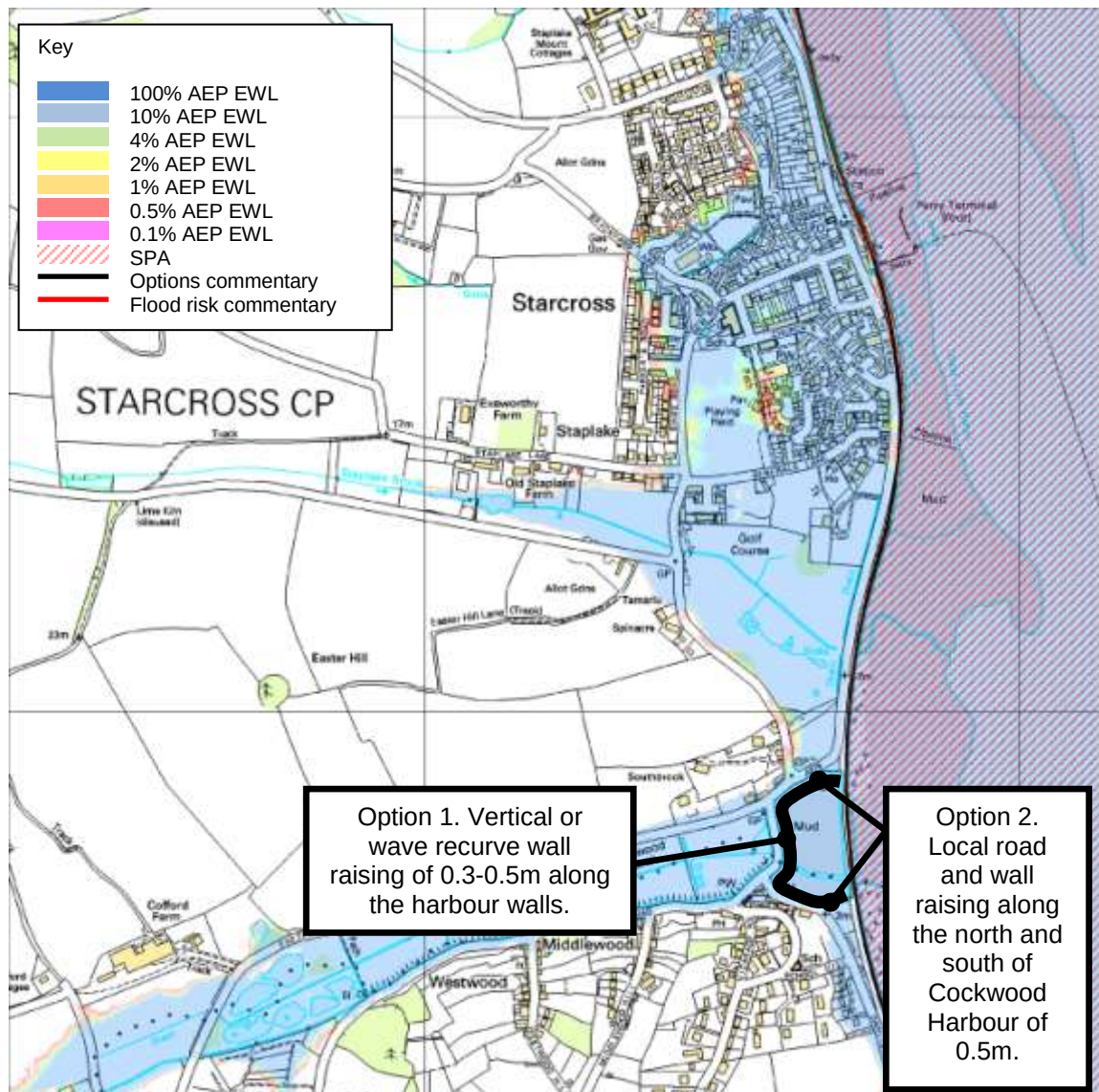


Figure 5.8 – Optimised design of short term improvements at Starcross.

5.16.2 Medium to Long Term Assessment

Option 1 (vertical or wave recurve wall raising along the railway embankment) and Option 2 (rock armouring or revetment raising along the railway embankment) from section 4.17 were assessed in further detail. Assessment of the PVB, PVC, BCR and iBCR, and application of the FCERM-AG



rules identifies that the least cost solution would be Option 1, with an optimised SoP of 0.1%AEP. This would require:

- Addition of a 1.2-1.6m high wave recurve wall to the existing railway embankments.
- Further raising of either Cockwood Harbour short term option of 0.8m.

5.17 Dawlish to Holcombe

5.17.1 Short Term Assessment

It was identified in section 4.18 that the strategically optimal option in the short term broadly concurs with the ongoing scheme level Network Rail studies. Further concerns have been raised by Teignbridge District Council relating to tide-locking and wider surface water flood risks.

5.17.2 Medium to Long Term Assessment

In the medium to long term, properties adjacent to Dawlish Water could be affected by tidal inundation through the existing beach access where Dawlish Water discharges. Assessment of the PVb, PVc, BCR and iBCR, and application of the FCERM-AG rules identifies that there would be economic justification for providing property resilience to around 40 properties by 2110.

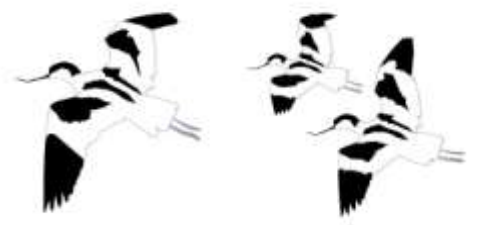
5.18 Prioritisation and Timing of Short Term Schemes

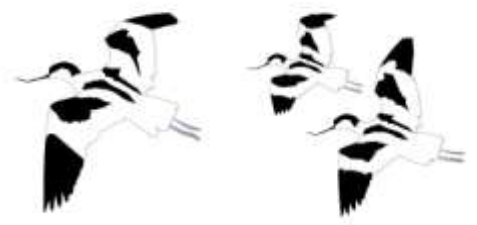
The proposed short term FCRM schemes were considered at an estuary-wide scale to indicate the potential prioritising of works, based on properties benefitting, funding certainty and legal (habitat) requirements. This indicates that the following schemes would preferably be progressed and delivered in the next 5 years:

- FCRM schemes at Exmouth and Starcross. Both these schemes have a strong case for funding within the National Priority Programme.
- Habitat creation schemes at the west bank of the Lower Clyst and at Kenn Valley. Both these schemes have a strong case for funding within the National Priority Programme, and would be legally required to support the integrity of the SPA.
- Further studies to enable beach recharge and recycling at Dawlish Warren sand spit, groyne maintenance, embankment raising, and the first phase of gabion removal. Whilst funding for these works will be complex, they are legally required to support the integrity of the SPA and SAC.

Further to this, schemes that should be progressed in the next 5-15 years consist of:

- FCRM schemes at The Maer, Topsham and Powderham Banks. Funding for these schemes require partnership contributions and time for negotiation.
- The second and third phases of gabion removal at Dawlish Warren sand spit, and cessation of beach recharge, recycling and groyne maintenance. These works would enable completion of the strategic intention to allow the sand spit to evolve naturally in the medium to long term, supporting the integrity of the SPA and SAC.





6. References

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- Atkins, 2006. Avonmouth to Aust Tidal Defence Scheme.
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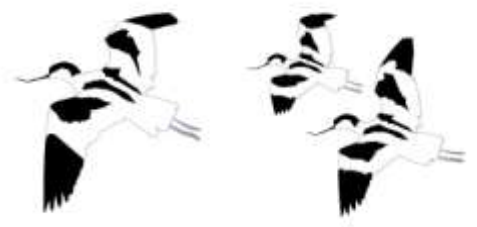
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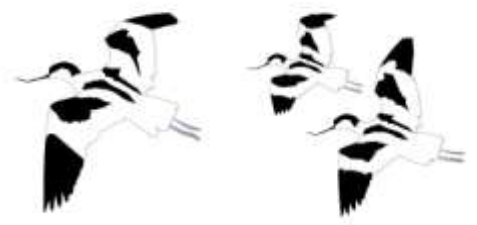
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Appendix A : FCRM Unit Objectives

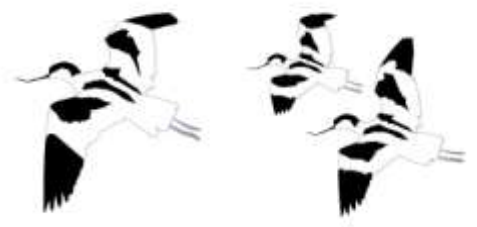


LOCATION			SDAD SMP2 OBJECTIVES	PRIMARY OBJECTIVES (FCRM, LEGAL)	SECONDARY OBJECTIVES
Relevant placename	FCRM Unit	SMP2 policy unit	- To avoid loss of property due to erosion and/or manage risk of flooding to people and property. - To avoid loss due to erosion of and manage risk of flooding to key community, recreational and amenity facilities. - To avoid loss due to erosion of and manage risk of flooding to industrial, commercial and economic assets and activities. - To ensure critical road and rail linkages are maintained. - To minimise the impact of policies on marine operations and activities.	- To avoid loss of property due to erosion and/or manage risk of flooding to people and property. - To avoid loss due to erosion of and manage risk of flooding to industrial, commercial and economic assets and activities. - To ensure critical road and rail linkages are maintained. - To comply with the Habitat Regulations (zero net loss of habitat, maintain form and functionality).	- To avoid loss due to erosion of and manage risk of flooding to key community, recreational and amenity facilities. - To minimise the impact of policies on marine operations and activities.
Sandy Bay	1	6a43			
The Maer	2	6a44-45			
Exmouth	3	6a46-6b01	- To avoid loss of property due to erosion and/or manage risk of flooding to people and property. - To minimise the impact of policies on marine operations and activities.	- To avoid loss of property due to erosion and/or manage risk of flooding to people and property. - To ensure critical road and rail linkages are maintained. - To comply with the Habitat Regulations (zero net loss of habitat, maintain form and functionality).	- To avoid loss due to erosion of and manage risk of flooding to key community, recreational and amenity facilities. - To minimise the impact of policies on marine operations and activities.
Courtlands	4	6b02	- To avoid loss of property due to erosion and/or manage risk of flooding to people and property. - To minimise the impact of policies on marine operations and activities. - To ensure MoD ranges remain operational. - To ensure critical road and rail linkages are maintained.	- To avoid loss of property due to erosion and/or manage risk of flooding to people and property. - To ensure critical road and rail linkages are maintained. - To comply with the Habitat Regulations (zero net loss of habitat, maintain form and functionality).	- To minimise the impact of policies on marine operations and activities. - To ensure MoD ranges remain operational.
Lympstone	5	6b03			
Lympstone Commando	6	6b04-5			
Exton	7	6b06-7	- To avoid loss of property due to erosion and/or manage risk of flooding to people and property. - To minimise the impact of policies on marine operations and activities. - To ensure MoD ranges remain operational. - To ensure critical road and rail linkages are maintained.	- To avoid loss of property due to erosion and/or manage risk of flooding to people and property. - To ensure critical road and rail linkages are maintained. - To comply with the Habitat Regulations (zero net loss of habitat, maintain form and functionality).	- To avoid loss due to erosion of and manage risk of flooding to key community, recreational and amenity facilities. - To ensure MoD ranges remain operational.
Clyst St. George	8	6b08			
Clyst St. Mary	9	NA			
Sowton	10	NA	- To avoid loss of property due to erosion and/or manage risk of flooding to people and property. - To avoid loss due to erosion of and manage risk of flooding to key community, recreational and amenity facilities. - To avoid loss due to erosion of and/or manage risk of flooding to agricultural land.	- To avoid loss of property due to erosion and/or manage risk of flooding to people and property. - To avoid loss due to erosion of and/or manage risk of flooding to agricultural land. - To comply with the Habitat Regulations (zero net loss of habitat, maintain form and functionality).	To avoid loss due to erosion of and manage risk of flooding to key community, recreational and amenity facilities.
Topsham East	11	6b08			
Topsham	12	6b09			

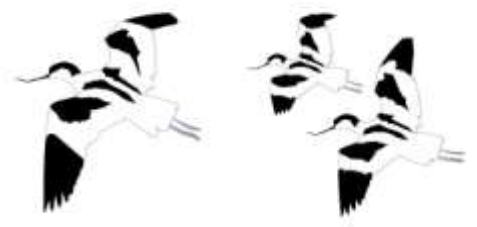


LOCATION			SDAD SMP2 OBJECTIVES	PRIMARY OBJECTIVES (FCRM, LEGAL)	SECONDARY OBJECTIVES
Relevant placename	FCRM Unit	SMP2 policy unit	- To avoid loss of property due to erosion and/or manage risk of flooding to people and property. - To minimise the impact of policies on marine operations and activities. - To ensure critical road and rail linkages are maintained. - To avoid loss due to erosion of and manage risk of flooding to key community, recreational and amenity facilities. - To avoid loss due to erosion of and/or manage risk of flooding to agricultural land.	- To avoid loss of property due to erosion and/or manage risk of flooding to people and property. - To ensure critical road and rail linkages are maintained. - To avoid loss due to erosion of and/or manage risk of flooding to agricultural land. - To comply with the Habitat Regulations (zero net loss of habitat; maintain form and functionality).	- To avoid loss due to erosion of and manage risk of flooding to key community, recreational and amenity facilities. - To minimise the impact of policies on marine operations and activities.
Countess Wear	13	6b10-11			
Exminster	14	6b12-13			
Kenn Valley	15	6b14-15			
Starcross	16	6b16-17			
Dawlish Warren	17	6b18-22	- To avoid loss of property due to erosion and/or manage risk of flooding to people and property. - To avoid loss due to erosion of and manage risk of flooding to key community, recreational and amenity facilities. - To avoid loss due to erosion of and manage risk of flooding to industrial, commercial and economic assets and activities.	- To avoid loss of property due to erosion and/or manage risk of flooding to people and property. - To avoid loss due to erosion of and manage risk of flooding to industrial, commercial and economic assets and activities. - To comply with the Habitat Regulations (zero net loss of habitat; maintain form and functionality).	To avoid loss due to erosion of and manage risk of flooding to key community, recreational and amenity facilities.
Dawlish to Holcombe	18	6b23-24	- To avoid loss of property due to erosion and/or manage risk of flooding to people and property. - To avoid loss due to erosion of and manage risk of flooding to key community, recreational and amenity facilities. - To ensure critical road and rail linkages are maintained.	- To avoid loss of property due to erosion and/or manage risk of flooding to people and property. - To ensure critical road and rail linkages are maintained. - To comply with the Habitat Regulations (zero net loss of habitat; maintain form and functionality).	To avoid loss due to erosion of and manage risk of flooding to key community, recreational and amenity facilities.



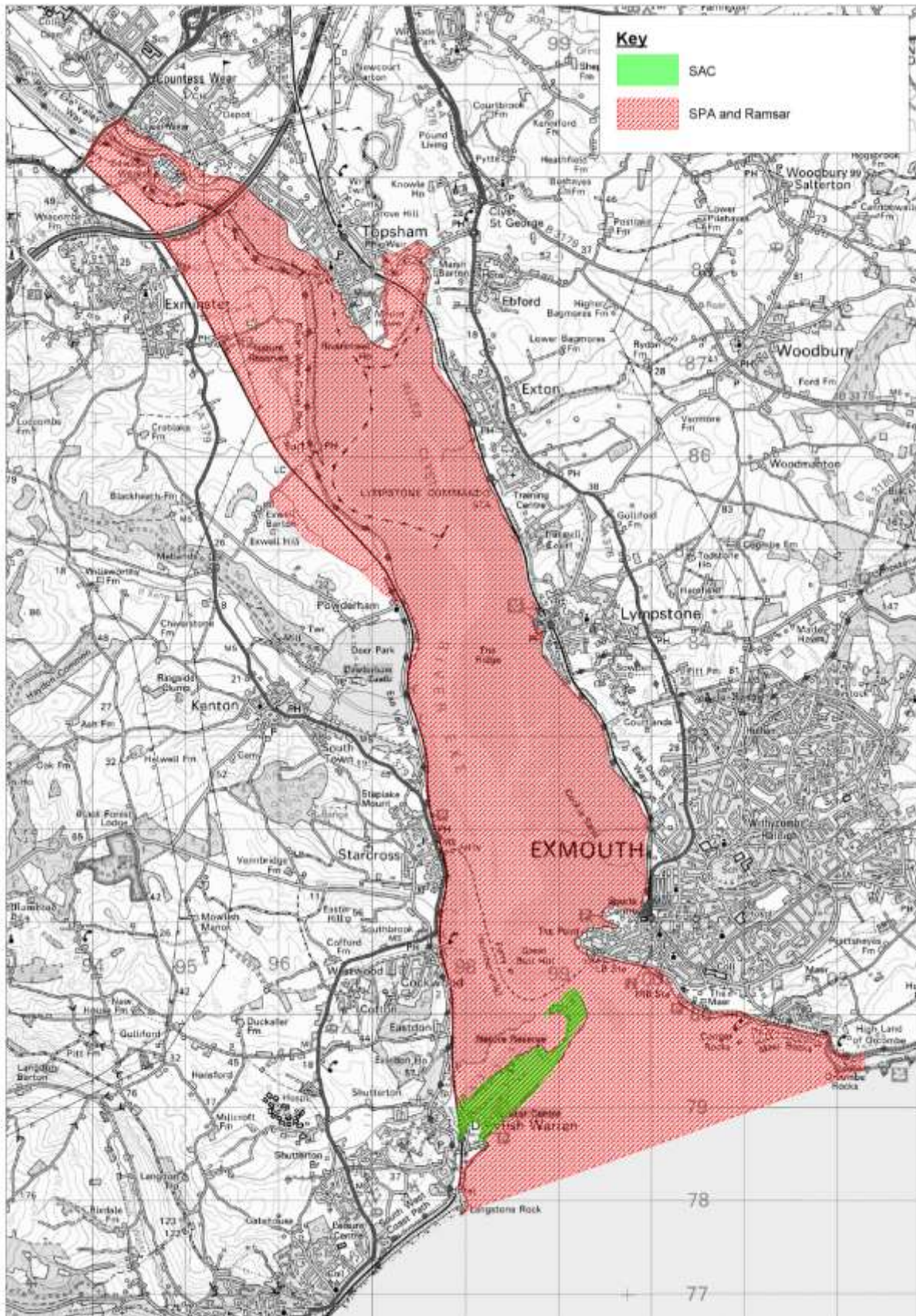


Appendix B : Scales of Assessment



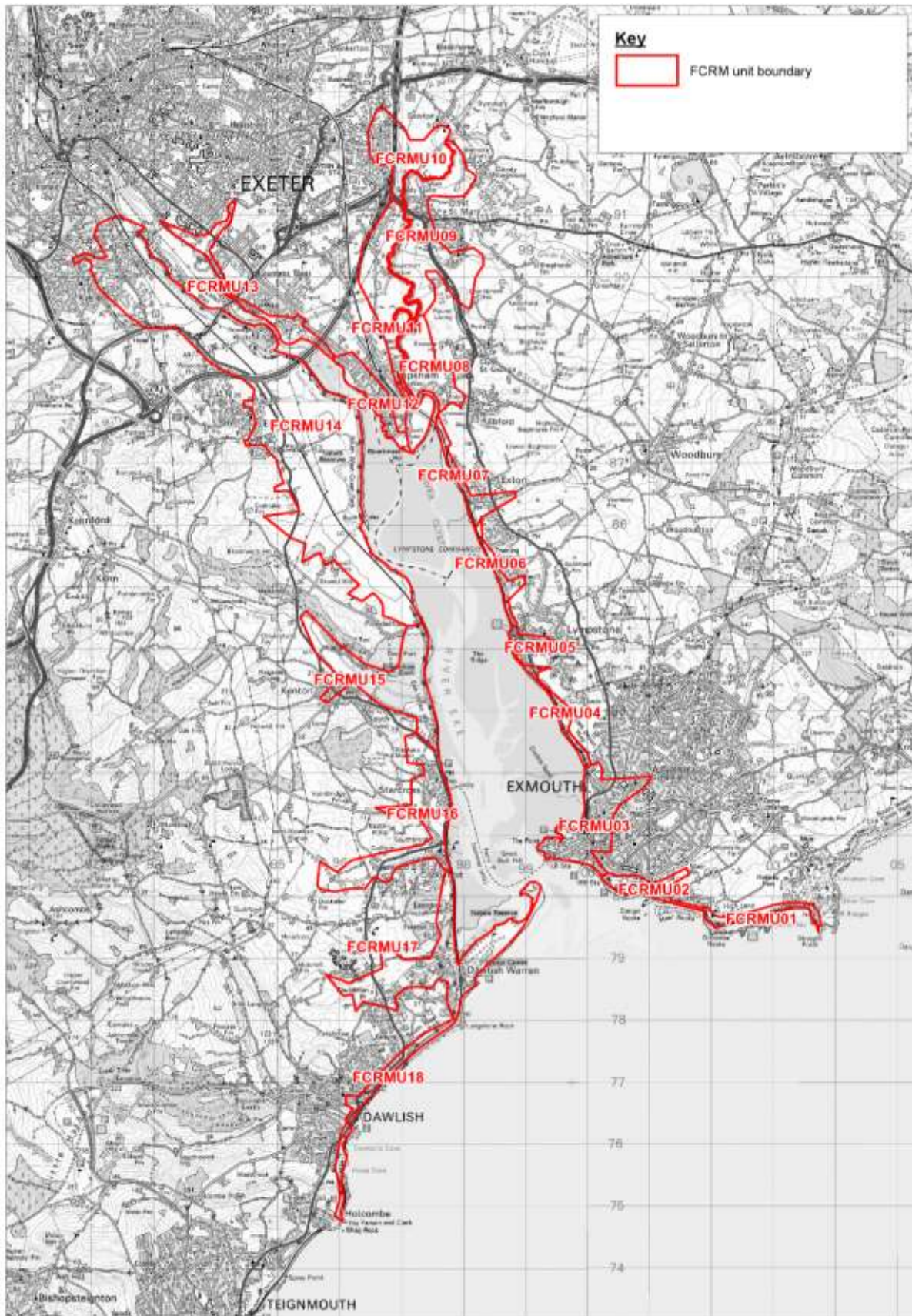


B.1 Estuary-wide





B.2 FCRM units





B.4 The Maer Sub-reaches



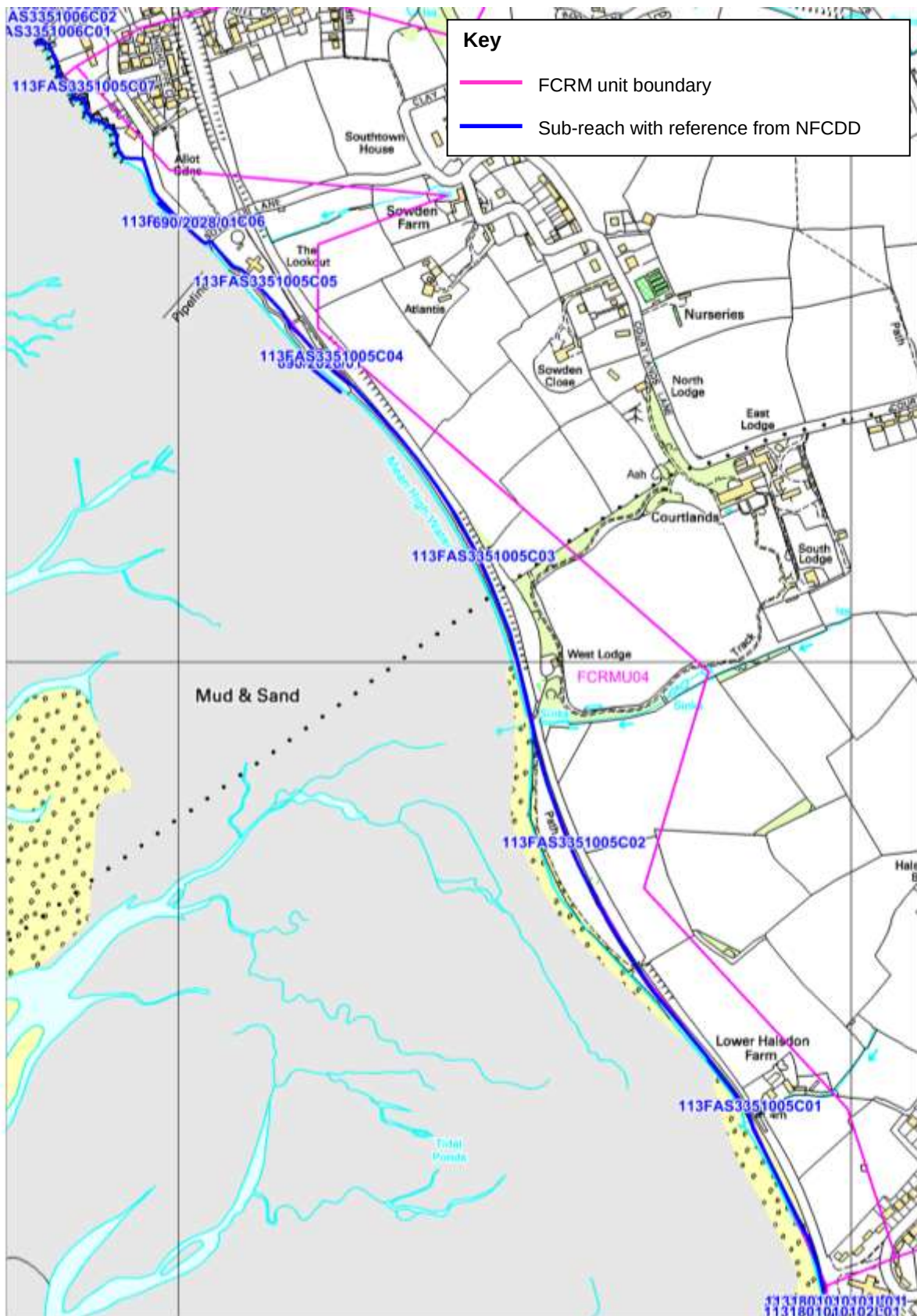


B.5 Exmouth Sub-reaches



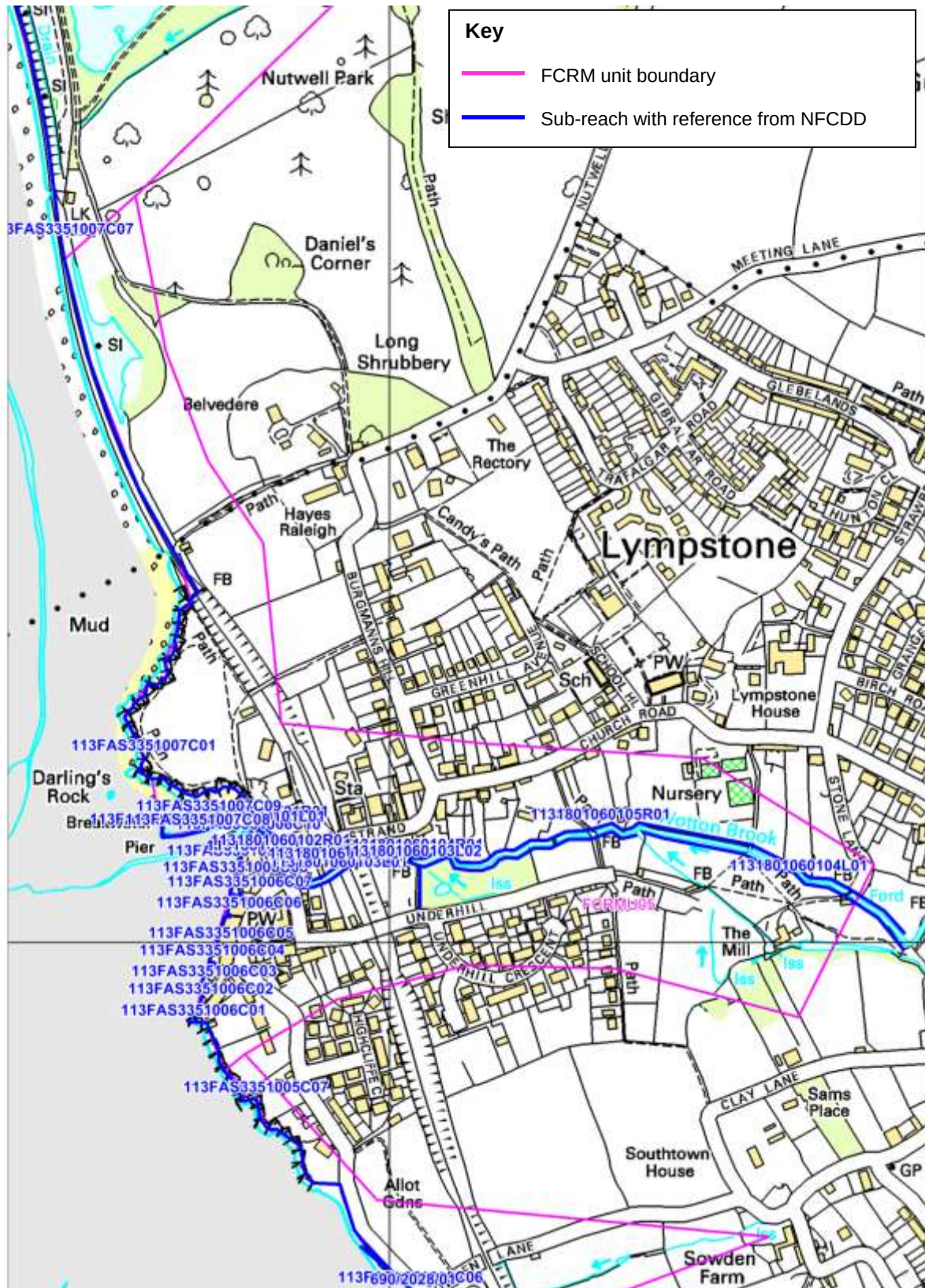


B.6 Courtlands Sub-reaches



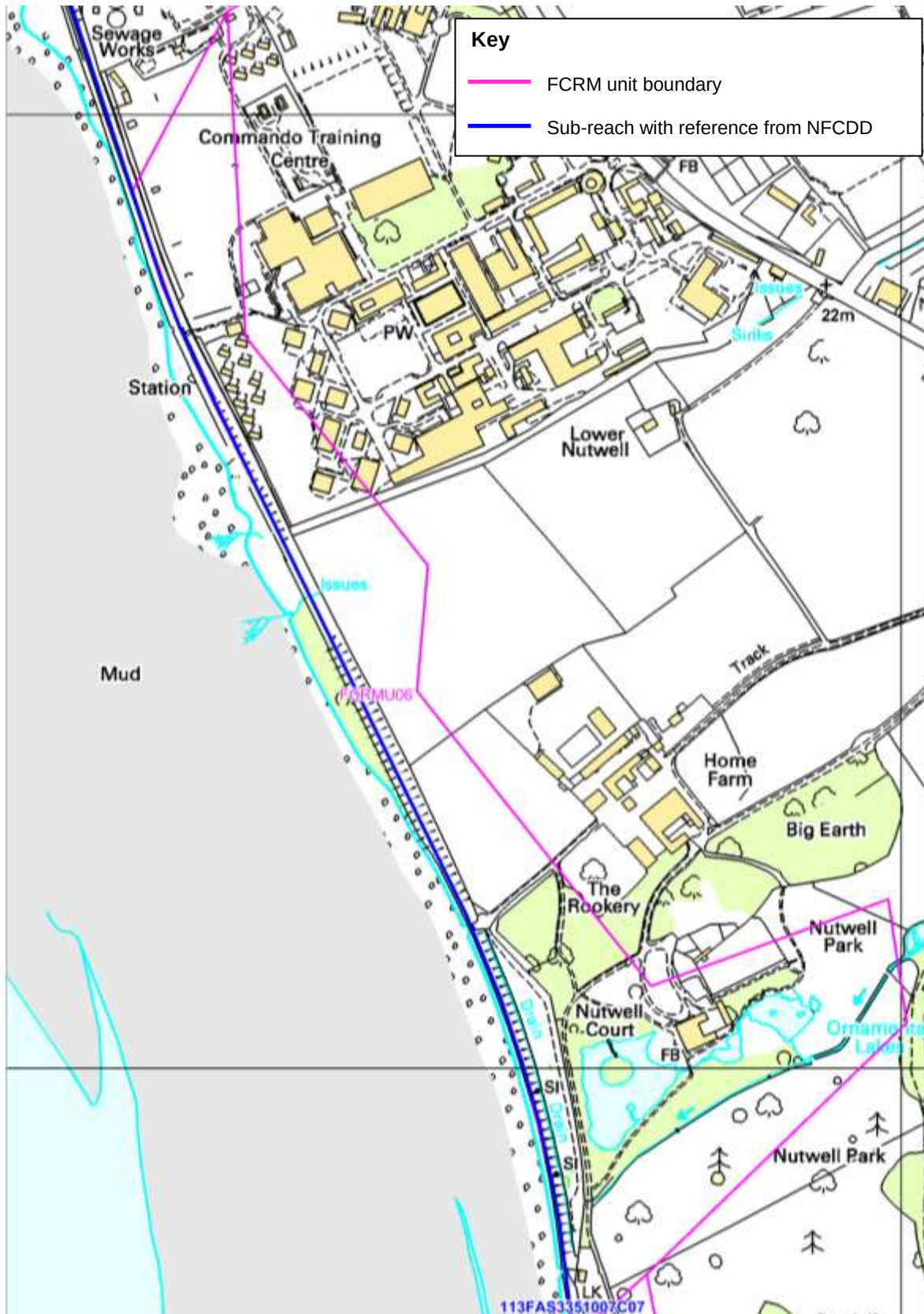


B.7 Lympstone Sub-reaches



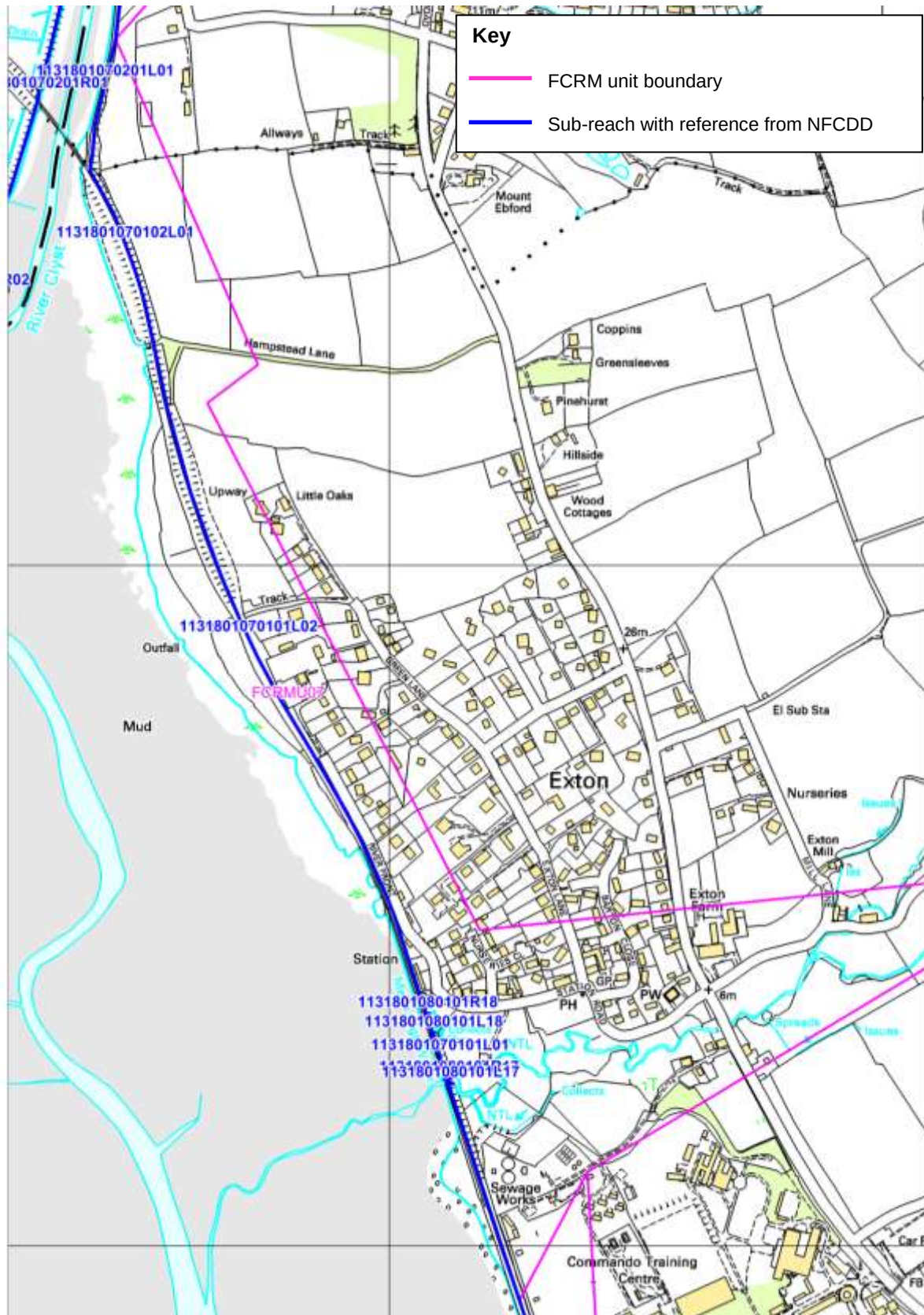


B.8 Lymestone Commando



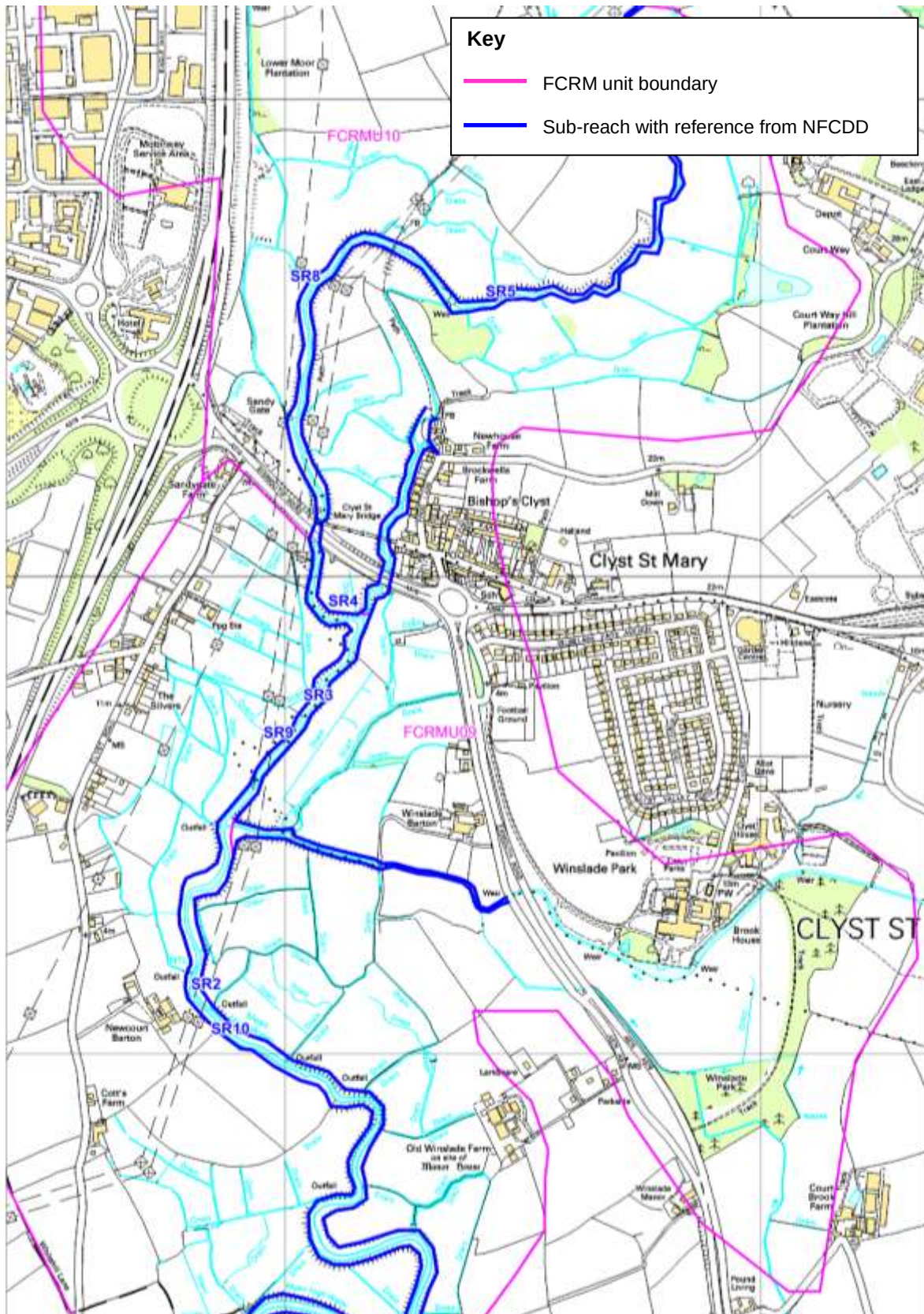


B.9 Exton



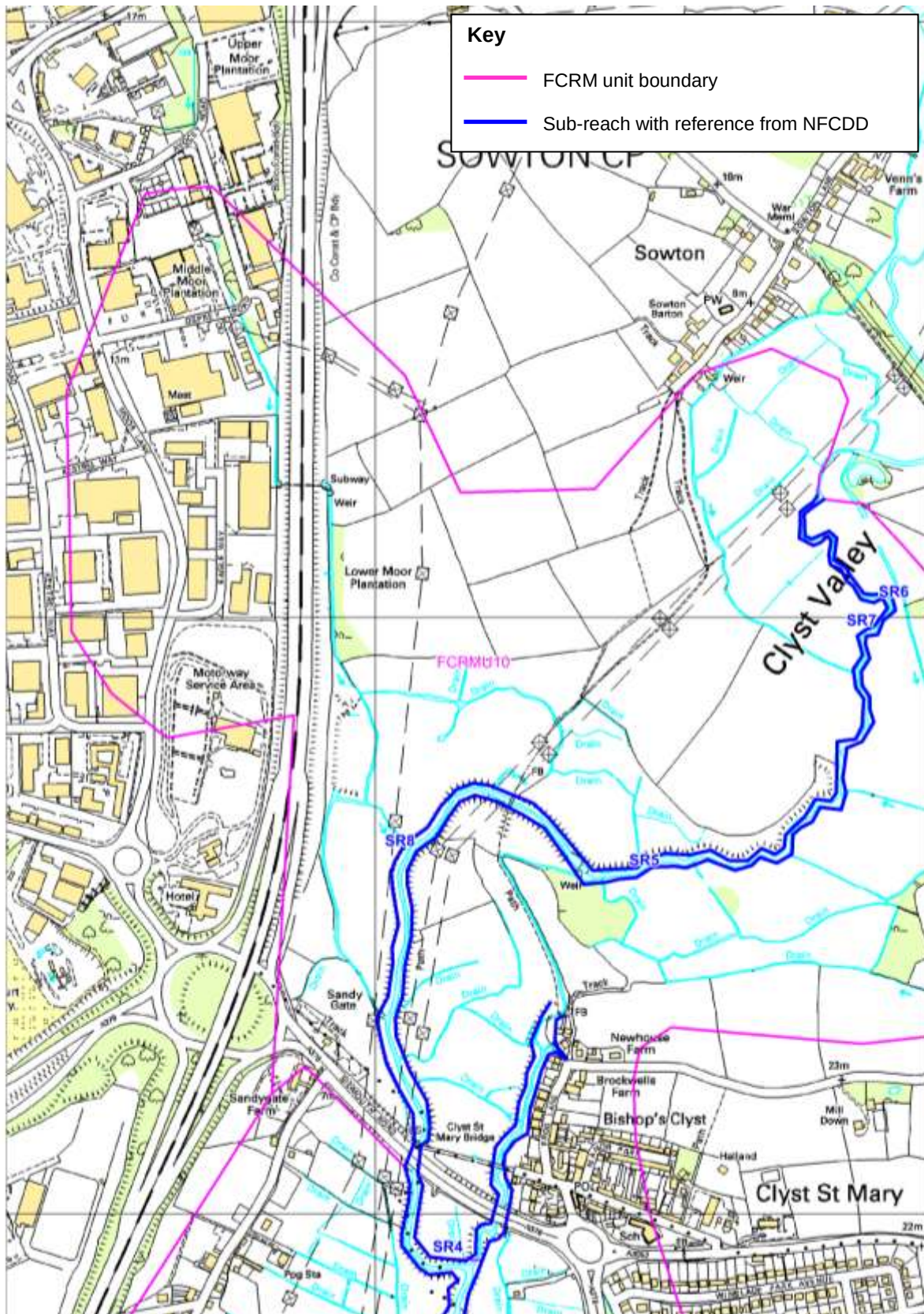


B.11 Clyst St. Mary



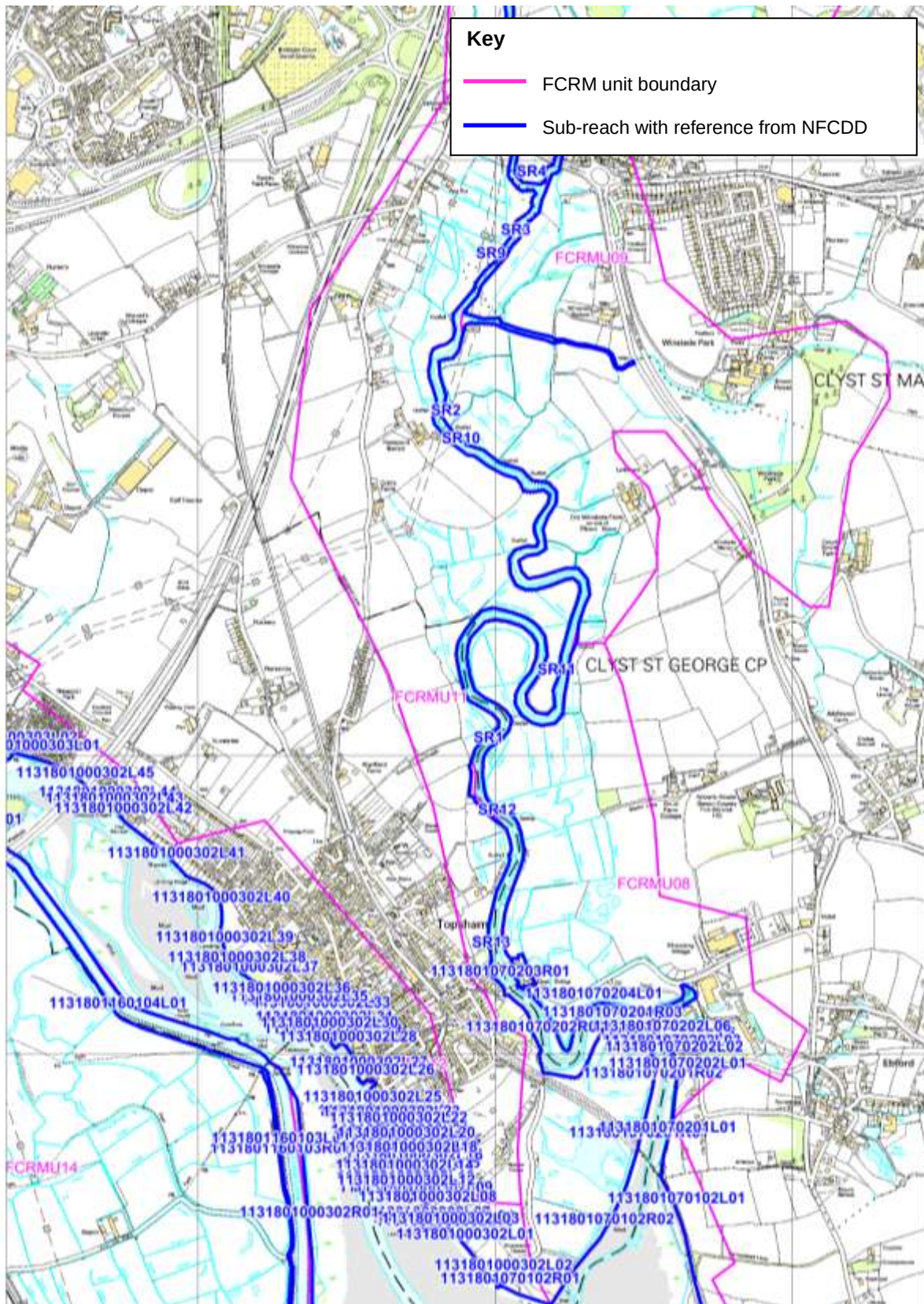


B.12 Sowton



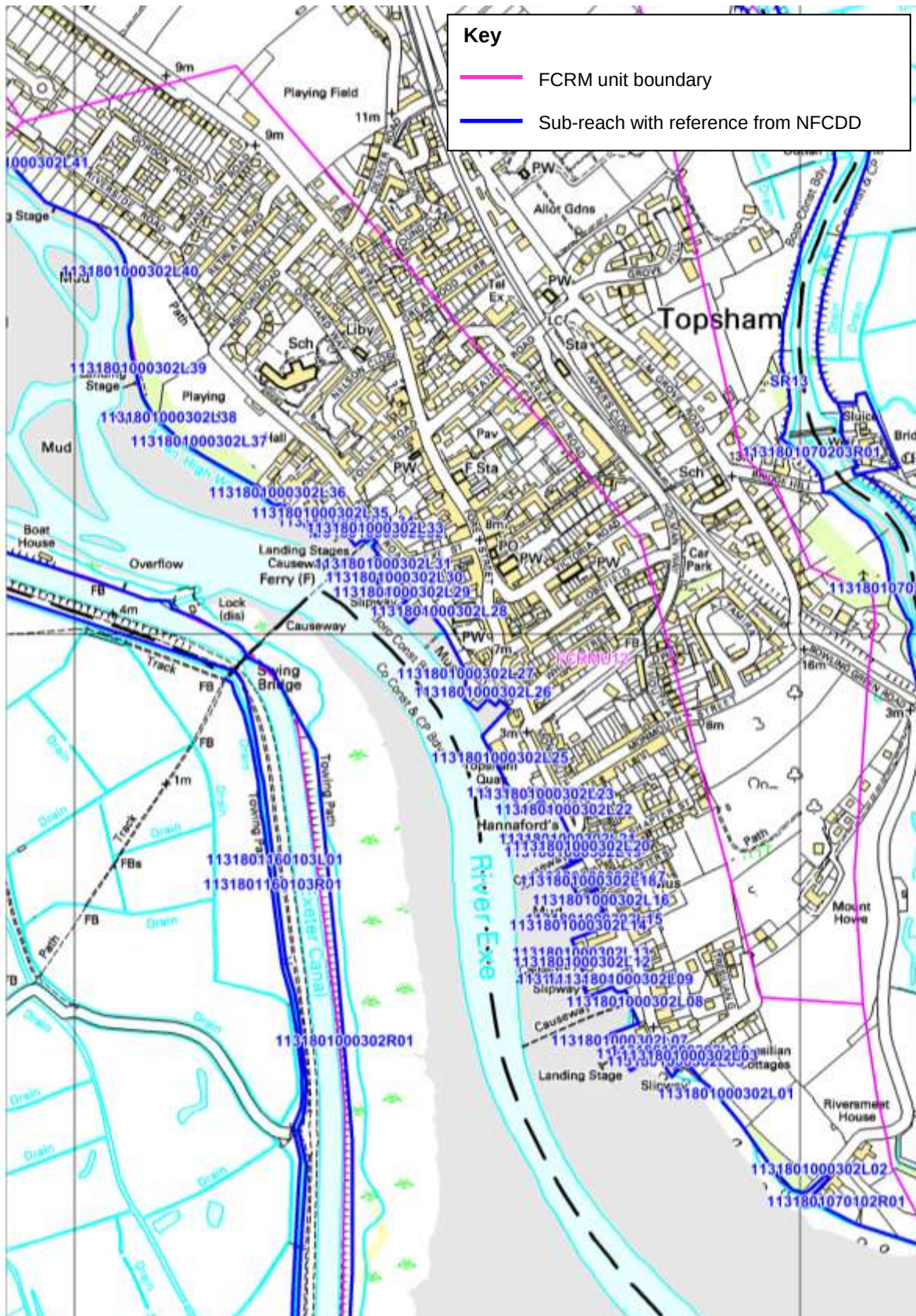


B.13 West bank of Clyst



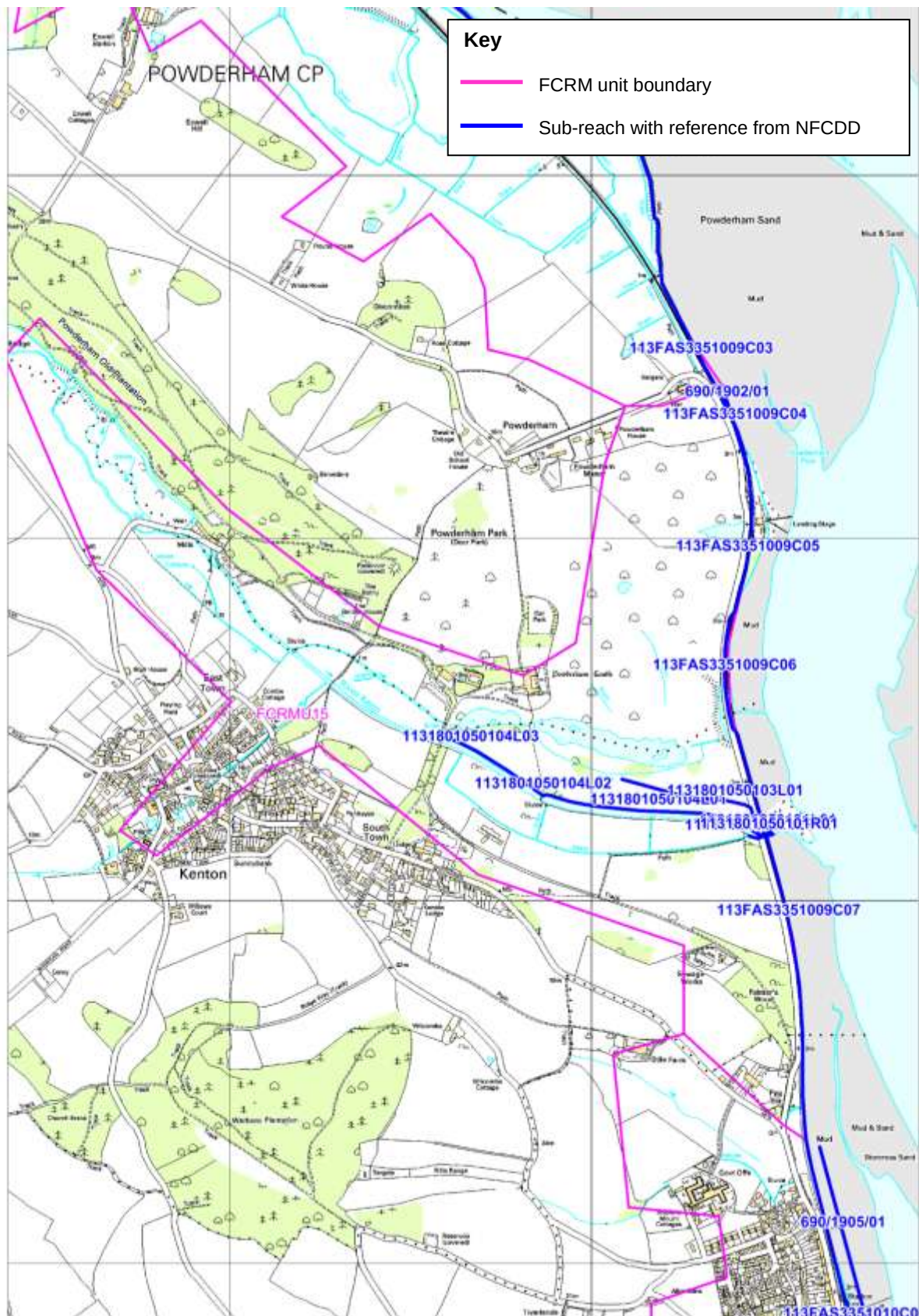


B.14 Topsham





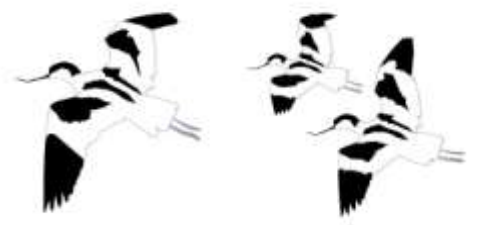
B.17 Kenn Valley Sub-reaches



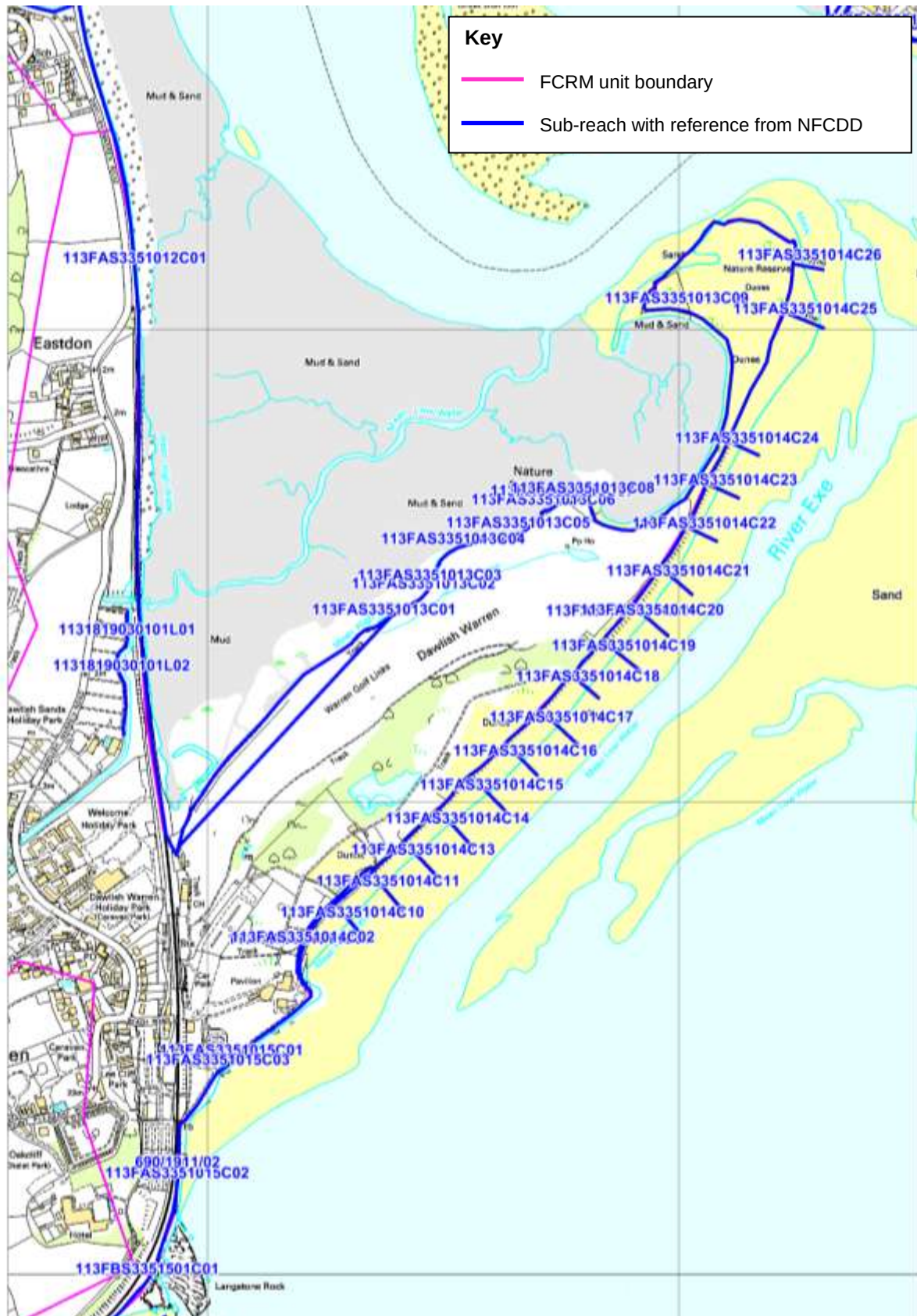


B.18 Starcross Sub-reaches





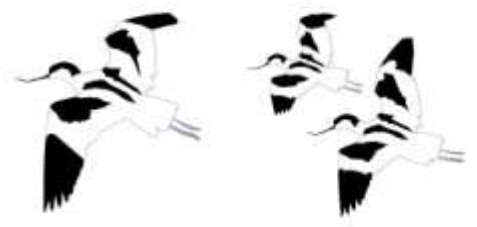
B.19 Dawlish Warren Sub-reaches



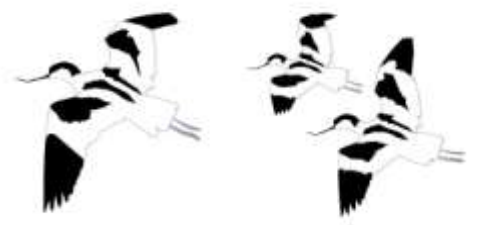


B.20 Dawlish to Holcombe Sub-reaches





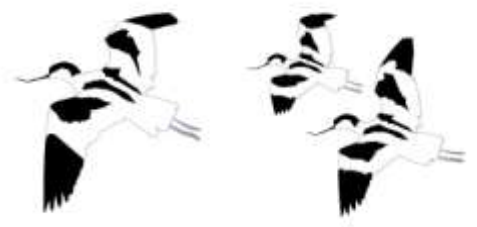
Appendix C : Coherency Between SMP2 and CFMP



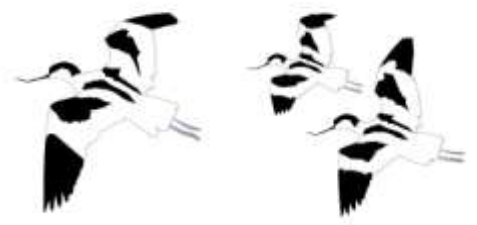


LOCATION			POLICY CONTEXT	
Relevant placename	FCRM Unit	SMP2 policy unit	CFMP policies	SMP2 policies (0, 20, 50 years)
Sandy Bay	1	6a43	NA	NA/NA/NA
The Maer	2	6a44-45	NA	HTL/MR/HTL
Exmouth	3	6a46-6b01	Sustain	HTL/HTL/HTL
Courtlands	4	6b02	Sustain	HTL/HTL/HTL
Lympstone	5	6b03	Sustain	HTL/HTL/HTL
Lympstone Commando	6	6b04-5	Sustain	HTL/HTL/HTL
Exton	7	6b06-7	Sustain	HTL/HTL/HTL
Clyst St. George	8	6b08	Sustain	MR/MR/MR
Clyst St. Mary	9	NA	MR	NA
Sowton	10	NA	MR	NA
Topsham East	11	6b08	Sustain	MR/MR/MR
Topsham	12	6b09	Sustain	HTL/HTL/HTL
Countess Wear	13	6b10-11	Sustain	HTL/HTL/HTL
Exminster	14	6b12-13	Sustain	HTL/MR/HTL
Kenn Valley	15	6b14-15	Sustain	HTL/HTL/HTL
Starcross	16	6b16-17	Sustain	HTL/HTL/HTL
Dawlish Warren	17	6b18-22	Sustain	Only defined for the short term. HTL on the seaward facing central and distal sections. NAI on the estuary facing central section.
Dawlish to Holcombe	18	6b23-24	NA	HTL/HTL/HTL





Appendix D : Summary of Modelling Results





D.1 Summary of Estuary-wide Impacts

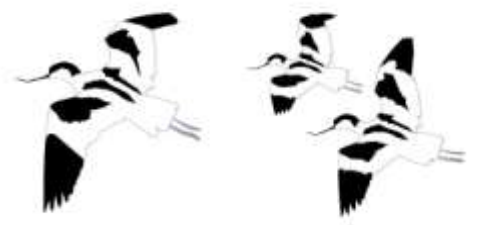
Various potential realignments in the Exe Estuary were modelled within DAWN for the whole estuary, and additionally with ISIS-TUFLOW for the Lower Clyst.

Inspection of the DAWN modelling results, based on the conceptual designs given below, identified the following:

- The existing propagation of water levels up-estuary results in an increase of up to 0.15m. The potential realignments have an impact of less than 0.1m on up-estuary propagation, which is within the confidence limits of the water levels themselves.
- The potential for the distal section of Dawlish Warren to flatten into the long term again has an impact of less than 0.1m on water levels, which is within the confidence limits of the water levels themselves. Additional MIKE21 modelling identifies up to 0.3m wave height increase around Starcross and Kenn Valley.
- The potential realignments and their conceptual design are indicated to enable habitat creation, with astronomic water levels in the realignment areas similar to those occurring in the estuary.
- Peak current speeds will increase into the future, generally by up to 0.1m/s in the short to long term. Localised areas of greater peak current increases of up to 0.3m/s are indicated to occur immediately adjacent to the potential inlet locations for the realignments. This indicates a potential need for local engineered protection around the inlet locations.
- The potential for the distal section of Dawlish Warren to flatten into the long term again has a very limited impact on current speeds in the wider estuary.

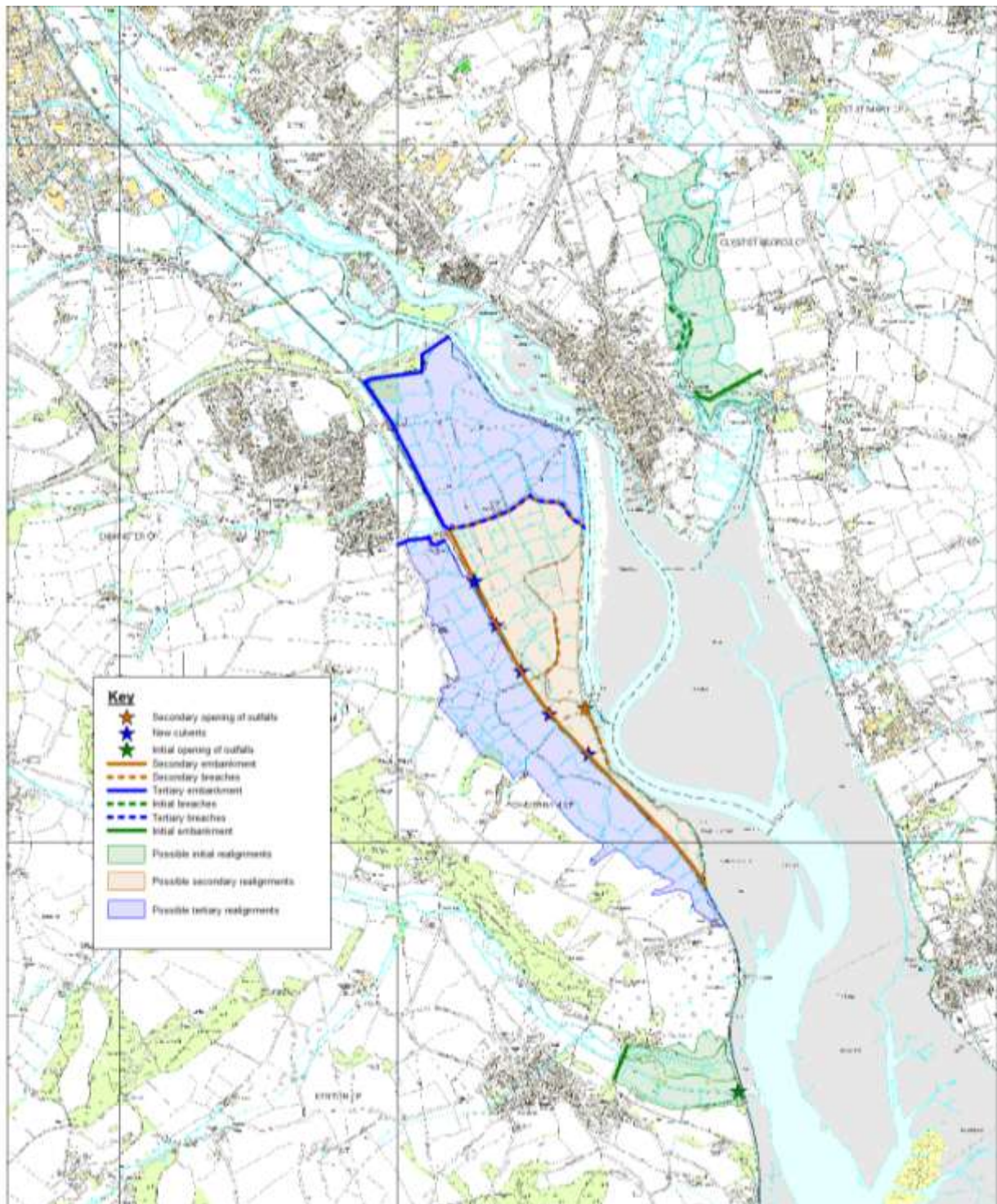
Inspection of the ISIS-TUFLOW modelling results, based on the conceptual designs given below, identified the following. If the potential realignment of the Lower Clyst between the mouth of the Clyst and the Frying Pan was engineered with an embankment along the northern perimeter of the C527 road, tidal and fluvial flows would be limited to passing through Topsham bridge in extreme events. This constraint is indicated to:

- Increase EWLs locally downstream of Topsham bridge by up to 0.5m.
- Increase EWLs locally upstream of the A376 bridge by up to 0.25m.
- Between Topsham bridge and the A376 bridge there would be negligible impact on EWLs.
- The above impacts could be avoided, if the C527 road is instead raised on a causeway, with culverts to avoid flow constraints, and a breach in the embankment downstream of the C527 to allow evacuation of water.



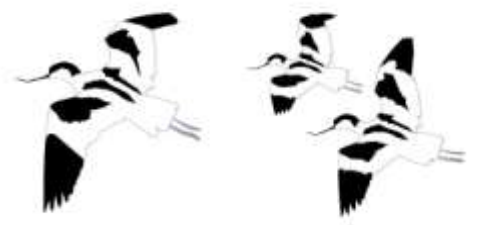


D.2 Conceptual Design of Various Managed Realignments



Note: the form, timing and location of any engineering works shown herein was used solely to determine the potential impacts of possible realignments. The broad engineering of any realignments is shown in sections 3, 4 and 5 of the main report.

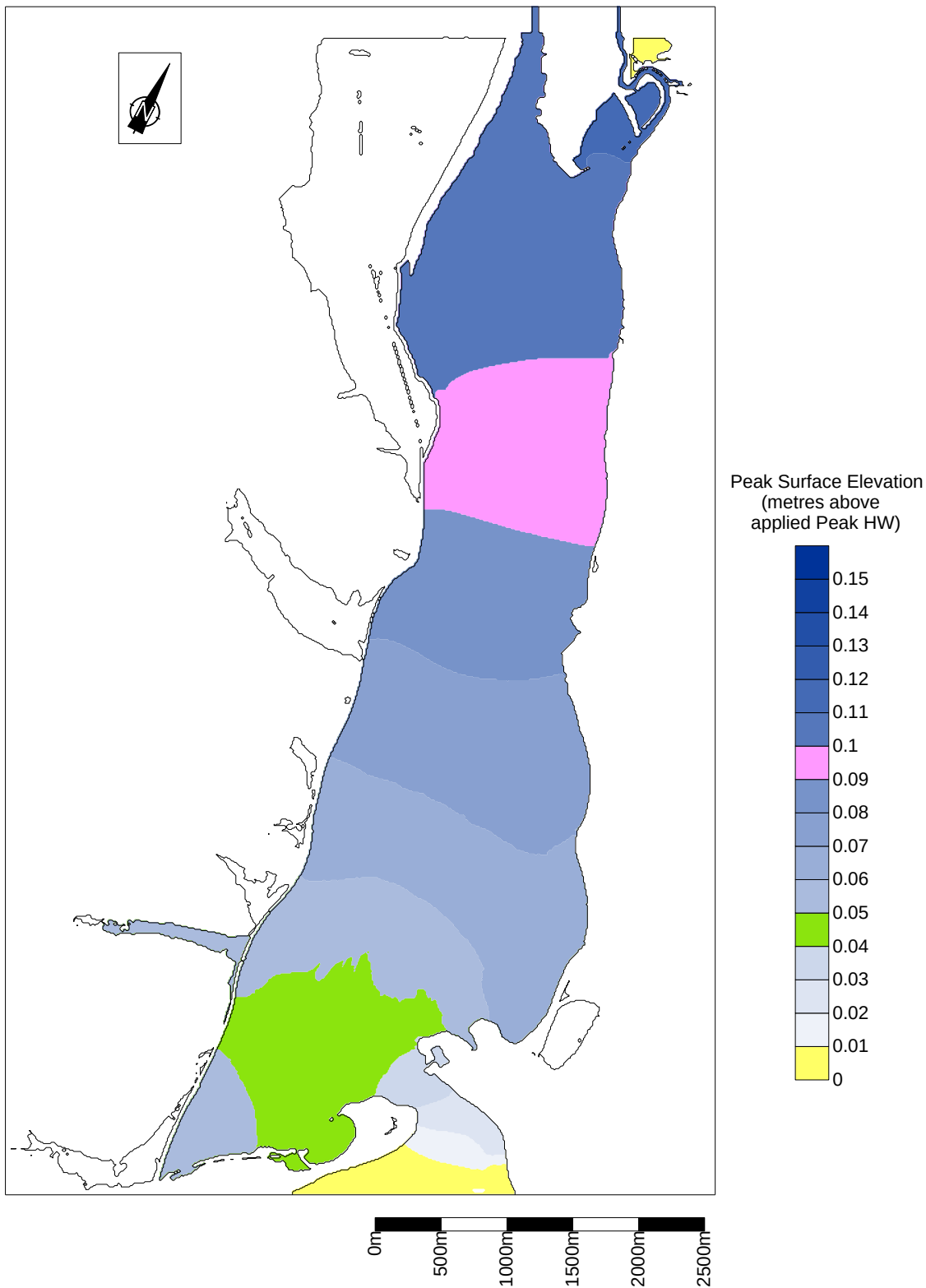


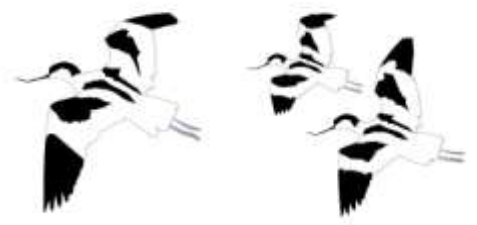


D.3 DAWN Modelling Results

Peak Surface Elevations

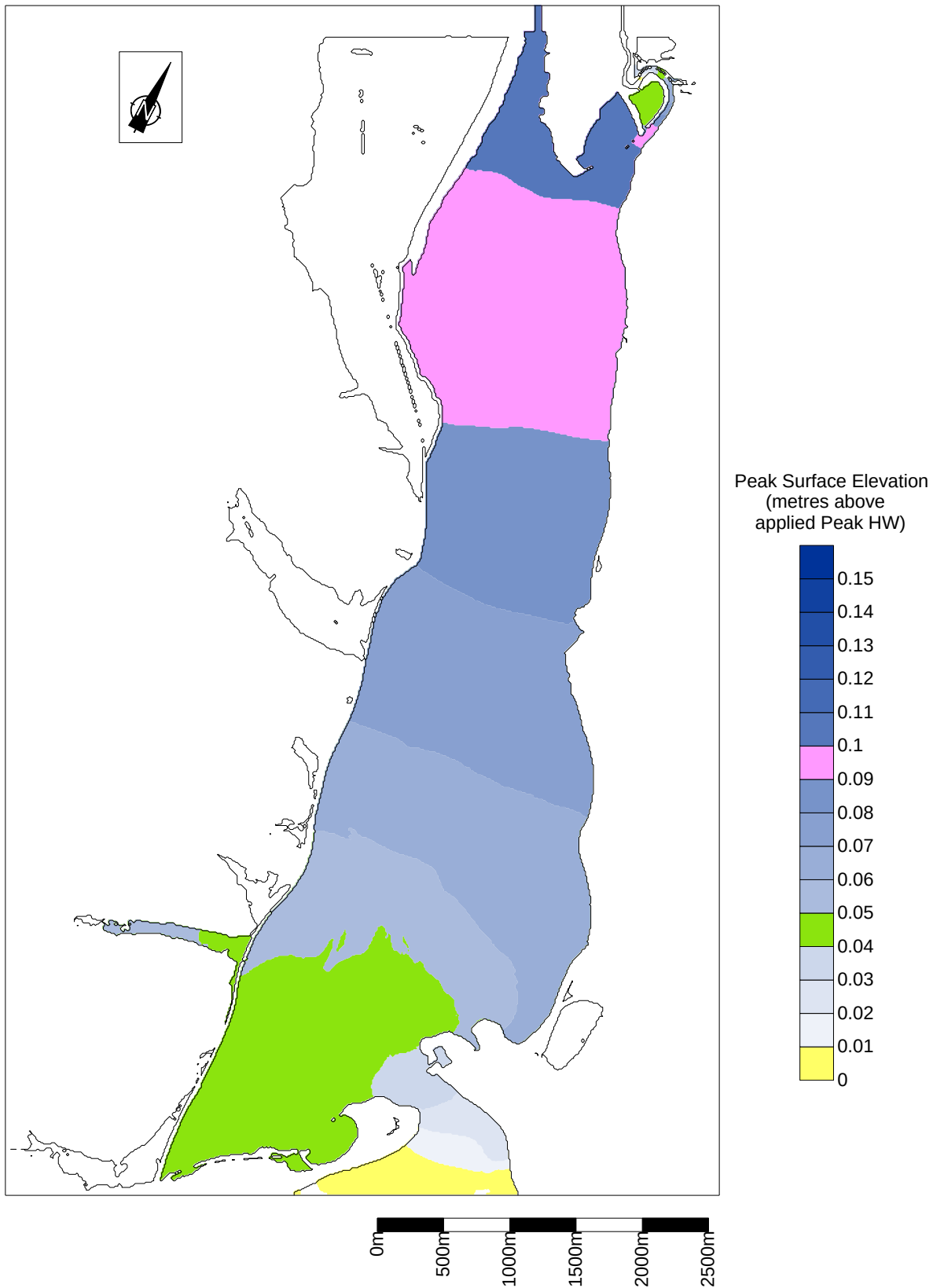
HAT, Year 2010





Peak Surface Elevations

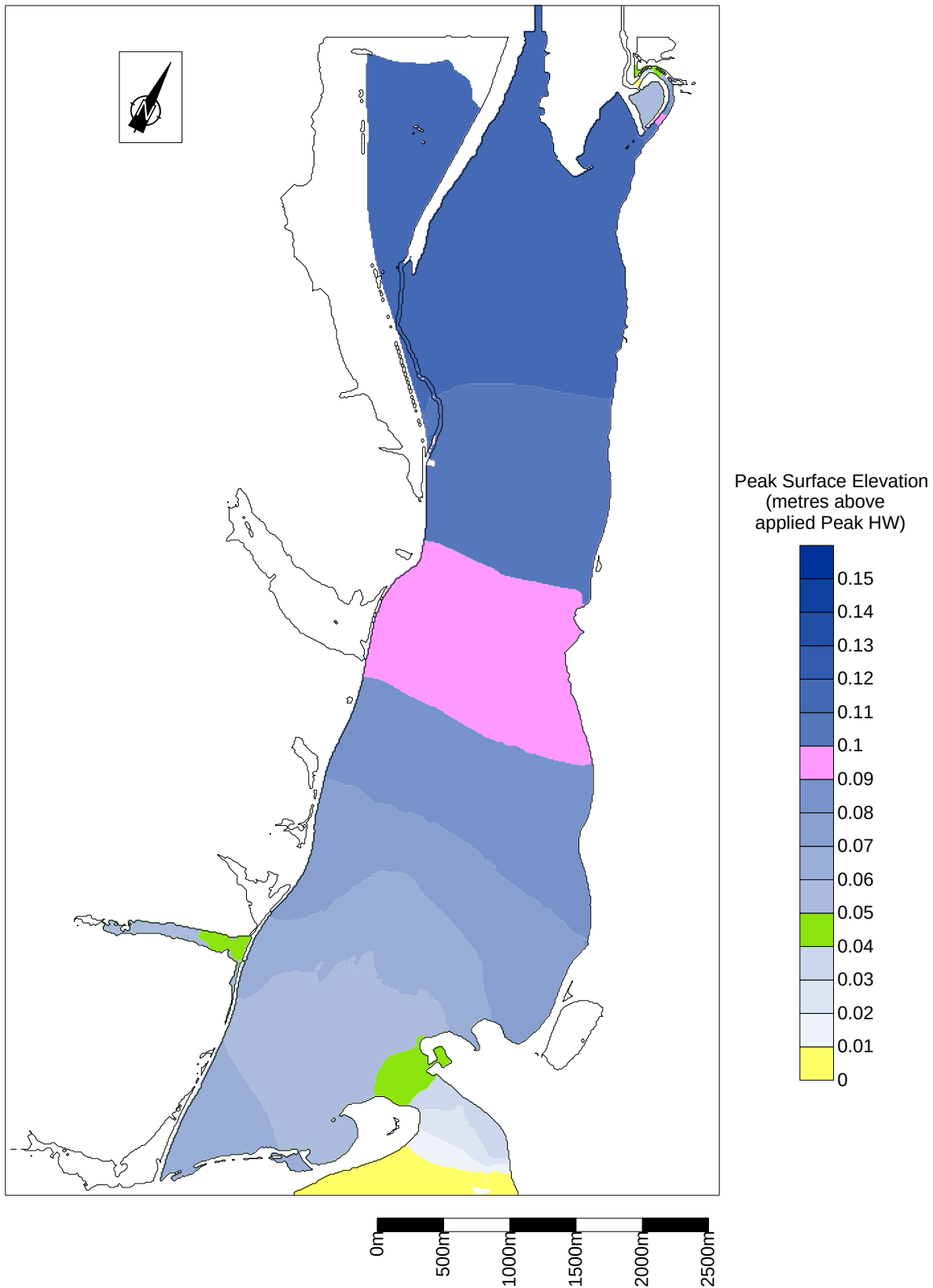
HAT, Year 2030

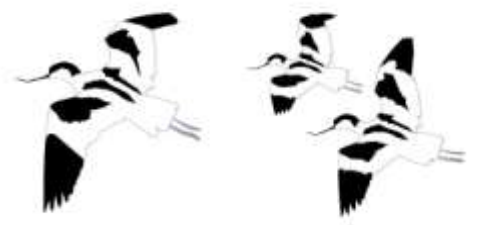




Peak Surface Elevations

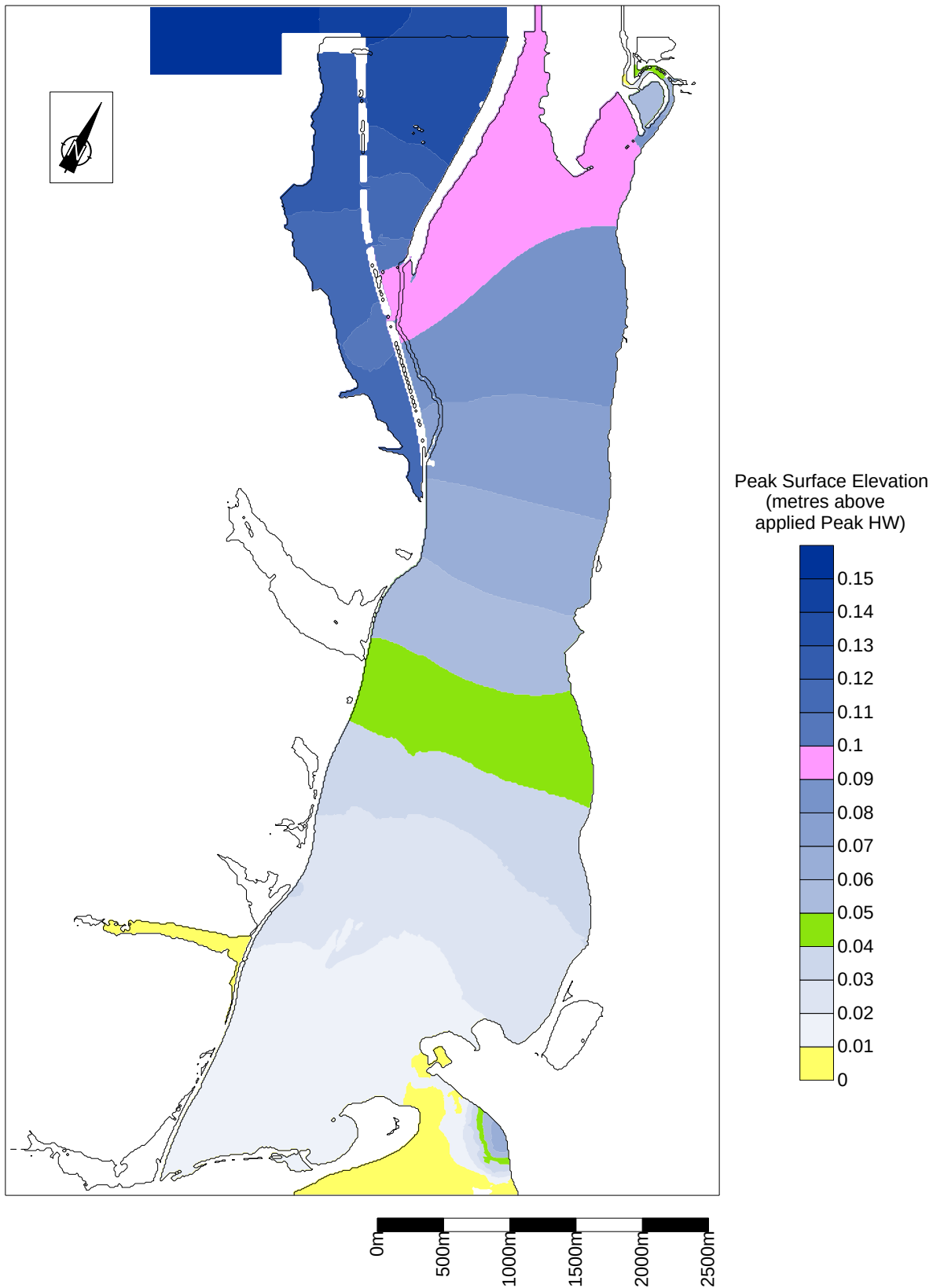
HAT, Year 2060

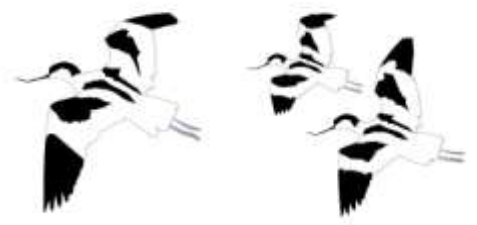




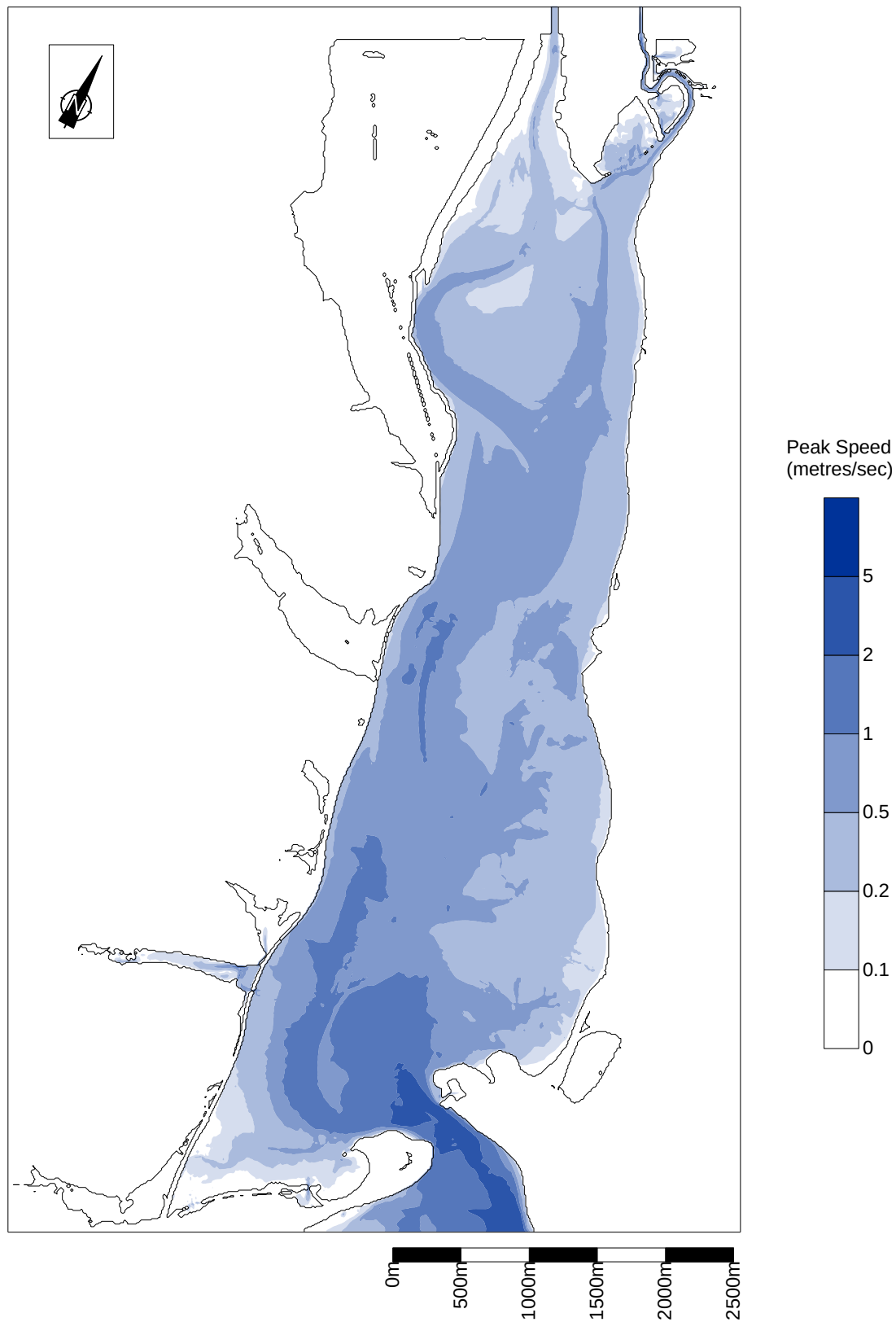
Peak Surface Elevations

HAT, Year 2110





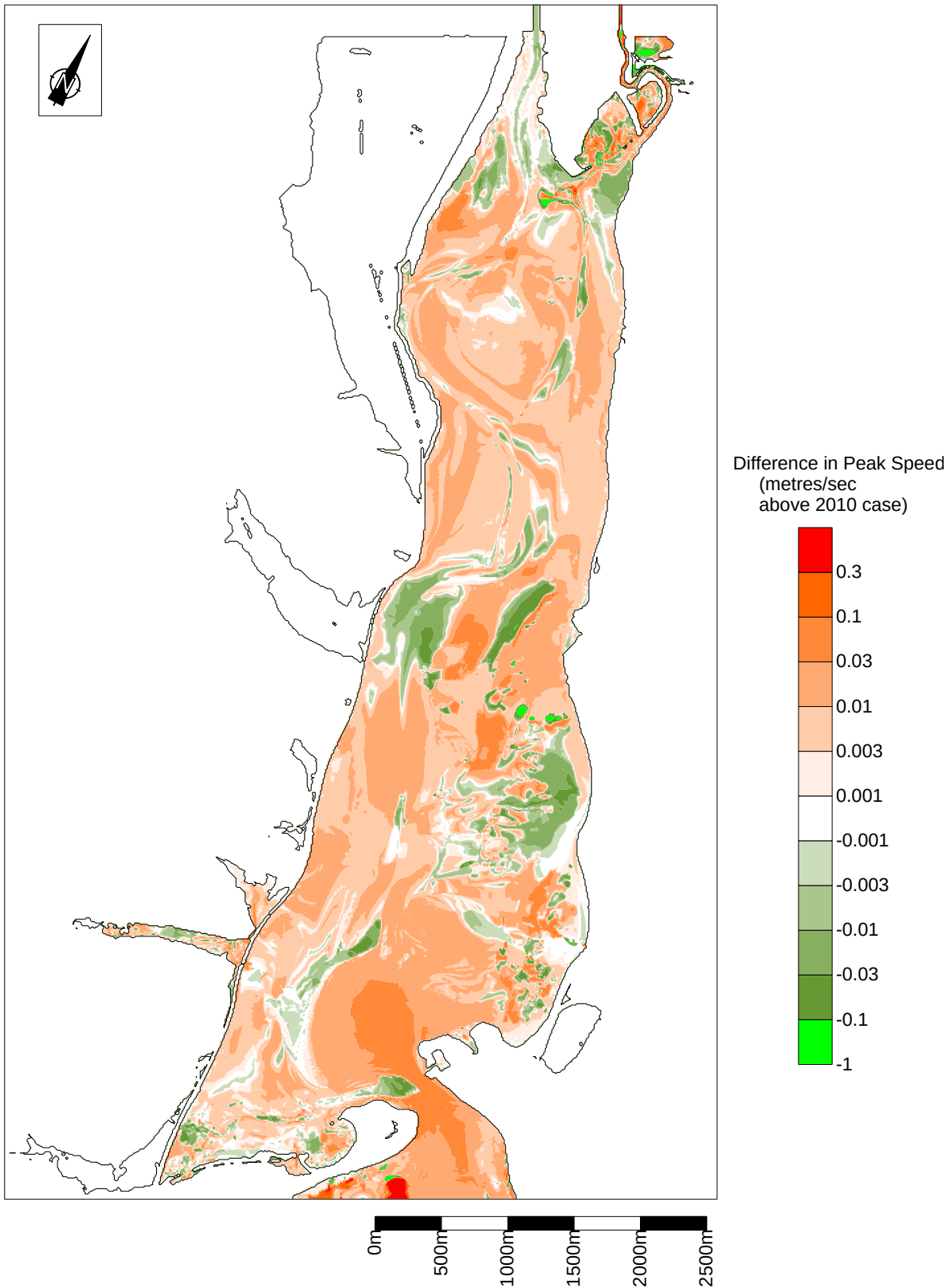
Peak Current Speed 2010

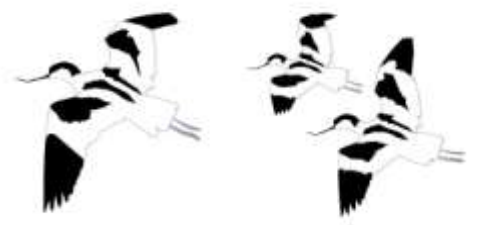




Increases in Peak Current Speed (Compared with 2010 case)

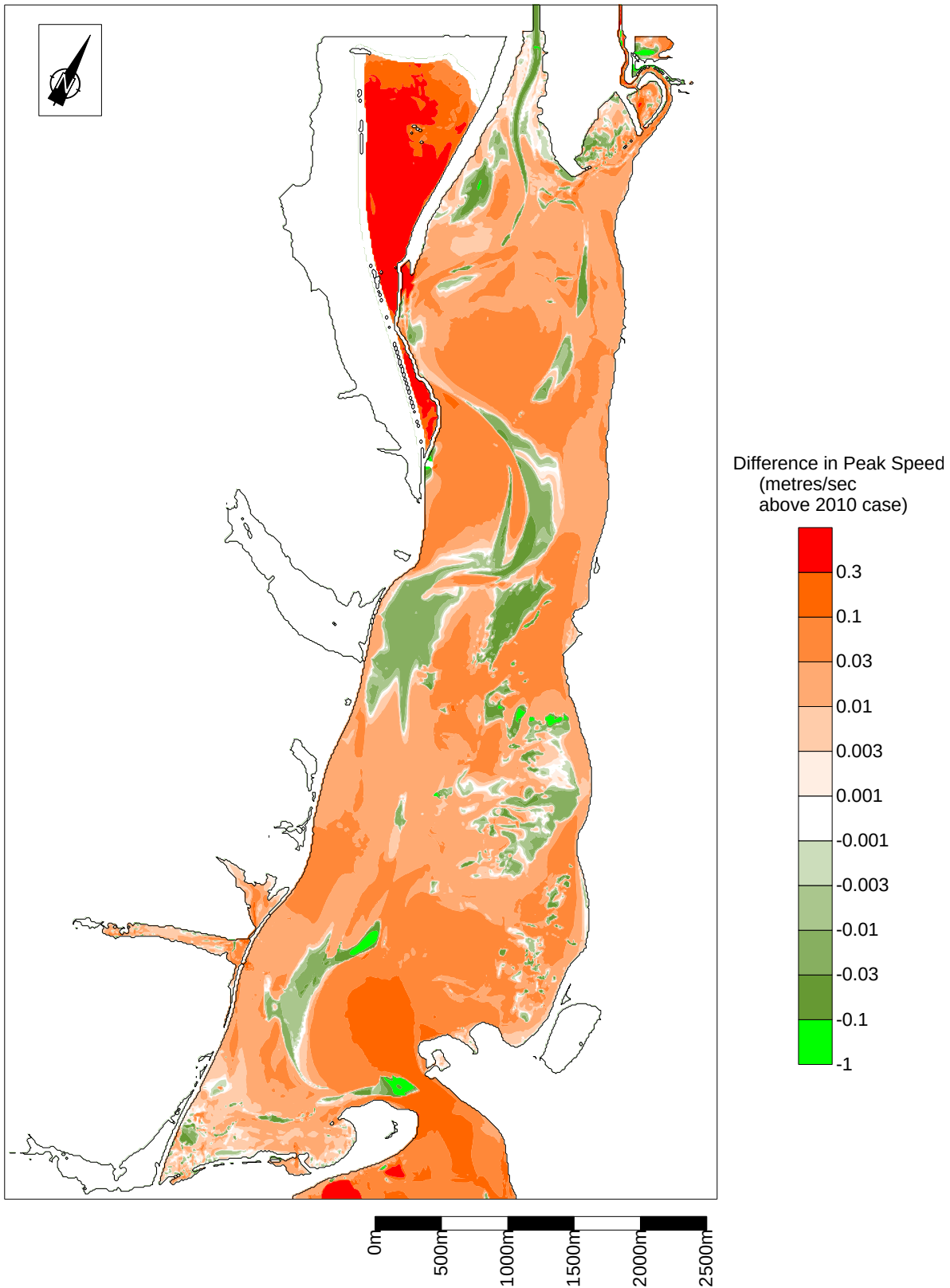
HAT, Year 2030

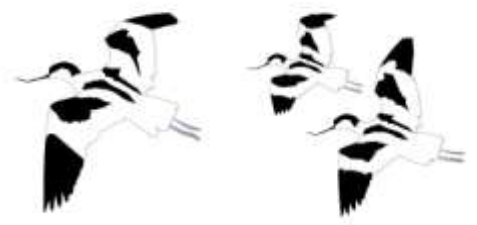




Increases in Peak Current Speed (Compared with 2010 case)

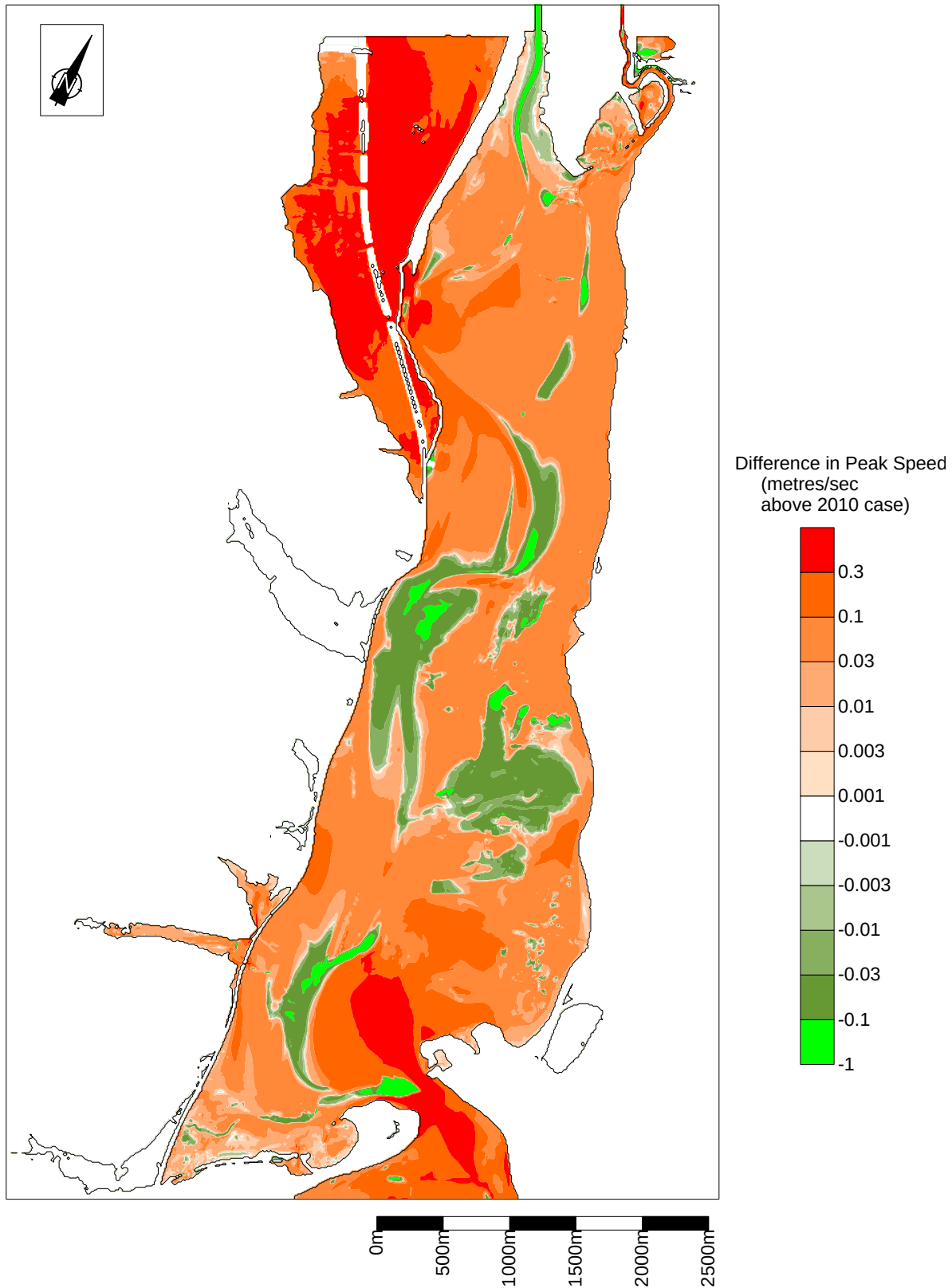
HAT, Year 2060





Increases in Peak Current Speed (Compared with 2010 case)

HAT, Year 2110

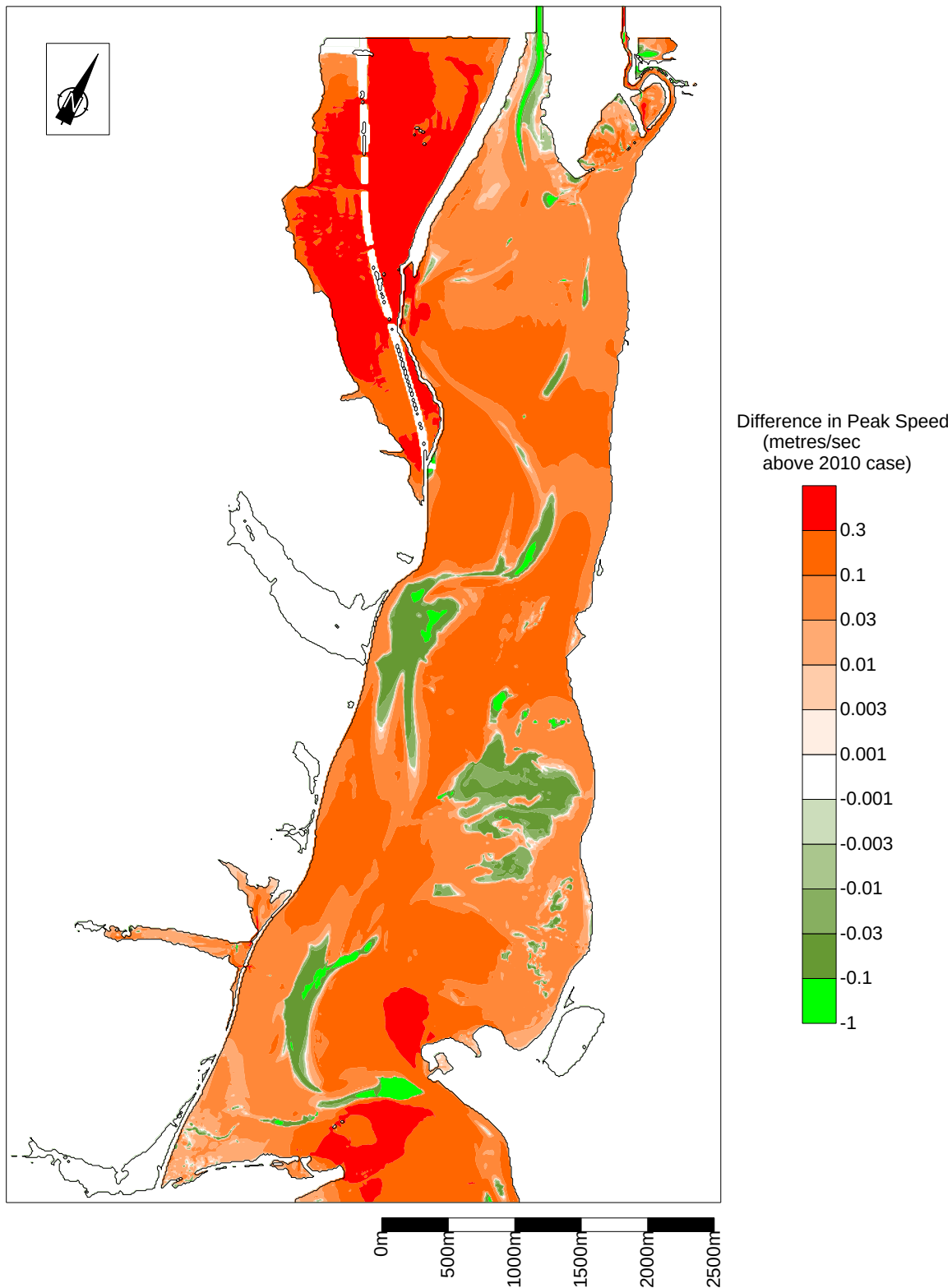


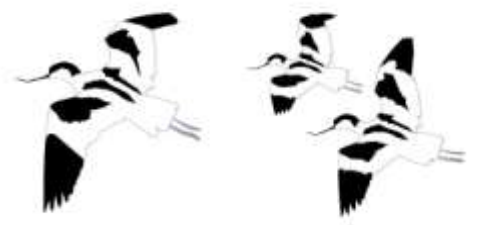


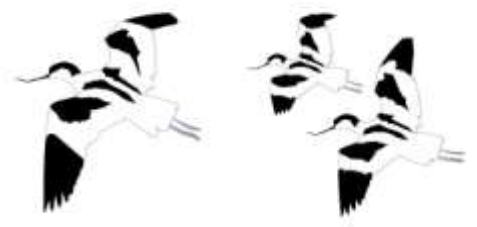
Increases in Peak Current Speed (Compared with 2010 case)

HAT, Year 2110

Distal End of Dawlish Warren Removed







Appendix E : Cost Database

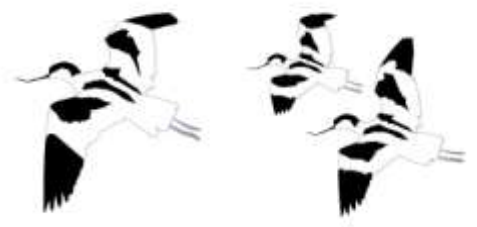


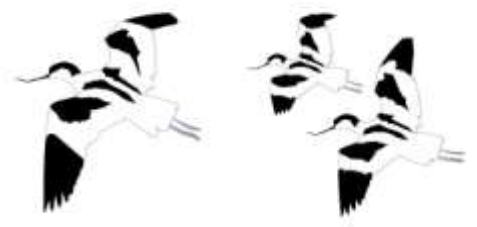
FRM Response Type		Base price (£/m for rural fluvial location, unless otherwise stated). CPI updated to Q4 12/13	
New earth embankment (dry construction)			
Height (m)	0.25	323	Geometry assumed to be 1/3 front slope, 5m crest width, 1/4 back slope as agreed with GQ Atkins review using Sporis developed a cost of £2130/m for 2m high embankment; this will be used as it is for where material cannot be sourced from a local borrow pit, which from SW experience may not always be possible. In addition to this, the use of non-local material would avoid impact on heritage (noted as an important point by heritage stakeholders). The ratio difference has been applied to all embankment heights. Cost is at April 2010 base date.
	0.5	646	
	0.75	969	
1	1	1292	
	1.25	1590	
	1.5	1888	
	1.75	2186	
	2	2484	
	2.25	2484	
	2.5	2484	
	3	2484	
	3.25	2876	
	3.5	3269	
	3.75	3662	
	4	4055	
	4.5	5029	
	5	6003	
	5.5	7164	
	6	8324	
Improved earth embankment (dry construction)			EA cost and Atkins review cost agree. Cost is at April 2010 base date. Exminster banks pre-feasibility indicated £730/m, broadly agreeing with these costs.
Height increase (m)	0.25	164	
	0.5	329	
	0.75	685	
1	1	1041	
	1.25	1155	
	1.5	1270	
	2	1455	
	2.5	1924	
	2.75	2319	
	3	2713	
Concrete revetment to existing embankment (dry construction)			Use of ground anchors for concrete revetments could reduce EA cost by 50%, but cannot be assumed to occur everywhere: higher EA cost used, with further detailed costs consideration to be carried out at scheme level. Cost is at April 2010 base date.
Height (m)	0.25	262	
	0.5	525	
	0.75	787	
1	1	1049	
	1.25	1312	
	1.5	1574	
	1.75	1836	
	2	2099	
	2.25	2361	
	2.5	2623	
	2.75	2886	
	3	3148	
	3.25	3410	
	3.5	3673	
	4	4197	
	4.5	4722	
	5	5247	
	5.25	5509	
	5.5	5772	
	6	6296	



Freestanding masonry wall (dry construction)	Height (m)	0.25	323	EA cost indicated £467/m for 1m high wall. This is based on masonry walls with no internal reinforcement (i.e. concrete). Atkins review using Spans developed a cost of £1107/m for 1m high wall; this will be used as it is for reinforced, FRM engineered walls. This ratio difference has been applied to all wall heights. Cost is at April 2010 base date.
		0.5	645	
		0.75	968	
		1	1291	
		1.25	1797	
		1.5	2304	
		2	3317	
		2.5	4042	
		3	4768	
Retaining wall (wet construction)	Height (m)	0.25	559	EA cost and Atkins review cost agree. Cost is at April 2010 base date.
		0.5	1118	
		0.75	1676	
		1	2235	
		1.25	2888	
		1.5	3400	
		2	4445	
		2.5	5593	
		3	6740	
		3.5	8002	
Cut-off structure	Height (m)	2	698	Costs based on EA data. Atkins review using Spans developed costs within 20% of EA data.
		2.5	891	
		3	1063	
Rock armour of front faceloe protection (wet construction)	Depth (m)	0.25	367	EA cost for the rock armouring of the front face add-on used in lieu of any further data. Cost is at April 2010 base date.
		0.5	735	
		0.75	1102	
		1	1469	
		1.25	1836	
		1.5	2204	
		2	2838	
		2.25	3306	
		2.5	3673	
		2.75	4040	
Wave recurve wall added to existing structure (dry construction)	Height (m)	0.25	167	Single height of wave recurve wall designed for: indicative of similar type to those used in Caldicot Levels SDI. Cost is at April 2010 base date.
		0.5	333	
		0.75	500	
		1	667	
		1.5	1000	
Vehicle access	Cost per m		56	EA cost for vehicle access was based on tarmac/concrete access track. Atkins review cost of £49/m is much less and based on a stone track. It is likely the majority of the access tracks would be stone rather than tarmac, hence the Atkins review rate has been used. Cost is at April 2010 base date.
	Polder fields (wet construction) No. of fields (100mx250m)	1	33813	
		2	67626	
		3	101439	
		4	135252	

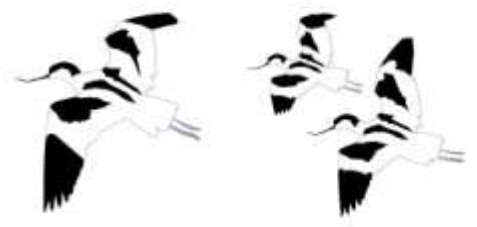




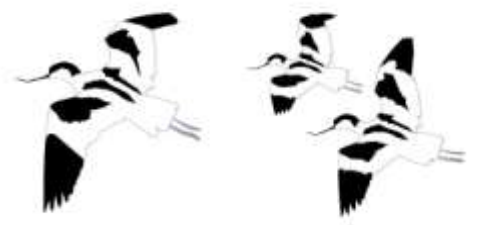


Appendix F : SEA HLO Assessment Summary

Details of this assessment are held in 'Environmental Assessment of High Level Options', AHA (June, 2012).



Appendix G : High Level Option Assessment Tables





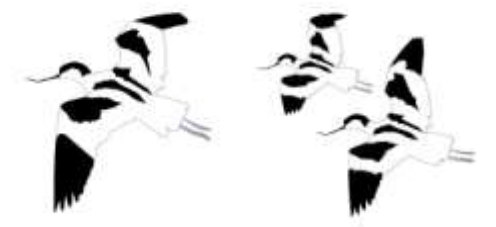
LOCATION			FACTUAL CRITERIA				ASSESSMENT OF HIGH LEVEL OPTIONS AGAINST FACTUAL CRITERIA AND OBJECTIVES					PREFERRED HIGH LEVEL OPTIONS		
Relevant placename	FCRM Unit	SMP2 policy unit	Features at risk	Habitat compensation potential	FCRM breach SoP (based on Maintain scenario)	Socio-economic viability (based on SMP2 and HLO costings, NAI PVD and Maintain PVB)	NAI	Maintain	Sustain	Improve	Manage	0 to 20 years	20 to 50 years	50 to 100 years
Sandy Bay	1	6a43	International (Exe Estuary SPA/Ramsar site & Dorset and East Devon WHS) and national (Exe Estuary SSSI) conservation sites present.	Very limited potential for habitat compensation.	No breach risk, minor erosion risk in 2110. Limited sensitivity to CC scenarios.	NAI PVD of ~£0M, HTL/Improve Pvc of £0.4-1.5M, HTL/Improve PVB~£0M, Maintain/Sustain/Improve BCR<1. No sensitivity to CC scenarios.	Low level of flood and erosion risk even by 2110. Internationally designated features supported. BCR supports this option. Both primary and secondary objectives would be achieved.	Low level of flood and erosion risk even by 2110. Internationally designated features supported. BCR does not support this option. Both primary and secondary objectives would be achieved.	Low level of flood and erosion risk even by 2110. Internationally designated features supported. BCR does not support this option. Both primary and secondary objectives would be achieved.	Low level of flood and erosion risk even by 2110. Internationally designated features supported. BCR does not support this option. Both primary and secondary objectives would be achieved.	Low level of flood and erosion risk even by 2110. Internationally designated features supported. BCR does not support this option. Both primary and secondary objectives would be achieved.	NAI	NAI	NAI
The Maer	2	6a44-45	Local road and amenity beach. International (Exe Estuary SPA/Ramsar site), national (Exe Estuary SSSI) and local (The Maer LNR/CWS and Orcombe Point to Straight Point CWS) conservation sites.	Limited potential for habitat compensation (sand dunes).	No breach risk until 2110 at the earliest, probably later. Limited sensitivity to CC scenarios.	NAI PVD of £4K (£0-4K), HTL/Improve Pvc of £0.5M (£0.3-1.2M), Maintain/Sustain/Improve BCR<1. No sensitivity to CC scenarios.	Beach erosion risk would increase through to 2030 with road, car parks, amenity and park area being progressively affected in the medium term. BCR supports this option. Whilst most primary objectives would be achieved, secondary objectives would not be.	Breach risk would remain low even by 2110, with less investment than for Sustain or Improve. Road, car parks, amenity and park area would be protected. BCR does not support this option: local funding and contributions would be required. Both primary and secondary objectives would be achieved.	Breach risk would be extremely low, and FCRM investment would be inefficient with no flood/erosion driver. Road, car parks, amenity and park area would be protected. BCR does not support this option: local funding and contributions would be required. Both primary and secondary objectives would be achieved.	Breach risk would be extremely low, and FCRM investment would be inefficient with no flood/erosion driver. Road, car parks, amenity and park area would be protected. BCR does not support this option: local funding and contributions would be required. Both primary and secondary objectives would be achieved.	Breach risk would be managed with a retreated line. Road, car parks and park area would be affected. Limited habitat/amenity potential for dune system to be reactivated. This would be extremely difficult to implement, but may be preferable to going outside of the N2K site. BCR may support this option dependent on habitat/environmental benefits. Whilst most primary objectives would be achieved, secondary objectives would not be.	Maintain	Sustain	Sustain
Exmouth	3	6a46-6b01	2000-3000 properties and related infrastructure. 4 electricity sub-stations. 2 care homes. 1 school. 1 landfill site. International (Exe Estuary SPA/Ramsar site). National (Exe Estuary SSSI) and local (Exmouth LNR) conservation sites. Imperial Recreation Ground landfill site and 19 listed buildings.	Very limited potential for habitat compensation.	4% (2010), 10-100% (2030), 20-100% (2060), 100% (2110). Medium sensitivity to CC scenarios.	NAI PVD of £355M (£281-560M), HTL/Improve Pvc of £4.3M (£3.1-9.1M), Maintain/Sustain/Improve BCR>5. No sensitivity to CC scenarios.	Up to 2000-3000 properties and infrastructure would be put at flood risk, along with environmental risk (such as landfill erosion). BCR does not support this option. Primary and secondary objectives would not be achieved.	Flood risk would increase to 10-100% AEP by 2030 for up to 2000-3000 properties and related infrastructure. BCR does support this option. Primary and secondary objectives would not be achieved.	Flood risk would continue to be high, unless previously reduced by Improve. Up to 2000-3000 properties and infrastructure would experience flooding in the 2% AEP event now and in the future. BCR would support this option. Primary and secondary objectives would be achieved.	Flood risk would be significantly reduced below 4% AEP for up to 2000-3000 properties and related infrastructure. BCR would support this option. Primary and secondary objectives would be achieved.	Very limited scope for realignment due to existing development. Most primary and secondary objectives would not be achieved.	Improve	Sustain	Sustain
Courtlands	4	6b02	Branchline railway and less than 10 properties. International (Exe Estuary SPA/Ramsar site), national (Exe Estuary SSSI) and local (Exmouth LNR) conservation sites. Local landscape designation (Exe Coastal Preservation Area). Grades 1 and 3 ALC.	Very limited potential for habitat compensation.	20% (2010), 100% AEP (2030-2110) locally around Sowden Farm. The railway line has 0.1% (2010-2030), 4-0.1% (2060) and 100-0.5% (2110). Limited sensitivity to CC scenarios.	NAI PVD of £7.3M (£7.3-7.5M), indicative HTL/improve Pvc of £0.5M (£0.3-1.2M), Maintain PVB of £7M, Maintain BCR>1, Sustain/Improve BCR>1. Not sensitive to CC scenarios.	Branchline railway structural viability would be at risk after 2030, along with less than 10 properties. BCR does not support this option. Primary and secondary objectives would not be achieved.	Branchline railway structural viability would be maintained through to 2110 with a breach SoP of 0.1-0.5% AEP. BCR does not support this option in the medium to long term. Primary and secondary objectives would be achieved.	Branchline railway structural viability would be maintained through to 2110 with a breach SoP of 0.1% AEP. BCR does support this option, although railway contributions would be required, and FCRM investment would be less efficient than for Maintain. Primary and secondary objectives would be achieved.	Branchline railway structural viability would be maintained through to 2110 with a breach SoP of greater than 0.1% AEP. BCR does support this option, although railway contributions would be required, and FCRM investment would be less efficient than for Maintain or Sustain. Primary and secondary objectives would be achieved.	Very limited scope for realignment due to existing development. Primary and secondary objectives would not be achieved.	Maintain	Maintain	Maintain, Sustain
Lympstone	5	6b03	Up to 150 properties. International (Exe Estuary SPA/Ramsar site) and national (Exe Estuary SSSI) conservation sites.. 21 listed buildings and Grades 1 and 3 ALC.	Very limited potential for habitat compensation.	1% (2010), 2-20% (2030), 10-100% (2060), 100% (2110). Medium sensitivity to CC scenarios.	NAI PVD of £21M (£13-29M), indicative HTL/improve Pvc of £0.3M (£0.2-0.8M), Maintain PVB of £7M, Maintain BCR<1, Sustain/Improve BCR>5. Not sensitive to CC scenarios.	Up to 150 properties would be put at flood risk immediately with no flood gate operation. BCR does not support this option. Primary and secondary objectives would not be achieved.	Up to 150 properties would experience flooding in the 1% AEP event rising significantly into the future. BCR does not support this option. Primary and secondary objectives would not be achieved.	Up to 150 properties would experience flooding in the 1% AEP event now and into the future. BCR does support this option. Primary and secondary objectives would be achieved.	Up to 150 properties would experience flooding less frequently than the 1% AEP event now and into the future. BCR does support this option, although FCRM investment would be less efficient than Sustain. Primary and secondary objectives would be achieved.	Very limited scope for realignment due to existing development. Primary and secondary objectives would not be achieved.	Maintain, Sustain	Sustain	Sustain
Lympstone Commando	6	6b04-5	Branchline railway and less than 10 properties. International (Exe Estuary SPA/Ramsar site) and national (Exe Estuary SSSI) conservation sites. 2 listed buildings and Grade 3 ALC.	Very limited potential for habitat compensation.	0.1% (2010-2030), 0.1-0.5% (2060), 4-100% (2110). Limited sensitivity to CC scenarios.	NAI PVD of £7.3M (£7.3-7.6M), indicative HTL/improve Pvc of £0.3M (£0.2-0.7M), Maintain PVB of £0-6M, Maintain/Sustain/Improve BCR>1. Limited sensitivity to CC scenarios.	Branchline railway structural viability would be at risk after 2030, along with less than 10 properties. BCR does not support this option. Primary and secondary objectives would not be achieved.	Branchline railway structural viability would be maintained through to 2110 with a breach SoP of 0.1-0.5% AEP. BCR does support this option, although railway contributions may be required. Primary and secondary objectives would be achieved.	Branchline railway structural viability would be maintained through to 2110 with a breach SoP of 0.1% AEP. BCR does support this option, although railway contributions would be required, and FCRM investment would be less efficient than for Maintain. Primary and secondary objectives would be achieved.	Branchline railway structural viability would be maintained through to 2110 with a breach SoP of greater than 0.1% AEP. BCR does support this option, although railway contributions would be required, and FCRM investment would be less efficient than for Maintain or Sustain. Primary and secondary objectives would be achieved.	Very limited scope for realignment due to existing development. Primary and secondary objectives would not be achieved.	Maintain	Maintain	Maintain, Sustain
Exton	7	6b06-7	Branchline railway and less than 10 properties. International (Exe Estuary SPA/Ramsar site), national (Exe Estuary SSSI) and local (Woodbury Road Station CWS) conservation sites. Grade 3 ALC.	Very limited potential for habitat compensation.	0.1% (2010-2060), 0.1-100% (2110). Limited sensitivity to CC scenarios.	NAI PVD of £7.5M (£7.3-8.6M), indicative HTL/improve Pvc of £0.4 (£0.3-1.1M), Maintain PVB of £7-8M, Maintain/Sustain/Improve BCR>1. Limited sensitivity to CC scenarios.	Branchline railway structural viability would be at risk after 2030, along with less than 10 properties. BCR does not support this option. Primary and secondary objectives would not be achieved.	Branchline railway structural viability would be maintained through to 2110 with a breach SoP of 0.1% AEP. BCR does support this option, although railway contributions may be required. Primary and secondary objectives would be achieved.	Branchline railway structural viability would be maintained through to 2110 with a breach SoP of 0.1% AEP. BCR does support this option, although railway contributions would be required, and FCRM investment would be less efficient than for Maintain. Primary and secondary objectives would be achieved.	Branchline railway structural viability would be maintained through to 2110 with a breach SoP of greater than 0.1% AEP. BCR does support this option, although railway contributions would be required, and FCRM investment would be less efficient than for Maintain or Sustain. Primary and secondary objectives would be achieved.	Very limited scope for realignment due to existing development. Primary and secondary objectives would not be achieved.	Maintain	Maintain	Maintain, Sustain
East bank of the Lower Clyst	8	6b08	Up to 40-60 properties. C527 road. C527 road bridge and railway bridge. Cycleway. International (Exe Estuary SPA/Ramsar site), national (Exe Estuary SSSI) and local (Clyst Marshes CWS) conservation sites present. 1 listed building and Grades 1 and 4 ALC.	Good potential for habitat compensation (mainly saltmarsh and transitional) in the short term onwards.	10% (2010), 100% (2030-2110). Limited sensitivity to CC scenarios.	NAI PVD of £4.9M (£3.8-7.2M), indicative HTL/improve Pvc of £1M (£0.7-2.4M), Maintain/Sustain PVB of £0M, Maintain/Sustain BCR<1, Improve BCR>1-5. Medium sensitivity to CC scenarios.	Up to 40-60 properties, the C527 and the cycleway would be put at regular flood risk by 2030. BCR does not support this option. Primary and secondary objectives would not be achieved.	Up to 40-60 properties, the C527 and the cycleway would still be put at regular flood risk by 2030. BCR does not support this option. Primary and secondary objectives would not be achieved.	Up to 40-60 properties, the C527 and the cycleway would still be put at flood risk in the 10% AEP event. BCR does not support this option. Primary and secondary objectives would not be achieved.	Up to 40-60 properties, the C527 and the cycleway would be at flood risk less frequently than the 20% AEP event; embankment improvements would need to be significant. BCR does support this option, although FCRM investment would likely be more efficiently focussed on realigned embankments protecting properties and the C527. Local funding and contributions may be required. Primary and secondary objectives would be achieved.	Flood risk in the 10% AEP event would be managed with a retreated line. Good potential for N2K habitat compensation. Locally important C527, bridges and cycleway, may be affected or could be locally protected. BCR may support this option, although local funding and contributions may be required. Primary and secondary objectives would be achieved (if local roads, properties and bridges are protected), as well as potential for N2K site integrity to be supported.	Manage	Manage	Manage
							Stronger reasons to prefer HLO	Stronger reasons to prefer HLO	Stronger reasons to prefer HLO	Stronger reasons to prefer HLO	Stronger reasons to prefer HLO			
							Some reasons to prefer HLO	Some reasons to prefer HLO	Some reasons to prefer HLO	Some reasons to prefer HLO	Some reasons to prefer HLO			
							Weaker reasons to prefer HLO	Weaker reasons to prefer HLO	Weaker reasons to prefer HLO	Weaker reasons to prefer HLO	Weaker reasons to prefer HLO			



LOCATION			FACTUAL CRITERIA				ASSESSMENT OF HIGH LEVEL OPTIONS AGAINST FACTUAL CRITERIA AND OBJECTIVES					PREFERRED HIGH LEVEL OPTIONS		
Relevant placename	FCRM Unit	SMP2 policy unit	Features at risk	Habitat compensation potential	FCRM breach SoP (based on Maintain scenario)	Socio-economic viability (based on SMP2 and HLO costings, NAI Pvd and Maintain Pvb)	NAI	Maintain	Sustain	Improve	Manage	0 to 20 years	20 to 50 years	50 to 100 years
Clyst St. Mary	9	NA	Up to 30-70 properties. A376 just outside at risk area. One local conservation site (Clyst Marshes CWS) present. Causeway Scheduled Monument and Grades 1, 3 and 4 ALC.	Good potential for habitat compensation (mainly transitional and freshwater) in the short term onwards.	10% (2010), 100% (2030-2110). Limited sensitivity to CC scenarios.	NAI Pvd of £4M (£1-14M), indicative HTL/improve Pvc of £1M (£1-3M), Maintain/Sustain Pvb of £0-4M, Maintain/Sustain BCR>1, Improve BCR>1-5. High sensitivity to CC scenarios.	Up to 30-70 properties would be put at regular flood risk by 2030. BCR does not support this option. Primary and secondary objectives would not be achieved.	Up to 30-70 properties would still be put at regular flood risk by 2030. BCR does not support this option. Freshwater habitat potential which could support N2K integrity, could be affected: to be determined at the next options stage. Primary and secondary objectives would not be achieved.	Up to 30-70 properties would still be put at regular flood risk by 2030. BCR does not support this option. Freshwater habitat potential which could support N2K integrity, could be affected: to be determined at the next options stage. Primary and secondary objectives would not be achieved.	Up to 30-70 properties would be at significantly reduced flood risk by 2030. BCR does support this option, although local funding and contributions may be required. Freshwater habitat potential which could support N2K integrity, could be affected: to be determined at the next options stage. Primary and secondary objectives would be achieved.	Flood risk would be managed with a landward alignment. BCR may support this option, although local funding and contributions may be required. Freshwater habitat potential which could support N2K integrity, could be affected: to be determined at the next options stage. Primary and secondary objectives could be achieved dependent on alignment.	NAI, Improve, Manage	NAI, Improve, Manage	NAI, Improve, Manage
Sowton	10	NA	Grades 1, 3 and 4 ALC.	Some potential for freshwater habitat compensation.	0.1% (2010-2020), 0.1-2% (2060), 0.1-100% (2110). Medium sensitivity to CC scenarios.	NAI Pvd of £0.1M, indicative HTL/improve Pvc of £0.3M (£0.1-0.7M), Maintain/Sustain Pvb of £0M, Maintain/Sustain/Improve BCR<1. Limited sensitivity to CC scenarios.	No properties would be put at flood risk. BCR does support this option. Freshwater habitat potential which could support N2K integrity, could be affected: to be determined at the next options stage. Primary and secondary objectives would be achieved as no assets at risk.	No properties would be put at flood risk. BCR does not support this option. Freshwater habitat potential which could support N2K integrity, could be affected: to be determined at the next options stage. Primary and secondary objectives would be achieved as no assets at risk.	No properties would be put at flood risk. BCR does not support this option. Freshwater habitat potential which could support N2K integrity, could be affected: to be determined at the next options stage. Primary and secondary objectives would be achieved as no assets at risk.	No properties would be put at flood risk. BCR does not support this option. Freshwater habitat potential which could support N2K integrity, could be affected: to be determined at the next options stage. Primary and secondary objectives would be achieved as no assets at risk.	Flood risk would be managed with a landward alignment. BCR does not support this option. Freshwater habitat potential which could support N2K integrity, could be affected: to be determined at the next options stage. Primary and secondary objectives could be achieved.	NAI, Manage	NAI, Manage	NAI, Manage
West bank of the Lower Clyst	11	6b08	Up to 20 properties. International (Exe Estuary SPA/Ramsar site), national (Exe Estuary SSSI) and local (Clyst Marshes CWS) conservation sites present. Grades 1 and 4 ALC.	Good potential for habitat compensation (mainly saltmarsh and transitional) in the short term onwards.	100% (2010-2110). Limited sensitivity to CC scenarios.	NAI Pvd of £0.7M (£0.7-3.2M), indicative HTL/improve Pvc of £1.3M (£1-3M), Maintain/Sustain Pvb of £0M, Maintain/Sustain/Improve BCR<1. Limited sensitivity to CC scenarios.	Up to 20 properties would be put at flood risk in the long term. BCR does support this option. Primary and secondary objectives would not be achieved, although potential for N2K site integrity to be supported could occur in the short term in an un-managed manner.	Up to 20 properties would still be put at flood risk in the long term. BCR does not support this option. Primary and secondary objectives would not be achieved, although potential for N2K site integrity to be supported could occur in the medium term.	Up to 20 properties would still be put at flood risk in the long term. BCR does not support this option. Primary and secondary objectives would not be achieved, although potential for N2K site integrity to be supported could occur in the long term.	Up to 20 properties would experience reduced flood risk in the long term. BCR does not support this option. Primary and secondary objectives would not be achieved.	Flood risk would be managed with a landward alignment. BCR may support this option, although local funding and contributions may be required. Primary and secondary objectives would not be achieved, although potential for N2K site integrity to be supported could occur.	NAI, Manage	NAI, Manage	NAI, Manage
Topsham	12	6b09	Up to 120-240 properties. 1 electricity sub-station. International (Exe Estuary SPA/Ramsar site), national (Exe Estuary SSSI) and local (Topsham Quay CWS, Exe Estuary RSPB Reserve) conservation sites. Topsham Playing Field landfill site, Grades 1 and 4 ALC and 67 listed buildings.	Very limited potential for habitat compensation.	20% (2010), 100% (2030-2110). Limited sensitivity to CC scenarios.	NAI Pvd of £16M (£7-45M), indicative HTL/improve Pvc of £7M (£7-9M), Maintain Pvb of -£4M to £8M, Maintain BCR<1, Sustain/Improve BCR>1. Limited sensitivity to CC scenarios.	Up to 120-240 properties would be put at regular flood risk. BCR does not support this option. Primary and secondary objectives would not be achieved.	Up to 120-240 properties would still be put at regular flood risk by 2030. BCR does not support this option. Primary and secondary objectives would be achieved with a low SoP.	Up to 120-240 properties would remain at flood risk in the 20% AEP event. BCR does support this option, although local funding and contributions may be required. Primary and secondary objectives would be achieved.	Up to 120-240 properties would experience flooding less frequently than the 20% AEP event. BCR does support this option, although local funding and contributions may be required. Primary and secondary objectives would be achieved.	Very limited scope for realignment due to existing development. Primary and secondary objectives would not be achieved.	Sustain, Improve	Sustain	Sustain
Countess Wear	13	6b10-11	Up to 10-40 properties and sewage treatment works. International (Exe Estuary SPA/Ramsar site), national (Exe Estuary SSSI) and local (Countess Wear CWS) conservation sites. Grade 4 ALC and 4 listed buildings.	Some potential for habitat compensation (mainly transitional and freshwater) on in-channel islands in the short term onwards.	2%, 20%, 100% (2060-2110), although 100% elsewhere. Limited sensitivity to CC scenarios.	NAI Pvd of £0.9M (£0-9M), indicative HTL/improve Pvc of £1.0M (£0.7-2.3M), Maintain Pvb of £0M, Maintain BCR<1, Sustain/Improve BCR>1-5. Sensitive to CC scenarios.	Up to 10-40 properties and infrastructure (sewage treatment works) would be put at flood risk. BCR may support this option. Primary and secondary objectives would not be achieved.	Up to 10-40 properties and infrastructure (sewage treatment works) would be put at increasing flood risk (more frequent than the 4% AEP event). BCR does not support this option. Primary and secondary objectives would be achieved in the short term.	Up to 10-40 properties and infrastructure (sewage treatment works) would continue to be at existing flood risk (4% AEP event). BCR may support this option, although local funding and contributions may be required. Primary and secondary objectives would be achieved.	Up to 10-40 properties and infrastructure (sewage treatment works) would be at reduced flood risk (less frequent than the 4% AEP event). BCR may support this option, although local funding and contributions may be required. Primary and secondary objectives would be achieved.	Up to 10-40 properties and infrastructure (sewage treatment works) would be at continued or reduced flood risk (less frequent than the 4% AEP event). Habitat potential at some of the in-channel islands would be realised. BCR may support this option, although local funding and contributions may be required. Primary and secondary objectives would be achieved.	Sustain, Manage	Sustain, Manage	Sustain, Manage
Exminster Marshes and Powderham Banks	14	6b12-13	Up to 150-270 properties and strategic infrastructure (mainline railway, A379, M5 and canal). Cycleway. 12 electricity sub-stations. Transco pipeline runs through the floodplain. Trunk sewer within canal bank. International (Exe Estuary SPA/Ramsar site), national (Exe Estuary SSSI) and local (Exeter Canal CWS, Exe Estuary RSPB Reserve) conservation sites. Local landscape designations (Exe Coastal Preservation Area & Area of Great Landscape Value). Grades 1 - 4 ALC, 1 landfill site and 9 listed buildings.	Good potential for habitat compensation (mainly mudflat and saltmarsh) in the short term onwards. Functionality assessment indicates that there would potentially be impacts on bird usage in the estuary.	0.1% (2010), 0.5-4% (2030), 2-100% (2060), 20-100% (2110). Medium sensitivity to CC scenarios.	NAI Pvd of £37M (£27-97M), indicative HTL/improve Pvc of £2M (£1-5M), Maintain Pvb of £6-18M, Maintain BCR>1, Sustain/Improve BCR>5. Limited sensitivity to CC scenarios.	Up to 150-270 properties and strategic infrastructure (mainline railway, M5 and canal) would be put at regular flood risk by 2030. BCR does not support this option. Exminster Marshes freshwater ecological function would change in an unmanaged way in the short term. Primary and secondary objectives would not be achieved.	Up to 150-270 properties and strategic infrastructure (mainline railway, M5 and canal) would be at increasing flood risk (more frequent than the 2% AEP event). BCR does support this option. Exminster Marshes freshwater ecological function would change in the medium term. Primary and secondary objectives would be achieved in the short term only.	Up to 150-270 properties and strategic infrastructure (mainline railway, M5 and canal) would continue to be at existing flood risk (2% AEP event), although below Network Rail guidelines. BCR does support this option, although local funding and contributions may be required. Exminster Marshes freshwater ecological function would be maintained. Primary and secondary objectives would be achieved.	Up to 150-270 properties and strategic infrastructure (mainline railway, M5 and canal) would be at reduced flood risk (less frequent than the 2% AEP event). BCR does support this option, although local funding and contributions may be required. Exminster Marshes freshwater ecological function would be maintained. Primary and secondary objectives would be achieved.	Up to 150-270 properties and strategic infrastructure (mainline railway, M5 and canal) would be at reduced flood risk (less frequent than the 2% AEP event) from a realigned embankment. BCR may support this option, although local funding and contributions may be required. Exminster Marshes freshwater ecological function would change in a managed way to intertidal habitat. Primary and secondary objectives could be achieved dependent on balance of freshwater and intertidal functionality: to be determined at next options stage.	Sustain	Sustain	Sustain, Manage
Kenn Valley	15	6b14-15	Up to 30-50 properties and strategic infrastructure (mainline railway). 1 electricity sub-station. International (Exe Estuary SPA/Ramsar site), national (Exe Estuary SSSI) and local (Powderham CWS) conservation sites. Local landscape designations (Exe Coastal Preservation Area & Area of Great Landscape Value). Grades 1 - 4 ALC, 8 listed buildings and Powderham Registered Park and Garden.	Some potential for habitat compensation (freshwater mainly, some saltmarsh/mudflat).	0.1% (2010), 0.5-2% (2030), 10-2% (2060), 100-4% (2110). Medium sensitivity to CC scenarios.	NAI Pvd of £11M (£10-15M), indicative HTL/improve Pvc of £0.6M (£0.3-1.4M), Maintain Pvb of £9M, Maintain BCR>5, Sustain/Improve BCR>5. Limited sensitivity to CC scenarios.	Up to 30-50 properties and strategic infrastructure (mainline railway) would be put at regular flood risk by 2030. BCR does not support this option. Kenn Valley freshwater ecological function would change in an unmanaged way in the short term. Primary and secondary objectives would not be achieved.	Up to 30-50 properties and strategic infrastructure (mainline railway) would be put at increasingly regular flood risk by 2060. BCR may support this option, although local funding and contributions may be required. Primary and secondary objectives would be achieved in the short term.	Up to 30-50 properties and strategic infrastructure (mainline railway) would continue to be at flood risk in the 0.1% AEP event. BCR does support this option, although local funding and contributions may be required. Primary and secondary objectives would be achieved.	Up to 30-50 properties and strategic infrastructure (mainline railway) would be at flood risk less frequently than the 0.1% AEP event. BCR does support this option, although local funding and contributions may be required. Primary and secondary objectives would be achieved.	Up to 30-50 properties and strategic infrastructure (mainline railway) would be at reduced flood risk (0.1% AEP event) from a realigned embankment. BCR may support this option, although the likely magnitude of habitat engineering costs would be unlikely to be supported by central funding. Primary and secondary objectives would could be achieved, as well as intertidal habitat potential (although as a significantly artificially engineered system).	Maintain	Sustain	Sustain, Manage
Starcross	16	6b16-17	Up to 600-800 properties and strategic infrastructure (mainline railway). 6 electricity sub-stations. 1 school. A379 road. International (Exe Estuary SPA/Ramsar site), national (Exe Estuary SSSI) and local (Starcross Golf Range CWS) conservation sites. Local landscape designations (Exe Coastal Preservation Area & Area of Great Landscape Value). Grades 1 - 3 ALC, 1 landfill site and 28 listed buildings. 1 Groundwater Source Protection Zone.	Some potential for freshwater habitat compensation.	0.1% (2010), 20-1% (2030), 100-2% (2060), 4-100% (2110), although weak spot at Cockwood with constrained flooding. Medium sensitivity to CC scenarios.	NAI Pvd of £145M (£112-205M), indicative HTL/improve Pvc of £0.6M (£0.4-1.5M), Maintain Pvb of £95M (£32-£95M), Maintain/Sustain/Improve BCR>5. Limited sensitivity to CC scenarios.	Up to 600-800 properties and strategic infrastructure (mainline railway) would be put at regular flood risk by 2030. BCR does not support this option. Primary and secondary objectives would not be achieved.	Up to 600-800 properties and strategic infrastructure (mainline railway) would be put at increasingly regular flood risk by 2030. BCR may support this option, although FCRM investment would be less efficient than Sustain or Improve. Primary and secondary objectives would be achieved in the short term.	Up to 600-800 properties and strategic infrastructure (mainline railway) would continue to be at flood risk in the 0.1% AEP event. BCR does support this option. Primary and secondary objectives would be achieved.	Up to 600-800 properties and strategic infrastructure (mainline railway) would continue to be at flood risk in the 0.1% AEP event. BCR does support this option. Primary and secondary objectives would be achieved.	Very limited scope for realignment due to existing development. Primary and secondary objectives would not be achieved.	Sustain, Improve	Sustain	Sustain
							Stronger reasons to prefer HLO	Stronger reasons to prefer HLO	Stronger reasons to prefer HLO	Stronger reasons to prefer HLO	Stronger reasons to prefer HLO			
							Some reasons to prefer HLO	Some reasons to prefer HLO	Some reasons to prefer HLO	Some reasons to prefer HLO	Some reasons to prefer HLO			
							Weaker reasons to prefer HLO	Weaker reasons to prefer HLO	Weaker reasons to prefer HLO	Weaker reasons to prefer HLO	Weaker reasons to prefer HLO			



LOCATION			FACTUAL CRITERIA				ASSESSMENT OF HIGH LEVEL OPTIONS AGAINST FACTUAL CRITERIA AND OBJECTIVES					PREFERRED HIGH LEVEL OPTIONS		
Relevant placename	FCRM Unit	SMP2 policy unit	Features at risk	Habitat compensation potential	FCRM breach SoP (based on Maintain scenario)	Socio-economic viability (based on SMP2 and HLO costings, NAI PVd and Maintain PVb)	NAI	Maintain	Sustain	Improve	Manage	0 to 20 years	20 to 50 years	50 to 100 years
Dawlish Warren	17	6b18-22	Up to 90-130 properties and strategic infrastructure (mainline railway). 2 electricity sub-stations. A379 road. International (Exe Estuary SPA/Ramsar site, Dawlish Warren SAC), national (Exe Estuary SSSI, Dawlish Warren NNR/SSSI) and local (Shutterton Brook, The Old Beach Huts, Langstone Rock Car Park, Port Road, Exe Estuary Margins CWS, Dawlish Warren LNR) conservation sites. Local landscape designations (Exe Coastal Preservation Area & Area of Great Landscape Value). Grades 1, 3 and 4 ALC and 3 listed buildings.	Limited potential for habitat compensation, although management of the existing habitats is important.	Variable, but weak location with 4% (2010), 10-100% (2030), 100% (2060-2110). Medium sensitivity to CC scenarios.	NAI PVd of £13M (£8-25M), indicative HTL/improve PVc of £2M (£1-5M) excluding any potential habitat compensation costs, Maintain PVb of £0.2M (£0-4M), Maintain BCR<1, Sustain/Improve BCR>1-5. Estuary-wide HTL/improve PVb of ~£100M, potentially giving BCR>5. Medium sensitivity to CC scenarios.	Breach risk along the central section would increase to 10% AEP in the short term: 90-130 properties locally would be at increased flood risk. At the neck and distal sections, towards 2060 flattening of the distal end could have impacts in the inner estuary, particularly at Starcross, Kenn Valley and Lympstone. Local BCR does support this option. Primary and secondary objectives would only be achieved if this was applied to the central and distal sections.	Breach risk along the central section would increase to 10% AEP in the short term: 90-130 properties locally would be at increased flood risk. At the neck and distal sections, engineering would need to be increasingly active after 2030. Engineered maintenance of the spit as a whole may require significant habitat compensation. Local BCR does not support this option, although the estuary-wide BCR does. Primary and secondary objectives in the short term would only be achieved if this was applied to the proximal section.	Breach risk along the central section would continue at 4% AEP: 90-130 properties locally would be at continued flood risk. At the neck and distal sections, engineering would need to be extremely active and hard after 2030. Engineering of the spit as a whole may require significant habitat compensation. Local and estuary-wide BCR do support this option, although FCRM investment may be more efficiently used to up-engineer the wider estuary assets towards 2060 and offset the increased flood risk. Primary and secondary objectives would only be achieved if this was applied to the proximal section.	Breach risk along the central section would reduced below 4% AEP: 90-130 properties locally would be at reduced flood risk. At the neck and distal sections, engineering would need to be extremely active and hard after 2030. Engineering of the spit as a whole may require significant habitat compensation. Local and estuary-wide BCR do support this option, although FCRM investment may be more efficiently used to up-engineer the wider estuary assets towards 2060 and offset the increased flood risk. Some primary and secondary objectives would only be achieved if this was applied to the central section in the short term, as this would likely result in SAC impact.	Breach risk would be managed along a different alignment. 90-130 local properties, and mainline railway, would be protected. BCR may support this option if flood risk to Dawlish Warren village is managed (and related risk predominantly at Starcross). This option could be more technically achievable as it works with natural processes. Reduced engineering of the spit as a whole may reduce the habitat compensation requirement. Primary and secondary objectives in the short to medium term may only be achieved (dependent on SAC impact) if this was applied to the central and distal sections.	NAI, Maintain, Sustain, Improve, Manage	NAI, Sustain, Manage	NAI, Sustain, Manage
Dawlish to Holcombe	18	6b23-24	Up to 10-40 properties and strategic infrastructure (mainline railway). 2 care homes. National (Dawlish Cliffs SSSI) conservation site. Grades 1 and 2 ALC and 5 listed buildings. Local landscape designation (Exe Area of Great Landscape Value).	Very limited potential for habitat compensation.	4-1% (2010-30), 100-2% (2060), 100-10% (2110). Medium sensitivity to CC scenarios.	NAI PVd of £21M (£3-34M), indicative HTL/improve PVc of £3M (£3-5M), Maintain PVb of £10M (£2M-£15M), Maintain BCR>1, Sustain/Improve BCR>1-5. Medium sensitivity to CC scenarios.	Mainline railway structural viability would be at risk after 2030, along with 10-40 properties. BCR does not support this option. Primary and secondary objectives would not be achieved.	Mainline railway structural viability would be at risk in the 4% AEP event in 2030 and increasing into the future, along with 10-40 properties. BCR does not support this option. Primary and secondary objectives would only be achieved in the short term.	Mainline railway structural viability would continue to be at risk in the 4% AEP event into the future (below Network Rail guidelines), along with 10-40 properties. BCR does support this option, although local funding and contributions may be required. Primary and secondary objectives would be achieved.	Mainline railway structural viability would be at risk less frequently than the 4% AEP event into the future (potentially achieving Network Rail guidelines), along with 10-40 properties. BCR does support this option, although local funding and contributions may be required. Primary and secondary objectives would be achieved.	Very limited scope for realignment due to existing development. Primary and secondary objectives would not be achieved.	Sustain, Improve	Sustain	Sustain
							Stronger reasons to prefer HLO	Stronger reasons to prefer HLO	Stronger reasons to prefer HLO	Stronger reasons to prefer HLO	Stronger reasons to prefer HLO			
							Some reasons to prefer HLO	Some reasons to prefer HLO	Some reasons to prefer HLO	Some reasons to prefer HLO	Some reasons to prefer HLO			
							Weaker reasons to prefer HLO	Weaker reasons to prefer HLO	Weaker reasons to prefer HLO	Weaker reasons to prefer HLO	Weaker reasons to prefer HLO			





Appendix H : Dawlish Warren SAC, sand spit and village options assessment





H.1 Introduction

The purpose of this note is to set out the physically sensible and achievable range of initial options for managing Dawlish Warren sand spit. It is assumed that the reader has read the Baseline Flood and Coastal Risk Assessment report (AHA, 2012); it is not the intention of this note to describe in detail the underlying reasoning relating to hydrodynamic and geomorphological change.

H.2 Strategic context

To date 4 over-arching options have been assessed in some detail (AHA, 2011):

- Do Nothing. Cease all maintenance. This may require removal of assets for H&S, environmental and habitat reasons.
- Natural Evolution. Allow beach recharge-recycling in the short term, with a view to reducing intervention so that the spit can naturally evolve in the medium to long term.
- Continue FCRM function. Any type of engineering works that enable the distal end to continue its sheltering function through to the long term.
- Tidal barrier/barrage. Control of the whole estuary mouth. This could have different aims (FCRM, habitats, energy, transport etc).

Internal work to support the above four options consisted of a logical consideration of:

- The sand spit split into five sections (proximal section, headland to groyne 2; central section seaward facing, groyne 2 to 12; neck section, groyne 12-14; distal section, groyne 14 north-eastwards; central section estuary facing, whole of inner face except distal section). See Figure 1.
- Five high level options for each section (NAI, MR, Maintain, Sustain, Improve).
- Three epochs (short, medium, long term).

Key definitions:

- NAI means doing nothing at all, except any works for H&S reasons.
- Maintain means maintain the structural integrity of the defence system, it does not include for foreshore management (recharge, recycling etc).
- Sustain means improve the primary defences to keep pace with climate change (SoP remains the same), including foreshore management if necessary.
- Improve means significantly improve the defences over and above climate change impacts i.e. raising/hardening defences, raising beach levels/width.
- Manage means wider options such as realignment and local protection of property and infrastructure.

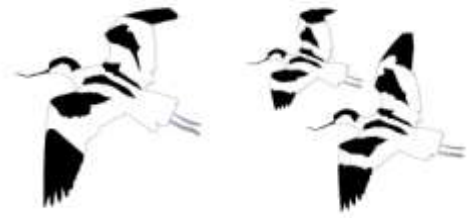


H.3 Option parameters

Key driving reasons for initial selection of option range:

- The proximal section has a high SoP (0.1%AEP) with a hard engineered defence (revetment/wave recurve). Removal of this structure would only be sensible if the intention is to allow the whole spit to evolve naturally i.e. NAI. As the SoP is already very high, Improve would never be necessary, and solely Maintain or Sustain would be required to keep the SoP as high as it is now. Hence in the short term viable options are NAI or Maintain, and in the medium to long term viable options are NAI or Sustain.
- The central section has some weaker points that have an overwashing/breach SoP of 1-10% AEP in the short term, reducing to 10-20% AEP in the medium term. If the central section is not at least Sustained or Improved (which would require harder engineering) in the short term, then SoP in the medium to long term would be so low as to render Maintain insensible for FCRM (and likely impossible as overwashing/breach would be occurring so frequently). Sustain and Improve could include foreshore management in the short term, but would become increasingly difficult in the medium to long term due to the magnitude of physical processes (i.e. drift rates), without hard engineering. Alternatively, NAI or Manage could be considered throughout the short to medium term, as it is noted that Manage in the long term again may be technically very difficult to achieve because of the magnitude of physical processes (i.e. drift rates). The obvious location to realign to would be the back dunes. Hence in the short term viable options are NAI, MR, Maintain, Sustain or Improve, in the medium term are NAI, MR or Sustain, and in the long term are NAI or Sustain.
- The neck section has some weaker points that have an overwashing/breach risk SoP of 2% AEP in the short term, reducing to 4-10% AEP in the medium to long term. If the neck section is not at least Sustained or Improved (which would require harder engineering) in the short term, then SoP in the medium to long term would be so low as to render Maintain insensible for FCRM (and likely physically very difficult as overwashing/breach would be occurring so frequently). The neck provides a key access to the distal section; if NAI is considered here, this would also apply to the distal section. It is notable that if NAI/MR occurs at the central section, this would put significant process pressure on the neck section, likely requiring greater monitoring and/or intervention (i.e. potentially harder engineering). Hence in the short term viable options are NAI, Maintain, Sustain or Improve, and in the medium to long term are NAI or Sustain.
- The distal section is a mobile feature, and is noted to have a high SoP of 0.5% AEP against over-washing/breach in the short term, although of less relevance in the context of its mobility. It carries out a key wave sheltering function for the Exe Estuary. Maintaining the distal section is only physically achievable in the short term, as by the medium to long term increased drift rates and likely increased mobility would force a decision towards either increased (Sustain) or decreased (NAI) FCRM effort. Furthermore, Improve is mainly physically sensible in the short term, prior to any further increased mobility or flattening. As HLOs refer to broad FCRM function, Sustain implies sustaining the wave sheltering function; this could include breakwater or other options at the next option stage. Hence in the short term viable options are NAI, Maintain, Sustain or Improve, in the medium to long term are NAI or Sustain.
- The estuary facing section is not actively managed. There is a weak point that allows a flood route through to Dawlish Warren village with a SoP of 4% AEP in the short term, increasing into the future. This could be managed via small scale works near the railway line or possibly across the sand spit access road (i.e. a flood gate). In broad terms the sensible options are NAI in the short to long term.
- In relation to the whole spit, towards the end of the medium term the increased rate of physical processes (overwashing/breach risk and erosion-drift rates) would render continued softer management of the spit physically inefficient and very difficult. At such a point either an acceptance of natural evolution (and loss of the distal section sheltering function) or harder engineering (i.e. revetments, rock armouring etc) would be required.

A decision tree drawn from the above reasoning, encompassing a range of options, is given in Figure 2. These options were assessed on geomorphological, extremes (wave and tidal), environmental, habitat, flood and coastal risk and socio-economic grounds. This is given in detail below.



H.4 Option assessment overview

An overall assessment of flood and coastal risk, and economic whole life costs of options for managing the sand spit was carried out, based on the detailed costings in Appendix K. The findings of this analysis are shown graphically in Figure 3. The whole life benefits of avoiding loss of the sand spit sheltering function are shown in Figure 4, as identified in the baseline flood and coastal risk assessment (AHA, July 2012). The ratio of whole life benefits and costs is shown in Figure 5. This identifies that the economically optimum timescale for the sand spit distal section to be allowed to permanently flatten and up-engineering of wider estuary assets to occur would be between the years 2035 to 2045. From the baseline understanding of geomorphological processes at the sand spit, this suggests that active intervention at the sand spit could potentially cease by 2030, as a lag period would be expected prior to permanent flattening of the distal section. From this economic assessment, the following decision tree paths would be socio-economically optimal:

- Options 2, 3, 4 or 5 in the short term.
- Options 8 and 12 in the medium to long term respectively.

Consideration of the costs related to Options 2, 3, 4 and 5 indicates that all these options would have a short term PVC of approximately £7-8M, dependent on whether beach recharge and recycling is deemed necessary to a) avoid the unlikely but critical that the distal section could permanently flatten by 2030, and b) ensure tourism and amenity value is either continued or enhanced.

The above socio-economically optimal options were discussed in meetings with the Environment Agency in March 2012 and Natural England in June and July 2012. In conjunction with the environmental and habitat assessments, these meetings broadly identified that a) gabion removal would be required to avoid SAC impacts and enable a naturally functioning system, b) the existing groyne system is considered neutral in habitat terms, and c) beach recharge and recycling could support re-activating the sand dune system, and prolong the viability of some plant populations and the sheltering function for bird feeding habitats in the lee of the sand spit. This is documented in greater detail in AHA (July, 2012). These requirements indicate that out of the socio-economically optimal Options 2, 3, 4 and 5, the only options that would achieve these requirements would be Options 3 or 4, followed by Options 8 and 12 in the medium and long term respectively.

H.5 Conclusions

The development of a wide range of options, and their assessment on geomorphological, extremes (wave and tidal), environmental, habitat, flood and coastal risk and socio-economic grounds has identified that Options 3 or 4 would be preferred in the short term, followed by Options 8 and 12 in the medium to long term respectively.

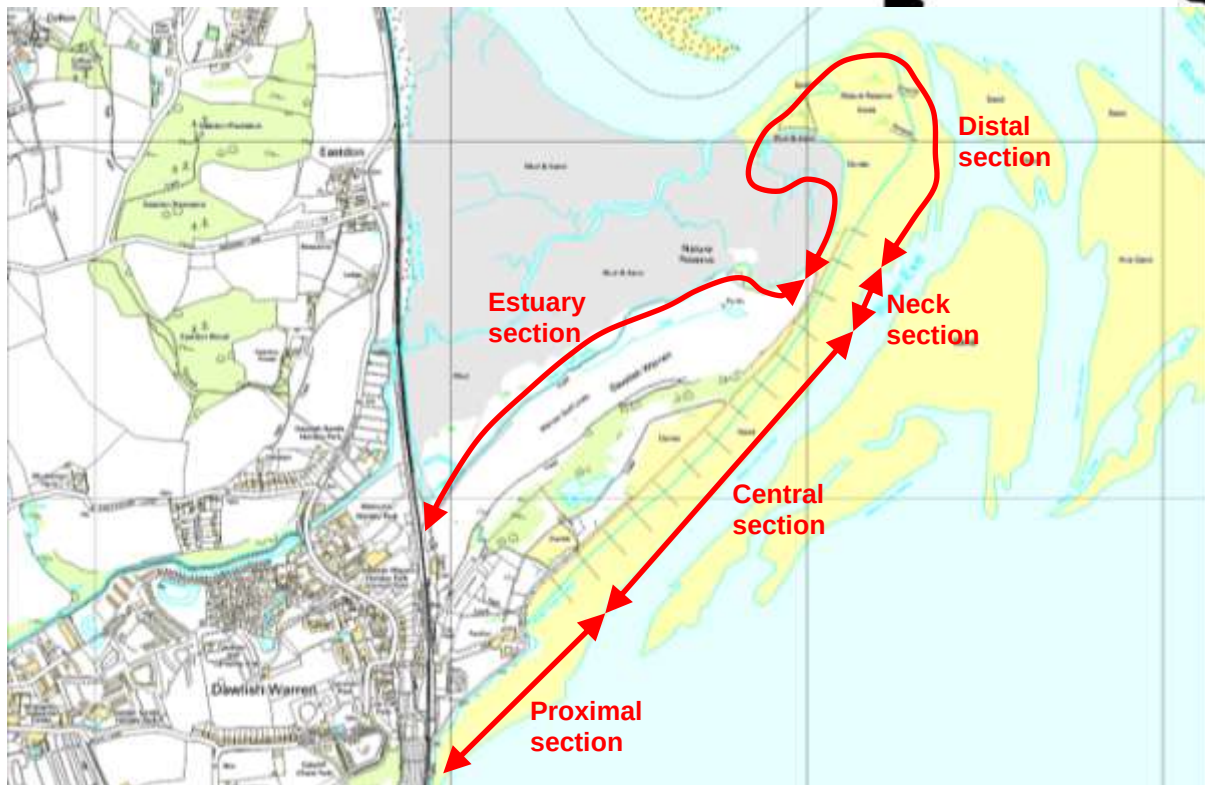


Figure 1. Sand spit sections

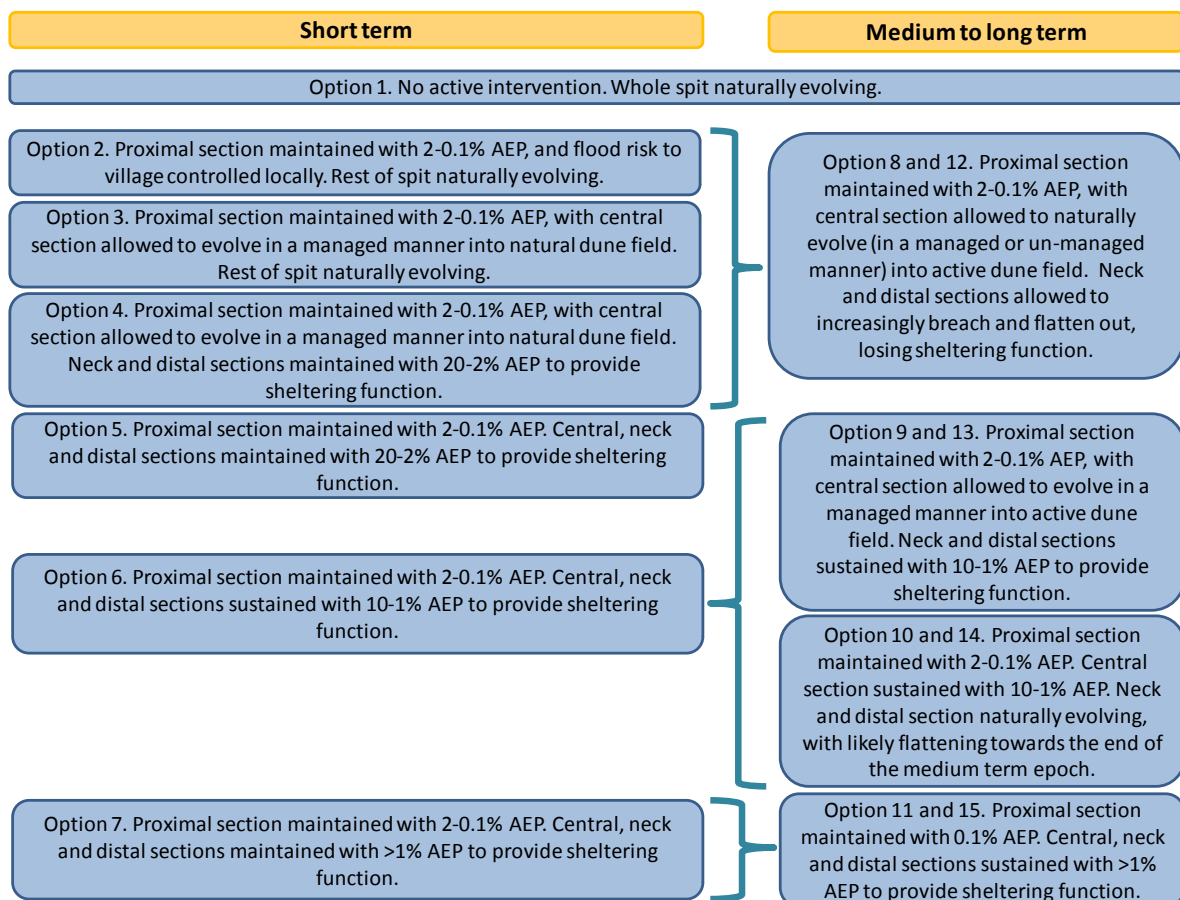


Figure 2. Dawlish warren sand spit decision tree.

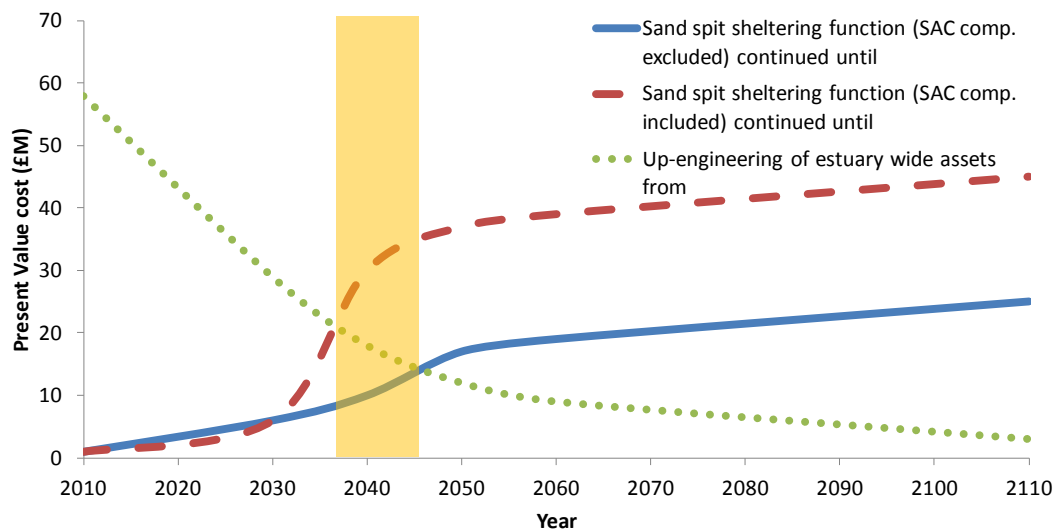


Figure 3. Comparison of whole life costs of continuing the sand spit sheltering function, and losing the sand spit sheltering function and offsetting this with wider estuary up-engineering.

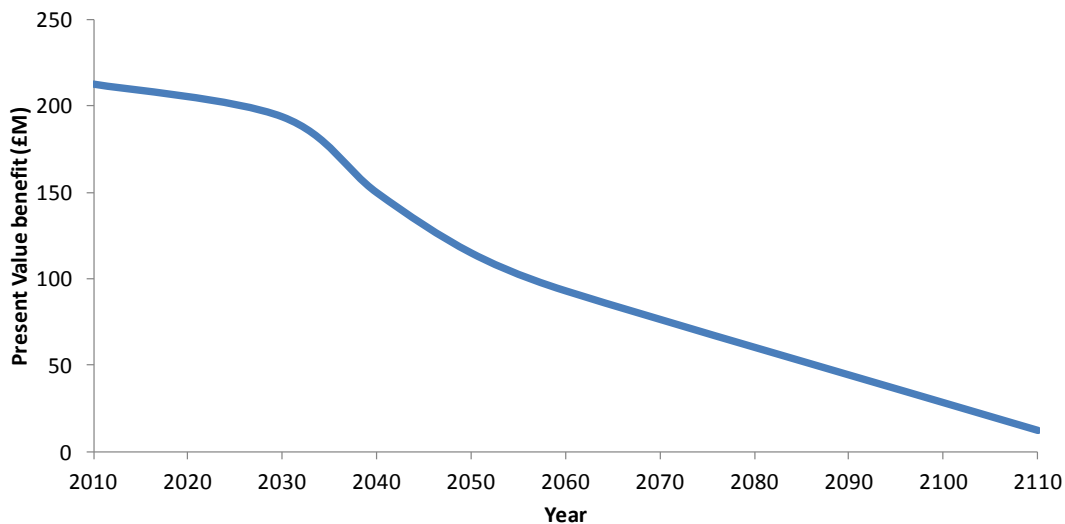


Figure 4. Whole life benefits of actively avoiding loss of sand spit sheltering function.

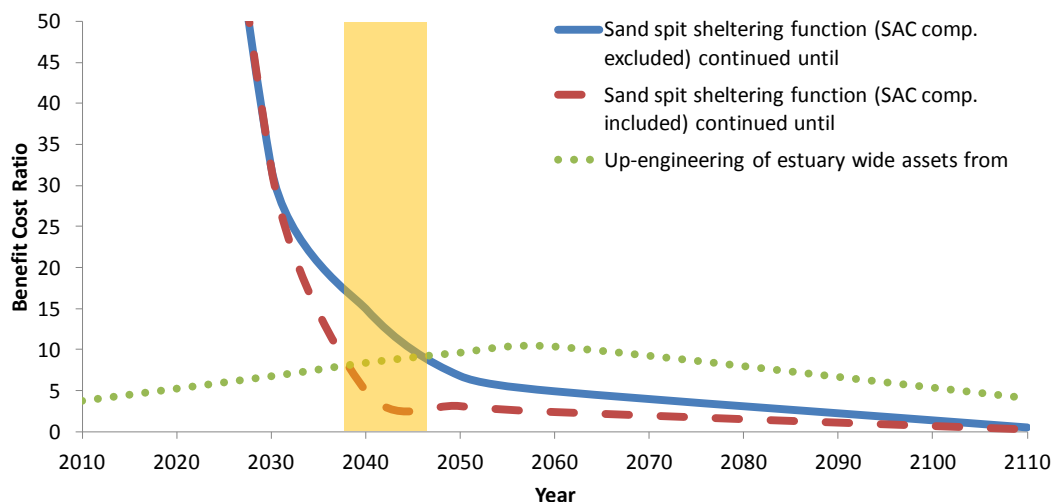
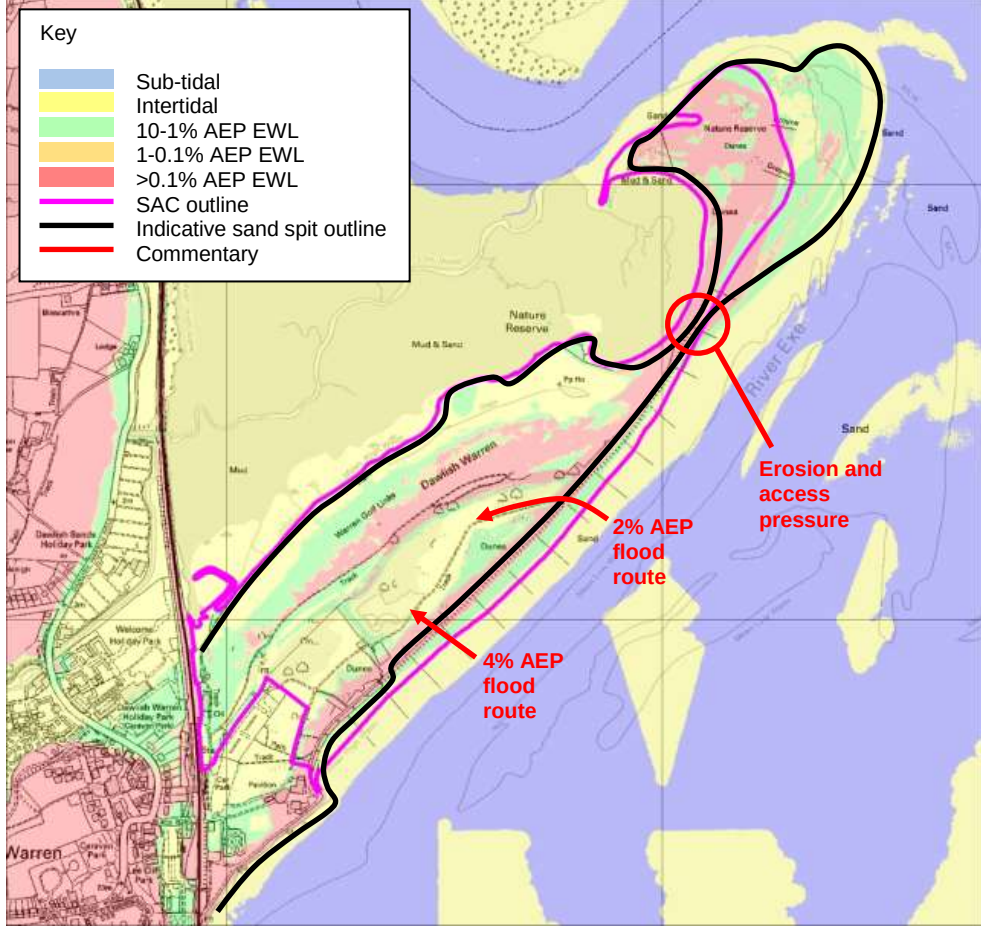


Figure 5. Benefit Cost Ratios for continuing the sand spit sheltering function, and losing the sand spit sheltering function and offsetting this with wider estuary up-engineering.

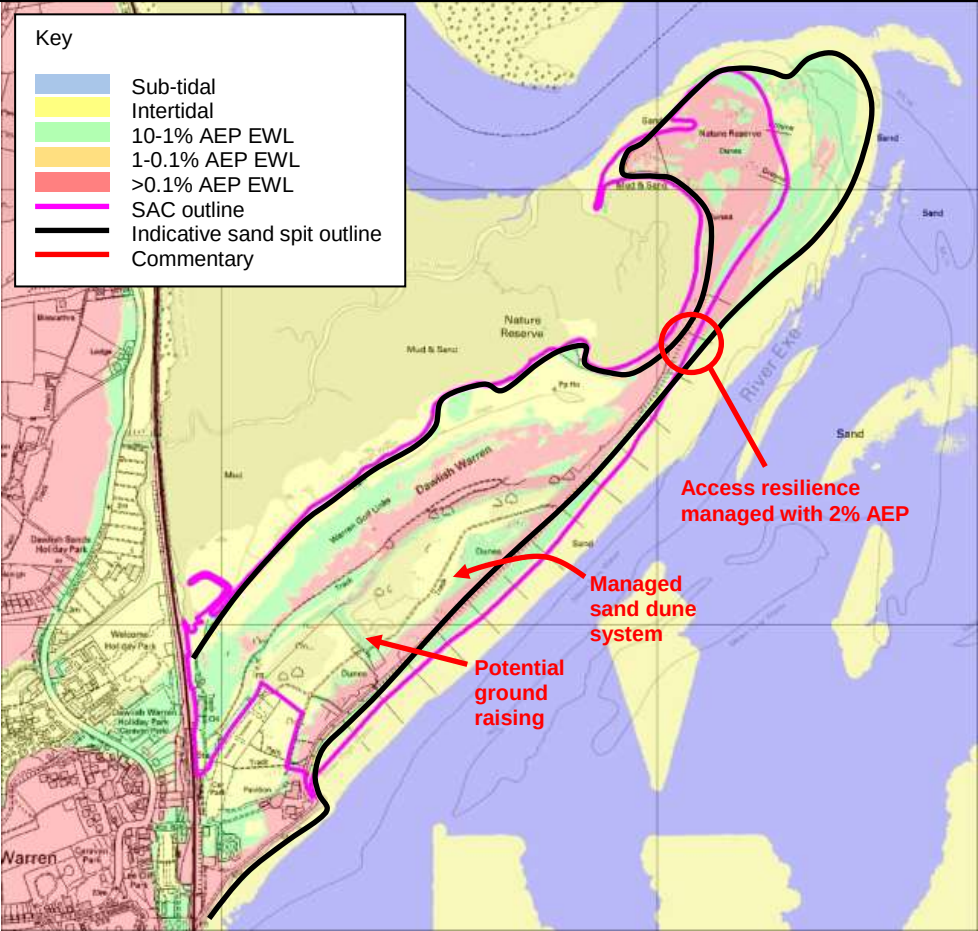


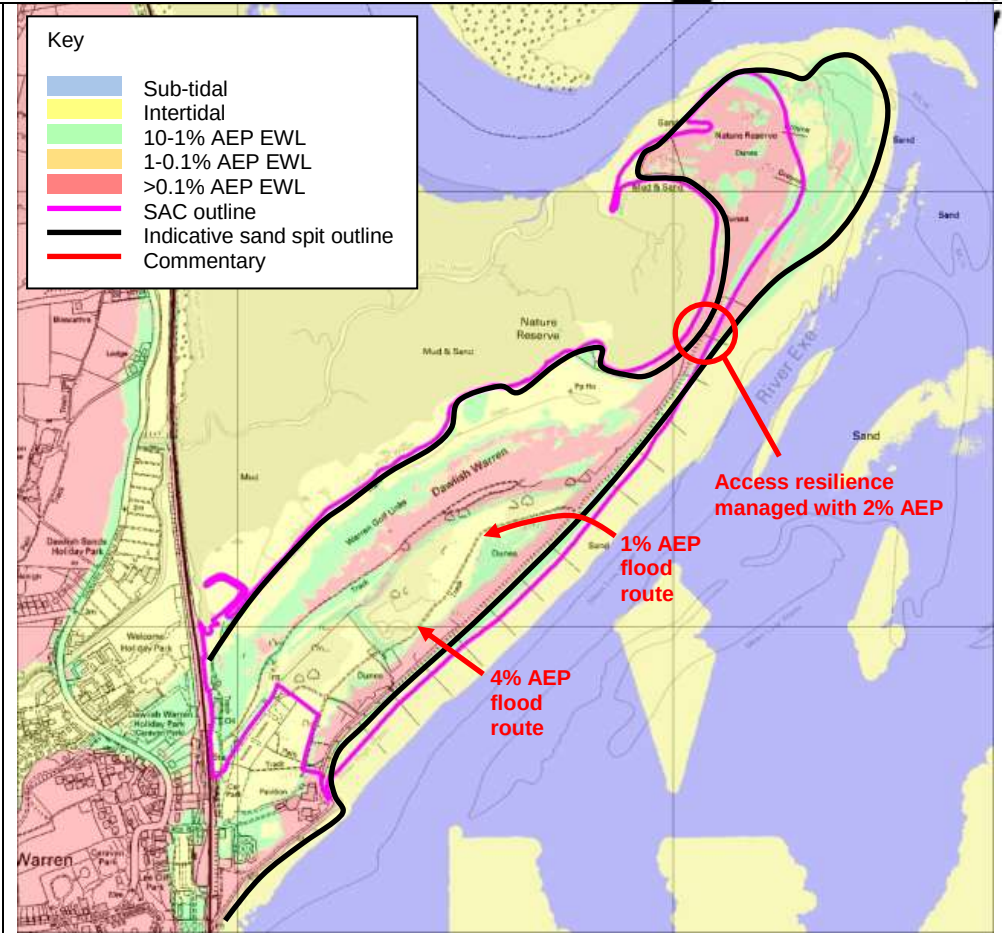
H.6 Short term (or 0.1m SLR) options

Option 1	
Option description	No active intervention on the spit itself, with flood risk to village controlled locally. Whole spit naturally evolving.
Geomorphology and extremes impact	The proximal and central section would experience loss of sediment, with transport towards the distal section, the inner estuary, and towards nearshore sand bars, resulting in a potential 40m recession of the sand dunes. The distal section would continue to be mobile, but broadly retain its current sheltering function. If the neck section experiences greater than predicted erosion in the short term, there would be a greater risk of loss of sheltering function.
Environment and habitats impact	Sand dune erosion of ~6Ha, deemed natural change. Estuary-wide (SPA/Ramsar) impacts are unlikely as loss of sheltering function is unlikely.
Flood and coastal risk impact	Groynes would lose their function within the next 5 years, and the gabion baskets would progressively lose their function. Local FRM would be required for the village of Dawlish Warren to cut off a flood route in the 4% AEP event along the sand spit access road. Estuary-wide impacts are unlikely as loss of sheltering function is unlikely.
Socio-economic impact	Short term PVd/b for village of Dawlish Warren of £7.6M. Options could include ground raising works near the car park, or a flood gate across the access road, with short term PVC of ~£1M. Short term BCR of 8, with FDGiA of ~50%. Groyne and gabion removal, if needed, would increase the costs, reduce BCR and FDGiA funding. There may be impacts (+ve/-ve) on tourism. If the neck section experiences greater than predicted erosion in the short term, estuary-wide PVd would be increased by ~£194M; this could be offset by estuary-wide up-engineering with PVC of ~£29M. Beach recharge/recycling to avoid this estuary-wide impact in the short term (and offset 6Ha sand dune loss) would increase PVC by ~£6M, and be the much lower cost option.

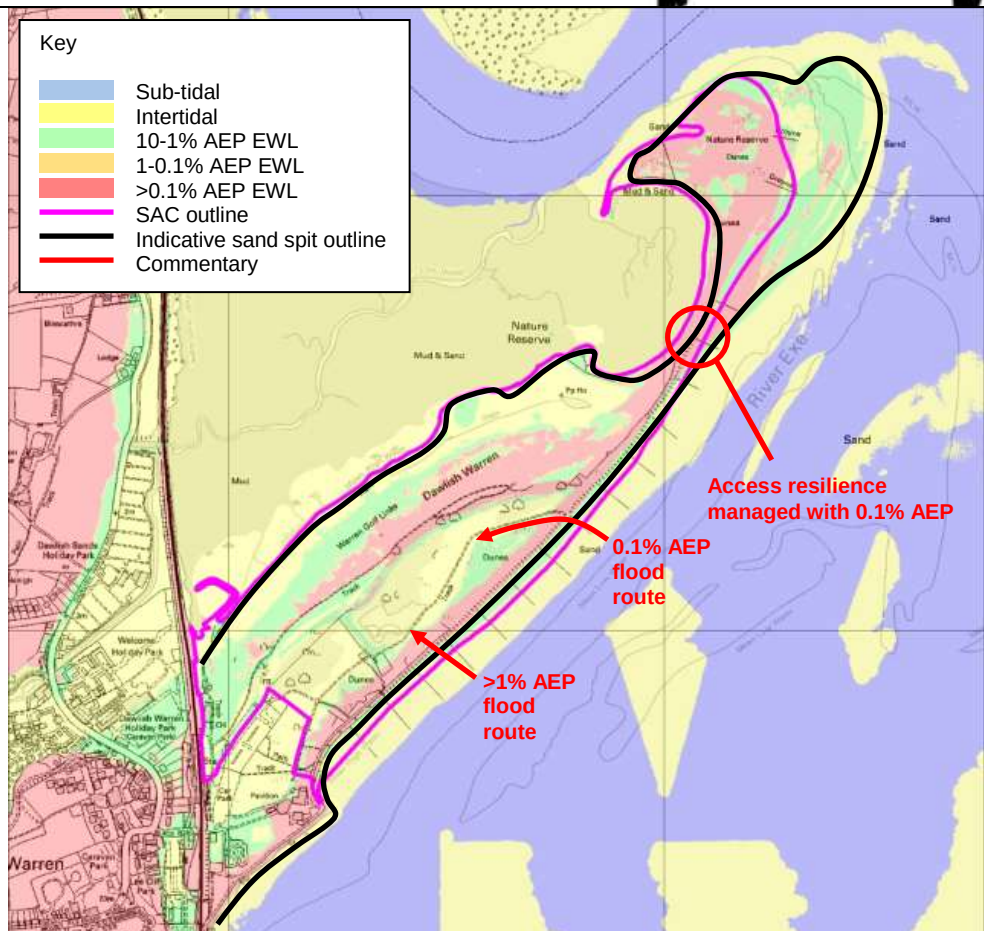
Option 2	
Option description	Proximal section maintained with 0.1% AEP, and flood risk to village controlled locally. Rest of spit naturally evolving.
Geomorphology and extremes impact	The proximal and central section would experience loss of sediment, with transport towards the distal section, the inner estuary, and towards nearshore sand bars, resulting in a potential 40m recession of the sand dunes. The distal section would continue to be mobile, but broadly retain its current sheltering function. If the neck section experiences greater than predicted erosion in the short term, there would be a greater risk of loss of sheltering function.
Environment and habitats impact	Natural sand dune loss of ~6Ha. Estuary-wide (SPA/Ramsar) impacts are unlikely as loss of sheltering function is unlikely.
Flood and coastal risk impact	Groynes would lose their function within the next 5 years, and the gabion baskets would progressively lose their function. Local FRM would be required for the village of Dawlish Warren to cut off a flood route in the 4% AEP event along the sand spit access road. Estuary-wide impacts are unlikely as loss of sheltering function is unlikely.
Socio-economic impact	Short term PVD/b for village of Dawlish Warren of £7.6M. Options could include ground raising works near the car park or a flood gate across the access road, along with revetment maintenance, with short term PVC of ~£1-2M. Short term BCR of 4-8, with FDGiA of ~30-50%. Groyne and gabion removal, if needed, would increase the costs, reduce BCR and FDGiA funding. There may be impacts (+ve/-ve) on tourism. If the neck section experiences greater than predicted erosion in the short term, estuary-wide PVD would be increased by ~£194M; this could be offset by estuary-wide up-engineering with PVC of ~£29M. Beach recharge/recycling to avoid this estuary-wide impact in the short term (and offset 6Ha sand dune loss) would increase PVC by ~£6M, and be the much lower cost option.

Option 3	
Option description	Proximal section maintained with 0.1% AEP, with central section allowed to evolve in a managed (such as beach recharge and recycling with complete gabion removal) manner into natural dune field. Rest of spit naturally evolving.
Geomorphology and extremes impact	The proximal, central and neck section would experience no loss of sediment. The distal section would continue to be mobile, but broadly retain its current sheltering function.
Environment and habitats impact	No sand dune losses due to beach recharge/recycling. No estuary-wide (SPA/Ramsar) impacts as no loss of sheltering function.
Flood and coastal risk impact	Local FRM would be required for the village of Dawlish Warren to cut off a flood route in the 4% AEP event along the sand spit access road. No estuary-wide impacts as no loss of sheltering function.
Socio-economic impact	Short term PVd/b for village of Dawlish Warren of £7.6M. Options could include ground raising works near the car park or a flood gate across the access road, along with beach recharge/recycling, with short term PVc of ~£7-8M. Gabion removal, if needed, would increase the costs and reduce BCR. There may be impacts (more likely positive) on tourism. Delay of estuary-wide impacts until after 2030 could provide up to an additional £44M PVb, therefore providing a high BCR with strong FDGiA potential.

Option 4	
Option description	Proximal section maintained with 0.1% AEP, with central section allowed to evolve in a managed (such as beach recharge and recycling with partial gabion removal) manner into natural dune field. Neck and distal sections 'maintained' (this may be simply active monitoring/repair of weak points) with 20-2% AEP to provide sheltering function.
Geomorphology and extremes impact	The proximal and central section would experience no loss of sediment. The distal section would be less mobile and retain its current sheltering function.
Environment and habitats impact	No sand dune losses due to beach recharge/recycling. No estuary-wide (SPA/Ramsar) impacts as no loss of sheltering function. Maintenance of assets particularly around the neck could be interpreted as un-natural impact i.e. an 'impact' of <5Ha sand dune.
Flood and coastal risk impact	Local FRM would be required for the village of Dawlish Warren to cut off a flood route in the 4% AEP event along the sand spit access road. No estuary-wide impacts as no loss of sheltering function. Due to the fragility of the neck section, if monitoring identifies a greater than predicted risk in the short term, more active maintenance (local groynes or gabions) of a minimum profile may be required.
Socio-economic impact	Short term PVD/b for village of Dawlish Warren of £7.6M. Options could include ground raising works near the car park or a flood gate across the access road, along with beach recharge/recycling, with short term PVC of ~£7-8M. Gabion removal, if needed, would increase the costs, reduce BCR and FDGiA funding. There may be impacts (more likely positive) on tourism. Maintenance at the neck section would delay estuary-wide impacts until after 2030, providing up to an additional £79M PVb, therefore providing a high BCR with strong FDGiA potential.

Option 5	
Option description	Proximal section maintained with 0.1% AEP. Central, neck and distal sections maintained with 4-1% AEP to provide sheltering function.
Geomorphology and extremes impact	The proximal and central section would experience loss of sediment if beach recharge-recycling was not part of the solution. The distal section would be less mobile and retain its current sheltering function.
Environment and habitats impact	No internal sand dune losses due to maintaining the existing FCRM assets, although this could potentially be deemed un-natural (suggested 5-10Ha sand dune 'impact'). No estuary-wide (SPA/Ramsar) impacts as no loss of sheltering function.
Flood and coastal risk impact	Minimal: a minor reduction in SoP would occur due to climate change.
Socio-economic impact	Short term PVd/b for village of Dawlish Warren of £7.6M. Options include maintenance of the groyne/gabion system, with short term PVC of ~£1-2M. Including for beach recharge-recycling to avoid beach erosion gives an extra PVC of £6M. There would be –ve impacts on tourism if beach recharge-recycling was not included. Maintenance at the neck and distal sections would delay estuary-wide impacts until towards 2060, providing up to an additional £93M PVb, therefore providing a high BCR with strong FDGiA potential.

Option 7



Option description	Proximal section maintained with 0.1% AEP. Central, neck and distal sections improved with >1% AEP to provide sheltering function.
Geomorphology and extremes impact	The proximal and central section would experience loss of sediment if beach recharge-recycling was not part of the solution. The distal section would be less mobile and retain its current sheltering function.
Environment and habitats impact	No internal sand dune losses due to maintaining the existing FCRM assets, although this could potentially be deemed un-natural (suggested 5-10Ha sand dune impact). No estuary-wide (SPA/Ramsar) impacts as no loss of sheltering function.
Flood and coastal risk impact	Existing flood risk would be reduced, particularly relating to potential for temporary breach of the central, neck and distal sections.
Socio-economic impact	Short term PVd/b for village of Dawlish Warren of £7.6M. Options include improvement/construction of revetments along whole front face of sand spit, with short term PVC of ~£22M. There would be –ve impacts on tourism with no beach recharge-recycling. Maintenance at the neck and distal sections would delay estuary-wide impacts until towards 2060, providing up to an additional £93M PVb, therefore providing a high BCR with strong FDGiA potential.

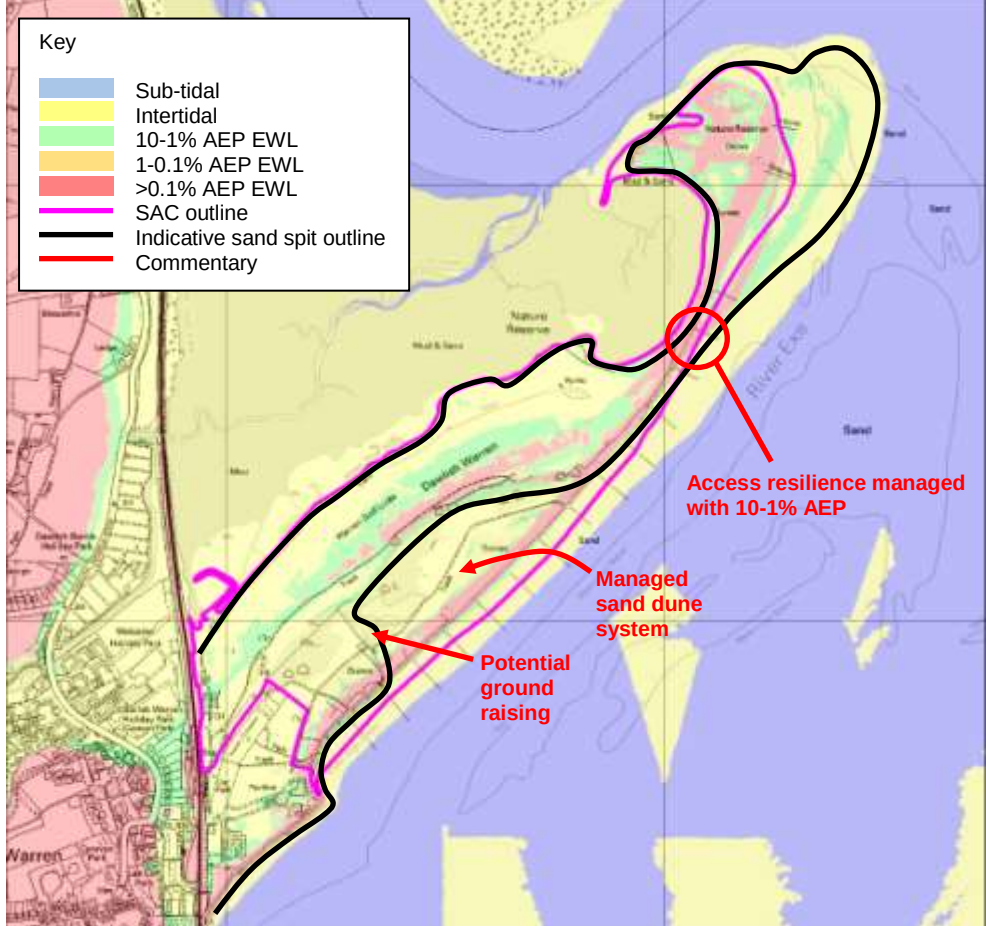


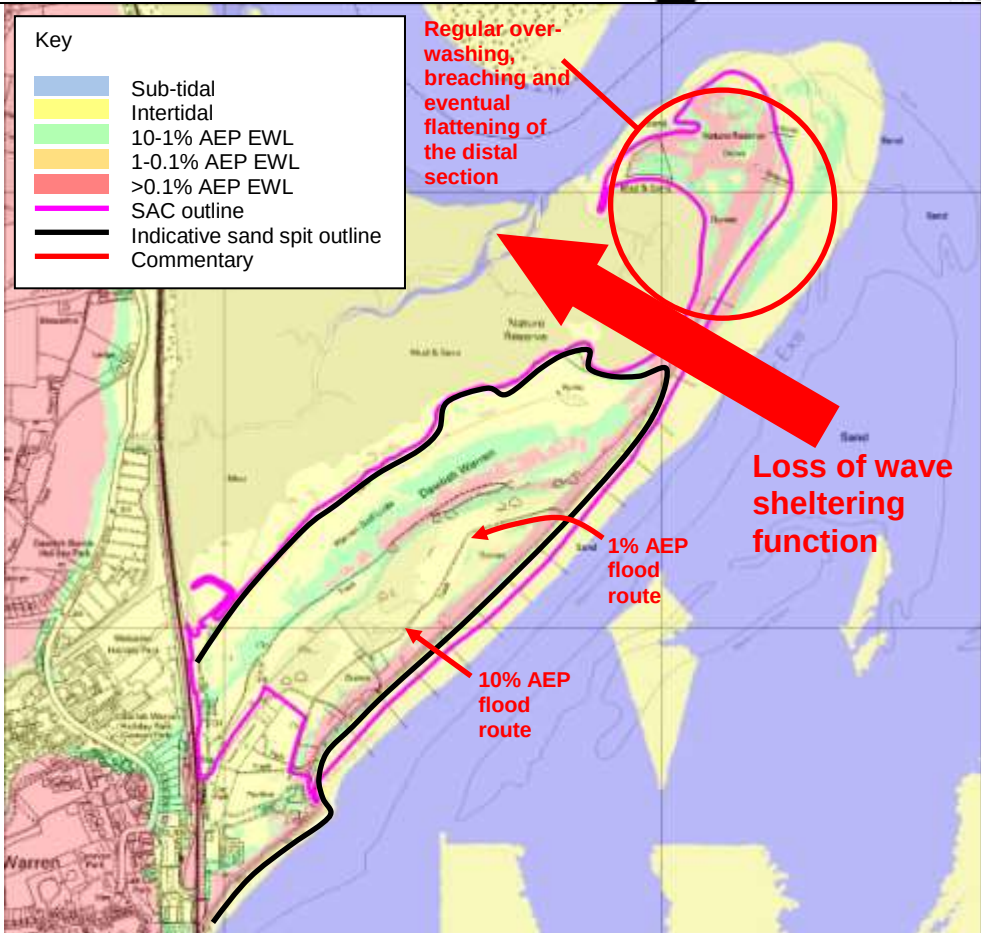
H.7 Medium to long term (or 0.3 to 0.7m SLR) options

Option 1	Key - Sub-tidal - Intertidal 10-1% AEP EWL 1-0.1% AEP EWL >0.1% AEP EWL - SAC outline - Indicative sand spit outline - Commentary Regular over-washing, breaching and eventual flattening of the distal section Loss of wave sheltering function ~100m recession resulting in reactivation of inner sand dunes Undermining and failure of revetments
Option description	No active intervention. Whole spit naturally evolving.
Geomorphology and extremes impact	The proximal and central section would experience loss of sediment, with transport towards the distal section, the inner estuary, and towards nearshore sand bars. The distal section would continue to be mobile, but broadly retain its current sheltering function. Wave heights in the estuary would increase by ~0.1m generally, with a local maximum increase of 0.3m around Starcross and Kenn Valley. Water levels may increase by less than 0.1m.
Environment and habitats impact	Natural sand dune loss of ~30Ha. Some wider (SPA/Ramsar) impacts once the distal section loses its sheltering function.
Flood and coastal risk impact	Local FRM would be required for the village of Dawlish Warren to cut off a regular flood route along the sand spit access road. The proximal and central FCRM assets would fail due to undermining and lack of maintenance. Estuary-wide assets would have SoP reduced generally by one interval (e.g. 0.1% AEP to 0.5% AEP), with Starcross and Kenn Valley experiencing much greater SoP reduction.
Socio-economic impact	Whole life PVD/b for village of Dawlish Warren of £13M. Options could include ground raising works around the car park, or a flood gate across the access road, with whole life PVC of ~£2M. Whole life BCR of 8, with FDGiA of ~50%. Groyne and gabion removal, if needed, would increase the costs, reduce BCR and FDGiA funding. There may be impacts (+/-) on tourism. If needed, beach recharge/recycling to offset sand dune loss would increase PVC by ~£23M, reducing BCR<1 with no FDGiA. Additional up-engineering of the estuary-wide assets give PVC of ~£9M, providing PVb of ~£194M, with high BCR and strong FDGiA potential.

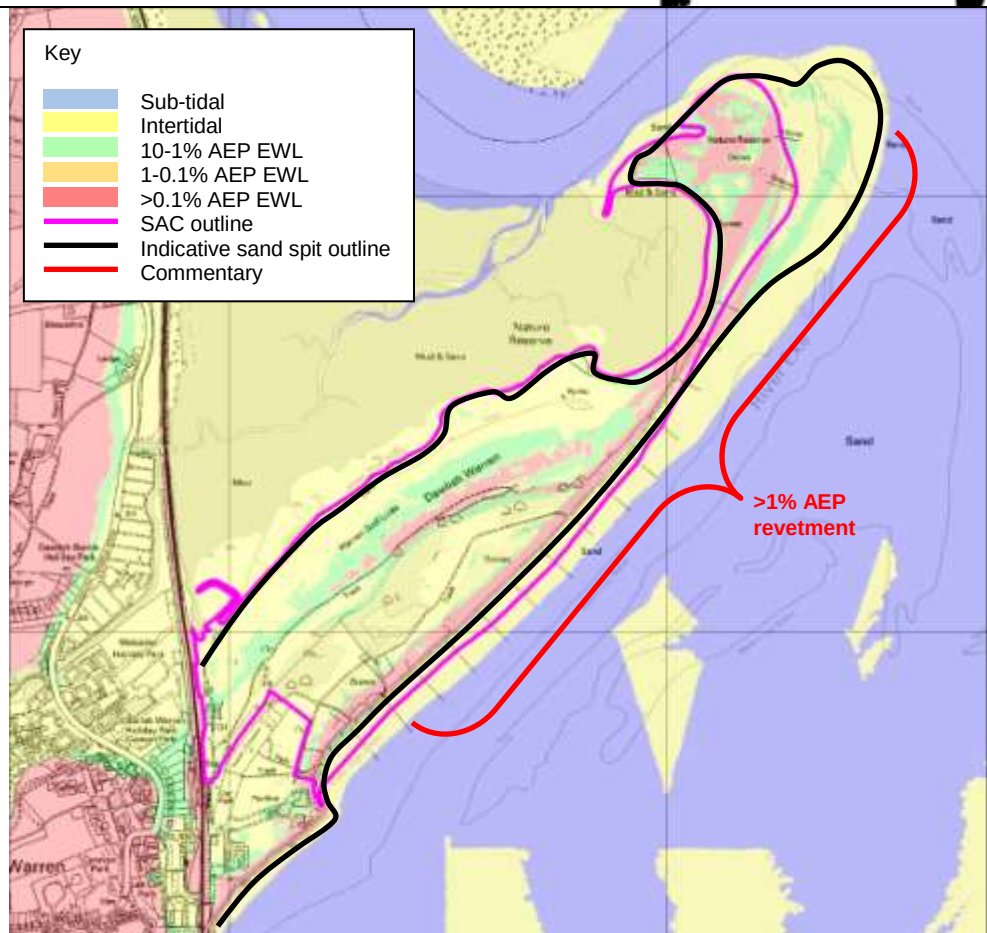


Option 8 and 12	Key - Sub-tidal - Intertidal 10-1% AEP EWL 1-0.1% AEP EWL >0.1% AEP EWL - SAC outline - Indicative sand spit outline - Commentary Regular over-washing, breaching and eventual flattening of the distal section Loss of wave sheltering function Local ground raising
Option description	Proximal section maintained with 0.1% AEP, with central section allowed to naturally evolve (in a managed or un-managed manner) into active dune field. Neck and distal sections allowed to increasingly breach and flatten out, losing sheltering function.
Geomorphology and extremes impact	The proximal and central section would experience continued loss of sediment, with transport towards the distal section, the inner estuary, and towards nearshore sand bars, resulting in a potential further 60m recession of the MHWs/MLWS mark. The distal section would be regularly over-washed, breached and flattened to the extent that it loses its sheltering function. Wave heights in the estuary would increase by ~0.1m generally, with a local maximum increase of 0.3m around Starcross and Kenn Valley. Water levels may increase by less than 0.1m.
Environment and habitats impact	Natural sand dune loss of ~30Ha. Some wider (SPA/Ramsar) impacts once the distal section loses its sheltering function.
Flood and coastal risk impact	Local FRM would be required for the village of Dawlish Warren to cut off a flood route in the 4% AEP event along the sand spit access road. Estuary-wide assets would have SoP reduced generally by one interval, with Starcross and Kenn Valley experiencing much greater SoP reduction.
Socio-economic impact	Whole life PVd/b for village of Dawlish Warren of £13M. Options could include ground raising works around the car park, or a flood gate across the access road, with whole life PVC of ~£2M. Whole life BCR of 8, with FDGiA of ~50%. Groyne and gabion removal, if needed, would increase the costs, reduce BCR and FDGiA funding. There may be impacts (+/-) on tourism. If needed, beach recharge/recycling to offset sand dune loss would increase PVC by ~£23M, reducing BCR<1 with no FDGiA. Additional up-engineering of the estuary-wide assets give PVC of ~£9M, providing PVb of ~£194M, with high BCR and strong FDGiA potential.

Option 9 and 13	
Option description	Proximal section maintained with 0.1% AEP, with central section allowed to evolve in a managed manner into active dune field. Neck and distal sections sustained with 10-1% AEP to provide sheltering function, requiring hard engineering in the long term.
Geomorphology and extremes impact	The proximal and central section would experience loss of sediment if beach recharge-recycling was not part of the solution, with the central section sand dunes receding by 60m. If fixed in place, the distal section would retain its current sheltering function. Alternatively it could be allowed to naturally evolve and the sheltering function achieved with a breakwater solution.
Environment and habitats impact	No internal sand dune losses due to maintaining the existing FCRM assets, although this could potentially be deemed un-natural (estimated 5-10Ha sand dune impact). A breakwater solution could be deemed to reduce the sand dune impact, but have a consequent impact on the Pole Sands ebb delta/near-shore sandbanks. No estuary-wide (SPA/Ramsar) impacts as no loss of sheltering function.
Flood and coastal risk impact	None; existing FCRM SoP continues.
Socio-economic impact	Whole life PVd/b for village of Dawlish Warren of £13M, with additional estuary-wide PVd/b of ~£194M. Options include maintenance and improvement of the groyne/gabion system at the neck/distal sections with beach recharge-recycling at the central section, with whole life PVC of ~£25M. Whole life BCR of ~4, with 20-30% FDGiA funding. Breakwater solution if implemented in the long term would increase the PVC to >£25M.

Option 10 and 14	
Option description	Proximal section maintained with 0.1% AEP. Central section sustained with 10-1% AEP. Neck and distal sections allowed to increasingly breach and flatten out, losing sheltering function by end of medium term epoch.
Geomorphology and extremes impact	Continued beach recharge-recycling with extension of the proximal section revetment would avoid erosion of the central section. The distal section would be regularly over-washed, breached and flattened to the extent that it loses its sheltering function. Wave heights in the estuary would increase by ~0.1m generally, with a local maximum increase of 0.3m around Starcross and Kenn Valley. Water levels may increase by less than 0.1m.
Environment and habitats impact	Natural sand dune loss of ~15Ha at the distal section. Some wider (SPA/Ramsar) impacts once the distal section loses its sheltering function.
Flood and coastal risk impact	Local SoP to Dawlish Warren village sustained into the future. Estuary-wide assets would have SoP reduced generally by one interval, with Starcross and Kenn Valley experiencing much greater SoP reduction.
Socio-economic impact	Whole life PVD/b for village of Dawlish Warren of £13M. Options include sustaining and extending the existing revetment and gabions system and beach recharge-recycling, with whole life PVC of ~£30M. Whole life BCR of <1, with no FDGiA funding. Additional up-engineering of the estuary-wide assets give PVC of ~£9M, providing PVB of ~£93M, with high BCR and strong FDGiA potential

Option 11 and 15



Option description	Proximal section maintained with 0.1% AEP. Central, neck and distal sections improved with >1% AEP to provide sheltering function.
Geomorphology and extremes impact	The proximal and central section would experience loss of sediment if beach recharge-recycling was not part of the solution. The distal section would be less mobile and retain its current sheltering function.
Environment and habitats impact	No internal sand dune losses due to maintaining the existing FCRM assets, although this could potentially be deemed un-natural (estimated 5-10Ha sand dune impact). No estuary-wide (SPA/Ramsar) impacts as no loss of sheltering function.
Flood and coastal risk impact	FCRM SoP is increased for the village of Dawlish Warren. Wider improvements along the spit would require hardening options such as revetments.
Socio-economic impact	Whole life PVd/b for village of Dawlish Warren of £13M, with additional estuary-wide PVd/b of ~£90M. Options include maintenance and improvement of the groyne/gabion system and/or wider revetments, with whole life PVc of ~£32M. Whole life BCR of ~4, with 20-30% FDGiA funding.

H.8 References

Atkins Halcrow Alliance, 2011. Update on High Level and Alignments and Types Options, Steering Group meeting booklet. Exe Estuary FCRM Strategy. Confidential document marked Locsen.

Atkins Halcrow Alliance, 2012. Baseline Flood and Coastal Risk Assessment report. Exe Estuary FCRM Strategy.

Atkins Halcrow Alliance, July 2012. Discussion document on Dawlish Warren sand spit options, drawn from meeting held with Environment Agency and Natural England in June 2012.



Appendix I : SEA Alignment and Type Assessment Summary





I.1 FCRMU1: Sandy Bay

Overview

There is no current flood risk to people or property in this area and risks are not expected to increase significantly in the future; some erosion of the sea cliffs may occur in the medium and long-term.

Environmental risks were considered in relation to: -

- Recreational assets including Devon Cliffs Holiday Park and East Devon Way.
- Pump House.
- Grades 2 and 3 agricultural land.
- Straight Point Rifle Range.
- Lyme Bay West coastal waterbody.
- International (Exe Estuary SPA and Ramsar site), national (Exe Estuary SSSI) and local (Orcombe Point to Straight Point, Orcombe Fields and Straight Point CWS) designations for nature conservation.
- East Devon Area of Outstanding Natural Beauty (AONB).

Viable High Level Options

High Level Option	Environmental Overview
No Active Intervention Preferred Option	No defence provision as flood risks are not expected to increase.
Managed Realignment	There is no flood risk to manage and erosion risk is also limited so these options were not considered further.
Hold the Line	

Short-Listed Option – No Active Intervention

Short-Listed Option	Environmental Overview
All epochs	
No flood defence provision or management of erosion along the natural cliff frontage Preferred Environmental Option	For • Allows the coastal system to function naturally, which benefits the designated conservation sites • Compatible with the landscape characteristics of East Devon AONB. • There will be limited impact on land along the cliff top over the next 100 years Against • Erosion of a very small area of MoD land and the South West Coastal Path in the long-term. These impacts are likely to be manageable.



I.2 FCRMU2: The Maer

Overview

The Maer is an area of low-lying land containing a relict former dune system, which has been cut off from the shoreline predominantly by hard flood defences. The standard of flood protection is naturally high due to elevated ground levels, which would stay high for the duration of the Strategy. A masonry seawall is present at the rear of the sand dunes but provides a limited flood defence function.

Environmental risks were considered in relation to: -

- Recreational assets including East Devon Way and Sustrans cycle Route 2.
- Development proposals.
- Exe transitional waterbody.
- Local roads (e.g. Queens Road) and the promenade.
- International (Exe Estuary SPA and Ramsar site), national (Exe Estuary SSSI) and local (The Maer LNR/CWS and Orcombe Point to Straight Point CWS) designations for nature conservation.

Viable High Level Options

High Option	Level	Environmental Overview
No Active Intervention		The standard of protection is naturally high in this area. NAI was the preferred environmental option as it enables a more naturally functioning system and presented an opportunity for the creation of sand dune habitat. However as the development of intertidal habitat would be constrained by existing infrastructure (e.g. Queen's Drive, a car park and the promenade), the option was not considered viable. The relocation of the existing infrastructure means that this option is unlikely to be politically or economically viable. In addition, the site is identified for development in the Exmouth Plan, which would conflict with any future nature conservation aspirations at this site. This option was therefore rejected.
Managed Realignment		This option would allow the Maer to evolve into an active sand dune system, and could potentially be used to provide compensatory habitat for any losses that might occur if a "Do Something" option is adopted at Dawlish Warren. However the feasibility of creating a high quality area of active sand dunes in this location is uncertain. Risks and uncertainties include proximity to an urban area, the limited area of land available, the value of the existing site as a recreational asset and its associated level of human use. This option would also conflict with Local Authority development aspirations. Managed realignment would allow natural processes to operate and would not result in the loss of any assets due to flooding during the timescale of the strategy. Some overtopping of recreational assets would occur but these could be relocated inland, in the long-term, if necessary. However, as the relocation of existing infrastructure means that this option is unlikely to be politically or economically viable, this option was rejected.
Hold the Line (Maintain/ Sustain/ Improve)	Preferred Option	Maintaining, sustaining and improving the existing masonry seawall would help to reduce the effects of wave overtopping, maintain the existing line of flood defence and provide protection to existing recreational assets along the frontage from overtopping, including the car park and road. Whilst the environmentally preferred option is to improve the defences in this FCRMU, the short-listed option is to "maintain" existing defences due to socio-economic limitations, and/or lack of proven technical need to improve the SoP.



Short-Listed Options – Hold the Line: Maintain

Short-listed Option	Environmental Overview
All epochs	
Option1: Soft foreshore management using beach recharge/ recycling and continued maintenance of the existing groynes Preferred Environmental Option	For - Increased protection would be provided to the promenade, Queen's Drive and recreational facilities along the frontage. - Increased safety would be provided to pedestrians under extreme events and there are opportunities to integrate the Maer and beach landscape. - Soft management practices such as beach recharge and recycling (if implemented alone) would allow natural coastal processes to operate, with no/minimal additional hydromorphological pressure on Exe transitional water body - Existing amenity value would be supported through retention of high beach levels and controlled sediment transport. - Land allocated for development at The Maer would be protected. - Terrestrial habitats including coastal grassland and scrub within The Maer LNR/CWS and Orcombe Point to Straight Point CWS would be protected. Against - Continued coastal squeeze of intertidal habitat (sand and mud) within the Exe Estuary SPA and Ramsar site through groyne works.
Option 2: Foreshore management and providing toe protection to the seawall in the medium to long-term	For - Increased protection would be provided to the promenade, Queen's Drive and recreational facilities along the frontage. - Increased safety would be provided to pedestrians under extreme events and there are opportunities to integrate the Maer and beach landscape. - Protection of terrestrial habitats including coastal grassland and scrub within The Maer LNR/CWS and Orcombe Point to Straight Point CWS. - Protection of land allocated for development at The Maer. Against - Reduction in beach amenity value through gradual narrowing of beach. - Continued coastal squeeze of intertidal habitat (sand and mud) within the Exe Estuary SPA and Ramsar site through continued works to hard defences, and additional hydromorphological pressure on Exe transitional water body. - The reduction in overtopping could lead to scour at the toe of the seawall
Option 3: Hard foreshore management by constructing offshore breakwaters to control sediment transport	For - Increased protection would be provided to the promenade, Queen's Drive and recreational facilities along the frontage. - Increased safety would be provided to pedestrians under extreme events. - Continuation of existing amenity value through controlled sediment transport. - Land allocated for development at The Maer would be protected. - Terrestrial habitats including coastal grassland and scrub within The Maer LNR/CWS and Orcombe Point to Straight Point CWS would be protected. Against - Direct impacts on designated intertidal habitat in footprint of defences. - Continued coastal squeeze of intertidal habitat (sand and mud) within the Exe Estuary SPA and Ramsar site through groyne works, and additional hydromorphological pressure on Exe transitional water body. - Permanent change in landscape character and likely deterioration in visual amenity due to the introduction of new defence structures.



I.3 FCRMU3: Exmouth

Overview

Coastal protection is provided by the beach, various types of walls and revetments. Flood and coastal risk is relatively high, with an existing standard of protection of 4% Annual Event Probability (AEP) around Exmouth Dock, The Point, Camperdown Terrace and north of the Imperial Recreation Ground. In addition, Exmouth is at a high risk of surface water flooding.

The following receptors were considered: -

- Residential and commercial properties in Exmouth.
- Recreational and tourist assets including East Devon Way, Sustrans cycle route, recreational grounds, clubs and the seafront.
- Exmouth railway station and branchline railway.
- Electricity substations and sewerage systems.
- Exe transitional waterbody.
- Local roads, dock and access to ferry terminal.
- Historic landfill site.
- Heritage features including listed buildings, Exmouth Conservation Area and historic townscape.
- Development proposals.
- International (Exe Estuary SPA and Ramsar site), national (Exe Estuary SSSI) and local (Exmouth LNR) designations for nature conservation.

Viable High Level Options

High Level Option	Environmental Overview
No Active Intervention	Option rejected on the grounds that it would not provide protection to people and properties in Exmouth.
Hold the Line (Maintain/Sustain/Improve) Preferred Option	The need to provide continued protection to people and properties in Exmouth and the fact that the floodplain is largely developed, with limited opportunity for creation of intertidal habitat, means that it is likely to be necessary to maintain or improve the flood defences throughout the lifetime of the Strategy. Improving the line of defence increases the level of protection provided to properties (with associated benefits in terms of human health), material assets, areas of proposed development within Exmouth identified in the Exmouth Masterplan, critical infrastructure and the historic environment. However, all the options to hold the existing defence line have the potential to adversely affect the Exe Estuary SPA and Ramsar site through the loss of intertidal habitats due to coastal squeeze.

Short-Listed Options – Hold the Line: Improve

Short-listed Option	Environmental Overview
Short-term options	
Camperdown Terrace: Option 1: Wall raising and reconstruction (up to 2-3m) along Camperdown Terrace and boatyard. Local road/pavement raising or demountable/temporary defences less	For • Increased flood protection provided to properties including those in Camperdown Terrace and protection of electricity substations. • Increased safety would be provided to pedestrians under extreme events. Against • Continued coastal squeeze of intertidal habitat within the Exe Estuary SPA and Ramsar site through continued works to hard defences, and existing hydromorphological pressure on Exe transitional water body will continue. • Potential for direct impacts on the designated sites if footprint of defences is



than 0.5m high at the slipway entrance at the eastern end of Camperdown Terrace.	extended seaward. • Permanent change in landscape character and significant deterioration in visual amenity, with likely obstruction of sea views for some residents, recreational users and vehicle travellers. • Potential reduction in amenity value of boatyard and recreational areas (e.g. playing field) due to new/raised defences.
Camperdown Terrace: Option 2: Property resilience for properties at the eastern end of Camperdown Terrace, and wall or embankment raising along the boatyard of up to 0.5m. Local road/pavement raising or demountable/temporary defences less than 0.5m high at the slipway entrance at the eastern end Preferred Environmental Option	For • Increased property resilience to flooding at the eastern end of Camperdown Terrace. • Local road/pavement-raising may improve views for vehicle travellers and pedestrians. Against • Continued coastal squeeze of intertidal habitat within the Exe Estuary SPA and Ramsar site through continued works to hard defences. • Potential for direct impacts on the designated sites if footprint of defences is extended seaward. • Potential change in landscape character.
North-East of the Imperial Recreation Ground: Option 1: Improvements to existing assets, consisting of vertical or wave recurve walls located along the crest of the existing revetment up to 0.75m high	For • Increased flood protection provided to properties including those in the Imperial Road area. • Protection of Imperial Recreation Ground and the playing field. Against • Continued coastal squeeze of intertidal habitat within the Exe Estuary SPA and Ramsar site through continued works to hard defences, and existing hydromorphological pressure on Exe transitional water body will continue. • The reduction in tidal overtopping of the revetment may lead to scour • Potential reduction in amenity value of recreational areas (e.g. playing field) due to raised defences. • Permanent change in landscape character and significant deterioration in visual amenity, with potential obstruction of sea views for some residents, recreational users and vehicle travellers.
North-East of the Imperial Recreation Ground: Option 2: Secondary assets, consisting of a vertical wall located along the access road to the playing field of up to 0.5m height, tying in to relatively high ground (around 0.5% AEP EWL) opposite the local car park Preferred Environmental Option	For • Increased flood protection provided to properties including those in the Imperial Road area. • Protection of Imperial Recreation Ground and the playing field. Against • Continued flood risk locally to car park.
Medium to Long-term options	
Option 1. Further improvements along the existing seaward	For • Improved flood protection to property and Exmouth Against



alignment. Raising of quay walls along Exmouth Docks, by 0.5-1.5m. New linear assets along the seaward frontage of Shelly Road properties, by 0-1m. New revetments or wall raising/reconstruction along Camperdown Terrace seaward frontage of between 1-3m, as property resilience becomes increasingly ineffective. Raising of walls along the slipway and boatyard by 0.5-1.5m. Raising of the seaward wall alignment north-east of the Imperial Recreation Ground, by 0.5-1.5m.	• Continued coastal squeeze of intertidal habitat within the Exe Estuary SPA and Ramsar site through continued works to hard defences • Potential for direct impacts on the designated site in the footprint of new or raised defences • Permanent change in landscape character and significant deterioration in visual amenity, with potential obstruction of sea views for some residents, recreational users and vehicle travellers around the docks • Potential reduction in amenity value of recreational areas around docks and Exmouth to Starcross ferry terminal due to raised defences
Option 2. Wider raising of quay walls along Exmouth Docks, by 0.5-1.5m. Wide-scale property resilience for Shelly Road and Camperdown Terrace properties, with 0.5-1m of road raising. Wider raising of walls along the slipway and boatyard by 0.5-1.5m. Wider raising of the seaward wall alignment north-east of the Imperial Recreation Ground, of between 0.5-1.5m	For • Improved flood protection to property and Exmouth Against • Continued coastal squeeze of intertidal habitat within the Exe Estuary SPA and Ramsar site through continued works to hard defences • Potential for direct impacts on the designated site in the footprint of new or raised defences • Permanent change in landscape character and significant deterioration in visual amenity, with potential obstruction of sea views for some residents, recreational users and vehicle travellers • Potential reduction in amenity value for recreational users around Exmouth seafront • May experience social opposition through need for residents to adapt to flooding



I.4 FCRMU4: Courtlands

Overview

Various coastal defences provide flood protection in this unit but there is a low spot near Sowden Farm where tidal weiring occurs.

The following receptors were considered: -

- Residential and commercial properties.
- Recreational assets including East Devon Way and Sustrans cycle route.
- Branchline railway and Sowden Lane.
- Exe transitional waterbody.
- Grades 1 and 3 agricultural land.
- Heritage features including area of historical landscape interest.
- Exe Coastal Preservation Area.
- International (Exe Estuary SPA and Ramsar site), national (Exe Estuary SSSI) and local (Exmouth LNR) designations for nature conservation.

Viable High Level Options

High Option	Level	Environmental Overview
No Active Intervention		NAI was the preferred environmental option in the medium and long-term as it enables a more naturally functioning system, particularly in the section of natural cliff. This policy was rejected in the developed section of the FCRMU as it would not provide protection to the branchline railway and the economic/regional importance of the FCRMU.
Hold the Line (Maintain/Sustain/Improve)		Holding the line continues to protect properties, the branchline railway, and high grade agricultural land. Improve the line was the preferred environmental option in some areas in all epochs of the strategy but has been rejected as the standard of protection is already sufficiently high in this FCRMU. As intertidal habitat migration inland would be constrained by topography in the absence of the railway due to rising sea levels, the 'hold the line' options are not considered to adversely affect the Exe Estuary SPA and Ramsar site through the loss of intertidal habitats due to coastal squeeze.

Short-Listed Options – No Active Intervention and Hold the Line: Maintain

Short-listed Option	Environmental Overview
All epochs	
No Active Intervention (natural cliff) Only short-listed option for natural cliff	For • Allows the coastal system to function naturally, which would be beneficial to the designated conservation sites and to hydromorphology of the Exe transitional water body. Against • East Devon Way and Sustrans route would be at flood risk and would need to be relocated inland. • Branchline railway at erosion risk when defences fail. • Increasing flood risk to Grades 1 and 3 agricultural land.
Continue to maintain the existing railway embankments, revetments and seawalls Only short-listed option for non-cliff	For • Protection of the existing branchline railway. Against • East Devon Way would be at increasing flood risk and would need to be relocated inland. • Coastal processes will be constrained.



I.5 FCRMU5: Lymestone

Overview

Flood risk in this FCRM unit is relatively low due to the recent construction of Lymestone tidal flood gates and associated wall improvements.

The following receptors were considered: -

- Residential and commercial properties in Lymestone.
- Recreational assets including a coastal footpath.
- Exe transitional waterbody.
- Grades 1 and 3 agricultural land.
- Heritage features including listed buildings, a Conservation Area and historic townscapes.
- International (Exe Estuary SPA and Ramsar site) and national (Exe Estuary SSSI) designations for nature conservation.

Viable High Level Options

High Option	Level	Environmental Overview
No Active Intervention		NAI enables a more naturally functioning system
Hold the Line (Maintain/Sustain/Improve)		Improving the level of protection provided to properties, the branchline railway, and high grade agricultural land was the preferred environmental option in some areas in all epochs of the strategy. Whilst the environmentally preferred option is to improve the defences in this FCRMU, the short-listed hold the line option is to maintain due to socio-economic limitations, and/or lack of technical need to improve the SoP. As intertidal habitat migration inland would be constrained by topography in the absence of the flood defences due to rising sea levels, the 'hold the line' options are not considered to adversely affect the Exe Estuary SPA and Ramsar site through the loss of intertidal habitats due to coastal squeeze.

Short-Listed Options – Hold the Line: Maintain and No Active Intervention

Short-listed Option	Environmental Overview
Short-term options	
No Active Intervention (natural cliff) Only short-listed option for natural cliff	For • Allows the coastal system to function naturally, which would be beneficial to the designated conservation sites and to hydromorphology of the Exe transitional water body. Against • Erosion would not be controlled and there may be some loss of agricultural land
Maintain existing walls and flood Only short-listed option for non-cliff frontage	For • Maintains existing protection to a significant number of residential and non-residential properties, local roads and built assets in the developed floodplain • Provides flood protection to Grades 1 and 3 agricultural land Against • Coastal processes will be constrained and existing hydromorphological pressure on Exe transitional water body will continue.
Medium-term options	
No Active Intervention (natural cliff)	For • Allows the coastal system to function naturally, which would be



Only short-listed option for natural cliff	beneficial to the designated conservation sites and to hydromorphology of the Exe transitional water body. Against • Erosion would not be controlled and there may be some loss of agricultural land
Sustain defences through reconstruction of/or raising of walls and flood gates by up to 0.7m Only short-listed option for non-cliff frontage	For • Maintains existing protection to a significant number of residential and non-residential properties, local roads and built assets in the developed floodplain • Improves standard of protection to Grades 1 and 3 agricultural land Against • Coastal processes will be constrained and existing hydromorphological pressure on Exe transitional water body will continue. • Permanent change in landscape character and visual amenity due to the reconstruction of defence structures and raising of walls/floodgate. Wall raising will need to be designed with due consideration of Lympstone Coastal Preservation Area.



I.6 FCRMU6: Lymptone Commando

Overview

The existing level of flood protection in this FCRM unit is high, and the railway embankment provides a level of protection above 0.1% AEP. The following receptors were considered: -

- Residential and commercial properties.
- A local footpath.
- Exe transitional waterbody.
- Grades 1 and 3 agricultural land.
- A historic designed landscape including a listed building and former historic military complex.
- International (Exe Estuary SPA and Ramsar site) and national (Exe Estuary SSSI) designations for nature conservation.

Viable High Level Options

High Option	Level	Environmental Overview
No Active Intervention		Enables a more naturally functioning system and would be beneficial to the designated conservation sites. However, this option was rejected as it would not provide protection to the properties at flood risk nor the branchline railway.
Hold the Line (Maintain/Sustain/Improve)	Preferred Option	Improving the level of protection provided to properties, the branchline railway, and high grade agricultural land was the preferred environmental option in some areas in all epochs of the strategy. Whilst the environmentally preferred option is to improve the defences in this FCRMU, the short-listed hold the line options are to maintain and sustain due to socio-economic limitations, and/or lack of technical need to improve the SoP. As intertidal habitat migration inland would be constrained by topography in the absence of the railway due to rising sea levels, the 'hold the line' options are not considered to adversely affect the Exe Estuary SPA and Ramsar site through the loss of intertidal habitats due to coastal squeeze.

Short-Listed Options – Hold the Line: Maintain and Sustain

Short-listed Option	Environmental Overview
Short and medium-term option	
Maintain existing walls, railway embankments and revetments Only short-listed option	For • Maintains existing protection to residential and non-residential properties, local roads and built assets in the developed floodplain • Protects the branchline railway • No change in flood risk to historic military landscape Against • Coastal processes will be constrained and existing hydromorphological pressure on Exe transitional water body will continue.
Long-term option	
Sustain defences through revetment, wall, embankment raising by up to 0.5m, armouring and wave recurve wall. Only short-listed option	For • Maintains existing protection to residential and non-residential properties, local roads and built assets in the developed floodplain • Protects the branchline railway • No change in flood risk to historic military landscape Against • Wave recurve wall may result in increased scouring of intertidal habitat • Coastal processes will be constrained and existing hydromorphological pressure on Exe transitional water body will continue. • Potential for adverse impact on views and access from behind earthwork through embankment raising



I.7 FCRMU7: Exton

Overview

The current standard of protection is high at 0.1% AEP until 2060. The railway embankment provides a level of protection above 0.1% AEP. Local tidal inundation, controlled by high ground, can occur where bridges/culverts under the railway allow. The following receptors were considered: -

- Residential and commercial properties.
- Exton railway station and mainline railway.
- Exton sewerage works and Exe transitional waterbody.
- Grade 3 agricultural land.
- Historic settlement with remnant medieval field systems.
- International (Exe Estuary SPA and Ramsar site), national (Exe Estuary SSSI) and local (Woodbury Road Station CWS) designations for nature conservation.

Viable High Level Options

High Option	Level	Environmental Overview
No Active Intervention		Enables a more naturally functioning system and would benefit the designated conservation sites. However, this option was rejected as properties, the mainline railway and Exton sewerage works would be at increasing risk of flooding.
Hold the Line (Maintain/Sustain/Improve)	Preferred Option	Improving the level of protection provided to properties, the branchline railway, and high grade agricultural land was the preferred environmental option in some areas in all epochs of the strategy. Whilst the environmentally preferred option is to improve the defences in this FCRMU, the short-listed hold the line options are to maintain and sustain due to socio-economic limitations, and/or lack of technical need to improve the SoP. As intertidal habitat migration inland would be constrained by topography in the absence of the railway due to rising sea levels and no intertidal habitat would be created, the 'hold the line' options are not considered to adversely affect the Exe Estuary SPA and Ramsar site through the loss of intertidal habitats due to coastal squeeze.

Short-Listed Options – Hold the Line: Maintain and Sustain

Short-listed Option	Environmental Overview
Short and medium-term option	
Maintain existing walls, railway embankments and revetments Only short-listed option	For • Maintains existing protection to residential and non-residential properties along Station Road, local roads and built assets in the developed floodplain. • Protects the mainline railway and railway station. Against • Coastal processes will be constrained and existing hydromorphological pressure on Exe transitional water body will continue.
Long-term option	
Sustain defences through improvement works (revetment, wall, embankment raising, armouring, wave recurve) by up to 0.5m Only short-listed option	For • Maintains existing protection to residential and non-residential properties along Station Road, local roads and built assets in the developed floodplain. • Protects the mainline railway and railway station. Against • Coastal processes will be constrained and existing hydromorphological pressure on Exe transitional water body will continue. • Change in landscape character and potential deterioration in visual amenity for residents and vehicle travellers along River Front Road due to the raising of defences.



I.8 FCRMU8: Clyst St George

Overview

Various coastal defences including an earth embankment, seawall and ramp block wall provide some flood protection to this settlement. However, the current flood risk is relatively high with an approximate 10% AEP of flooding. The following receptors were considered: -

- Residential and commercial properties.
- Key branchline railway, Bridge Hill C257 road and Topsham Bridge.
- Clyst river waterbody.
- Grades 1 and 4 agricultural land.
- Historic assets including a listed building and Conservation Area.
- International (Exe Estuary SPA and Ramsar site), national (Exe Estuary SSSI) and local (Clyst Marshes CWS) designations for nature conservation.

Viable High Level Options

High Option	Level	Environmental Overview
No Active Intervention		NAI would enable a more naturally functioning system and would benefit the designated conservation sites. However, this option was rejected as properties, the branchline railway and the C257, would be at increasing risk of tidal flooding.
Hold the Line (Maintain/Sustain/Improve)		These options will maintain, sustain or improve the flood risk to properties, the branchline railway, C257, Topsham bridge and high grade agricultural land. However, all hold the line options have the potential to adversely affect the Exe Estuary SPA and Ramsar site through the loss of intertidal habitats due to coastal squeeze.
Managed Realignment	Preferred Option	Managed realignment at Lower Clyst was the preferred environmental option, enabling a naturally functioning system, which will maintain the nature conservation interests of the site and could create significant areas of intertidal, freshwater and reedbed habitat, adjacent to the international conservation site. No properties or high grade agricultural land will be placed at an increased risk of flooding as a result of implementing this policy although a significant area of Grade 4 agricultural land would be lost.

Short-Listed Options – Managed Realignment

Short-listed Option	Environmental Overview
All epochs	
Managed Realignment at Lower Clyst by constructing realigned defences up to 1.5m high, with controlled breaching of the existing embankment (i.e. approx 100m along the east bank of the Clyst). Rock armouring around bridge abutments	For • Enables a naturally functioning system and contributes directly to hydromorphological mitigation measures for Clyst river water body. • Creation of up to 0.5ha mudflat, 104ha saltmarsh and 15ha of freshwater grazing marsh in the short-term (0-20 years), adjacent to international conservation site. The suitability for habitat creation is deemed good by Natural England. • Would continue to protect local properties. Against • Potential direct impacts including scour issues on (and indirect impacts on the setting) of Topsham Bridge (listed structure) through defence construction, rock armouring and changes in flow regime/velocities. A new wall would minimise footprint/land-take but may be less aesthetically pleasing than an embankment. • Loss of Grade 4 agricultural land/floodplain grazing marsh. • Permanent change in landscape character and potential deterioration in visual amenity for property occupants in Topsham, along the A376 Exmouth



	Road, and along Marsh Lane due to new defence construction. • Saline inundation of Clyst Marshes CWS may lead to loss or degradation of existing habitat. • Potential impact on upstream water levels during fluvial event. • Some opposition from local landowners and residents.
Managed Realignment at Lower Clyst by raising of the C-road by up to 1.5m with culverts, with controlled breaching of the existing embankment (i.e. approx 100m along the east bank of the Clyst). Preferred Environmental Option	For • Enables a naturally functioning system and contributes directly to hydromorphological mitigation measures for Clyst river water body. • Creation of up to 0.5ha mudflat, 104ha saltmarsh and 15ha of freshwater grazing marsh in the short-term (0-20 years), adjacent to international conservation site. The suitability for habitat creation is deemed good by Natural England. • Continues to manage flooding to local properties and the C257 • Improves views for vehicle travellers on C257. • Allows for future improvements to land south of the C257 Road, which is included in the SPA and is currently in unfavourable condition, provided that new access could be provided. Against • Loss of Grade 4 agricultural land/floodplain grazing marsh. • Permanent change in landscape character and potential deterioration in visual amenity for property occupants in Topsham, along the A376 Exmouth Road, and along Marsh Lane due to road raising • Saline inundation of Clyst Marshes CWS may lead to loss or degradation of existing habitat. • Raising of C257 and changes in flow/velocities has potential to impact on Topsham Bridge (listed structure) including scour issues. • Costly to raise road. • Some opposition from local landowners and residents.



I.9 FCRMU9: Clyst St Mary

Overview

An earth embankment provides the coastal defence in this FCRM unit. Flood risk is relatively high with an existing breach standard of protection of 20% AEP. The following receptors were considered: -

- Residential and commercial properties.
- Public footpath.
- A376 Exmouth Road, Clyst St Mary Bridge and Frog Lane.
- Clyst river waterbody.
- Grades 1 and 4 agricultural land.
- Scheduled Monument.
- Local nature conservation designation (Clyst Marshes CWS).

Viable High Level Options

High Option	Level	Environmental Overview
No Active Intervention		NAI would enable a more naturally functioning system. However, there would be an increasing risk of flooding to a significant number of properties and key transport routes including A376, agricultural land and historic assets.
Hold the Line (Maintain/Sustain/Improve)		Holding the line provides flood risk protection to properties and key transport routes.
Managed Realignment		This policy would have major positive impacts on the environment, enabling a naturally functioning system, without increasing the risk of flooding to properties and built assets. Providing an improved secondary line of flood defence is considered the preferred environmental option in the medium and long-term to manage the flood risk to properties, material assets including nationally important transport routes and a Scheduled Monument. This option was rejected because the embankments currently protect only agricultural land, MR would prove uneconomic and there are no benefits for habitat creation in this area.

Short-Listed Options – No Active Intervention and Hold the Line: Maintain/Sustain

Short-listed Option	Environmental Overview
Short-term option	
No Active Intervention	For • Allows the coastal system to function naturally and reduces hydromorphological pressure on the Clyst river water body Against • Increasing flood risk to a significant number of residential and commercial properties, A376 and built assets in the developed floodplain, which would require management. • Increasing flood risk to Grades 1, 3 and 4 agricultural land. • Potential tidal erosion damage to Clyst St Mary Bridge and Causeway Scheduled Monument, and other locally important historic assets.
Maintain embankments along Winslade Barton and Frog Lane	For • Provides flood protection to residential and non-residential properties in Clyst St Mary. Against • Natural processes will be constrained and existing hydromorphological pressure on Clyst river water body will continue.
Medium and long-term	



No Active Intervention	For - Allows the coastal system to function naturally and reduces hydromorphological pressure on the Clyst river water body Against - Increasing flood risk to a significant number of residential and commercial properties, A376 and built assets in the developed floodplain, which would require management. - Increasing flood risk to Grades 1, 3 and 4 agricultural land. - Potential tidal erosion damage to Clyst St Mary Bridge and Causeway Scheduled Monument, and other locally important historic assets.
Maintain embankments (short-term). Sustain defences along Winslade Barton and Frog Lane through embankment raising by up to 0.25m.	For - Provides flood protection to residential and non-residential properties in Clyst St Mary. Against - Natural processes will be constrained and existing hydromorphological pressure on Clyst river water body will continue. - Loss of agricultural land due to increased footprint of embankment in the long-term.
No clear environmentally preferred option	



I.10 FCRMU10: Sowton

Overview

An earth embankment providing the coastal defence in this FCRM unit is deteriorating. The following receptors were considered: -

- Public footpath.
- A376 Sidmouth Road.
- Clyst river waterbody.
- Grades 1 and 4 agricultural land.
- Historic water meadows and medieval landscape.

Viable High Level Options

High Option	Level	Environmental Overview
No Active Intervention		NAI enables a more naturally functioning system and the maintenance of defences has already been withdrawn in some areas. However, this policy increases the flood risk to Clyst St Mary bridge and Grades 1, 3 and 4 agricultural land.
Hold the Line (Maintain/Sustain/Improve)		This policy will maintain, sustain or improve the level of flood protection provided to the Clyst St Mary Bridge. This option was rejected as there are no economic assets to protect.
Managed Realignment		Enables a naturally functioning system. However, large areas of high grade agricultural land will be subject to flood risk. As there are no economic assets requiring protection, this option was rejected.

Short-Listed Options – No Active Intervention

Short-listed Option	Environmental Overview
All epochs	
No Active Intervention	For • Allows the coastal system to function naturally and reduces hydromorphological pressure on the Clyst river water body. • Potential creation of wetland habitats. Against • Medium to long-term loss of water meadows. • Increasing flood risk to Grades 1, 3 and 4 agricultural land. • Potential tidal erosion damage to Clyst St Mary Bridge and Causeway Scheduled Monument, and other locally important historic assets, which would require management.
Only short-listed option	



I.11 FCRMU11: West bank of the Clyst

Overview

An earth embankment provides the coastal defence in this FCRM unit. Flood risk is relatively high. The following receptors were considered: -

- Residential and commercial properties.
- Public footpath.
- Clyst Road and Bridge Hill, and branchline railway.
- Clyst river waterbody.
- Grades 1 and 4 agricultural land.
- Historic landscape features.
- International (Exe Estuary SPA and Ramsar site), national (Exe Estuary SSSI) and local (Exe Estuary RSPB Reserve – Bowling Green Marsh) designations for nature conservation.

Viable High Level Options

High Option	Level	Environmental Overview
No Active Intervention		Enables a more naturally functioning system and would benefit the designated conservation sites. However, this option has been rejected because it would result in the loss of significant areas of high grade agricultural land and would not enable delivery of legal compensatory habitat requirements, associated with holding the line elsewhere in the estuary.
Hold the Line (Maintain/Sustain/Improve)		Protection provided to properties, the railway, and high grade agricultural land. However, all the options involving holding the existing defence line have the potential to adversely affect the Exe Estuary SPA and Ramsar site through the loss of intertidal habitats due to coastal squeeze.
Managed Realignment		Enables a naturally functioning system and will create wetland habitat adjacent to the internationally designated conservation sites, without increasing the risk of flooding to properties and built assets. However, in the medium and longer term, large areas of high grade agricultural land and historic landscapes will be subject to flood risk. There will also be a change in the freshwater interests of Bowling Green Marshes RSPB Reserve.

Short-Listed Options – Hold the Line: Maintain and Managed Realignment

Short-listed Option	Environmental Overview
All epochs	
Maintain existing embankments	For • Continued protection of Clyst Road and railway. Against • Natural processes will be constrained and existing hydromorphological pressure on Clyst river water body will continue.
Managed Realignment by local breaching of embankments and erosion protection around Clyst St George and Bowling Green Marsh. Construction of realigned embankments	For • Enables a naturally functioning system and contributes directly to hydromorphological mitigation measures for Clyst river water body. • Creation of up to 15ha of intertidal habitat (mudflat and saltmarsh), adjacent to international conservation site. • Continued protection of Clyst Road and railway. Against • Potential for significant direct impacts on (and indirect impacts on the setting) of Topsham Bridge (listed structure) through defence construction and rock armouring. • Loss of Grades 1 and 4 agricultural land. • Permanent change in landscape character and potential deterioration in
Preferred	



Environmental Option	visual amenity due to new habitat creation and defences. • Saline inundation of Clyst Marshes CWS may lead to loss or degradation of existing habitat. • Change in freshwater interests and potential loss of roosting sites at Bowling Green Marshes.
Continued management of the existing embankment at Goosemoor	For • Provides flood protection to residential and non-residential properties in Clyst St Mary. • Continued protection of Clyst Road and railway Against • Natural processes will be constrained and existing hydromorphological pressure on Clyst river water body will continue. • Maintenance of Goosemoor is unsustainable in the long-term.



I.12 FCRMU12: Topsham

Overview

Various coastal defences including earth embankments, flood walls and natural banks provide the flood protection in this FCRM unit. The current flood risk is 20% AEP. The following receptors were considered: -

- Residential and commercial properties (including Darts Farm).
- Recreational assets including public rights of way and playing field.
- Local roads and an electricity sub-station.
- Exe transitional waterbody.
- Grade 1 agricultural land.
- Historic landfill site.
- Historic settlement of Topsham including a significant cluster of heritage assets.
- International (Exe Estuary SPA and Ramsar site), national (Exe Estuary SSSI) and local (Topsham Quay CWS) designations for nature conservation.

Viable High Level Options

High Option	Level	Environmental Overview
No Active Intervention		Enables a more naturally functioning system, and will benefit the designated conservation sites. However, this option was rejected because it does not provide protection to a significant number of properties and built assets (including Darts Farm, electricity substation, landfill site, historic assets and local road network) in the developed floodplain.
Hold the Line (Maintain/Sustain/Improve)	Preferred Option	Holding the existing line of defence (and improving the standard of defences in the medium and long-term) is the preferred environmental option as it protects numerous residential and commercial properties (including Darts Farm), with associated benefits to human health, and protects infrastructure, heritage and amenity assets and high grade agricultural land. Whilst the environmentally preferred option is to improve the defences in this FCRMU, the short-listed hold the line options are to maintain or sustain due to socio-economic limitations, and/or lack of technical need to improve the SoP. However, all the options involving holding the existing defence line have the potential to adversely affect the Exe Estuary SPA and Ramsar site through the loss of intertidal habitats due to coastal squeeze.

Short-Listed Options – Hold the Line: Maintain/Sustain

Short-listed Option	Environmental Overview
Short term option	
Maintain existing flood defence structures	For • Maintains existing level of flood protection to a significant number of residential and non-residential properties Topsham. • Meets the aspirations of the majority of the local population who have voiced concerns over the development of a scheme. Against • Continued coastal squeeze of intertidal habitat within the Exe Estuary SPA and Ramsar site through maintenance works. • Coastal processes will be constrained and existing hydromorphological pressure on Exe transitional water body will continue.
Construction of new walls or embankments along the playing field periphery, up to 0.5m in height	For • Provides flood protection to a significant number of residential and non-residential properties Topsham. • Protection of electricity substation on Ferry Road. Against



	• May meet opposition with some members of the local community who have voiced concerns over the development of a scheme. • Change in landscape character due to the construction of new defence structures. • Partial loss of playing field in footprint of new wall or embankment.
Property resilience for around 10 properties located along the periphery of the playing field and local road/pavement raising on Ferry Road of up to 0.25m	For • Provides flood protection to around 10 properties along the periphery of the playing field. • Protection of electricity substation on Ferry Road. Against • May meet opposition with some members of the local community who have voiced concerns over the development of a scheme. • Change in landscape character due to the construction of new defence structures.
Property resilience for around 20 properties located along the periphery of the playing field and along Ferry Road	For • Provides flood protection to around 20 properties along the periphery of the playing field and along Ferry Road. Against • May meet opposition with some members of the local community who have voiced concerns over the development of a scheme.
Preferred Environmental Option	
Medium to long term option	
Raising of Quay Walls in Topsham along the Strand of between 0 and 2m	For • Provides flood protection to a significant number of residential and non-residential properties Topsham. Against • Continued coastal squeeze of intertidal habitat within the Exe Estuary SPA and Ramsar site through raising of quay walls. • Natural processes will be constrained and existing hydromorphological pressure on Exe transitional water body will continue. • May meet opposition with some members of the local community who have voiced concerns over the development of a scheme. • Permanent change in landscape character and deterioration in visual amenity (with possible loss of view of quay) for property occupants and vehicle travellers along The Strand and Monmouth Hill.
No clear preferred environmental option in the medium to long-term – impacts of this option are dependent on height of defence raising required.	
Extensive property resilience for around 150 – 200 properties in Topsham	For • Provides flood protection to a significant number of properties in Topsham. Against • May meet opposition with some members of the local community who have voiced concerns over the development of a scheme. • Change in landscape character due to the construction of new defence structure.
No clear preferred environmental option in the medium to long-term.	



I.13 FCRMU13: Countess Wear

Overview

Existing coastal protection is provided by a natural bank and flood wall. The following receptors were considered: -

- Residential and commercial properties (including a care home and crematorium).
- Recreational assets including public rights of way, cycle track, playing field, canal towing path and Rivers Valley Park.
- North Brook river waterbody.
- Grade 4 agricultural land.
- Historic assets including listed buildings and a scheduled monument.
- International (Exe Estuary SPA and Ramsar site) and national (Exe Estuary SSSI) nature conservation sites.

Viable High Level Options

High Option	Level	Environmental Overview
No Active Intervention		Enables a more naturally functioning system and the in-channel islands would evolve naturally – this policy will benefit the designated conservation sites. Natural banks and ground levels currently control flood risk. The in-channel islands of River Exe County Park would be allowed to naturally evolve.
Hold the Line (Maintain/Sustain/Improve)		Holding the existing line of defence (and improving the standard of defences in the medium and long-term, which was the preferred environmental option) protects numerous residential and commercial properties (including vulnerable properties), with associated benefits to human health, and protects heritage and amenity assets. Whilst the environmentally preferred option is to improve the defences in this FCRMU, the short-listed hold the line options are to maintain or sustain due to socio-economic limitations, and/or lack of technical need to improve the SoP. All hold the line options however, will have negative effects on internationally designated nature conservation sites through coastal squeeze of intertidal habitat (and these require further consideration under the Habitats and Species Conservation Regulations 2010).
Managed Realignment		Enables a more naturally functioning system

Short-Listed Options – Hold the Line: Maintain/Sustain

Short-listed Option	Environmental Overview
All epochs	
Sustain: minor raising of the earth embankments (e.g. at Sewage Treatment Works)	For • Provides flood protection to properties at Countess Wear. • Protects the Sewage Treatment Works from flooding. Against • Continued coastal squeeze of intertidal habitat within the Exe Estuary SPA and Ramsar site through embankment raising. • Natural processes will be constrained and existing hydromorphological pressure on Exe transitional water body will continue.
Preferred Environmental Option	
Maintain existing flood walls with some local embankment or wall raising at Mill Lane	For • Provides flood protection to properties at Countess Wear. • Protects the Sewage Treatment Works from flooding. Against



and Retreat Drive.	- Continued coastal squeeze of intertidal habitat within the Exe Estuary SPA and Ramsar site through embankment raising. - Natural processes will be constrained and existing hydromorphological pressure on Exe transitional water body will continue. - Potential change in landscape character and deterioration in visual amenity as a result of wall raising.
Maintain existing flood walls with some individual property resilience in the short-term and with some wall raising in the long-term	For - Provides flood protection to properties at Countess Wear. - Protects the Sewage Treatment Works from flooding. Against - Continued coastal squeeze of intertidal habitat within the Exe Estuary SPA and Ramsar site through embankment raising. - Natural processes will be constrained and existing hydromorphological pressure on Exe transitional water body will continue. - Potential change in landscape character and deterioration in visual amenity as a result of wall raising.



I.14 FCRMU14: Exminster

Overview

Existing coastal protection is provided by a natural bank and flood wall. The existing flood risk in this FCRM unit is relatively low.

The following receptors were considered: -

- Residential and commercial properties.
- Recreational assets including public rights of way and Sustrans cycle route.
- Significant infrastructure including nationally important transport routes, electricity sub-stations, sewerage treatment works and railway line.
- Exe transitional waterbody.
- Historic landfill site.
- Grades 1, 2, 3 and 4 agricultural land.
- Historic assets including listed buildings, Exeter Ship Canal and historic landscapes.
- International (Exe Estuary SPA and Ramsar site), national (Exe Estuary SSSI) and local (Exeter Canal, Grace Road Tip, Countess Wear, Wracombe Farm and Sentrys Farm CWSSs, and Exe Estuary RSPB Reserve - Exminster Marshes) nature conservation sites.

Viable High Level Options

High Option	Level	Environmental Overview
No Active Intervention		Enables a more naturally functioning system and will benefit the designated conservation sites. However, this option was rejected as there is an increasing risk of flooding to significant properties and built assets in Exminster.
Hold the Line (Maintain/Sustain/Improve)		Holding the existing line of defence protects a significant number of residential and commercial properties (including vulnerable properties), with associated benefits to human health, and protects heritage and amenity assets. All hold the line options however, will have negative effects on internationally designated nature conservation sites through coastal squeeze of intertidal habitat (and these require further consideration under the Habitats and Species Conservation Regulations 2010).
Managed Realignment		Enables a naturally functioning system, providing opportunity for up to 87ha of intertidal habitat creation at Exminster Marshes. Provides continued protection to a significant number of residential and commercial properties in Exminster (with associated benefits on human health). However, there would be increasing flood risk to a large area of high quality agricultural land, which would need to be managed carefully. This option was rejected as more appropriate habitat creation sites have been identified for the short-term that would avoid the need to impact on the RSPB Reserve, would avoid the need to create secondary replacement freshwater habitat, and avoid the loss of roosting habitat for breeding waders.

Short-Listed Options – Hold the Line: Maintain/Sustain

Short-listed Option	Environmental Overview
Short-term options	
Powderham Banks: 1. Hard foreshore management consisting of sheet piling along the revetment toe, through the revetment itself or rock armouring at the toe	For • Provides flood protection to properties • Piling may avoid direct impacts on SPA and Ramsar site • Ongoing protection of terrestrial habitats and species associated with numerous CWS' and coastal grazing marsh at RSPB reserve. Against • Natural processes will continue to be constrained and existing hydromorphological pressure on Exe transitional water body will continue. • Reducing standard of flood protection afforded to properties



	• Sheet piling would be visually unattractive and may result in a deterioration in landscape character
Powderham Banks: 2. Revetment, vertical or wave recurve wall raising of up to 0.5m	For • Provides flood protection to properties and the mainline railway • Piling may avoid direct impacts on SPA • Ongoing protection of terrestrial habitats and species associated with numerous CWS' and coastal grazing marsh at RSPB reserve. • Raising of existing defence could be undertaken to avoid direct impacts on the SPA and Ramsar site Against • Natural processes will continue to be constrained and existing hydromorphological pressure on Exe transitional water body will continue. • Risk of undermining of the revetment
Powderham Banks: A combination of option 1 and 2.	For • Provides improved standard of flood protection to properties and the mainline railway • Piling may avoid direct impacts on SPA • Ongoing protection of terrestrial habitats and species associated with numerous CWS' and coastal grazing marsh at RSPB reserve. • Raising of existing defence could be undertaken to avoid direct impacts on the SPA and Ramsar site Against • Natural processes will continue to be constrained and existing hydromorphological pressure on Exe transitional water body will continue. • Sheet piling would be visually unattractive and may result in a deterioration in landscape character
Medium and long-term options	
Maintain the existing embankments (Exeter Canal and Turf Lock). In the long term, some canal bank raising of between 0-0.75m would be carried out. Preferred Environmental Option	For • Provides flood protection to a significant number of properties and historic assets in Exminster and high grade agricultural land. • Ongoing protection of terrestrial habitats and species associated with numerous CWS' and coastal grazing marsh at RSPB reserve. Against • Natural processes will continue to be constrained and existing hydromorphological pressure on Exe transitional water body will continue.
1. Sustain or Improve the embankments with sheet piling along the revetment toe or through the revetment itself, or rock armouring at the toe (Turf Lock and the southern extent of the non-railway embankment).	For • Provides flood protection to a significant number of properties and historic assets in Exminster and high grade agricultural land. • Ongoing protection of terrestrial habitats and species associated with numerous CWS' and coastal grazing marsh at RSPB reserve. Against • Natural processes will continue to be constrained and existing hydromorphological pressure on Exe transitional water body will continue or worsen. • Deterioration in landscape character at Powderham within the Exe Preservation Area and an Area of Great Landscape Value. • Reduced visual amenity due to the use of sheet piling.
2. Sustain or Improve the embankments with revetment, vertical or wave recurve wall raising of up to 0.5m. (Turf Lock and the southern extent of the	For • Provides flood protection to a significant number of properties and historic assets in Exminster and high grade agricultural land. • Ongoing protection of terrestrial habitats and species associated with numerous CWS' and coastal grazing marsh at RSPB reserve. Against



non-railway embankment).	• Natural processes will continue to be constrained and existing hydromorphological pressure on Exe transitional water body will continue. • Change in landscape character and visual amenity within the Exe Preservation Area and an Area of Great Landscape Value due to embankment and wall raising.
Sustain or Improve the embankments with a combination of both options 1 and 2. In the medium to long term, further raising of Powderham Banks may be required between 0.5-1.5m. (Turf Lock and the southern extent of the non-railway embankment).	For • Provides flood protection to a significant number of properties and historic assets in Exminster and high grade agricultural land. • Ongoing protection of terrestrial habitats and species associated with numerous CWS' and coastal grazing marsh at RSPB reserve. Against • Natural processes will continue to be constrained and existing hydromorphological pressure on Exe transitional water body will continue or worsen. • Change in landscape character and visual amenity within the Exe Preservation Area and an Area of Great Landscape Value due to embankment and wall raising • Reduced visual amenity due to the use of sheet piling.



I.15 FCRMU15: Kenn Valley

Overview

Existing coastal protection is provided by a flood wall and railway embankment. Flood risk in this FCRM unit is relatively low with an existing breach standard of protection of 0.1%AEP.

The following receptors were considered: -

- Residential and commercial properties.
- Recreational assets including public rights of way.
- Mainline railway.
- Exe transitional and Kenn River waterbodies.
- Grades 1, 3 and 4 agricultural land.
- Historic assets including listed buildings and a Registered Park and Garden.
- International (Exe Estuary SPA and Ramsar site), national (Exe Estuary SSSI) and local (Powderham CWS) nature conservation sites.

Viable High Level Options

High Option	Level	Environmental Overview
No Active Intervention		Enables a more naturally functioning system and will benefit the designated conservation sites. However, this option was rejected because it would result in an increasing flood risk to properties and built assets in the developed floodplain and the loss of the mainline railway.
Hold the Line (Maintain/Sustain/Improve)		Holding the existing line of defence protects a significant number of residential and commercial properties (including vulnerable properties), with associated benefits to human health, and protects heritage and amenity assets. All hold the line options however, will have negative effects on internationally designated nature conservation sites through coastal squeeze of intertidal habitat (and these require further consideration under the Habitats and Species Conservation Regulations 2010).
Managed Realignment		Managed realignment in the River Kenn Valley on the right bank of the River Exe enables a naturally functioning system, providing opportunity for habitat creation and a naturally evolving landscape. The potential site includes the floodplain of the River Kenn up to the road bridge near Willsworthy Farm. The site lies outside the Exe Estuary SPA/Ramsar site so no secondary compensation of habitat would be required. The lower part of the valley is important for wigeon, and both they and large numbers of black-tailed godwits (both SPA species) also feed on adjacent intertidal shore of the estuary. Further consideration would need to be given to the sustainability of any future habitat creation opportunity in this FCRM unit and the increasing flood risk to a small number of residential properties and a significant area of high grade agricultural land would need to be managed carefully.



Short-Listed Options – Hold the Line: Maintain and Managed Realignment

Short-listed Option	Environmental Overview
All epochs	
Maintain the existing railway embankments, revetment and wall (railway embankment and the A379 junction).	For - Provides flood protection to properties in Kanton. - Maintains important infrastructure including the mainline railway and A379 junction. Against - Continued coastal squeeze of intertidal habitat within the Exe Estuary SPA and Ramsar site through maintenance works. - Coastal processes will be constrained and existing hydromorphological pressure on Exe transitional and Kenn river water bodies will continue.
Maintain the existing railway embankments, revetment and wall (railway embankment and the A379 junction). and Regulated Tidal Exchange, with a RTE device attached to the existing culvert and the tide flap removed. Preferred Environmental Option, as it avoids introducing new embankments into existing landscape	For - Provides flood protection to properties in Kanton. - Maintains important infrastructure including the mainline railway and A379 junction. - Creation of up to 15ha of mudflat, 30ha of saltmarsh and 5ha of grazing marsh in the short-term, which is considered to have significant ecological functionality benefits and is the lowest cost location in the Exe Estuary. - Opportunities to improve existing problem with flapped outfall. - Improves fish access to the River Kenn, directly assisting in achieving WFD status. Against - Significant change in landscape character and visual amenity for the local community as a result of land use changes. - Potential changes in erosion and accretion, with impacts on estuary channel morphology, and existing hydromorphological pressure on Exe transitional water body will continue.
Maintain the existing railway embankments, revetment and wall (railway embankment and the A379 junction). and Secondary embankments along the fringes of the habitat creation area, with the culvert tide flap removed. In the medium to long term, effective options, assuming the above short term works occur, would consist of vertical or wave recurve wall raising of between 0-1.5m, or rock armouring or revetment raising of between 0-1.5m, dependent on climate change scenario.	For - Provides flood protection to properties in Kanton. - Maintains important infrastructure including the mainline railway and A379 junction. - Creation of up to 15ha of mudflat, 30ha of saltmarsh and 5ha of grazing marsh in the short-term, which is considered to have significant ecological functionality benefits and is the lowest cost location in the Exe Estuary. - Opportunities to improve existing problem with flapped outfall. - Improves fish access to the River Kenn, assisting in achieving WFD status. Against - Significant change in landscape character and visual amenity for the local community as a result of land use changes and embankment construction. - Potential changes in erosion and accretion, with impacts on estuary channel morphology, and existing hydromorphological pressure on Exe transitional water body will continue.



I.16 FCRMU16: Starcross

Overview

Existing coastal protection is provided by railway embankments and a masonry seawall. Flood risk in this FCRM unit is relatively low with an existing breach standard of protection of 0.1%AEP, although there is a weak spot in the defences at Cockwood.

The following receptors were considered: -

- Residential and commercial properties.
- Recreational assets including public rights of way.
- Electricity substations, a railway station and A379.
- Groundwater source protection zone, historic landfill and Exe transitional and multiple Exe River (tidal) waterbodies.
- Grades 1, 2 and 3 agricultural land.
- Important clusters of heritage assets in Starcross and Cockwood.
- International (Exe Estuary SPA and Ramsar site), national (Exe Estuary SSSI) and local (Starcross Gold Range and Cockwood Harbour CWSs) nature conservation sites.

Viable High Level Options

High Option	Level	Environmental Overview
No Active Intervention		Enables a more naturally functioning system and will benefit the designated conservation sites. However, this option was rejected because it would result in an increasing flood risk to a significant number of properties and built assets in the developed floodplain and the loss of the mainline railway.
Hold the Line (Maintain/Sustain/Improve)		The preferred option on environmental grounds was to hold the line. Improving the existing line of defence increases the level of protection provided to a significant number of properties in Starcross (with associated benefits to human health), material assets, critical infrastructure, high grade agricultural land and the high cluster of Listed Buildings. All hold the line options however, will have negative effects on internationally designated nature conservation sites through coastal squeeze of intertidal habitat (and these require further consideration under the Habitats and Species Conservation Regulations 2010).

Short-Listed Options – Hold the Line: Maintain

Short-listed Option	Environmental Overview
All epochs	
A379 junction to Cockwood Harbour: Maintain the existing structures in the short term with vertical or wave recurve wall raising of between 0-1.5m, or rock armouring or revetment raising of between 0-1.5m, dependent on climate change scenario. Only short-listed option for this location	For • Provides flood protection to properties around Cockwood Harbour and Starcross. • Maintains important infrastructure including the mainline railway and A379 junction. Against • Continued coastal squeeze of intertidal habitat within the Exe Estuary SPA and Ramsar site through maintenance works. • Coastal processes will be constrained and existing hydromorphological pressure on Exe transitional water body will continue. • Potential loss of amenity value due to wall raising and defence works.



Cockwood Harbour: Improve in the short term by vertical or wave recurve wall raising of up to 0.5m along the harbour walls, with further raising of up to 1.5m in the medium to long-term Preferred Environmental Option (short-term only). No clear preferred environmental option for this location in the medium and long-term – impacts are comparable with alternative short-listed option, and dependent on height of defence raising required.	For • Provides flood protection to properties around Cockwood Harbour and Starcross. • Maintains important infrastructure including the mainline railway and A379 junction. Against • Continued coastal squeeze of intertidal habitat within the Exe Estuary SPA and Ramsar site through maintenance works. • Coastal processes will be constrained and existing hydromorphological pressure on Exe transitional water body will continue. • Potential loss of amenity value and access due to wall raising and defence works. • Permanent change in landscape character and deterioration in views for property owners along Dawlish Warren Road including the hotel, due to the raising of harbour walls.
Cockwood Harbour: Improve in the short term by constructing a new wall or embankment north of Cockwood Harbour, with A379 road raising or a flood gate, to cut off the flood route to Starcross; 1-2m in height. In the medium to long term, further raising would be required, between 0-1.5m. No clear preferred environmental option for this location in the medium and long-term – impacts are comparable with alternative short-listed option, and dependent on height of defence raising required.	For • Provides flood protection to properties around Cockwood Harbour and Starcross. • Maintains important infrastructure including the mainline railway and A379 junction. Against • Continued coastal squeeze of intertidal habitat within the Exe Estuary SPA and Ramsar site through maintenance works. • Coastal processes will be constrained and existing hydromorphological pressure on Exe transitional water body will continue. • Potential loss of amenity value and access due to wall raising, new flood gates and defence works. • Permanent change in landscape character and deterioration in views for property owners along Dawlish Warren Road including the hotel, due to the raising of harbour walls.
Cockwood Harbour to the Welcome Holiday Park: Maintain the existing railway embankments. Only short-listed option for this location	For • Maintains important infrastructure including the mainline railway. Against • Continued coastal squeeze of intertidal habitat within the Exe Estuary SPA and Ramsar site through maintenance works. • Coastal processes will be constrained and existing hydromorphological pressure on Exe transitional water body will continue.



I.17 FCRMU17: Dawlish Warren

Overview

Existing coastal protection is provided by railway embankment, walls and sand dunes, and the current standard of flood protection is variable.

The following receptors were considered: -

- Residential and commercial properties.
- Recreational assets including caravans, Dawlish Warren seafront, tourist attractions and public rights of way.
- Railway station, mainline railway, A379 and electricity substations.
- Commercial shellfisheries.
- Geological Conservation Review site.
- Exe transitional waterbody.
- Grades 1 and 4 agricultural land.
- Important clusters of heritage assets in Dawlish Warren.
- International (Exe Estuary SPA/Ramsar site and Dawlish Warren SAC), national (Exe Estuary SSSI and Dawlish Warren SSSI/NNR) and local (Dawlish Warren LNR, Shutterton Brook, Langdon Fields, The Old Beach Huts, Langstone Rock Car Park and Port Road CWSs) nature conservation sites.

Viable High Level Options

High Option	Level	Environmental Overview
No Active Intervention		Enables natural evolution of the spit and benefits the designated conservation sites. The removal of some assets may be required on grounds of health and safety.
Managed Realignment		Enables natural evolution of the spit and benefits the designated conservation sites. Allows some dune management.
Hold the Line (Maintain/Sustain/Improve)		Combinations of options to maintain, sustain or improve have been considered. All options provide some level of flood protection to Dawlish Warren but all have the potential to impact on the designated conservation sites.

Currently, the **proximal section** has a high standard of protection (SoP) (0.1%AEP) with a hard engineered defence (revetment/wave recurve). Removal of this structure would only be appropriate if the whole spit is allowed to evolve naturally i.e. NAI. As the SoP is already very high, Improve would be unnecessary. Maintain or Sustain would be required to keep the SoP as high as it is now. Hence in the short term viable options are NAI or Maintain, and in the medium to long term viable options are NAI or Sustain.

The **central section** has some weaker points with an overwashing/breach SoP of 1-10% AEP in the short term, reducing to 10-20% AEP in the medium term. If the central section is not Sustained or Improved (which would require harder engineering) in the short term, then the SoP in the medium to long term would be so low as to render Maintain inappropriate. Sustain and Improve could include foreshore management in the short term, but would become increasingly difficult in the medium to long term due to the magnitude of physical processes. NAI or Managed Realignment could be considered in the short to medium term. The obvious location to realign to would be the back dunes. Hence in the short term, viable options are NAI, MR, Maintain, Sustain or Improve, in the medium term are NAI, MR or Sustain, and in the long term are NAI or Sustain.

The **neck section** has some weaker points that have an overwashing/breach risk SoP of 2% AEP in the short term, reducing to 4-10% AEP in the medium to long term. If the neck section is not Sustained or Improved (which would require harder engineering) in the short term, then the SoP in the medium to long term would be so low as to render Maintain inappropriate. The neck provides access to the distal section; and therefore if NAI is considered for the neck, NAI would also apply to the distal section. It is notable that if NAI/MR occurs at the central section, this would place significant process pressure on the neck section, likely requiring greater monitoring and/or intervention (i.e. potentially harder engineering). Hence in the short



term, viable options are NAI, Maintain, Sustain or Improve, and in the medium to long term are NAI or Sustain.

The **distal section** is mobile, and has a high SoP (0.5% AEP) against over-washing/breach in the short term. This section carries out a key wave sheltering function for the Exe Estuary. Maintaining the distal section is only physically achievable in the short term. By the medium to long term, increased drift rates and likely increased mobility would force a decision towards either increased (Sustain) or decreased (NAI) effort. Furthermore, Improve is mainly physically sensible in the short term, prior to any further increased mobility or flattening. As HLOs refer to broad FCRM function, Sustain implies sustaining the wave sheltering function; this could include breakwater or other options at the next option stage. Hence in the short term, viable options are NAI, Maintain, Sustain or Improve, in the medium to long term are NAI or Sustain.

The **estuary facing section** is not actively managed. There is a weak point that allows a flood route through to Dawlish Warren village with a SoP of 4% AEP in the short term, increasing into the future. This could be managed via small scale works near the railway line or across the sand spit access road (i.e. a flood gate). In broad terms, viable options are NAI in the short to long term. In relation to the whole spit, towards the end of the medium term, the increased rate of physical processes, would render continued softer management of the spit inefficient and difficult. At this time, either an acceptance of natural evolution (and loss of the distal section sheltering function) or harder engineering (i.e. revetments, rock armouring etc) would be required.

Short-listed Option * Short-term * Medium to long-term	Environmental Overview
Option 1: No Active Intervention on the spit itself, with flood risk to village controlled locally. <i>(short-term to long-term)</i>	For - Does not constrain natural processes and allows natural change within the internationally designated conservation sites. - Maintains the geomorphological interest of Dawlish Warren GCR site. - Beneficial to hydromorphology of the Exe transitional water body. Against - Increased flood risk to properties and mobile homes in Dawlish Warren (short-term); local flood protection in the village would be required. Increasing flood risk to Starcross and Kenn Valley in the medium to long-term. - Increasing flood risk to recreational assets (e.g. main resort area at proximal end, golf course, visitor centre and public rights of way) and heritage assets. - Continued erosion of the beach with potential 40m recession of sand dunes, resulting in the narrowing and steepening of beach and loss of amenity value. - Natural loss of 6ha of sand dune within Dawlish Warren SAC (short-term), increasing to 30ha (medium to long-term). - Potential for impacts on the integrity of the Exe Estuary SPA and Ramsar site in the medium-term due to changes in wave heights and water levels, once the distal section loses its wave sheltering function. - Potential changes to shellfisheries around the coast. - Increasing flood risk to some freshwater habitats (e.g. woodland, reedbed and freshwater) and species (e.g. sand lizard and petalwort). - Potential loss in visitor numbers as there are increasing restrictions on publically accessible areas (with indirect beneficial impacts on nature conservation). - Potential loss of access for emergency rescue boat. - Deteriorating defence structures and gabions will become unsightly and pose a health hazard. - Reactivation of a natural and dynamic dune system is currently constrained by lack of a sediment supply.
Option 2: Maintain proximal section with 0.1% AEP, and	For - Allows natural change over the majority of the spit. - Maintains recreational assets (including main resort area) at proximal end



flood risk to village controlled locally. Rest of spit naturally evolving. Option 8: Maintain proximal section with 0.1% AEP, with central section allowed to naturally evolve into active dune field. Neck and distal sections allowed to increasingly breach and flatten	• Maintains the geomorphological interest of Dawlish Warren GCR site. • Beneficial to hydromorphology of the Exe transitional water body. Against • Increased flood risk to properties and mobile homes in Dawlish Warren (short-term); local flood protection in the village would be required. Increasing flood risk to Starcross and Kenn Valley in the medium-term. • Continued erosion of the beach with potential 40m recession of sand dunes (short-term), resulting in the narrowing and steepening of beach and loss of amenity value in the central section (short-term). A potential further 60m recession of sand dunes (medium to long-term) would significantly impact on the amenity value of the beach. • Natural loss of 6ha of sand dune within Dawlish Warren SAC (short-term), increasing to 30ha (medium to long-term). • Potential for impacts on the integrity of the Exe Estuary SPA and Ramsar site in the medium-term due to changes in wave heights and water levels, once the distal section loses its wave sheltering function. • Potential changes to shellfisheries around the coast. • Increasing flood risk to some freshwater habitats (e.g. woodland, reedbed and freshwater) and species (e.g. sand lizard and petalwort). • Potential loss in visitor numbers as there are increasing restrictions on publically accessible areas (with indirect beneficial impacts on nature conservation). • Reactivation of a natural and dynamic dune system is currently constrained by lack of a sediment supply.
Option 3: Maintain proximal section with 0.1% AEP, with central section allowed to evolve in a managed (such as beach recycling) manner into natural dune field. Rest of spit naturally evolving. Preferred environmental option, with some modification to include beach recharge (central section) & gabion removal for the management of the SAC. Some groyne works may be required to retain sand on the beach.	For • Allows a transition to natural change over the majority of the spit, which is necessary to comply with the requirements of the Habitats Directive. • No sand dune losses due to recharge/recycling, thus allowing the dunes of Dawlish Warren SAC to reactivate and evolve naturally. • Amenity value of the beach will be retained as the beach width will be retained. • Maintains recreational assets (including main resort area) at proximal end. • Beach recharge means that removal of gabions is possible without compromising sheltering function of the spit. • Spit should shelter shallow feeding areas for SPA birds for longer than under a complete NAI scenario (Option 1). • Maintains the geomorphological interest of Dawlish Warren GCR site. • Beneficial to hydromorphology of the Exe transitional water body. Against • Increased flood risk to properties and mobile homes in Dawlish Warren, but local flood protection in the village can be provided. • Potential changes to shellfisheries around the coast. • Increasing flood risk to some freshwater habitats (e.g. woodland, reedbed and freshwater) and species (e.g. sand lizard) as well as species associated with dune slacks such as petalwort).
Option 4: Maintain proximal section with 0.1% AEP; central section allowed to evolve in a managed (beach recycling) manner into natural dune	For • Allows natural change over some parts of the spit. • Recharge/recycling will retain sand on the beach, thus retaining the amenity value of the beach. • Maintains recreational assets (including main resort area) at proximal end. Management of the beach where there is the highest concentration of beach activities will be beneficial for recreational users. • Beneficial to hydromorphology of the Exe transitional water body.



field. Neck and distal sections 'maintained' (possibly by active monitoring/repair of weak points) with 20-2% AEP Option 9: as above but neck and distal sections 'sustained' with 10-1% AEP	Against • Maintenance of defences around the neck and distal end has the potential for coastal squeeze of the sand dune habitat within Dawlish Warren SAC, with the potential loss of up to 5ha of sand (short-term), increasing to 10ha in the medium to long-term. • Increased flood risk to properties and mobile homes in Dawlish Warren; local flood protection in the village would be required. • Potential changes to shellfisheries around the coast. • Hard engineering in the long-term will change the landscape character of the spit and reduce the attractiveness of the site for visitors.
Option 5 – 7 Maintain proximal section with 0.1% AEP. Central, neck and distal sections maintained with varying levels (i.e. >4% - 0.1%) AEP to provide sheltering function. Option 11: as above but central, neck and distal sections improved with >1%AEP	For • Protects properties and mobile homes in Dawlish Warren and the wider estuary. • Recharge/recycling will retain sand on the beach, thus retaining the amenity value of the beach. • Maintains recreational assets (including main resort area). • Protection of freshwater habitats (e.g. woodland, reedbed and freshwater) and species (e.g. sand lizard and petalwort). Against • Constrains natural processes and existing hydromorphological pressure on the Exe transitional water body will continue. • Maintenance and/or improvement of defences has the potential for coastal squeeze of the sand dune habitat within Dawlish Warren SAC, with the potential loss of between 5 and 10ha of sand. • The improvement of the defences in the medium and long-term is likely to change the landscape character of the area and reduce the attractiveness of the spit for visitors.
Option 10: Maintain proximal section with 0.1% AEP. Sustain central with 10-1%AEP. Neck and distal sections allowed to increasingly breach and flatter.	For • Allows natural change at the neck and distal sections. • Local standard of protection to Dawlish Warren village sustained into the future. • Maintains recreational assets (including main resort) at proximal end and in central section. Management of the beach where there is the highest concentration of beach activities will be beneficial for recreational users. • Beneficial to hydromorphology of the Exe transitional water body. Against • Constrains natural processes in the proximal and central section. • Increased flood risk to properties in Starcross and Kenn Valley. • Natural loss of approximately 15ha of sand at the distal end, which are considered relatively undisturbed and of high ecological value. • Potential for impacts on the integrity of the Exe Estuary SPA and Ramsar site in the medium-term due to changes in wave heights and water levels, once the distal section loses its wave sheltering function. • Potential changes to shellfisheries around the coast. • Increasing flood risk to some freshwater habitats (e.g. woodland, reedbed and freshwater) and species (e.g. sand lizard and petalwort). • Loss of amenity beach in neck and distal sections. • Potential loss in visitor numbers as there are increasing restrictions on publically accessible areas (with indirect beneficial impacts on nature conservation).
Note: At Dawlish Warren, many interests have to be balanced and there are legal obligations to comply with the requirements of the Habitats Directive.	



I.18 FCRMU18: Dawlish to Holcombe

Overview

Existing coastal protection is provided by railway embankment, walls and sand dunes, and the current standard of protection is variable.

The following receptors: -

- Public rights of way.
- Railway station and mainline railway.
- Lyme Bay West coastal waterbody.
- Grades 1 and 4 agricultural land.
- National nature and geological conservation site (Dawlish Cliffs SSSI).
- Area of Great Landscape Value.

Viable High Level Options

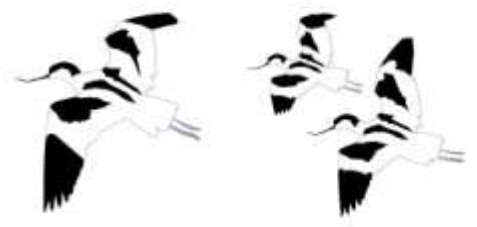
High Option	Level	Environmental Overview
No Active Intervention		As there are limited assets to protect where the coast is natural cliff to the west of the FCRMU, this policy enables natural processes and benefits the geological conservation features along the coast. However, this option was rejected in the developed part of the FCRMU as it would result in the failure of the mainline railway, and would be considered socially and economically unacceptable.
Hold the Line (Maintain/Sustain/Improve)		Constrains natural processes but provides continued protection to the mainline railway. Opportunities exist to develop recreational facilities such as cycle ways and work in partnership with both the local community and Teignbridge District Council for regeneration in this area.

Short-Listed Options

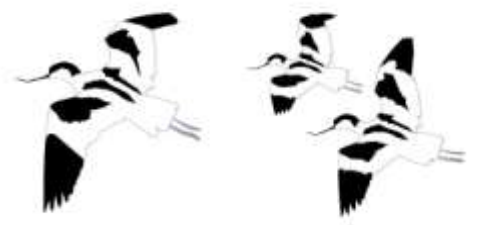
Short-listed Option	Environmental Overview
Langstone Rock to Dawlish village: Sustain and improve existing railway embankment (revetment/wall raising, armouring, wave recurve) with vertical or wave recurve wall raising of up to 0.5m,	For • Maintains railway embankment and limited areas of flood risk Station Road, Piedmont Place and Brunswick Place. Against • Constrains natural coastal processes.
Langstone Rock to Dawlish village: Sustain and improve existing railway embankment (revetment/wall raising, armouring, wave recurve) with	For • Maintains railway embankment and limited areas of flood risk Station Road, Piedmont Place and Brunswick Place. • Maintains amenity value through provision of sandy beach. • Opportunity to develop a cycle route along the frontage. Against • Potential deterioration in views for properties occupants along Marine Parade and Station Road due to revetment raising.

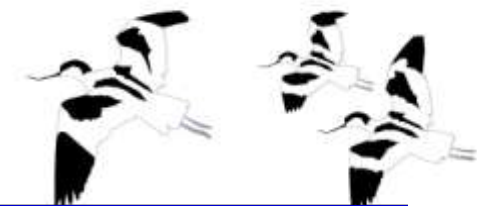


rock armouring or revetment raising of up to 0.5m	• Constrains natural coastal processes. • Rock armouring may present health and safety hazards for pedestrians and recreational users.
Langstone Rock to Dawlish village: Sustain and improve existing railway embankment, as per the local Network Rail study. Preferred environmental option	For • Improves flood protection afforded to railway embankment and limited areas of flood risk Station Road, Piedmont Place and Brunswick Place. Against • Potential deterioration in views for properties occupants along Marine Parade and Station Road due to revetment raising. • Constrains natural coastal processes.
West of Dawlish village: Maintain the railway embankment in the short-term. In the medium-long term, further raising would be required, with potential local property resilience at the properties near where Dawlish Water discharges (the railway bridge). Only short-listed option for this location	For • Maintains railway embankment and limited areas of flood risk Station Road, Piedmont Place and Brunswick Place. Against • Constrains natural coastal processes.



Appendix J : Alignment and Type Assessment Tables





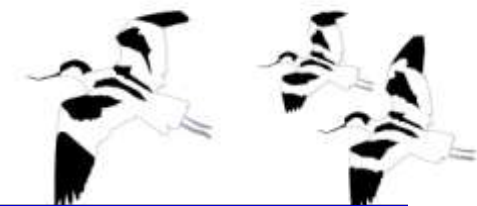
J.1 Sandy Bay and The Maer

LOCATION					BASELINE FCA PERFORMANCE (STRUCTURAL INTEGRITY MAINTAINED, % AEP)					HIGH LEVEL STRATEGIC OPTIONS			SUB-REACH MANAGEMENT			ALIGNMENT AND TYPE ASSESSMENT (SOCIO-ECONOMIC, TECHNICAL, HABITAT AND ENVIRONMENTAL APPROPRIATENESS)			PREFERRED ALIGNMENT			PREFERRED TYPE		
Relevant placename	FCRM Unit	SMP2 policy unit	FRM asset description	Sub-reach reference	2010	2030	2060	2110	Residual life	0 to 20 years	20 to 50 years	50 to 100 years	Short term	Medium term	Long term	Technical	Socio-economic	Habitat and environmental	Short term	Medium term	Long term	Short term	Medium term	Long term
Sandy Bay	1	6a43	Natural Cliff	113FAS3350 501C01	0	0	0	0	NA	NAI	NAI	NAI	NAI	NAI	NAI	No engineering required for FCRM.	No BCR as no engineering required.	NAI is the environmentally preferred option.	Natural location	Natural location	Natural location	Do Nothing	Do Nothing	Do Nothing
			Natural Cliff	113FAS3350 501C02	0	0	0	0	NA				NAI	NAI	NAI				Natural location	Natural location	Natural location	Do Nothing	Do Nothing	Do Nothing
			Natural Cliff	113FAS3350 501C03	0	0	0	0	NA				NAI	NAI	NAI				Natural location	Natural location	Natural location	Do Nothing	Do Nothing	Do Nothing
			Natural Cliff	113FAS3351 001C01	0	0	0	0	NA				NAI	NAI	NAI				Natural location	Natural location	Natural location	Do Nothing	Do Nothing	Do Nothing
The Maer	2	6a44-45	MASONRY SEA WALL	113FAS3351 002C01	0	0	0	0	45	NAI, Maintain, Sustain	NAI, Maintain, Sustain	NAI, Maintain, Sustain	Maintain, Sustain	Maintain, Sustain	Maintain, Sustain	Maintain FCRM would be most effectively achieved by maintenance of the existing seawall, with Option 1) soft foreshore management (beach recharge and recycling, with groyne works) to control sediment transport, or Option 2) hard foreshore management (toe protection to the seawall in the medium to long term as beach erosion continues), or Option 3) hard foreshore management (breakwater construction to control sediment transport).	Whole life cost under NAI or MR would require reactive or proactive seawall and road removal, along with land compensation, amounting to £13.20M. Whole life cost of seawall maintenance amounts to £0.5M. Whole life cost with groyne maintenance and beach recharge included amounts to £9.1M. Whole life cost with shore parallel breakwaters is £12M. Whole life cost with toe protection from the medium term onwards is £5.0M.	Soft foreshore management (beach recharge and recycling, with groyne works) to control sediment transport is the environmentally preferred option.	Existing	Existing	Existing	Soft foreshore management	Soft foreshore management	Soft foreshore management
			MASONRY SEA WALL	113FAS3351 002C02	0	0	0	0	45				Maintain, Sustain	Maintain, Sustain	Maintain, Sustain				Existing	Existing	Existing	Soft foreshore management	Soft foreshore management	Soft foreshore management
			MASONRY SEA WALL	113FAS3351 002C03	0	0	0	0	45				Maintain, Sustain	Maintain, Sustain	Maintain, Sustain				Existing	Existing	Existing	Soft foreshore management	Soft foreshore management	Soft foreshore management



J.2 Exmouth

LOCATION					BASELINE FCA PERFORMANCE (STRUCTURAL INTEGRITY MAINTAINED, % AEP)					HIGH LEVEL STRATEGIC OPTIONS			SUB-REACH MANAGEMENT			ALIGNMENT AND TYPE ASSESSMENT (SOCIO-ECONOMIC, TECHNICAL, HABITAT AND ENVIRONMENTAL APPROPRIATENESS)			PREFERRED ALIGNMENT			PREFERRED TYPE		
Relevant placename	FCRM Unit	SMP2 policy unit	FRM asset description	Sub-reach reference	2010	2030	2060	2110	Residual life	0 to 20 years	20 to 50 years	50 to 100 years	Short term	Medium term	Long term	Technical	Socio-economic	Habitat and environmental	Short term	Medium term	Long term	Short term	Medium term	Long term
Exmouth	3	6a46-6b01	MASONRY SEA WALL	113FAS33510 02C04	0	0	0	0	45	Improve	Sustain	Sustain	Maintain	Maintain	Maintain	At Beach Gardens to Ferry terminal, Maintain FCRM would be most effectively achieved by maintenance of the existing seawall. The EGA (AHA, 2012) indicates that the beach in this area (Beach Gardens) is relatively healthy, stable and accreting, and therefore does not require active management. At Exmouth Docks in the short term, local promenade flooding and risk of damage to the quay walls would most effectively be managed via vertical or wave recurve wall construction of up to 0.5m. In the medium to long term, along the Shelly Road frontage, Sustain FCRM would be most effectively achieved by improvement works such as wall raising or reconstruction, wave recurve, revetments, rock armouring, of between 0.5-2m in height dependent on climate change scenario, although some of these structures may not be appropriate for operational use/access. At the sailing club slipway access in the short term, assets do not provide a FCRM function (discontinuous and providing access/egress to the sailing club). Improvements could be provided by temporary or demountable defences of up to 0.5m in height, or minor road raising could be effective at the Shelly Road entrance, of up to 0.5m in height. In the medium to long term, new linear assets along the seaward frontage of Shelly Road properties may be required, of between 0-1m dependent on climate change scenario. Along the Camperdown Terrace frontage to the playing field, Improve and Sustain FCRM would be most effectively achieved by Option 1) wall raising and reconstruction (potentially of up to 2-3m) along Camperdown Terrace and the boatyard, local road/pavement raising or demountable/temporary defences of less than 0.5m in height at the slipway entrance at the eastern end of Camperdown Terrace, or Option 2) property resilience for the properties at the eastern end of Camperdown Terrace, and wall or embankment raising along the boatyard of up to 0.5m, local road/pavement raising or demountable/temporary defences of less than 0.5m in height at the slipway entrance at the eastern end of Camperdown Terrace. In the medium to long term, Sustain could be achieved with Option 1) new revetments or wall raising/reconstruction along Camperdown Terrace seaward frontage, as property resilience becomes increasingly ineffective, (revetment or wall raising could be between 1-3m dependent on climate change scenario), or Option 2) property resilience along Camperdown Terrace, wall or embankment raising along the boatyard of up to 0.5m, and local road/pavement raising or demountable/temporary defences of less than 0.5m in height at the slipway entrance at the eastern end of Camperdown Terrace. Structures designed to disperse wave energy, such as wave recurves, revetments and rock armouring, would be limited in effectiveness due to the locally sheltered area, and likely not be appropriate for operational use/access. Surface water management is also of concern, and for example may require upsizing of outfalls. Adjacent to the Imperial Recreation Ground north-east frontage, effective options to carry out Improve FCRM would consist of Option 1) Improvements to existing assets, consisting of vertical or wave recurve walls located along the crest of the existing revetment of up to 0.75m height, or Option 2) secondary assets, consisting of a vertical wall located along the access road to the playing field of up to 0.5m height, tying in to relatively high ground (around 0.5% AEP EWL) opposite the local car park. In the medium to long term, wider raising of the landward or seaward wall alignments north-east of the Imperial Recreation Ground may be required, of between 0.5-2m dependent on climate change scenario. Along Royal Avenue to Withycombe Brook, Maintain FCRM would be most effectively achieved by maintenance of the existing embankments and revetments, and improvement works (revetment/wall/embankment raising, wave recurve) in the long term to achieve Sustain FCRM. Surface water management is also of concern, and for example may require upsizing of outfalls. Withycombe Brook south bank walls are indicated to be above tidal EWLs into the long term, therefore	Whole life cost of improving and sustaining the existing assets in their current form amounts to £3.4M, with hardening amounting to £5.2M, with a benefit of £322-355M, giving a BCR well above 5. FDGA calculator indicates improvement works will be a Candidate for the National Priority Programme subject to EA and RFCC approval.	The environmentally preferred option in the short term is Option 2 at Camperdown Terrace, slipway, boatyard and north-east of the Imperial recreation Ground. The environmental assessment identifies no clear preference between the medium to long term options.	Existing	Existing	Existing	Maintenance	Maintenance	Maintenance
			MASONRY SEA WALL	113FAS33510 02C05	0	0	0	0	45				Maintain	Maintain	Maintain	Existing			Existing	Existing	Existing	Maintenance	Maintenance	Maintenance
			Sheet Piled Wall	113FAS33510 03C01	0	0	0	0	20				Maintain	Maintain	Maintain	Existing			Existing	Existing	Existing	Maintenance	Maintenance	Maintenance
			Complex Wall	113FAS33510 03C02	2	4	10	100	20				Improve	Sustain	Sustain	Existing			Existing	Existing	Existing	New linear assets	New linear assets	New linear assets
			Concrete Wall	113FAS33510 03C03	1	2	10	100	45				Sustain	Sustain	Sustain	Existing			Existing	Existing	Existing	Improve existing assets	Improve existing assets	Improve existing assets
			Timber Revetment	113FAS33510 03C04	1	2	10	100	30				Sustain	Sustain	Sustain	Existing			Existing	Existing	Existing	Improve existing assets	Improve existing assets	Improve existing assets
			Concrete and Masonry Wall	113FAS33510 03C05	100	100	100	100	65				Improve	Sustain	Sustain	Existing			Existing	Existing	Existing	Temporary, demountable defences or new linear assets	Temporary, demountable defences or new linear assets	Temporary, demountable defences or new linear assets
			Gabion Wall	113FAS33510 03C06	100	100	100	100	30				Improve	Sustain	Sustain	Existing			Existing	Existing	Existing	Temporary, demountable defences or new linear assets	Temporary, demountable defences or new linear assets	Temporary, demountable defences or new linear assets
			Pitched Stone Revetment	113FAS33510 03C07	10	20	20	100	30				Improve	Sustain	Sustain	Existing or secondary at Shelly Road			Existing or secondary at Shelly Road	Existing or secondary at Shelly Road	Existing or secondary at Shelly Road	New linear assets, property resilience	New linear assets, property resilience	New linear assets, property resilience
			Complex Wall	113FAS33510 03C08	4	10	20	100	45				Improve	Sustain	Sustain	Existing or secondary at Shelly Road			Existing or secondary at Shelly Road	Existing or secondary at Shelly Road	Existing or secondary at Shelly Road	New linear assets, property resilience	New linear assets, property resilience	New linear assets, property resilience
			Masonry Wall	113FAS33510 03C09	20	100	100	100	45				Improve	Sustain	Sustain	Existing or secondary at Shelly Road			Existing or secondary at Shelly Road	Existing or secondary at Shelly Road	Existing or secondary at Shelly Road	New linear assets, property resilience	New linear assets, property resilience	New linear assets, property resilience
			Masonry Wall	113FAS33510 03C10	20	100	100	100	45				Improve	Sustain	Sustain	Existing or secondary at Shelly Road			Existing or secondary at Shelly Road	Existing or secondary at Shelly Road	Existing or secondary at Shelly Road			
			Complex wall	113FAS33510 04C01	20	20	100	100	45				Improve	Sustain	Sustain	Existing or secondary at Shelly Road			Existing or secondary at Shelly Road	Existing or secondary at Shelly Road	Existing or secondary at Shelly Road			
			Gabion toe revetment	113FAS33510 04C02	0.1	1	10	100	20				Sustain	Sustain	Sustain	Existing or secondary at Shelly Road			Existing or secondary at Shelly Road	Existing or secondary at Shelly Road	Existing or secondary at Shelly Road			
			Block Revetment	113FAS33510 04C03	4	20	100	100	20				Improve	Sustain	Sustain	Secondary landward of car park			Secondary landward of car park	Secondary landward of car park	Secondary landward of car park	New linear assets	New linear assets	New linear assets
			Raised Ground	113FAS33510 04C04	NA	0.1	0.5	100	34				Maintain	Maintain	Sustain	Existing			Existing	Existing	Existing	Improve existing assets	Improve existing assets	Improve existing assets
			Embankment	113FAS33510 04C05	0	0	0	4	34				Maintain	Maintain	Sustain	Existing			Existing	Existing	Existing	Improve existing assets	Improve existing assets	Improve existing assets



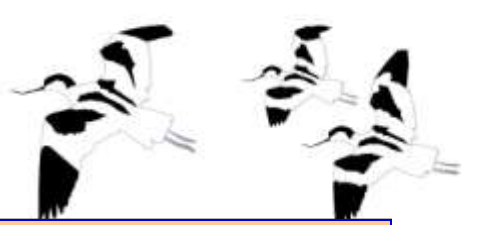
J.3 Courtlands, Lymptone, Lymptone Commando and Exton

LOCATION					BASELINE FCA PERFORMANCE (STRUCTURAL INTEGRITY MAINTAINED, % AEP)					HIGH LEVEL STRATEGIC OPTIONS			SUB-REACH MANAGEMENT			ALIGNMENT AND TYPE ASSESSMENT (SOCIO-ECONOMIC, TECHNICAL, HABITAT AND ENVIRONMENTAL APPROPRIATENESS)			PREFERRED ALIGNMENT			PREFERRED TYPE		
Relevant placename	FCRM Unit	SMP2 policy unit	FRM asset description	Sub-reach reference	2010	2030	2060	2110	Residual life	0 to 20 years	20 to 50 years	50 to 100 years	Short term	Medium term	Long term	Technical	Socio-economic	Habitat and environmental	Short term	Medium term	Long term	Short term	Medium term	Long term
Courtlands	4	6b02	Railway Embankment with Revetment	113FAS33510 05C01	0	0	0	0	35	Maintain	Maintain	Maintain	Maintain	Maintain	Maintain	Maintain FCRM would be most effectively achieved by maintenance of the existing embankments, revetments and walls.	Whole life cost of maintaining and sustaining the existing assets in their current form amounts to £2.4-3.1M, with a benefit of £7.2-7.3M, giving a BCR above unity. Over 90% of Pvb relates to railway benefits. Consideration of the at risk branchline in totality (FCRMUs 4, 6, 7) gives a whole life cost of £5.7M and a benefit of £22M, indicating a BCR above unity. Non-maintenance of the branchline railway would be unacceptable on wider strategic, social and also cost (i.e. reactive removal for health and safety reasons) grounds.	Maintain (along the railway) and NAI (along the cliffs) is the environmentally preferred option.	Existing	Existing	Existing	Improve existing assets	Improve existing assets	Improve existing assets
			Wall	113FAS33510 05C02	0	0	0	0	45				Maintain	Maintain	Maintain				Existing	Existing	Existing	Improve existing assets	Improve existing assets	Improve existing assets
			Railway Embankment with Revetment	113FAS33510 05C03	0	0	0	2	35				Maintain	Maintain	Maintain				Existing	Existing	Existing	Improve existing assets	Improve existing assets	Improve existing assets
			Timber Wall	113FAS33510 05C04	0	0	0	0	20				Maintain	Maintain	Maintain				Existing	Existing	Existing	Improve existing assets	Improve existing assets	Improve existing assets
			Concrete Revetment	113FAS33510 05C05	0	0	0	0	20				Maintain	Maintain	Maintain				Existing	Existing	Existing	Improve existing assets	Improve existing assets	Improve existing assets
			Masonry Wall	113FAS33510 05C06	0	0	0	0	45				Maintain	Maintain	Maintain				Existing	Existing	Existing	Improve existing assets	Improve existing assets	Improve existing assets
			Natural Cliff (check elements)	113FAS33510 05C07	0	0	0	0	NA				NAI	NAI	NAI				Natural location	Natural location	Natural location	Do Nothing	Do Nothing	Do Nothing
Lymptone	5	6b03	MASONRY WALL	113FAS33510 06C02	0	0	0	2	45	Maintain, Sustain	Sustain	Sustain	Maintain	Maintain	Sustain	Maintain FCRM would be most effectively achieved by maintenance of the existing walls and flood gates. In the long term, effective options would consist of further reconstruction and/or raising of building walls, and reconstruction of the existing flood gates of 0-0.7m dependent on climate change scenario. Surface water management is also of concern.	Whole life cost of maintaining and sustaining the existing assets in their current form amounts to £2.6M, with a benefit of £20-21M, giving a BCR of 6. IDGA calculator indicates partial funding, with improvement works deferred unless costs are reduced and/or additional contributions/RFCC levy secured.	Maintain and Sustain (along Lymptone village) and NAI (along the cliffs) is the environmentally preferred option.	Existing	Existing	Existing	Improve existing assets	Improve existing assets	Improve existing assets
			Masonry Wall	113FAS33510 06C03	0	0	0.1	10	45				Maintain	Maintain	Sustain				Existing	Existing	Existing	Improve existing assets	Improve existing assets	Improve existing assets
			Masonry Wall	113FAS33510 06C04	0	0	0	2	45				Maintain	Maintain	Sustain				Existing	Existing	Existing	Improve existing assets	Improve existing assets	Improve existing assets
			MASONRY WALL	113FAS33510 06C05	0	0.1	1	100	45				Maintain	Sustain	Sustain				Existing	Existing	Existing	Improve existing assets	Improve existing assets	Improve existing assets
			MASONRY WALL	113FAS33510 06C06	0	0	0	2	45				Maintain	Maintain	Sustain				Existing	Existing	Existing	Improve existing assets	Improve existing assets	Improve existing assets
			MASONRY WALL	113FAS33510 06C07	0	0.1	0.5	10	45				Maintain	Maintain	Sustain				Existing	Existing	Existing	Improve existing assets	Improve existing assets	Improve existing assets
			Masonry Wall, Linetkin	113FAS33510 06C08	0	0	0.5	10	45				Maintain	Maintain	Sustain				Existing	Existing	Existing	Improve existing assets	Improve existing assets	Improve existing assets
			Masonry Wall	113FAS33510 06C09	0	0	1	20	45				Maintain	Maintain	Sustain				Existing	Existing	Existing	Improve existing assets	Improve existing assets	Improve existing assets
			Building Walls	113FAS33510 06C10	1	2	20	20	45				Sustain	Sustain	Sustain				Existing	Existing	Existing	Improve existing assets	Improve existing assets	Improve existing assets
			Natural Cliff	113FAS33510 07C01	0	0	0	0	NA				NAI	NAI	NAI				Natural location	Natural location	Natural location	Do Nothing	Do Nothing	Do Nothing
Lymptone Commando			Railway Embankment with Revetment and Wall	113FAS33510 07C07	0	0	0	0	20				Maintain	Maintain	Maintain	Maintain FCRM would be most effectively achieved by maintenance of the existing railway embankments, revetment and wall.	Whole life cost of maintaining and sustaining the existing assets in their current form amounts to £2M, with a benefit of £7.3M, giving a BCR above unity. Over 90% of Pvb relates to railway benefits. Consideration of the at risk branchline in totality (FCRMUs 4, 6, 7) gives a whole life cost of £5.7M and a benefit of £22M, indicating a BCR above unity. Non-maintenance of the branchline railway would be unacceptable on wider strategic, social and also cost (i.e. reactive removal for health and safety reasons) grounds.	Maintain (along the railway) and NAI (along the cliffs) is the environmentally preferred option.	Existing	Existing	Existing	Improve existing assets	Improve existing assets	Improve existing assets
			Railway Embankment (check elements)	11318010701 01L01	0	0	0	2	20				Maintain	Maintain	Sustain				Existing	Existing	Existing	Improve existing assets	Improve existing assets	Improve existing assets
			Railway Embankment (check elements)	11318010701 01L01	0	0	0	2	20				Maintain	Maintain	Sustain				Existing	Existing	Existing	Improve existing assets	Improve existing assets	Improve existing assets
Exton	7	6b06-7	Railway Embankment (check elements)	11318010701 01L02	0	0	0	1	20	Maintain	Maintain	Maintain, Sustain	Maintain	Maintain	Sustain	Maintain FCRM would be most effectively achieved by maintenance of the existing railway embankments, revetment and wall. Improvement works (revetment/wall/embankment raising, armouring, wave curve) in the long term to achieve Sustain FCRM may be required, of up to 0.5m dependent on climate change scenario.	Whole life cost of maintaining and sustaining the existing assets in their current form amounts to £1.3M, with a benefit of £7.5M, giving a BCR above unity. Over 90% of Pvb relates to railway benefits. Consideration of the at risk branchline in totality (FCRMUs 4, 6, 7) gives a whole life cost of £5.7M and a benefit of £22M, indicating a BCR above unity. Non-maintenance of the branchline railway would be unacceptable on wider strategic, social and also cost (i.e. reactive removal for health and safety reasons) grounds.	Maintain (along the railway) and NAI (along the cliffs) is the environmentally preferred option.	Existing	Existing	Existing	Improve existing assets	Improve existing assets	Improve existing assets
			Railway Embankment (check elements)	11318010702 01L01	0	0	0	0	34				Maintain	Maintain	Maintain				Existing	Existing	Existing	Improve existing assets	Improve existing assets	Improve existing assets



J.4 East bank of the Lower Clyst, Clyst St. Mary, Sowton and west bank of the Lower Clyst

LOCATION					BASELINE FCA PERFORMANCE (STRUCTURAL INTEGRITY MAINTAINED, % AEP)					HIGH LEVEL STRATEGIC OPTIONS			SUB-REACH MANAGEMENT			ALIGNMENT AND TYPE ASSESSMENT (SOCIO-ECONOMIC, TECHNICAL, HABITAT AND ENVIRONMENTAL APPROPRIATENESS)			PREFERRED ALIGNMENT			PREFERRED TYPE				
Relevant placename	FCRM Unit	SMP2 policy unit	FRM asset description	Sub-reach reference	2010	2030	2060	2110	Residual life	0 to 20 years	20 to 50 years	50 to 100 years	Short term	Medium term	Long term	Technical	Socio-economic	Habitat and environmental	Short term	Medium term	Long term	Short term	Medium term	Long term		
East bank of the Lower Clyst	8	6b08	Earth Embankment	11318010702 04L01	0.1	2	20	100	34	Manage	Manage	Manage	Sustain, Manage	Sustain	Sustain	Maintain FCRM would be most effectively achieved by maintenance of the existing embankments and walls. Improvement works (wall/embankment raising, armouring) in the long term to achieve Sustain FCRM may be required.	Whole life cost of improving existing assets in their current form and compensating for saline habitat losses amounts to £4.9-9.6M, with a benefit of £8.4M, giving a BCR of 1 to 2. PV cost per Ha for the realignment is ~£115K.	The environmental assessment identified that Option 2 is preferred in the short to long term.	Existing, or with to C527 road protected with road raising	Existing, or with to C527 road protected with road raising	Existing, or with to C527 road protected with road raising	Improve existing assets, or new linear assets	Improve existing assets, or new linear assets	Improve existing assets, or new linear assets		
			Wall	11318010702 02L05	NA	NA	NA	NA	45				Maintain	Maintain	Maintain				Existing	Existing	Existing	Maintenance or improve existing assets	Maintenance or improve existing assets	Maintenance or improve existing assets		
			Timber Pile Wall With Concrete Cap	11318010702 02L06	NA	NA	NA	NA	20				Maintain	Maintain	Maintain				Existing	Existing	Existing	Maintenance or improve existing assets	Maintenance or improve existing assets	Maintenance or improve existing assets		
			Ramp block wall.	11318010702 02L03	NA	NA	0.1	10	45				Maintain	Maintain	Sustain				Existing	Existing	Existing	Maintenance or improve existing assets	Maintenance or improve existing assets	Maintenance or improve existing assets		
			Earth Embankment	11318010702 02L02	NA	0.1	1	100	34				Maintain	Maintain	Sustain				Existing	Existing	Existing	Maintenance or improve existing assets	Maintenance or improve existing assets	Maintenance or improve existing assets		
			Earth Embankment	11318010702 02L01	NA	NA	NA	2	34				Maintain	Maintain	Sustain				Existing	Existing	Existing	Maintenance or improve existing assets	Maintenance or improve existing assets	Maintenance or improve existing assets		
			Earth Embankment	Dummy1	10	100	100	100	15				Manage	Sustain	Sustain	Manage FCRM would be achieved via Option 1) construction of realigned embankments of up to 1.5m to protect property and infrastructure (Specifically the C road and Bridge Mt), and any associated erosion protection (specifically around the C road and railway bridge abutments), with controlled breaching of the existing embankment, or Option 2) raising of the C road by up to 1.5m with culverts.			Landward to high ground, with C527 road protected with embankment or road raising	Landward to high ground, with C527 road protected with embankment or road raising	Landward to high ground, with C527 road protected with embankment or road raising	New linear assets, point structures	New linear assets, point structures	New linear assets, point structures		
Clyst St. Mary	9	NA	Earth Embankment	Dummy2	10	100	100	100	15	NAI, Improve,	NAI, Improve,	NAI, Improve,	NAI	NAI	NAI	Maintain FCRM would be achieved via maintenance in the short term of embankments along Winslade Barton and Frog Lane to protect property and infrastructure, and any associated erosion protection, with the other embankment unmaintained. In the medium to long term, embankment raising may be required along Winslade Barton and Frog Lane of between 0-1.5m dependent on climate change scenario.	Whole life cost of compensating for freshwater habitat losses amounts to £1.2M, with a benefit of £3.3-4M, giving a BCR of 3.	Maintain and Sustain (along Lymestone village) and NAI elsewhere is the environmentally preferred option.	Existing	Embankment failure would lead to flooding constrained by high ground	Embankment failure would lead to flooding constrained by high ground	Do Nothing	Do Nothing	Do Nothing		
			Earth Embankment	Dummy3	NA	0.5	2	100	15				Maintain	Maintain	Sustain				Existing	Existing	Existing	Maintenance	Improve existing assets	Improve existing assets		
			Earth Embankment	Dummy4	NA	NA	0.1	4	15				NAI	NAI	NAI				Existing	Embankment failure would lead to flooding constrained by high ground	Embankment failure would lead to flooding constrained by high ground	Do Nothing	Do Nothing	Do Nothing		
			Earth Embankment	Dummy5	NA	NA	NA	NA	15				NAI	NAI	NAI				Existing	Embankment failure would lead to flooding constrained by high ground	Embankment failure would lead to flooding constrained by high ground	Do Nothing	Do Nothing	Do Nothing		
			Earth Embankment	Dummy6	NA	NA	NA	NA	15				NAI	NAI	NAI				Existing	Embankment failure would lead to flooding constrained by high ground	Embankment failure would lead to flooding constrained by high ground	Do Nothing	Do Nothing	Do Nothing		
Sowton	10	NA	Earth Embankment	Dummy7	NA	NA	NA	NA	15	NAI, Manage	NAI, Manage	NAI, Manage	NAI	NAI	NAI	No engineering required for FCRM purposes.	No BCR as no engineering required.	NAI is the environmentally preferred option.	Existing	Embankment failure would lead to flooding constrained by high ground	Embankment failure would lead to flooding constrained by high ground	Do Nothing	Do Nothing	Do Nothing		
			Earth Embankment	Dummy8	NA	NA	0.1	4	15				NAI	NAI	NAI				Existing	Embankment failure would lead to flooding constrained by high ground	Embankment failure would lead to flooding constrained by high ground	Do Nothing	Do Nothing	Do Nothing		
West bank of the Lower Clyst	11	6b08	Earth Embankment	Dummy9	0.5	10	100	100	15	Manage	Manage	Manage	Manage	Manage	Manage	Manage FCRM would be achieved via local breaching of embankments to compensate for saline habitat losses, with the potential for a cut-off embankment at the foot, dependent on extent of realignment decided.	Whole life cost of compensating for saline habitat losses amounts to £2.2M, with a benefit of £3.4M, giving a BCR around unity. Cost per Ha for the realignment is ~£125K.	The environmental assessment identified that realignment between Topsham Bridge and the Frying Pan/foot would be preferred, with maintenance and improvement works at Bowling Green Marsh in the short to long term.	Landward to high ground	Landward to high ground	Landward to high ground	Point structures	Point structures	Point structures		
			Earth Embankment	Dummy10	NA	NA	NA	0.1	15				Manage	Manage	Manage				Landward to high ground	Landward to high ground	Landward to high ground	Point structures	Point structures	Point structures		
			Earth Embankment	Dummy11	20	100	100	100	15				Manage	Manage	Manage				Landward to high ground or to cut off embankment	Landward to high ground or to cut off embankment	Landward to high ground or to cut off embankment	New linear assets, point structures	Point structures	Point structures		
			Earth Embankment	Dummy12	0.5	10	100	100	15				NAI	NAI	NAI	Maintain FCRM would be achieved via maintenance of existing embankments, and any erosion protection associated with realignment around Clyst St. George.			Existing	Embankment failure would lead to flooding constrained by high ground	Embankment failure would lead to flooding constrained by high ground	Do Nothing	Do Nothing	Do Nothing		
			Earth Embankment	Dummy13	NA	NA	NA	NA	15				NAI	NAI	NAI				Existing	Embankment failure would lead to flooding constrained by high ground	Embankment failure would lead to flooding constrained by high ground	Do Nothing	Do Nothing	Do Nothing		
			Naturalised bank	11318010702 03R01	10	100	100	100	34				Maintain	Maintain	Maintain				Existing	Existing	Existing	Maintenance	Maintenance	Maintenance		
				11318010702 02R01	NA	NA	NA	NA	34				Maintain	Maintain	Maintain				Existing	Existing	Existing	Maintenance	Maintenance	Maintenance		
			Embankment	11318010702 01R03	0.1	4	20	100	15				Maintain	Sustain	Sustain				Existing	Existing	Existing	Maintenance	Improve existing assets	Improve existing assets		
			Embankment	11318010702 01R02	2	20	100	100	15				Maintain	Sustain	Sustain				Existing	Existing	Existing	Maintenance	Improve existing assets	Improve existing assets		
			Railway Bridge Abutment	11318010702 01R01	NA	NA	0.1	20	45				Maintain	Maintain	Sustain				Existing	Existing	Existing	Maintenance	Maintenance	Improve existing assets		
			Embankment	11318010701 02R02	0.1	1	4	100	15				Sustain	Sustain	Sustain				Existing	Existing	Existing	Improve existing assets	Improve existing assets	Improve existing assets		



J.5 Topsham and Countess Wear

LOCATION					BASELINE FCA PERFORMANCE (STRUCTURAL INTEGRITY MAINTAINED, % AEP)					HIGH LEVEL STRATEGIC OPTIONS			SUB-REACH MANAGEMENT			ALIGNMENT AND TYPE ASSESSMENT (SOCIO-ECONOMIC, TECHNICAL, HABITAT AND ENVIRONMENTAL APPROPRIATENESS)			PREFERRED ALIGNMENT			PREFERRED TYPE		
Relevant placename	FCRM Unit	SMP2 policy unit	FRM asset description	Sub-reach reference	2010	2030	2060	2110	Residual life	0 to 20 years	20 to 50 years	50 to 100 years	Short term	Medium term	Long term	Technical	Socio-economic	Habitat and environmental	Short term	Medium term	Long term	Short term	Medium term	Long term
Topsham	12	6b09	Flood Wall	11318010701 02R01	NA	NA	NA	NA	34	Sustain, Improve	Sustain	Sustain	Maintain	Maintain	Maintain	Between Bowling Green Road and the Topsham recreation ground, Maintain and Sustain FCRM would be most effectively achieved by maintenance and minor improvement works (embankment/wall reconstruction and raising, armouring, wave recure) on the existing structures, or new assets where none currently exist. Along the Topsham recreation ground frontage, technically effective options to improve FCRM would consist of Option 1) New walls or embankments along the playing field periphery, of up to 0.5m in height. Option 2) Property resilience for around 10 properties located along the periphery of the playing field, and local road/pavement raising on Ferry Road of up to 0.25m. Option 3) Property resilience for around 20 properties located along the periphery of the playing field and along Ferry Road. In the medium to long term, technically effective options to Sustain FCRM would consist of wider raising of quay walls in Topsham along The Strand of between 0-2m dependent on climate change scenario (the upper limit of raising would be unlikely to be viable on engineering, landscape and operational grounds), or an extensive programme of property resilience works for the around 150-200 properties progressively at flood risk in the Topsham community.	Whole life cost of improving and sustaining the existing assets in their current form amounts to £4.0M, or with extensive property resilience up to £5.1M, with a benefit of £16-17M, giving a BCR of around 4 to 5.	The environmentally preferred option in the short term is Option 3 at Topsham playing fields. The environmental assessment identifies no clear preference between the medium to long term options.	Existing	Existing	Existing	Maintenance	Maintenance	Maintenance
			Hump In Road	11318010003 02L02	0.1	2	10	100	45				Maintain	Sustain	Sustain	Existing			Existing	Existing	Existing	Maintenance	Improve existing assets, property resilience	Improve existing assets, property resilience
			0	11318010003 02L01	2	20	100	100	34				Sustain	Sustain	Sustain	Existing			Existing	Existing	Existing	Improve existing assets	Improve existing assets, property resilience	Improve existing assets, property resilience
			Natural Bank	11318010003 02L40	20	100	100	100	34				Improve	Sustain	Sustain	Existing			Existing	Existing	Existing	New linear assets, property resilience	Improve existing assets, property resilience	Improve existing assets, property resilience
			Private Slipway and Boat Yard	11318010003 02L39	20	100	100	100	20				Improve	Sustain	Sustain	Existing			Existing	Existing	Existing	New linear assets, property resilience	Improve existing assets, property resilience	Improve existing assets, property resilience
			Wall	11318010003 02L29	NA	NA	NA	0.1	45				Maintain	Maintain	Maintain	Existing			Existing	Existing	Existing	Maintenance	Maintenance	Maintenance
			Wall	11318010003 02L31	NA	NA	0.5	20	45				Maintain	Maintain	Sustain	Existing			Existing	Existing	Existing	Maintenance	Maintenance	Improve existing assets, property resilience
			Wall	11318010003 02L32	NA	0.1	0.5	20	45				Maintain	Maintain	Sustain	Existing			Existing	Existing	Existing	Maintenance	Maintenance	Improve existing assets, property resilience
			Wall	11318010003 02L34	0.1	1	10	100	45				Maintain	Sustain	Sustain	Existing			Existing	Existing	Existing	Maintenance	Improve existing assets, property resilience	Improve existing assets, property resilience
			Slipway	11318010003 02L35	NA	0.5	4	100	20				Maintain	Sustain	Sustain	Existing			Existing	Existing	Existing	Maintenance	Improve existing assets, property resilience	Improve existing assets, property resilience
			Wall	11318010003 02L36	NA	NA	0.1	4	45				Maintain	Maintain	Sustain	Existing			Existing	Existing	Existing	Maintenance	Maintenance	Improve existing assets, property resilience
			Wall	11318010003 02L37	100	100	100	100	45				Improve	Sustain	Sustain	Existing			Existing	Existing	Existing	New linear assets, property resilience	Improve existing assets, property resilience	Improve existing assets, property resilience
			Natural Bank	11318010003 02L38	10	100	100	100	34				Improve	Sustain	Sustain	Existing			Existing	Existing	Existing	New linear assets, property resilience	Improve existing assets, property resilience	Improve existing assets, property resilience
			Wall Fronting Canal	11318010003 02L11	NA	NA	NA	0.1	45				Maintain	Maintain	Maintain	Existing			Existing	Existing	Existing	Maintenance	Maintenance	Maintenance
			Wall Fronting Canal	11318010003 02L15	NA	NA	NA	1	45				Maintain	Maintain	Sustain	Existing			Existing	Existing	Existing	Maintenance	Maintenance	Improve existing assets, property resilience
			Wall	11318010003 02L16	0.5	4	20	100	45				Sustain	Sustain	Sustain	Existing			Existing	Existing	Existing	Improve existing assets	Improve existing assets, property resilience	Improve existing assets, property resilience
			Surrounding Wall, With Gates	11318010003 02L07	1	10	100	100	45				Sustain	Sustain	Sustain	Existing			Existing	Existing	Existing	Improve existing assets	Improve existing assets, property resilience	Improve existing assets, property resilience
			Wall	11318010003 02L09	NA	NA	NA	0.5	45				Maintain	Maintain	Sustain	Existing			Existing	Existing	Existing	Maintenance	Maintenance	Improve existing assets, property resilience
			Wall	11318010003 02L08	NA	0.1	0.5	20	45				Maintain	Maintain	Sustain	Existing			Existing	Existing	Existing	Maintenance	Maintenance	Improve existing assets, property resilience
			Wall With Toe Protection	11318010003 02L06	NA	NA	NA	NA	45				Maintain	Maintain	Maintain	Existing			Existing	Existing	Existing	Maintenance	Maintenance	Maintenance
			Wall With Promenade	11318010003 02L05	NA	NA	NA	0.5	45				Maintain	Maintain	Sustain	Existing			Existing	Existing	Existing	Maintenance	Maintenance	Improve existing assets, property resilience
			Ramp / Slipway	11318010003 02L04	0.1	2	10	100	20				Maintain	Sustain	Sustain	Existing			Existing	Existing	Existing	Maintenance	Improve existing assets, property resilience	Improve existing assets, property resilience
			Wall / Road	11318010003 02L28	NA	NA	NA	NA	45				Maintain	Maintain	Maintain	Existing			Existing	Existing	Existing	Maintenance	Maintenance	Maintenance
			Marina Wall	11318010003 02L27	NA	NA	NA	NA	45				Maintain	Maintain	Maintain	Existing			Existing	Existing	Existing	Maintenance	Maintenance	Maintenance
			Building	11318010003 02L26	NA	0.1	0.5	20	45				Maintain	Maintain	Sustain	Existing			Existing	Existing	Existing	Maintenance	Maintenance	Improve existing assets, property resilience
			Quay Wall	11318010003 02L25	0.5	4	20	100	45				Maintain	Sustain	Sustain	Existing			Existing	Existing	Existing	Maintenance	Improve existing assets, property resilience	Improve existing assets, property resilience
			Side Of Building	11318010003 02L24	1	10	100	100	45				Sustain	Sustain	Sustain	Existing			Existing	Existing	Existing	Improve existing assets	Improve existing assets, property resilience	Improve existing assets, property resilience
			House / Wall	11318010003 02L23	1	10	100	100	45				Sustain	Sustain	Sustain	Existing			Existing	Existing	Existing	Improve existing assets	Improve existing assets, property resilience	Improve existing assets, property resilience
			Wall / Road	11318010003 02L22	1	10	100	100	45				Sustain	Sustain	Sustain	Existing			Existing	Existing	Existing	Improve existing assets	Improve existing assets, property resilience	Improve existing assets, property resilience
			Wall	11318010003 02L21	NA	NA	NA	NA	45				Maintain	Maintain	Maintain	Existing			Existing	Existing	Existing	Maintenance	Improve existing assets, property resilience	Maintenance
			Wall	11318010003 02L19	NA	NA	NA	NA	45				Maintain	Maintain	Maintain	Existing			Existing	Existing	Existing	Maintenance	Maintenance	Maintenance
			Wall	11318010003 02L14	NA	NA	NA	2	45				Maintain	Maintain	Sustain	Existing			Existing	Existing	Existing	Maintenance	Maintenance	Improve existing assets, property resilience
			Wall	11318010003 02L13	NA	NA	NA	0.1	45				Maintain	Maintain	Sustain	Existing			Existing	Existing	Existing	Maintenance	Maintenance	Improve existing assets, property resilience
			Slipway	11318010003 02L12	0.1	2	10	100	20				Maintain	Sustain	Sustain	Existing			Existing	Existing	Existing	Maintenance	Improve existing assets, property resilience	Improve existing assets, property resilience
Countess Wear	13	6b10-11	Natural Bank	11318010003 15L01	NA	NA	NA	NA	34	Sustain, Manage	Sustain, Manage	Sustain, Manage	NAI	NAI	NAI	No engineering required for FCRM purposes, as natural banks and ground levels control flood risk. The in-channel islands of River Exe County Park would be allowed to naturally evolve. For the FCRM assets at the sewage treatment works, Sustain FCRM would be most effectively achieved by 1) minor raising of the earth embankments in the short to long term.			Existing	Existing	Existing	Do Nothing	Do Nothing	Do Nothing
			Natural Bank	11318010003 09L01	NA	NA	NA	NA	34				NAI	NAI	NAI	Existing			Existing	Existing	Existing	Do Nothing	Do Nothing	Do Nothing
			Natural Bank	11318010003 05L01	1	10	100	100	34				NAI	NAI	NAI	Existing			Existing	Existing	Existing	Do Nothing	Do Nothing	Do Nothing
			NATURAL BANK	11318010003 04L01	100	100	100	100	34				NAI	NAI	NAI	Existing			Existing	Existing	Existing	Do Nothing	Do Nothing	Do Nothing
			0	11318010003 03L03	100	100	100	100	34				NAI	NAI	NAI	Existing			Existing	Existing	Existing	Do Nothing	Do Nothing	Do Nothing
			Flood Wall	11318010003 03L01	NA	NA	NA	4	45				Maintain	Maintain	Sustain	Maintain FCRM would be most effectively achieved by maintenance of the existing walls, with some potential for Sustain FCRM at Mill Lane and the Retreat Drive in the short term. Improvement works (wall raising) in the medium-long term to achieve Sustain FCRM may also be required.			Existing	Existing	Existing	Maintenance	Maintenance	Improve existing assets, property resilience
			Walkway	11318010003 02L45	NA	NA	NA	NA	45				Maintain	Maintain	Sustain	Existing			Existing	Existing	Existing	Maintenance	Maintenance	Improve existing assets, property resilience
			Slipway / Platform for Boat Yard	11318010003 02L44	NA	NA	0.1	4	20				Maintain	Maintain	Sustain	Existing			Existing	Existing	Existing	Maintenance	Maintenance	Improve existing assets, property resilience
			Wall With Toe Walkway	11318010003 02L43	NA	NA	NA	NA	45				Maintain	Maintain	Maintain	Existing			Existing	Existing	Existing	Maintenance	Maintenance	Maintenance
			Wall / Pathway fronting Gardens	11318010003 02L42	NA	NA	0.1	4	45				Maintain	Maintain	Sustain	Existing			Existing	Existing	Existing	Maintenance	Maintenance	Improve existing assets, property resilience
			Wall / Pathway fronting Gardens	11318010003 02L41	2	20	100	100	45				Sustain	Sustain	Sustain	Existing			Existing	Existing	Existing	Improve existing assets	Improve existing assets, property resilience	Improve existing assets, property resilience



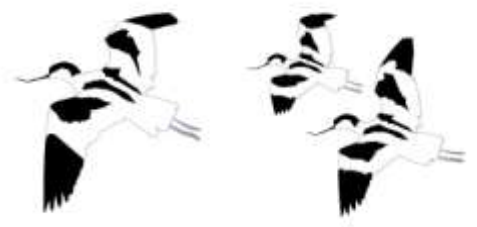
J.6 Exminster Marshes and Powderham Banks, and Kenn Valley

LOCATION					BASELINE FCA PERFORMANCE (STRUCTURAL INTEGRITY MAINTAINED, % AEP)					HIGH LEVEL STRATEGIC OPTIONS			SUB-REACH MANAGEMENT			ALIGNMENT AND TYPE ASSESSMENT (SOCIO-ECONOMIC, TECHNICAL, HABITAT AND ENVIRONMENTAL APPROPRIATENESS)			PREFERRED ALIGNMENT			PREFERRED TYPE		
Relevant placename	FCRM Unit	SMP2 policy unit	FRM asset description	Sub-reach reference	2010	2030	2060	2110	Residual life	0 to 20 years	20 to 50 years	50 to 100 years	Short term	Medium term	Long term	Technical	Socio-economic	Habitat and environmental	Short term	Medium term	Long term	Short term	Medium term	Long term
Exminster Marshes and Powderham Banks	14	6b12-13	Earth Embankment	1131801130118R02	NA	NA	NA	NA	34	Sustain	Sustain	Sustain, Manage	Maintain	Maintain	Maintain	Along the Exeter canal to Turf Lock, Maintain FCRM would be most effectively achieved by maintenance of the existing embankments. In the long term to achieve Sustain FCRM, effective options would consist of canal bank raising of between 0-0.75m, dependent on climate change scenario.	Whole life cost of improving existing assets in their current form amounts to £7.7M, with a benefit of £32-37M, giving a BCR of around 5. 25% of PVB relates to railway benefits.	The environmental assessment identifies no clear preference between the short to long term options.	Existing	Existing	Existing	Maintenance	Maintenance	Maintenance
			Earth Embankment	1131801130117R01	NA	NA	NA	NA	34				Maintain	Maintain	Maintain				Existing	Existing	Existing	Maintenance	Maintenance	Maintenance
			Canal embankment	1131801130104L01	NA	NA	NA	NA	34				Maintain	Maintain	Maintain				Existing	Existing	Existing	Maintenance	Maintenance	Maintenance
			Earth Bank	1131801130106L01	NA	NA	NA	NA	34				Maintain	Maintain	Maintain				Existing	Existing	Existing	Maintenance	Maintenance	Maintenance
			Canal embankment	1131801130105L01	NA	NA	NA	NA	34				Maintain	Maintain	Maintain				Existing	Existing	Existing	Maintenance	Maintenance	Maintenance
			Earth Embankment With Screeded Stone Rev	1131801130102L01	NA	NA	NA	0.1	34				Maintain	Maintain	Maintain				Existing	Existing	Existing	Maintenance	Maintenance	Maintenance
			Canal embankment	1131801130103L01	NA	NA	NA	NA	34				Maintain	Maintain	Maintain				Existing	Existing	Existing	Maintenance	Maintenance	Maintenance
			Maintained Channel	1131801160106L01	NA	NA	NA	NA	34				Maintain	Maintain	Maintain				Existing	Existing	Existing	Maintenance	Maintenance	Maintenance
			Earth Embankment	1131801130102R01	0.1	1	10	100	34				Maintain	Sustain	Sustain				Existing	Existing	Existing	Maintenance	Improve existing assets	Improve existing assets
			Earth Embankment	1131801000305R01	NA	NA	NA	0.5	34				Maintain	Maintain	Sustain				Existing	Existing	Existing	Maintenance	Maintenance	Improve existing assets
			Canal Embankment	1131801000302R01	NA	NA	NA	2	34				Maintain	Maintain	Sustain	From Turf Lock to the southern extent of the non-railway embankment, Sustain or Improve FCRM would potentially require both embankment improvements and also some form of toe protection, due to the existing erosion pressures and proximity of the low water channel. Improvements to the embankments would most effectively consist of Option 1) Hard foreshore management, consisting of sheet piling along the revetment toe or through the revetment itself, or rock armouring at the toe, Option 2) Revetment, vertical or wave recurve wall raising of up to 0.5m, or Option 3) A combination of both options 1 and 2. In the medium to long term, further raising of Powderham Banks may be required of between 0.5-1.5m dependent on climate change. As the upper limit of raising would be unlikely to be viable on engineering grounds, an alternative to this would be to harden the revetment to avoid breach during increasingly regular overtopping, accepting a lower SoP against tidal overtopping.			Existing	Existing	Existing	Improve existing assets, hard foreshore management	Improve existing assets, hard foreshore management	Improve existing assets, hard foreshore management
			Natural Cliff (check elements)	113FAS3351009C01	0.5	4	20	100	NA				Sustain	Sustain	Sustain				Existing	Existing	Existing	Improve existing assets, hard foreshore management	Improve existing assets, hard foreshore management	Improve existing assets, hard foreshore management
			Natural Cliff (check elements)	113FAS3351009C02	2	20	100	100	NA				Improve, Sustain	Sustain	Sustain				Existing	Existing	Existing	Improve existing assets, hard foreshore management	Improve existing assets, hard foreshore management	Improve existing assets, hard foreshore management
			Wall + Revetment	113FAS3351009C03	NA	0.1	0.5	20	45	Maintain, Manage	Sustain, Manage	Sustain, Manage	Maintain	Maintain	Sustain	Between the railway embankment and the A379 junction, Maintain FCRM would be most effectively achieved by maintenance of the existing railway embankments, revetment and wall. The potential for habitat creation could be achieved via the technically effective Option 1) Regulated Tidal Exchange, with a RTE device attached to the existing culvert and the tide flap removed, or Option 2) Secondary embankments along the fringes of the habitat creation area, with the culvert tide flap removed. In the medium to long term, effective options, assuming the above short term works occur, would consist of vertical or wave recurve wall raising of between 0-1.5m, or rock armouring or revetment raising of between 0-1.5m, dependent on climate change scenario.	Whole life cost of improving existing assets in their current form amounts to £2.1-6.9M, with a benefit of £13.5-14.1M, giving a BCR of around 1 to 2. 40% of PVB relates to railway benefits. Cost per Ha for the realignment is -£93K.	The environmentally preferred option in the short to long term is Option 1.	Existing	Existing	Existing	Maintenance	Maintenance	Improve existing assets
Kenn Valley	15	6b14-15	Wall	6901902/01	0	0	0	2	45				Maintain	Maintain	Sustain				Existing	Existing	Existing	Maintenance	Maintenance	Improve existing assets
			Wall	113FAS3351009C05	0	0	0	2	45				Maintain	Maintain	Sustain				Existing	Existing	Existing	Maintenance	Maintenance	Improve existing assets
			Wall	113FAS3351009C06	0.5	1	10	20	45				Maintain, Manage	Sustain, Manage	Sustain, Manage				Landward to high ground or constrained by secondary embankments	Landward to high ground or constrained by secondary embankments	Landward to high ground or constrained by secondary embankments	Point structures, secondary assets	Point structures, secondary assets	Point structures, secondary assets
			Wall	113FAS3351009C07	0	0	2	20	45				Maintain	Sustain	Sustain				Existing	Existing	Existing	Maintenance	Improve existing assets	Improve existing assets
			Railway embankment	113FAS3351010C01	0	0.5	4	20	20				Maintain	Sustain	Sustain				Existing	Existing	Existing	Maintenance	Improve existing assets	Improve existing assets

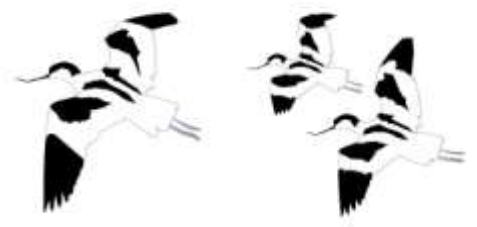


J.7 Starcross, Dawlish Warren and Dawlish to Holcombe

LOCATION					BASELINE FCA PERFORMANCE (STRUCTURAL INTEGRITY MAINTAINED, % AEP)					HIGH LEVEL STRATEGIC OPTIONS			SUB-REACH MANAGEMENT			ALIGNMENT AND TYPE ASSESSMENT (SOCIO-ECONOMIC, TECHNICAL, HABITAT AND ENVIRONMENTAL APPROPRIATENESS)			PREFERRED ALIGNMENT			PREFERRED TYPE		
Relevant placename	FCRM Unit	SMP2 policy unit	FRM asset description	Sub-reach reference	2010	2030	2060	2110	Residual life	0 to 20 years	20 to 50 years	50 to 100 years	Short term	Medium term	Long term	Technical	Socio-economic	Habitat and environmental	Short term	Medium term	Long term	Short term	Medium term	Long term
Starcross	16	6b16-17	Railway embankment	113FAS33510 10C01	0.5	1	100	100	20	Sustain, Improve	Sustain	Sustain	Maintain	Sustain	Sustain	Between the A379 junction and Cockwood Harbour, Maintain FCRM in the short term would be most effectively achieved by maintenance of the existing structures. In the medium to long term, effective options would consist of vertical or wave recurve wall raising of between 0-1.5m, or rock armouring or revetment raising of between 0-1.5m, dependent on climate change scenario.	Whole life cost of maintaining, sustaining and improving the existing assets in their current form amounts to £3.9-9.6M, with a benefit of £135-146M (14% related to the railway), giving a high BCR.	The environmentally preferred option in the short term is Option 1, with no clear preference in the medium to long term.	Existing	Existing	Existing	Maintenance	Improve existing assets	Improve existing assets
			Railway embankment	113FAS33510 11C01	0	0.1	20	100	20				Maintain	Sustain	Sustain				Existing	Existing	Existing	Maintenance	Improve existing assets	Improve existing assets
			masonry wall	113FAS33510 11C04	2	4	100	100	20				Improve	Sustain	Sustain	At Cockwood Harbour, Improve FCRM in the short term could be achieved via the effective options of Option 1) Vertical or wave recurve wall raising of up to 0.5m along the harbour walls, or Option 2) A new wall or embankment north and south of Cockwood Harbour, with road raising or a flood gate, to cut off the flood route to Starcross, these could be between 1-2m in height. In the medium to long term, further raising on either of the alignments above would be required, of between 0-1.5m dependent on climate change scenario.			Existing, or immediately landward of Dawlish Road	Existing, or immediately landward of Dawlish Road	Existing, or immediately landward of Dawlish Road	Improve existing assets, secondary assets, temporary, demountable defences	Improve existing assets, secondary assets, temporary, demountable defences	Improve existing assets, secondary assets, temporary, demountable defences
			masonry wall	113FAS33510 11C05	2	4	100	100	20				Improve	Sustain	Sustain				Existing, or immediately landward of Dawlish Road	Existing, or immediately landward of Dawlish Road	Existing, or immediately landward of Dawlish Road	Improve existing assets, secondary assets, temporary, demountable defences	Improve existing assets, secondary assets, temporary, demountable defences	Improve existing assets, secondary assets, temporary, demountable defences
			0	113FAS33510 11C03	4	4	100	100	20				Improve	Sustain	Sustain				Existing, or immediately landward of Dawlish Road	Existing, or immediately landward of Dawlish Road	Existing, or immediately landward of Dawlish Road	Improve existing assets, secondary assets, temporary, demountable defences	Improve existing assets, secondary assets, temporary, demountable defences	Improve existing assets, secondary assets, temporary, demountable defences
			embankment	113FAS33510 11C02	2	4	100	100	34				Improve	Sustain	Sustain				Existing, or immediately landward of Dawlish Road	Existing, or immediately landward of Dawlish Road	Existing, or immediately landward of Dawlish Road	Improve existing assets, secondary assets, temporary, demountable defences	Improve existing assets, secondary assets, temporary, demountable defences	Improve existing assets, secondary assets, temporary, demountable defences
			embankment	113FAS33510 11C06	4	10	100	100	34				Improve	Sustain	Sustain				Existing, or immediately landward of Dawlish Road	Existing, or immediately landward of Dawlish Road	Existing, or immediately landward of Dawlish Road	Improve existing assets, secondary assets, temporary, demountable defences	Improve existing assets, secondary assets, temporary, demountable defences	Improve existing assets, secondary assets, temporary, demountable defences
			Railway embankment	113FAS33510 12C01	0	0	0	0	20				Maintain	Maintain	Maintain	Between Cockwood Harbour and the Welcome Holiday Park, Maintain FCRM would be most effectively achieved by maintenance of the existing railway embankments.			Existing	Existing	Existing	Maintenance	Maintenance	Maintenance
Dawlish Warren	17	6b18-22	Railway embankment	113FAS33510 12C01	0	0	0	0	20	NAI, Maintain, Sustain, Improve, Manage	NAI, Sustain, Manage	NAI, Sustain, Manage	See seperate assessment.			See seperate assessment.	See seperate assessment.	See seperate assessment.	See seperate assessment			See seperate assessment		
			Embankment	113FAS33510 13C01	4	20	100	100	34															
			gabions	113FAS33510 13C02	0	0.5	2	100	18															
			wall	113FAS33510 13C03	0	0	0	0	18															
			gabion wall	113FAS33510 13C04	0	0	0	0	18															
			wall	113FAS33510 13C05	0	0	0	0	18															
			wall	113FAS33510 13C06	0	0	1	100	18															
			gabion revetment	113FAS33510 13C07	0	0	0.1	10	18															
			Bank	113FAS33510 13C09	0	0	0	0	34				See seperate assessment.			From Langstone Rock to Dawlish village, Sustain and Improve FCRM would be most effectively achieved via improvements to the existing railway embankment (revetment/wall raising, armouring, wave recurve). Technically effective options would consist of Option 1) Vertical or wave recurve wall raising of up to 0.5m, Option 2) Rock armouring or revetment raising of up to 0.5m, or 3) improvements as per the local Network Rail study. To the west of Dawlish village, Maintain FCRM would be most effectively achieved for continued maintenance of the railway embankment. In the medium to long term, further raising would be required, along with the potential for local property resilience at the properties near where Dawlish Water discharges (the railway bridge).	Whole life cost of maintaining assets for FCRM in their current form amounts to £2.1-6.2M, with a benefit of £21M, giving a BCR of 3-10. 75-100% of Pvb relates to railway benefits.	The environmental assessment preferred the Network Rail study options.	Existing	Existing	Existing	As per Network Rail study (Halcrow, 2009)	As per Network Rail study (Halcrow, 2009)	As per Network Rail study (Halcrow, 2009)
			Dunes	113FAS33510 14C01	0.5	1	2	20	15															
			Natural Cliff	113FBS3351 501C01	0	0	0	0	NA															
			Rock Armour	113FAS33510 14C02	0	0	0	0.1	34															
			concrete wall	113FAS33510 15C01	0	0	0	0	45															
			Embankment	113FAS33510 14C02	0	0.1	0.5	4	34															
Dawlish to Holcombe	18	6b23-24	Recurved Wall + Splash Wall + Revetment + Groyves	113FBS3351 501C03	0.5	1	2	20	20	Sustain, Improve	Sustain	Sustain	Sustain	Sustain	Sustain				Existing	Existing	Existing	As per Network Rail study (Halcrow, 2009)	As per Network Rail study (Halcrow, 2009)	As per Network Rail study (Halcrow, 2009)
			Recurved Wall + Groyves + Revetment + Splash Wall	113FBS3351 501C02	1	2	4	100	20				Improve	Sustain	Sustain				Existing	Existing	Existing	As per Network Rail study (Halcrow, 2009)	As per Network Rail study (Halcrow, 2009)	As per Network Rail study (Halcrow, 2009)



Appendix K : Alignment and Type Option Costing



K.1 Sandy Bay



FCRMU approach	Asset Type	Asset reference	Parameter	Amount	Reference	Rate (£/parameter)	HLO	Period	Epochal discount factor	Basic construction cost (£M)	Plus Tidal/urban uplift (25% each) cost (£M)	Plus PAR, design and supervision (20%) cost (£M)	Plus Optimism bias 60% cost (£M)	
SHORT-LISTED ALIGNMENT AND TYPE OPTIONS														
NAI	Natural Cliff	113FAS3350501C01	Length (km)		GIS/NFCDD	0	NAI	Short to long term	30	0.00	0	0	0	
	Natural Cliff	113FAS3350501C02	Length (km)		GIS/NFCDD	0	NAI	Short to long term	30	0.00	0	0	0	
	Natural Cliff	113FAS3350501C03	Length (km)		GIS/NFCDD	0	NAI	Short to long term	30	0.00	0	0	0	
	Natural Cliff	113FAS3351001C01	Length (km)		GIS/NFCDD	0	NAI	Short to long term	30	0.00	0	0	0	
													0	TOTAL



K.2 The Maer

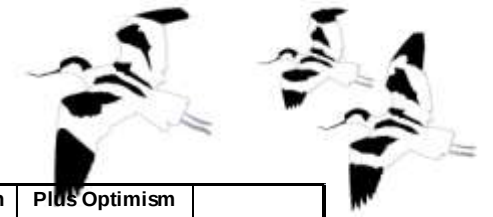


FCRMU Options	Asset Type	Asset reference	Parameter	Amount	Reference	Rate (£/parameter)	HLO	Period	Epochal discount factor	Basic construction cost (£M)	Plus tidal/urban uplift (25% each) cost (£M)	Plus PAR, design and supervision (20%) cost (£M)	Plus Optimism bias 60% cost (£M)	
SHORT-LISTED ALIGNMENT AND TYPE OPTIONS														
Option 1. Soft foreshore management, consisting of beach recharge and recycling, with groyne works.	Seawall maintenance	113FAS3351002C01	Length (km)	0.72	GIS/NFCDD	5405	Maintain	Short to long term	30	0.12	0.182406531	0.218887837	0.35022054	
	Seawall maintenance	113FAS3351002C02	Length (km)	0.14	GIS/NFCDD	5405	Maintain	Short to long term	30	0.02	0.035467937	0.042561524	0.068098438	
	Seawall maintenance	113FAS3351002C03	Length (km)	0.06	GIS/NFCDD	5405	Maintain	Short to long term	30	0.01	0.015200544	0.018240653	0.029185045	
	Groyne maintenance		No	6		1081	Maintain	Short to long term	30	0.19	0.304010885	0.364813062	0.583700899	
	Groyne reconstruction		No	6		811	Maintain	Short	1	0.00	0.007600272	0.009120327	0.014592522	
	Groyne reconstruction		No	6		811	Maintain	Medium	0.5	0.00	0.003800136	0.004560163	0.007296261	
	Groyne reconstruction		No	6		811	Maintain	Long	0.2	0.00	0.001520054	0.001824065	0.002918504	
	Recharge/ recycling	113FAS3351002C01	Volume (m3)	3562.5	Conceptual model	22	Maintain	Short	15	1.16	1.80506463	2.166077556	3.465724089	
	Recharge/ recycling		Volume (m3)	4312.5	Conceptual model	22	Maintain	Medium	10	0.93	1.456718824	1.748062589	2.796900142	
	Recharge/ recycling		Volume (m3)	5437.5	Conceptual model	22	Maintain	Long	5	0.59	0.918366215	1.102039458	1.763263133	
													9.081899574	TOTAL
Option 2. Hard foreshore management, consisting of toe protection to the seawall towards the end of the short term as beach erosion continues.	Seawall maintenance	113FAS3351002C01	Length (km)	0.72	GIS/NFCDD	5405	Maintain	Short to long term	30	0.12	0.182406531	0.218887837	0.35022054	
	Seawall maintenance	113FAS3351002C02	Length (km)	0.14	GIS/NFCDD	5405	Maintain	Short to long term	30	0.02	0.035467937	0.042561524	0.068098438	
	Seawall maintenance	113FAS3351002C03	Length (km)	0.06	GIS/NFCDD	5405	Maintain	Short to long term	30	0.01	0.015200544	0.018240653	0.029185045	
	Groyne maintenance		No	6		1081	Maintain	Short to long term	30	0.19	0.304010885	0.364813062	0.583700899	
	Groyne reconstruction		No	6		811	Maintain	Short	1	0.00	0.007600272	0.009120327	0.014592522	
	Groyne reconstruction		No	6		811	Maintain	Medium	0.5	0.00	0.003800136	0.004560163	0.007296261	
	Groyne reconstruction		No	6		811	Maintain	Long	0.2	0.00	0.001520054	0.001824065	0.002918504	
	Toe protection		Length (m)	920		2724	Maintain	Medium	0.5	1.25	1.957830099	2.349396119	3.759033791	
	Toe protection maintenance		Length (km)	0.92		5405	Maintain	Medium to long term	15	0.07	0.116537506	0.139845007	0.223752011	
													5.038798012	TOTAL
Option 3. Hard foreshore management, consisting of breakwater construction to control sediment transport.	Seawall maintenance	113FAS3351002C01	Length (km)	0.72	GIS/NFCDD	5405	Maintain	Short to long term	30	0.12	0.182406531	0.218887837	0.35022054	
	Seawall maintenance	113FAS3351002C02	Length (km)	0.14	GIS/NFCDD	5405	Maintain	Short to long term	30	0.02	0.035467937	0.042561524	0.068098438	
	Seawall maintenance	113FAS3351002C03	Length (km)	0.06	GIS/NFCDD	5405	Maintain	Short to long term	30	0.01	0.015200544	0.018240653	0.029185045	
	Shore parallel breakwater construction	113FAS3351002C01	Length (m)	500		4500	Maintain	Short	1	2.25	3.515625	4.21875	6.75	
	Assume 1km long x 30m wide		Length (m)	500		4500	Maintain	Medium	0.5	1.13	1.7578125	2.109375	3.375	
			Length (m)	500		4500	Maintain	Long	0.2	0.45	0.703125	0.84375	1.35	
	SPA footprint compensation		Area (Ha)	3		50000	Maintain	Short	1	0.15	0.234375	0.28125	0.45	
													11.92250402	TOTAL



ADDITIONAL ASSESSMENT OF HIGH LEVEL OPTIONS													
NAI HLO	Seawall maintenance	113FAS3351002C02	Length (km)	0.14	GIS/NFCDD	5405	Maintain	Short to long term	30	0.02	0.035467937	0.042561524	0.068098438
	Seawall maintenance	113FAS3351002C03	Length (km)	0.06	GIS/NFCDD	5405	Maintain	Short to long term	30	0.01	0.015200544	0.018240653	0.029185045
	Seawall removal along the whole of Queens Drive	Cost based on removal of masonry wall, 1m high	Length (m)	1500	GIS/NFCDD	1197	Manage	Short term	1	1.79	2.804500414	3.365400497	5.384640795
	Promenade and road removal along the whole of Queen's Drive	Cost based on removal of hard structure, 2m deep x 15m wide	m3	45000		100	Manage	Short term	1	4.50	7.03125	8.4375	13.5
	Making good, consisting of sand recharge	Cost based on 2m deep x 15m wide sand volume	m3	45000		0	Manage	Short term	1	0.00	0	0	0
	ST land compensation		Area (Ha)	10	GIS/NFCDD	15000	Manage	Medium term	0.5	0.075	0.09375	0.1125	0.18
												19.16192428	TOTAL
Maintain HLO	Seawall maintenance	113FAS3351002C01	Length (km)	0.72	GIS/NFCDD	5405	Maintain	Short to long term	30	0.12	0.182406531	0.218887837	0.35022054
	Seawall maintenance	113FAS3351002C02	Length (km)	0.14	GIS/NFCDD	5405	Maintain	Short to long term	30	0.02	0.035467937	0.042561524	0.068098438
	Seawall maintenance	113FAS3351002C03	Length (km)	0.06	GIS/NFCDD	5405	Maintain	Short to long term	30	0.01	0.015200544	0.018240653	0.029185045
	Groyne maintenance		No	6		1081	Maintain	Short to long term	30	0.19	0.304010885	0.364813062	0.583700899
												1.031204922	TOTAL
Manage HLO	Seawall maintenance	113FAS3351002C02	Length (km)	0.14	GIS/NFCDD	5405	Maintain	Short to long term	30	0.02	0.035467937	0.042561524	0.068098438
	Seawall maintenance	113FAS3351002C03	Length (km)	0.06	GIS/NFCDD	5405	Maintain	Short to long term	30	0.01	0.015200544	0.018240653	0.029185045
	Seawall removal at The Maer	Cost based on removal of masonry wall, 1m high	Length (m)	720	GIS/NFCDD	1197	Manage	Short term	1	0.86	1.346160199	1.615392239	2.584627582
	Promenade and road removal at The Maer	Cost based on removal of hard structure, 2m deep x 15m wide	m3	21600		100	Manage	Short term	1	2.16	3.375	4.05	6.48
	Making good, consisting of sand recharge of lost volume	Cost based on 2m deep x 15m wide sand volume	m3	21600		22	Manage	Short term	1	0.47	0.729626124	0.875551349	1.400882158
	ST land compensation		Area (Ha)	10	GIS/NFCDD	15000	Manage	Short term	1	0.15	0.1875	0.225	0.36
	Recharge/ recycling		Volume (m3)	1875	Conceptual model	22	Maintain	Medium	10	0.41	0.63335601	0.760027212	1.21604354
	Recharge/ recycling		Volume (m3)	1875	Conceptual model	22	Maintain	Long	5	0.20	0.316678005	0.380013606	0.60802177
												12.74685853	TOTAL

K.3 Exmouth



FCRMU approach	Asset Type	Asset reference	Parameter	Amount	Reference	Rate (£/parameter)	HLO	Epoch	Epochal discount factor	Basic construction cost (£M)	Plus Tidal/urban uplift (25% each) cost (£M)	Plus PAR, design and supervision (20%) cost (£M)	Plus Optimism bias 60% cost (£M)	
SHORT-LISTED ALIGNMENT AND TYPE OPTIONS														
Short Term Option 1. Medium to Long Term Option 1 (continuation of exiting asset types).	Seawall maintenance	113FAS3351002C04	Length (km)	0.17	GIS/NFCDD	5405	Maintain	Short to long term	30	0.027563654	0.043068209	0.05168185	0.082690961	
	Seawall maintenance	113FAS3351002C05	Length (km)	0.7	GIS/NFCDD	5405	Maintain	Short to long term	30	0.113497397	0.177339683	0.212807619	0.340492191	
	Sheet piled wall maintenance	113FAS3351003C01	Length (km)	0.09	GIS/NFCDD	5405	Maintain	Short to long term	30	0.014592522	0.022800816	0.02736098	0.043777567	
	CC 0.5m addition		Length (m)	90	GIS/NFCDD	1036	Improve	Short	1	0.093246219	0.145697217	0.17483666	0.279738656	
	CC 0.3m addition		Length (m)	90	GIS/NFCDD	518	Sustain	Medium	0.5	0.023311555	0.036424304	0.043709165	0.069934664	
Exmouth Docks improvements to avoid pedestrian/local flooding	CC 0.3m addition		Length (m)	90	GIS/NFCDD	518	Sustain	Long	0.2	0.009324622	0.014569722	0.017483666	0.027973866	
	Complex Wall maintenance	113FAS3351003C02	Length (km)	1	GIS/NFCDD	5405	Maintain	Short to long term	30	0.162139139	0.253342404	0.304010885	0.486417416	
	CC 0.5m addition		Length (m)	150	GIS/NFCDD	598	Improve	Short	1	0.089744013	0.140225021	0.168270025	0.26923204	
	CC 0.3m addition		Length (m)	1000	GIS/NFCDD	299	Sustain	Medium	0.5	0.149573355	0.233708368	0.280450041	0.448720066	
	CC 0.3m addition		Length (m)	1000	GIS/NFCDD	299	Sustain	Long	0.2	0.059829342	0.093483347	0.112180017	0.179488027	
	Complex Wall maintenance	113FAS3351003C03	Length (km)	0.12	GIS/NFCDD	5405	Maintain	Short to long term	30	0.019456697	0.030401088	0.036481306	0.05837009	
	CC 0.3m addition		Length (m)	120	GIS/NFCDD	518	Sustain	Medium	0.5	0.031082073	0.048565739	0.058278887	0.093246219	
	CC 0.3m addition		Length (m)	120	GIS/NFCDD	518	Sustain	Long	0.2	0.012432829	0.019426296	0.023311555	0.037298487	
	Timber revetment maintenance	113FAS3351003C04	Length (km)	0.08	GIS/NFCDD	5405	NAI	Short to long term	30	0.012971131	0.020267392	0.024320871	0.038913393	
Sailing club access road raising	road raising 0.5m	113FAS3351003C05	Length (m)	20	GIS/NFCDD	598	Improve	Short	1	0.011965868	0.018696669	0.022436003	0.035897605	
	Gabion Wall maintenance	113FAS3351003C06	Length (km)	0.06	GIS/NFCDD	5405	NAI	Short to long term	30	0.009728348	0.015200544	0.018240653	0.029185045	
Camperdown Terrace wall raising/reconstruction	Pitched Stone Revetment maintenance	113FAS3351003C07	Length (km)	0.05	GIS/NFCDD	5405	Maintain	Short to long term	30	0.008106957	0.01266712	0.015200544	0.024320871	
	CC 0.5m addition		Length (m)	50	GIS/NFCDD	681	Improve	Short	1	0.034049219	0.053201905	0.063842286	0.102147657	
	CC 0.3m addition		Length (m)	50	GIS/NFCDD	340	Sustain	Medium	0.5	0.008512305	0.013300476	0.015960571	0.025536914	
	CC 0.3m addition		Length (m)	50	GIS/NFCDD	340	Sustain	Long	0.2	0.003404922	0.00532019	0.006384229	0.010214766	
	Complex Wall maintenance	113FAS3351003C08	Length (km)	0.08	GIS/NFCDD	5405	Maintain	Short to long term	30	0.012971131	0.020267392	0.024320871	0.038913393	
	CC 0.5m addition		Length (m)	80	GIS/NFCDD	1036	Improve	Short	1	0.082885528	0.129508637	0.155410364	0.248656583	
	CC 0.3m addition		Length (m)	80	GIS/NFCDD	518	Sustain	Medium	0.5	0.020721382	0.032377159	0.038852591	0.062164146	
	CC 0.3m addition		Length (m)	80	GIS/NFCDD	518	Sustain	Long	0.2	0.008288553	0.012950864	0.015541036	0.024865658	
	Masonry Wall maintenance	113FAS3351003C09	Length (km)	0.07	GIS/NFCDD	5405	Maintain	Short to long term	30	0.01134974	0.017733968	0.021280762	0.034049219	
	CC 1m addition		Length (m)	70	GIS/NFCDD	2072	Improve	Short	1	0.145049673	0.226640115	0.271968138	0.43514902	
	CC 0.3m addition		Length (m)	70	GIS/NFCDD	518	Sustain	Medium	0.5	0.018131209	0.028330014	0.033996017	0.054393628	
	CC 0.3m addition		Length (m)	70	GIS/NFCDD	518	Sustain	Long	0.2	0.007252484	0.011332006	0.013598407	0.021757451	
	Masonry Wall maintenance	113FAS3351003C10	Length (km)	0.06	GIS/NFCDD	5405	Maintain	Short to long term	30	0.009728348	0.015200544	0.018240653	0.029185045	
	CC 1m addition		Length (m)	60	GIS/NFCDD	2072	Improve	Short	1	0.124328292	0.194262956	0.233115547	0.372984875	
	CC 0.3m addition		Length (m)	60	GIS/NFCDD	518	Sustain	Medium	0.5	0.015541036	0.024282869	0.029139443	0.046623109	
	CC 0.3m addition		Length (m)	60	GIS/NFCDD	518	Sustain	Long	0.2	0.006216415	0.009713148	0.011655777	0.018649244	
Slipway/boatyard road/wall raising	Complex Wall maintenance	113FAS3351004C01	Length (km)	0.09	GIS/NFCDD	5405	Maintain	Short to long term	30	0.014592522	0.022800816	0.02736098	0.043777567	
	CC 0.5m addition		Length (m)	90	GIS/NFCDD	598	Improve	Short	1	0.053846408	0.084135012	0.100962015	0.161539224	
	CC 0.3m addition		Length (m)	90	GIS/NFCDD	299	Sustain	Medium	0.5	0.013461602	0.021033753	0.025240504	0.040384806	
	CC 0.3m addition		Length (m)	90	GIS/NFCDD	299	Sustain	Long	0.2	0.005384641	0.008413501	0.010096201	0.016153922	
	Gabion toe maintenance	113FAS3351004C02	Length (km)	0.11	GIS/NFCDD	5405	Maintain	Short to long term	30	0.017835305	0.027867664	0.033441197	0.053505916	
	CC 0.1m addition		Length (m)	110	GIS/NFCDD	299	Sustain	Short	1	0.032906138	0.051415841	0.061699009	0.098718415	
	CC 0.3m addition		Length (m)	110	GIS/NFCDD	299	Sustain	Medium	0.5	0.016453069	0.02570792	0.030849505	0.049359207	
	CC 0.3m addition		Length (m)	110	GIS/NFCDD	299	Sustain	Long	0.2	0.006581228	0.010283168	0.012339802	0.019743683	
North-east Imperial Recreation Ground wave recurve addition	Revetment maintenance	113FAS3351004C03	Length (km)	0.55	GIS/NFCDD	5405	Maintain	Short to long term	30	0.089176526	0.139338322	0.167205987	0.267529579	
	CC 0.75m addition		Length (m)	100	GIS/NFCDD	464	Improve	Short	1	0.046371794	0.072455928	0.086947113	0.139115381	
	CC 0.3m addition		Length (m)	100	GIS/NFCDD	155	Sustain	Medium	0.5	0.007728632	0.012075988	0.014491186	0.023185897	
	CC 0.3m addition		Length (m)	100	GIS/NFCDD	155	Sustain	Long	0.2	0.003091453	0.004830395	0.005796474	0.009274359	
	Embankment maintenance	113FAS3351004C04	Length (km)	0.39	GIS/NFCDD	1081	Maintain	Short to long term	30	0.012646853	0.019760708	0.023712849	0.037940558	
	CC 0.3m addition		Length (m)	390	GIS/NFCDD	152	Sustain	Long	0.2	0.011888042	0.018575065	0.022290078	0.035664125	
	Embankment maintenance	113FAS3351004C05	Length (km)	0.56	GIS/NFCDD	1081	Maintain	Short to long term	30	0.018159584	0.028374349	0.034049219	0.054478751	
	CC 0.3m addition		Length (m)	560	GIS/NFCDD	152	Sustain	Long	0.2	0.017070009	0.026671888	0.032006266	0.051210026	
													5.172569287	TOTAL



Short Term Option 2. Medium to Long Term Option 2 (continuation of exiting asset types).	Seawall maintenance	113FAS3351002C04	Length (km)	0.17	GIS/NFCDD	5405	Maintain	Short to long term	30	0.027563654	0.043068209	0.05168185	0.082690961	
	Seawall maintenance	113FAS3351002C05	Length (km)	0.7	GIS/NFCDD	5405	Maintain	Short to long term	30	0.113497397	0.177339683	0.212807619	0.340492191	
	Sheet piled wall maintenance	113FAS3351003C01	Length (km)	0.09	GIS/NFCDD	5405	Maintain	Short to long term	30	0.014592522	0.022800816	0.02736098	0.043777567	
	CC 0.5m addition		Length (m)	90	GIS/NFCDD	1036	Improve	Short	1	0.093246219	0.145697217	0.17483666	0.279738656	
	CC 0.3m addition		Length (m)	90	GIS/NFCDD	518	Sustain	Medium	0.5	0.023311555	0.036424304	0.043709165	0.069934664	
	CC 0.3m addition		Length (m)	90	GIS/NFCDD	518	Sustain	Long	0.2	0.009324622	0.014569722	0.017483666	0.027973866	
Exmouth Docks improvements to avoid pedestrian/local flooding	Complex Wall maintenance	113FAS3351003C02	Length (km)	1	GIS/NFCDD	5405	Maintain	Short to long term	30	0.162139139	0.253342404	0.304010885	0.486417416	
	CC 0.5m addition		Length (m)	150	GIS/NFCDD	598	Improve	Short	1	0.089744013	0.140225021	0.168270025	0.26923204	
	CC 0.3m addition		Length (m)	1000	GIS/NFCDD	299	Sustain	Medium	0.5	0.149573355	0.233708368	0.280450041	0.448720066	
	CC 0.3m addition		Length (m)	1000	GIS/NFCDD	299	Sustain	Long	0.2	0.059829342	0.093483347	0.112180017	0.179488027	
	Complex Wall maintenance	113FAS3351003C03	Length (km)	0.12	GIS/NFCDD	5405	Maintain	Short to long term	30	0.019456697	0.030401088	0.036481306	0.05837009	
	CC 0.3m addition		Length (m)	120	GIS/NFCDD	518	Sustain	Medium	0.5	0.031082073	0.048565739	0.058278887	0.093246219	
	CC 0.3m addition		Length (m)	120	GIS/NFCDD	518	Sustain	Long	0.2	0.012432829	0.019426296	0.023311555	0.037298487	
	Timber revetment maintenance	113FAS3351003C04	Length (km)	0.08	GIS/NFCDD	5405	NAI	Short to long term	30	0.012971131	0.020267392	0.024320871	0.038913393	
Sailing club access road raising	road raising 0.5m	113FAS3351003C05	Length (m)	20	GIS/NFCDD	598	Improve	Short	1	0.011965868	0.018696669	0.022436003	0.035897605	
	Gabion Wall maintenance	113FAS3351003C06	Length (km)	0.06	GIS/NFCDD	5405	NAI	Short to long term	30	0.009728348	0.015200544	0.018240653	0.029185045	
Camperdown Terrace property resilience	Property resilience	NA	Number	10	GIS/NFCDD	10809	Improve	Short	1	0.108092759	0.168894936	0.202673923	0.324278277	
	Pitched Stone Revetment maintenance	113FAS3351003C07	Length (km)	0.05	GIS/NFCDD	5405	Maintain	Short to long term	30	0.008106957	0.01266712	0.015200544	0.024320871	
	Complex Wall maintenance	113FAS3351003C08	Length (km)	0.08	GIS/NFCDD	5405	Maintain	Short to long term	30	0.012971131	0.020267392	0.024320871	0.038913393	
	Masonry Wall maintenance	113FAS3351003C09	Length (km)	0.07	GIS/NFCDD	5405	Maintain	Short to long term	30	0.01134974	0.017733968	0.021280762	0.034049219	
	Masonry Wall maintenance	113FAS3351003C10	Length (km)	0.06	GIS/NFCDD	5405	Maintain	Short to long term	30	0.009728348	0.015200544	0.018240653	0.029185045	
Slipway/boatyard road/wall raising	Complex Wall maintenance	113FAS3351004C01	Length (km)	0.09	GIS/NFCDD	5405	Maintain	Short to long term	30	0.014592522	0.022800816	0.02736098	0.043777567	
	CC 0.5m addition		Length (m)	90	GIS/NFCDD	598	Improve	Short	1	0.053846408	0.084135012	0.100962015	0.161539224	
	CC 0.3m addition		Length (m)	90	GIS/NFCDD	299	Sustain	Medium	0.5	0.013461602	0.021033753	0.025240504	0.040384806	
	CC 0.3m addition		Length (m)	90	GIS/NFCDD	299	Sustain	Long	0.2	0.005384641	0.008413501	0.010096201	0.016153922	
	Gabion toe maintenance	113FAS3351004C02	Length (km)	0.11	GIS/NFCDD	5405	Maintain	Short to long term	30	0.017835305	0.027867664	0.033441197	0.053505916	
	CC 0.1m addition		Length (m)	110	GIS/NFCDD	299	Sustain	Short	1	0.032906138	0.051415841	0.061699009	0.098718415	
	CC 0.3m addition		Length (m)	110	GIS/NFCDD	299	Sustain	Medium	0.5	0.016453069	0.02570792	0.030849505	0.049359207	
	CC 0.3m addition		Length (m)	110	GIS/NFCDD	299	Sustain	Long	0.2	0.006581228	0.010283168	0.012339802	0.019743683	
	Revetment maintenance	113FAS3351004C03	Length (km)	0.55	GIS/NFCDD	5405	Maintain	Short to long term	30	0.089176526	0.139338322	0.167205987	0.267529579	
North-east Imperial Recreation Ground landward wall raising	Wall maintenance		Length (km)	0.15	GIS/NFCDD	5405	Maintain	Short to long term	30	0.024320871	0.038001361	0.045601633	0.072962612	
	CC 0.5m addition		Length (m)	150	GIS/NFCDD	598	Improve	Short	1	0.089744013	0.140225021	0.168270025	0.26923204	
	CC 0.3m addition		Length (m)	150	GIS/NFCDD	299	Sustain	Medium	0.5	0.022436003	0.035056255	0.042067506	0.06730801	
	CC 0.3m addition		Length (m)	150	GIS/NFCDD	299	Sustain	Long	0.2	0.008974401	0.014022502	0.016827002	0.026923204	
	Embankment maintenance	113FAS3351004C04	Length (km)	0.39	GIS/NFCDD	1081	Maintain	Short to long term	30	0.012646853	0.019760708	0.023712849	0.037940558	
	CC 0.3m addition		Length (m)	390	GIS/NFCDD	152	Sustain	Long	0.2	0.011888042	0.018575065	0.022290078	0.035664125	
	Embankment maintenance	113FAS3351004C05	Length (km)	0.56	GIS/NFCDD	1081	Maintain	Short to long term	30	0.018159584	0.028374349	0.034049219	0.054478751	
	CC 0.3m addition		Length (m)	560	GIS/NFCDD	152	Sustain	Long	0.2	0.017070009	0.026671888	0.032006266	0.051210026	
													4.338554743	TOTAL



Short Term Option 1. Medium to Long Term Option 1 (hardening with efficient asset types).	Seawall maintenance	113FAS3351002C04	Length (km)	0.17	GIS/NFCDD	5405	Maintain	Short to long term	30	0.027563654	0.043068209	0.05168185	0.082690961	
	Seawall maintenance	113FAS3351002C05	Length (km)	0.7	GIS/NFCDD	5405	Maintain	Short to long term	30	0.113497397	0.177339683	0.212807619	0.340492191	
	Sheet piled wall maintenance	113FAS3351003C01	Length (km)	0.09	GIS/NFCDD	5405	Maintain	Short to long term	30	0.014592522	0.022800816	0.02736098	0.043777567	
	Wave recurve wall 1m		Length (m)	90	GIS/NFCDD	618	Improve	Short	1	0.055646152	0.086947113	0.104336536	0.166938457	
	Complex Wall maintenance	113FAS3351003C02	Length (km)	1	GIS/NFCDD	5405	Maintain	Short to long term	30	0.162139139	0.253342404	0.304010885	0.486417416	
	Wave recurve wall 0.5m		Length (m)	150	GIS/NFCDD	464	Improve	Short	1	0.06955769	0.108683891	0.13042067	0.208673071	
	Complex Wall maintenance	113FAS3351003C03	Length (km)	0.12	GIS/NFCDD	5405	Maintain	Short to long term	30	0.019456697	0.030401088	0.036481306	0.05837009	
	CC 0.3m addition		Length (m)	120	GIS/NFCDD	518	Sustain	Medium	0.5	0.031082073	0.048565739	0.058278887	0.093246219	
	CC 0.3m addition		Length (m)	120	GIS/NFCDD	518	Sustain	Long	0.2	0.012432829	0.019426296	0.023311555	0.037298487	
	Timber revetment maintenance	113FAS3351003C04	Length (km)	0.08	GIS/NFCDD	5405	NAI	Short to long term	30	0.012971131	0.020267392	0.024320871	0.038913393	
Sailing club access road raising	road raising 0.5m	113FAS3351003C05	Length (m)	20	GIS/NFCDD	598	Improve	Short	1	0.011965868	0.018696669	0.022436003	0.035897605	
Camperdown Terrace wall raising/reconstrucion	Gabion Wall maintenance	113FAS3351003C06	Length (km)	0.06	GIS/NFCDD	5405	NAI	Short to long term	30	0.009728348	0.015200544	0.018240653	0.029185045	
	Pitched Stone Revetment maintenance	113FAS3351003C07	Length (km)	0.05	GIS/NFCDD	5405	Maintain	Short to long term	30	0.008106957	0.01266712	0.015200544	0.024320871	
	CC 0.5m addition		Length (m)	50	GIS/NFCDD	681	Improve	Short	1	0.034049219	0.053201905	0.063842286	0.102147657	
	CC 0.3m addition		Length (m)	50	GIS/NFCDD	340	Sustain	Medium	0.5	0.008512305	0.013300476	0.015960571	0.025536914	
	CC 0.3m addition		Length (m)	50	GIS/NFCDD	340	Sustain	Long	0.2	0.003404922	0.00532019	0.006384229	0.010214766	
	Complex Wall maintenance	113FAS3351003C08	Length (km)	0.08	GIS/NFCDD	5405	Maintain	Short to long term	30	0.012971131	0.020267392	0.024320871	0.038913393	
	CC 0.5m addition		Length (m)	80	GIS/NFCDD	1036	Improve	Short	1	0.082885528	0.129508637	0.155410364	0.248656583	
	CC 0.3m addition		Length (m)	80	GIS/NFCDD	518	Sustain	Medium	0.5	0.020721382	0.032377159	0.038852591	0.062164146	
	CC 0.3m addition		Length (m)	80	GIS/NFCDD	518	Sustain	Long	0.2	0.008288553	0.012950864	0.015541036	0.024865658	
	Masonry Wall maintenance	113FAS3351003C09	Length (km)	0.07	GIS/NFCDD	5405	Maintain	Short to long term	30	0.01134974	0.017733968	0.021280762	0.034049219	
	CC 1m addition		Length (m)	70	GIS/NFCDD	2072	Improve	Short	1	0.145049673	0.226640115	0.271968138	0.43514902	
	CC 0.3m addition		Length (m)	70	GIS/NFCDD	518	Sustain	Medium	0.5	0.018131209	0.028330014	0.033996017	0.054393628	
	CC 0.3m addition		Length (m)	70	GIS/NFCDD	518	Sustain	Long	0.2	0.007252484	0.011332006	0.013598407	0.021757451	
	Masonry Wall maintenance	113FAS3351003C10	Length (km)	0.06	GIS/NFCDD	5405	Maintain	Short to long term	30	0.009728348	0.015200544	0.018240653	0.029185045	
	CC 1m addition		Length (m)	60	GIS/NFCDD	2072	Improve	Short	1	0.124328292	0.194262956	0.233115547	0.372984875	
	CC 0.3m addition		Length (m)	60	GIS/NFCDD	518	Sustain	Medium	0.5	0.015541036	0.024282869	0.029139443	0.046623109	
	CC 0.3m addition		Length (m)	60	GIS/NFCDD	518	Sustain	Long	0.2	0.006216415	0.009713148	0.011655777	0.018649244	
Slipway/boatyard road/wall raising	Complex Wall maintenance	113FAS3351004C01	Length (km)	0.09	GIS/NFCDD	5405	Maintain	Short to long term	30	0.014592522	0.022800816	0.02736098	0.043777567	
	Wave recurve wall 1m		Length (m)	90	GIS/NFCDD	618	Improve	Short	1	0.055646152	0.086947113	0.104336536	0.166938457	
	Gabion toe maintenance	113FAS3351004C02	Length (km)	0.11	GIS/NFCDD	5405	Maintain	Short to long term	30	0.017835305	0.027867664	0.033441197	0.053505916	
	Wave recurve wall 1m		Length (m)	110	GIS/NFCDD	618	Improve	Short	1	0.068011964	0.106268694	0.127522433	0.204035892	
	Revetment maintenance	113FAS3351004C03	Length (km)	0.55	GIS/NFCDD	5405	Maintain	Short to long term	30	0.089176526	0.139338322	0.167205987	0.267529579	
North-east Imperial Recreation Ground revetment raising	CC 0.5m addition		Length (m)	100	GIS/NFCDD	1036	Improve	Short	1	0.10360691	0.161885796	0.194262956	0.310820729	
	CC 0.3m addition		Length (m)	100	GIS/NFCDD	518	Sustain	Medium	0.5	0.025901727	0.040471449	0.048565739	0.077705182	
	CC 0.3m addition		Length (m)	100	GIS/NFCDD	518	Sustain	Long	0.2	0.010360691	0.01618858	0.019426296	0.031082073	
	Embankment maintenance	113FAS3351004C04	Length (km)	0.39	GIS/NFCDD	1081	Maintain	Short to long term	30	0.012646853	0.019760708	0.023712849	0.037940558	
	Embankment maintenance	113FAS3351004C05	Length (km)	0.56	GIS/NFCDD	1081	Maintain	Short to long term	30	0.018159584	0.028374349	0.034049219	0.054478751	
	CC 0.3m addition		Length (m)	560	GIS/NFCDD	152	Sustain	Long	0.2	0.017070009	0.026671888	0.032006266	0.051210026	
													4.470536813	TOTAL



Short Term Option 2. Medium to Long Term Option 2 (hardening with efficient asset types).	Seawall maintenance	113FAS3351002C04	Length (km)	0.17	GIS/NFCDD	5405	Maintain	Short to long term	30	0.027563654	0.043068209	0.05168185	0.082690961	
	Seawall maintenance	113FAS3351002C05	Length (km)	0.7	GIS/NFCDD	5405	Maintain	Short to long term	30	0.113497397	0.177339683	0.212807619	0.340492191	
	Sheet piled wall maintenance	113FAS3351003C01	Length (km)	0.09	GIS/NFCDD	5405	Maintain	Short to long term	30	0.014592522	0.022800816	0.02736098	0.043777567	
	Wave recurve wall 1m		Length (m)	90	GIS/NFCDD	618	Improve	Short	1	0.055646152	0.086947113	0.104336536	0.166938457	
	Complex Wall maintenance	113FAS3351003C02	Length (km)	1	GIS/NFCDD	5405	Maintain	Short to long term	30	0.162139139	0.253342404	0.304010885	0.486417416	
	Wave recurve wall 0.5m		Length (m)	150	GIS/NFCDD	464	Improve	Short	1	0.06955769	0.108683891	0.13042067	0.208673071	
	Complex Wall maintenance	113FAS3351003C03	Length (km)	0.12	GIS/NFCDD	5405	Maintain	Short to long term	30	0.019456697	0.030401088	0.036481306	0.05837009	
	CC 0.3m addition		Length (m)	120	GIS/NFCDD	518	Sustain	Medium	0.5	0.031082073	0.048565739	0.058278887	0.093246219	
	CC 0.3m addition		Length (m)	120	GIS/NFCDD	518	Sustain	Long	0.2	0.012432829	0.019426296	0.023311555	0.037298487	
	Timber revetment maintenance	113FAS3351003C04	Length (km)	0.08	GIS/NFCDD	5405	NAI	Short to long term	30	0.012971131	0.020267392	0.024320871	0.038913393	
Sailing club access road raising	road raising 0.5m	113FAS3351003C05	Length (m)	20	GIS/NFCDD	598	Improve	Short	1	0.011965868	0.018696669	0.022436003	0.035897605	
	Gabion Wall maintenance	113FAS3351003C06	Length (km)	0.06	GIS/NFCDD	5405	NAI	Short to long term	30	0.009728348	0.015200544	0.018240653	0.029185045	
Camperdown Terrace property resilience	Property resilience	NA	Number	10	GIS/NFCDD	10809	Improve	Short	1	0.108092759	0.168894936	0.202673923	0.324278277	
	Pitched Stone Revetment maintenance	113FAS3351003C07	Length (km)	0.05	GIS/NFCDD	5405	Maintain	Short to long term	30	0.008106957	0.01266712	0.015200544	0.024320871	
	Complex Wall maintenance	113FAS3351003C08	Length (km)	0.08	GIS/NFCDD	5405	Maintain	Short to long term	30	0.012971131	0.020267392	0.024320871	0.038913393	
	Masonry Wall maintenance	113FAS3351003C09	Length (km)	0.07	GIS/NFCDD	5405	Maintain	Short to long term	30	0.01134974	0.017733968	0.021280762	0.034049219	
	Masonry Wall maintenance	113FAS3351003C10	Length (km)	0.06	GIS/NFCDD	5405	Maintain	Short to long term	30	0.009728348	0.015200544	0.018240653	0.029185045	
Slipway/boatyard road/wall raising	Complex Wall maintenance	113FAS3351004C01	Length (km)	0.09	GIS/NFCDD	5405	Maintain	Short to long term	30	0.014592522	0.022800816	0.02736098	0.043777567	
	Wave recurve wall 1m		Length (m)	90	GIS/NFCDD	618	Improve	Short	1	0.055646152	0.086947113	0.104336536	0.166938457	
	Gabion toe maintenance	113FAS3351004C02	Length (km)	0.11	GIS/NFCDD	5405	Maintain	Short to long term	30	0.017835305	0.027867664	0.033441197	0.053505916	
	Wave recurve wall 1m		Length (m)	110	GIS/NFCDD	618	Improve	Short	1	0.068011964	0.106268694	0.127522433	0.204035892	
	Revetment maintenance	113FAS3351004C03	Length (km)	0.55	GIS/NFCDD	5405	Maintain	Short to long term	30	0.089176526	0.139338322	0.167205987	0.267529579	
North-east Imperial Recreation Ground revetment raising	CC 0.5m addition		Length (m)	100	GIS/NFCDD	1036	Improve	Short	1	0.10360691	0.161885796	0.194262956	0.310820729	
	CC 0.3m addition		Length (m)	100	GIS/NFCDD	518	Sustain	Medium	0.5	0.025901727	0.040471449	0.048565739	0.077705182	
	CC 0.3m addition		Length (m)	100	GIS/NFCDD	518	Sustain	Long	0.2	0.010360691	0.01618858	0.019426296	0.031082073	
	Embankment maintenance	113FAS3351004C04	Length (km)	0.39	GIS/NFCDD	1081	Maintain	Short to long term	30	0.012646853	0.019760708	0.023712849	0.037940558	
	Embankment maintenance	113FAS3351004C05	Length (km)	0.56	GIS/NFCDD	1081	Maintain	Short to long term	30	0.018159584	0.028374349	0.034049219	0.054478751	
	CC 0.3m addition		Length (m)	560	GIS/NFCDD	152	Sustain	Long	0.2	0.017070009	0.026671888	0.032006266	0.051210026	
													3.371672039	TOTAL

K.4 Courtlands



FCRMU approach	Asset Type	Asset reference	Parameter	Amount	Reference	Rate (£/parameter)	HLO	Epoch	Epochal discount factor	Basic construction cost (£M)	Plus Tidal/urban uplift (25% each) cost (£M)	Plus PAR, design and supervision (20%) cost (£M)	Plus Optimism bias 60% cost (£M)	
SHORT-LISTED ALIGNMENT AND TYPE OPTIONS														
Option 1. Rock armouring or revetment raising (to dissipate wave energy) of up to 0.5m to the existing structure. Dawlish Warren sand spit	Railway Embankment with Revetment	113FAS3351005C01	Length (km)	0.59	GIS/NFCDD	5405	Maintain	Short to long term	30	0.095662092	0.119577615	0.143493138	0.22958902	
	Wall	113FAS3351005C02	Length (km)	0.37	GIS/NFCDD	5405	Maintain	Short to long term	30	0.059991481	0.074989352	0.089987222	0.143979555	
	Railway Embankment with Revetment	113FAS3351005C03	Length (km)	0.6	GIS/NFCDD	5405	Maintain	Short to long term	30	0.097283483	0.121604354	0.145925225	0.23348036	
	Timber Wall	113FAS3351005C04	Length (km)	0.08	GIS/NFCDD	5405	Maintain	Short to long term	30	0.012971131	0.016213914	0.019456697	0.031130715	
	Concrete Revetment	113FAS3351005C05	Length (km)	0.22	GIS/NFCDD	5405	Maintain	Short to long term	30	0.035670611	0.044588263	0.053505916	0.085609465	
	Masonry Wall	113FAS3351005C06	Length (km)	0.17	GIS/NFCDD	5405	Maintain	Short to long term	30	0.027563654	0.034454567	0.04134548	0.066152769	
	Natural Cliff (check elements)	113FAS3351005C07	Length (km)	0.27	GIS/NFCDD	0	Maintain	Short to long term	30	0	0	0	0	
													0.789941884	TOTAL
Option 2. Vertical or wave recurve wall additions of up to 0.5m to the existing structure. Dawlish Warren sand spit distal section flattened in 2060.	Railway Embankment with Revetment	113FAS3351005C01	Length (km)	0.59	GIS/NFCDD	5405	Maintain	Short to long term	30	0.095662092	0.119577615	0.143493138	0.22958902	
	Wall	113FAS3351005C02	Length (km)	0.37	GIS/NFCDD	5405	Maintain	Short to long term	30	0.059991481	0.074989352	0.089987222	0.143979555	
	Railway Embankment with Revetment	113FAS3351005C03	Length (km)	0.6	GIS/NFCDD	5405	Maintain	Short to long term	30	0.097283483	0.121604354	0.145925225	0.23348036	
	Timber Wall	113FAS3351005C04	Length (km)	0.08	GIS/NFCDD	5405	Maintain	Short to long term	30	0.012971131	0.016213914	0.019456697	0.031130715	
	Concrete Revetment	113FAS3351005C05	Length (km)	0.22	GIS/NFCDD	5405	Maintain	Short to long term	30	0.035670611	0.044588263	0.053505916	0.085609465	
	Masonry Wall	113FAS3351005C06	Length (km)	0.17	GIS/NFCDD	5405	Maintain	Short to long term	30	0.027563654	0.034454567	0.04134548	0.066152769	
	Natural Cliff (check elements)	113FAS3351005C07	Length (km)	0.27	GIS/NFCDD	0	Maintain	Short to long term	30	0	0	0	0	
													0.789941884	TOTAL
ADDITIONAL ASSESSMENT OF TIMING OF PERMANENT FLATTENING OF DAWLISH WARREN SAND SPIT DISTAL SECTION														
Dawlish Warren sand spit maintained, Improve with existing form when and where necessary	Railway Embankment with Revetment	113FAS3351005C01	Length (km)	0.59	GIS/NFCDD	5405	Maintain	Short to long term	30	0.095662092	0.119577615	0.143493138	0.22958902	
	Wall	113FAS3351005C02	Length (km)	0.37	GIS/NFCDD	5405	Maintain	Short to long term	30	0.059991481	0.074989352	0.089987222	0.143979555	
	Railway Embankment with Revetment	113FAS3351005C03	Length (km)	0.6	GIS/NFCDD	5405	Maintain	Short to long term	30	0.097283483	0.121604354	0.145925225	0.23348036	
	CC 0.3m addition		Length (m)	600	GIS/NFCDD	518	Sustain	Long	0.2	0.062164146	0.077705182	0.093246219	0.14919395	
	Timber Wall	113FAS3351005C04	Length (km)	0.08	GIS/NFCDD	5405	Maintain	Short to long term	30	0.012971131	0.016213914	0.019456697	0.031130715	
	Concrete Revetment	113FAS3351005C05	Length (km)	0.22	GIS/NFCDD	5405	Maintain	Short to long term	30	0.035670611	0.044588263	0.053505916	0.085609465	
	Masonry Wall	113FAS3351005C06	Length (km)	0.17	GIS/NFCDD	5405	Maintain	Short to long term	30	0.027563654	0.034454567	0.04134548	0.066152769	
	Natural Cliff (check elements)	113FAS3351005C07	Length (km)	0.27	GIS/NFCDD	0	Maintain	Short to long term	30	0	0	0	0	
													0.939135833	TOTAL
Dawlish Warren sand spit distal section flattened in 2030, Improve with existing form when and where necessary	Railway Embankment with Revetment	113FAS3351005C01	Length (km)	0.59	GIS/NFCDD	5405	Maintain	Short to long term	30	0.095662092	0.119577615	0.143493138	0.22958902	
	CC 0.3m addition		Length (m)	590	GIS/NFCDD	518	Sustain	Short	1	0.305640383	0.382050479	0.458460575	0.73353692	
	CC 0.3m addition		Length (m)	590	GIS/NFCDD	518	Sustain	Medium	0.5	0.152820192	0.19102524	0.229230288	0.36676846	
	Wall	113FAS3351005C02	Length (km)	0.37	GIS/NFCDD	5405	Maintain	Short to long term	30	0.059991481	0.074989352	0.089987222	0.143979555	
	CC 0.3m addition		Length (m)	370	GIS/NFCDD	518	Sustain	Short	1	0.191672783	0.239590978	0.287509174	0.460014679	
	CC 0.3m addition		Length (m)	370	GIS/NFCDD	518	Sustain	Medium	0.5	0.095836391	0.119795489	0.143754587	0.230007339	
	Railway Embankment with Revetment	113FAS3351005C03	Length (km)	0.6	GIS/NFCDD	5405	Maintain	Short to long term	30	0.097283483	0.121604354	0.145925225	0.23348036	
	CC 0.6m addition		Length (m)	600	GIS/NFCDD	1036	Sustain	Short	1	0.621641458	0.777051822	0.932462186	1.491939498	
	CC 0.3m addition		Length (m)	600	GIS/NFCDD	518	Sustain	Medium	0.5	0.155410364	0.194262956	0.233115547	0.372984875	
	Timber Wall	113FAS3351005C04	Length (km)	0.08	GIS/NFCDD	5405	Maintain	Short to long term	30	0.012971131	0.016213914	0.019456697	0.031130715	
	CC 0.3m addition		Length (m)	80	GIS/NFCDD	518	Sustain	Short	1	0.041442764	0.051803455	0.062164146	0.099462633	
	CC 0.3m addition		Length (m)	80	GIS/NFCDD	518	Sustain	Medium	0.5	0.020721382	0.025901727	0.031082073	0.049731317	
	Concrete Revetment	113FAS3351005C05	Length (km)	0.22	GIS/NFCDD	5405	Maintain	Short to long term	30	0.035670611	0.044588263	0.053505916	0.085609465	
	CC 0.3m addition		Length (m)	220	GIS/NFCDD	518	Sustain	Short	1	0.113967601	0.142459501	0.170951401	0.273522241	
	CC 0.3m addition		Length (m)	220	GIS/NFCDD	518	Sustain	Medium	0.5	0.0569838	0.07122975	0.0854757	0.136761121	
	Masonry Wall	113FAS3351005C06	Length (km)	0.17	GIS/NFCDD	5405	Maintain	Short to long term	30	0.027563654	0.034454567	0.04134548	0.066152769	
	CC 0.3m addition		Length (m)	170	GIS/NFCDD	518	Sustain	Short	1	0.088065873	0.110082341	0.13209881	0.211358096	
	CC 0.3m addition		Length (m)	170	GIS/NFCDD	518	Sustain	Medium	0.5	0.044032937	0.055041171	0.066049405	0.105679048	
	Natural Cliff (check elements)	113FAS3351005C07	Length (km)	0.27	GIS/NFCDD	0	Maintain	Short to long term	30	0	0	0	0	
													5.32170811	TOTAL

K.5 Lympstone Commando



FCRMU approach	Asset Type	Asset reference	Parameter	Amount	Reference	Rate (£/parameter)	HLO	Epoch	Epochal discount factor	Basic construction cost (£M)	Plus Tidal/urban uplift (25% each) cost (£M)	Plus PAR, design and supervision (20%) cost (£M)	Plus Optimism bias 60% cost (£M)	
SHORT-LISTED ALIGNMENT AND TYPE OPTIONS														
Option 1. Rock armouring or revetment raising (to dissipate wave energy) of up to 0.5m to the existing structure. Dawlish Warren sand spit distal section flattened in 2060.	Railway Embankment with Revetment and Wall	113FAS3351007C07	Length (km)	0.89	GIS/NFCDD	5405	Maintain	Short to long term	30	0.144303833	0.22547474	0.270569688	0.4329115	
	CC 0.3m addition		Length (m)	890	GIS/NFCDD	518	Sustain	Long	0.2	0.09221015	0.144078359	0.17289403	0.276630449	
	Railway Embankment (check elements)	1131801070101L01	Length (km)	0.4	GIS/NFCDD	5405	Maintain	Short to long term	30	0.064855655	0.101336962	0.121604354	0.194566966	
	CC 0.3m addition		Length (m)	400	GIS/NFCDD	518	Sustain	Long	0.2	0.041442764	0.064754319	0.077705182	0.124328292	
													1.028437207	TOTAL
Option 2. Vertical or wave recurve wall additions of up to 0.5m to the existing structure. Dawlish Warren sand spit distal section flattened in 2060.	Railway Embankment with Revetment and Wall	113FAS3351007C07	Length (km)	0.89	GIS/NFCDD	5405	Maintain	Short to long term	30	0.144303833	0.22547474	0.270569688	0.4329115	
	Wave recurve 0.25m addition		Length (m)	890	GIS/NFCDD	155	Sustain	Long	0.2	0.027513931	0.042990517	0.05158862	0.082541793	
	Railway Embankment (check elements)	1131801070101L01	Length (km)	0.4	GIS/NFCDD	5405	Maintain	Short to long term	30	0.064855655	0.101336962	0.121604354	0.194566966	
	Wave recurve 0.25m addition		Length (m)	400	GIS/NFCDD	155	Sustain	Long	0.2	0.012365812	0.019321581	0.023185897	0.037097435	
													0.747117694	TOTAL
ADDITIONAL ASSESSMENT OF TIMING OF PERMANENT FLATTENING OF DAWLISH WARREN SAND SPIT DISTAL SECTION														
Dawlish Warren sand spit maintained, Improve with existing form when and where necessary	Railway Embankment with Revetment and Wall	113FAS3351007C07	Length (km)	0.89	GIS/NFCDD	5405	Maintain	Short to long term	30	0.144303833	0.22547474	0.270569688	0.4329115	
	CC 0.3m addition		Length (m)	890	GIS/NFCDD	518	Sustain	Long	0.2	0.09221015	0.144078359	0.17289403	0.276630449	
	Railway Embankment (check elements)	1131801070101L01	Length (km)	0.4	GIS/NFCDD	5405	Maintain	Short to long term	30	0.064855655	0.101336962	0.121604354	0.194566966	
	CC 0.3m addition		Length (m)	400	GIS/NFCDD	518	Sustain	Long	0.2	0.041442764	0.064754319	0.077705182	0.124328292	
													1.028437207	TOTAL
Dawlish Warren sand spit distal section flattened in 2030, Improve with existing form when and where necessary	Railway Embankment with Revetment and Wall	113FAS3351007C07	Length (km)	0.89	GIS/NFCDD	5405	Maintain	Short to long term	30	0.144303833	0.22547474	0.270569688	0.4329115	
	CC 0.3m addition		Length (m)	890	GIS/NFCDD	518	Sustain	Short	1	0.461050748	0.720391793	0.864470152	1.383152243	
	CC 0.3m addition		Length (m)	890	GIS/NFCDD	518	Sustain	Medium	0.5	0.230525374	0.360195897	0.432235076	0.691576122	
	CC 0.3m addition		Length (m)	890	GIS/NFCDD	518	Sustain	Long	0.2	0.09221015	0.144078359	0.17289403	0.276630449	
	Railway Embankment (check elements)	1131801070101L01	Length (km)	0.4	GIS/NFCDD	5405	Maintain	Short to long term	30	0.064855655	0.101336962	0.121604354	0.194566966	
	CC 0.3m addition		Length (m)	400	GIS/NFCDD	518	Sustain	Short	1	0.207213819	0.323771593	0.388525911	0.621641458	
	CC 0.3m addition		Length (m)	400	GIS/NFCDD	518	Sustain	Medium	0.5	0.10360691	0.161885796	0.194262956	0.310820729	
	CC 0.3m addition		Length (m)	400	GIS/NFCDD	518	Sustain	Long	0.2	0.041442764	0.064754319	0.077705182	0.124328292	
													4.035627758	TOTAL



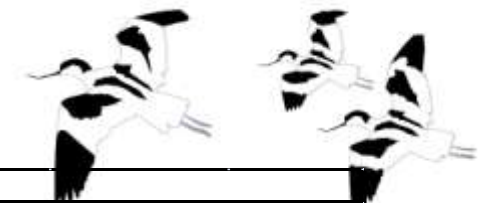
FCRMU approach	Asset Type	Asset reference	Parameter	Amount	Reference	Rate (£/parameter)	HLO	Epoch	Epochal discount factor	Basic construction cost (£M)	Plus Tidal/urban uplift (25% each) cost (£M)	Plus PAR, design and supervision (20%) cost (£M)	Plus Optimism bias 60% cost (£M)	
SHORT-LISTED ALIGNMENT AND TYPE OPTIONS														
Option 1. Rock armouring or revetment raising (to dissipate wave energy) of up to 0.5m to the existing structure. Dawlish Warren sand spit distal section flattened in 2060.	Railway Embankment (check elements)	1131801070101L02	Length (km)	1.41	GIS/NFCDD	5405	Maintain	Short to long term	30	0.228616186	0.35721279	0.428655348	0.685848557	
	CC 0.3m addition		Length (m)	1410	GIS/NFCDD	518	Sustain	Long	0.2	0.146085743	0.228258973	0.273910767	0.438257228	
	Railway Embankment (check elements)	1131801070201L01	Length (km)	0.37	GIS/NFCDD	5405	Maintain	Short to long term	30	0.059991481	0.09373669	0.112484027	0.179974444	
													1.304080228	TOTAL
Option 2. Vertical or wave recurve wall additions of up to 0.5m to the existing structure. Dawlish Warren sand spit distal section flattened in 2060.	Railway Embankment (check elements)	1131801070101L02	Length (km)	1.41	GIS/NFCDD	5405	Maintain	Short to long term	30	0.228616186	0.35721279	0.428655348	0.685848557	
	Wave recurve 0.25m addition		Length (m)	1410	GIS/NFCDD	155	Sustain	Long	0.2	0.043589486	0.068108572	0.081730286	0.130768458	
	Railway Embankment (check elements)	1131801070201L01	Length (km)	0.37	GIS/NFCDD	5405	Maintain	Short to long term	30	0.059991481	0.09373669	0.112484027	0.179974444	
													0.996591459	TOTAL





FCRMU approach	Asset Type	Asset reference	Parameter	Amount	Reference	Rate (£/parameter)	HLO	Epoch	Epochal discount factor	Basic construction cost (£M)	Plus Tidal/urban uplift (25% each) cost (£M)	Plus PAR, design and supervision (20%) cost (£M)	Plus Optimism bias 60% cost (£M)	
SHORT-LISTED ALIGNMENT AND TYPE OPTIONS														
Option 1. Further reconstruction and/or raising of building walls, and reconstruction of the existing flood gates of 0-0.7m by 2110. Dawlish Warren sand spit distal section flattened in 2060.	MASONRY WALL	113FAS3351006C02	Length (km)	0.04	GIS/NFCDD	5405	Maintain	Short to long term	30	0.006485566	0.010133696	0.012160435	0.019456697	
	CC 0.3m addition		Length (m)	40	GIS/NFCDD	518	Sustain	Long	0.2	0.004144276	0.006475432	0.007770518	0.012432829	
	Masonry Wall	113FAS3351006C03	Length (km)	0.04	GIS/NFCDD	5405	Maintain	Short to long term	30	0.006485566	0.010133696	0.012160435	0.019456697	
	CC 0.3m addition		Length (m)	40	GIS/NFCDD	518	Sustain	Long	0.2	0.004144276	0.006475432	0.007770518	0.012432829	
	Masonry Wall	113FAS3351006C04	Length (km)	0.04	GIS/NFCDD	5405	Maintain	Short to long term	30	0.006485566	0.010133696	0.012160435	0.019456697	
	CC 0.3m addition		Length (m)	40	GIS/NFCDD	518	Sustain	Long	0.2	0.004144276	0.006475432	0.007770518	0.012432829	
	MASONRY WALL	113FAS3351006C05	Length (km)	0.05	GIS/NFCDD	5405	Maintain	Short to long term	30	0.008106957	0.01266712	0.015200544	0.024320871	
	CC 0.3m addition		Length (m)	50	GIS/NFCDD	518	Sustain	Medium	0.5	0.012950864	0.020235725	0.024282869	0.038852591	
	CC 0.3m addition		Length (m)	50	GIS/NFCDD	518	Sustain	Long	0.2	0.005180345	0.00809429	0.009713148	0.015541036	
	MASONRY WALL	113FAS3351006C06	Length (km)	0.03	GIS/NFCDD	5405	Maintain	Short to long term	30	0.004864174	0.007600272	0.009120327	0.014592522	
	CC 0.3m addition		Length (m)	30	GIS/NFCDD	518	Sustain	Long	0.2	0.003108207	0.004856574	0.005827889	0.009324622	
	MASONRY WALL	113FAS3351006C07	Length (km)	0.05	GIS/NFCDD	5405	Maintain	Short to long term	30	0.008106957	0.01266712	0.015200544	0.024320871	
	CC 0.3m addition		Length (m)	50	GIS/NFCDD	518	Sustain	Medium	0.5	0.012950864	0.020235725	0.024282869	0.038852591	
	CC 0.3m addition		Length (m)	50	GIS/NFCDD	518	Sustain	Long	0.2	0.005180345	0.00809429	0.009713148	0.015541036	
	Masonry Wall, Limekiln.	113FAS3351006C08	Length (km)	0.02	GIS/NFCDD	5405	Maintain	Short to long term	30	0.003242783	0.005066848	0.006080218	0.009728348	
	CC 0.3m addition		Length (m)	0.02	GIS/NFCDD	518	Sustain	Long	0.2	2.07214E-06	3.23772E-06	3.88526E-06	6.21641E-06	
	Masonry Wall	113FAS3351006C09	Length (km)	0.03	GIS/NFCDD	5405	Maintain	Short to long term	30	0.004864174	0.007600272	0.009120327	0.014592522	
	Building Walls	113FAS3351006C10	Length (km)	0.02	GIS/NFCDD	5405	Maintain	Short to long term	30	0.003242783	0.005066848	0.006080218	0.009728348	
	CC 0.3m addition		Length (m)	20	GIS/NFCDD	518	Sustain	Medium	0.5	0.005180345	0.00809429	0.009713148	0.015541036	
	CC 0.3m addition		Length (m)	20	GIS/NFCDD	518	Sustain	Long	0.2	0.002072138	0.003237716	0.003885259	0.006216415	
	Natural Cliff	113FAS3351007C01	Length (km)	0.39	GIS/NFCDD	0	Maintain	Short to long term	30	0	0	0	0	
	Railway Embankment with Revetment and Wall	113FAS3351007C07	Length (km)	0.39	GIS/NFCDD	5405	Maintain	Short to long term	30	0.063234264	0.098803538	0.118564245	0.189702792	
	Replacement of flood gates		Number	7	GIS/NFCDD	500000	Sustain	Long	0.2	0.7	1.09375	1.3125	2.1	
													2.622530397	TOTAL





ADDITIONAL ASSESSMENT OF TIMING OF PERMANENT FLATTENING OF DAWLISH WARREN SAND SPIT DISTAL SECTION														
Dawlish Warren sand spit maintained, Improve with existing form when and where necessary	MASONRY WALL	113FAS3351006C02	Length (km)	0.04	GIS/NFCDD	5405	Maintain	Short to long term	30	0.006485566	0.010133696	0.012160435	0.019456697	
	CC 0.3m addition		Length (m)	40	GIS/NFCDD	518	Sustain	Long	0.2	0.004144276	0.006475432	0.007770518	0.012432829	
	Masonry Wall	113FAS3351006C03	Length (km)	0.04	GIS/NFCDD	5405	Maintain	Short to long term	30	0.006485566	0.010133696	0.012160435	0.019456697	
	CC 0.3m addition		Length (m)	40	GIS/NFCDD	518	Sustain	Long	0.2	0.004144276	0.006475432	0.007770518	0.012432829	
	Masonry Wall	113FAS3351006C04	Length (km)	0.04	GIS/NFCDD	5405	Maintain	Short to long term	30	0.006485566	0.010133696	0.012160435	0.019456697	
	CC 0.3m addition		Length (m)	40	GIS/NFCDD	518	Sustain	Long	0.2	0.004144276	0.006475432	0.007770518	0.012432829	
	MASONRY WALL	113FAS3351006C05	Length (km)	0.05	GIS/NFCDD	5405	Maintain	Short to long term	30	0.008106957	0.01266712	0.015200544	0.024320871	
	CC 0.3m addition		Length (m)	50	GIS/NFCDD	518	Sustain	Long	0.2	0.005180345	0.00809429	0.009713148	0.015541036	
	MASONRY WALL	113FAS3351006C06	Length (km)	0.03	GIS/NFCDD	5405	Maintain	Short to long term	30	0.004864174	0.007600272	0.009120327	0.014592522	
	CC 0.3m addition		Length (m)	30	GIS/NFCDD	518	Sustain	Long	0.2	0.003108207	0.004856574	0.005827889	0.009324622	
	MASONRY WALL	113FAS3351006C07	Length (km)	0.05	GIS/NFCDD	5405	Maintain	Short to long term	30	0.008106957	0.01266712	0.015200544	0.024320871	
	CC 0.3m addition		Length (m)	50	GIS/NFCDD	518	Sustain	Medium	0.5	0.012950864	0.020235725	0.024282869	0.038852591	
	CC 0.3m addition		Length (m)	50	GIS/NFCDD	518	Sustain	Long	0.2	0.005180345	0.00809429	0.009713148	0.015541036	
	Masonry Wall, Limekiln.	113FAS3351006C08	Length (km)	0.02	GIS/NFCDD	5405	Maintain	Short to long term	30	0.003242783	0.005066848	0.006080218	0.009728348	
	CC 0.6m addition		Length (m)	20	GIS/NFCDD	1036	Sustain	Long	0.2	0.004144276	0.006475432	0.007770518	0.012432829	
	Masonry Wall	113FAS3351006C09	Length (km)	0.03	GIS/NFCDD	5405	Maintain	Short to long term	30	0.004864174	0.007600272	0.009120327	0.014592522	
	Building Walls	113FAS3351006C10	Length (km)	0.02	GIS/NFCDD	5405	Maintain	Short to long term	30	0.003242783	0.005066848	0.006080218	0.009728348	
	CC 0.3m addition		Length (m)	20	GIS/NFCDD	518	Sustain	Medium	0.5	0.005180345	0.00809429	0.009713148	0.015541036	
	CC 0.3m addition		Length (m)	20	GIS/NFCDD	518	Sustain	Long	0.2	0.002072138	0.003237716	0.003885259	0.006216415	
	Natural Cliff	113FAS3351007C01	Length (km)	0.39	GIS/NFCDD	0	Maintain	Short to long term	30	0	0	0	0	
	Railway Embankment with Revetment and Wall	113FAS3351007C07	Length (km)	0.39	GIS/NFCDD	5405	Maintain	Short to long term	30	0.063234264	0.098803538	0.118564245	0.189702792	
	Replacement of flood gates		Number	7	GIS/NFCDD	500000	Sustain	Long	0.2	0.7	1.09375	1.3125	2.1	
													2.596104419	TOTAL
Dawlish Warren sand spit distal section flattened in 2030, Improve with existing form when and where necessary	MASONRY WALL	113FAS3351006C02	Length (km)	0.04	GIS/NFCDD	5405	Maintain	Short to long term	30	0.006485566	0.010133696	0.012160435	0.019456697	
	CC 0.3m addition		Length (m)	40	GIS/NFCDD	518	Sustain	Long	0.2	0.004144276	0.006475432	0.007770518	0.012432829	
	Masonry Wall	113FAS3351006C03	Length (km)	0.04	GIS/NFCDD	5405	Maintain	Short to long term	30	0.006485566	0.010133696	0.012160435	0.019456697	
	CC 0.3m addition		Length (m)	40	GIS/NFCDD	518	Sustain	Long	0.2	0.004144276	0.006475432	0.007770518	0.012432829	
	Masonry Wall	113FAS3351006C04	Length (km)	0.04	GIS/NFCDD	5405	Maintain	Short to long term	30	0.006485566	0.010133696	0.012160435	0.019456697	
	CC 0.3m addition		Length (m)	40	GIS/NFCDD	518	Sustain	Long	0.2	0.004144276	0.006475432	0.007770518	0.012432829	
	MASONRY WALL	113FAS3351006C05	Length (km)	0.05	GIS/NFCDD	5405	Maintain	Short to long term	30	0.008106957	0.01266712	0.015200544	0.024320871	
	CC 0.3m addition		Length (m)	50	GIS/NFCDD	518	Sustain	Short	1	0.025901727	0.040471449	0.048565739	0.077705182	
	CC 0.3m addition		Length (m)	50	GIS/NFCDD	518	Sustain	Medium	0.5	0.012950864	0.020235725	0.024282869	0.038852591	
	CC 0.3m addition		Length (m)	50	GIS/NFCDD	518	Sustain	Long	0.2	0.005180345	0.00809429	0.009713148	0.015541036	
	MASONRY WALL	113FAS3351006C06	Length (km)	0.03	GIS/NFCDD	5405	Maintain	Short to long term	30	0.004864174	0.007600272	0.009120327	0.014592522	
	CC 0.3m addition		Length (m)	30	GIS/NFCDD	518	Sustain	Long	0.2	0.003108207	0.004856574	0.005827889	0.009324622	
	MASONRY WALL	113FAS3351006C07	Length (km)	0.05	GIS/NFCDD	5405	Maintain	Short to long term	30	0.008106957	0.01266712	0.015200544	0.024320871	
	CC 0.3m addition		Length (m)	50	GIS/NFCDD	518	Improve	Short	1	0.025901727	0.040471449	0.048565739	0.077705182	
	CC 0.3m addition		Length (m)	50	GIS/NFCDD	518	Sustain	Medium	0.5	0.012950864	0.020235725	0.024282869	0.038852591	
	CC 0.3m addition		Length (m)	50	GIS/NFCDD	518	Sustain	Long	0.2	0.005180345	0.00809429	0.009713148	0.015541036	
	Masonry Wall, Limekiln.	113FAS3351006C08	Length (km)	0.02	GIS/NFCDD	5405	Maintain	Short to long term	30	0.003242783	0.005066848	0.006080218	0.009728348	
	CC 0.3m addition		Length (m)	0.02	GIS/NFCDD	518	Sustain	Long	0.2	2.07214E-06	3.23772E-06	3.88526E-06	6.21641E-06	
	Masonry Wall	113FAS3351006C09	Length (km)	0.03	GIS/NFCDD	5405	Maintain	Short to long term	30	0.004864174	0.007600272	0.009120327	0.014592522	
	Building Walls	113FAS3351006C10	Length (km)	0.02	GIS/NFCDD	5405	Maintain	Short to long term	30	0.003242783	0.005066848	0.006080218	0.009728348	
	CC 0.3m addition		Length (m)	20	GIS/NFCDD	518	Sustain	Short	1	0.010360691	0.01618858	0.019426296	0.031082073	
	CC 0.3m addition		Length (m)	20	GIS/NFCDD	518	Sustain	Medium	0.5	0.005180345	0.00809429	0.009713148	0.015541036	
	CC 0.3m addition		Length (m)	20	GIS/NFCDD	518	Sustain	Long	0.2	0.002072138	0.003237716	0.003885259	0.006216415	
	Natural Cliff	113FAS3351007C01	Length (km)	0.39	GIS/NFCDD	0	Maintain	Short to long term	30	0	0	0	0	
	Railway Embankment with Revetment and Wall	113FAS3351007C07	Length (km)	0.39	GIS/NFCDD	5405	Maintain	Short to long term	30	0.063234264	0.098803538	0.118564245	0.189702792	
	Replacement of flood gates		Number	7	GIS/NFCDD	500000	Sustain	Long	0.2	0.7	1.09375	1.3125	2.1	
													2.809022834	TOTAL

K.8 The east bank of the Lower Clyst



FCRMU approach	Asset Type	Asset reference	Parameter	Amount	Reference	Rate (£/parameter)	HLO	Epoch	Epochal discount factor	Basic construction cost (£M)	Plus Tidal/urban uplift (25% each) cost (£M)	Plus PAR, design and supervision (20%) cost (£M)	Plus Optimism bias 60% cost (£M)	
SHORT-LISTED ALIGNMENT AND TYPE OPTIONS														
Short Term Option 1 and Medium to Long Term Option 1. Breach of 100m length in the existing embankment, a new embankment along the north side of the C527 of up to 1.5m to provide continued or improve flood protection to the road and local properties, rock armour protection to the C527 and railway bridges to address erosion risk, and raising of the assets downstream of the C527 bridge (up to 0.5m). Rising ground levels at the landward extent would naturally constrain the extent of inundation.	Earth Embankment	1131801070204L01	Length (km)	0.78	GIS/NFCDD	1081	Maintain	Short to long term	30	0.025293706	0.039521415	0.047425698	0.075881117	
	EWL impact 0.5m addition		Length (m)	780	GIS/NFCDD	305	Sustain	Short	1	0.237760833	0.297201041	0.356641249	0.570625999	
	Wall	1131801070202L05	Length (km)	0.04	GIS/NFCDD	5405	Maintain	Short to long term	30	0.006485566	0.010133696	0.012160435	0.019456697	
	EWL impact 0.5m addition		Length (m)	40	GIS/NFCDD	1036	Sustain	Short	1	0.041442764	0.051803455	0.062164146	0.099462633	
	Timber Pile Wall With Concrete Cap	1131801070202L06	Length (km)	0.02	GIS/NFCDD	5405	Maintain	Short to long term	30	0.003242783	0.005066848	0.006080218	0.009728348	
	EWL impact 0.5m addition		Length (m)	20	GIS/NFCDD	1036	Sustain	Short	1	0.020721382	0.025901727	0.031082073	0.049731317	
	Ramp block wall.	1131801070202L03	Length (km)	0.02	GIS/NFCDD	5405	Maintain	Short to long term	30	0.003242783	0.005066848	0.006080218	0.009728348	
	EWL impact 0.5m addition		Length (m)	20	GIS/NFCDD	1036	Sustain	Short	1	0.020721382	0.025901727	0.031082073	0.049731317	
	Earth Embankment	1131801070202L02	Length (km)	0.05	GIS/NFCDD	1081	Maintain	Short to long term	30	0.001621391	0.002533424	0.003040109	0.004864174	
	EWL impact 0.5m addition		Length (m)	50	GIS/NFCDD	305	Sustain	Short	1	0.015241079	0.019051349	0.022861619	0.03657859	
	Earth Embankment	1131801070202L01	Length (km)	0.09	GIS/NFCDD	1081	Maintain	Short to long term	30	0.002918504	0.004560163	0.005472196	0.008755513	
	EWL impact 0.5m addition		Length (m)	90	GIS/NFCDD	305	Sustain	Short	1	0.027433942	0.034292428	0.041150913	0.065841461	
	Earth Embankment	Dummy1	Length (km)	0.29	GIS/NFCDD	1081	Maintain	Short to long term	30	0.00940407	0.014693859	0.017632631	0.02821221	
	100m long breach in existing embankment u/s of Topsham, Bridge		Length (m)	100		300	Maintain	Short	1	0.03	0.046875	0.05625	0.09	
	Rock armour toe protection to abutment		Length (m)	50		2724	Maintain	Short	1	0.136196876	0.212807619	0.255369143	0.408590629	
	Maintenance of rock armour toe protection to abutment		Length (km)	0.1		5405	Maintain	Short to long term	30	0.016213914	0.02533424	0.030401088	0.048641742	
	Rock armour toe protection to Clyst Bridge abutment		Length (m)	50		2724	Maintain	Short	1	0.136196876	0.212807619	0.255369143	0.408590629	
	Maintenance of rock armour toe protection to Clyst Bridge abutment		Length (km)	0.1		5405	Maintain	Short to long term	30	0.016213914	0.02533424	0.030401088	0.048641742	
	ST Realigned embankment maintenance		Length (km)	0.53	GIS/NFCDD	5405	Manage	Short to long term	30	0.085933743	0.107417179	0.128900615	0.206240984	
	ST Realigned embankment construction 1.5m height		Length (m)	530	GIS/NFCDD	1177	Manage	Short	1	0.623878978	0.779848722	0.935818467	1.497309547	
	ST land compensation		Area (Ha)	34.25	GIS/NFCDD	15000	Manage	Short	1	0.51375	0.6421875	0.770625	1.233	
													4.969612998	TOTAL
												Cost (£K/Ha) for MR	115.0661394	
Short Term Option 2 and Medium to Long Term Option 2. Breach of 100m length in the existing embankments, and raising of the C527 road with culverts. Rising ground levels at the landward extent would naturally constrain the extent of inundation.	Earth Embankment	1131801070204L01	Length (km)	0.78	GIS/NFCDD	1081	Maintain	Short to long term	30	0.025293706	0.039521415	0.047425698	0.075881117	
	Wall	1131801070202L05	Length (km)	0.04	GIS/NFCDD	5405	Maintain	Short to long term	30	0.006485566	0.010133696	0.012160435	0.019456697	
	Timber Pile Wall With Concrete Cap	1131801070202L06	Length (km)	0.02	GIS/NFCDD	5405	Maintain	Short to long term	30	0.003242783	0.005066848	0.006080218	0.009728348	
	Ramp block wall.	1131801070202L03	Length (km)	0.02	GIS/NFCDD	5405	Maintain	Short to long term	30	0.003242783	0.005066848	0.006080218	0.009728348	
	Earth Embankment	1131801070202L02	Length (km)	0.05	GIS/NFCDD	1081	Maintain	Short to long term	30	0.001621391	0.002533424	0.003040109	0.004864174	
	Earth Embankment	1131801070202L01	Length (km)	0.09	GIS/NFCDD	1081	Maintain	Short to long term	30	0.002918504	0.004560163	0.005472196	0.008755513	
	Earth Embankment	Dummy1	Length (km)	0.29	GIS/NFCDD	1081	Maintain	Short to long term	30	0.00940407	0.014693859	0.017632631	0.02821221	
	100m long breach in existing embankment u/s of Topsham, Bridge		Length (m)	100		300	Maintain	Short	1	0.03	0.046875	0.05625	0.09	
	100m long breach in existing embankment d/s of Topsham, Bridge		Length (m)	100		300	Maintain	Short	1	0.03	0.046875	0.05625	0.09	
	ST Realigned revetment maintenance		Length (km)	0.53	GIS/NFCDD	5405	Manage	Short to long term	30	0.085933743	0.107417179	0.128900615	0.206240984	
	ST Realigned revetment construction 1.5m height		Length (m)	530	GIS/NFCDD	3209	Manage	Short	1	1.700911873	2.126139841	2.551367809	4.082188495	
	ST Realigned 5 culvert (assumed) construction		Number	5	GIS/NFCDD	300000	Manage	Short	1	1.5	1.875	2.25	3.6	
	ST land compensation		Area (Ha)	38.091	GIS/NFCDD	15000	Manage	Short	1	0.571365	0.71420625	0.8570475	1.371276	
													9.596331887	TOTAL
												Cost (£K/Ha) for MR	247.8198388	



ADDITIONAL ASSESSMENT OF HIGH LEVEL OPTIONS													
Improve HLO	Earth Embankment	1131801070204L01	Length (km)	0.78	GIS/NFCDD	1081	Maintain	Short to long term	30	0.025293706	0.039521415	0.047425698	0.075881117
	Wall	1131801070202L05	Length (km)	0.04	GIS/NFCDD	5405	Maintain	Short to long term	30	0.006485566	0.010133696	0.012160435	0.019456697
	Timber Pile Wall With Concrete Cap	1131801070202L06	Length (km)	0.02	GIS/NFCDD	5405	Maintain	Short to long term	30	0.003242783	0.005066848	0.006080218	0.009728348
	Ramp block wall.	1131801070202L03	Length (km)	0.02	GIS/NFCDD	5405	Maintain	Short to long term	30	0.003242783	0.005066848	0.006080218	0.009728348
	CC 0.3m addition		Length (m)	20	GIS/NFCDD	152	Sustain	Long	0.2	0.000609643	0.000762054	0.000914465	0.001463144
	Earth Embankment	1131801070202L02	Length (km)	0.05	GIS/NFCDD	1081	Maintain	Short to long term	30	0.001621391	0.002533424	0.003040109	0.004864174
	CC 0.3m addition		Length (m)	50	GIS/NFCDD	152	Sustain	Long	0.2	0.001524108	0.001905135	0.002286162	0.003657859
	Earth Embankment	1131801070202L01	Length (km)	0.09	GIS/NFCDD	1081	Maintain	Short to long term	30	0.002918504	0.004560163	0.005472196	0.008755513
	CC 0.3m addition		Length (m)	90	GIS/NFCDD	152	Sustain	Long	0.2	0.002743394	0.003429243	0.004115091	0.006584146
	Earth Embankment	Dummy1	Length (km)	2.55	GIS/NFCDD	1081	Manage	Short to long term	30	0.082690961	0.129204626	0.155045551	0.248072882
	CC 1m addition		Length (m)	2550	GIS/NFCDD	965	Manage	Short	1	2.461434264	3.845991038	4.615189245	7.384302792
	CC 0.3m addition		Length (m)	2550	GIS/NFCDD	152	Manage	Medium	0.5	0.194323758	0.242904697	0.291485637	0.466377018
	CC 0.3m addition		Length (m)	2550	GIS/NFCDD	152	Manage	Long	0.2	0.077729503	0.097161879	0.116594255	0.186550807
												8.425422847	TOTAL



FCRMU approach	Asset Type	Asset reference	Parameter	Amount	Reference	Rate (£/parameter)	HLO	Epoch	Epochal discount factor	Basic construction cost (£M)	Plus Tidal/urban uplift (25% each) cost (£M)	Plus PAR, design and supervision (20%) cost (£M)	Plus Optimism bias 60% cost (£M)	
SHORT-LISTED ALIGNMENT AND TYPE OPTIONS														
Option 1. Continued maintenance and raising of the Frog Lane and Winslade Barton embankments by between 0-1.5m. The remaining embankments would continue to be unmaintained.	Earth Embankment	Whole of Dummy3	Length (km)	1.68	GIS/NFCDD	1081	Maintain	Short to long term	30	0.054478751	0.085123048	0.102147657	0.163436252	
	FCRMU08 0.25m EWL influence		Length (m)	1680	GIS/NFCDD	152	Sustain	Short	1	0.256050128	0.32006266	0.384075192	0.614520307	
	CC 0.3m addition		Length (m)	1680	GIS/NFCDD	152	Sustain	Medium	0.5	0.128025064	0.16003133	0.192037596	0.307260153	
	CC 0.3m addition		Length (m)	1680	GIS/NFCDD	152	Sustain	Long	0.2	0.051210026	0.064012532	0.076815038	0.122904061	
													1.208120773	TOTAL
ADDITIONAL ASSESSMENT OF HIGH LEVEL OPTIONS														
Improve HLO	Earth Embankment	Dummy2	Length (km)	0.69	GIS/NFCDD	1081	Manage	Short to long term	30	0.022375201	0.034961252	0.041953502	0.067125603	
	CC 1m addition		Length (m)	690	GIS/NFCDD	965	Improve	Short	1	0.666035154	1.040679928	1.248815913	1.998105461	
	CC 0.3m addition		Length (m)	690	GIS/NFCDD	152	Sustain	Medium	0.5	0.052581723	0.065727153	0.078872584	0.126196134	
	CC 0.3m addition		Length (m)	690	GIS/NFCDD	152	Sustain	Long	0.2	0.021032689	0.026290861	0.031549034	0.050478454	
	Earth Embankment	Dummy3	Length (km)	0.96	GIS/NFCDD	1081	Manage	Short to long term	30	0.031130715	0.048641742	0.05837009	0.093392144	
	FCRMU08 0.25m EWL influence		Length (m)	960	GIS/NFCDD	152	Sustain	Short	1	0.146314359	0.182892948	0.219471538	0.351154461	
	CC 0.3m addition		Length (m)	960	GIS/NFCDD	152	Sustain	Medium	0.5	0.073157179	0.091446474	0.109735769	0.17557723	
	CC 0.3m addition		Length (m)	960	GIS/NFCDD	152	Sustain	Long	0.2	0.029262872	0.03657859	0.043894308	0.070230892	
	Earth Embankment	Dummy4	Length (km)	0.74	GIS/NFCDD	1081	Manage	Short to long term	30	0.023996593	0.037494676	0.044993611	0.071989778	
	CC 0.3m addition		Length (m)	740	GIS/NFCDD	152	Sustain	Long	0.2	0.022556797	0.028195996	0.033835195	0.054136313	
	Earth Embankment	Dummy5	Length (km)	0.56	GIS/NFCDD	1081	Manage	Short to long term	30	0.018159584	0.028374349	0.034049219	0.054478751	
	Earth Embankment	Dummy6	Length (km)	1.71	GIS/NFCDD	1081	Manage	Short to long term	30	0.055451585	0.086643102	0.103971723	0.166354756	
													3.279219978	TOTAL



K.10 Sowton and West Bank of the Lower Clyst



FCRMU approach	Asset Type	Asset reference	Parameter	Amount	Reference	Rate (£/parameter)	HLO	Epoch	Epochal discount factor	Basic construction cost (£M)	Plus Tidal/urban uplift (25% each) cost (£M)	Plus PAR, design and supervision (20%) cost (£M)	Plus Optimism bias 60% cost (£M)	
SHORT-LISTED ALIGNMENT AND TYPE OPTIONS														
Option 1. 100m breaches in the existing embankments, from the Frying Pan to the C527 bridge, with rising ground levels naturally constraining inundation, or an embankment at 'the foot'. Maintenance of the existing embankment around Bowling Green Marsh, with raising of between 0-1.5m in the medium to long term. The remaining embankments would continue to be unmaintained.	Earth Embankment	Dummy7	Length (km)	1.06	GIS/NFCDD	0	Al, Manag	Short to long term	0	0	0	0	0	
	Earth Embankment	Dummy8	Length (km)	1.12	GIS/NFCDD	0	Al, Manag	Short to long term	0	0	0	0	0	
	Earth Embankment	Dummy9	Length (km)	1.16	GIS/NFCDD	1081	Maintain	Short to long term	30	0.03761628	0.058775438	0.070530525	0.112848841	
	Earth Embankment	Dummy10	Length (km)	0.36	GIS/NFCDD	1081	Maintain	Short to long term	30	0.011674018	0.018240653	0.021888784	0.035022054	
	Earth Embankment	Dummy11	Length (km)	2.4	GIS/NFCDD	1081	Maintain	Short to long term	30	0.077826787	0.121604354	0.145925225	0.23348036	
	Earth Embankment	Dummy12	Length (km)	0.54	GIS/NFCDD	0	Manage	Short to long term	0	0	0	0	0	
	Earth Embankment	Dummy13	Length (km)	0.28	GIS/NFCDD	1081	Maintain	Short to long term	30	0.009079792	0.014187175	0.01702461	0.027239375	
	Naturalised bank	1131801070203R01	Length (km)	0.09	GIS/NFCDD	1081	Maintain	Short to long term	30	0.002918504	0.004560163	0.005472196	0.008755513	
	0	1131801070202R01	Length (km)	0.35	GIS/NFCDD	1081	Maintain	Short to long term	30	0.01134974	0.017733968	0.021280762	0.034049219	
	Embankment	1131801070201R03	Length (km)	0.57	GIS/NFCDD	1081	Maintain	Short to long term	30	0.018483862	0.028881034	0.034657241	0.055451585	
	Embankment	1131801070201R02	Length (km)	0.23	GIS/NFCDD	1081	Maintain	Short to long term	30	0.0074584	0.011653751	0.013984501	0.022375201	
	Railway Bridge Abutment	1131801070201R01	Length (km)	0.03	GIS/NFCDD	5405	Maintain	Short to long term	30	0.004864174	0.007600272	0.009120327	0.014592522	
	Embankment	1131801070102R02	Length (km)	0.51	GIS/NFCDD	1081	Maintain	Short to long term	30	0.016538192	0.025840925	0.03100911	0.049614576	
	Cut off bank of up to 1m high if necessary across 'the foot'		Length (m)	100		1198		Short	1	0.11976551	0.18713361	0.224560332	0.359296531	
	Rock armour toe protection to railway bridge abutment		Length (m)	50		2724		Short	1	0.136196876	0.212807619	0.255369143	0.408590629	
	Maintenance of rock armour toe protection to railway bridge abutment		Length (km)	0.1		5405		Short to long term	30	0.016213914	0.02533424	0.030401088	0.048641742	
	Rock armour toe protection to Clyst Bridge abutment		Length (m)	50		2724		Short	1	0.136196876	0.212807619	0.255369143	0.408590629	
	Maintenance of rock armour toe protection to Clyst Bridge abutment		Length (km)	0.1		5405		Short to long term	30	0.016213914	0.02533424	0.030401088	0.048641742	
	ST land compensation		Area (Ha)	10	GIS/NFCDD	15000		Medium term	1	0.15	0.1875	0.225	0.36	
													2.227190521	TOTAL
												Cost (£K/Ha) for MR	127.4464742	



FCRMU approach	Asset Type	Asset reference	Parameter	Amount	Reference	Rate (£/parameter)	HLO	Epoch	Epochal discount factor	Basic construction cost (£M)	Plus Tidal/urban uplift (25% each) cost (£M)	Plus PAR, design and supervision (20%) cost (£M)	Plus Optimism bias 60% cost (£M)	
SHORT-LISTED ALIGNMENT AND TYPE OPTIONS														
Short Term Option 1. New walls or embankments along the playing field periphery, of up to 0.5m in height.	New embankment or wall of 0.5m		Length (m)	250		598		Short	1	0.149573355	0.233708368	0.280450041	0.448720066	
													0.448720066	TOTAL
Short Term Option 2. Property resilience for around 10 properties located along the periphery of the playing field. Local road/pavement raising as FCRMU	Property resilience for c10 properties		Number	10		10809		Short	1	0.108092759	0.168894936	0.202673923	0.324278277	
	New embankment or wall of 0.5m		Length (m)	20		299		Short	1	0.005982934	0.009348335	0.011218002	0.017948803	
													0.34222708	TOTAL
Short Term Option 3. Property resilience for around 20 properties located along the periphery of the playing field.	Property resilience for c20 properties		Number	20		10809		Short	1	0.216185518	0.337789872	0.405347847	0.648556555	
													0.648556555	TOTAL





Medium to Long Term Option 1. Wider raising of quay walls in Topsham (along The Strand) of between 0-2m dependent on climate change scenario. The upper limit of raising would be unlikely to be viable on engineering, landscape and operational grounds.	Flood Wall	1131801070102R01	Length (km)	0.42	GIS/NFCDD	5405	Maintain	Short to long term	30	0.068098438	0.10640381	0.127684572	0.204295345	
	Hump In Road	1131801000302L02	Length (km)	0.09	GIS/NFCDD	5405	Maintain	Short to long term	30	0.014592522	0.022800816	0.02736098	0.04377775	
	CC 0.3m addition		Length (m)	90	GIS/NFCDD	518	Sustain	Medium	0.5	0.023311555	0.036424304	0.043709165	0.0699346	
	CC 0.3m addition		Length (m)	90	GIS/NFCDD	518	Sustain	Long	0.2	0.009324622	0.014569722	0.017483666	0.027973866	
	0	1131801000302L01	Length (km)	0.25	GIS/NFCDD	5405	Maintain	Short to long term	30	0.040534785	0.063335601	0.076002721	0.121604354	
	CC 0.1m addition		Length (m)	250	GIS/NFCDD	518	Sustain	Short	1	0.129508637	0.202357245	0.242828694	0.388525911	
	CC 0.3m addition		Length (m)	250	GIS/NFCDD	518	Sustain	Medium	0.5	0.064754319	0.101178623	0.121414347	0.194262956	
	CC 0.3m addition		Length (m)	250	GIS/NFCDD	518	Sustain	Long	0.2	0.025901727	0.040471449	0.048565739	0.077705182	
	Natural Bank	1131801000302L40	Length (km)	0.21	GIS/NFCDD	0	Maintain	Short to long term	30	0	0	0	0	
	Private Slipway and Storage Yard	1131801000302L39	Length (km)	0.05	GIS/NFCDD	5405	Maintain	Short to long term	30	0.008106957	0.01266712	0.015200544	0.024320871	
	Wall	1131801000302L29	Length (km)	0.09	GIS/NFCDD	5405	Maintain	Short to long term	30	0.014592522	0.022800816	0.02736098	0.0437777567	
	Wall	1131801000302L31	Length (km)	0.07	GIS/NFCDD	5405	Maintain	Short to long term	30	0.01134974	0.017733968	0.021280762	0.034049219	
	CC 0.3m addition		Length (m)	70	GIS/NFCDD	518	Sustain	Long	0.2	0.007252484	0.011332006	0.013598407	0.021757451	
	Wall	1131801000302L32	Length (km)	0.04	GIS/NFCDD	5405	Maintain	Short to long term	30	0.006485566	0.010133696	0.012160435	0.019456697	
	CC 0.3m addition		Length (m)	40	GIS/NFCDD	518	Sustain	Long	0.2	0.004144276	0.006475432	0.007770518	0.012432829	
	Wall	1131801000302L34	Length (km)	0.11	GIS/NFCDD	5405	Maintain	Short to long term	30	0.017835305	0.027867664	0.033441197	0.053505916	
	CC 0.3m addition		Length (m)	110	GIS/NFCDD	518	Sustain	Medium	0.5	0.0284919	0.044518594	0.053422313	0.0854757	
	CC 0.3m addition		Length (m)	110	GIS/NFCDD	518	Sustain	Long	0.2	0.01139676	0.017807438	0.021368925	0.03419028	
	Slipway	1131801000302L35	Length (km)	0.04	GIS/NFCDD	5405	Maintain	Short to long term	30	0.006485566	0.010133696	0.012160435	0.019456697	
	CC 0.3m addition		Length (m)	40	GIS/NFCDD	518	Sustain	Medium	0.5	0.010360691	0.01618858	0.019426296	0.031082073	
	CC 0.3m addition		Length (m)	40	GIS/NFCDD	518	Sustain	Long	0.2	0.004144276	0.006475432	0.007770518	0.012432829	
	Wall	1131801000302L36	Length (km)	0.1	GIS/NFCDD	5405	Maintain	Short to long term	30	0.016213914	0.02533424	0.030401088	0.048641742	
	CC 0.3m addition		Length (m)	100	GIS/NFCDD	518	Sustain	Long	0.2	0.010360691	0.01618858	0.019426296	0.031082073	
	Wall	1131801000302L37	Length (km)	0.12	GIS/NFCDD	5405	Maintain	Short to long term	30	0.019456697	0.030401088	0.036481306	0.05837009	
	Natural Bank	1131801000302L38	Length (km)	0.09	GIS/NFCDD	0	Maintain	Short to long term	30	0	0	0	0	
	Wall Fronting Gardens	1131801000302L11	Length (km)	0.05	GIS/NFCDD	5405	Maintain	Short to long term	30	0.008106957	0.01266712	0.015200544	0.024320871	
	Wall Fronting Flats	1131801000302L15	Length (km)	0.03	GIS/NFCDD	5405	Maintain	Short to long term	30	0.004864174	0.007600272	0.009120327	0.014592522	
	CC 0.3m addition		Length (m)	30	GIS/NFCDD	518	Sustain	Long	0.2	0.003108207	0.004856574	0.005827889	0.009324622	
	Wall	1131801000302L16	Length (km)	0.07	GIS/NFCDD	5405	Maintain	Short to long term	30	0.01134974	0.017733968	0.021280762	0.034049219	
	CC 0.1m addition		Length (m)	70	GIS/NFCDD	518	Sustain	Short	1	0.036262418	0.056660029	0.067992034	0.108787255	
	CC 0.3m addition		Length (m)	70	GIS/NFCDD	518	Sustain	Medium	0.5	0.018131209	0.028330014	0.033996017	0.054393628	
	CC 0.3m addition		Length (m)	70	GIS/NFCDD	518	Sustain	Long	0.2	0.007252484	0.011332006	0.013598407	0.021757451	
	Surrounding Wall, With Gate in South West Facing Wall	1131801000302L07	Length (km)	0.15	GIS/NFCDD	5405	Maintain	Short to long term	30	0.024320871	0.038001361	0.045601633	0.072962612	
	CC 0.1m addition		Length (m)	150	GIS/NFCDD	518	Sustain	Short	1	0.077705182	0.121414347	0.145697217	0.233115547	
	CC 0.3m addition		Length (m)	150	GIS/NFCDD	518	Sustain	Medium	0.5	0.038852591	0.060707174	0.072848608	0.116557773	
	CC 0.3m addition		Length (m)	150	GIS/NFCDD	518	Sustain	Long	0.2	0.015541036	0.024282869	0.029139443	0.046623109	
	Wall	1131801000302L09	Length (km)	0.02	GIS/NFCDD	5405	Maintain	Short to long term	30	0.003242783	0.005066848	0.006080218	0.009728348	
	CC 0.3m addition		Length (m)	20	GIS/NFCDD	518	Sustain	Long	0.2	0.002072138	0.003237716	0.003885259	0.006216415	
	Wall	1131801000302L08	Length (km)	0.03	GIS/NFCDD	5405	Maintain	Short to long term	30	0.004864174	0.007600272	0.009120327	0.014592522	
	CC 0.3m addition		Length (m)	30	GIS/NFCDD	518	Sustain	Long	0.2	0.003108207	0.004856574	0.005827889	0.009324622	
	Wall With Toe Protection	1131801000302L06	Length (km)	0.04	GIS/NFCDD	5405	Maintain	Short to long term	30	0.006485566	0.010133696	0.012160435	0.019456697	
	Wall With Promenade	1131801000302L05	Length (km)	0.01	GIS/NFCDD	5405	Maintain	Short to long term	30	0.001621391	0.002533424	0.003040109	0.004864174	
	CC 0.3m addition		Length (m)	10	GIS/NFCDD	518	Sustain	Long	0.2	0.001036069	0.001618858	0.00194263	0.003108207	
	Ramp / Slipway	1131801000302L04	Length (km)	0.03	GIS/NFCDD	5405	Maintain	Short to long term	30	0.004864174	0.007600272	0.009120327	0.014592522	
	CC 0.3m addition		Length (m)	30	GIS/NFCDD	518	Sustain	Medium	0.5	0.007770518	0.012141435	0.014569722	0.023311555	
	CC 0.3m addition		Length (m)	30	GIS/NFCDD	518	Sustain	Long	0.2	0.003108207	0.004856574	0.005827889	0.009324622	
	Wall / Road	1131801000302L28	Length (km)	0.1	GIS/NFCDD	5405	Maintain	Short to long term	30	0.016213914	0.02533424	0.030401088	0.048641742	
	Marina Wall	1131801000302L27	Length (km)	0.05	GIS/NFCDD	5405	Maintain	Short to long term	30	0.008106957	0.01266712	0.015200544	0.024320871	
	Building	1131801000302L26	Length (km)	0.06	GIS/NFCDD	5405	Maintain	Short to long term	30	0.009728348	0.015200544	0.018240653	0.029185045	
	CC 0.3m addition		Length (m)	60	GIS/NFCDD	518	Sustain	Long	0.2	0.006216415	0.009713148	0.011655777	0.018649244	
	Quay Wall	1131801000302L25	Length (km)	0.2	GIS/NFCDD	5405	Maintain	Short to long term	30	0.032427828	0.050668481	0.060802177	0.097283483	
	CC 0.3m addition		Length (m)	200	GIS/NFCDD	518	Sustain	Medium	0.5	0.051803455	0.080942898	0.097131478	0.155410364	
	CC 0.3m addition		Length (m)	200	GIS/NFCDD	518	Sustain	Long	0.2	0.020721382	0.032377159	0.038852591	0.062164146	
	Side Of Building	1131801000302L24	Length (km)	0.02	GIS/NFCDD	5405	Maintain	Short to long term	30	0.003242783	0.005066848	0.006080218	0.009728348	
	CC 0.1m addition		Length (m)	20	GIS/NFCDD	518	Sustain	Short	1	0.010360691	0.01618858	0.019426296	0.031082073	
	CC 0.3m addition		Length (m)	20	GIS/NFCDD	518	Sustain	Medium	0.5	0.005180345	0.00809429	0.009713148	0.015541036	
	CC 0.3m addition		Length (m)	20	GIS/NFCDD	518	Sustain	Long	0.2	0.002072138	0.003237716	0.003885259	0.006216415	
	House / Wall	1131801000302L23	Length (km)	0.03	GIS/NFCDD	5405	Maintain	Short to long term	30	0.004864174	0.007600272	0.009120327	0.014592522	
	CC 0.1m addition		Length (m)	30	GIS/NFCDD	518	Sustain	Short	1	0.015541036	0.024282869	0.029139443	0.046623109	
	CC 0.3m addition		Length (m)	30	GIS/NFCDD	518	Sustain	Medium	0.5	0.007770518	0.012141435	0.014569722	0.023311555	
	CC 0.3m addition		Length (m)	30	GIS/NFCDD	518	Sustain	Long	0.2	0.003108207	0.004856574	0.005827889	0.009324622	
	Wall / Road	1131801000302L22	Length (km)	0.04	GIS/NFCDD	5405	Maintain	Short to long term	30	0.006485566	0.010133696	0.012160435	0.019456697	
	CC 0.1m addition		Length (m)	40	GIS/NFCDD	518	Sustain	Short	1	0.020721382	0.032377159	0.038852591	0.062164146	
	CC 0.3m addition		Length (m)	40	GIS/NFCDD	518	Sustain	Medium	0.5	0.010360691	0.01618858	0.019426296	0.031082073	
	CC 0.3m addition		Length (m)	40	GIS/NFCDD	518	Sustain	Long	0.2	0.004144276	0.006475432	0.007770518	0.012432829	
	Wall	1131801000302L21	Length (km)	0.06	GIS/NFCDD	5405	Maintain	Short to long term	30	0.009728348	0.015200544	0.018240653	0.029185045	
	Wall	1131801000302L19	Length (km)	0.07	GIS/NFCDD	5405	Maintain	Short to long term	30	0.01134974	0.017733968	0.021280762	0.034049219	
	Wall	1131801000302L14	Length (km)	0.04	GIS/NFCDD	5405	Maintain	Short to long term	30	0.006485566	0.010133696	0.012160435	0.019456697	
	CC 0.3m addition		Length (m)	40	GIS/NFCDD	518	Sustain	Long	0.2	0.004144276	0.006475432	0.007770518	0.012432829	
	Wall	1131801000302L13	Length (km)	0.02	GIS/NFCDD	5405	Maintain	Short to long term	30	0.003242783	0.005066848	0.006080218	0.009728348	
	CC 0.3m addition		Length (m)	20	GIS/NFCDD	518	Sustain	Long	0.2	0.002072138	0.003237716	0.003885259	0.006216415	
	Slipway	1131801000302L12	Length (km)	0.02	GIS/NFCDD	5405	Maintain	Short to long term	30	0.003242783	0.005066848	0.006080218	0.009728348	
	CC 0.3m addition		Length (m)	20	GIS/NFCDD	518	Sustain	Medium	0.5	0.005180345	0.00809429	0.009713148	0.015541036	
	CC 0.3m addition		Length (m)	20	GIS/NFCDD	518	Sustain	Long	0.2	0.002072138	0.003237716	0.003885259	0.006216415	
													3.368880814	TOTAL



Medium to Long Term Option 2. An extensive programme of property resilience works for the around 150-200 properties progressively at flood risk in the Topsham and Countess Wear communities.	Flood Wall	1131801070102R01	Length (km)	0.42	GIS/NFCDD	5405	Maintain	Short to long term	30	0.068098438	0.10640381	0.127684572	0.204295315	
	Hump In Road	1131801000302L02	Length (km)	0.09	GIS/NFCDD	5405	Maintain	Short to long term	30	0.014592522	0.022800816	0.02736098	0.043777567	
	0	1131801000302L01	Length (km)	0.25	GIS/NFCDD	5405	Maintain	Short to long term	30	0.040534785	0.063335601	0.076002721	0.121604354	
	Natural Bank	1131801000302L40	Length (km)	0.21	GIS/NFCDD	0	Maintain	Short to long term	30	0	0	0	0	
	Private Slipway and Storage Yard	1131801000302L39	Length (km)	0.05	GIS/NFCDD	5405	Maintain	Short to long term	30	0.008106957	0.01266712	0.015200544	0.024320871	
	Wall	1131801000302L29	Length (km)	0.09	GIS/NFCDD	5405	Maintain	Short to long term	30	0.014592522	0.022800816	0.02736098	0.043777567	
	Wall	1131801000302L31	Length (km)	0.07	GIS/NFCDD	5405	Maintain	Short to long term	30	0.01134974	0.017733968	0.021280762	0.034049219	
	Wall	1131801000302L32	Length (km)	0.04	GIS/NFCDD	5405	Maintain	Short to long term	30	0.006485566	0.010133696	0.012160435	0.019456697	
	Wall	1131801000302L34	Length (km)	0.11	GIS/NFCDD	5405	Maintain	Short to long term	30	0.017835305	0.027867664	0.033441197	0.053505916	
	Slipway	1131801000302L35	Length (km)	0.04	GIS/NFCDD	5405	Maintain	Short to long term	30	0.006485566	0.010133696	0.012160435	0.019456697	
	Wall	1131801000302L36	Length (km)	0.1	GIS/NFCDD	5405	Maintain	Short to long term	30	0.016213914	0.02533424	0.030401088	0.048641742	
	Wall	1131801000302L37	Length (km)	0.12	GIS/NFCDD	5405	Maintain	Short to long term	30	0.019456697	0.030401088	0.036481306	0.05837009	
	Natural Bank	1131801000302L38	Length (km)	0.09	GIS/NFCDD	0	Maintain	Short to long term	30	0	0	0	0	
	Wall Fronting Gardens	1131801000302L11	Length (km)	0.05	GIS/NFCDD	5405	Maintain	Short to long term	30	0.008106957	0.01266712	0.015200544	0.024320871	
	Wall Fronting Flats	1131801000302L15	Length (km)	0.03	GIS/NFCDD	5405	Maintain	Short to long term	30	0.004864174	0.007600272	0.009120327	0.014592522	
	Wall	1131801000302L16	Length (km)	0.07	GIS/NFCDD	5405	Maintain	Short to long term	30	0.01134974	0.017733968	0.021280762	0.034049219	
	Surrounding Wall, With Gate in South West Facing Wall	1131801000302L07	Length (km)	0.15	GIS/NFCDD	5405	Maintain	Short to long term	30	0.024320871	0.038001361	0.045601633	0.072962612	
	Wall	1131801000302L09	Length (km)	0.02	GIS/NFCDD	5405	Maintain	Short to long term	30	0.003242783	0.005066848	0.006080218	0.009728348	
	Wall	1131801000302L08	Length (km)	0.03	GIS/NFCDD	5405	Maintain	Short to long term	30	0.004864174	0.007600272	0.009120327	0.014592522	
	Wall With Toe Protection	1131801000302L06	Length (km)	0.04	GIS/NFCDD	5405	Maintain	Short to long term	30	0.006485566	0.010133696	0.012160435	0.019456697	
	Wall With Promenade	1131801000302L05	Length (km)	0.01	GIS/NFCDD	5405	Maintain	Short to long term	30	0.001621391	0.002533424	0.003040109	0.004864174	
	Ramp / Slipway	1131801000302L04	Length (km)	0.03	GIS/NFCDD	5405	Maintain	Short to long term	30	0.004864174	0.007600272	0.009120327	0.014592522	
	Wall / Road	1131801000302L28	Length (km)	0.1	GIS/NFCDD	5405	Maintain	Short to long term	30	0.016213914	0.02533424	0.030401088	0.048641742	
	Marina Wall	1131801000302L27	Length (km)	0.05	GIS/NFCDD	5405	Maintain	Short to long term	30	0.008106957	0.01266712	0.015200544	0.024320871	
	Building	1131801000302L26	Length (km)	0.06	GIS/NFCDD	5405	Maintain	Short to long term	30	0.009728348	0.015200544	0.018240653	0.029185045	
	Quay Wall	1131801000302L25	Length (km)	0.2	GIS/NFCDD	5405	Maintain	Short to long term	30	0.032427828	0.050668481	0.060802177	0.097283483	
	Side Of Building	1131801000302L24	Length (km)	0.02	GIS/NFCDD	5405	Maintain	Short to long term	30	0.003242783	0.005066848	0.006080218	0.009728348	
	House / Wall	1131801000302L23	Length (km)	0.03	GIS/NFCDD	5405	Maintain	Short to long term	30	0.004864174	0.007600272	0.009120327	0.014592522	
	Wall / Road	1131801000302L22	Length (km)	0.04	GIS/NFCDD	5405	Maintain	Short to long term	30	0.006485566	0.010133696	0.012160435	0.019456697	
	Wall	1131801000302L21	Length (km)	0.06	GIS/NFCDD	5405	Maintain	Short to long term	30	0.009728348	0.015200544	0.018240653	0.029185045	
	Wall	1131801000302L19	Length (km)	0.07	GIS/NFCDD	5405	Maintain	Short to long term	30	0.01134974	0.017733968	0.021280762	0.034049219	
	Wall	1131801000302L14	Length (km)	0.04	GIS/NFCDD	5405	Maintain	Short to long term	30	0.006485566	0.010133696	0.012160435	0.019456697	
	Wall	1131801000302L13	Length (km)	0.02	GIS/NFCDD	5405	Maintain	Short to long term	30	0.003242783	0.005066848	0.006080218	0.009728348	
	Slipway	1131801000302L12	Length (km)	0.02	GIS/NFCDD	5405	Maintain	Short to long term	30	0.003242783	0.005066848	0.006080218	0.009728348	
	Property resilience for c200 properties		Number	200		10809	Sustain	Medium	0.5	1.080927591	1.688949361	2.026739233	3.242782773	
													4.468554662	TOTAL

K.12 Countess Wear

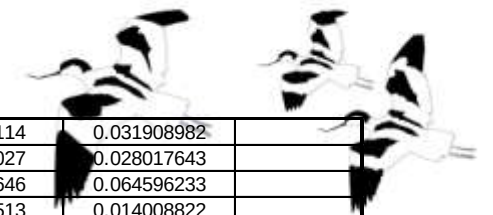


FCRMU approach	Asset Type	Asset reference	Parameter	Amount	Reference	Rate (£/parameter)	HLO	Epoch	Epochal discount factor	Basic construction cost (£M)	Plus Tidal/urban uplift (25% each) cost (£M)	Plus PAR, design and supervision (20%) cost (£M)	Plus Optimism bias 60% cost (£M)	
SHORT-LISTED ALIGNMENT AND TYPE OPTIONS														
Medium to Long Term Option 1. Wider raising of quay walls in Topsham (along The Strand) of between 0-2m dependent on climate change scenario. The upper limit of raising would be unlikely to be viable on engineering, landscape and operational grounds.	Natural Bank	1131801000315L01	Length (km)	2.24	GIS/NFCDD	0	NAI	Short to long term	30	0	0	0	0	
	Natural Bank	1131801000309L01	Length (km)	0.35	GIS/NFCDD	0	NAI	Short to long term	30	0	0	0	0	
	Natural Bank	1131801000305L01	Length (km)	0.18	GIS/NFCDD	0	NAI	Short to long term	30	0	0	0	0	
	NATURAL BANK	1131801000304L01	Length (km)	0.44	GIS/NFCDD	0	NAI	Short to long term	30	0	0	0	0	
	0	1131801000303L03	Length (km)	0.08	GIS/NFCDD	0	NAI	Short to long term	30	0	0	0	0	
	Flood Wall	1131801000303L01	Length (km)	0.19	GIS/NFCDD	5405	Maintain	Short to long term	30	0.030806436	0.038508045	0.046209655	0.073935447	
	CC 0.3m addition		Length (m)	190	GIS/NFCDD	152	Sustain	Long	0.2	0.00579161	0.007239513	0.008687415	0.013899864	
	Walkway	1131801000302L45	Length (km)	0.16	GIS/NFCDD	5405	Maintain	Short to long term	30	0.025942262	0.032427828	0.038913393	0.062261429	
	CC 0.3m addition		Length (m)	160	GIS/NFCDD	152	Sustain	Long	0.2	0.004877145	0.006096432	0.007315718	0.011705149	
	Slipway / Platform for Boat Yard	1131801000302L44	Length (km)	0.05	GIS/NFCDD	5405	Maintain	Short to long term	30	0.008106957	0.010133696	0.012160435	0.019456697	
	CC 0.3m addition		Length (m)	50	GIS/NFCDD	152	Sustain	Long	0.2	0.001524108	0.001905135	0.002286162	0.003657859	
	Wall With Toe Walkway	1131801000302L43	Length (km)	0.05	GIS/NFCDD	5405	Maintain	Short to long term	30	0.008106957	0.010133696	0.012160435	0.019456697	
	CC 0.3m addition		Length (m)	50	GIS/NFCDD	152	Sustain	Long	0.2	0.001524108	0.001905135	0.002286162	0.003657859	
	Wall / Pathway fronting Gardens	1131801000302L42	Length (km)	0.15	GIS/NFCDD	5405	Maintain	Short to long term	30	0.024320871	0.030401088	0.036481306	0.05837009	
Medium to Long Term Option 2. An extensive programme of property resilience works for the around 150-200 properties progressively at flood risk in the Topsham and Countess Wear communities.	Sewage treatment works embankment		Length (km)	0.5		1081	Maintain	Short to long term	30	0.016213914	0.020267392	0.024320871	0.038913393	
	CC 0.3m		Length (m)	500		152	Sustain	Medium	0.5	0.038102698	0.047628372	0.057154046	0.091446474	
	CC 0.3m		Length (m)	500		152	Sustain	Long	0.2	0.015241079	0.019051349	0.022861619	0.03657859	
													0.433339548	TOTAL
	Natural Bank	1131801000315L01	Length (km)	2.24	GIS/NFCDD	0	NAI	Short to long term	30	0	0	0	0	
	Natural Bank	1131801000309L01	Length (km)	0.35	GIS/NFCDD	0	NAI	Short to long term	30	0	0	0	0	
	Natural Bank	1131801000305L01	Length (km)	0.18	GIS/NFCDD	0	NAI	Short to long term	30	0	0	0	0	
	NATURAL BANK	1131801000304L01	Length (km)	0.44	GIS/NFCDD	0	NAI	Short to long term	30	0	0	0	0	
	0	1131801000303L03	Length (km)	0.08	GIS/NFCDD	0	NAI	Short to long term	30	0	0	0	0	
	Flood Wall	1131801000303L01	Length (km)	0.19	GIS/NFCDD	5405	Maintain	Short to long term	30	0.030806436	0.038508045	0.046209655	0.073935447	
	Walkway	1131801000302L45	Length (km)	0.16	GIS/NFCDD	5405	Maintain	Short to long term	30	0.025942262	0.032427828	0.038913393	0.062261429	
	Slipway / Platform for Boat Yard	1131801000302L44	Length (km)	0.05	GIS/NFCDD	5405	Maintain	Short to long term	30	0.008106957	0.010133696	0.012160435	0.019456697	
	Wall With Toe Walkway	1131801000302L43	Length (km)	0.05	GIS/NFCDD	5405	Maintain	Short to long term	30	0.008106957	0.010133696	0.012160435	0.019456697	
	Wall / Pathway fronting Gardens	1131801000302L42	Length (km)	0.15	GIS/NFCDD	5405	Maintain	Short to long term	30	0.024320871	0.030401088	0.036481306	0.05837009	
	Sewage treatment works embankment		Length (km)	0.5		1081	Maintain	Short to long term	30	0.016213914	0.020267392	0.024320871	0.038913393	
	CC 0.3m		Length (m)	500		152	Sustain	Medium	0.5	0.038102698	0.047628372	0.057154046	0.091446474	
	CC 0.3m		Length (m)	500		152	Sustain	Long	0.2	0.015241079	0.019051349	0.022861619	0.03657859	
													0.400418817	TOTAL

K.13 Exminster Marshes and Powderham Banks



FCRMU approach	Asset Type	Asset reference	Parameter	Amount	Reference	Rate (£/parameter)	HLO	Epoch	Epochal discount factor	Basic construction cost (£M)	Plus Tidal/urban uplift (25% each) cost (£M)	Plus PAR, design and supervision (20%) cost (£M)	Plus Optimism bias 60% cost (£M)	
SHORT-LISTED ALIGNMENT AND TYPE OPTIONS														
Short Term Option 1. Hard foreshore management, consisting of sheet piling along the revetment toe or through the revetment itself, or rock armouring at the toe. Medium to Long Term Option 1.	Earth Embankment	1131801130118R02	Length (km)	0.41	GIS/NFCDD	1081	Maintain	Short to long term	30	0.013295409	0.016619262	0.019943114	0.031908982	
	Earth Embankment	1131801130117R01	Length (km)	0.36	GIS/NFCDD	1081	Maintain	Short to long term	30	0.011674018	0.014592522	0.017511027	0.028017643	
	Canal embankment	1131801130104L01	Length (km)	0.83	GIS/NFCDD	1081	Maintain	Short to long term	30	0.026915097	0.033643871	0.040372646	0.064596233	
	Earth Bank	1131801130106L01	Length (km)	0.18	GIS/NFCDD	1081	Maintain	Short to long term	30	0.005837009	0.007296261	0.008755513	0.014008822	
	Canal embankment	1131801130105L01	Length (km)	0.36	GIS/NFCDD	1081	Maintain	Short to long term	30	0.011674018	0.014592522	0.017511027	0.028017643	
	Earth Embankment With Screeded Stone Rev	1131801130102L01	Length (km)	0.04	GIS/NFCDD	5405	Maintain	Short to long term	30	0.006485566	0.008106957	0.009728348	0.015565357	
	CC 0.3m addition		Length (m)	40	GIS/NFCDD	518	Sustain	Medium	0.5	0.010360691	0.012950864	0.015541036	0.024865658	
	CC 0.3m addition		Length (m)	40	GIS/NFCDD	518	Sustain	Long	0.2	0.004144276	0.005180345	0.006216415	0.009946263	
	Canal embankment	1131801130103L01	Length (km)	0.15	GIS/NFCDD	1081	Maintain	Short to long term	30	0.004864174	0.006080218	0.007296261	0.011674018	
	Maintained Channel	1131801160106L01	Length (km)	0.78	GIS/NFCDD	1081	Maintain	Short to long term	30	0.025293706	0.031617132	0.037940558	0.060704894	
	Earth Embankment	1131801130102R01	Length (km)	0.34	GIS/NFCDD	1081	Maintain	Short to long term	30	0.011025461	0.013781827	0.016538192	0.026461107	
	CC 0.3m addition		Length (m)	340	GIS/NFCDD	152	Sustain	Medium	0.5	0.025909834	0.032387293	0.038864752	0.062183602	
	CC 0.3m addition		Length (m)	340	GIS/NFCDD	152	Sustain	Long	0.2	0.010363934	0.012954917	0.015545901	0.024873441	
	Earth Embankment	1131801000303R01	Length (km)	0.59	GIS/NFCDD	1081	Maintain	Short to long term	30	0.019132418	0.023915523	0.028698628	0.045917804	
	CC 0.3m addition		Length (m)	590	GIS/NFCDD	152	Sustain	Long	0.2	0.017984473	0.022480592	0.02697671	0.043162736	
	Canal Embankment	1131801000302R01	Length (km)	3.23	GIS/NFCDD	1081	Maintain	Short to long term	30	0.104741884	0.130927354	0.157112825	0.251380521	
	CC 0.3m addition		Length (m)	3230	GIS/NFCDD	152	Sustain	Long	0.2	0.098457371	0.123071713	0.147686056	0.236297689	
	Natural Cliff (check elements)	113FAS3351009C01	Length (km)	0.46	GIS/NFCDD	1081	Maintain	Short to long term	30	0.014916801	0.018646001	0.022375201	0.035800322	
	CC 0.3m addition		Length (m)	460	GIS/NFCDD	518	Sustain	Medium	0.5	0.119147946	0.148934933	0.178721919	0.285955071	
	CC 0.3m addition		Length (m)	460	GIS/NFCDD	518	Sustain	Long	0.2	0.047659178	0.059573973	0.071488768	0.114382028	
	Natural Cliff (check elements)	113FAS3351009C02	Length (km)	1.1	GIS/NFCDD	1081	Maintain	Short to long term	30	0.035670611	0.044588263	0.053505916	0.085609465	
	CC 0.3m addition		Length (m)	1100	GIS/NFCDD	518	Sustain	Medium	0.5	0.284919001	0.356148752	0.427378502	0.683805603	
	CC 0.3m addition		Length (m)	1100	GIS/NFCDD	518	Sustain	Long	0.2	0.113967601	0.142459501	0.170951401	0.273522241	
	Wall + Revetment	113FAS3351009C03	Length (km)	0.35	GIS/NFCDD	5405	Maintain	Short to long term	30	0.056748699	0.070935873	0.085123048	0.136196876	
	CC 0.3m addition		Length (m)	350	GIS/NFCDD	518	Sustain	Long	0.2	0.036262418	0.045328023	0.054393628	0.087029804	
	Toe protection (rock armour)		Length (m)	700	GIS/NFCDD	681	Sustain	Short	1	0.476689068	0.595861335	0.715033602	1.144053762	
													3.825937588	TOTAL
Short Term Option 2. Revetment, vertical or wave recurve wall raising of up to 0.5m. Medium to Long Term Option 1.	Earth Embankment	1131801130118R02	Length (km)	0.41	GIS/NFCDD	1081	Maintain	Short to long term	30	0.013295409	0.016619262	0.019943114	0.031908982	
	Earth Embankment	1131801130117R01	Length (km)	0.36	GIS/NFCDD	1081	Maintain	Short to long term	30	0.011674018	0.014592522	0.017511027	0.028017643	
	Canal embankment	1131801130104L01	Length (km)	0.83	GIS/NFCDD	1081	Maintain	Short to long term	30	0.026915097	0.033643871	0.040372646	0.064596233	
	Earth Bank	1131801130106L01	Length (km)	0.18	GIS/NFCDD	1081	Maintain	Short to long term	30	0.005837009	0.007296261	0.008755513	0.014008822	
	Canal embankment	1131801130105L01	Length (km)	0.36	GIS/NFCDD	1081	Maintain	Short to long term	30	0.011674018	0.014592522	0.017511027	0.028017643	
	Earth Embankment With Screeded Stone Rev	1131801130102L01	Length (km)	0.04	GIS/NFCDD	5405	Maintain	Short to long term	30	0.006485566	0.008106957	0.009728348	0.015565357	
	CC 0.3m addition		Length (m)	40	GIS/NFCDD	518	Sustain	Medium	0.5	0.010360691	0.012950864	0.015541036	0.024865658	
	CC 0.3m addition		Length (m)	40	GIS/NFCDD	518	Sustain	Long	0.2	0.004144276	0.005180345	0.006216415	0.009946263	
	Canal embankment	1131801130103L01	Length (km)	0.15	GIS/NFCDD	1081	Maintain	Short to long term	30	0.004864174	0.006080218	0.007296261	0.011674018	
	Maintained Channel	1131801160106L01	Length (km)	0.78	GIS/NFCDD	1081	Maintain	Short to long term	30	0.025293706	0.031617132	0.037940558	0.060704894	
	Earth Embankment	1131801130102R01	Length (km)	0.34	GIS/NFCDD	1081	Maintain	Short to long term	30	0.011025461	0.013781827	0.016538192	0.026461107	
	CC 0.3m addition		Length (m)	340	GIS/NFCDD	152	Sustain	Medium	0.5	0.025909834	0.032387293	0.038864752	0.062183602	
	CC 0.3m addition		Length (m)	340	GIS/NFCDD	152	Sustain	Long	0.2	0.010363934	0.012954917	0.015545901	0.024873441	
	Earth Embankment	1131801000303R01	Length (km)	0.59	GIS/NFCDD	1081	Maintain	Short to long term	30	0.019132418	0.023915523	0.028698628	0.045917804	
	CC 0.3m addition		Length (m)	590	GIS/NFCDD	152	Sustain	Long	0.2	0.017984473	0.022480592	0.02697671	0.043162736	
	Canal Embankment	1131801000302R01	Length (km)	3.23	GIS/NFCDD	1081	Maintain	Short to long term	30	0.104741884	0.130927354	0.157112825	0.251380521	
	CC 0.3m addition		Length (m)	3230	GIS/NFCDD	152	Sustain	Long	0.2	0.098457371	0.123071713	0.147686056	0.236297689	
	Natural Cliff (check elements)	113FAS3351009C01	Length (km)	0.46	GIS/NFCDD	1081	Maintain	Short to long term	30	0.014916801	0.018646001	0.022375201	0.035800322	
	CC 0.5m addition		Length (m)	460	GIS/NFCDD	1036	Sustain	Short	1	0.476591784	0.59573973	0.714887676	1.143820282	
	CC 0.3m addition		Length (m)	460	GIS/NFCDD	518	Sustain	Medium	0.5	0.119147946	0.148934933	0.178721919	0.285955071	
	CC 0.3m addition		Length (m)	460	GIS/NFCDD	518	Sustain	Long	0.2	0.047659178	0.059573973	0.071488768	0.114382028	
	Natural Cliff (check elements)	113FAS3351009C02	Length (km)	1.1	GIS/NFCDD	1081	Maintain	Short to long term	30	0.035670611	0.044588263	0.053505916	0.085609465	
	CC 0.5m addition		Length (m)	1100	GIS/NFCDD	1036	Sustain	Short	1	1.139676006	1.424595007	1.709514009	2.735222414	
	CC 0.3m addition		Length (m)	1100	GIS/NFCDD	518	Sustain	Medium	0.5	0.284919001	0.356148752	0.427378502	0.683805603	
	CC 0.3m addition		Length (m)	1100	GIS/NFCDD	518	Sustain	Long	0.2	0.113967601	0.142459501	0.170951401	0.273522241	
	Wall + Revetment	113FAS3351009C03	Length (km)	0.35	GIS/NFCDD	5405	Maintain	Short to long term	30	0.056748699	0.070935873	0.085123048	0.136196876	
	CC 0.3m addition		Length (m)	350	GIS/NFCDD	518	Sustain	Long	0.2	0.036262418	0.045328023	0.054393628	0.087029804	
													6.560926521	TOTAL



Short Term Option 3. A combination of both options 1 and 2. Medium to Long Term Option 1.	Earth Embankment	1131801130118R02	Length (km)	0.41	GIS/NFCDD	1081	Maintain	Short to long term	30	0.013295409	0.016619262	0.019943114	0.031908982	
	Earth Embankment	1131801130117R01	Length (km)	0.36	GIS/NFCDD	1081	Maintain	Short to long term	30	0.011674018	0.014592522	0.017511027	0.028017643	
	Canal embankment	1131801130104L01	Length (km)	0.83	GIS/NFCDD	1081	Maintain	Short to long term	30	0.026915097	0.033643871	0.040372646	0.064596233	
	Earth Bank	1131801130106L01	Length (km)	0.18	GIS/NFCDD	1081	Maintain	Short to long term	30	0.005837009	0.007296261	0.008755513	0.014008822	
	Canal embankment	1131801130105L01	Length (km)	0.36	GIS/NFCDD	1081	Maintain	Short to long term	30	0.011674018	0.014592522	0.017511027	0.028017643	
	Earth Embankment With Screeded Stone Rev	1131801130102L01	Length (km)	0.04	GIS/NFCDD	5405	Maintain	Short to long term	30	0.006485566	0.008106957	0.009728348	0.015565357	
	CC 0.3m addition		Length (m)	40	GIS/NFCDD	518	Sustain	Medium	0.5	0.010360691	0.012950864	0.015541036	0.024865658	
	CC 0.3m addition		Length (m)	40	GIS/NFCDD	518	Sustain	Long	0.2	0.004144276	0.005180345	0.006216415	0.009946263	
	Canal embankment	1131801130103L01	Length (km)	0.15	GIS/NFCDD	1081	Maintain	Short to long term	30	0.004864174	0.006080218	0.007296261	0.011674018	
	Maintained Channel	1131801160106L01	Length (km)	0.78	GIS/NFCDD	1081	Maintain	Short to long term	30	0.025293706	0.031617132	0.037940558	0.060704894	
	Earth Embankment	1131801130102R01	Length (km)	0.34	GIS/NFCDD	1081	Maintain	Short to long term	30	0.011025461	0.013781827	0.016538192	0.026461107	
	CC 0.3m addition		Length (m)	340	GIS/NFCDD	152	Sustain	Medium	0.5	0.025909834	0.032387293	0.038864752	0.062183602	
	CC 0.3m addition		Length (m)	340	GIS/NFCDD	152	Sustain	Long	0.2	0.010363934	0.012954917	0.015545901	0.024873441	
	Earth Embankment	1131801000303R01	Length (km)	0.59	GIS/NFCDD	1081	Maintain	Short to long term	30	0.019132418	0.023915523	0.028698628	0.045917804	
	CC 0.3m addition		Length (m)	590	GIS/NFCDD	152	Sustain	Long	0.2	0.017984473	0.022480592	0.02697671	0.043162736	
	Canal Embankment	1131801000302R01	Length (km)	3.23	GIS/NFCDD	1081	Maintain	Short to long term	30	0.104741884	0.130927354	0.157112825	0.251380521	
	CC 0.3m addition		Length (m)	3230	GIS/NFCDD	152	Sustain	Long	0.2	0.098457371	0.123071713	0.147686056	0.236297689	
	Natural Cliff (check elements)	113FAS3351009C01	Length (km)	0.46	GIS/NFCDD	1081	Maintain	Short to long term	30	0.014916801	0.018646001	0.022375201	0.035800322	
	CC 0.5m addition		Length (m)	460	GIS/NFCDD	1036	Sustain	Short	1	0.476591784	0.59573973	0.714887676	1.143820282	
	CC 0.3m addition		Length (m)	460	GIS/NFCDD	518	Sustain	Medium	0.5	0.119147946	0.148934933	0.178721919	0.285955071	
	CC 0.3m addition		Length (m)	460	GIS/NFCDD	518	Sustain	Long	0.2	0.047659178	0.059573973	0.071488768	0.114382028	
	Natural Cliff (check elements)	113FAS3351009C02	Length (km)	1.1	GIS/NFCDD	1081	Maintain	Short to long term	30	0.035670611	0.044588263	0.053505916	0.085609465	
	CC 0.5m addition		Length (m)	1100	GIS/NFCDD	1036	Sustain	Short	1	1.139676006	1.424595007	1.709514009	2.735222414	
	CC 0.3m addition		Length (m)	1100	GIS/NFCDD	518	Sustain	Medium	0.5	0.284919001	0.356148752	0.427378502	0.683805603	
	CC 0.3m addition		Length (m)	1100	GIS/NFCDD	518	Sustain	Long	0.2	0.113967601	0.142459501	0.170951401	0.273522241	
	Wall + Revetment	113FAS3351009C03	Length (km)	0.35	GIS/NFCDD	5405	Maintain	Short to long term	30	0.056748699	0.070935873	0.085123048	0.136196876	
	CC 0.3m addition		Length (m)	350	GIS/NFCDD	518	Sustain	Long	0.2	0.036262418	0.045328023	0.054393628	0.087029804	
	Toe protection (rock armour)		Length (m)	700	GIS/NFCDD	681	Sustain	Short	1	0.476689068	0.595861335	0.715033602	1.144053762	
													7.704980284	TOTAL



ADDITIONAL ASSESSMENT OF HIGH LEVEL OPTIONS													
Maintain HLO	Earth Embankment	1131801130118R02	Length (km)	0.41	GIS/NFCDD	1081	Maintain	Short to long term	30	0.013295409	0.016619262	0.019943114	0.031908982
	Earth Embankment	1131801130117R01	Length (km)	0.36	GIS/NFCDD	1081	Maintain	Short to long term	30	0.011674018	0.014592522	0.017511027	0.028017643
	Canal embankment	1131801130104L01	Length (km)	0.83	GIS/NFCDD	1081	Maintain	Short to long term	30	0.026915097	0.033643871	0.040372646	0.064596233
	Earth Bank	1131801130106L01	Length (km)	0.18	GIS/NFCDD	1081	Maintain	Short to long term	30	0.005837009	0.007296261	0.008755513	0.014008822
	Canal embankment	1131801130105L01	Length (km)	0.36	GIS/NFCDD	1081	Maintain	Short to long term	30	0.011674018	0.014592522	0.017511027	0.028017643
	Earth Embankment With Screeded Stone Rev	1131801130102L01	Length (km)	0.04	GIS/NFCDD	5405	Maintain	Short to long term	30	0.006485566	0.008106957	0.009728348	0.015565357
	Canal embankment	1131801130103L01	Length (km)	0.15	GIS/NFCDD	1081	Maintain	Short to long term	30	0.004864174	0.006080218	0.007296261	0.011674018
	Maintained Channel	1131801160106L01	Length (km)	0.78	GIS/NFCDD	1081	Maintain	Short to long term	30	0.025293706	0.031617132	0.037940558	0.060704894
	Earth Embankment	1131801130102R01	Length (km)	0.34	GIS/NFCDD	1081	Maintain	Short to long term	30	0.011025461	0.013781827	0.016538192	0.026461107
	Earth Embankment	1131801000303R01	Length (km)	0.59	GIS/NFCDD	1081	Maintain	Short to long term	30	0.019132418	0.023915523	0.028698628	0.045917804
	Canal Embankment	1131801000302R01	Length (km)	3.23	GIS/NFCDD	1081	Maintain	Short to long term	30	0.104741884	0.130927354	0.157112825	0.251380521
	Natural Cliff (check elements)	113FAS3351009C01	Length (km)	0.46	GIS/NFCDD	1081	Maintain	Short to long term	30	0.014916801	0.018646001	0.022375201	0.035800322
	Natural Cliff (check elements)	113FAS3351009C02	Length (km)	1.1	GIS/NFCDD	1081	Maintain	Short to long term	30	0.035670611	0.044588263	0.053505916	0.085609465
	Wall + Revetment	113FAS3351009C03	Length (km)	0.35	GIS/NFCDD	5405	Maintain	Short to long term	30	0.056748699	0.070935873	0.085123048	0.136196876
												0.835859688	TOTAL
Manage HLO	Earth Embankment	1131801130118R02	Length (km)	0.41	GIS/NFCDD	1081	Maintain	Short to long term	30	0.013295409	0.016619262	0.019943114	0.031908982
	Earth Embankment	1131801130117R01	Length (km)	0.36	GIS/NFCDD	1081	Maintain	Short to long term	30	0.011674018	0.014592522	0.017511027	0.028017643
	Canal embankment	1131801130104L01	Length (km)	0.83	GIS/NFCDD	1081	Maintain	Short to long term	30	0.026915097	0.033643871	0.040372646	0.064596233
	Earth Bank	1131801130106L01	Length (km)	0.18	GIS/NFCDD	1081	Maintain	Short to long term	30	0.005837009	0.007296261	0.008755513	0.014008822
	Canal embankment	1131801130105L01	Length (km)	0.36	GIS/NFCDD	1081	Maintain	Short to long term	30	0.011674018	0.014592522	0.017511027	0.028017643
	Earth Embankment With Screeded Stone Rev	1131801130102L01	Length (km)	0.04	GIS/NFCDD	5405	Maintain	Short to long term	30	0.006485566	0.008106957	0.009728348	0.015565357
	Canal embankment	1131801130103L01	Length (km)	0.15	GIS/NFCDD	1081	Maintain	Short to long term	30	0.004864174	0.006080218	0.007296261	0.011674018
	Maintained Channel	1131801160106L01	Length (km)	0.78	GIS/NFCDD	1081	Maintain	Short to long term	30	0.025293706	0.031617132	0.037940558	0.060704894
	Earth Embankment	1131801130102R01	Length (km)	0.34	GIS/NFCDD	1081	Maintain	Short to long term	30	0.011025461	0.013781827	0.016538192	0.026461107
	Earth Embankment	1131801000303R01	Length (km)	0.59	GIS/NFCDD	1081	Maintain	Short to long term	30	0.019132418	0.023915523	0.028698628	0.045917804
	Canal Embankment	1131801000302R01	Length (km)	3.23	GIS/NFCDD	1081	Maintain	Short to long term	30	0.104741884	0.130927354	0.157112825	0.251380521
	Natural Cliff (check elements)	113FAS3351009C01	Length (km)	0.46	GIS/NFCDD	1081	Maintain	Short to long term	30	0.014916801	0.018646001	0.022375201	0.035800322
	Natural Cliff (check elements)	113FAS3351009C02	Length (km)	1.1	GIS/NFCDD	1081	Maintain	Short to long term	30	0.035670611	0.044588263	0.053505916	0.085609465
	Wall + Revetment	113FAS3351009C03	Length (km)	0.35	GIS/NFCDD	5405	Maintain	Short to long term	30	0.056748699	0.070935873	0.085123048	0.136196876
Medium term realignment costs	MT Realigned embankment maintenance		Length (km)	4.29	GIS/NFCDD	5405	Manage	Medium term	10	0.231858968	0.28982371	0.347788452	0.556461524
	MT Realigned embankment construction 3m height		Length (m)	4290	GIS/NFCDD	2515	Manage	Medium term	0.2	2.158143277	2.697679096	3.237214915	5.179543864
	MT Landward canal bank maintenance		Length (km)	1.29	GIS/NFCDD	5405	Manage	Medium term	10	0.06971983	0.087149787	0.104579744	0.167327591
	MT Landward canal bank hardening		Length (m)	1290	GIS/NFCDD	1946	Manage	Medium term	0.2	0.501982773	0.627478467	0.75297416	1.204758656
	MT land compensation		Area (Ha)	62.14	GIS/NFCDD	15000	Manage	Medium term	0.2	0.18642	0.233025	0.27963	0.447408
	MT Associated freshwater compensation		Area (Ha)	107.26	GIS/NFCDD	15000	Manage	Medium term	0.2	0.32178	0.402225	0.48267	0.772272
Long term realignment costs	LT Realigned embankment partial removal		Length (m)	1120	GIS/NFCDD	2515	Manage	Long term	0.2	0.563431345	0.704289181	0.845147018	1.352235228
	LT Realigned embankment maintenance		Length (km)	1.12	GIS/NFCDD	5405	Manage	Long term	5	0.030265973	0.037832466	0.045398959	0.072638334
	LT Realigned embankment construction 3m height		Length (m)	2370	GIS/NFCDD	2515	Manage	Long term	0.05	0.298065243	0.372581553	0.447097864	0.715356583
	LT Railway embankment culverts		Number	10	GIS/NFCDD	450000	Manage	Long term	0.05	0.225	0.28125	0.3375	0.54
	LT Landward railway embankment hardening		Length (m)	4290	GIS/NFCDD	1946	Manage	Long term	0.05	0.417346143	0.521682679	0.626019214	1.001630743
	LT Landward canal bank maintenance		Length (km)	3.11	GIS/NFCDD	5405	Manage	Long term	5	0.08404212	0.10505265	0.12606318	0.201701088
	LT Landward canal bank hardening		Length (m)	1820	GIS/NFCDD	1946	Manage	Long term	0.05	0.177055939	0.221319924	0.265583909	0.424934255
	LT land compensation		Area (Ha)	241.3	GIS/NFCDD	15000	Manage	Long term	0.05	0.180975	0.22621875	0.2714625	0.43434
	LT associated freshwater compensation		Area (Ha)	241.3	GIS/NFCDD	15000	Manage	Long term	0.05	0.180975	0.22621875	0.2714625	0.43434
												14.34080755	TOTAL
												Cost (£K/Ha) for MT MR	77.64098112
												Cost (£K/Ha) for LT MR	59.43144448



FCRMU approach	Asset Type	Asset reference	Parameter	Amount	Reference	Rate (£/parameter)	HLO	Epoch	Epochal discount factor	Basic construction cost (£M)	Plus Tidal/urban uplift (25% each) cost (£M)	Plus PAR, design and supervision (20%) cost (£M)	Plus Optimism bias 60% cost (£M)	
SHORT-LISTED ALIGNMENT AND TYPE OPTIONS														
Short Term Option 1. Regulated Tidal Exchange, with a RTE device attached to the existing culvert and the tide flap removed. Dawlish Warren sand spit distal section flattened in 2060. Medium to Long Term Option 1.	Wall	690/1902/01	Length (km)	0.24	GIS/NFCDD	5405	Maintain	Short to long term	30	0.038913393	0.048641742	0.05837009	0.093392144	
	CC 0.75m addition		Length (m)	240	GIS/NFCDD	1554	Sustain	Long	0.2	0.074596975	0.093246219	0.111895462	0.17903274	
	Wall	113FAS3351009C05	Length (km)	0.4	GIS/NFCDD	5405	Maintain	Short to long term	30	0.064855655	0.081069569	0.097283483	0.155653573	
	CC 0.5m addition		Length (m)	400	GIS/NFCDD	1036	Sustain	Medium	0.5	0.207213819	0.259017274	0.310820729	0.497313166	
	CC 0.75m addition		Length (m)	400	GIS/NFCDD	1554	Sustain	Long	0.2	0.124328292	0.155410364	0.186492437	0.2983879	
	Wall	113FAS3351009C06	Length (km)	0.64	GIS/NFCDD	5405	Maintain	Short to long term	30	0.103769049	0.129711311	0.155653573	0.249045717	
	CC 0.5m addition		Length (m)	640	GIS/NFCDD	1036	Sustain	Medium	0.5	0.331542111	0.414427638	0.497313166	0.795701066	
	CC 0.75m addition		Length (m)	640	GIS/NFCDD	1554	Sustain	Long	0.2	0.198925266	0.248656583	0.2983879	0.477420639	
	Wall	113FAS3351009C07	Length (km)	0.63	GIS/NFCDD	5405	Maintain	Short to long term	30	0.102147657	0.127684572	0.153221486	0.245154378	
	CC 0.5m addition		Length (m)	630	GIS/NFCDD	1036	Sustain	Medium	0.5	0.326361765	0.407952207	0.489542648	0.783268237	
	CC 0.75m addition		Length (m)	630	GIS/NFCDD	1554	Sustain	Long	0.2	0.195817059	0.244771324	0.293725589	0.469960942	
	Railway embankment	113FAS3351010C01	Length (km)	0.21	GIS/NFCDD	5405	Maintain	Short to long term	30	0.034049219	0.042561524	0.051073829	0.081718126	
	CC 0.5m addition		Length (m)	210	GIS/NFCDD	1036	Sustain	Medium	0.5	0.108787255	0.135984069	0.163180883	0.261089412	
	CC 0.75m addition		Length (m)	210	GIS/NFCDD	1554	Sustain	Long	0.2	0.065272353	0.081590441	0.09790853	0.156653647	
	Localised embankments to manage flooding to properties at The Mill		Length (m)	100	GIS/NFCDD	599	Manage	Short	1	0.059882755	0.074853444	0.089824133	0.143718612	
	RTE		No	1	GIS/NFCDD	300000	Manage	Short	1	0.3	0.375	0.45	0.72	
	ST land compensation		Area (Ha)	15	GIS/NFCDD	15000	Manage	Short	1	0.225	0.28125	0.3375	0.54	
													6.147510299	TOTAL
													Cost (£K/Ha) for MR	93.58124083
Short Term Option 2. Regulated Tidal Exchange, with a RTE device attached to the existing culvert and the tide flap removed. Dawlish Warren sand spit distal section flattened in 2060. Medium to Long Term Option 2.	Wall	690/1902/01	Length (km)	0.24	GIS/NFCDD	5405	Maintain	Short to long term	30	0.038913393	0.048641742	0.05837009	0.093392144	
	CC 0.25m addition		Length (m)	240	GIS/NFCDD	155	Sustain	Long	0.2	0.007419487	0.009274359	0.01112923	0.017806769	
	CC 0.5m addition		Length (m)	240	GIS/NFCDD	309	Sustain	Long	0.2	0.014838974	0.018548717	0.022258461	0.035613538	
	Wall	113FAS3351009C05	Length (km)	0.4	GIS/NFCDD	5405	Maintain	Short to long term	30	0.064855655	0.081069569	0.097283483	0.155653573	
	CC 0.25m addition		Length (m)	400	GIS/NFCDD	155	Sustain	Medium	0.5	0.030914529	0.038643161	0.046371794	0.07419487	
	CC 0.5m addition		Length (m)	400	GIS/NFCDD	309	Sustain	Long	0.2	0.024731623	0.030914529	0.037097435	0.059355896	
	Wall	113FAS3351009C06	Length (km)	0.64	GIS/NFCDD	5405	Maintain	Short to long term	30	0.103769049	0.129711311	0.155653573	0.249045717	
	CC 0.25m addition		Length (m)	640	GIS/NFCDD	155	Sustain	Medium	0.5	0.049463247	0.061829058	0.07419487	0.118711792	
	CC 0.5m addition		Length (m)	640	GIS/NFCDD	309	Sustain	Long	0.2	0.039570597	0.049463247	0.059355896	0.094969433	
	Wall	113FAS3351009C07	Length (km)	0.63	GIS/NFCDD	5405	Maintain	Short to long term	30	0.102147657	0.127684572	0.153221486	0.245154378	
	CC 0.25m addition		Length (m)	630	GIS/NFCDD	155	Sustain	Medium	0.5	0.048690383	0.060862979	0.073035575	0.11685692	
	CC 0.5m addition		Length (m)	630	GIS/NFCDD	309	Sustain	Long	0.2	0.038952307	0.048690383	0.05842846	0.093485536	
	Railway embankment	113FAS3351010C01	Length (km)	0.21	GIS/NFCDD	5405	Maintain	Short to long term	30	0.034049219	0.042561524	0.051073829	0.081718126	
	CC 0.25m addition		Length (m)	210	GIS/NFCDD	155	Sustain	Medium	0.5	0.016230128	0.02028766	0.024345192	0.038952307	
	CC 0.5m addition		Length (m)	210	GIS/NFCDD	309	Sustain	Long	0.2	0.012984102	0.016230128	0.019476153	0.031161845	
	Localised embankments to manage flooding to properties at The Mill		Length (m)	100	GIS/NFCDD	599	Manage	Short	1	0.059882755	0.074853444	0.089824133	0.143718612	
	RTE		No	1	GIS/NFCDD	300000	Manage	Short	1	0.3	0.375	0.45	0.72	
	ST land compensation		Area (Ha)	15	GIS/NFCDD	15000	Manage	Short	1	0.225	0.28125	0.3375	0.54	
													2.909791455	TOTAL
													Cost (£K/Ha) for MR	93.58124083



Short Term Option 2. Secondary embankments along the fringes of the habitat creation area, with the culvert tide flap removed. Dawlish Warren sand spit distal section flattened in 2060. Medium to Long Term Option 1.	Wall	690/1902/01	Length (km)	0.24	GIS/NFCDD	5405	Maintain	Short to long term	30	0.038913393	0.048641742	0.05837009	0.093392144	
	CC 0.75m addition		Length (m)	240	GIS/NFCDD	1554	Sustain	Long	0.2	0.074596975	0.093246219	0.111895462	0.17903274	
	Wall	113FAS3351009C05	Length (km)	0.4	GIS/NFCDD	5405	Maintain	Short to long term	30	0.064855655	0.081069569	0.097283483	0.155653573	
	CC 0.5m addition		Length (m)	400	GIS/NFCDD	1036	Sustain	Medium	0.5	0.207213819	0.259017274	0.310820729	0.497313166	
	CC 0.75m addition		Length (m)	400	GIS/NFCDD	1554	Sustain	Long	0.2	0.124328292	0.155410364	0.186492437	0.2983879	
	Wall	113FAS3351009C06	Length (km)	0.64	GIS/NFCDD	5405	Maintain	Short to long term	30	0.103769049	0.129711311	0.155653573	0.249045717	
	CC 0.5m addition		Length (m)	640	GIS/NFCDD	1036	Sustain	Medium	0.5	0.331542111	0.414427638	0.497313166	0.795701066	
	CC 0.75m addition		Length (m)	640	GIS/NFCDD	1554	Sustain	Long	0.2	0.198925266	0.248656583	0.2983879	0.477420639	
	Wall	113FAS3351009C07	Length (km)	0.63	GIS/NFCDD	5405	Maintain	Short to long term	30	0.102147657	0.127684572	0.153221486	0.245154378	
	CC 0.5m addition		Length (m)	630	GIS/NFCDD	1036	Sustain	Medium	0.5	0.326361765	0.407952207	0.489542648	0.783268237	
	CC 0.75m addition		Length (m)	630	GIS/NFCDD	1554	Sustain	Long	0.2	0.195817059	0.244771324	0.293725589	0.469960942	
	Railway embankment	113FAS3351010C01	Length (km)	0.21	GIS/NFCDD	5405	Maintain	Short to long term	30	0.034049219	0.042561524	0.051073829	0.081718126	
	CC 0.5m addition		Length (m)	210	GIS/NFCDD	1036	Sustain	Medium	0.5	0.108787255	0.135984069	0.163180883	0.261089412	
	CC 0.75m addition		Length (m)	210	GIS/NFCDD	1554	Sustain	Long	0.2	0.065272353	0.081590441	0.09790853	0.156653647	
	Indicative embankments to manage flooding		Length (m)	2000	GIS/NFCDD	599	Manage	Short	1	1.197655104	1.49706888	1.796482656	2.874372249	
	ST land compensation		Area (Ha)	15	GIS/NFCDD	15000	Manage	Short	1	0.225	0.28125	0.3375	0.54	
													8.158163936	TOTAL
												Cost (£K/Ha) for MR	227.6248166	
Short Term Option 2. Secondary embankments along the fringes of the habitat creation area, with the culvert tide flap removed. Dawlish Warren sand spit distal section flattened in 2060. Medium to Long Term Option 2.	Wall	690/1902/01	Length (km)	0.24	GIS/NFCDD	5405	Maintain	Short to long term	30	0.038913393	0.048641742	0.05837009	0.093392144	
	CC 0.25m addition		Length (m)	240	GIS/NFCDD	155	Sustain	Long	0.2	0.007419487	0.009274359	0.01112923	0.017806769	
	CC 0.5m addition		Length (m)	240	GIS/NFCDD	309	Sustain	Long	0.2	0.014838974	0.018548717	0.022258461	0.035613538	
	Wall	113FAS3351009C05	Length (km)	0.4	GIS/NFCDD	5405	Maintain	Short to long term	30	0.064855655	0.081069569	0.097283483	0.155653573	
	CC 0.25m addition		Length (m)	400	GIS/NFCDD	155	Sustain	Medium	0.5	0.030914529	0.038643161	0.046371794	0.07419487	
	CC 0.5m addition		Length (m)	400	GIS/NFCDD	309	Sustain	Long	0.2	0.024731623	0.030914529	0.037097435	0.059355896	
	Wall	113FAS3351009C06	Length (km)	0.64	GIS/NFCDD	5405	Maintain	Short to long term	30	0.103769049	0.129711311	0.155653573	0.249045717	
	CC 0.25m addition		Length (m)	640	GIS/NFCDD	155	Sustain	Medium	0.5	0.049463247	0.061829058	0.07419487	0.118711792	
	CC 0.5m addition		Length (m)	640	GIS/NFCDD	309	Sustain	Long	0.2	0.039570597	0.049463247	0.059355896	0.094969433	
	Wall	113FAS3351009C07	Length (km)	0.63	GIS/NFCDD	5405	Maintain	Short to long term	30	0.102147657	0.127684572	0.153221486	0.245154378	
	CC 0.25m addition		Length (m)	630	GIS/NFCDD	155	Sustain	Medium	0.5	0.048690383	0.060862979	0.073035575	0.11685692	
	CC 0.5m addition		Length (m)	630	GIS/NFCDD	309	Sustain	Long	0.2	0.038952307	0.048690383	0.05842846	0.093485536	
	Railway embankment	113FAS3351010C01	Length (km)	0.21	GIS/NFCDD	5405	Maintain	Short to long term	30	0.034049219	0.042561524	0.051073829	0.081718126	
	CC 0.25m addition		Length (m)	210	GIS/NFCDD	155	Sustain	Medium	0.5	0.016230128	0.02028766	0.024345192	0.038952307	
	CC 0.5m addition		Length (m)	210	GIS/NFCDD	309	Sustain	Long	0.2	0.012984102	0.016230128	0.019476153	0.031161845	
	Indicative embankments to manage flooding		Length (m)	2000	GIS/NFCDD	599	Manage	Short	1	1.197655104	1.49706888	1.796482656	2.874372249	
	ST land compensation		Area (Ha)	15	GIS/NFCDD	15000	Manage	Short	1	0.225	0.28125	0.3375	0.54	
													4.920445092	TOTAL
												Cost (£K/Ha) for MR	227.6248166	



ADDITIONAL ASSESSMENT OF TIMING OF PERMANENT FLATTENING OF DAWLISH WARREN SAND SPIT DISTAL SECTION														
Dawlish Warren sand spit maintained, Improve with existing form when and where necessary	Wall	690/1902/01	Length (km)	0.24	GIS/NFCDD	5405	Maintain	Short to long term	30	0.038913393	0.048641742	0.05837009	0.093392144	
	Wall	113FAS3351009C05	Length (km)	0.4	GIS/NFCDD	5405	Maintain	Short to long term	30	0.064855655	0.081069569	0.097283483	0.155653573	
	CC 0.3m addition		Length (m)	400	GIS/NFCDD	518	Sustain	Long	0.2	0.041442764	0.051803455	0.062164146	0.099462633	
	Wall	113FAS3351009C06	Length (km)	0.64	GIS/NFCDD	5405	Maintain	Short to long term	30	0.103769049	0.129711311	0.155653573	0.249045717	
	CC 0.3m addition		Length (m)	640	GIS/NFCDD	518	Sustain	Long	0.2	0.066308422	0.082885528	0.099462633	0.159140213	
	Wall	113FAS3351009C07	Length (km)	0.63	GIS/NFCDD	5405	Maintain	Short to long term	30	0.102147657	0.127684572	0.153221486	0.245154378	
	CC 0.3m addition		Length (m)	630	GIS/NFCDD	518	Sustain	Medium	0.5	0.163180883	0.203976103	0.244771324	0.391634118	
	CC 0.3m addition		Length (m)	630	GIS/NFCDD	518	Sustain	Long	0.2	0.065272353	0.081590441	0.09790853	0.156653647	
	Railway embankment	113FAS3351010C01	Length (km)	0.21	GIS/NFCDD	5405	Maintain	Short to long term	30	0.034049219	0.042561524	0.051073829	0.081718126	
	CC 0.3m addition		Length (m)	210	GIS/NFCDD	518	Sustain	Medium	0.5	0.054393628	0.067992034	0.081590441	0.130544706	
	CC 0.3m addition		Length (m)	210	GIS/NFCDD	518	Sustain	Long	0.2	0.021757451	0.027196814	0.032636177	0.052217882	
	Localised embankments to manage flooding to properties at The Mill		Length (m)	100	GIS/NFCDD	599	Manage	Short	1	0.059882755	0.074853444	0.089824133	0.143718612	
	RTE		No	1	GIS/NFCDD	300000	Manage	Short	1	0.3	0.375	0.45	0.72	
	ST land compensation		Area (Ha)	15	GIS/NFCDD	15000	Manage	Short	1	0.225	0.28125	0.3375	0.54	
													3.218335751	TOTAL
												Cost (£K/Ha) for MR	93.58124083	
Dawlish Warren sand spit distal section flattened in 2030, Improve with existing form when and where necessary	Wall	690/1902/01	Length (km)	0.24	GIS/NFCDD	5405	Maintain	Short to long term	30	0.038913393	0.048641742	0.05837009	0.093392144	
	CC .75m addition		Length (m)	240	GIS/NFCDD	1554	Sustain	Long	0.2	0.074596975	0.093246219	0.111895462	0.17903274	
	Wall	113FAS3351009C05	Length (km)	0.4	GIS/NFCDD	5405	Maintain	Short to long term	30	0.064855655	0.081069569	0.097283483	0.155653573	
	CC 0.5m addition		Length (m)	400	GIS/NFCDD	1036	Sustain	Short	1	0.414427638	0.518034548	0.621641458	0.994626332	
	CC 0.5m addition		Length (m)	400	GIS/NFCDD	1036	Sustain	Medium	0.5	0.207213819	0.259017274	0.310820729	0.497313166	
	CC 0.75m addition		Length (m)	400	GIS/NFCDD	1554	Sustain	Long	0.2	0.124328292	0.155410364	0.186492437	0.2983879	
	Wall	113FAS3351009C06	Length (km)	0.64	GIS/NFCDD	5405	Maintain	Short to long term	30	0.103769049	0.129711311	0.155653573	0.249045717	
	CC 0.5m addition		Length (m)	640	GIS/NFCDD	1036	Sustain	Short	1	0.663084221	0.828855277	0.994626332	1.591402132	
	CC 0.5m addition		Length (m)	640	GIS/NFCDD	1036	Sustain	Medium	0.5	0.331542111	0.414427638	0.497313166	0.795701066	
	CC 0.75m addition		Length (m)	640	GIS/NFCDD	1554	Sustain	Long	0.2	0.198925266	0.248656583	0.2983879	0.477420639	
	Wall	113FAS3351009C07	Length (km)	0.63	GIS/NFCDD	5405	Maintain	Short to long term	30	0.102147657	0.127684572	0.153221486	0.245154378	
	CC 0.5m addition		Length (m)	630	GIS/NFCDD	1036	Sustain	Short	1	0.652723531	0.815904413	0.979085296	1.566536473	
	CC 0.5m addition		Length (m)	630	GIS/NFCDD	1036	Sustain	Medium	0.5	0.326361765	0.407952207	0.489542648	0.783268237	
	CC 0.75m addition		Length (m)	630	GIS/NFCDD	1554	Sustain	Long	0.2	0.195817059	0.244771324	0.293725589	0.469960942	
	Railway embankment	113FAS3351010C01	Length (km)	0.21	GIS/NFCDD	5405	Maintain	Short to long term	30	0.034049219	0.042561524	0.051073829	0.081718126	
	CC 0.5m addition		Length (m)	210	GIS/NFCDD	1036	Sustain	Short	1	0.21757451	0.271968138	0.326361765	0.522178824	
	CC 0.5m addition		Length (m)	210	GIS/NFCDD	1036	Sustain	Medium	0.5	0.108787255	0.135984069	0.163180883	0.261089412	
	CC 0.75m addition		Length (m)	210	GIS/NFCDD	1554	Sustain	Long	0.2	0.065272353	0.081590441	0.09790853	0.156653647	
	Localised embankments to manage flooding to properties at The Mill		Length (m)	100	GIS/NFCDD	599	Manage	Short	1	0.059882755	0.074853444	0.089824133	0.143718612	
	RTE		No	1	GIS/NFCDD	300000	Manage	Short	1	0.3	0.375	0.45	0.72	
	ST land compensation		Area (Ha)	15	GIS/NFCDD	15000	Manage	Short	1	0.225	0.28125	0.3375	0.54	
													10.82225406	TOTAL
												Cost (£K/Ha) for MR	93.58124083	



FCRMU approach	Asset Type	Asset reference	Parameter	Amount	Reference	Rate (£/parameter)	HLO	Epoch	Epochal discount factor	Basic construction cost (£M)	Plus Tidal/urban uplift (25% each) cost (£M)	Plus PAR, design and supervision (20%) cost (£M)	Plus Optimism bias 60% cost (£M)	
SHORT-LISTED ALIGNMENT AND TYPE OPTIONS														
Short Term Option 1. Vertical or wave recurve wall raising of up to 0.5m along the harbour walls. Dawlish Warren sand spit distal section flattened in 2060. Medium to Long Term Option 1. Vertical or wave recurve wall raising of between 0-1.5m in the medium to long term. Further raising of the short term Cockwood Harbour works of between 0-1m.	Railway embankment	113FAS3351010C01	Length (km)	0.96	GIS/NFCDD	5405	Maintain	Short to long term	30	0.155653573	0.194566966	0.23348036	0.373568575	
	CC 0.5m addition		Length (m)	960	GIS/NFCDD	309	Improve	Medium	0.5	0.14838974	0.231858968	0.278230762	0.445169219	
	CC 0.3m addition		Length (m)	960	GIS/NFCDD	155	Sustain	Long	0.2	0.029677948	0.037097435	0.044516922	0.071227075	
	Railway embankment	113FAS3351011C01	Length (km)	0.61	GIS/NFCDD	5405	Maintain	Short to long term	30	0.098904875	0.123631093	0.148357312	0.237371699	
	CC 0.5m addition		Length (m)	610	GIS/NFCDD	309	Sustain	Medium	0.5	0.094289314	0.117861642	0.141433971	0.226294353	
	CC 0.3m addition		Length (m)	610	GIS/NFCDD	155	Sustain	Long	0.2	0.018857863	0.023572328	0.028286794	0.045258871	
	masonry wall	113FAS3351011C04	Length (km)	0.13	GIS/NFCDD	5405	Maintain	Short to long term	30	0.021078088	0.02634761	0.031617132	0.050587411	
	CC 0.5m addition		Length (m)	130	GIS/NFCDD	1036	Improve	Short	1	0.134688982	0.210451535	0.252541842	0.404066947	
	CC 1m addition		Length (m)	130	GIS/NFCDD	2072	Sustain	Medium	0.5	0.134688982	0.168361228	0.202033474	0.323253558	
	CC 0.3m addition		Length (m)	130	GIS/NFCDD	518	Sustain	Long	0.2	0.013468898	0.016836123	0.020203347	0.032325356	
	masonry wall	113FAS3351011C05	Length (km)	0.11	GIS/NFCDD	5405	Maintain	Short to long term	30	0.017835305	0.022294132	0.026752958	0.042804733	
	CC 0.5m addition		Length (m)	110	GIS/NFCDD	1036	Improve	Short	1	0.113967601	0.178074376	0.213689251	0.341902802	
	CC 1m addition		Length (m)	110	GIS/NFCDD	2072	Sustain	Medium	0.5	0.113967601	0.142459501	0.170951401	0.273522241	
	CC 0.3m addition		Length (m)	110	GIS/NFCDD	518	Sustain	Long	0.2	0.01139676	0.01424595	0.01709514	0.027352224	
	masonry wall	113FAS3351011C03	Length (km)	0.08	GIS/NFCDD	5405	Maintain	Short to long term	30	0.012971131	0.016213914	0.019456697	0.031130715	
	CC 0.5m addition		Length (m)	80	GIS/NFCDD	1036	Improve	Short	1	0.082885528	0.129508637	0.155410364	0.248656583	
	CC 1m addition		Length (m)	80	GIS/NFCDD	2072	Sustain	Medium	0.5	0.082885528	0.10360691	0.124328292	0.198925266	
	CC 0.3m addition		Length (m)	80	GIS/NFCDD	518	Sustain	Long	0.2	0.008288553	0.010360691	0.012432829	0.019892527	
	embankment	113FAS3351011C02	Length (km)	0.07	GIS/NFCDD	1081	Maintain	Short to long term	30	0.002269948	0.002837435	0.003404922	0.005447875	
	CC 0.5m addition		Length (m)	70	GIS/NFCDD	305	Improve	Short	1	0.021337511	0.03333986	0.040007832	0.064012532	
	CC 1m addition		Length (m)	70	GIS/NFCDD	965	Sustain	Medium	0.5	0.033784392	0.04223049	0.050676588	0.08108254	
	CC 0.3m addition		Length (m)	70	GIS/NFCDD	152	Sustain	Long	0.2	0.002133751	0.002667189	0.003200627	0.005121003	
	embankment	113FAS3351011C06	Length (km)	0.07	GIS/NFCDD	1081	Maintain	Short to long term	30	0.002269948	0.002837435	0.003404922	0.005447875	
	CC 0.5m addition		Length (m)	70	GIS/NFCDD	305	Improve	Short	1	0.021337511	0.03333986	0.040007832	0.064012532	
	CC 1m addition		Length (m)	70	GIS/NFCDD	965	Sustain	Medium	0.5	0.033784392	0.04223049	0.050676588	0.08108254	
	CC 0.3m addition		Length (m)	70	GIS/NFCDD	152	Sustain	Long	0.2	0.002133751	0.002667189	0.003200627	0.005121003	
	Railway embankment	113FAS3351012C01	Length (km)	0.28	GIS/NFCDD	5405	Maintain	Short to long term	30	0.045398959	0.056748699	0.068098438	0.108957501	
	CC 0.5m addition		Length (m)	280	GIS/NFCDD	309	Sustain	Medium	0.5	0.043280341	0.054100426	0.064920511	0.103872818	
	CC 0.3m addition		Length (m)	280	GIS/NFCDD	155	Sustain	Long	0.2	0.008656068	0.010820085	0.012984102	0.020774564	
													3.938242938	TOTAL
Short Term Option 1. Vertical or wave recurve wall raising of up to 0.5m along the harbour walls. Dawlish Warren sand spit distal section flattened in 2060. Medium to Long Term Option 2. Rock armouring or revetment raising of between 0-1.5m in the medium to long term. Further raising of the short term Cockwood Harbour works of between 0-1m.	Railway embankment	113FAS3351010C01	Length (km)	0.96	GIS/NFCDD	5405	Maintain	Short to long term	30	0.155653573	0.194566966	0.23348036	0.373568575	
	CC 0.1m addition		Length (m)	960	GIS/NFCDD	518	Improve	Short	1	0.497313166	0.777051822	0.932462186	1.491939498	
	CC 1m addition		Length (m)	960	GIS/NFCDD	2072	Sustain	Medium	0.5	0.994626332	1.243282915	1.491939498	2.387103197	
	CC 0.3m addition		Length (m)	960	GIS/NFCDD	518	Sustain	Long	0.2	0.099462633	0.124328292	0.14919395	0.23871032	
	Railway embankment	113FAS3351011C01	Length (km)	0.61	GIS/NFCDD	5405	Maintain	Short to long term	30	0.098904875	0.123631093	0.148357312	0.237371699	
	CC 1m addition		Length (m)	610	GIS/NFCDD	2072	Sustain	Medium	0.5	0.632002149	0.790002686	0.948003223	1.516805157	
	CC 0.3m addition		Length (m)	610	GIS/NFCDD	518	Sustain	Long	0.2	0.063200215	0.079000269	0.094800322	0.151680516	
	masonry wall	113FAS3351011C04	Length (km)	0.13	GIS/NFCDD	5405	Maintain	Short to long term	30	0.021078088	0.02634761	0.031617132	0.050587411	
	CC 0.5m addition		Length (m)	130	GIS/NFCDD	1036	Improve	Short	1	0.134688982	0.210451535	0.252541842	0.404066947	
	CC 1m addition		Length (m)	130	GIS/NFCDD	2072	Sustain	Medium	0.5	0.134688982	0.168361228	0.202033474	0.323253558	
	CC 0.3m addition		Length (m)	130	GIS/NFCDD	518	Sustain	Long	0.2	0.013468898	0.016836123	0.020203347	0.032325356	
	masonry wall	113FAS3351011C05	Length (km)	0.11	GIS/NFCDD	5405	Maintain	Short to long term	30	0.017835305	0.022294132	0.026752958	0.042804733	
	CC 0.5m addition		Length (m)	110	GIS/NFCDD	1036	Improve	Short	1	0.113967601	0.178074376	0.213689251	0.341902802	
	CC 1m addition		Length (m)	110	GIS/NFCDD	2072	Sustain	Medium	0.5	0.113967601	0.142459501	0.170951401	0.273522241	
	CC 0.3m addition		Length (m)	110	GIS/NFCDD	518	Sustain	Long	0.2	0.01139676	0.01424595	0.01709514	0.027352224	
	masonry wall	113FAS3351011C03	Length (km)	0.08	GIS/NFCDD	5405	Maintain	Short to long term	30	0.012971131	0.016213914	0.019456697	0.031130715	
	CC 0.5m addition		Length (m)	80	GIS/NFCDD	1036	Improve	Short	1	0.082885528	0.129508637	0.155410364	0.248656583	
	CC 1m addition		Length (m)	80	GIS/NFCDD	2072	Sustain	Medium	0.5	0.082885528	0.10360691	0.124328292	0.198925266	
	CC 0.3m addition		Length (m)	80	GIS/NFCDD	518	Sustain	Long	0.2	0.008288553	0.010360691	0.012432829	0.019892527	
	embankment	113FAS3351011C02	Length (km)	0.07	GIS/NFCDD	1081	Maintain	Short to long term	30	0.002269948	0.002837435	0.003404922	0.005447875	
	CC 0.5m addition		Length (m)	70	GIS/NFCDD	305	Improve	Short	1	0.021337511	0.03333986	0.040007832	0.064012532	
	CC 1m addition		Length (m)	70	GIS/NFCDD	965	Sustain	Medium	0.5	0.033784392	0.04223049	0.050676588	0.08108254	
	CC 0.3m addition		Length (m)	70	GIS/NFCDD	152	Sustain	Long	0.2	0.002133751	0.002667189	0.003200627	0.005121003	
	embankment	113FAS3351011C06	Length (km)	0.07	GIS/NFCDD	1081	Maintain	Short to long term	30	0.002269948	0.002837435	0.003404922	0.005447875	
	CC 0.5m addition		Length (m)	70	GIS/NFCDD	305	Improve	Short	1	0.021337511	0.03333986	0.040007832	0.064012532	
	CC 1m addition		Length (m)	70	GIS/NFCDD	965	Sustain	Medium	0.5	0.033784392	0.04223049	0.050676588	0.08108254	
	CC 0.3m addition		Length (m)	70	GIS/NFCDD	152	Sustain	Long	0.2	0.002133751	0.002667189	0.003200627	0.005121003	
	Railway embankment	113FAS3351012C01	Length (km)	0.28	GIS/NFCDD	5405	Maintain	Short to long term	30	0.045398959	0.056748699	0.068098438	0.108957501	
	CC 1m addition		Length (m)	280	GIS/NFCDD	2072	Sustain	Medium	0.5	0.290099347	0.362624184	0.43514902	0.696238433	
	CC 0.3m addition		Length (m)	280	GIS/NFCDD	518	Sustain	Long	0.2	0.029009935	0.036262418	0.043514902	0.069623843	
													9.577747002	TOTAL



Short Term Option 2. A new wall or embankment north of Cockwood Harbour, with road raising or a flood gate, to cut off the flood route to Starcross, and road raising to the south of Cockwood Harbour. These could be between 1-2m in height. Dawlish Warren sand spit distal section flattened in 2060. Medium to Long Term Option 1. Vertical or wave recurve wall raising of between 0-1.5m in the medium to	Railway embankment	113FAS3351010C01	Length (km)	0.96	GIS/NFCDD	5405	Maintain	Short to long term	30	0.155653573	0.194566966	0.23348036	0.373568575	
	CC 0.5m addition		Length (m)	960	GIS/NFCDD	309	Improve	Medium	0.5	0.14838974	0.231858968	0.278230762	0.445169219	
	CC 0.3m addition		Length (m)	960	GIS/NFCDD	155	Sustain	Long	0.2	0.029677948	0.037097435	0.044516922	0.071227075	
	Railway embankment	113FAS3351011C01	Length (km)	0.61	GIS/NFCDD	5405	Maintain	Short to long term	30	0.098904875	0.123631093	0.148357312	0.237371699	
	CC 0.5m addition		Length (m)	610	GIS/NFCDD	309	Sustain	Medium	0.5	0.094289314	0.117861642	0.141433971	0.226294353	
	CC 0.3m addition		Length (m)	610	GIS/NFCDD	155	Sustain	Long	0.2	0.018857863	0.023572328	0.028286794	0.045258871	
	masonry wall	113FAS3351011C04	Length (km)	0.13	GIS/NFCDD	5405	Maintain	Short to long term	30	0.021078088	0.02634761	0.031617132	0.050587411	
	New embankment to the north 100m length		Length (m)	100		1459	Improve	Short	1	0.145925225	0.228008164	0.273609796	0.437775674	
	CC 0.3m addition		Length (m)	100		243	Sustain	Medium	0.5	0.012160435	0.015200544	0.018240653	0.029185045	
	CC 0.3m addition		Length (m)	100		243	Sustain	Long	0.2	0.004864174	0.006080218	0.007296261	0.011674018	
	masonry wall	113FAS3351011C05	Length (km)	0.11	GIS/NFCDD	5405	Maintain	Short to long term	30	0.017835305	0.022294132	0.026752958	0.042804733	
	masonry wall	113FAS3351011C03	Length (km)	0.08	GIS/NFCDD	5405	Maintain	Short to long term	30	0.012971131	0.016213914	0.019456697	0.031130715	
	embankment	113FAS3351011C02	Length (km)	0.07	GIS/NFCDD	1081	Maintain	Short to long term	30	0.002269948	0.002837435	0.003404922	0.005447875	
	embankment	113FAS3351011C06	Length (km)	0.07	GIS/NFCDD	1081	Maintain	Short to long term	30	0.002269948	0.002837435	0.003404922	0.005447875	
	Road/ground raising to the south 50m length		Length (m)	50		1459	Improve	Short	1	0.072962612	0.114004082	0.136804898	0.218887837	
	CC 0.3m addition		Length (m)	50		243	Sustain	Medium	0.5	0.006080218	0.007600272	0.009120327	0.014592522	
	CC 0.3m addition		Length (m)	50		243	Sustain	Long	0.2	0.002432087	0.003040109	0.003648131	0.005837009	
	Railway embankment	113FAS3351012C01	Length (km)	0.28	GIS/NFCDD	5405	Maintain	Short to long term	30	0.045398959	0.056748699	0.068098438	0.108957501	
	CC 0.5m addition		Length (m)	280	GIS/NFCDD	309	Sustain	Medium	0.5	0.043280341	0.054100426	0.064920511	0.103872818	
	CC 0.3m addition		Length (m)	280	GIS/NFCDD	155	Sustain	Long	0.2	0.008656068	0.010820085	0.012984102	0.020774564	
													2.485865389	TOTAL
Short Term Option 2. A new wall or embankment north of Cockwood Harbour, with road raising or a flood gate, to cut off the flood route to Starcross, and road raising to the south of Cockwood Harbour. These could be between 1-2m in height. Dawlish Warren sand spit distal section flattened in 2060. Medium to Long Term Option 2. Rock armouring or revetment raising of between 0-1.5m in the medium to long	Railway embankment	113FAS3351010C01	Length (km)	0.96	GIS/NFCDD	5405	Maintain	Short to long term	30	0.155653573	0.194566966	0.23348036	0.373568575	
	CC 0.1m addition		Length (m)	960	GIS/NFCDD	518	Improve	Short	1	0.497313166	0.777051822	0.932462186	1.491939498	
	CC 1m addition		Length (m)	960	GIS/NFCDD	2072	Sustain	Medium	0.5	0.994626332	1.243282915	1.491939498	2.387103197	
	CC 0.3m addition		Length (m)	960	GIS/NFCDD	518	Sustain	Long	0.2	0.099462633	0.124328292	0.14919395	0.23871032	
	Railway embankment	113FAS3351011C01	Length (km)	0.61	GIS/NFCDD	5405	Maintain	Short to long term	30	0.098904875	0.123631093	0.148357312	0.237371699	
	CC 1m addition		Length (m)	610	GIS/NFCDD	2072	Sustain	Medium	0.5	0.632002149	0.790002686	0.948003223	1.516805157	
	CC 0.3m addition		Length (m)	610	GIS/NFCDD	518	Sustain	Long	0.2	0.063200215	0.079000269	0.094800322	0.151680516	
	masonry wall	113FAS3351011C04	Length (km)	0.13	GIS/NFCDD	5405	Maintain	Short to long term	30	0.021078088	0.02634761	0.031617132	0.050587411	
	New embankment to the north 100m length		Length (m)	100		1459	Improve	Short	1	0.145925225	0.228008164	0.273609796	0.437775674	
	CC 0.3m addition		Length (m)	100		243	Sustain	Medium	0.5	0.012160435	0.015200544	0.018240653	0.029185045	
	CC 0.3m addition		Length (m)	100		243	Sustain	Long	0.2	0.004864174	0.006080218	0.007296261	0.011674018	
	masonry wall	113FAS3351011C05	Length (km)	0.11	GIS/NFCDD	5405	Maintain	Short to long term	30	0.017835305	0.022294132	0.026752958	0.042804733	
	masonry wall	113FAS3351011C03	Length (km)	0.08	GIS/NFCDD	5405	Maintain	Short to long term	30	0.012971131	0.016213914	0.019456697	0.031130715	
	embankment	113FAS3351011C02	Length (km)	0.07	GIS/NFCDD	1081	Maintain	Short to long term	30	0.002269948	0.002837435	0.003404922	0.005447875	
	embankment	113FAS3351011C06	Length (km)	0.07	GIS/NFCDD	1081	Maintain	Short to long term	30	0.002269948	0.002837435	0.003404922	0.005447875	
	Road/ground raising to the south 50m length		Length (m)	50		1459	Improve	Short	1	0.072962612	0.114004082	0.136804898	0.218887837	
	CC 0.3m addition		Length (m)	50		243	Sustain	Medium	0.5	0.006080218	0.007600272	0.009120327	0.014592522	
	CC 0.3m addition		Length (m)	50		243	Sustain	Long	0.2	0.002432087	0.003040109	0.003648131	0.005837009	
	Railway embankment	113FAS3351012C01	Length (km)	0.28	GIS/NFCDD	5405	Maintain	Short to long term	30	0.045398959	0.056748699	0.068098438	0.108957501	
	CC 1m addition		Length (m)	280	GIS/NFCDD	2072	Sustain	Medium	0.5	0.290099347	0.362624184	0.43514902	0.696238433	
	CC 0.3m addition		Length (m)	280	GIS/NFCDD	518	Sustain	Long	0.2	0.029009935	0.036262418	0.043514902	0.069623843	
													8.125369454	TOTAL



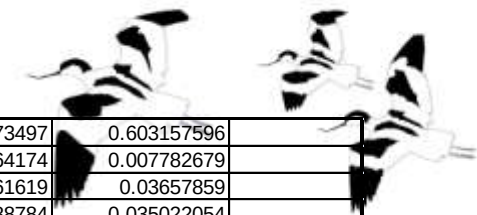
ADDITIONAL ASSESSMENT OF TIMING OF PERMANENT FLATTENING OF DAWLISH WARREN SAND SPIT DISTAL SECTION														
Dawlish Warren sand spit maintained, Improve with existing form when and where necessary	Railway embankment	113FAS3351010C01	Length (km)	0.96	GIS/NFCDD	5405	Maintain	Short to long term	30	0.155653573	0.194566966	0.23348036	0.373568575	
	CC 0.1m addition		Length (m)	960	GIS/NFCDD	518	Improve	Short	1	0.497313166	0.777051822	0.932462186	1.491939498	
	CC 0.3m addition		Length (m)	960	GIS/NFCDD	518	Sustain	Medium	0.5	0.248656583	0.310820729	0.372984875	0.596775799	
	CC 0.3m addition		Length (m)	960	GIS/NFCDD	518	Sustain	Long	0.2	0.099462633	0.124328292	0.14919395	0.23871032	
	Railway embankment	113FAS3351011C01	Length (km)	0.61	GIS/NFCDD	5405	Maintain	Short to long term	30	0.098904875	0.123631093	0.148357312	0.237371699	
	CC 0.3m addition		Length (m)	610	GIS/NFCDD	518	Sustain	Medium	0.5	0.158000537	0.197500671	0.237000806	0.379201289	
	CC 0.3m addition		Length (m)	610	GIS/NFCDD	518	Sustain	Long	0.2	0.063200215	0.079000269	0.094800322	0.151680516	
	masonry wall	113FAS3351011C04	Length (km)	0.13	GIS/NFCDD	5405	Maintain	Short to long term	30	0.021078088	0.02634761	0.031617132	0.050587411	
	CC 0.5m addition		Length (m)	130	GIS/NFCDD	1036	Improve	Short	1	0.134688982	0.210451535	0.252541842	0.404066947	
	CC 0.3m addition		Length (m)	130	GIS/NFCDD	518	Sustain	Medium	0.5	0.033672246	0.042090307	0.050508368	0.080813389	
	CC 0.3m addition		Length (m)	130	GIS/NFCDD	518	Sustain	Long	0.2	0.013468898	0.016836123	0.020203347	0.032325356	
	masonry wall	113FAS3351011C05	Length (km)	0.11	GIS/NFCDD	5405	Maintain	Short to long term	30	0.017835305	0.022294132	0.026752958	0.042804733	
	CC 0.5m addition		Length (m)	110	GIS/NFCDD	1036	Improve	Short	1	0.113967601	0.178074376	0.213689251	0.341902802	
	CC 0.3m addition		Length (m)	110	GIS/NFCDD	518	Sustain	Medium	0.5	0.0284919	0.035614875	0.04273785	0.06838056	
	CC 0.3m addition		Length (m)	110	GIS/NFCDD	518	Sustain	Long	0.2	0.01139676	0.01424595	0.01709514	0.027352224	
	masonry wall	113FAS3351011C03	Length (km)	0.08	GIS/NFCDD	5405	Maintain	Short to long term	30	0.012971131	0.016213914	0.019456697	0.031130715	
	CC 0.5m addition		Length (m)	80	GIS/NFCDD	1036	Improve	Short	1	0.082885528	0.129508637	0.155410364	0.248656583	
	CC 0.3m addition		Length (m)	80	GIS/NFCDD	518	Sustain	Medium	0.5	0.020721382	0.025901727	0.031082073	0.049731317	
	CC 0.3m addition		Length (m)	80	GIS/NFCDD	518	Sustain	Long	0.2	0.008288553	0.010360691	0.012432829	0.019892527	
	embankment	113FAS3351011C02	Length (km)	0.07	GIS/NFCDD	1081	Maintain	Short to long term	30	0.002269948	0.002837435	0.003404922	0.005447875	
	CC 0.5m addition		Length (m)	70	GIS/NFCDD	305	Improve	Short	1	0.021337511	0.03333986	0.040007832	0.064012532	
	CC 0.3m addition		Length (m)	70	GIS/NFCDD	152	Sustain	Medium	0.5	0.005334378	0.006667972	0.008001566	0.012802506	
	CC 0.3m addition		Length (m)	70	GIS/NFCDD	518	Sustain	Long	0.2	0.007252484	0.009065605	0.010878726	0.017405961	
	embankment	113FAS3351011C06	Length (km)	0.07	GIS/NFCDD	1081	Maintain	Short to long term	30	0.002269948	0.002837435	0.003404922	0.005447875	
	CC 0.5m addition		Length (m)	70	GIS/NFCDD	305	Improve	Short	1	0.021337511	0.03333986	0.040007832	0.064012532	
	CC 0.3m addition		Length (m)	70	GIS/NFCDD	152	Sustain	Medium	0.5	0.005334378	0.006667972	0.008001566	0.012802506	
	CC 0.3m addition		Length (m)	70	GIS/NFCDD	518	Sustain	Long	0.2	0.007252484	0.009065605	0.010878726	0.017405961	
	Railway embankment	113FAS3351012C01	Length (km)	0.28	GIS/NFCDD	5405	Maintain	Short to long term	30	0.045398959	0.056748699	0.068098438	0.108957501	
CC 0.3m addition		Length (m)	280	GIS/NFCDD	518	Sustain	Medium	0.5	0.072524837	0.090656046	0.108787255	0.174059608		
CC 0.3m addition		Length (m)	280	GIS/NFCDD	518	Sustain	Long	0.2	0.029009935	0.036262418	0.043514902	0.069623843		
												5.418870961	TOTAL	
Dawlish Warren sand spit distal section flattened in 2030, Improve with existing form when and where necessary	Railway embankment	113FAS3351010C01	Length (km)	0.96	GIS/NFCDD	5405	Maintain	Short to long term	30	0.155653573	0.194566966	0.23348036	0.373568575	
	CC 1m addition		Length (m)	960	GIS/NFCDD	2072	Improve	Short	1	1.989252664	3.108207288	3.729848746	5.967757993	
	CC 1m addition		Length (m)	960	GIS/NFCDD	2072	Sustain	Medium	0.5	0.994626332	1.243282915	1.491939498	2.387103197	
	CC 0.3m addition		Length (m)	960	GIS/NFCDD	518	Sustain	Long	0.2	0.099462633	0.124328292	0.14919395	0.23871032	
	Railway embankment	113FAS3351011C01	Length (km)	0.61	GIS/NFCDD	5405	Maintain	Short to long term	30	0.098904875	0.123631093	0.148357312	0.237371699	
	CC 1m addition		Length (m)	610	GIS/NFCDD	2072	Improve	Short	1	1.264004297	1.975006714	2.370008057	3.792012892	
	CC 1m addition		Length (m)	610	GIS/NFCDD	2072	Sustain	Medium	0.5	0.632002149	0.790002686	0.948003223	1.516805157	
	CC 0.3m addition		Length (m)	610	GIS/NFCDD	518	Sustain	Long	0.2	0.063200215	0.079000269	0.094800322	0.151680516	
	masonry wall	113FAS3351011C04	Length (km)	0.13	GIS/NFCDD	5405	Maintain	Short to long term	30	0.021078088	0.02634761	0.031617132	0.050587411	
	CC 1m addition		Length (m)	130	GIS/NFCDD	2072	Improve	Short	1	0.269377965	0.42090307	0.505083684	0.808133895	
	CC 1m addition		Length (m)	130	GIS/NFCDD	2072	Sustain	Medium	0.5	0.134688982	0.168361228	0.202033474	0.323253558	
	CC 0.3m addition		Length (m)	130	GIS/NFCDD	518	Sustain	Long	0.2	0.013468898	0.016836123	0.020203347	0.032325356	
	masonry wall	113FAS3351011C05	Length (km)	0.11	GIS/NFCDD	5405	Maintain	Short to long term	30	0.017835305	0.022294132	0.026752958	0.042804733	
	CC 1m addition		Length (m)	110	GIS/NFCDD	2072	Improve	Short	1	0.227935201	0.356148752	0.427378502	0.683805603	
	CC 1m addition		Length (m)	110	GIS/NFCDD	2072	Sustain	Medium	0.5	0.113967601	0.142459501	0.170951401	0.273522241	
	CC 0.3m addition		Length (m)	110	GIS/NFCDD	518	Sustain	Long	0.2	0.01139676	0.01424595	0.01709514	0.027352224	
	masonry wall	113FAS3351011C03	Length (km)	0.08	GIS/NFCDD	5405	Maintain	Short to long term	30	0.012971131	0.016213914	0.019456697	0.031130715	
	CC 1m addition		Length (m)	80	GIS/NFCDD	2072	Improve	Short	1	0.165771055	0.259017274	0.310820729	0.497313166	
	CC 1m addition		Length (m)	80	GIS/NFCDD	2072	Sustain	Medium	0.5	0.082885528	0.10360691	0.124328292	0.198925266	
	CC 0.3m addition		Length (m)	80	GIS/NFCDD	518	Sustain	Long	0.2	0.008288553	0.010360691	0.012432829	0.019892527	
	embankment	113FAS3351011C02	Length (km)	0.07	GIS/NFCDD	1081	Maintain	Short to long term	30	0.002269948	0.002837435	0.003404922	0.005447875	
	CC 1m addition		Length (m)	70	GIS/NFCDD	965	Improve	Short	1	0.067568784	0.105576225	0.126691469	0.202706351	
	CC 1m addition		Length (m)	70	GIS/NFCDD	965	Sustain	Medium	0.5	0.033784392	0.04223049	0.050676588	0.08108254	
	CC 0.3m addition		Length (m)	70	GIS/NFCDD	152	Sustain	Long	0.2	0.002133751	0.002667189	0.003200627	0.005121003	
	embankment	113FAS3351011C06	Length (km)	0.07	GIS/NFCDD	1081	Maintain	Short to long term	30	0.002269948	0.002837435	0.003404922	0.005447875	
	CC 1m addition		Length (m)	70	GIS/NFCDD	965	Improve	Short	1	0.067568784	0.105576225	0.126691469	0.202706351	
	CC 1m addition		Length (m)	70	GIS/NFCDD	965	Sustain	Medium	0.5	0.033784392	0.04223049	0.050676588	0.08108254	
	CC 0.3m addition		Length (m)	70	GIS/NFCDD	152	Sustain	Long	0.2	0.002133751	0.002667189	0.003200627	0.005121003	
Railway embankment	113FAS3351012C01	Length (km)	0.28	GIS/NFCDD	5405	Maintain	Short to long term	30	0.045398959	0.056748699	0.068098438	0.108957501		
CC 1m addition		Length (m)	280	GIS/NFCDD	2072	Improve	Short	1	0.580198694	0.906560459	1.087872551	1.740596081		
CC 1m addition		Length (m)	280	GIS/NFCDD	2072	Sustain	Medium	0.5	0.290099347	0.362624184	0.43514902	0.696238433		
CC 0.3m addition		Length (m)	280	GIS/NFCDD	518	Sustain	Long	0.2	0.029009935	0.036262418	0.043514902	0.069623843		
												20.85818844	TOTAL	



FCRMU approach	Asset Type	Asset reference	Parameter	Amount	Reference	Rate (£/parameter)	HLO	Epoch	Epochal discount factor	Basic construction cost (£M)	Plus Tidal/urban uplift (25% each) cost (£M)	Plus PAR, design and supervision (20%) cost (£M)	Plus Optimism bias 60% cost (£M)	
DECISION TREE ASSESSMENT														
Options 2,8,12 Central/distal sections not maintained, proximal section sustained into future.	Railway embankment	113FAS3351012C01	Length (km)	1.55	GIS/NFCDD	5405	Maintain	Short to long term	30	0.251315665	0.314144581	0.376973497	0.603157596	
	Embankment	113FAS3351013C01	Length (km)	0.1	GIS/NFCDD	1081	Maintain	Short to long term	30	0.003242783	0.004053478	0.004864174	0.007782679	
	gabions	113FAS3351013C02	Length (km)	0.09	GIS/NFCDD	0	NAI	Short to long term	30	0	0	0	0	
	wall	113FAS3351013C03	Length (km)	0.03	GIS/NFCDD	0	NAI	Short to long term	30	0	0	0	0	
	gabion wall	113FAS3351013C04	Length (km)	0.18	GIS/NFCDD	0	NAI	Short to long term	30	0	0	0	0	
	wall	113FAS3351013C05	Length (km)	0.12	GIS/NFCDD	0	NAI	Short to long term	30	0	0	0	0	
	wall	113FAS3351013C06	Length (km)	0.02	GIS/NFCDD	0	NAI	Short to long term	30	0	0	0	0	
	gabion revetment	113FAS3351013C07	Length (km)	0.08	GIS/NFCDD	0	NAI	Short to long term	30	0	0	0	0	
	Bank	113FAS3351013C09	Length (km)	1.27	GIS/NFCDD	0	NAI	Short to long term	30	0	0	0	0	
	Natural Cliff	113FBS3351501C01	Length (km)	0.1	GIS/NFCDD	0	Maintain	Short to long term	30	0	0	0	0	
	Rock Armour	113FAS3351015C02	Length (km)	0.28	GIS/NFCDD	5405	Maintain	Short to long term	30	0.045398959	0.056748699	0.068098438	0.108957501	
	concrete wall	113FAS3351015C01	Length (km)	0.41	GIS/NFCDD	5405	Maintain	Short to long term	30	0.066477047	0.083096309	0.09971557	0.159544912	
	Revetment	113FAS3351014C02	Length (km)	0.32	GIS/NFCDD	5405	Maintain	Short to long term	30	0.051884524	0.064855655	0.077826787	0.124522858	
	Removal of groynes and gabions etc	Groynes, based on construction cost	Number	16	GIS/NFCDD	25700	NAI	Short	1	0.4112	0.514	0.6168	0.98688	
		Gabions, based on demolition cost per estimated m3	m3	2000	GIS/NFCDD	100	NAI	Short	1	0.2	0.25	0.3	0.48	
	Ground raising around car park		Length (m)	500		1198		Short	1	0.598827552	0.74853444	0.898241328	1.437186125	
													3.908031671	TOTAL
Options 3,8,12 Central/distal sections managed realignment, proximal section sustained into future.	Railway embankment	113FAS3351012C01	Length (km)	1.55	GIS/NFCDD	5405	Maintain	Short to long term	30	0.251315665	0.314144581	0.376973497	0.603157596	
	Embankment	113FAS3351013C01	Length (km)	0.1	GIS/NFCDD	1081	Maintain	Short to long term	30	0.003242783	0.004053478	0.004864174	0.007782679	
	gabions	113FAS3351013C02	Length (km)	0.09	GIS/NFCDD	0	NAI	Short to long term	30	0	0	0	0	
	wall	113FAS3351013C03	Length (km)	0.03	GIS/NFCDD	0	NAI	Short to long term	30	0	0	0	0	
	gabion wall	113FAS3351013C04	Length (km)	0.18	GIS/NFCDD	0	NAI	Short to long term	30	0	0	0	0	
	wall	113FAS3351013C05	Length (km)	0.12	GIS/NFCDD	0	NAI	Short to long term	30	0	0	0	0	
	wall	113FAS3351013C06	Length (km)	0.02	GIS/NFCDD	0	NAI	Short to long term	30	0	0	0	0	
	gabion revetment	113FAS3351013C07	Length (km)	0.08	GIS/NFCDD	0	NAI	Short to long term	30	0	0	0	0	
	Bank	113FAS3351013C09	Length (km)	1.27	GIS/NFCDD	0	NAI	Short to long term	30	0	0	0	0	
	Recharge/recycling high end estimate	113FAS3351014C01	Volume (m3)	6450	Conceptual model	22	Maintain	Short	15	2.09	3.268117014	3.921740416	6.274784666	
			Volume (m3)	14742.86	Conceptual model	22	Maintain	Medium	10	3.19	4.97998783	5.975985397	9.561576634	
	Natural Cliff	113FBS3351501C01	Length (km)	0.1	GIS/NFCDD	0	Maintain	Short to long term	30	0	0	0	0	
	Rock Armour	113FAS3351015C02	Length (km)	0.28	GIS/NFCDD	5405	Maintain	Short to long term	30	0.045398959	0.056748699	0.068098438	0.108957501	
	concrete wall	113FAS3351015C01	Length (km)	0.41	GIS/NFCDD	5405	Maintain	Short to long term	30	0.066477047	0.083096309	0.09971557	0.159544912	
	Revetment	113FAS3351014C02	Length (km)	0.32	GIS/NFCDD	5405	Maintain	Short to long term	30	0.051884524	0.064855655	0.077826787	0.124522858	
	Removal of groynes and gabions etc	Groynes, based on construction cost	Number	16	GIS/NFCDD	25700	NAI	Short	1	0.4112	0.514	0.6168	0.98688	
		Gabions, based on demolition cost per estimated m3	m3	2000	GIS/NFCDD	100	NAI	Short	1	0.2	0.25	0.3	0.48	
	Ground raising around car park		Length (m)	500		1459		Short	1	0.729626124	0.912032655	1.094439186	1.751102698	
													20.05830954	TOTAL



Options 4,8,12 Central section managed realignment, neck/distal end maintained in ST, proximal section sustained into future	Railway embankment	113FAS3351012C01	Length (km)	1.55	GIS/NFCDD	5405	Maintain	Short to long term	30	0.251315665	0.314144581	0.376973497	0.603157596	
	Embankment	113FAS3351013C01	Length (km)	0.1	GIS/NFCDD	1081	Maintain	Short to long term	30	0.003242783	0.004053478	0.004864174	0.007782679	
	gabions	113FAS3351013C02	Length (km)	0.09	GIS/NFCDD	5405	NAI	Short to long term	30	0.014592522	0.018240653	0.021888784	0.035022054	
	wall	113FAS3351013C03	Length (km)	0.03	GIS/NFCDD	5405	NAI	Short to long term	30	0.004864174	0.006080218	0.007296261	0.011674018	
	gabion wall	113FAS3351013C04	Length (km)	0.18	GIS/NFCDD	5405	NAI	Short to long term	30	0.029185045	0.036481306	0.043777567	0.070044108	
	wall	113FAS3351013C05	Length (km)	0.12	GIS/NFCDD	0	NAI	Short to long term	30	0	0	0	0	
	wall	113FAS3351013C06	Length (km)	0.02	GIS/NFCDD	0	NAI	Short to long term	30	0	0	0	0	
	gabion revetment	113FAS3351013C07	Length (km)	0.08	GIS/NFCDD	0	NAI	Short to long term	30	0	0	0	0	
	Bank	113FAS3351013C09	Length (km)	1.27	GIS/NFCDD	0	NAI	Short to long term	30	0	0	0	0	
	Recharge/recycling high end estimate	113FAS3351014C01	Volume (m3)	6450	Conceptual model	22	Maintain	Short	15	2.09	3.268117014	3.921740416	6.274784666	
			Volume (m3)	14742.86	Conceptual model	22	Maintain	Medium	10	3.19	4.97998783	5.975985397	9.561576634	
	Natural Cliff	113FBS3351501C01	Length (km)	0.1	GIS/NFCDD	0	Maintain	Short to long term	30	0	0	0	0	
	Rock Armour	113FAS3351015C02	Length (km)	0.28	GIS/NFCDD	5405	Maintain	Short to long term	30	0.045398959	0.056748699	0.068098438	0.108957501	
	concrete wall	113FAS3351015C01	Length (km)	0.41	GIS/NFCDD	5405	Maintain	Short to long term	30	0.066477047	0.083096309	0.09971557	0.159544912	
	Revetment	113FAS3351014C02	Length (km)	0.32	GIS/NFCDD	5405	Maintain	Short to long term	30	0.051884524	0.064855655	0.077826787	0.124522858	
	Removal of groynes and gabions etc	Groynes, based on construction cost	Number	16	GIS/NFCDD	25700	NAI	Medium	0.5	0.2056	0.257	0.3084	0.49344	
		Gabions, based on demolition cost per estimated m3	m3	1000	GIS/NFCDD	100	NAI	Medium	0.5	0.05	0.0625	0.075	0.12	
	Ground raising around car park		Length (m)	500		2121		Short	1	1.060389967	1.325487459	1.59058495	2.54493592	
													20.11544295	TOTAL
Options 5,8,12 Central/neck/distal end maintained in ST, proximal section sustained into future	Railway embankment	113FAS3351012C01	Length (km)	1.55	GIS/NFCDD	5405	Maintain	Short to long term	30	0.251315665	0.314144581	0.376973497	0.603157596	
	Embankment	113FAS3351013C01	Length (km)	0.1	GIS/NFCDD	1081	Maintain	Short to long term	30	0.003242783	0.004053478	0.004864174	0.007782679	
	gabions	113FAS3351013C02	Length (km)	0.09	GIS/NFCDD	5405	NAI	Short to long term	30	0.014592522	0.018240653	0.021888784	0.035022054	
	wall	113FAS3351013C03	Length (km)	0.03	GIS/NFCDD	5405	NAI	Short to long term	30	0.004864174	0.006080218	0.007296261	0.011674018	
	gabion wall	113FAS3351013C04	Length (km)	0.18	GIS/NFCDD	5405	NAI	Short to long term	30	0.029185045	0.036481306	0.043777567	0.070044108	
	wall	113FAS3351013C05	Length (km)	0.12	GIS/NFCDD	5405	NAI	Short to long term	30	0.019456697	0.024320871	0.029185045	0.046696072	
	wall	113FAS3351013C06	Length (km)	0.02	GIS/NFCDD	5405	NAI	Short to long term	30	0.003242783	0.004053478	0.004864174	0.007782679	
	gabion revetment	113FAS3351013C07	Length (km)	0.08	GIS/NFCDD	5405	NAI	Short to long term	30	0.012971131	0.016213914	0.019456697	0.031130715	
	Bank	113FAS3351013C09	Length (km)	1.27	GIS/NFCDD	5405	NAI	Short to long term	30	0.205916706	0.257395883	0.308875059	0.494200095	
	Recharge/recycling high end estimate	113FAS3351014C01	Volume (m3)	14742.86	Conceptual model	22	Maintain	Medium	10	3.19	4.97998783	5.975985397	9.561576634	
	Natural Cliff	113FBS3351501C01	Length (km)	0.1	GIS/NFCDD	0	Maintain	Short to long term	30	0	0	0	0	
	Rock Armour	113FAS3351015C02	Length (km)	0.28	GIS/NFCDD	5405	Maintain	Short to long term	30	0.045398959	0.056748699	0.068098438	0.108957501	
	concrete wall	113FAS3351015C01	Length (km)	0.41	GIS/NFCDD	5405	Maintain	Short to long term	30	0.066477047	0.083096309	0.09971557	0.159544912	
	Revetment	113FAS3351014C02	Length (km)	0.32	GIS/NFCDD	5405	Maintain	Short to long term	30	0.051884524	0.064855655	0.077826787	0.124522858	
	Ground raising around car park		Length (m)	500		1021		Medium	0.5	0.255369143	0.319211429	0.383053715	0.612885944	
													11.87497786	TOTAL



Options 6,8,12 Central/neck/distal end sustained in ST, proximal section sustained into future	Railway embankment	113FAS3351012C01	Length (km)	1.55	GIS/NFCDD	5405	Maintain	Short to long term	30	0.251315665	0.314144581	0.376973497	0.603157596	
	Embankment	113FAS3351013C01	Length (km)	0.1	GIS/NFCDD	1081	Maintain	Short to long term	30	0.003242783	0.004053478	0.004864174	0.007782679	
	CC 0.3m addition		Length (m)	100	GIS/NFCDD	152	Sustain	Short	1	0.015241079	0.019051349	0.022861619	0.03657859	
	gabions	113FAS3351013C02	Length (km)	0.09	GIS/NFCDD	5405	NAI	Short to long term	30	0.014592522	0.018240653	0.021888784	0.035022054	
	2m gabion reconstruction		Length (m)	90	GIS/NFCDD	2724	Sustain	Short	1	0.245154378	0.306442972	0.367731566	0.588370506	
	wall	113FAS3351013C03	Length (km)	0.03	GIS/NFCDD	5405	NAI	Short to long term	30	0.004864174	0.006080218	0.007296261	0.011674018	
	2m gabion reconstruction		Length (m)	30	GIS/NFCDD	2724	Sustain	Short	1	0.081718126	0.102147657	0.122577189	0.196123502	
	gabion wall	113FAS3351013C04	Length (km)	0.18	GIS/NFCDD	5405	NAI	Short to long term	30	0.029185045	0.036481306	0.043777567	0.070044108	
	2m gabion reconstruction		Length (m)	180	GIS/NFCDD	2724	Sustain	Short	1	0.490308755	0.612885944	0.735463133	1.176741013	
	wall	113FAS3351013C05	Length (km)	0.12	GIS/NFCDD	5405	NAI	Short to long term	30	0.019456697	0.024320871	0.029185045	0.046696072	
	2m gabion reconstruction		Length (m)	120	GIS/NFCDD	2724	Sustain	Short	1	0.326872504	0.408590629	0.490308755	0.784494009	
	wall	113FAS3351013C06	Length (km)	0.02	GIS/NFCDD	5405	NAI	Short to long term	30	0.003242783	0.004053478	0.004864174	0.007782679	
	2m gabion reconstruction		Length (m)	20	GIS/NFCDD	2724	Sustain	Short	1	0.054478751	0.068098438	0.081718126	0.130749001	
	gabion revetment	113FAS3351013C07	Length (km)	0.08	GIS/NFCDD	5405	NAI	Short to long term	30	0.012971131	0.016213914	0.019456697	0.031130715	
	2m gabion reconstruction		Length (m)	80	GIS/NFCDD	2724	Sustain	Short	1	0.217915002	0.272393753	0.326872504	0.522996006	
	Bank	113FAS3351013C09	Length (km)	1.27	GIS/NFCDD	5405	NAI	Short to long term	30	0.205916706	0.257395883	0.308875059	0.494200095	
	Recharge/recycling high end estimate	113FAS3351014C01	Volume (m3)	14742.86	Conceptual model	22	Maintain	Medium	10	3.19	4.97998783	5.975985397	9.561576634	
	Natural Cliff	113FBS3351501C01	Length (km)	0.1	GIS/NFCDD	0	Maintain	Short to long term	30	0	0	0	0	
	Rock Armour	113FAS3351015C02	Length (km)	0.28	GIS/NFCDD	5405	Maintain	Short to long term	30	0.045398959	0.056748699	0.068098438	0.108957501	
	concrete wall	113FAS3351015C01	Length (km)	0.41	GIS/NFCDD	5405	Maintain	Short to long term	30	0.066477047	0.083096309	0.09971557	0.159544912	
	CC 0.1m addition		Length (m)	410	GIS/NFCDD	518	Sustain	Short	1	0.212394165	0.331865882	0.398239059	0.637182494	
	CC 0.3m addition		Length (m)	410	GIS/NFCDD	518	Sustain	Medium	0.5	0.106197082	0.132746353	0.159295624	0.254872998	
	CC 0.3m addition		Length (m)	410	GIS/NFCDD	518	Sustain	Long	0.2	0.042478833	0.053098541	0.063718249	0.101949199	
	Revetment	113FAS3351014C02	Length (km)	0.32	GIS/NFCDD	5405	Maintain	Short to long term	30	0.051884524	0.064855655	0.077826787	0.124522858	
	CC 0.1m addition		Length (m)	320	GIS/NFCDD	340	Sustain	Short	1	0.108957501	0.170246096	0.204295315	0.326872504	
	CC 0.3m addition		Length (m)	320	GIS/NFCDD	340	Sustain	Medium	0.5	0.054478751	0.068098438	0.081718126	0.130749001	
	CC 0.3m addition		Length (m)	320	GIS/NFCDD	340	Sustain	Long	0.2	0.0217915	0.027239375	0.03268725	0.052299601	
	Ground raising around car park		Length (m)	500		1021		Medium	0.5	0.255369143	0.319211429	0.383053715	0.612885944	
													16.81495629	TOTAL
Options 6,9,13 Central section maintained in ST, proximal/neck/distal section sustained into future	Railway embankment	113FAS3351012C01	Length (km)	1.55	GIS/NFCDD	5405	Maintain	Short to long term	30	0.251315665	0.314144581	0.376973497	0.603157596	
	Embankment	113FAS3351013C01	Length (km)	0.1	GIS/NFCDD	1081	Maintain	Short to long term	30	0.003242783	0.004053478	0.004864174	0.007782679	
	CC 0.3m addition		Length (m)	100	GIS/NFCDD	152	Sustain	Short	1	0.015241079	0.019051349	0.022861619	0.03657859	
	gabions	113FAS3351013C02	Length (km)	0.09	GIS/NFCDD	5405	NAI	Short to long term	30	0.014592522	0.018240653	0.021888784	0.035022054	
	2m gabion reconstruction		Length (m)	90	GIS/NFCDD	2724	Sustain	Short	1	0.245154378	0.306442972	0.367731566	0.588370506	
	wall	113FAS3351013C03	Length (km)	0.03	GIS/NFCDD	5405	NAI	Short to long term	30	0.004864174	0.006080218	0.007296261	0.011674018	
	2m gabion reconstruction		Length (m)	30	GIS/NFCDD	2724	Sustain	Short	1	0.081718126	0.102147657	0.122577189	0.196123502	
	gabion wall	113FAS3351013C04	Length (km)	0.18	GIS/NFCDD	5405	NAI	Short to long term	30	0.029185045	0.036481306	0.043777567	0.070044108	
	2m gabion reconstruction		Length (m)	180	GIS/NFCDD	2724	Sustain	Short	1	0.490308755	0.612885944	0.735463133	1.176741013	
	2m gabion reconstruction		Length (m)	180	GIS/NFCDD	2724	Sustain	Medium	0.5	0.245154378	0.306442972	0.367731566	0.588370506	
	2m gabion reconstruction		Length (m)	180	GIS/NFCDD	2724	Sustain	Long	0.2	0.098061751	0.122577189	0.147092627	0.235348203	
	wall	113FAS3351013C05	Length (km)	0.12	GIS/NFCDD	5405	NAI	Short to long term	30	0.019456697	0.024320871	0.029185045	0.046696072	
	2m gabion reconstruction		Length (m)	120	GIS/NFCDD	2724	Sustain	Short	1	0.326872504	0.408590629	0.490308755	0.784494009	
	2m gabion reconstruction		Length (m)	120	GIS/NFCDD	2724	Sustain	Medium	0.5	0.163436252	0.204295315	0.245154378	0.392247004	
	2m gabion reconstruction		Length (m)	120	GIS/NFCDD	2724	Sustain	Long	0.2	0.065374501	0.081718126	0.098061751	0.156898802	
	wall	113FAS3351013C06	Length (km)	0.02	GIS/NFCDD	5405	NAI	Short to long term	30	0.003242783	0.004053478	0.004864174	0.007782679	
	2m gabion reconstruction		Length (m)	20	GIS/NFCDD	2724	Sustain	Short	1	0.054478751	0.068098438	0.081718126	0.130749001	
	2m gabion reconstruction		Length (m)	20	GIS/NFCDD	2724	Sustain	Medium	0.5	0.027239375	0.034049219	0.040859063	0.065374501	
	2m gabion reconstruction		Length (m)	20	GIS/NFCDD	2724	Sustain	Long	0.2	0.01089575	0.013619688	0.016343625	0.0261498	
	gabion revetment	113FAS3351013C07	Length (km)	0.08	GIS/NFCDD	5405	NAI	Short to long term	30	0.012971131	0.016213914	0.019456697	0.031130715	
	2m gabion reconstruction		Length (m)	80	GIS/NFCDD	2724	Sustain	Short	1	0.217915002	0.272393753	0.326872504	0.522996006	
	2m gabion reconstruction		Length (m)	80	GIS/NFCDD	2724	Sustain	Medium	0.5	0.108957501	0.136196876	0.163436252	0.261498003	
	2m gabion reconstruction		Length (m)	80	GIS/NFCDD	2724	Sustain	Long	0.2	0.043583	0.054478751	0.065374501	0.104599201	
	Bank	113FAS3351013C09	Length (km)	1.27	GIS/NFCDD	5405	NAI	Short to long term	30	0.205916706	0.257395883	0.308875059	0.494200095	
	Recharge/recycling high end estimate	113FAS3351014C01	Volume (m3)	14742.86	Conceptual model	22	Maintain	Medium	10	3.19	4.97998783	5.975985397	9.561576634	
	Recharge/recycling high end estimate	113FAS3351014C01	Volume (m3)	21192.86	Conceptual model	22	Maintain	Long	5	2.29	3.579366253	4.295239504	6.872383206	
	Natural Cliff	113FBS3351501C01	Length (km)	0.1	GIS/NFCDD	0	Maintain	Short to long term	30	0	0	0	0	
	Rock Armour	113FAS3351015C02	Length (km)	0.28	GIS/NFCDD	5405	Maintain	Short to long term	30	0.045398959	0.056748699	0.068098438	0.108957501	
	concrete wall	113FAS3351015C01	Length (km)	0.41	GIS/NFCDD	5405	Maintain	Short to long term	30	0.066477047	0.083096309	0.09971557	0.159544912	
	CC 0.1m addition		Length (m)	410	GIS/NFCDD	518	Sustain	Short	1	0.212394165	0.331865882	0.398239059	0.637182494	
	CC 0.3m addition		Length (m)	410	GIS/NFCDD	518	Sustain	Medium	0.5	0.106197082	0.132746353	0.159295624	0.254872998	
	CC 0.3m addition		Length (m)	410	GIS/NFCDD	518	Sustain	Long	0.2	0.042478833	0.053098541	0.063718249	0.101949199	
	Revetment	113FAS3351014C02	Length (km)	0.32	GIS/NFCDD	5405	Maintain	Short to long term	30	0.051884524	0.064855655	0.077826787	0.124522858	
	CC 0.1m addition		Length (m)	320	GIS/NFCDD	340	Sustain	Short	1	0.108957501	0.170246096	0.204295315	0.326872504	
	CC 0.3m addition		Length (m)	320	GIS/NFCDD	340	Sustain	Medium	0.5	0.054478751	0.068098438	0.081718126	0.130749001	
	CC 0.3m addition		Length (m)	320	GIS/NFCDD	340	Sustain	Long	0.2	0.0217915	0.027239375	0.03268725	0.052299601	
	Alternative breakwater option		Length (m)	1000		4500	Sustain	Long	0.2	0.9	1.125	1.35	2.16	
	Breakwater maintenance		Length (km)	1		5405	Maintain	Long term	10	0.05404638	0.067557974	0.081069569	0.129711311	
													27.19465088	TOTAL

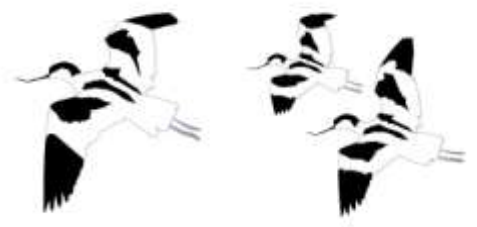


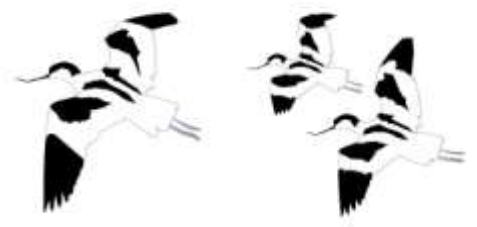
Options 6,10,14 Neck/distal section maintained in ST, central/proximal section sustained into future	Railway embankment	113FAS3351012C01	Length (km)	1.55	GIS/NFCDD	5405	Maintain	Short to long term	30	0.251315665	0.314144581	0.376973497	0.603157596	
	Embankment	113FAS3351013C01	Length (km)	0.1	GIS/NFCDD	1081	Maintain	Short to long term	30	0.003242783	0.004053478	0.004864174	0.007782679	
	CC 0.3m addition		Length (m)	100	GIS/NFCDD	2724	Sustain	Short	1	0.272393753	0.340492191	0.408590629	0.653745007	
	CC 0.3m addition		Length (m)	100	GIS/NFCDD	2724	Sustain	Medium	0.5	0.136196876	0.170246096	0.204295315	0.326872504	
	Long term revetment		Length (m)	100	GIS/NFCDD	2724	Sustain	Long	0.2	0.054478751	0.068098438	0.081718126	0.130749001	
	gabions	113FAS3351013C02	Length (km)	0.09	GIS/NFCDD	5405	NAI	Short to long term	30	0.014592522	0.018240653	0.021888784	0.035022054	
	CC 0.3m addition		Length (m)	90	GIS/NFCDD	2724	Sustain	Short	1	0.245154378	0.306442972	0.367731566	0.588370506	
	CC 0.3m addition		Length (m)	90	GIS/NFCDD	2724	Sustain	Medium	0.5	0.122577189	0.153221486	0.183865783	0.294185253	
	Long term revetment		Length (m)	90	GIS/NFCDD	2724	Sustain	Long	0.2	0.049030876	0.061288594	0.073546313	0.117674101	
	gabions	113FAS3351013C02	Length (km)	0.09	GIS/NFCDD	5405	NAI	Short to long term	30	0.014592522	0.018240653	0.021888784	0.035022054	
	wall	113FAS3351013C03	Length (km)	0.03	GIS/NFCDD	5405	NAI	Short to long term	30	0.004864174	0.006080218	0.007296261	0.011674018	
	CC 0.3m addition		Length (m)	30	GIS/NFCDD	2724	Sustain	Short	1	0.081718126	0.102147657	0.122577189	0.196123502	
	CC 0.3m addition		Length (m)	30	GIS/NFCDD	2724	Sustain	Medium	0.5	0.040859063	0.051073829	0.061288594	0.098061751	
	Long term revetment		Length (m)	30	GIS/NFCDD	2724	Sustain	Long	0.2	0.016343625	0.020429531	0.024515438	0.0392247	
	gabion wall	113FAS3351013C04	Length (km)	0.18	GIS/NFCDD	5405	NAI	Short to long term	30	0.029185045	0.036481306	0.043777567	0.070044108	
	CC 0.3m addition		Length (m)	180	GIS/NFCDD	2724	Sustain	Short	0.5	0.245154378	0.306442972	0.367731566	0.588370506	
	wall	113FAS3351013C05	Length (km)	0.12	GIS/NFCDD	5405	NAI	Short to long term	30	0.019456697	0.024320871	0.029185045	0.046696072	
	CC 0.3m addition		Length (m)	120	GIS/NFCDD	2724	Sustain	Short	0.5	0.163436252	0.204295315	0.245154378	0.392247004	
	wall	113FAS3351013C06	Length (km)	0.02	GIS/NFCDD	5405	NAI	Short to long term	30	0.003242783	0.004053478	0.004864174	0.007782679	
	CC 0.3m addition		Length (m)	20	GIS/NFCDD	2724	Sustain	Short	0.5	0.027239375	0.034049219	0.040859063	0.065374501	
	gabion revetment	113FAS3351013C07	Length (km)	0.08	GIS/NFCDD	5405	NAI	Short to long term	30	0.012971131	0.016213914	0.019456697	0.031130715	
	CC 0.3m addition		Length (m)	80	GIS/NFCDD	2724	Sustain	Short	0.5	0.108957501	0.136196876	0.163436252	0.261498003	
	Bank	113FAS3351013C09	Length (km)	1.27	GIS/NFCDD	5405	NAI	Short to long term	30	0.205916706	0.257395883	0.308875059	0.494200095	
	Revetting of sand spit front face		Length (m)	1000		4086	Sustain	Medium	0.5	2.042953147	3.192114292	3.830537151	6.128859442	
	CC 0.5m addition		Length (m)	1000	GIS/NFCDD	681	Sustain	Long	0.2	0.136196876	0.212807619	0.255369143	0.408590629	
	Maintenance of revetting		Length (km)	1		309	Sustain	Short to long term	30	0.009274359	0.014491186	0.017389423	0.027823076	
	Recharge/recycling high end estimate	113FAS3351014C01	Volume (m3)	14742.86	Conceptual model	22	Maintain	Medium	10	3.19	4.97998783	5.975985397	9.561576634	
	Recharge/recycling high end estimate	113FAS3351014C01	Volume (m3)	21192.86	Conceptual model	22	Maintain	Long	5	2.29	3.579366253	4.295239504	6.872383206	
	Natural Cliff	113FBS3351501C01	Length (km)	0.1	GIS/NFCDD	0	Maintain	Short to long term	30	0	0	0	0	
	Rock Armour	113FAS3351015C02	Length (km)	0.28	GIS/NFCDD	5405	Maintain	Short to long term	30	0.045398959	0.056748699	0.068098438	0.108957501	
	concrete wall	113FAS3351015C01	Length (km)	0.41	GIS/NFCDD	5405	Maintain	Short to long term	30	0.066477047	0.083096309	0.09971557	0.159544912	
	CC 0.1m addition		Length (m)	410	GIS/NFCDD	518	Sustain	Short	1	0.212394165	0.331865882	0.398239059	0.637182494	
	CC 0.3m addition		Length (m)	410	GIS/NFCDD	518	Sustain	Medium	0.5	0.106197082	0.132746353	0.159295624	0.254872998	
	CC 0.3m addition		Length (m)	410	GIS/NFCDD	518	Sustain	Long	0.2	0.042478833	0.053098541	0.063718249	0.101949199	
	Revetment	113FAS3351014C02	Length (km)	0.32	GIS/NFCDD	5405	Maintain	Short to long term	30	0.051884524	0.064855655	0.077826787	0.124522858	
	CC 0.1m addition		Length (m)	320	GIS/NFCDD	340	Sustain	Short	1	0.108957501	0.170246096	0.204295315	0.326872504	
	CC 0.3m addition		Length (m)	320	GIS/NFCDD	340	Sustain	Medium	0.5	0.054478751	0.068098438	0.081718126	0.130749001	
	CC 0.3m addition		Length (m)	320	GIS/NFCDD	340	Sustain	Long	0.2	0.0217915	0.027239375	0.03268725	0.052299601	
													29.99119246	TOTAL
Options 7,11,15 sand spit improved and sustained	Railway embankment	113FAS3351012C01	Length (km)	1.55	GIS/NFCDD	5405	Maintain	Short to long term	30	0.251315665	0.314144581	0.376973497	0.603157596	
	Embankment	113FAS3351013C01	Length (km)	0.1	GIS/NFCDD	1081	Maintain	Short to long term	30	0.003242783	0.004053478	0.004864174	0.007782679	
	CC 0.5m addition		Length (m)	100	GIS/NFCDD	305	Improve	Short	1	0.030482158	0.047628372	0.057154046	0.091446474	
	Rock Armour	113FAS3351015C02	Length (km)	0.28	GIS/NFCDD	5405	Maintain	Short to long term	30	0.045398959	0.056748699	0.068098438	0.108957501	
	concrete wall	113FAS3351015C01	Length (km)	0.41	GIS/NFCDD	5405	Maintain	Short to long term	30	0.066477047	0.083096309	0.09971557	0.159544912	
	CC 0.1m addition		Length (m)	410	GIS/NFCDD	518	Sustain	Short	1	0.212394165	0.331865882	0.398239059	0.637182494	
	Revetment	113FAS3351014C02	Length (km)	0.32	GIS/NFCDD	5405	Maintain	Short to long term	30	0.051884524	0.064855655	0.077826787	0.124522858	
	CC 0.1m addition		Length (m)	320	GIS/NFCDD	340	Sustain	Short	1	0.108957501	0.170246096	0.204295315	0.326872504	
	Revetment	113FAS3351014C02	Length (km)	0.32	GIS/NFCDD	5405	Maintain	Short to long term	30	0.051884524	0.064855655	0.077826787	0.124522858	
	CC 0.1m addition		Length (m)	320	GIS/NFCDD	340	Sustain	Short	1	0.108957501	0.170246096	0.204295315	0.326872504	
	Revetting of sand spit front face		Length (m)	1790		4086	Sustain	Medium	0.5	3.656886133	5.713884584	6.8566615	10.9706584	
	CC 0.5m addition		Length (m)	1790	GIS/NFCDD	681	Sustain	Long	0.2	0.243792409	0.380925639	0.457110767	0.731377227	
	Maintenance of revetting		Length (km)	1.79		5405	Sustain	Short to long term	30	0.290229058	0.453482903	0.544179484	0.870687175	
	Recharge/recycling high end estimate	113FAS3351014C01	Volume (m3)	14742.86	Conceptual model	22	Maintain	Medium	10	3.19	4.97998783	5.975985397	9.561576634	
	Recharge/recycling high end estimate	113FAS3351014C01	Volume (m3)	21192.86	Conceptual model	22	Maintain	Long	5	2.29	3.579366253	4.295239504	6.872383206	
													31.51754502	TOTAL



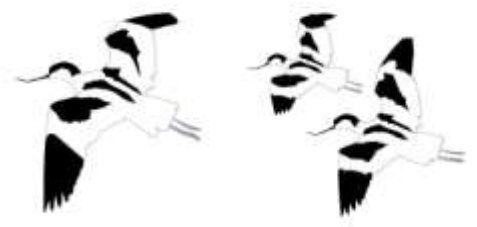
FCRMU approach	Asset Type	Asset reference	Parameter	Amount	Reference	Rate (£/parameter)	HLO	Epoch	Epochal discount factor	Basic construction cost (£M)	Plus Tidal/urban uplift (25% each) cost (£M)	Plus PAR, design and supervision (20%) cost (£M)	Plus Optimism bias 60% cost (£M)	
SHORT-LISTED ALIGNMENT AND TYPE OPTIONS														
Short, Medium and Long Term Option 1. Vertical or wave recurve wall raising along the railway embankment of between 0.5-2m.	Recurved Wall + Splash Wall + Revetment + Groynes	113FBS3351501C03	Length (km)	1.27	GIS/NFCDD	5405	Maintain	Short to long term	30	0.205916706	0.257395883	0.308875059	0.494200095	
	CC 0.1m addition		Length (m)	1270	GIS/NFCDD	155	Sustain	Short	1	0.19630726	0.306730093	0.368076112	0.588921779	
	CC 0.3m addition		Length (m)	1270	GIS/NFCDD	155	Sustain	Medium	0.5	0.09815363	0.122692037	0.147230445	0.235568712	
	CC 0.3m addition		Length (m)	1270	GIS/NFCDD	155	Sustain	Long	0.2	0.039261452	0.049076815	0.058892178	0.094227485	
	Recurved Wall + Groynes + Revetment + Splash Wall	113FBS3351501C02	Length (km)	0.58	GIS/NFCDD	5405	Maintain	Short to long term	30	0.0940407	0.117550876	0.141061051	0.225697681	
	CC 0.5m addition		Length (m)	580	GIS/NFCDD	155	Improve	Short	1	0.089652134	0.14008146	0.168097752	0.268956403	
	CC 0.3m addition		Length (m)	580	GIS/NFCDD	155	Sustain	Medium	0.5	0.044826067	0.056032584	0.067239101	0.107582561	
	CC 0.3m addition		Length (m)	580	GIS/NFCDD	155	Sustain	Long	0.2	0.017930427	0.022413034	0.02689564	0.043033025	
	Property resilience for c10 properties		Number	10		10809	Sustain	Long	0.2	0.021618552	0.033778987	0.040534785	0.064855655	
													2.123043396	TOTAL
Short, Medium and Long Term Option 2. Rock armouring or revetment raising along the railway embankment of between 0.5-2m.	Recurved Wall + Splash Wall + Revetment + Groynes	113FBS3351501C03	Length (km)	1.27	GIS/NFCDD	5405	Maintain	Short to long term	30	0.205916706	0.257395883	0.308875059	0.494200095	
	CC 0.1m addition		Length (m)	1270	GIS/NFCDD	518	Sustain	Short	1	0.657903876	1.027974806	1.233569768	1.973711628	
	CC 0.3m addition		Length (m)	1270	GIS/NFCDD	518	Sustain	Medium	0.5	0.328951938	0.411189923	0.493427907	0.789484651	
	CC 0.3m addition		Length (m)	1270	GIS/NFCDD	518	Sustain	Long	0.2	0.131580775	0.164475969	0.197371163	0.31579386	
	Recurved Wall + Groynes + Revetment + Splash Wall	113FBS3351501C02	Length (km)	0.58	GIS/NFCDD	5405	Maintain	Short to long term	30	0.0940407	0.117550876	0.141061051	0.225697681	
	CC 0.5m addition		Length (m)	580	GIS/NFCDD	1036	Improve	Short	1	0.600920076	0.938937618	1.126725142	1.802760227	
	CC 0.3m addition		Length (m)	580	GIS/NFCDD	518	Sustain	Medium	0.5	0.150230019	0.187787524	0.225345028	0.360552045	
	CC 0.3m addition		Length (m)	580	GIS/NFCDD	518	Sustain	Long	0.2	0.060092008	0.075115009	0.090138011	0.144220818	
	Property resilience for c10 properties		Number	10		10809	Sustain	Long	0.2	0.021618552	0.033778987	0.040534785	0.064855655	
													6.171276662	TOTAL





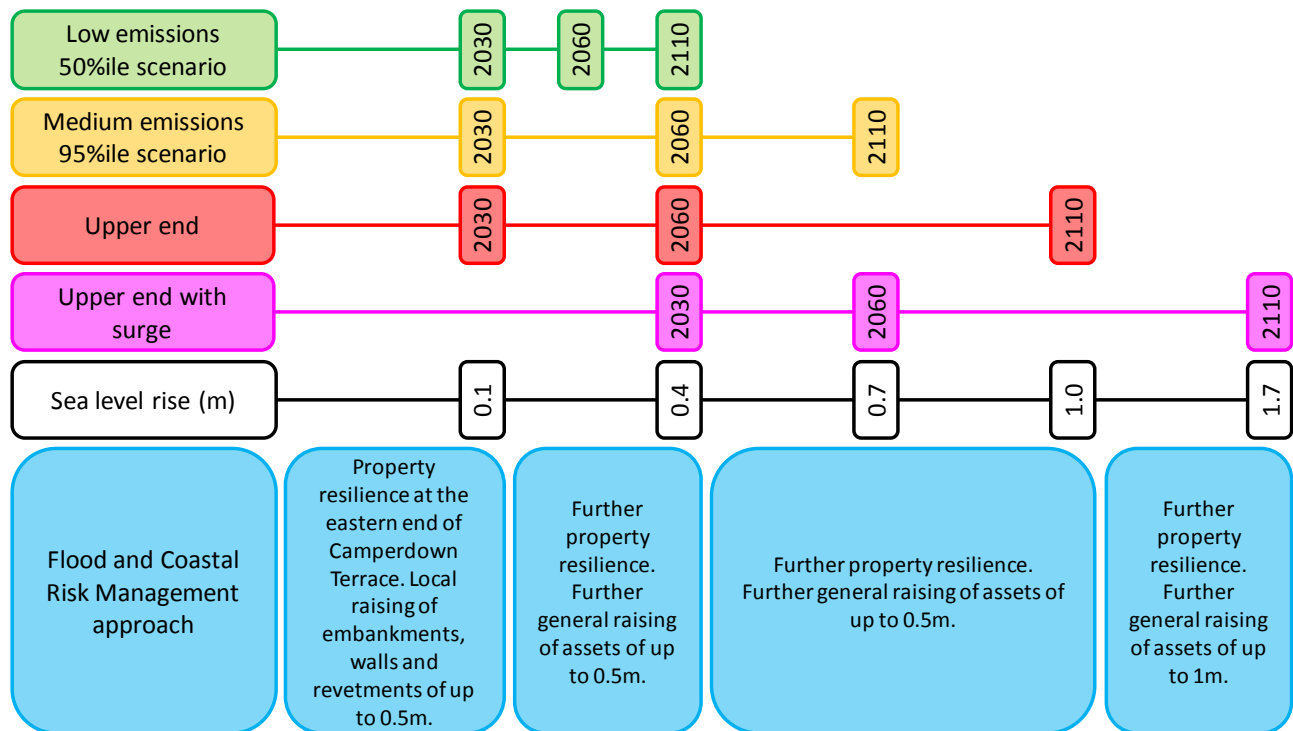


Appendix L : Decision trees

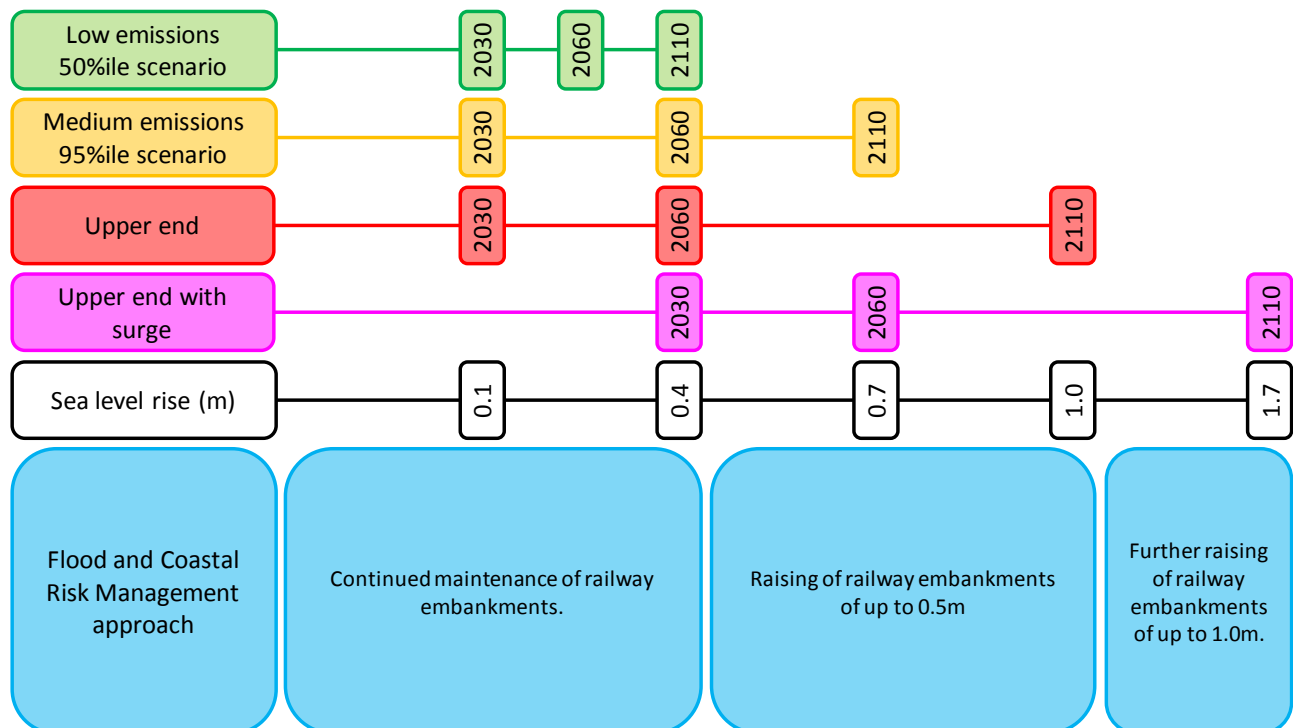


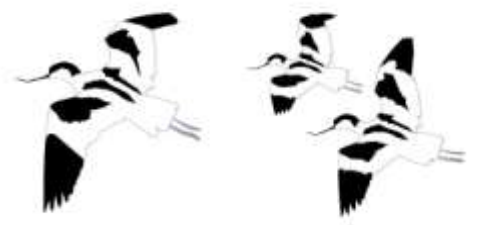


L.1 Exmouth

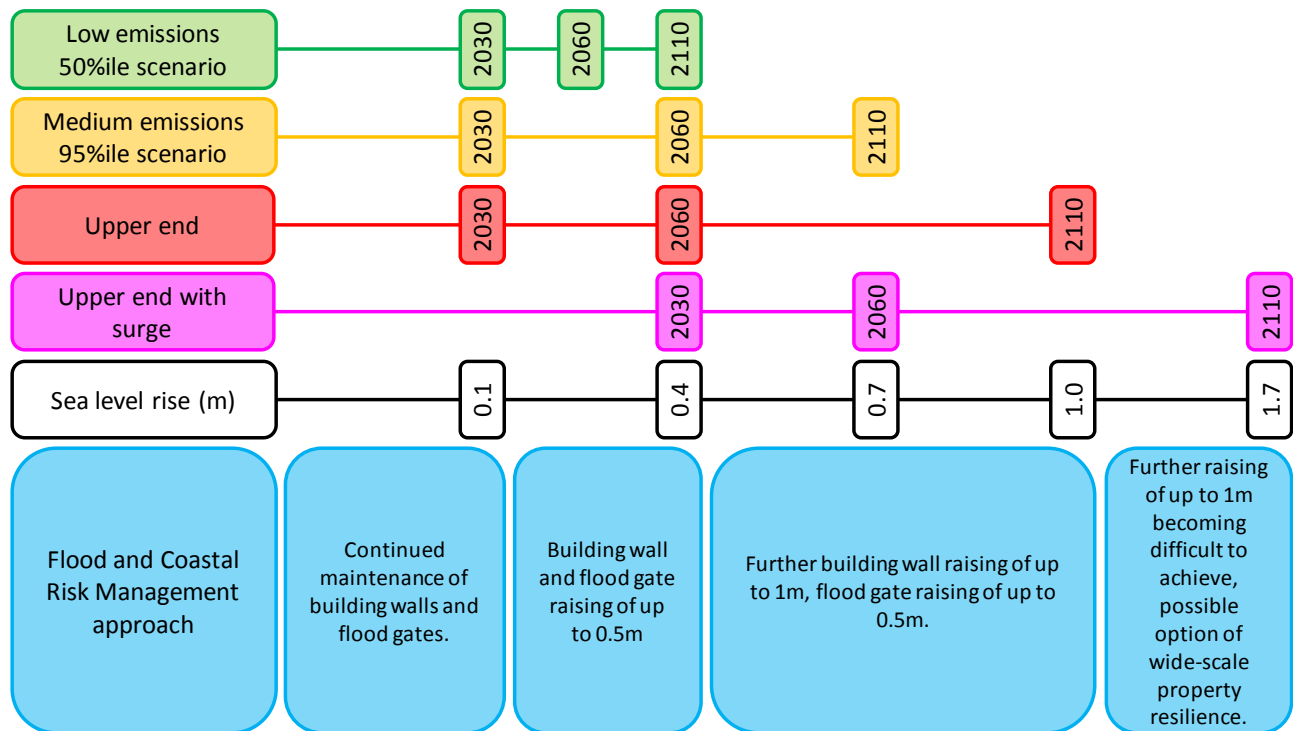


L.2 Courtlands, Lymington Commando and Exton

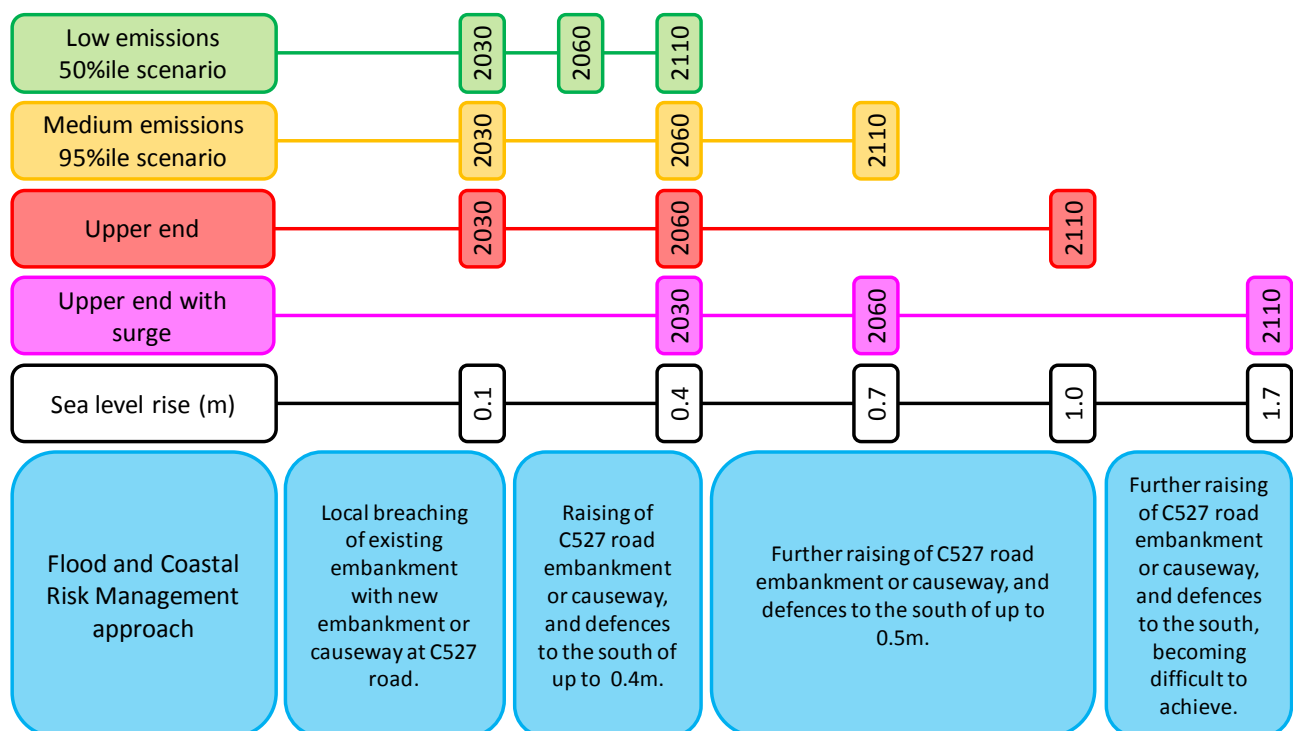


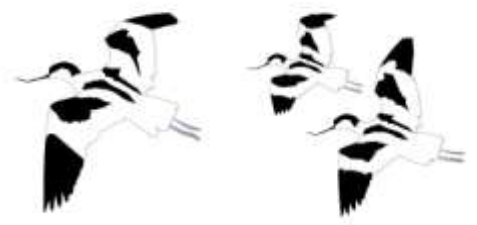


L.3 Lympstone

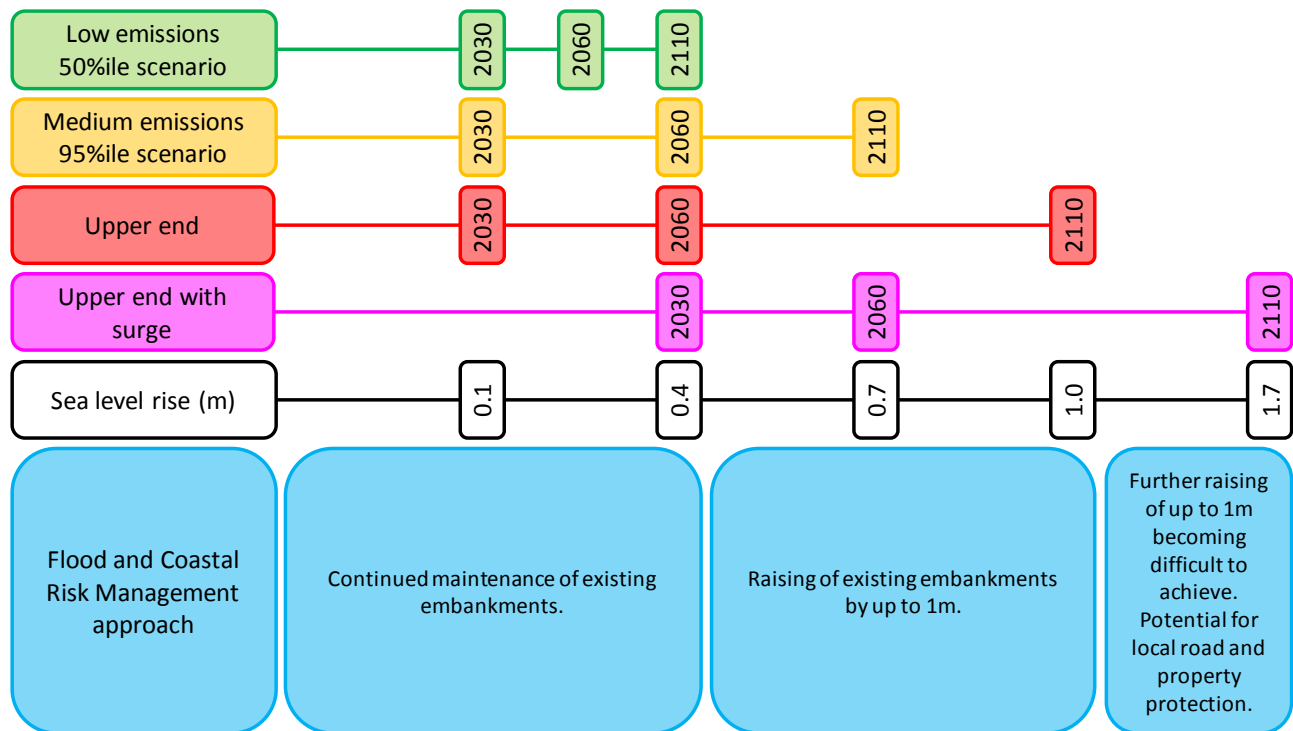


L.4 East bank of the Lower Clyst

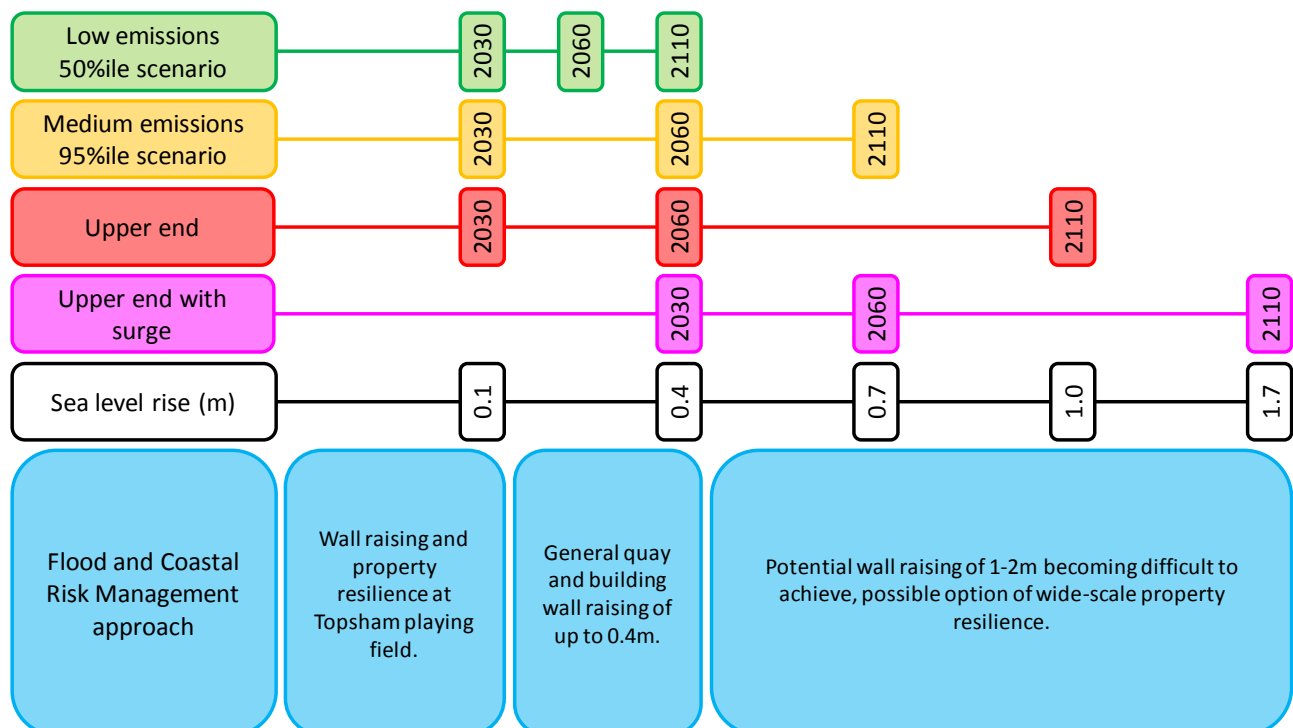


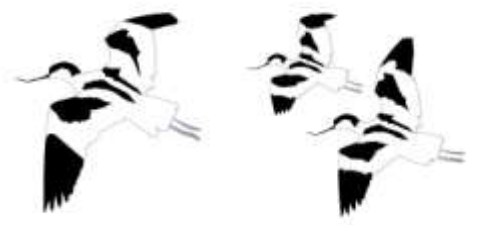


L.5 Clyst St. Mary

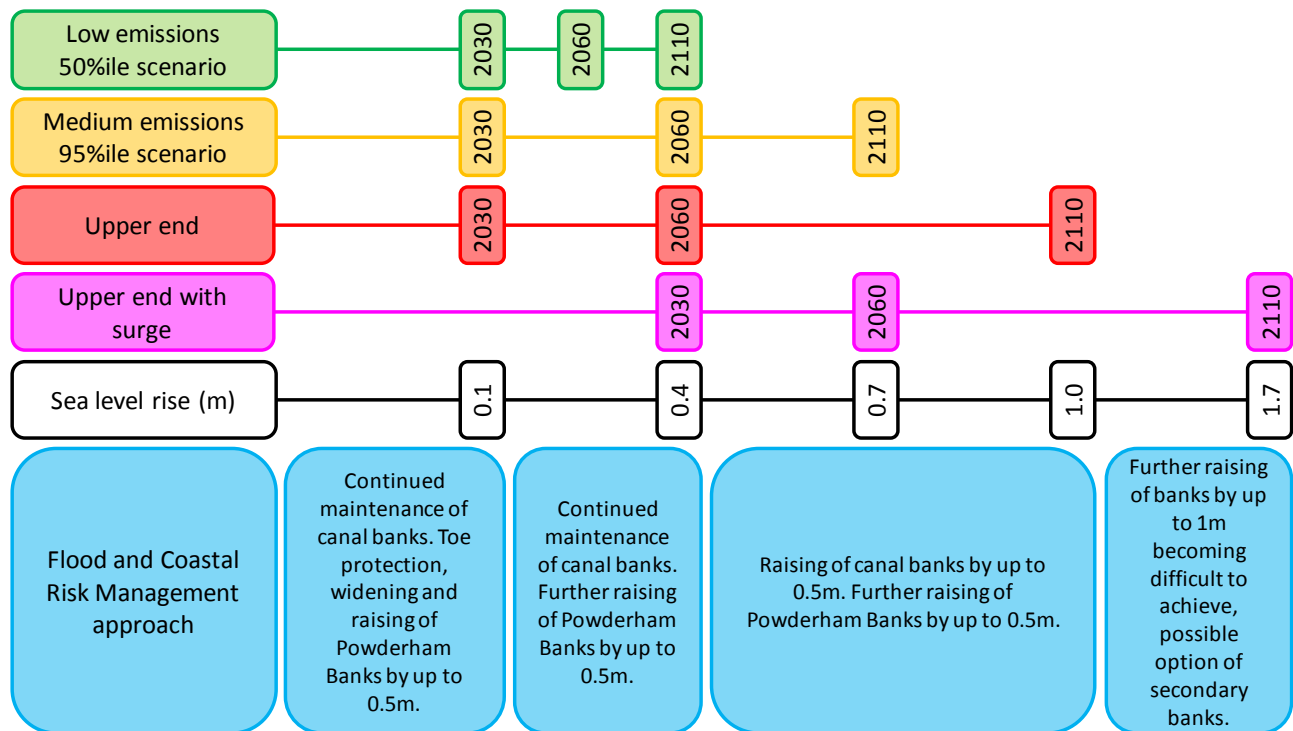


L.6 Topsham and Countess Wear

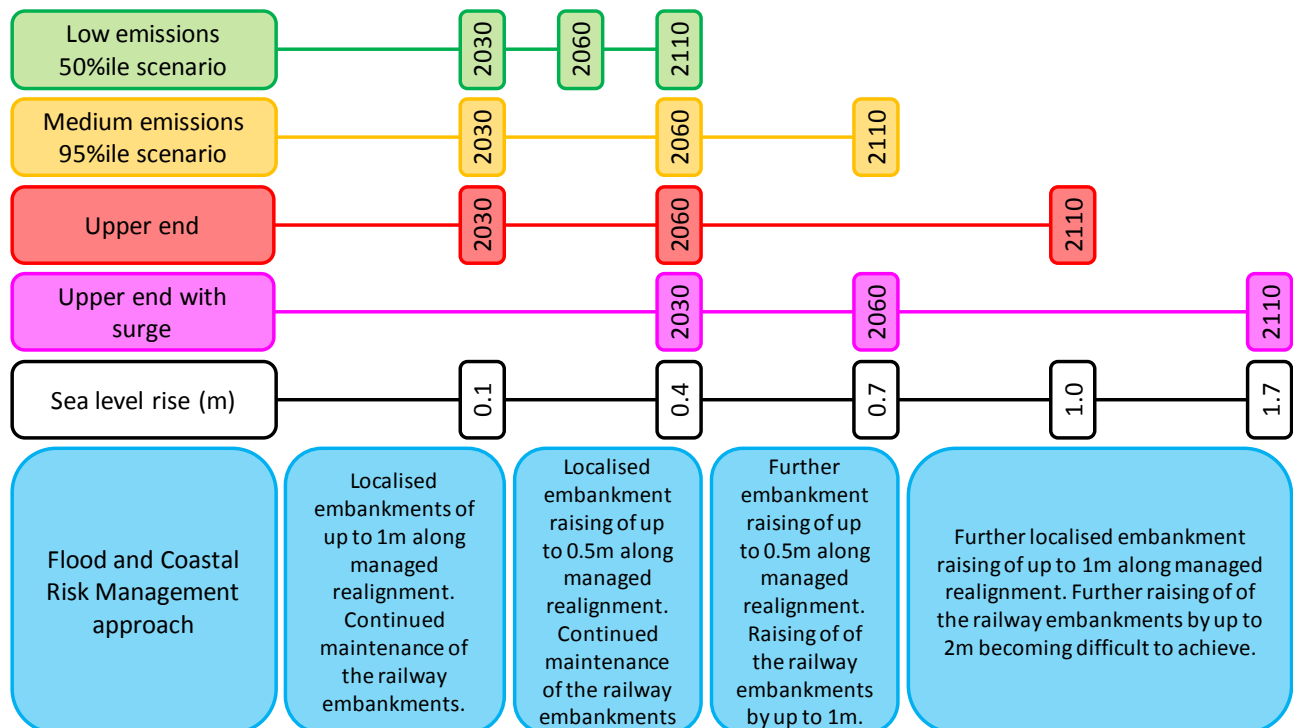




L.7 Exminster and Powderham Banks

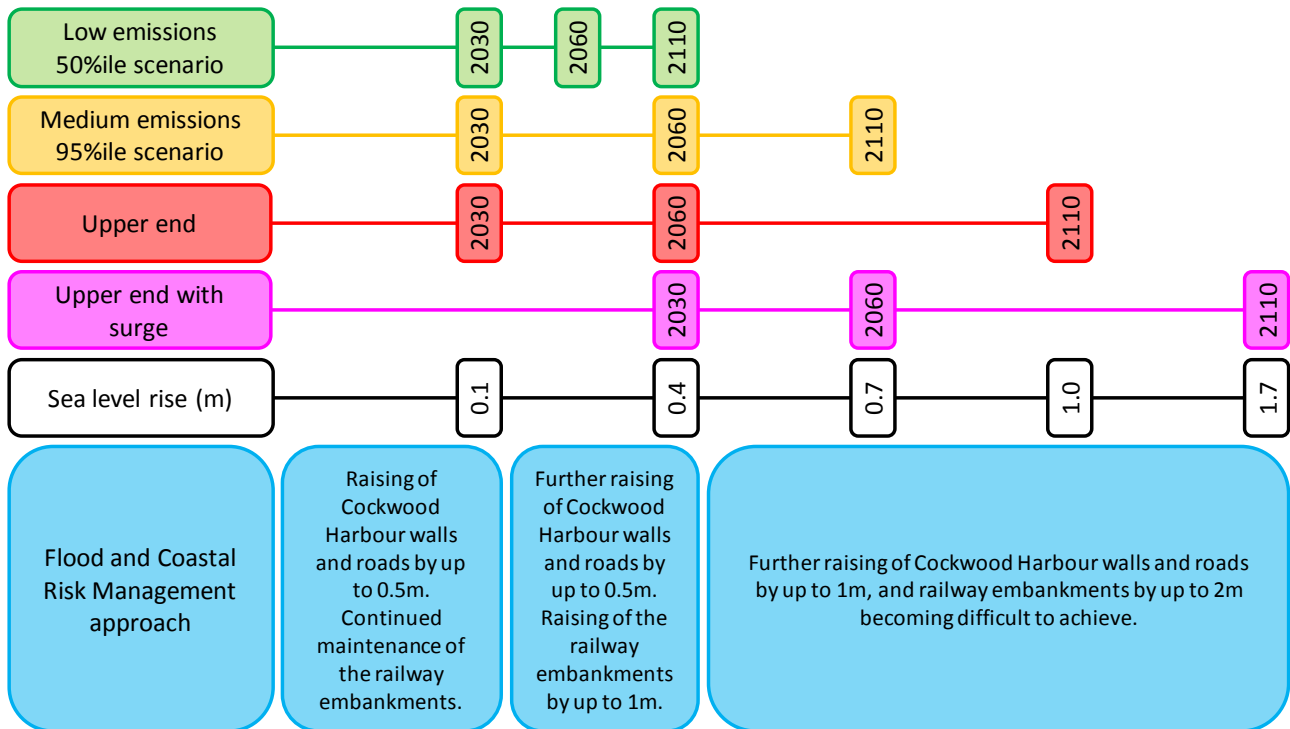


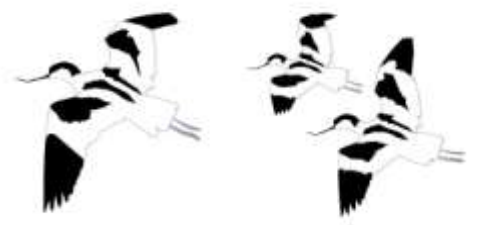
L.8 Kenn Valley

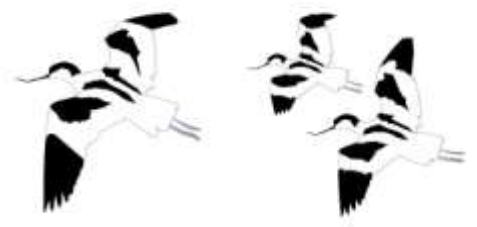




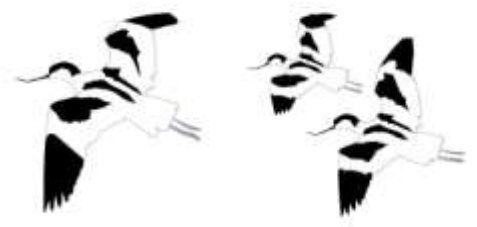
L.9 Starcross







Appendix M : Outline Design and Costing in the Short Term



M.1 The Maer



FCRMU Options	Asset Type	Asset reference	Parameter	Amount	Reference	Rate (£/parameter)	HLO	Period	Epochal discount factor	Basic construction cost (£M)	Plus tidal/urban uplift (25% each) cost (£M)	Plus PAR, design and supervision (20%) cost (£M)	Plus Optimism bias 60% cost (£M)		FOOTPRINT IMPACT (Ha)			
RESPONSE OPTIONS																SPA/SSSI	SAC	None
Option 1. Soft foreshore management, consisting of beach recharge and recycling, with groyne works.	Seawall maintenance	113FAS3351002C01	Length (km)	0.72	GIS/NFCDD	5830	Maintain	Short to long term	15	0.06	0.098378348	0.118054017	0.188886427			0	0	0
	Seawall maintenance	113FAS3351002C02	Length (km)	0.14	GIS/NFCDD	5830	Maintain	Short to long term	15	0.01	0.019129123	0.022954948	0.036727916			0	0	0
	Seawall maintenance	113FAS3351002C03	Length (km)	0.06	GIS/NFCDD	5830	Maintain	Short to long term	15	0.01	0.008198196	0.009837835	0.015740536			0	0	0
	Groyne maintenance		No	6		1166	Maintain	Short to long term	15	0.10	0.163963913	0.196756695	0.314810712			0	0	0
	Groyne reconstruction		No	6		874	Maintain	Short	1	0.01	0.008198196	0.009837835	0.015740536			0	0	0
	Groyne reconstruction		No	6		0	Maintain	Medium	0.5	0.00	0	0	0			0	0	0
	Groyne reconstruction		No	6		0	Maintain	Long	0.2	0.00	0	0	0			0	0	0
	Recharge/ recycling	113FAS3351002C01	Volume (m3)	3562.5	Conceptual model	23	Maintain	Short	15	1.25	1.947071462	2.336485755	3.738377208			0	0	0
	Recharge/ recycling		Volume (m3)	4312.5	Conceptual model	0	Maintain	Medium	10	0.00	0	0	0			0	0	0
	Recharge/ recycling		Volume (m3)	5437.5	Conceptual model	0	Maintain	Long	5	0.00	0	0	0			0	0	0
													4.310283335	TOTAL				



M.2 Exmouth



FCRMU approach	Asset Type	Asset reference	Parameter	Amount	Reference	Rate (£/parameter)	HLO	Epoch	Epochal discount factor	Basic construction cost (£M)	Plus Tidal/urban uplift (25% each) cost (£M)	Plus PAR, design and supervision (20%) cost (£M)	Plus Optimism bias 60% cost (£M)		FOOTPRINT IMPACT (Ha)		
RESPONSE OPTIONS															SPA/SSSI	SAC	None
Short Term Option 2 (Camperdown Terrace) and 1 (Imperial Recreation Ground). Medium to Long Term Option 2 (seaward and landward)	Seawall maintenance	113FAS3351002C04	Length (km)	0.17	GIS/NFCDD	5830	Maintain	Short to long term	15	0.014866061	0.023228221	0.027873865	0.044598184		0	0	0
	Seawall maintenance	113FAS3351002C05	Length (km)	0.7	GIS/NFCDD	5830	Maintain	Short to long term	15	0.061213194	0.095645616	0.114774739	0.183639582		0	0	0
	Sheet piled wall maintenance	113FAS3351003C01	Length (km)	0.09	GIS/NFCDD	5830	Maintain	Short to long term	15	0.007870268	0.012297293	0.014756752	0.023610803		0	0	0
	No addition		Length (m)	90	GIS/NFCDD	0	Sustain	Medium	0.5	0	0	0	0		0	0	0
	CC 0.2m addition		Length (m)	90	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0		0	0	0
Exmouth Docks improvements to avoid pedestrian/local flooding	Complex Wall maintenance	113FAS3351003C02	Length (km)	1	GIS/NFCDD	5830	Maintain	Short to long term	15	0.08744742	0.136636594	0.163963913	0.26234226		0	0	0
	No addition		Length (m)	150	GIS/NFCDD	0	Improve	Short	1	0	0	0	0		0	0	0
	CC 0.2m addition		Length (m)	1000	GIS/NFCDD	0	Sustain	Medium	0.5	0	0	0	0		0	0	0
	CC 0.5m addition		Length (m)	1000	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0		0	0	0
	Complex Wall maintenance	113FAS3351003C03	Length (km)	0.12	GIS/NFCDD	5830	Maintain	Short to long term	15	0.01049369	0.016396391	0.01967567	0.031481071		0	0	0
	CC 0.1m addition		Length (m)	120	GIS/NFCDD	0	Sustain	Medium	0.5	0	0	0	0		0	0	0
	CC 0.3m addition		Length (m)	120	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0		0	0	0
	Timber revetment maintenance	113FAS3351003C04	Length (km)	0.08	GIS/NFCDD	5830	NAI	Short to long term	15	0.006995794	0.010930928	0.013117113	0.020987381		0	0	0
Sailing club access road raising	No road raising	113FAS3351003C05	Length (m)	20	GIS/NFCDD	0	Improve	Short	1	0	0	0	0		0	0	0
	Gabion Wall maintenance	113FAS3351003C06	Length (km)	0.06	GIS/NFCDD	5830	NAI	Short to long term	15	0.005246845	0.008198196	0.009837835	0.015740536		0	0	0
Camperdown Terrace/Shelly Road property resilience and road raising	Property resilience	NA	Number	10	GIS/NFCDD	11660	Improve	Short	1	0.11659656	0.182182125	0.21861855	0.34978968		0	0	0
	Property resilience CC	NA	Number	10	GIS/NFCDD	0	Improve	Medium	0.5	0	0	0	0		0	0	0
	Property resilience CC	NA	Number	7	GIS/NFCDD	0	Improve	Long	0.2	0	0	0	0		0	0	0
	Pitched Stone Revetment maintenance	113FAS3351003C07	Length (km)	0.05	GIS/NFCDD	5830	Maintain	Short to long term	15	0.004372371	0.00683183	0.008198196	0.013117113		0	0	0
	Complex Wall maintenance	113FAS3351003C08	Length (km)	0.08	GIS/NFCDD	5830	Maintain	Short to long term	15	0.006995794	0.010930928	0.013117113	0.020987381		0	0	0
	Masonry Wall maintenance	113FAS3351003C09	Length (km)	0.07	GIS/NFCDD	5830	Maintain	Short to long term	15	0.006121319	0.009564562	0.011477474	0.018363958		0	0	0
	Masonry Wall maintenance	113FAS3351003C10	Length (km)	0.06	GIS/NFCDD	5830	Maintain	Short to long term	15	0.005246845	0.008198196	0.009837835	0.015740536		0	0	0
Slipway/boatyard road/wall raising	Complex Wall maintenance	113FAS3351004C01	Length (km)	0.09	GIS/NFCDD	5830	Maintain	Short to long term	15	0.007870268	0.012297293	0.014756752	0.023610803		0	0	0
	No addition		Length (m)	90	GIS/NFCDD	0	Improve	Short	1	0	0	0	0		0	0	0
	CC 0.3m addition		Length (m)	90	GIS/NFCDD	0	Sustain	Medium	0.5	0	0	0	0		0	0	0
	CC 0.7m addition		Length (m)	90	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0		0	0	0
	Gabion toe maintenance	113FAS3351004C02	Length (km)	0.11	GIS/NFCDD	5830	Maintain	Short to long term	15	0.009619216	0.015030025	0.01803603	0.028857649		0	0	0
	No addition		Length (m)	110	GIS/NFCDD	0	Sustain	Short	1	0	0	0	0		0	0	0
	No addition		Length (m)	110	GIS/NFCDD	0	Sustain	Medium	0.5	0	0	0	0		0	0	0
	CC 0.4m addition		Length (m)	110	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0		0	0	0
North-east Imperial Recreation Ground revetment wave wall raising	Revetment maintenance	113FAS3351004C03	Length (km)	0.55	GIS/NFCDD	5830	Maintain	Short to long term	15	0.048096081	0.075150127	0.090180152	0.144288243		0	0	0
	Wall maintenance		Length (km)	0.1	GIS/NFCDD	5830	Maintain	Short to long term	15	0.008744742	0.013663659	0.016396391	0.026234226		0	0	0
	No addition		Length (m)	100	GIS/NFCDD	0	Improve	Short	1	0	0	0	0		0	0	0
	CC 0.25m addition		Length (m)	100	GIS/NFCDD	0	Sustain	Medium	0.5	0	0	0	0		0	0	0
	CC 0.25m addition		Length (m)	100	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0		0	0	0
	Embankment maintenance	113FAS3351004C04	Length (km)	0.39	GIS/NFCDD	1166	Maintain	Short to long term	15	0.006820899	0.010657654	0.012789185	0.020462696		0	0	0
	No addition		Length (m)	390	GIS/NFCDD	0	Sustain	Short	1	0	0	0	0		0	0	0
	CC 0.5m addition		Length (m)	390	GIS/NFCDD	0	Sustain	Medium	0.5	0	0	0	0		0	0	0
	CC 0.5m addition		Length (m)	390	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0		0	0	0
	Embankment maintenance	113FAS3351004C05	Length (km)	0.56	GIS/NFCDD	1166	Maintain	Short to long term	15	0.009794111	0.015303299	0.018363958	0.029382333		0	0	0
	No addition		Length (m)	560	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0		0	0	0
													1.273234436	TOTAL			



FCRMU approach	Asset Type	Asset reference	Parameter	Amount	Reference	Rate (£/parameter)	HLO	Epoch	Epochal discount factor	Basic construction cost (£M)	Plus Tidal/urban uplift (25% each) cost (£M)	Plus PAR, design and supervision (20%) cost (£M)	Plus Optimism bias 60% cost (£M)		FOOTPRINT IMPACT (Ha)		
RESPONSE OPTIONS															SPA/SSSI	SAC	None

Short Term Option 2 (Camperdown Terrace) and 1 (Imperial Recreation Ground). Medium to Long Term Option 2 (seaward and landward)	Seawall maintenance	113FAS3351002C04	Length (km)	0.17	GIS/NFCDD	5830	Maintain	Short to long term	15	0.014866061	0.023228221	0.027873865	0.044598184		0	0	0
	Seawall maintenance	113FAS3351002C05	Length (km)	0.7	GIS/NFCDD	5830	Maintain	Short to long term	15	0.061213194	0.095645616	0.114774739	0.183639582		0	0	0
	Sheet piled wall maintenance	113FAS3351003C01	Length (km)	0.09	GIS/NFCDD	5830	Maintain	Short to long term	15	0.007870268	0.012297293	0.014756752	0.023610803		0	0	0
	No addition		Length (m)	90	GIS/NFCDD	0	Sustain	Medium	0.5	0	0	0	0		0	0	0
	CC 0.2m addition		Length (m)	90	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0		0	0	0
Exmouth Docks improvements to avoid pedestrian/local flooding	Complex Wall maintenance	113FAS3351003C02	Length (km)	1	GIS/NFCDD	5830	Maintain	Short to long term	15	0.08744742	0.136636594	0.163963913	0.26234226		0	0	0
	No addition		Length (m)	150	GIS/NFCDD	0	Improve	Short	1	0	0	0	0		0	0	0
	CC 0.2m addition		Length (m)	1000	GIS/NFCDD	0	Sustain	Medium	0.5	0	0	0	0		0	0	0
	CC 0.5m addition		Length (m)	1000	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0		0	0	0
	Complex Wall maintenance	113FAS3351003C03	Length (km)	0.12	GIS/NFCDD	5830	Maintain	Short to long term	15	0.01049369	0.016396391	0.01967567	0.031481071		0	0	0
	CC 0.1m addition		Length (m)	120	GIS/NFCDD	0	Sustain	Medium	0.5	0	0	0	0		0	0	0
	CC 0.3m addition		Length (m)	120	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0		0	0	0
	Timber revetment maintenance	113FAS3351003C04	Length (km)	0.08	GIS/NFCDD	5830	NAI	Short to long term	15	0.006995794	0.010930928	0.013117113	0.020987381		0	0	0
Sailing club access road raising	No road raising	113FAS3351003C05	Length (m)	20	GIS/NFCDD	0	Improve	Short	1	0	0	0	0		0	0	0
	Gabion Wall maintenance	113FAS3351003C06	Length (km)	0.06	GIS/NFCDD	5830	NAI	Short to long term	15	0.005246845	0.008198196	0.009837835	0.015740536		0	0	0
Camperdown Terrace/Shelly Road property resilience and road raising	Property resilience	NA	Number	10	GIS/NFCDD	11660	Improve	Short	1	0.11659656	0.182182125	0.21861855	0.34978968		0	0	0
	Property resilience CC	NA	Number	10	GIS/NFCDD	0	Improve	Medium	0.5	0	0	0	0		0	0	0
	Property resilience CC	NA	Number	7	GIS/NFCDD	0	Improve	Long	0.2	0	0	0	0		0	0	0
	Pitched Stone Revetment maintenance	113FAS3351003C07	Length (km)	0.05	GIS/NFCDD	5830	Maintain	Short to long term	15	0.004372371	0.00683183	0.008198196	0.013117113		0	0	0
	Complex Wall maintenance	113FAS3351003C08	Length (km)	0.08	GIS/NFCDD	5830	Maintain	Short to long term	15	0.006995794	0.010930928	0.013117113	0.020987381		0	0	0
	Masonry Wall maintenance	113FAS3351003C09	Length (km)	0.07	GIS/NFCDD	5830	Maintain	Short to long term	15	0.006121319	0.009564562	0.011477474	0.018363958		0	0	0
	Masonry Wall maintenance	113FAS3351003C10	Length (km)	0.06	GIS/NFCDD	5830	Maintain	Short to long term	15	0.005246845	0.008198196	0.009837835	0.015740536		0	0	0
Slipway/boatyard road/wall raising	Complex Wall maintenance	113FAS3351004C01	Length (km)	0.09	GIS/NFCDD	5830	Maintain	Short to long term	15	0.007870268	0.012297293	0.014756752	0.023610803		0	0	0
	CC 0.1m addition		Length (m)	90	GIS/NFCDD	323	Improve	Short	1	0.029041288	0.045377013	0.054452415	0.087123865		0.018	0	0
	CC 0.3m addition		Length (m)	90	GIS/NFCDD	0	Sustain	Medium	0.5	0	0	0	0		0	0	0
	CC 0.7m addition		Length (m)	90	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0		0	0	0
	Gabion toe maintenance	113FAS3351004C02	Length (km)	0.11	GIS/NFCDD	5830	Maintain	Short to long term	15	0.009619216	0.015030025	0.01803603	0.028857649		0	0	0
	No addition		Length (m)	110	GIS/NFCDD	0	Sustain	Short	1	0	0	0	0		0	0	0
	No addition		Length (m)	110	GIS/NFCDD	0	Sustain	Medium	0.5	0	0	0	0		0	0	0
	CC 0.4m addition		Length (m)	110	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0		0	0	0
	Revetment maintenance	113FAS3351004C03	Length (km)	0.55	GIS/NFCDD	5830	Maintain	Short to long term	15	0.048096081	0.075150127	0.090180152	0.144288243		0	0	0
North-east Imperial Recreation Ground revetment wave wall raising	Wall maintenance		Length (km)	0.1	GIS/NFCDD	5830	Maintain	Short to long term	15	0.008744742	0.013663659	0.016396391	0.026234226		0	0	0
	No addition		Length (m)	100	GIS/NFCDD	0	Improve	Short	1	0	0	0	0		0	0	0
	CC 0.25m addition		Length (m)	100	GIS/NFCDD	0	Sustain	Medium	0.5	0	0	0	0		0	0	0
	CC 0.25m addition		Length (m)	100	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0		0	0	0
	Embankment maintenance	113FAS3351004C04	Length (km)	0.39	GIS/NFCDD	1166	Maintain	Short to long term	15	0.006820899	0.010657654	0.012789185	0.020462696		0	0	0
	No addition		Length (m)	390	GIS/NFCDD	0	Sustain	Short	1	0	0	0	0		0	0	0
	CC 0.5m addition		Length (m)	390	GIS/NFCDD	0	Sustain	Medium	0.5	0	0	0	0		0	0	0
	CC 0.5m addition		Length (m)	390	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0		0	0	0
	Embankment maintenance	113FAS3351004C05	Length (km)	0.56	GIS/NFCDD	1166	Maintain	Short to long term	15	0.009794111	0.015303299	0.018363958	0.029382333		0	0	0
	No addition		Length (m)	560	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0		0	0	0
												1.360358301	TOTAL				



FCRMU approach	Asset Type	Asset reference	Parameter	Amount	Reference	Rate (£/parameter)	HLO	Epoch	Epochal discount factor	Basic construction cost (£M)	Plus Tidal/urban uplift (25% each) cost (£M)	Plus PAR, design and supervision (20%) cost (£M)	Plus Optimism bias 60% cost (£M)		FOOTPRINT IMPACT (Ha)		
RESPONSE OPTIONS															SPA/SSSI	SAC	None

Short Term Option 2 (Camperdown Terrace) and 1 (Imperial Recreation Ground). Medium to Long Term Option 2 (seaward and landward)	Seawall maintenance	113FAS3351002C04	Length (km)	0.17	GIS/NFCDD	5830	Maintain	Short to long term	15	0.014866061	0.023228221	0.027873865	0.044598184			0	0	0
	Seawall maintenance	113FAS3351002C05	Length (km)	0.7	GIS/NFCDD	5830	Maintain	Short to long term	15	0.061213194	0.095645616	0.114774739	0.183639582			0	0	0
	Sheet piled wall maintenance	113FAS3351003C01	Length (km)	0.09	GIS/NFCDD	5830	Maintain	Short to long term	15	0.007870268	0.012297293	0.014756752	0.023610803			0	0	0
	No addition		Length (m)	90	GIS/NFCDD	0	Sustain	Medium	0.5	0	0	0	0			0	0	0
	CC 0.3m addition		Length (m)	90	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0			0	0	0
Exmouth Docks improvements to avoid pedestrian/local flooding	Complex Wall maintenance	113FAS3351003C02	Length (km)	1	GIS/NFCDD	5830	Maintain	Short to long term	15	0.08744742	0.136636594	0.163963913	0.26234226			0	0	0
	CC 0.25m addition		Length (m)	150	GIS/NFCDD	323	Improve	Short	1	0.048402147	0.075628355	0.090754026	0.145206441			0	0	0.03
	No addition		Length (m)	1000	GIS/NFCDD	0	Sustain	Medium	0.5	0	0	0	0			0	0	0
	CC 0.5m addition		Length (m)	1000	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0			0	0	0
	Complex Wall maintenance	113FAS3351003C03	Length (km)	0.12	GIS/NFCDD	5830	Maintain	Short to long term	15	0.01049369	0.016396391	0.01967567	0.031481071			0	0	0
	CC 0.2m addition		Length (m)	120	GIS/NFCDD	0	Sustain	Medium	0.5	0	0	0	0			0	0	0
	CC 0.4m addition		Length (m)	120	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0			0	0	0
	Timber revetment maintenance	113FAS3351003C04	Length (km)	0.08	GIS/NFCDD	5830	NAI	Short to long term	15	0.006995794	0.010930928	0.013117113	0.020987381			0	0	0
Sailing club access road raising	road raising 0.1m	113FAS3351003C05	Length (m)	20	GIS/NFCDD	323	Improve	Short	1	0.00645362	0.010083781	0.012100537	0.019360859			0.004	0	0
	Gabion Wall maintenance	113FAS3351003C06	Length (km)	0.06	GIS/NFCDD	5830	NAI	Short to long term	15	0.005246845	0.008198196	0.009837835	0.015740536			0	0	0
Camperdown Terrace/Shelly Road property resilience	Property resilience	NA	Number	12	GIS/NFCDD	11660	Improve	Short	1	0.139915872	0.21861855	0.26234226	0.419747616			0	0	0
	Property resilience CC	NA	Number	10	GIS/NFCDD	0	Improve	Medium	0.5	0	0	0	0			0	0	0
	Property resilience CC	NA	Number	7	GIS/NFCDD	0	Improve	Long	0.2	0	0	0	0			0	0	0
	Pitched Stone Revetment maintenance	113FAS3351003C07	Length (km)	0.05	GIS/NFCDD	5830	Maintain	Short to long term	15	0.004372371	0.00683183	0.008198196	0.013117113			0	0	0
	Complex Wall maintenance	113FAS3351003C08	Length (km)	0.08	GIS/NFCDD	5830	Maintain	Short to long term	15	0.006995794	0.010930928	0.013117113	0.020987381			0	0	0
	Masonry Wall maintenance	113FAS3351003C09	Length (km)	0.07	GIS/NFCDD	5830	Maintain	Short to long term	15	0.006121319	0.009564562	0.011477474	0.018363958			0	0	0
	Masonry Wall maintenance	113FAS3351003C10	Length (km)	0.06	GIS/NFCDD	5830	Maintain	Short to long term	15	0.005246845	0.008198196	0.009837835	0.015740536			0	0	0
Slipway/boatyard road/wall raising	Complex Wall maintenance	113FAS3351004C01	Length (km)	0.09	GIS/NFCDD	5830	Maintain	Short to long term	15	0.007870268	0.012297293	0.014756752	0.023610803			0	0	0
	CC 0.2m addition		Length (m)	90	GIS/NFCDD	323	Improve	Short	1	0.029041288	0.045377013	0.054452415	0.087123865			0.018	0	0
	CC 0.2m addition		Length (m)	90	GIS/NFCDD	0	Sustain	Medium	0.5	0	0	0	0			0	0	0
	CC 1.1m addition		Length (m)	90	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0			0	0	0
	Gabion toe maintenance	113FAS3351004C02	Length (km)	0.11	GIS/NFCDD	5830	Maintain	Short to long term	15	0.009619216	0.015030025	0.01803603	0.028857649			0	0	0
	No addition		Length (m)	110	GIS/NFCDD	0	Sustain	Short	1	0	0	0	0			0	0	0
	CC 0.1m addition		Length (m)	110	GIS/NFCDD	0	Sustain	Medium	0.5	0	0	0	0			0	0	0
	CC 0.4m addition		Length (m)	110	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0			0	0	0
North-east Imperial Recreation Ground revetment wave wall raising	Revetment maintenance	113FAS3351004C03	Length (km)	0.55	GIS/NFCDD	5830	Maintain	Short to long term	15	0.048096081	0.075150127	0.090180152	0.144288243			0	0	0
	Wall maintenance		Length (km)	0.1	GIS/NFCDD	5830	Maintain	Short to long term	15	0.008744742	0.013663659	0.016396391	0.026234226			0	0	0
	CC 0.25m addition		Length (m)	100	GIS/NFCDD	167	Improve	Short	1	0.016673308	0.026052044	0.031262453	0.050019924			0.02	0	0
	No addition		Length (m)	100	GIS/NFCDD	0	Sustain	Medium	0.5	0	0	0	0			0	0	0
	CC 0.25m addition		Length (m)	100	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0			0	0	0
	Embankment maintenance	113FAS3351004C04	Length (km)	0.39	GIS/NFCDD	1166	Maintain	Short to long term	15	0.006820899	0.010657654	0.012789185	0.020462696			0	0	0
	No addition		Length (m)	390	GIS/NFCDD	0	Sustain	Short	1	0	0	0	0			0	0	0
	CC 0.6m addition		Length (m)	390	GIS/NFCDD	0	Sustain	Medium	0.5	0	0	0	0			0	0	0
	CC 0.4m addition		Length (m)	390	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0			0	0	0
	Embankment maintenance	113FAS3351004C05	Length (km)	0.56	GIS/NFCDD	1166	Maintain	Short to long term	15	0.009794111	0.015303299	0.018363958	0.029382333			0	0	0
	No addition		Length (m)	560	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0			0	0	0
													1.644903461	TOTAL				



FCRMU approach	Asset Type	Asset reference	Parameter	Amount	Reference	Rate (£/parameter)	HLO	Epoch	Epochal discount factor	Basic construction cost (£M)	Plus Tidal/urban uplift (25% each) cost (£M)	Plus PAR, design and supervision (20%) cost (£M)	Plus Optimism bias 60% cost (£M)		FOOTPRINT IMPACT (Ha)		
RESPONSE OPTIONS															SPA/SSSI	SAC	None

Short Term Option 2 (Camperdown Terrace) and 1 (Imperial Recreation Ground). Medium to Long Term Option 2 (seaward and landward)	Seawall maintenance	113FAS3351002C04	Length (km)	0.17	GIS/NFCDD	5830	Maintain	Short to long term	15	0.014866061	0.023228221	0.027873865	0.044598184		0	0	0
	Seawall maintenance	113FAS3351002C05	Length (km)	0.7	GIS/NFCDD	5830	Maintain	Short to long term	15	0.061213194	0.095645616	0.114774739	0.183639582		0	0	0
	Sheet piled wall maintenance	113FAS3351003C01	Length (km)	0.09	GIS/NFCDD	5830	Maintain	Short to long term	15	0.007870268	0.012297293	0.014756752	0.023610803		0	0	0
	CC 0.1m addition		Length (m)	90	GIS/NFCDD	0	Sustain	Medium	0.5	0	0	0	0		0	0	0
	CC 0.4m addition		Length (m)	90	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0		0	0	0
Exmouth Docks improvements to avoid pedestrian/local flooding	Complex Wall maintenance	113FAS3351003C02	Length (km)	1	GIS/NFCDD	5830	Maintain	Short to long term	15	0.08744742	0.136636594	0.163963913	0.26234226		0	0	0
	CC 0.25m addition		Length (m)	150	GIS/NFCDD	323	Improve	Short	1	0.048402147	0.075628355	0.090754026	0.145206441		0	0	0.03
	No addition		Length (m)	1000	GIS/NFCDD	0	Sustain	Medium	0.5	0	0	0	0		0	0	0
	CC 0.75m addition		Length (m)	1000	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0		0	0	0
	Complex Wall maintenance	113FAS3351003C03	Length (km)	0.12	GIS/NFCDD	5830	Maintain	Short to long term	15	0.01049369	0.016396391	0.01967567	0.031481071		0	0	0
	CC 0.2m addition		Length (m)	120	GIS/NFCDD	0	Sustain	Medium	0.5	0	0	0	0		0	0	0
	CC 0.4m addition		Length (m)	120	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0		0	0	0
	Timber revetment maintenance	113FAS3351003C04	Length (km)	0.08	GIS/NFCDD	5830	NAI	Short to long term	15	0.006995794	0.010930928	0.013117113	0.020987381		0	0	0
Sailing club access road raising	road raising 0.2m	113FAS3351003C05	Length (m)	20	GIS/NFCDD	323	Improve	Short	1	0.00645362	0.010083781	0.012100537	0.019360859		0	0	0.02
Wider Camperdown Terrace road raising	road raising 0.1m	NA	Length (m)	150	GIS/NFCDD	0	Sustain	Medium	0.5	0	0	0	0		0	0	0
Wider Camperdown Terrace road raising	road raising 0.3m	NA	Length (m)	150	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0		0	0	0
Camperdown Terrace/Shelly Road property resilience	Gabion Wall maintenance	113FAS3351003C06	Length (km)	0.06	GIS/NFCDD	5830	NAI	Short to long term	15	0.005246845	0.008198196	0.009837835	0.015740536		0	0	0
	Property resilience	NA	Number	15	GIS/NFCDD	11660	Improve	Short	1	0.17489484	0.273273188	0.327927825	0.52468452		0	0	0
	Property resilience CC	NA	Number	9	GIS/NFCDD	0	Improve	Medium	0.5	0	0	0	0		0	0	0
	Property resilience CC	NA	Number	44	GIS/NFCDD	0	Improve	Long	0.2	0	0	0	0		0	0	0
	Pitched Stone Revetment maintenance	113FAS3351003C07	Length (km)	0.05	GIS/NFCDD	5830	Maintain	Short to long term	15	0.004372371	0.00683183	0.008198196	0.013117113		0	0	0
	Complex Wall maintenance	113FAS3351003C08	Length (km)	0.08	GIS/NFCDD	5830	Maintain	Short to long term	15	0.006995794	0.010930928	0.013117113	0.020987381		0	0	0
	Masonry Wall maintenance	113FAS3351003C09	Length (km)	0.07	GIS/NFCDD	5830	Maintain	Short to long term	15	0.006121319	0.009564562	0.011477474	0.018363958		0	0	0
	Masonry Wall maintenance	113FAS3351003C10	Length (km)	0.06	GIS/NFCDD	5830	Maintain	Short to long term	15	0.005246845	0.008198196	0.009837835	0.015740536		0	0	0
Slipway/boatyard road/wall raising	Complex Wall maintenance	113FAS3351004C01	Length (km)	0.09	GIS/NFCDD	5830	Maintain	Short to long term	15	0.007870268	0.012297293	0.014756752	0.023610803		0	0	0
	CC 0.3m addition		Length (m)	90	GIS/NFCDD	323	Improve	Short	1	0.029041288	0.045377013	0.054452415	0.087123865		0.018	0	0
	CC 0.2m addition		Length (m)	90	GIS/NFCDD	0	Sustain	Medium	0.5	0	0	0	0		0	0	0
	CC 1.1m addition		Length (m)	90	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0		0	0	0
	Gabion toe maintenance	113FAS3351004C02	Length (km)	0.11	GIS/NFCDD	5830	Maintain	Short to long term	15	0.009619216	0.015030025	0.01803603	0.028857649		0	0	0
	CC 0.1m addition		Length (m)	110	GIS/NFCDD	323	Sustain	Short	1	0.035494908	0.055460793	0.066552952	0.106484723		0.022	0	0
	CC 0.1m addition		Length (m)	110	GIS/NFCDD	0	Sustain	Medium	0.5	0	0	0	0		0	0	0
	CC 0.4m addition		Length (m)	110	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0		0	0	0
	Revetment maintenance	113FAS3351004C03	Length (km)	0.55	GIS/NFCDD	5830	Maintain	Short to long term	15	0.048096081	0.075150127	0.090180152	0.144288243		0	0	0
North-east Imperial Recreation Ground revetment wave wall raising	Wall maintenance		Length (km)	0.1	GIS/NFCDD	5830	Maintain	Short to long term	15	0.008744742	0.013663659	0.016396391	0.026234226		0	0	0
	CC 0.25m addition		Length (m)	100	GIS/NFCDD	167	Improve	Short	1	0.016673308	0.026052044	0.031262453	0.050019924		0.02	0	0
	No addition		Length (m)	100	GIS/NFCDD	0	Sustain	Medium	0.5	0	0	0	0		0	0	0
	CC 0.25m addition		Length (m)	100	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0		0	0	0
	Embankment maintenance	113FAS3351004C04	Length (km)	0.39	GIS/NFCDD	1166	Maintain	Short to long term	15	0.006820899	0.010657654	0.012789185	0.020462696		0	0	0
	CC 0.4m addition		Length (m)	390	GIS/NFCDD	329	Sustain	Short	1	0.128232897	0.200363901	0.240436681	0.38469869		0.078	0	0
	CC 0.3m addition		Length (m)	390	GIS/NFCDD	0	Sustain	Medium	0.5	0	0	0	0		0	0	0
	CC 0.3m addition		Length (m)	390	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0		0	0	0
	Embankment maintenance	113FAS3351004C05	Length (km)	0.56	GIS/NFCDD	1166	Maintain	Short to long term	15	0.009794111	0.015303299	0.018363958	0.029382333		0	0	0
	No addition		Length (m)	560	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0		0	0	0
														2.241023779	TOTAL		



FCRMU approach	Asset Type	Asset reference	Parameter	Amount	Reference	Rate (£/parameter)	HLO	Epoch	Epochal discount factor	Basic construction cost (£M)	Plus Tidal/urban uplift (25% each) cost (£M)	Plus PAR, design and supervision (20%) cost (£M)	Plus Optimism bias 60% cost (£M)		FOOTPRINT IMPACT (Ha)		
RESPONSE OPTIONS															SPA/SSSI	SAC	None

Short Term Option 2 (Camperdown Terrace) and 1 (Imperial Recreation Ground). Medium to Long Term Option 2 (seaward and landward	Seawall maintenance	113FAS3351002C04	Length (km)	0.17	GIS/NFCDD	5830	Maintain	Short to long term	15	0.014866061	0.023228221	0.027873865	0.044598184		0	0	0
	Seawall maintenance	113FAS3351002C05	Length (km)	0.7	GIS/NFCDD	5830	Maintain	Short to long term	15	0.061213194	0.095645616	0.114774739	0.183639582		0	0	0
	Sheet piled wall maintenance	113FAS3351003C01	Length (km)	0.09	GIS/NFCDD	5830	Maintain	Short to long term	15	0.007870268	0.012297293	0.014756752	0.023610803		0	0	0
	CC 0.1m addition		Length (m)	90	GIS/NFCDD	0	Sustain	Medium	0.5	0	0	0	0		0	0	0
Exmouth Docks improvements to avoid pedestrian/local flooding	CC 0.4m addition		Length (m)	90	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0		0	0	0
	Complex Wall maintenance	113FAS3351003C02	Length (km)	1	GIS/NFCDD	5830	Maintain	Short to long term	15	0.08744742	0.136636594	0.163963913	0.26234226		0	0	0
	CC 0.5m addition		Length (m)	150	GIS/NFCDD	645	Improve	Short	1	0.096804294	0.151256709	0.181508051	0.290412882		0	0	0.03
	No addition		Length (m)	1000	GIS/NFCDD	0	Sustain	Medium	0.5	0	0	0	0		0	0	0
	CC 0.5m addition		Length (m)	1000	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0		0	0	0
	Complex Wall maintenance	113FAS3351003C03	Length (km)	0.12	GIS/NFCDD	5830	Maintain	Short to long term	15	0.01049369	0.016396391	0.01967567	0.031481071		0	0	0
	CC 0.2m addition		Length (m)	120	GIS/NFCDD	0	Sustain	Medium	0.5	0	0	0	0		0	0	0
	CC 0.4m addition		Length (m)	120	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0		0	0	0
	Timber revetment maintenance	113FAS3351003C04	Length (km)	0.08	GIS/NFCDD	5830	NAI	Short to long term	15	0.006995794	0.010930928	0.013117113	0.020987381		0	0	0
	road raising 0.3m	113FAS3351003C05	Length (m)	20	GIS/NFCDD	323	Improve	Short	1	0.00645362	0.010083781	0.012100537	0.019360859		0	0	0.02
Wider Camperdown Terrace road raising	road raising 0.3m	NA	Length (m)	150	GIS/NFCDD	0	Sustain	Medium	0.5	0	0	0	0		0	0	0
Wider Camperdown Terrace road raising	road raising 0.4m	NA	Length (m)	150	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0		0	0	0
Camperdown Terrace/Shelly Road property resilience	Gabion Wall maintenance	113FAS3351003C06	Length (km)	0.06	GIS/NFCDD	5830	NAI	Short to long term	15	0.005246845	0.008198196	0.009837835	0.015740536		0	0	0
	Property resilience	NA	Number	22	GIS/NFCDD	11660	Improve	Short	1	0.256512432	0.400800675	0.48096081	0.769537297		0	0	0
	Property resilience CC	NA	Number	2	GIS/NFCDD	0	Improve	Medium	0.5	0	0	0	0		0	0	0
	Property resilience CC	NA	Number	44	GIS/NFCDD	0	Improve	Long	0.2	0	0	0	0		0	0	0
	Pitched Stone Revetment maintenance	113FAS3351003C07	Length (km)	0.05	GIS/NFCDD	5830	Maintain	Short to long term	15	0.004372371	0.00683183	0.008198196	0.013117113		0	0	0
	Complex Wall maintenance	113FAS3351003C08	Length (km)	0.08	GIS/NFCDD	5830	Maintain	Short to long term	15	0.006995794	0.010930928	0.013117113	0.020987381		0	0	0
	Masonry Wall maintenance	113FAS3351003C09	Length (km)	0.07	GIS/NFCDD	5830	Maintain	Short to long term	15	0.006121319	0.009564562	0.011477474	0.018363958		0	0	0
Slipway/boatyard road/wall raising	Masonry Wall maintenance	113FAS3351003C10	Length (km)	0.06	GIS/NFCDD	5830	Maintain	Short to long term	15	0.005246845	0.008198196	0.009837835	0.015740536		0	0	0
	Complex Wall maintenance	113FAS3351004C01	Length (km)	0.09	GIS/NFCDD	5830	Maintain	Short to long term	15	0.007870268	0.012297293	0.014756752	0.023610803		0	0	0
	CC 0.5m addition		Length (m)	90	GIS/NFCDD	645	Improve	Short	1	0.058082576	0.090754026	0.108904831	0.174247729		0.018	0	0
	CC 0.2m addition		Length (m)	90	GIS/NFCDD	0	Sustain	Medium	0.5	0	0	0	0		0	0	0
	CC 1m addition		Length (m)	90	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0		0	0	0
	Gabion toe maintenance	113FAS3351004C02	Length (km)	0.11	GIS/NFCDD	5830	Maintain	Short to long term	15	0.009619216	0.015030025	0.01803603	0.028857649		0	0	0
	CC 0.1m addition		Length (m)	110	GIS/NFCDD	323	Sustain	Short	1	0.035494908	0.055460793	0.066552952	0.106484723		0.022	0	0
North-east Imperial Recreation Ground revetment wave wall raising	CC 0.3m addition		Length (m)	110	GIS/NFCDD	0	Sustain	Medium	0.5	0	0	0	0		0	0	0
	CC 0.4m addition		Length (m)	110	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0		0	0	0
	Revetment maintenance	113FAS3351004C03	Length (km)	0.55	GIS/NFCDD	5830	Maintain	Short to long term	15	0.048096081	0.075150127	0.090180152	0.144288243		0	0	0
	Wall maintenance		Length (km)	0.1	GIS/NFCDD	5830	Maintain	Short to long term	15	0.008744742	0.013663659	0.016396391	0.026234226		0	0	0
	CC 0.5m addition		Length (m)	100	GIS/NFCDD	333	Improve	Short	1	0.033346616	0.052104088	0.062524905	0.100039849		0.02	0	0
	No addition		Length (m)	100	GIS/NFCDD	0	Sustain	Medium	0.5	0	0	0	0		0	0	0
	CC 0.25m addition		Length (m)	100	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0		0	0	0
	Embankment maintenance	113FAS3351004C04	Length (km)	0.39	GIS/NFCDD	1166	Maintain	Short to long term	15	0.006820899	0.010657654	0.012789185	0.020462696		0	0	0
	CC 0.5m addition		Length (m)	390	GIS/NFCDD	329	Sustain	Short	1	0.128232897	0.200363901	0.240436681	0.38469869		0.078	0	0
	CC 0.3m addition		Length (m)	390	GIS/NFCDD	0	Sustain	Medium	0.5	0	0	0	0		0	0	0
	CC 0.3m addition		Length (m)	390	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0		0	0	0
	Embankment maintenance	113FAS3351004C05	Length (km)	0.56	GIS/NFCDD	1166	Maintain	Short to long term	15	0.009794111	0.015303299	0.018363958	0.029382333		0	0	0
	CC 0.1m addition		Length (m)	560	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0		0	0	0
													2.768226785	TOTAL			



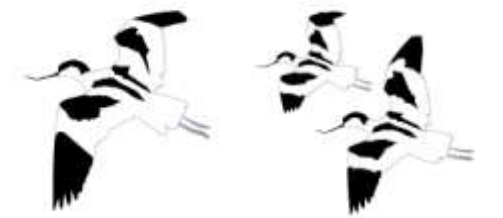
FCRMU approach	Asset Type	Asset reference	Parameter	Amount	Reference	Rate (£/parameter)	HLO	Epoch	Epochal discount factor	Basic construction cost (£M)	Plus Tidal/urban uplift (25% each) cost (£M)	Plus PAR, design and supervision (20%) cost (£M)	Plus Optimism bias 60% cost (£M)		FOOTPRINT IMPACT (Ha)		
RESPONSE OPTIONS															SPA/SSSI	SAC	None

Short Term Option 2 (Camperdown Terrace and Imperial Recreation Ground). Medium to Long Term Option 2 (seaward and landward)	Seawall maintenance	113FAS3351002C04	Length (km)	0.17	GIS/NFCDD	5830	Maintain	Short to long term	15	0.014866061	0.023228221	0.027873865	0.044598184		0	0	0
	Seawall maintenance	113FAS3351002C05	Length (km)	0.7	GIS/NFCDD	5830	Maintain	Short to long term	15	0.061213194	0.095645616	0.114774739	0.183639582		0	0	0
	Sheet piled wall maintenance	113FAS3351003C01	Length (km)	0.09	GIS/NFCDD	5830	Maintain	Short to long term	15	0.007870268	0.012297293	0.014756752	0.023610803		0	0	0
	No addition		Length (m)	90	GIS/NFCDD	0	Sustain	Medium	0.5	0	0	0	0		0	0	0
	CC 0.2m addition		Length (m)	90	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0		0	0	0
Exmouth Docks improvements to avoid pedestrian/local flooding	Complex Wall maintenance	113FAS3351003C02	Length (km)	1	GIS/NFCDD	5830	Maintain	Short to long term	15	0.08744742	0.136636594	0.163963913	0.26234226		0	0	0
	No addition		Length (m)	150	GIS/NFCDD	0	Improve	Short	1	0	0	0	0		0	0	0
	CC 0.2m addition		Length (m)	1000	GIS/NFCDD	0	Sustain	Medium	0.5	0	0	0	0		0	0	0
	CC 0.5m addition		Length (m)	1000	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0		0	0	0
	Complex Wall maintenance	113FAS3351003C03	Length (km)	0.12	GIS/NFCDD	5830	Maintain	Short to long term	15	0.01049369	0.016396391	0.01967567	0.031481071		0	0	0
	CC 0.1m addition		Length (m)	120	GIS/NFCDD	0	Sustain	Medium	0.5	0	0	0	0		0	0	0
	CC 0.3m addition		Length (m)	120	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0		0	0	0
	Timber revetment maintenance	113FAS3351003C04	Length (km)	0.08	GIS/NFCDD	5830	NAI	Short to long term	15	0.006995794	0.010930928	0.013117113	0.020987381		0	0	0
	No road raising	113FAS3351003C05	Length (m)	20	GIS/NFCDD	0	Improve	Short	1	0	0	0	0		0	0	0
	Gabion Wall maintenance	113FAS3351003C06	Length (km)	0.06	GIS/NFCDD	5830	NAI	Short to long term	15	0.005246845	0.008198196	0.009837835	0.015740536		0	0	0
Camperdown Terrace/Shelly Road property resilience	Property resilience	NA	Number	10	GIS/NFCDD	11660	Improve	Short	1	0.11659656	0.182182125	0.21861855	0.34978968		0	0	0
	Property resilience CC	NA	Number	10	GIS/NFCDD	0	Improve	Medium	0.5	0	0	0	0		0	0	0
	Property resilience CC	NA	Number	7	GIS/NFCDD	0	Improve	Long	0.2	0	0	0	0		0	0	0
	Pitched Stone Revetment maintenance	113FAS3351003C07	Length (km)	0.05	GIS/NFCDD	5830	Maintain	Short to long term	15	0.004372371	0.00683183	0.008198196	0.013117113		0	0	0
	Complex Wall maintenance	113FAS3351003C08	Length (km)	0.08	GIS/NFCDD	5830	Maintain	Short to long term	15	0.006995794	0.010930928	0.013117113	0.020987381		0	0	0
Slipway/boatyard road/wall raising	Masonry Wall maintenance	113FAS3351003C09	Length (km)	0.07	GIS/NFCDD	5830	Maintain	Short to long term	15	0.006121319	0.009564562	0.011477474	0.018363958		0	0	0
	Masonry Wall maintenance	113FAS3351003C10	Length (km)	0.06	GIS/NFCDD	5830	Maintain	Short to long term	15	0.005246845	0.008198196	0.009837835	0.015740536		0	0	0
	Complex Wall maintenance	113FAS3351004C01	Length (km)	0.09	GIS/NFCDD	5830	Maintain	Short to long term	15	0.007870268	0.012297293	0.014756752	0.023610803		0	0	0
	No addition		Length (m)	90	GIS/NFCDD	0	Improve	Short	1	0	0	0	0		0	0	0
	CC 0.3m addition		Length (m)	90	GIS/NFCDD	0	Sustain	Medium	0.5	0	0	0	0		0	0	0
North-east Imperial Recreation Ground landward wall/road raising	CC 0.7m addition		Length (m)	90	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0		0	0	0
	Gabion toe maintenance	113FAS3351004C02	Length (km)	0.11	GIS/NFCDD	5830	Maintain	Short to long term	15	0.009619216	0.015030025	0.01803603	0.028857649		0	0	0
	No addition		Length (m)	110	GIS/NFCDD	0	Sustain	Short	1	0	0	0	0		0	0	0
	No addition		Length (m)	110	GIS/NFCDD	0	Sustain	Medium	0.5	0	0	0	0		0	0	0
	CC 0.4m addition		Length (m)	110	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0		0	0	0
	Revetment maintenance	113FAS3351004C03	Length (km)	0.55	GIS/NFCDD	5830	Maintain	Short to long term	15	0.048096081	0.075150127	0.090180152	0.144288243		0	0	0
	Wall maintenance		Length (km)	0.15	GIS/NFCDD	5830	Maintain	Short to long term	15	0.013117113	0.020495489	0.024594587	0.039351339		0	0	0
	No addition		Length (m)	150	GIS/NFCDD	0	Improve	Short	1	0	0	0	0		0	0	0
	CC 0.2m addition		Length (m)	150	GIS/NFCDD	0	Sustain	Medium	0.5	0	0	0	0		0	0	0
	Extended wall 0.3m addition		Length (m)	250	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0		0	0	0
	Embankment maintenance	113FAS3351004C04	Length (km)	0.39	GIS/NFCDD	1166	Maintain	Short to long term	15	0.006820899	0.010657654	0.012789185	0.020462696		0	0	0
	No addition		Length (m)	390	GIS/NFCDD	0	Sustain	Short	1	0	0	0	0		0	0	0
	CC 0.5m addition		Length (m)	390	GIS/NFCDD	0	Sustain	Medium	0.5	0	0	0	0		0	0	0
	CC 0.5m addition		Length (m)	390	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0		0	0	0
	Embankment maintenance	113FAS3351004C05	Length (km)	0.56	GIS/NFCDD	1166	Maintain	Short to long term	15	0.009794111	0.015303299	0.018363958	0.029382333		0	0	0
	No addition		Length (m)	560	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0		0	0	0
												1.286351549	TOTAL				



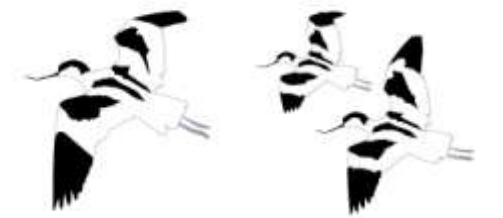
FCRMU approach	Asset Type	Asset reference	Parameter	Amount	Reference	Rate (£/parameter)	HLO	Epoch	Epochal discount factor	Basic construction cost (£M)	Plus Tidal/urban uplift (25% each) cost (£M)	Plus PAR, design and supervision (20%) cost (£M)	Plus Optimism bias 60% cost (£M)		FOOTPRINT IMPACT (Ha)		
RESPONSE OPTIONS															SPA/SSSI	SAC	None

Short Term Option 2 (Camperdown Terrace and Imperial Recreation Ground). Medium to Long Term Option 2 (seaward and landward)	Seawall maintenance	113FAS3351002C04	Length (km)	0.17	GIS/NFCDD	5830	Maintain	Short to long term	15	0.014866061	0.023228221	0.027873865	0.044598184		0	0	0
	Seawall maintenance	113FAS3351002C05	Length (km)	0.7	GIS/NFCDD	5830	Maintain	Short to long term	15	0.061213194	0.095645616	0.114774739	0.183639582		0	0	0
	Sheet piled wall maintenance	113FAS3351003C01	Length (km)	0.09	GIS/NFCDD	5830	Maintain	Short to long term	15	0.007870268	0.012297293	0.014756752	0.023610803		0	0	0
	No addition		Length (m)	90	GIS/NFCDD	0	Sustain	Medium	0.5	0	0	0	0		0	0	0
	CC 0.2m addition		Length (m)	90	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0		0	0	0
Exmouth Docks improvements to avoid pedestrian/local flooding	Complex Wall maintenance	113FAS3351003C02	Length (km)	1	GIS/NFCDD	5830	Maintain	Short to long term	15	0.08744742	0.136636594	0.163963913	0.26234226		0	0	0
	No addition		Length (m)	150	GIS/NFCDD	0	Improve	Short	1	0	0	0	0		0	0	0
	CC 0.2m addition		Length (m)	1000	GIS/NFCDD	0	Sustain	Medium	0.5	0	0	0	0		0	0	0
	CC 0.5m addition		Length (m)	1000	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0		0	0	0
	Complex Wall maintenance	113FAS3351003C03	Length (km)	0.12	GIS/NFCDD	5830	Maintain	Short to long term	15	0.01049369	0.016396391	0.01967567	0.031481071		0	0	0
	CC 0.1m addition		Length (m)	120	GIS/NFCDD	0	Sustain	Medium	0.5	0	0	0	0		0	0	0
	CC 0.3m addition		Length (m)	120	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0		0	0	0
	Timber revetment maintenance	113FAS3351003C04	Length (km)	0.08	GIS/NFCDD	5830	NAI	Short to long term	15	0.006995794	0.010930928	0.013117113	0.020987381		0	0	0
Sailing club access road raising	No road raising	113FAS3351003C05	Length (m)	20	GIS/NFCDD	0	Improve	Short	1	0	0	0	0		0	0	0
	Gabion Wall maintenance	113FAS3351003C06	Length (km)	0.06	GIS/NFCDD	5830	NAI	Short to long term	15	0.005246845	0.008198196	0.009837835	0.015740536		0	0	0
Camperdown Terrace/Shelly Road property resilience	Property resilience	NA	Number	10	GIS/NFCDD	11660	Improve	Short	1	0.11659656	0.182182125	0.21861855	0.34978968		0	0	0
	Property resilience CC	NA	Number	10	GIS/NFCDD	0	Improve	Medium	0.5	0	0	0	0		0	0	0
	Property resilience CC	NA	Number	7	GIS/NFCDD	0	Improve	Long	0.2	0	0	0	0		0	0	0
	Pitched Stone Revetment maintenance	113FAS3351003C07	Length (km)	0.05	GIS/NFCDD	5830	Maintain	Short to long term	15	0.004372371	0.00683183	0.008198196	0.013117113		0	0	0
	Complex Wall maintenance	113FAS3351003C08	Length (km)	0.08	GIS/NFCDD	5830	Maintain	Short to long term	15	0.006995794	0.010930928	0.013117113	0.020987381		0	0	0
	Masonry Wall maintenance	113FAS3351003C09	Length (km)	0.07	GIS/NFCDD	5830	Maintain	Short to long term	15	0.006121319	0.009564562	0.011477474	0.018363958		0	0	0
	Masonry Wall maintenance	113FAS3351003C10	Length (km)	0.06	GIS/NFCDD	5830	Maintain	Short to long term	15	0.005246845	0.008198196	0.009837835	0.015740536		0	0	0
Slipway/boatyard road/wall raising	Complex Wall maintenance	113FAS3351004C01	Length (km)	0.09	GIS/NFCDD	5830	Maintain	Short to long term	15	0.007870268	0.012297293	0.014756752	0.023610803		0	0	0
	CC 0.1m addition		Length (m)	90	GIS/NFCDD	323	Improve	Short	1	0.029041288	0.045377013	0.054452415	0.087123865		0.018	0	0
	CC 0.3m addition		Length (m)	90	GIS/NFCDD	0	Sustain	Medium	0.5	0	0	0	0		0	0	0
	CC 0.7m addition		Length (m)	90	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0		0	0	0
	Gabion toe maintenance	113FAS3351004C02	Length (km)	0.11	GIS/NFCDD	5830	Maintain	Short to long term	15	0.009619216	0.015030025	0.01803603	0.028857649		0	0	0
	No addition		Length (m)	110	GIS/NFCDD	0	Sustain	Short	1	0	0	0	0		0	0	0
	No addition		Length (m)	110	GIS/NFCDD	0	Sustain	Medium	0.5	0	0	0	0		0	0	0
	CC 0.4m addition		Length (m)	110	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0		0	0	0
North-east Imperial Recreation Ground landward wall/road raising	Revetment maintenance	113FAS3351004C03	Length (km)	0.55	GIS/NFCDD	5830	Maintain	Short to long term	15	0.048096081	0.075150127	0.090180152	0.144288243		0	0	0
	Wall maintenance		Length (km)	0.15	GIS/NFCDD	5830	Maintain	Short to long term	15	0.013117113	0.020495489	0.024594587	0.039351339		0	0	0
	New wall 0.2m addition		Length (m)	150	GIS/NFCDD	323	Improve	Short	1	0.048402147	0.075628355	0.090754026	0.145206441		0	0	0.03
	CC 0.2m addition		Length (m)	150	GIS/NFCDD	0	Sustain	Medium	0.5	0	0	0	0		0	0	0
	Extended wall 0.3m addition		Length (m)	250	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0		0	0	0
	Embankment maintenance	113FAS3351004C04	Length (km)	0.39	GIS/NFCDD	1166	Maintain	Short to long term	15	0.006820899	0.010657654	0.012789185	0.020462696		0	0	0
	No addition		Length (m)	390	GIS/NFCDD	0	Sustain	Short	1	0	0	0	0		0	0	0
	CC 0.5m addition		Length (m)	390	GIS/NFCDD	0	Sustain	Medium	0.5	0	0	0	0		0	0	0
	CC 0.5m addition		Length (m)	390	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0		0	0	0
	Embankment maintenance	113FAS3351004C05	Length (km)	0.56	GIS/NFCDD	1166	Maintain	Short to long term	15	0.009794111	0.015303299	0.018363958	0.029382333		0	0	0
	No addition		Length (m)	560	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0		0	0	0
												1.518681855	TOTAL				



FCRMU approach	Asset Type	Asset reference	Parameter	Amount	Reference	Rate (£/parameter)	HLO	Epoch	Epochal discount factor	Basic construction cost (£M)	Plus Tidal/urban uplift (25% each) cost (£M)	Plus PAR, design and supervision (20%) cost (£M)	Plus Optimism bias 60% cost (£M)		FOOTPRINT IMPACT (Ha)			
RESPONSE OPTIONS																SPA/SSSI	SAC	None

Short Term Option 2 (Camperdown Terrace and Imperial Recreation Ground). Medium to Long Term Option 2 (seaward and landward)	Seawall maintenance	113FAS3351002C04	Length (km)	0.17	GIS/NFCDD	5830	Maintain	Short to long term	15	0.014866061	0.023228221	0.027873865	0.044598184			0	0	0
	Seawall maintenance	113FAS3351002C05	Length (km)	0.7	GIS/NFCDD	5830	Maintain	Short to long term	15	0.061213194	0.095645616	0.114774739	0.183639582			0	0	0
	Sheet piled wall maintenance	113FAS3351003C01	Length (km)	0.09	GIS/NFCDD	5830	Maintain	Short to long term	15	0.007870268	0.012297293	0.014756752	0.023610803			0	0	0
	No addition		Length (m)	90	GIS/NFCDD	0	Sustain	Medium	0.5	0	0	0	0			0	0	0
	CC 0.3m addition		Length (m)	90	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0			0	0	0
Exmouth Docks improvements to avoid pedestrian/local flooding	Complex Wall maintenance	113FAS3351003C02	Length (km)	1	GIS/NFCDD	5830	Maintain	Short to long term	15	0.08744742	0.136636594	0.163963913	0.26234226			0	0	0
	CC 0.25m addition		Length (m)	150	GIS/NFCDD	323	Improve	Short	1	0.048402147	0.075628355	0.090754026	0.145206441			0	0	0.03
	No addition		Length (m)	1000	GIS/NFCDD	0	Sustain	Medium	0.5	0	0	0	0			0	0	0
	CC 0.5m addition		Length (m)	1000	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0			0	0	0
	Complex Wall maintenance	113FAS3351003C03	Length (km)	0.12	GIS/NFCDD	5830	Maintain	Short to long term	15	0.01049369	0.016396391	0.01967567	0.031481071			0	0	0
	CC 0.2m addition		Length (m)	120	GIS/NFCDD	0	Sustain	Medium	0.5	0	0	0	0			0	0	0
	CC 0.4m addition		Length (m)	120	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0			0	0	0
	Timber revetment maintenance	113FAS3351003C04	Length (km)	0.08	GIS/NFCDD	5830	NAI	Short to long term	15	0.006995794	0.010930928	0.013117113	0.020987381			0	0	0
Sailing club access road raising	road raising 0.1m	113FAS3351003C05	Length (m)	20	GIS/NFCDD	323	Improve	Short	1	0.00645362	0.010083781	0.012100537	0.019360859			0.004	0	0
	Gabion Wall maintenance	113FAS3351003C06	Length (km)	0.06	GIS/NFCDD	5830	NAI	Short to long term	15	0.005246845	0.008198196	0.009837835	0.015740536			0	0	0
Camperdown Terrace/Shelly Road property resilience	Property resilience	NA	Number	12	GIS/NFCDD	11660	Improve	Short	1	0.139915872	0.21861855	0.26234226	0.419747616			0	0	0
	Property resilience CC	NA	Number	10	GIS/NFCDD	0	Improve	Medium	0.5	0	0	0	0			0	0	0
	Property resilience CC	NA	Number	7	GIS/NFCDD	0	Improve	Long	0.2	0	0	0	0			0	0	0
	Pitched Stone Revetment maintenance	113FAS3351003C07	Length (km)	0.05	GIS/NFCDD	5830	Maintain	Short to long term	15	0.004372371	0.00683183	0.008198196	0.013117113			0	0	0
	Complex Wall maintenance	113FAS3351003C08	Length (km)	0.08	GIS/NFCDD	5830	Maintain	Short to long term	15	0.006995794	0.010930928	0.013117113	0.020987381			0	0	0
	Masonry Wall maintenance	113FAS3351003C09	Length (km)	0.07	GIS/NFCDD	5830	Maintain	Short to long term	15	0.006121319	0.009564562	0.011477474	0.018363958			0	0	0
	Masonry Wall maintenance	113FAS3351003C10	Length (km)	0.06	GIS/NFCDD	5830	Maintain	Short to long term	15	0.005246845	0.008198196	0.009837835	0.015740536			0	0	0
Slipway/boatyard road/wall raising	Complex Wall maintenance	113FAS3351004C01	Length (km)	0.09	GIS/NFCDD	5830	Maintain	Short to long term	15	0.007870268	0.012297293	0.014756752	0.023610803			0	0	0
	CC 0.2m addition		Length (m)	90	GIS/NFCDD	323	Improve	Short	1	0.029041288	0.045377013	0.054452415	0.087123865			0.018	0	0
	CC 0.2m addition		Length (m)	90	GIS/NFCDD	0	Sustain	Medium	0.5	0	0	0	0			0	0	0
	CC 1.1m addition		Length (m)	90	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0			0	0	0
	Gabion toe maintenance	113FAS3351004C02	Length (km)	0.11	GIS/NFCDD	5830	Maintain	Short to long term	15	0.009619216	0.015030025	0.01803603	0.028857649			0	0	0
	No addition		Length (m)	110	GIS/NFCDD	0	Sustain	Short	1	0	0	0	0			0	0	0
	CC 0.1m addition		Length (m)	110	GIS/NFCDD	0	Sustain	Medium	0.5	0	0	0	0			0	0	0
	CC 0.4m addition		Length (m)	110	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0			0	0	0
North-east Imperial Recreation Ground landward wall/road raising	Revetment maintenance	113FAS3351004C03	Length (km)	0.55	GIS/NFCDD	5830	Maintain	Short to long term	15	0.048096081	0.075150127	0.090180152	0.144288243			0	0	0
	Wall maintenance		Length (km)	0.15	GIS/NFCDD	5830	Maintain	Short to long term	15	0.013117113	0.020495489	0.024594587	0.039351339			0	0	0
	New wall 0.3m addition		Length (m)	150	GIS/NFCDD	323	Improve	Short	1	0.048402147	0.075628355	0.090754026	0.145206441			0	0	0.03
	CC 0.2m addition		Length (m)	150	GIS/NFCDD	0	Sustain	Medium	0.5	0	0	0	0			0	0	0
	Extended wall 0.4m addition		Length (m)	250	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0			0	0	0
	Embankment maintenance	113FAS3351004C04	Length (km)	0.39	GIS/NFCDD	1166	Maintain	Short to long term	15	0.006820899	0.010657654	0.012789185	0.020462696			0	0	0
	No addition		Length (m)	390	GIS/NFCDD	0	Sustain	Short	1	0	0	0	0			0	0	0
	CC 0.6m addition		Length (m)	390	GIS/NFCDD	0	Sustain	Medium	0.5	0	0	0	0			0	0	0
	CC 0.4m addition		Length (m)	390	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0			0	0	0
	Embankment maintenance	113FAS3351004C05	Length (km)	0.56	GIS/NFCDD	1166	Maintain	Short to long term	15	0.009794111	0.015303299	0.018363958	0.029382333			0	0	0
	No addition		Length (m)	560	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0			0	0	0
													1.753207091	TOTAL				



FCRMU approach	Asset Type	Asset reference	Parameter	Amount	Reference	Rate (£/parameter)	HLO	Epoch	Epochal discount factor	Basic construction cost (£M)	Plus Tidal/urban uplift (25% each) cost (£M)	Plus PAR, design and supervision (20%) cost (£M)	Plus Optimism bias 60% cost (£M)		FOOTPRINT IMPACT (Ha)		
RESPONSE OPTIONS															SPA/SSSI	SAC	None

Short Term Option 2 (Camperdown Terrace and Imperial Recreation Ground). Medium to Long Term Option 2 (seaward and landward)	Seawall maintenance	113FAS3351002C04	Length (km)	0.17	GIS/NFCDD	5830	Maintain	Short to long term	15	0.014866061	0.023228221	0.027873865	0.044598184		0	0	0
	Seawall maintenance	113FAS3351002C05	Length (km)	0.7	GIS/NFCDD	5830	Maintain	Short to long term	15	0.061213194	0.095645616	0.114774739	0.183639582		0	0	0
	Sheet piled wall maintenance	113FAS3351003C01	Length (km)	0.09	GIS/NFCDD	5830	Maintain	Short to long term	15	0.007870268	0.012297293	0.014756752	0.023610803		0	0	0
	CC 0.1m addition		Length (m)	90	GIS/NFCDD	0	Sustain	Medium	0.5	0	0	0	0		0	0	0
	CC 0.4m addition		Length (m)	90	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0		0	0	0
Exmouth Docks improvements to avoid pedestrian/local flooding	Complex Wall maintenance	113FAS3351003C02	Length (km)	1	GIS/NFCDD	5830	Maintain	Short to long term	15	0.08744742	0.136636594	0.163963913	0.26234226		0	0	0
	CC 0.25m addition		Length (m)	150	GIS/NFCDD	323	Improve	Short	1	0.048402147	0.075628355	0.090754026	0.145206441		0	0	0.03
	No addition		Length (m)	1000	GIS/NFCDD	0	Sustain	Medium	0.5	0	0	0	0		0	0	0
	CC 0.75m addition		Length (m)	1000	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0		0	0	0
	Complex Wall maintenance	113FAS3351003C03	Length (km)	0.12	GIS/NFCDD	5830	Maintain	Short to long term	15	0.01049369	0.016396391	0.01967567	0.031481071		0	0	0
	CC 0.2m addition		Length (m)	120	GIS/NFCDD	0	Sustain	Medium	0.5	0	0	0	0		0	0	0
	CC 0.4m addition		Length (m)	120	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0		0	0	0
	Timber revetment maintenance	113FAS3351003C04	Length (km)	0.08	GIS/NFCDD	5830	NAI	Short to long term	15	0.006995794	0.010930928	0.013117113	0.020987381		0	0	0
Sailing club access road raising	road raising 0.2m	113FAS3351003C05	Length (m)	20	GIS/NFCDD	323	Improve	Short	1	0.00645362	0.010083781	0.012100537	0.019360859		0	0	0.02
Wider Camperdown Terrace road raising	road raising 0.1m	NA	Length (m)	150	GIS/NFCDD	0	Sustain	Medium	0.5	0	0	0	0		0	0	0
Wider Camperdown Terrace road raising	road raising 0.3m	NA	Length (m)	150	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0		0	0	0
Camperdown Terrace/Shelly Road property resilience	Gabion Wall maintenance	113FAS3351003C06	Length (km)	0.06	GIS/NFCDD	5830	NAI	Short to long term	15	0.005246845	0.008198196	0.009837835	0.015740536		0	0	0
	Property resilience	NA	Number	15	GIS/NFCDD	11660	Improve	Short	1	0.17489484	0.273273188	0.327927825	0.52468452		0	0	0
	Property resilience CC	NA	Number	9	GIS/NFCDD	0	Improve	Medium	0.5	0	0	0	0		0	0	0
	Property resilience CC	NA	Number	44	GIS/NFCDD	0	Improve	Long	0.2	0	0	0	0		0	0	0
	Pitched Stone Revetment maintenance	113FAS3351003C07	Length (km)	0.05	GIS/NFCDD	5830	Maintain	Short to long term	15	0.004372371	0.00683183	0.008198196	0.013117113		0	0	0
	Complex Wall maintenance	113FAS3351003C08	Length (km)	0.08	GIS/NFCDD	5830	Maintain	Short to long term	15	0.006995794	0.010930928	0.013117113	0.020987381		0	0	0
	Masonry Wall maintenance	113FAS3351003C09	Length (km)	0.07	GIS/NFCDD	5830	Maintain	Short to long term	15	0.006121319	0.009564562	0.011477474	0.018363958		0	0	0
	Masonry Wall maintenance	113FAS3351003C10	Length (km)	0.06	GIS/NFCDD	5830	Maintain	Short to long term	15	0.005246845	0.008198196	0.009837835	0.015740536		0	0	0
Slipway/boatyard road/wall raising	Complex Wall maintenance	113FAS3351004C01	Length (km)	0.09	GIS/NFCDD	5830	Maintain	Short to long term	15	0.007870268	0.012297293	0.014756752	0.023610803		0	0	0
	CC 0.3m addition		Length (m)	90	GIS/NFCDD	323	Improve	Short	1	0.029041288	0.045377013	0.054452415	0.087123865		0.018	0	0
	CC 0.2m addition		Length (m)	90	GIS/NFCDD	0	Sustain	Medium	0.5	0	0	0	0		0	0	0
	CC 1.1m addition		Length (m)	90	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0		0	0	0
	Gabion toe maintenance	113FAS3351004C02	Length (km)	0.11	GIS/NFCDD	5830	Maintain	Short to long term	15	0.009619216	0.015030025	0.01803603	0.028857649		0	0	0
	CC 0.1m addition		Length (m)	110	GIS/NFCDD	323	Sustain	Short	1	0.035494908	0.055460793	0.066552952	0.10648723		0.022	0	0
	CC 0.1m addition		Length (m)	110	GIS/NFCDD	0	Sustain	Medium	0.5	0	0	0	0		0	0	0
	CC 0.4m addition		Length (m)	110	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0		0	0	0
	Revetment maintenance	113FAS3351004C03	Length (km)	0.55	GIS/NFCDD	5830	Maintain	Short to long term	15	0.048096081	0.075150127	0.090180152	0.144288243		0	0	0
North-east Imperial Recreation Ground landward wall/road raising	Wall maintenance		Length (km)	0.15	GIS/NFCDD	5830	Maintain	Short to long term	15	0.013117113	0.020495489	0.024594587	0.039351339		0	0	0
	New wall 0.4m addition		Length (m)	150	GIS/NFCDD	645	Improve	Short	1	0.096804294	0.151256709	0.181508051	0.290412882		0	0	0.03
	CC 0.2m addition		Length (m)	150	GIS/NFCDD	0	Sustain	Medium	0.5	0	0	0	0		0	0	0
	Extended wall 0.5m addition		Length (m)	250	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0		0	0	0
	Embankment maintenance	113FAS3351004C04	Length (km)	0.39	GIS/NFCDD	1166	Maintain	Short to long term	15	0.006820899	0.010657654	0.012789185	0.020462696		0	0	0
	CC 0.4m addition		Length (m)	390	GIS/NFCDD	329	Sustain	Short	1	0.128232897	0.200363901	0.240436681	0.38469869		0.078	0	0
	CC 0.3m addition		Length (m)	390	GIS/NFCDD	0	Sustain	Medium	0.5	0	0	0	0		0	0	0
	CC 0.3m addition		Length (m)	390	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0		0	0	0
	Embankment maintenance	113FAS3351004C05	Length (km)	0.56	GIS/NFCDD	1166	Maintain	Short to long term	15	0.009794111	0.015303299	0.018363958	0.029382333		0	0	0
	No addition		Length (m)	560	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0		0	0	0
														2.49453385	TOTAL		



FCRMU approach	Asset Type	Asset reference	Parameter	Amount	Reference	Rate (£/parameter)	HLO	Epoch	Epochal discount factor	Basic construction cost (£M)	Plus Tidal/urban uplift (25% each) cost (£M)	Plus PAR, design and supervision (20%) cost (£M)	Plus Optimism bias 60% cost (£M)		FOOTPRINT IMPACT (Ha)		
RESPONSE OPTIONS															SPA/SSSI	SAC	None

Short Term Option 2 (Camperdown Terrace and Imperial Recreation Ground).	Seawall maintenance	113FAS3351002C04	Length (km)	0.17	GIS/NFCDD	5830	Maintain	Short to long term	15	0.014866061	0.023228221	0.027873865	0.044598184		0	0	0
	Seawall maintenance	113FAS3351002C05	Length (km)	0.7	GIS/NFCDD	5830	Maintain	Short to long term	15	0.061213194	0.095645616	0.114774739	0.183639582		0	0	0
	Sheet piled wall maintenance	113FAS3351003C01	Length (km)	0.09	GIS/NFCDD	5830	Maintain	Short to long term	15	0.007870268	0.012297293	0.014756752	0.023610803		0	0	0
	CC 0.1m addition		Length (m)	90	GIS/NFCDD	0	Sustain	Medium	0.5	0	0	0	0		0	0	0
	CC 0.4m addition		Length (m)	90	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0		0	0	0
Exmouth Docks improvements to avoid pedestrian/local flooding	Complex Wall maintenance	113FAS3351003C02	Length (km)	1	GIS/NFCDD	5830	Maintain	Short to long term	15	0.08744742	0.136636594	0.163963913	0.26234226		0	0	0
	CC 0.5m addition		Length (m)	150	GIS/NFCDD	645	Improve	Short	1	0.096804294	0.151256709	0.181508051	0.290412882		0	0	0.03
	No addition		Length (m)	1000	GIS/NFCDD	0	Sustain	Medium	0.5	0	0	0	0		0	0	0
	CC 0.5m addition		Length (m)	1000	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0		0	0	0
	Complex Wall maintenance	113FAS3351003C03	Length (km)	0.12	GIS/NFCDD	5830	Maintain	Short to long term	15	0.01049369	0.016396391	0.01967567	0.031481071		0	0	0
	CC 0.2m addition		Length (m)	120	GIS/NFCDD	0	Sustain	Medium	0.5	0	0	0	0		0	0	0
	CC 0.4m addition		Length (m)	120	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0		0	0	0
	Timber revetment maintenance	113FAS3351003C04	Length (km)	0.08	GIS/NFCDD	5830	NAI	Short to long term	15	0.006995794	0.010930928	0.013117113	0.020987381		0	0	0
Sailing club access road raising	road raising 0.3m	113FAS3351003C05	Length (m)	20	GIS/NFCDD	323	Improve	Short	1	0.00645362	0.010083781	0.012100537	0.019360859		0	0	0.02
Wider Camperdown Terrace road raising	road raising 0.3m	NA	Length (m)	150	GIS/NFCDD	0	Sustain	Medium	0.5	0	0	0	0		0	0	0
Wider Camperdown Terrace road raising	road raising 0.4m	NA	Length (m)	150	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0		0	0	0
Camperdown Terrace/Shelly Road property resilience	Gabion Wall maintenance	113FAS3351003C06	Length (km)	0.06	GIS/NFCDD	5830	NAI	Short to long term	15	0.005246845	0.008198196	0.009837835	0.015740536		0	0	0
	Property resilience	NA	Number	22	GIS/NFCDD	11660	Improve	Short	1	0.256512432	0.400800675	0.48096081	0.769537297		0	0	0
	Property resilience CC	NA	Number	2	GIS/NFCDD	0	Improve	Medium	0.5	0	0	0	0		0	0	0
	Property resilience CC	NA	Number	44	GIS/NFCDD	0	Improve	Long	0.2	0	0	0	0		0	0	0
	Pitched Stone Revetment maintenance	113FAS3351003C07	Length (km)	0.05	GIS/NFCDD	5830	Maintain	Short to long term	15	0.004372371	0.00683183	0.008198196	0.013117113		0	0	0
	Complex Wall maintenance	113FAS3351003C08	Length (km)	0.08	GIS/NFCDD	5830	Maintain	Short to long term	15	0.006995794	0.010930928	0.013117113	0.020987381		0	0	0
	Masonry Wall maintenance	113FAS3351003C09	Length (km)	0.07	GIS/NFCDD	5830	Maintain	Short to long term	15	0.006121319	0.009564562	0.011477474	0.018363958		0	0	0
	Masonry Wall maintenance	113FAS3351003C10	Length (km)	0.06	GIS/NFCDD	5830	Maintain	Short to long term	15	0.005246845	0.008198196	0.009837835	0.015740536		0	0	0
Slipway/boatyard road/wall raising	Complex Wall maintenance	113FAS3351004C01	Length (km)	0.09	GIS/NFCDD	5830	Maintain	Short to long term	15	0.007870268	0.012297293	0.014756752	0.023610803		0	0	0
	CC 0.5m addition		Length (m)	90	GIS/NFCDD	645	Improve	Short	1	0.058082576	0.090754026	0.108904831	0.174247729		0.018	0	0
	CC 0.2m addition		Length (m)	90	GIS/NFCDD	0	Sustain	Medium	0.5	0	0	0	0		0	0	0
	CC 1m addition		Length (m)	90	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0		0	0	0
	Gabion toe maintenance	113FAS3351004C02	Length (km)	0.11	GIS/NFCDD	5830	Maintain	Short to long term	15	0.009619216	0.015030025	0.01803603	0.028857649		0	0	0
	CC 0.1m addition		Length (m)	110	GIS/NFCDD	323	Sustain	Short	1	0.035494908	0.055460793	0.066552952	0.106484723		0.022	0	0
	CC 0.3m addition		Length (m)	110	GIS/NFCDD	0	Sustain	Medium	0.5	0	0	0	0		0	0	0
	CC 0.4m addition		Length (m)	110	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0		0	0	0
North-east Imperial Recreation Ground landward wall/road raising	Revetment maintenance	113FAS3351004C03	Length (km)	0.55	GIS/NFCDD	5830	Maintain	Short to long term	15	0.048096081	0.075150127	0.090180152	0.144288243		0	0	0
	Wall maintenance		Length (km)	0.25	GIS/NFCDD	5830	Maintain	Short to long term	15	0.021861855	0.034159148	0.040990978	0.065585565		0	0	0
	New wall 0.6m addition		Length (m)	250	GIS/NFCDD	645	Improve	Short	1	0.16134049	0.252094516	0.302513419	0.48402147		0	0	0.05
	CC 0.2m addition		Length (m)	250	GIS/NFCDD	0	Sustain	Medium	0.5	0	0	0	0		0	0	0
	CC0.4m addition		Length (m)	250	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0		0	0	0
	Embankment maintenance	113FAS3351004C04	Length (km)	0.39	GIS/NFCDD	1166	Maintain	Short to long term	15	0.006820899	0.010657654	0.012789185	0.020462696		0	0	0
	CC 0.5m addition		Length (m)	390	GIS/NFCDD	329	Sustain	Short	1	0.128232897	0.200363901	0.240436681	0.38469869		0.078	0	0
	CC 0.3m addition		Length (m)	390	GIS/NFCDD	0	Sustain	Medium	0.5	0	0	0	0		0	0	0
	CC 0.3m addition		Length (m)	390	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0		0	0	0
	Embankment maintenance	113FAS3351004C05	Length (km)	0.56	GIS/NFCDD	1166	Maintain	Short to long term	15	0.009794111	0.015303299	0.018363958	0.029382333		0	0	0
	CC 0.1m addition		Length (m)	560	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0		0	0	0
														3.191559745	TOTAL		

M.3 East bank of the Clyst



FCRMU approach	Asset Type	Asset reference	Parameter	Amount	Reference	Rate (£/parameter)	HLO	Epoch	Epochal discount factor	Basic construction cost (£M)	Plus Tidal/urban uplift (25% each) cost (£M)	Plus PAR, design and supervision (20%) cost (£M)	Plus Optimism bias 60% cost (£M)		FOOTPRINT IMPACT (Ha)			
RESPONSE OPTIONS																SPA/SSSI	SAC	None
Short Term Option 1 and Medium to Long Term Option 1. Breach of 100m length in the existing embankment, a new embankment along the north side of the C527 of up to 1.5m to provide continued or improve flood protection to the road and local properties, rock armour protection to the C527 and railway bridges to address erosion risk, and raising of the assets downstream of the C527 bridge (up to 0.5m). Rising ground levels at the landward extent would naturally constrain the extent of inundation. 20%AEP SoP.	Earth Embankment	1131801070204L01	Length (km)	0.78	GIS/NFCDD	1166	Maintain	Short to long term	15	0.013641798	0.021315309	0.02557837	0.040925393		0	0	0	
	No EWL impact		Length (m)	780	GIS/NFCDD	0	Sustain	Short	1	0	0	0	0		0	0	0	
	Wall	1131801070202L05	Length (km)	0.04	GIS/NFCDD	5830	Maintain	Short to long term	15	0.003497897	0.005465464	0.006558557	0.01049369		0	0	0	
	No EWL impact		Length (m)	40	GIS/NFCDD	0	Sustain	Short	1	0	0	0	0		0	0	0	
	Timber Pile Wall With Concrete Cap	1131801070202L06	Length (km)	0.02	GIS/NFCDD	5830	Maintain	Short to long term	15	0.001748948	0.002732732	0.003279278	0.005246845		0	0	0	
	No EWL impact		Length (m)	20	GIS/NFCDD	0	Sustain	Short	1	0	0	0	0		0	0	0	
	Ramp block wall.	1131801070202L03	Length (km)	0.02	GIS/NFCDD	5830	Maintain	Short to long term	15	0.001748948	0.002732732	0.003279278	0.005246845		0	0	0	
	No EWL impact		Length (m)	20	GIS/NFCDD	0	Sustain	Short	1	0	0	0	0		0	0	0	
	Earth Embankment	1131801070202L02	Length (km)	0.05	GIS/NFCDD	1166	Maintain	Short to long term	15	0.000874474	0.001366366	0.001639639	0.002623423		0	0	0	
	No EWL impact		Length (m)	50	GIS/NFCDD	0	Sustain	Short	1	0	0	0	0		0	0	0	
	Earth Embankment	1131801070202L01	Length (km)	0.09	GIS/NFCDD	1166	Maintain	Short to long term	15	0.001574054	0.002459459	0.00295135	0.004722161		0	0	0	
	No EWL impact		Length (m)	90	GIS/NFCDD	0	Sustain	Short	1	0	0	0	0		0	0	0	
	Earth Embankment	Dummy1	Length (km)	0.29	GIS/NFCDD	0	NAI	Short to long term	15	0	0	0	0		0	0	0	
	100m long breach in existing embankment u/s of Topsham, Bridge		Length (m)	100		324	Maintain	Short	1	0.03236014	0.050562719	0.060675262	0.09708042		0	0	0	
	Rock armour toe protection to abutment		Length (m)	25		2938	Maintain	Short	1	0.073455833	0.114774739	0.137729687	0.220367499	0.0125	0	0		
	Maintenance of rock armour toe protection to abutment		Length (km)	0.025		5830	Maintain	Short to long term	15	0.002186186	0.003415915	0.004099098	0.006558557		0	0	0	
	Rock armour toe protection to Clyst Bridge abutment		Length (m)	25		2938	Maintain	Short	1	0.073455833	0.114774739	0.137729687	0.220367499		0	0	0.0125	
	Maintenance of rock armour toe protection to Clyst Bridge abutment		Length (km)	0.025		5830	Maintain	Short to long term	15	0.002186186	0.003415915	0.004099098	0.006558557		0	0	0	
	ST Realigned embankment maintenance		Length (km)	0.53	GIS/NFCDD	5830	Manage	Short to long term	15	0.046347133	0.057933916	0.069520699	0.111233118		0	0	0	
	ST Realigned embankment construction 0.5m height		Length (m)	530	GIS/NFCDD	646	Manage	Short	1	0.342347199	0.427933999	0.513520798	0.821633277		0	0	0.5035	
ST land compensation		Area (Ha)	34.25	GIS/NFCDD	15000	Manage	Short	1	0.51375	0.51375	0.51375	0.51375		0	0	0		
												2.066807282	TOTAL					
												Cost (£K/Ha) for MR	58.32259636					





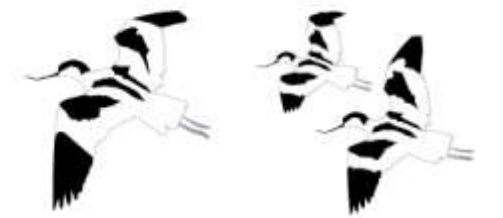
FCRMU approach	Asset Type	Asset reference	Parameter	Amount	Reference	Rate (£/parameter)	HLO	Epoch	Epochal discount factor	Basic construction cost (£M)	Plus Tidal/urban uplift (25% each) cost (£M)	Plus PAR, design and supervision (20%) cost (£M)	Plus Optimism bias 60% cost (£M)			FOOTPRINT IMPACT (Ha)		
RESPONSE OPTIONS																SPA/SSSI	SAC	None

Short Term Option 1 and Medium to Long Term Option 1. Breach of 100m length in the existing embankment, a new embankment along the north side of the C527 of up to 1.5m to provide continued or improve flood protection to the road and local properties, rock armour protection to the C527 and railway bridges to address erosion risk, and raising of the assets downstream of the C527 bridge (up to 0.5m). Rising ground levels at the landward extent would naturally constrain the extent of inundation. 10%AEP SoP.	Earth Embankment	1131801070204L01	Length (km)	0.78	GIS/NFCDD	1166	Maintain	Short to long term	15	0.013641798	0.021315309	0.02557837	0.040925393			0	0	0
	No EWL impact		Length (m)	780	GIS/NFCDD	0	Sustain	Short	1	0	0	0	0			0	0	0
	Wall	1131801070202L05	Length (km)	0.04	GIS/NFCDD	5830	Maintain	Short to long term	15	0.003497897	0.005465464	0.006558557	0.01049369			0	0	0
	No EWL impact		Length (m)	40	GIS/NFCDD	0	Sustain	Short	1	0	0	0	0			0	0	0
	Timber Pile Wall With Concrete Cap	1131801070202L06	Length (km)	0.02	GIS/NFCDD	5830	Maintain	Short to long term	15	0.001748948	0.002732732	0.003279278	0.005246845			0	0	0
	No EWL impact		Length (m)	20	GIS/NFCDD	0	Sustain	Short	1	0	0	0	0			0	0	0
	Ramp block wall.	1131801070202L03	Length (km)	0.02	GIS/NFCDD	5830	Maintain	Short to long term	15	0.001748948	0.002732732	0.003279278	0.005246845			0	0	0
	No EWL impact		Length (m)	20	GIS/NFCDD	0	Sustain	Short	1	0	0	0	0			0	0	0
	Earth Embankment	1131801070202L02	Length (km)	0.05	GIS/NFCDD	1166	Maintain	Short to long term	15	0.000874474	0.001366366	0.001639639	0.002623423			0	0	0
	No EWL impact		Length (m)	50	GIS/NFCDD	0	Sustain	Short	1	0	0	0	0			0	0	0
	Earth Embankment	1131801070202L01	Length (km)	0.09	GIS/NFCDD	1166	Maintain	Short to long term	15	0.001574054	0.002459459	0.00295135	0.004722161			0	0	0
	No EWL impact		Length (m)	90	GIS/NFCDD	0	Sustain	Short	1	0	0	0	0			0	0	0
	Earth Embankment	Dummy1	Length (km)	0.29	GIS/NFCDD	0	NAI	Short to long term	15	0	0	0	0			0	0	0
	100m long breach in existing embankment u/s of Topsham, Bridge		Length (m)	100		324	Maintain	Short	1	0.03236014	0.050562719	0.060675262	0.09708042			0	0	0
	Rock armour toe protection to abutment		Length (m)	25		2938	Maintain	Short	1	0.073455833	0.114774739	0.137729687	0.220367499			0.0125	0	0
	Maintenance of rock armour toe protection to abutment		Length (km)	0.025		5830	Maintain	Short to long term	15	0.002186186	0.003415915	0.004099098	0.006558557			0	0	0
	Rock armour toe protection to Clyst Bridge abutment		Length (m)	25		2938	Maintain	Short	1	0.073455833	0.114774739	0.137729687	0.220367499			0	0	0.0125
	Maintenance of rock armour toe protection to Clyst Bridge abutment		Length (km)	0.025		5830	Maintain	Short to long term	15	0.002186186	0.003415915	0.004099098	0.006558557			0	0	0
	ST Realigned embankment maintenance		Length (km)	0.53	GIS/NFCDD	5830	Manage	Short to long term	15	0.046347133	0.057933916	0.069520699	0.111233118			0	0	0
	ST Realigned embankment construction 0.5m height		Length (m)	530	GIS/NFCDD	646	Manage	Short	1	0.342347199	0.427933999	0.513520798	0.821633277			0	0	0.5035
	ST land compensation		Area (Ha)	34.25	GIS/NFCDD	15000	Manage	Short	1	0.51375	0.51375	0.51375	0.51375			0	0	0
													2.066807282	TOTAL				
												Cost (£K/ha) for MR	58.32259636					



FCRMU approach	Asset Type	Asset reference	Parameter	Amount	Reference	Rate (£/parameter)	HLO	Epoch	Epochal discount factor	Basic construction cost (£M)	Plus Tidal/urban uplift (25% each) cost (£M)	Plus PAR, design and supervision (20%) cost (£M)	Plus Optimism bias 60% cost (£M)			FOOTPRINT IMPACT (Ha)		
RESPONSE OPTIONS																SPA/SSSI	SAC	None

Short Term Option 1 and Medium to Long Term Option 1. Breach of 100m length in the existing embankment, a new embankment along the north side of the C527 of up to 1.5m to provide continued or improve flood protection to the road and local properties, rock armour protection to the C527 and railway bridges to address erosion risk, and raising of the assets downstream of the C527 bridge (up to 0.5m). Rising ground levels at the landward extent would naturally constrain the extent of inundation. 4%AEP SoP.	Earth Embankment	1131801070204L01	Length (km)	0.78	GIS/NFCDD	1166	Maintain	Short to long term	15	0.013641798	0.021315309	0.02557837	0.040925393			0	0	0
	No EWL impact		Length (m)	780	GIS/NFCDD	0	Sustain	Short	1	0	0	0	0			0	0	0
	Wall	1131801070202L05	Length (km)	0.04	GIS/NFCDD	5830	Maintain	Short to long term	15	0.003497897	0.005465464	0.006558557	0.01049369			0	0	0
	No EWL impact		Length (m)	40	GIS/NFCDD	0	Sustain	Short	1	0	0	0	0			0	0	0
	Timber Pile Wall With Concrete Cap	1131801070202L06	Length (km)	0.02	GIS/NFCDD	5830	Maintain	Short to long term	15	0.001748948	0.002732732	0.003279278	0.005246845			0	0	0
	No EWL impact		Length (m)	20	GIS/NFCDD	0	Sustain	Short	1	0	0	0	0			0	0	0
	Ramp block wall.	1131801070202L03	Length (km)	0.02	GIS/NFCDD	5830	Maintain	Short to long term	15	0.001748948	0.002732732	0.003279278	0.005246845			0	0	0
	No EWL impact		Length (m)	20	GIS/NFCDD	0	Sustain	Short	1	0	0	0	0			0	0	0
	Earth Embankment	1131801070202L02	Length (km)	0.05	GIS/NFCDD	1166	Maintain	Short to long term	15	0.000874474	0.001366366	0.001639639	0.002623423			0	0	0
	No EWL impact		Length (m)	50	GIS/NFCDD	0	Sustain	Short	1	0	0	0	0			0	0	0
	Earth Embankment	1131801070202L01	Length (km)	0.09	GIS/NFCDD	1166	Maintain	Short to long term	15	0.001574054	0.002459459	0.00295135	0.004722161			0	0	0
	No EWL impact		Length (m)	90	GIS/NFCDD	0	Sustain	Short	1	0	0	0	0			0	0	0
	Earth Embankment	Dummy1	Length (km)	0.29	GIS/NFCDD	0	NAI	Short to long term	15	0	0	0	0			0	0	0
	100m long breach in existing embankment u/s of Topsham, Bridge		Length (m)	100		324	Maintain	Short	1	0.03236014	0.050562719	0.060675262	0.09708042			0	0	0
	Rock armour toe protection to abutment		Length (m)	50		2938	Maintain	Short	1	0.146911666	0.229549478	0.275459373	0.440734997			0.025	0	0
	Maintenance of rock armour toe protection to abutment		Length (km)	0.05		5830	Maintain	Short to long term	15	0.004372371	0.00683183	0.008198196	0.013117113			0	0	0
	Rock armour toe protection to Clyst Bridge abutment		Length (m)	50		2938	Maintain	Short	1	0.146911666	0.229549478	0.275459373	0.440734997			0	0	0.025
	Maintenance of rock armour toe protection to Clyst Bridge abutment		Length (km)	0.05		5830	Maintain	Short to long term	15	0.004372371	0.00683183	0.008198196	0.013117113			0	0	0
	ST Realigned embankment maintenance		Length (km)	0.53	GIS/NFCDD	5830	Manage	Short to long term	15	0.046347133	0.057933916	0.069520699	0.111233118			0	0	0
	ST Realigned embankment construction 0.75m height		Length (m)	530	GIS/NFCDD	969	Manage	Short	1	0.513520798	0.641900998	0.770281197	1.232449916			0	0	0.5035
	ST land compensation		Area (Ha)	34.25	GIS/NFCDD	15000	Manage	Short	1	0.51375	0.51375	0.51375	0.51375			0	0	0
													2.931476031	TOTAL				
												Cost (£K/ha) for MR	83.56839924					



FCRMU approach	Asset Type	Asset reference	Parameter	Amount	Reference	Rate (£/parameter)	HLO	Epoch	Epochal discount factor	Basic construction cost (£M)	Plus Tidal/urban uplift (25% each) cost (£M)	Plus PAR, design and supervision (20%) cost (£M)	Plus Optimism bias 60% cost (£M)			FOOTPRINT IMPACT (Ha)		
RESPONSE OPTIONS																SPA/SSSI	SAC	None

Short Term Option 1 and Medium to Long Term Option 1. Breach of 100m length in the existing embankment, a new embankment along the north side of the C527 of up to 1.5m to provide continued or improve flood protection to the road and local properties, rock armour protection to the C527 and railway bridges to address erosion risk, and raising of the assets downstream of the C527 bridge (up to 0.5m). Rising ground levels at the landward extent would naturally constrain the extent of inundation. 2%AEP SoP.	Earth Embankment	1131801070204L01	Length (km)	0.78	GIS/NFCDD	1166	Maintain	Short to long term	15	0.013641798	0.021315309	0.02557837	0.040925393			0	0	0
	No EWL impact		Length (m)	780	GIS/NFCDD	0	Sustain	Short	1	0	0	0	0			0	0	0
	Wall	1131801070202L05	Length (km)	0.04	GIS/NFCDD	5830	Maintain	Short to long term	15	0.003497897	0.005465464	0.006558557	0.01049369			0	0	0
	No EWL impact		Length (m)	40	GIS/NFCDD	0	Sustain	Short	1	0	0	0	0			0	0	0
	Timber Pile Wall With Concrete Cap	1131801070202L06	Length (km)	0.02	GIS/NFCDD	5830	Maintain	Short to long term	15	0.001748948	0.002732732	0.003279278	0.005246845			0	0	0
	No EWL impact		Length (m)	20	GIS/NFCDD	0	Sustain	Short	1	0	0	0	0			0	0	0
	Ramp block wall.	1131801070202L03	Length (km)	0.02	GIS/NFCDD	5830	Maintain	Short to long term	15	0.001748948	0.002732732	0.003279278	0.005246845			0	0	0
	No EWL impact		Length (m)	20	GIS/NFCDD	0	Sustain	Short	1	0	0	0	0			0	0	0
	Earth Embankment	1131801070202L02	Length (km)	0.05	GIS/NFCDD	1166	Maintain	Short to long term	15	0.000874474	0.001366366	0.001639639	0.002623423			0	0	0
	No EWL impact		Length (m)	50	GIS/NFCDD	0	Sustain	Short	1	0	0	0	0			0	0	0
	Earth Embankment	1131801070202L01	Length (km)	0.09	GIS/NFCDD	1166	Maintain	Short to long term	15	0.001574054	0.002459459	0.00295135	0.004722161			0	0	0
	No EWL impact		Length (m)	90	GIS/NFCDD	0	Sustain	Short	1	0	0	0	0			0	0	0
	Earth Embankment	Dummy1	Length (km)	0.29	GIS/NFCDD	0	NAI	Short to long term	15	0	0	0	0			0	0	0
	100m long breach in existing embankment u/s of Topsham, Bridge		Length (m)	100		324	Maintain	Short	1	0.03236014	0.050562719	0.060675262	0.09708042			0	0	0
	Rock armour toe protection to abutment		Length (m)	50		2938	Maintain	Short	1	0.146911666	0.229549478	0.275459373	0.440734997			0.025	0	0
	Maintenance of rock armour toe protection to abutment		Length (km)	0.05		5830	Maintain	Short to long term	15	0.004372371	0.00683183	0.008198196	0.013117113			0	0	0
	Rock armour toe protection to Clyst Bridge abutment		Length (m)	50		2938	Maintain	Short	1	0.146911666	0.229549478	0.275459373	0.440734997			0	0	0.025
	Maintenance of rock armour toe protection to Clyst Bridge abutment		Length (km)	0.05		5830	Maintain	Short to long term	15	0.004372371	0.00683183	0.008198196	0.013117113			0	0	0
	ST Realigned embankment maintenance		Length (km)	0.53	GIS/NFCDD	5830	Manage	Short to long term	15	0.046347133	0.057933916	0.069520699	0.111233118			0	0	0
	ST Realigned embankment construction 0.75m height		Length (m)	530	GIS/NFCDD	969	Manage	Short	1	0.513520798	0.641900998	0.770281197	1.232449916			0	0	0.5035
	ST land compensation		Area (Ha)	34.25	GIS/NFCDD	15000	Manage	Short	1	0.51375	0.51375	0.51375	0.51375			0	0	0
													2.931476031	TOTAL				
												Cost (£K/ha) for MR	83.56839924					



FCRMU approach	Asset Type	Asset reference	Parameter	Amount	Reference	Rate (£/parameter)	HLO	Epoch	Epochal discount factor	Basic construction cost (£M)	Plus Tidal/urban uplift (25% each) cost (£M)	Plus PAR, design and supervision (20%) cost (£M)	Plus Optimism bias 60% cost (£M)		FOOTPRINT IMPACT (Ha)			
RESPONSE OPTIONS																SPA/SSSI	SAC	None

Short Term Option 1 and Medium to Long Term Option 1. Breach of 100m length in the existing embankment, a new embankment along the north side of the C527 of up to 1.5m to provide continued or improve flood protection to the road and local properties, rock armour protection to the C527 and railway bridges to address erosion risk, and raising of the assets downstream of the C527 bridge (up to 0.5m). Rising ground levels at the landward extent would naturally constrain the extent of inundation. 1%AEP SoP.	Earth Embankment	1131801070204L01	Length (km)	0.78	GIS/NFCDD	1166	Maintain	Short to long term	15	0.013641798	0.021315309	0.02557837	0.040925393			0	0	0
	EWL impact 0.25m addition		Length (m)	780	GIS/NFCDD	164	Sustain	Short	1	0.128232897	0.160291121	0.192349345	0.307758952			0.0585	0	0
	Wall	1131801070202L05	Length (km)	0.04	GIS/NFCDD	5830	Maintain	Short to long term	15	0.003497897	0.005465464	0.006558557	0.01049369			0	0	0
	EWL impact 0.25m addition		Length (m)	40	GIS/NFCDD	164	Sustain	Short	1	0.006576046	0.008220057	0.009864069	0.01578251			0.003	0	0
	Timber Pile Wall With Concrete Cap	1131801070202L06	Length (km)	0.02	GIS/NFCDD	5830	Maintain	Short to long term	15	0.001748948	0.002732732	0.003279278	0.005246845			0	0	0
	EWL impact 0.25m addition		Length (m)	20	GIS/NFCDD	164	Sustain	Short	1	0.003288023	0.004110029	0.004932034	0.007891255			0.0015	0	0
	Ramp block wall.	1131801070202L03	Length (km)	0.02	GIS/NFCDD	5830	Maintain	Short to long term	15	0.001748948	0.002732732	0.003279278	0.005246845			0	0	0
	EWL impact 0.25m addition		Length (m)	20	GIS/NFCDD	164	Sustain	Short	1	0.003288023	0.004110029	0.004932034	0.007891255			0.0015	0	0
	Earth Embankment	1131801070202L02	Length (km)	0.05	GIS/NFCDD	1166	Maintain	Short to long term	15	0.000874474	0.001366366	0.001639639	0.002623423			0	0	0
	EWL impact 0.25m addition		Length (m)	50	GIS/NFCDD	164	Sustain	Short	1	0.008220057	0.010275072	0.012330086	0.019728138			0.00375	0	0
	Earth Embankment	1131801070202L01	Length (km)	0.09	GIS/NFCDD	1166	Maintain	Short to long term	15	0.001574054	0.002459459	0.00295135	0.004722161			0	0	0
	EWL impact 0.25m addition		Length (m)	90	GIS/NFCDD	164	Sustain	Short	1	0.014796103	0.018495129	0.022194155	0.035510648			0.00675	0	0
	Earth Embankment	Dummy1	Length (km)	0.29	GIS/NFCDD	0	NAI	Short to long term	15	0	0	0	0			0	0	0
	100m long breach in existing embankment u/s of Topsham, Bridge		Length (m)	100		324	Maintain	Short	1	0.03236014	0.050562719	0.060675262	0.09708042			0	0	0
	Rock armour toe protection to abutment		Length (m)	50		2938	Maintain	Short	1	0.146911666	0.229549478	0.275459373	0.440734997			0.025	0	0
	Maintenance of rock armour toe protection to abutment		Length (km)	0.05		5830	Maintain	Short to long term	15	0.004372371	0.00683183	0.008198196	0.013117113			0	0	0
	Rock armour toe protection to Clyst Bridge abutment		Length (m)	50		2938	Maintain	Short	1	0.146911666	0.229549478	0.275459373	0.440734997			0	0	0.025
	Maintenance of rock armour toe protection to Clyst Bridge abutment		Length (km)	0.05		5830	Maintain	Short to long term	15	0.004372371	0.00683183	0.008198196	0.013117113			0	0	0
	ST Realigned embankment maintenance		Length (km)	0.53	GIS/NFCDD	5830	Manage	Short to long term	15	0.046347133	0.057933916	0.069520699	0.111233118			0	0	0
	ST Realigned embankment construction 1m height		Length (m)	530	GIS/NFCDD	1292	Manage	Short	1	0.684694398	0.855867997	1.027041597	1.643266555			0	0	0.5353
	ST land compensation		Area (Ha)	34.25	GIS/NFCDD	15000	Manage	Short	1	0.51375	0.51375	0.51375	0.51375			0	0	0
														3.736855429	TOTAL			
												Cost (£K/ha) for MR	95.56304563					



FCRMU approach	Asset Type	Asset reference	Parameter	Amount	Reference	Rate (£/parameter)	HLO	Epoch	Epochal discount factor	Basic construction cost (£M)	Plus Tidal/urban uplift (25% each) cost (£M)	Plus PAR, design and supervision (20%) cost (£M)	Plus Optimism bias 60% cost (£M)		FOOTPRINT IMPACT (Ha)			
RESPONSE OPTIONS																SPA/SSSI	SAC	None
Short Term Option 1 and Medium to Long Term Option 1. Breach of 100m length in the existing embankment, a new embankment along the north side of the C527 of up to 1.5m to provide continued or improve flood protection to the road and local properties, rock armour protection to the C527 and railway bridges to address erosion risk, and raising of the assets downstream of the C527 bridge (up to 0.5m). Rising ground levels at the landward extent would naturally constrain the extent of inundation. 0.5%AEP SoP.	Earth Embankment	1131801070204L01	Length (km)	0.78	GIS/NFCDD	1166	Maintain	Short to long term	15	0.013641798	0.021315309	0.02557837	0.040925393		0	0	0	
	EWL impact 0.5m addition		Length (m)	780	GIS/NFCDD	329	Sustain	Short	1	0.256465794	0.320582242	0.38469869	0.615517905		0.117	0	0	
	Wall	1131801070202L05	Length (km)	0.04	GIS/NFCDD	5830	Maintain	Short to long term	15	0.003497897	0.005465464	0.006558557	0.01049369		0	0	0	
	EWL impact 0.5m addition		Length (m)	40	GIS/NFCDD	329	Sustain	Short	1	0.013152092	0.016440115	0.019728138	0.031565021		0.006	0	0	
	Timber Pile Wall With Concrete Cap	1131801070202L06	Length (km)	0.02	GIS/NFCDD	5830	Maintain	Short to long term	15	0.001748948	0.002732732	0.003279278	0.005246845		0	0	0	
	EWL impact 0.5m addition		Length (m)	20	GIS/NFCDD	329	Sustain	Short	1	0.006576046	0.008220057	0.009864069	0.01578251		0.003	0	0	
	Ramp block wall.	1131801070202L03	Length (km)	0.02	GIS/NFCDD	5830	Maintain	Short to long term	15	0.001748948	0.002732732	0.003279278	0.005246845		0	0	0	
	EWL impact 0.5m addition		Length (m)	20	GIS/NFCDD	329	Sustain	Short	1	0.006576046	0.008220057	0.009864069	0.01578251		0.003	0	0	
	Earth Embankment	1131801070202L02	Length (km)	0.05	GIS/NFCDD	1166	Maintain	Short to long term	15	0.000874474	0.001366366	0.001639639	0.002623423		0	0	0	
	EWL impact 0.5m addition		Length (m)	50	GIS/NFCDD	329	Sustain	Short	1	0.016440115	0.020550144	0.024660172	0.039456276		0.0075	0	0	
	Earth Embankment	1131801070202L01	Length (km)	0.09	GIS/NFCDD	1166	Maintain	Short to long term	15	0.001574054	0.002459459	0.00295135	0.004722161		0	0	0	
	EWL impact 0.5m addition		Length (m)	90	GIS/NFCDD	329	Sustain	Short	1	0.029592207	0.036990259	0.04438831	0.071021297		0.0135	0	0	
	Earth Embankment	Dummy1	Length (km)	0.29	GIS/NFCDD	0	NAI	Short to long term	15	0	0	0	0		0	0	0	
	100m long breach in existing embankment u/s of Topsham, Bridge		Length (m)	100		324	Maintain	Short	1	0.03236014	0.050562719	0.060675262	0.09708042		0	0	0	
	Rock armour toe protection to abutment		Length (m)	50		2938	Maintain	Short	1	0.146911666	0.229549478	0.275459373	0.440734997		0.025	0	0	
	Maintenance of rock armour toe protection to abutment		Length (km)	0.05		5830	Maintain	Short to long term	15	0.004372371	0.00683183	0.008198196	0.013117113		0	0	0	
	Rock armour toe protection to Clyst Bridge abutment		Length (m)	50		2938	Maintain	Short	1	0.146911666	0.229549478	0.275459373	0.440734997		0	0	0.025	
	Maintenance of rock armour toe protection to Clyst Bridge abutment		Length (km)	0.05		5830	Maintain	Short to long term	15	0.004372371	0.00683183	0.008198196	0.013117113		0	0	0	
	ST Realigned embankment maintenance		Length (km)	0.53	GIS/NFCDD	5830	Manage	Short to long term	15	0.046347133	0.057933916	0.069520699	0.111233118		0	0	0	
	ST Realigned embankment construction 1m height		Length (m)	530	GIS/NFCDD	1292	Manage	Short	1	0.684694398	0.855867997	1.027041597	1.643266555		0	0	0.583	
	ST land compensation		Area (Ha)	34.25	GIS/NFCDD	15000	Manage	Short	1	0.51375	0.51375	0.51375	0.51375		0	0	0	
												4.131418188	TOTAL					
												Cost (£K/ha) for MR	95.56304563					



FCRMU approach	Asset Type	Asset reference	Parameter	Amount	Reference	Rate (£/parameter)	HLO	Epoch	Epochal discount factor	Basic construction cost (£M)	Plus Tidal/urban uplift (25% each) cost (£M)	Plus PAR, design and supervision (20%) cost (£M)	Plus Optimism bias 60% cost (£M)			FOOTPRINT IMPACT (Ha)		
RESPONSE OPTIONS																SPA/SSSI	SAC	None

Short Term Option 1 and Medium to Long Term Option 1. Breach of 100m length in the existing embankment, a new embankment along the north side of the C527 of up to 1.5m to provide continued or improve flood protection to the road and local properties, rock armour protection to the C527 and railway bridges to address erosion risk, and raising of the assets downstream of the C527 bridge (up to 0.5m). Rising ground levels at the landward extent would naturally constrain the extent of inundation. 0.1%AEP SoP.	Earth Embankment	1131801070204L01	Length (km)	0.78	GIS/NFCDD	1166	Maintain	Short to long term	15	0.013641798	0.021315309	0.02557837	0.040925393			0	0	0
	EWL impact 0.5m addition		Length (m)	780	GIS/NFCDD	329	Sustain	Short	1	0.256465794	0.320582242	0.38469869	0.615517905			0.117	0	0
	Wall	1131801070202L05	Length (km)	0.04	GIS/NFCDD	5830	Maintain	Short to long term	15	0.003497897	0.005465464	0.006558557	0.01049369			0	0	0
	EWL impact 0.5m addition		Length (m)	40	GIS/NFCDD	329	Sustain	Short	1	0.013152092	0.016440115	0.019728138	0.031565021			0.006	0	0
	Timber Pile Wall With Concrete Cap	1131801070202L06	Length (km)	0.02	GIS/NFCDD	5830	Maintain	Short to long term	15	0.001748948	0.002732732	0.003279278	0.005246845			0	0	0
	EWL impact 0.5m addition		Length (m)	20	GIS/NFCDD	329	Sustain	Short	1	0.006576046	0.008220057	0.009864069	0.01578251			0.003	0	0
	Ramp block wall.	1131801070202L03	Length (km)	0.02	GIS/NFCDD	5830	Maintain	Short to long term	15	0.001748948	0.002732732	0.003279278	0.005246845			0	0	0
	EWL impact 0.5m addition		Length (m)	20	GIS/NFCDD	329	Sustain	Short	1	0.006576046	0.008220057	0.009864069	0.01578251			0.003	0	0
	Earth Embankment	1131801070202L02	Length (km)	0.05	GIS/NFCDD	1166	Maintain	Short to long term	15	0.000874474	0.001366366	0.001639639	0.002623423			0	0	0
	EWL impact 0.5m addition		Length (m)	50	GIS/NFCDD	329	Sustain	Short	1	0.016440115	0.020550144	0.024660172	0.039456276			0.0075	0	0
	Earth Embankment	1131801070202L01	Length (km)	0.09	GIS/NFCDD	1166	Maintain	Short to long term	15	0.001574054	0.002459459	0.00295135	0.004722161			0	0	0
	EWL impact 0.5m addition		Length (m)	90	GIS/NFCDD	329	Sustain	Short	1	0.029592207	0.036990259	0.04438831	0.071021297			0.0135	0	0
	Earth Embankment	Dummy1	Length (km)	0.29	GIS/NFCDD	0	NAI	Short to long term	15	0	0	0	0			0	0	0
	100m long breach in existing embankment u/s of Topsham, Bridge		Length (m)	100		324	Maintain	Short	1	0.03236014	0.050562719	0.060675262	0.09708042			0	0	0
	Rock armour toe protection to abutment		Length (m)	50		2938	Maintain	Short	1	0.146911666	0.229549478	0.275459373	0.440734997			0.025	0	0
	Maintenance of rock armour toe protection to abutment		Length (km)	0.05		5830	Maintain	Short to long term	15	0.004372371	0.00683183	0.008198196	0.013117113			0	0	0
	Rock armour toe protection to Clyst Bridge abutment		Length (m)	50		2938	Maintain	Short	1	0.146911666	0.229549478	0.275459373	0.440734997			0	0	0.025
	Maintenance of rock armour toe protection to Clyst Bridge abutment		Length (km)	0.05		5830	Maintain	Short to long term	15	0.004372371	0.00683183	0.008198196	0.013117113			0	0	0
	ST Realigned embankment maintenance		Length (km)	0.53	GIS/NFCDD	5830	Manage	Short to long term	15	0.046347133	0.057933916	0.069520699	0.111233118			0	0	0
	ST Realigned embankment construction 1.25m height		Length (m)	530	GIS/NFCDD	1590	Manage	Short	1	0.84258544	1.0532318	1.26387816	2.022205056			0	0	0.6625
	ST land compensation		Area (Ha)	34.25	GIS/NFCDD	15000	Manage	Short	1	0.51375	0.51375	0.51375	0.51375			0	0	0
													4.51035669	TOTAL				
												Cost (£K/ha) for MR	106.6269435					



FCRMU approach	Asset Type	Asset reference	Parameter	Amount	Reference	Rate (£/parameter)	HLO	Epoch	Epochal discount factor	Basic construction cost (£M)	Plus Tidal/urban uplift (25% each) cost (£M)	Plus PAR, design and supervision (20%) cost (£M)	Plus Optimism bias 60% cost (£M)		FOOTPRINT IMPACT (Ha)			
RESPONSE OPTIONS																SPA/SSSI	SAC	None

Short Term Option 2 and Medium to Long Term Option 2. Breach of 100m length in the existing embankments, and raising of the C527 road with culverts. Rising ground levels at the landward extent would naturally constrain the extent of inundation. 20%AEP.	Earth Embankment	1131801070204L01	Length (km)	0.78	GIS/NFCDD	1166	Maintain	Short to long term	15	0.013641798	0.021315309	0.02557837	0.040925393			0	0	0
	Wall	1131801070202L05	Length (km)	0.04	GIS/NFCDD	5830	Maintain	Short to long term	15	0.003497897	0.005465464	0.006558557	0.01049369			0	0	0
	Timber Pile Wall With Concrete Cap	1131801070202L06	Length (km)	0.02	GIS/NFCDD	5830	Maintain	Short to long term	15	0.001748948	0.002732732	0.003279278	0.005246845			0	0	0
	Ramp block wall.	1131801070202L03	Length (km)	0.02	GIS/NFCDD	5830	Maintain	Short to long term	15	0.001748948	0.002732732	0.003279278	0.005246845			0	0	0
	Earth Embankment	1131801070202L02	Length (km)	0.05	GIS/NFCDD	1166	Maintain	Short to long term	15	0.000874474	0.001366366	0.001639639	0.002623423			0	0	0
	Earth Embankment	1131801070202L01	Length (km)	0.09	GIS/NFCDD	1166	Maintain	Short to long term	15	0.001574054	0.002459459	0.00295135	0.004722161			0	0	0
	Earth Embankment	Dummy1	Length (km)	0.29	GIS/NFCDD	0	NAI	Short to long term	15	0	0	0	0			0	0	0
	100m long breach in existing embankment u/s of Topsham, Bridge		Length (m)	100		324	Maintain	Short	1	0.03236014	0.050562719	0.060675262	0.09708042			0	0	0
	100m long breach in existing embankment d/s of Topsham, Bridge		Length (m)	100		324	Maintain	Short	1	0.03236014	0.050562719	0.060675262	0.09708042			0	0	0
	ST Realigned revetment maintenance		Length (km)	0.53	GIS/NFCDD	5830	Manage	Short to long term	15	0.046347133	0.057933916	0.069520699	0.111233118			0	0	0
	ST Realigned revetment construction 0.5m height with c10m crest width		Length (m)	530	GIS/NFCDD	2901	Manage	Short	1	1.53779243	1.922240537	2.306688644	3.690701831			0.2385	0	0.7685
	ST Realigned 5 culvert (assumed) construction		Number	5	GIS/NFCDD	26967	Manage	Short	1	0.134833916	0.168542395	0.202250874	0.323601399			0	0	0
	ST land compensation		Area (Ha)	38.091	GIS/NFCDD	15000	Manage	Short	1	0.571365	0.571365	0.571365	0.571365			0	0	0
													4.960320544	TOTAL				
												Cost (£K/Ha) for MR	128.4046674					



FCRMU approach	Asset Type	Asset reference	Parameter	Amount	Reference	Rate (£/parameter)	HLO	Epoch	Epochal discount factor	Basic construction cost (£M)	Plus Tidal/urban uplift (25% each) cost (£M)	Plus PAR, design and supervision (20%) cost (£M)	Plus Optimism bias 60% cost (£M)			FOOTPRINT IMPACT (Ha)		
RESPONSE OPTIONS																SPA/SSSI	SAC	None

Short Term Option 2 and Medium to Long Term Option 2. Breach of 100m length in the existing embankments, and raising of the C527 road with culverts. Rising ground levels at the landward extent would naturally constrain the extent of inundation. 10%AEP.	Earth Embankment	1131801070204L01	Length (km)	0.78	GIS/NFCDD	1166	Maintain	Short to long term	15	0.013641798	0.021315309	0.02557837	0.040925393		0	0	0
	Wall	1131801070202L05	Length (km)	0.04	GIS/NFCDD	5830	Maintain	Short to long term	15	0.003497897	0.005465464	0.006558557	0.01049369		0	0	0
	Timber Pile Wall With Concrete Cap	1131801070202L06	Length (km)	0.02	GIS/NFCDD	5830	Maintain	Short to long term	15	0.001748948	0.002732732	0.003279278	0.005246845		0	0	0
	Ramp block wall.	1131801070202L03	Length (km)	0.02	GIS/NFCDD	5830	Maintain	Short to long term	15	0.001748948	0.002732732	0.003279278	0.005246845		0	0	0
	Earth Embankment	1131801070202L02	Length (km)	0.05	GIS/NFCDD	1166	Maintain	Short to long term	15	0.000874474	0.001366366	0.001639639	0.002623423		0	0	0
	Earth Embankment	1131801070202L01	Length (km)	0.09	GIS/NFCDD	1166	Maintain	Short to long term	15	0.001574054	0.002459459	0.00295135	0.004722161		0	0	0
	Earth Embankment	Dummy1	Length (km)	0.29	GIS/NFCDD	0	NAI	Short to long term	15	0	0	0	0		0	0	0
	100m long breach in existing embankment u/s of Topsham, Bridge		Length (m)	100		324	Maintain	Short	1	0.03236014	0.050562719	0.060675262	0.09708042		0	0	0
	100m long breach in existing embankment d/s of Topsham, Bridge		Length (m)	100		324	Maintain	Short	1	0.03236014	0.050562719	0.060675262	0.09708042		0	0	0
	ST Realigned revetment maintenance		Length (km)	0.53	GIS/NFCDD	5830	Manage	Short to long term	15	0.046347133	0.057933916	0.069520699	0.111233118		0	0	0
	ST Realigned revetment construction 0.75m height with c10m crest width		Length (m)	530	GIS/NFCDD	3462	Manage	Short	1	1.83472487	2.293406087	2.752087305	4.403339687		0.2385	0	0.7685
	ST Realigned 5 culvert (assumed) construction		Number	5	GIS/NFCDD	26967	Manage	Short	1	0.134833916	0.168542395	0.202250874	0.323601399		0	0	0
	ST land compensation		Area (Ha)	38.091	GIS/NFCDD	15000	Manage	Short	1	0.571365	0.571365	0.571365	0.571365		0	0	0
													5.6729584	TOTAL			
												Cost (£K/Ha) for MR	147.1134925				



FCRMU approach	Asset Type	Asset reference	Parameter	Amount	Reference	Rate (£/parameter)	HLO	Epoch	Epochal discount factor	Basic construction cost (£M)	Plus Tidal/urban uplift (25% each) cost (£M)	Plus PAR, design and supervision (20%) cost (£M)	Plus Optimism bias 60% cost (£M)			FOOTPRINT IMPACT (Ha)		
RESPONSE OPTIONS																SPA/SSSI	SAC	None

Short Term Option 2 and Medium to Long Term Option 2. Breach of 100m length in the existing embankments, and raising of the C527 road with culverts. Rising ground levels at the landward extent would naturally constrain the extent of inundation. 4%AEP.	Earth Embankment	1131801070204L01	Length (km)	0.78	GIS/NFCDD	1166	Maintain	Short to long term	15	0.013641798	0.021315309	0.02557837	0.040925393			0	0	0
	Wall	1131801070202L05	Length (km)	0.04	GIS/NFCDD	5830	Maintain	Short to long term	15	0.003497897	0.005465464	0.006558557	0.01049369			0	0	0
	Timber Pile Wall With Concrete Cap	1131801070202L06	Length (km)	0.02	GIS/NFCDD	5830	Maintain	Short to long term	15	0.001748948	0.002732732	0.003279278	0.005246845			0	0	0
	Ramp block wall.	1131801070202L03	Length (km)	0.02	GIS/NFCDD	5830	Maintain	Short to long term	15	0.001748948	0.002732732	0.003279278	0.005246845			0	0	0
	Earth Embankment	1131801070202L02	Length (km)	0.05	GIS/NFCDD	1166	Maintain	Short to long term	15	0.000874474	0.001366366	0.001639639	0.002623423			0	0	0
	Earth Embankment	1131801070202L01	Length (km)	0.09	GIS/NFCDD	1166	Maintain	Short to long term	15	0.001574054	0.002459459	0.00295135	0.004722161			0	0	0
	Earth Embankment	Dummy1	Length (km)	0.29	GIS/NFCDD	0	NAI	Short to long term	15	0	0	0	0			0	0	0
	100m long breach in existing embankment u/s of Topsham, Bridge		Length (m)	100		324	Maintain	Short	1	0.03236014	0.050562719	0.060675262	0.09708042			0	0	0
	100m long breach in existing embankment d/s of Topsham, Bridge		Length (m)	100		324	Maintain	Short	1	0.03236014	0.050562719	0.060675262	0.09708042			0	0	0
	ST Realigned revetment maintenance		Length (km)	0.53	GIS/NFCDD	5830	Manage	Short to long term	15	0.046347133	0.057933916	0.069520699	0.111233118			0	0	0
	ST Realigned revetment construction 0.75m height with c10m crest width		Length (m)	530	GIS/NFCDD	3462	Manage	Short	1	1.83472487	2.293406087	2.752087305	4.403339687			0.2385	0	0.7685
	ST Realigned 5 culvert (assumed) construction		Number	5	GIS/NFCDD	26967	Manage	Short	1	0.134833916	0.168542395	0.202250874	0.323601399			0	0	0
	ST land compensation		Area (Ha)	38.091	GIS/NFCDD	15000	Manage	Short	1	0.571365	0.571365	0.571365	0.571365			0	0	0
													5.6729584	TOTAL				
													Cost (£K/Ha) for MR					
													147.1134925					



FCRMU approach	Asset Type	Asset reference	Parameter	Amount	Reference	Rate (£/parameter)	HLO	Epoch	Epochal discount factor	Basic construction cost (£M)	Plus Tidal/urban uplift (25% each) cost (£M)	Plus PAR, design and supervision (20%) cost (£M)	Plus Optimism bias 60% cost (£M)			FOOTPRINT IMPACT (Ha)		
RESPONSE OPTIONS																SPA/SSSI	SAC	None

Short Term Option 2 and Medium to Long Term Option 2. Breach of 100m length in the existing embankments, and raising of the C527 road with culverts. Rising ground levels at the landward extent would naturally constrain the extent of inundation. 2%AEP.	Earth Embankment	1131801070204L01	Length (km)	0.78	GIS/NFCDD	1166	Maintain	Short to long term	15	0.013641798	0.021315309	0.02557837	0.040925393			0	0	0
	Wall	1131801070202L05	Length (km)	0.04	GIS/NFCDD	5830	Maintain	Short to long term	15	0.003497897	0.005465464	0.006558557	0.01049369			0	0	0
	Timber Pile Wall With Concrete Cap	1131801070202L06	Length (km)	0.02	GIS/NFCDD	5830	Maintain	Short to long term	15	0.001748948	0.002732732	0.003279278	0.005246845			0	0	0
	Ramp block wall.	1131801070202L03	Length (km)	0.02	GIS/NFCDD	5830	Maintain	Short to long term	15	0.001748948	0.002732732	0.003279278	0.005246845			0	0	0
	Earth Embankment	1131801070202L02	Length (km)	0.05	GIS/NFCDD	1166	Maintain	Short to long term	15	0.000874474	0.001366366	0.001639639	0.002623423			0	0	0
	Earth Embankment	1131801070202L01	Length (km)	0.09	GIS/NFCDD	1166	Maintain	Short to long term	15	0.001574054	0.002459459	0.00295135	0.004722161			0	0	0
	Earth Embankment	Dummy1	Length (km)	0.29	GIS/NFCDD	0	NAI	Short to long term	15	0	0	0	0			0	0	0
	100m long breach in existing embankment u/s of Topsham, Bridge		Length (m)	100		324	Maintain	Short	1	0.03236014	0.050562719	0.060675262	0.09708042			0	0	0
	100m long breach in existing embankment d/s of Topsham, Bridge		Length (m)	100		324	Maintain	Short	1	0.03236014	0.050562719	0.060675262	0.09708042			0	0	0
	ST Realigned revetment maintenance		Length (km)	0.53	GIS/NFCDD	5830	Manage	Short to long term	15	0.046347133	0.057933916	0.069520699	0.111233118			0	0	0
	ST Realigned revetment construction 0.75m height with c10m crest width		Length (m)	530	GIS/NFCDD	3462	Manage	Short	1	1.83472487	2.293406087	2.752087305	4.403339687			0.2385	0	0.7685
	ST Realigned 5 culvert (assumed) construction		Number	5	GIS/NFCDD	26967	Manage	Short	1	0.134833916	0.168542395	0.202250874	0.323601399			0	0	0
	ST land compensation		Area (Ha)	38.091	GIS/NFCDD	15000	Manage	Short	1	0.571365	0.571365	0.571365	0.571365			0	0	0
													5.6729584	TOTAL				
													Cost (£K/Ha) for MR					
													147.1134925					



FCRMU approach	Asset Type	Asset reference	Parameter	Amount	Reference	Rate (£/parameter)	HLO	Epoch	Epochal discount factor	Basic construction cost (£M)	Plus Tidal/urban uplift (25% each) cost (£M)	Plus PAR, design and supervision (20%) cost (£M)	Plus Optimism bias 60% cost (£M)		FOOTPRINT IMPACT (Ha)			
RESPONSE OPTIONS																SPA/SSSI	SAC	None

Short Term Option 2 and Medium to Long Term Option 2. Breach of 100m length in the existing embankments, and raising of the C527 road with culverts. Rising ground levels at the landward extent would naturally constrain the extent of inundation. 1%AEP.	Earth Embankment	1131801070204L01	Length (km)	0.78	GIS/NFCDD	1166	Maintain	Short to long term	15	0.013641798	0.021315309	0.02557837	0.040925393			0	0	0
	Wall	1131801070202L05	Length (km)	0.04	GIS/NFCDD	5830	Maintain	Short to long term	15	0.003497897	0.005465464	0.006558557	0.01049369			0	0	0
	Timber Pile Wall With Concrete Cap	1131801070202L06	Length (km)	0.02	GIS/NFCDD	5830	Maintain	Short to long term	15	0.001748948	0.002732732	0.003279278	0.005246845			0	0	0
	Ramp block wall.	1131801070202L03	Length (km)	0.02	GIS/NFCDD	5830	Maintain	Short to long term	15	0.001748948	0.002732732	0.003279278	0.005246845			0	0	0
	Earth Embankment	1131801070202L02	Length (km)	0.05	GIS/NFCDD	1166	Maintain	Short to long term	15	0.000874474	0.001366366	0.001639639	0.002623423			0	0	0
	Earth Embankment	1131801070202L01	Length (km)	0.09	GIS/NFCDD	1166	Maintain	Short to long term	15	0.001574054	0.002459459	0.00295135	0.004722161			0	0	0
	Earth Embankment	Dummy1	Length (km)	0.29	GIS/NFCDD	0	NAI	Short to long term	15	0	0	0	0			0	0	0
	100m long breach in existing embankment u/s of Topsham, Bridge		Length (m)	100		324	Maintain	Short	1	0.03236014	0.050562719	0.060675262	0.09708042			0	0	0
	100m long breach in existing embankment d/s of Topsham, Bridge		Length (m)	100		324	Maintain	Short	1	0.03236014	0.050562719	0.060675262	0.09708042			0	0	0
	ST Realigned revetment maintenance		Length (km)	0.53	GIS/NFCDD	5830	Manage	Short to long term	15	0.046347133	0.057933916	0.069520699	0.111233118			0	0	0
	ST Realigned revetment construction 1m height with c10m crest width		Length (m)	530	GIS/NFCDD	4022	Manage	Short	1	2.13165731	2.664571637	3.197485965	5.115977544			0.2385	0	0.7685
	ST Realigned 5 culvert (assumed) construction		Number	5	GIS/NFCDD	26967	Manage	Short	1	0.134833916	0.168542395	0.202250874	0.323601399			0	0	0
	ST land compensation		Area (Ha)	38.091	GIS/NFCDD	15000	Manage	Short	1	0.571365	0.571365	0.571365	0.571365			0	0	0
													6.385596257	TOTAL				
												Cost (£K/Ha) for MR	165.8223176					



FCRMU approach	Asset Type	Asset reference	Parameter	Amount	Reference	Rate (£/parameter)	HLO	Epoch	Epochal discount factor	Basic construction cost (£M)	Plus Tidal/urban uplift (25% each) cost (£M)	Plus PAR, design and supervision (20%) cost (£M)	Plus Optimism bias 60% cost (£M)			FOOTPRINT IMPACT (Ha)		
RESPONSE OPTIONS																SPA/SSSI	SAC	None

Short Term Option 2 and Medium to Long Term Option 2. Breach of 100m length in the existing embankments, and raising of the C527 road with culverts. Rising ground levels at the landward extent would naturally constrain the extent of inundation. 0.5%AEP.	Earth Embankment	1131801070204L01	Length (km)	0.78	GIS/NFCDD	1166	Maintain	Short to long term	15	0.013641798	0.021315309	0.02557837	0.040925393			0	0	0
	Wall	1131801070202L05	Length (km)	0.04	GIS/NFCDD	5830	Maintain	Short to long term	15	0.003497897	0.005465464	0.006558557	0.01049369			0	0	0
	Timber Pile Wall With Concrete Cap	1131801070202L06	Length (km)	0.02	GIS/NFCDD	5830	Maintain	Short to long term	15	0.001748948	0.002732732	0.003279278	0.005246845			0	0	0
	Ramp block wall.	1131801070202L03	Length (km)	0.02	GIS/NFCDD	5830	Maintain	Short to long term	15	0.001748948	0.002732732	0.003279278	0.005246845			0	0	0
	Earth Embankment	1131801070202L02	Length (km)	0.05	GIS/NFCDD	1166	Maintain	Short to long term	15	0.000874474	0.001366366	0.001639639	0.002623423			0	0	0
	Earth Embankment	1131801070202L01	Length (km)	0.09	GIS/NFCDD	1166	Maintain	Short to long term	15	0.001574054	0.002459459	0.00295135	0.004722161			0	0	0
	Earth Embankment	Dummy1	Length (km)	0.29	GIS/NFCDD	0	NAI	Short to long term	15	0	0	0	0			0	0	0
	100m long breach in existing embankment u/s of Topsham, Bridge		Length (m)	100		324	Maintain	Short	1	0.03236014	0.050562719	0.060675262	0.09708042			0	0	0
	100m long breach in existing embankment d/s of Topsham, Bridge		Length (m)	100		324	Maintain	Short	1	0.03236014	0.050562719	0.060675262	0.09708042			0	0	0
	ST Realigned revetment maintenance		Length (km)	0.53	GIS/NFCDD	5830	Manage	Short to long term	15	0.046347133	0.057933916	0.069520699	0.111233118			0	0	0
	ST Realigned revetment construction 1.1m height with c10m crest width		Length (m)	530	GIS/NFCDD	4582	Manage	Short	1	2.42858975	3.035737188	3.642884625	5.8286154			0.2385	0	0.7685
	ST Realigned 5 culvert (assumed) construction		Number	5	GIS/NFCDD	26967	Manage	Short	1	0.134833916	0.168542395	0.202250874	0.323601399			0	0	0
	ST land compensation		Area (Ha)	38.091	GIS/NFCDD	15000	Manage	Short	1	0.571365	0.571365	0.571365	0.571365			0	0	0
													7.098234113	TOTAL				
												Cost (£K/Ha) for MR	184.5311427					



FCRMU approach	Asset Type	Asset reference	Parameter	Amount	Reference	Rate (£/parameter)	HLO	Epoch	Epochal discount factor	Basic construction cost (£M)	Plus Tidal/urban uplift (25% each) cost (£M)	Plus PAR, design and supervision (20%) cost (£M)	Plus Optimism bias 60% cost (£M)			FOOTPRINT IMPACT (Ha)		
RESPONSE OPTIONS																SPA/SSSI	SAC	None

Short Term Option 2 and Medium to Long Term Option 2. Breach of 100m length in the existing embankments, and raising of the C527 road with culverts. Rising ground levels at the landward extent would naturally constrain the extent of inundation. 0.1%AEP.	Earth Embankment	1131801070204L01	Length (km)	0.78	GIS/NFCDD	1166	Maintain	Short to long term	15	0.013641798	0.021315309	0.02557837	0.040925393			0	0	0
	Wall	1131801070202L05	Length (km)	0.04	GIS/NFCDD	5830	Maintain	Short to long term	15	0.003497897	0.005465464	0.006558557	0.01049369			0	0	0
	Timber Pile Wall With Concrete Cap	1131801070202L06	Length (km)	0.02	GIS/NFCDD	5830	Maintain	Short to long term	15	0.001748948	0.002732732	0.003279278	0.005246845			0	0	0
	Ramp block wall.	1131801070202L03	Length (km)	0.02	GIS/NFCDD	5830	Maintain	Short to long term	15	0.001748948	0.002732732	0.003279278	0.005246845			0	0	0
	Earth Embankment	1131801070202L02	Length (km)	0.05	GIS/NFCDD	1166	Maintain	Short to long term	15	0.000874474	0.001366366	0.001639639	0.002623423			0	0	0
	Earth Embankment	1131801070202L01	Length (km)	0.09	GIS/NFCDD	1166	Maintain	Short to long term	15	0.001574054	0.002459459	0.00295135	0.004722161			0	0	0
	Earth Embankment	Dummy1	Length (km)	0.29	GIS/NFCDD	0	NAI	Short to long term	15	0	0	0	0			0	0	0
	100m long breach in existing embankment u/s of Topsham, Bridge		Length (m)	100		324	Maintain	Short	1	0.03236014	0.050562719	0.060675262	0.09708042			0	0	0
	100m long breach in existing embankment d/s of Topsham, Bridge		Length (m)	100		324	Maintain	Short	1	0.03236014	0.050562719	0.060675262	0.09708042			0	0	0
	ST Realigned revetment maintenance		Length (km)	0.53	GIS/NFCDD	5830	Manage	Short to long term	15	0.046347133	0.057933916	0.069520699	0.111233118			0	0	0
	ST Realigned revetment construction 1.25m height with c10m crest width		Length (m)	530	GIS/NFCDD	4845	Manage	Short	1	2.567631148	3.209538935	3.851446722	6.162314755			0.2385	0	0.7685
	ST Realigned 5 culvert (assumed) construction		Number	5	GIS/NFCDD	26967	Manage	Short	1	0.134833916	0.168542395	0.202250874	0.323601399			0	0	0
	ST land compensation		Area (Ha)	38.091	GIS/NFCDD	15000	Manage	Short	1	0.571365	0.571365	0.571365	0.571365			0	0	0
													7.431933468	TOTAL				
												Cost (£K/Ha) for MR	193.2917254					

[illegible]



FCRMU approach	Asset Type	Asset reference	Parameter	Amount	Reference	Rate (£/parameter)	HLO	Epoch	Epochal discount factor	Basic construction cost (£M)	Plus Tidal/urban uplift (25% each) cost (£M)	Plus PAR, design and supervision (20%) cost (£M)	Plus Optimism bias 60% cost (£M)		FOOTPRINT IMPACT (Ha)		
RESPONSE OPTIONS															SPA/SSSI	SAC	None

Option 1. 100m breaches in the existing embankments, from the Frying Pan to the C527 bridge, with rising ground levels naturally constraining inundation. The remaining embankments would continue to be unmaintained. 0.1%AEP	Earth Embankment	Dummy7	Length (km)	1.06	GIS/NFCDD	0	Al, Manag	Short to long term	0	0	0	0	0		0	0	0
	Earth Embankment	Dummy8	Length (km)	1.12	GIS/NFCDD	0	Al, Manag	Short to long term	0	0	0	0	0		0	0	0
	Earth Embankment	Dummy9	Length (km)	1.16	GIS/NFCDD	0	Maintain	Short to long term	15	0	0	0	0		0	0	0
	Earth Embankment	Dummy10	Length (km)	0.36	GIS/NFCDD	0	Maintain	Short to long term	15	0	0	0	0		0	0	0
	Earth Embankment	Dummy11	Length (km)	2.4	GIS/NFCDD	0	Maintain	Short to long term	15	0	0	0	0		0	0	0
	Earth Embankment	Dummy12	Length (km)	0.54	GIS/NFCDD	0	Manage	Short to long term	0	0	0	0	0		0	0	0
	Earth Embankment	Dummy13	Length (km)	0.28	GIS/NFCDD	0	Maintain	Short to long term	15	0	0	0	0		0	0	0
	Naturalised bank	1131801070203R01	Length (km)	0.09	GIS/NFCDD	0	Maintain	Short to long term	15	0	0	0	0		0	0	0
	0	1131801070202R01	Length (km)	0.35	GIS/NFCDD	0	Maintain	Short to long term	15	0	0	0	0		0	0	0
	Embankment	1131801070201R03	Length (km)	0.57	GIS/NFCDD	0	Maintain	Short to long term	15	0	0	0	0		0	0	0
	Embankment	1131801070201R02	Length (km)	0.23	GIS/NFCDD	0	Maintain	Short to long term	15	0	0	0	0		0	0	0
	Railway Bridge Abutment	1131801070201R01	Length (km)	0.03	GIS/NFCDD	0	Maintain	Short to long term	15	0	0	0	0		0	0	0
	Embankment	1131801070102R02	Length (km)	0.51	GIS/NFCDD	0	Maintain	Short to long term	15	0	0	0	0		0	0	0
	Property resilience		Number	4		11660		Short	1	0.046638624	0.07287285	0.08744742	0.139915872		0	0	0
	Three 50m breaches in embankments		Length (m)	150		300		Short	1	0.045	0.0703125	0.084375	0.135		0	0	0
	ST land compensation		Area (Ha)	21	GIS/NFCDD	15000		Short	1	0.315	0.315	0.378	0.6048		0	0	21
													0.879715872	TOTAL			
												Cost (£K/Ha) for MR	35.22857143				



FCRMU approach	Asset Type	Asset reference	Parameter	Amount	Reference	Rate (£/parameter)	HLO	Epoch	Epochal discount factor	Basic construction cost (£M)	Plus Tidal/urban uplift (25% each) cost (£M)	Plus PAR, design and supervision (20%) cost (£M)	Plus Optimism bias 60% cost (£M)		FOOTPRINT IMPACT (Ha)		
RESPONSE OPTIONS															SPA/SSSI	SAC	None

Option 1. 100m breaches in the existing embankments, from the Frying Pan to the C527 bridge, with rising ground levels naturally constraining inundation and an embankment at 'the foot'. The remaining embankments would continue to be unmaintained.	Earth Embankment	Dummy7	Length (km)	1.06	GIS/NFCDD	0	Al, Manag	Short to long term	0	0	0	0	0		0	0	0
	Earth Embankment	Dummy8	Length (km)	1.12	GIS/NFCDD	0	Al, Manag	Short to long term	0	0	0	0	0		0	0	0
	Earth Embankment	Dummy9	Length (km)	1.16	GIS/NFCDD	0	Maintain	Short to long term	15	0	0	0	0		0	0	0
	Earth Embankment	Dummy10	Length (km)	0.36	GIS/NFCDD	0	Maintain	Short to long term	15	0	0	0	0		0	0	0
	Earth Embankment	Dummy11	Length (km)	2.4	GIS/NFCDD	0	Maintain	Short to long term	15	0	0	0	0		0	0	0
	Earth Embankment	Dummy12	Length (km)	0.54	GIS/NFCDD	0	Manage	Short to long term	0	0	0	0	0		0	0	0
	Earth Embankment	Dummy13	Length (km)	0.28	GIS/NFCDD	0	Maintain	Short to long term	15	0	0	0	0		0	0	0
	Naturalised bank	1131801070203R01	Length (km)	0.09	GIS/NFCDD	0	Maintain	Short to long term	15	0	0	0	0		0	0	0
	0	1131801070202R01	Length (km)	0.35	GIS/NFCDD	0	Maintain	Short to long term	15	0	0	0	0		0	0	0
	Embankment	1131801070201R03	Length (km)	0.57	GIS/NFCDD	0	Maintain	Short to long term	15	0	0	0	0		0	0	0
	Embankment	1131801070201R02	Length (km)	0.23	GIS/NFCDD	0	Maintain	Short to long term	15	0	0	0	0		0	0	0
	Railway Bridge Abutment	1131801070201R01	Length (km)	0.03	GIS/NFCDD	0	Maintain	Short to long term	15	0	0	0	0		0	0	0
	Embankment	1131801070102R02	Length (km)	0.51	GIS/NFCDD	0	Maintain	Short to long term	15	0	0	0	0		0	0	0
	Cut off bank of up to 1.5m high if necessary across 'the foot'		Length (m)	100		1750		Short	1	0.175001544	0.273439912	0.328127894	0.525004631			0	0.14
	Three 50m breaches in embankments		Length (m)	150		300		Short	1	0.045	0.0703125	0.084375	0.135		0	0	0
	ST land compensation		Area (Ha)	21	GIS/NFCDD	15000		Short	1	0.315	0.315	0.378	0.6048		0	0	21
													1.264804631	TOTAL	0	0	0
															0	0	0
												Cost (£K/Ha) for MR	35.22857143		0	0	0



FCRMU approach	Asset Type	Asset reference	Parameter	Amount	Reference	Rate (£/parameter)	HLO	Epoch	Epochal discount factor	Basic construction cost (£M)	Plus Tidal/urban uplift (25% each) cost (£M)	Plus PAR, design and supervision (20%) cost (£M)	Plus Optimism bias 60% cost (£M)			FOOTPRINT IMPACT (Ha)			
RESPONSE OPTIONS																SPA/SSSI	SAC	None	
Short Term Option 1. New walls or embankments along the playing field periphery, of up to 0.5m in height. 2%AEP SoP.	New embankment of 0.35m		Length (m)	250		484		Short	1	0.121005368	0.121005368	0.145206441	0.232330306			0	0	0.0525	
													0.232330306	TOTAL					
Short Term Option 1. New walls or embankments along the playing field periphery, of up to 0.5m in height. 1%AEP SoP.	New embankment of 0.45m		Length (m)	250		645		Short	1	0.16134049	0.16134049	0.193608588	0.309773741			0	0	0.0675	
													0.309773741	TOTAL					
Short Term Option 1. New walls or embankments along the playing field periphery, of up to 0.5m in height. 0.5%AEP SoP.	New embankment of 0.5m		Length (m)	250		645		Short	1	0.16134049	0.16134049	0.193608588	0.309773741			0	0	0.075	
													0.309773741	TOTAL					
Short Term Option 1. New walls or embankments along the playing field periphery, of up to 0.5m in height. 0.1%AEP SoP.	New embankment of 0.7m		Length (m)	250		968		Short	1	0.242010735	0.242010735	0.290412882	0.464660611			0	0	0.105	
													0.464660611	TOTAL					





FCRMU approach	Asset Type	Asset reference	Parameter	Amount	Reference	Rate (£/parameter)	HLO	Epoch	Epochal discount factor	Basic construction cost (£M)	Plus Tidal/urban uplift (25% each) cost (£M)	Plus PAR, design and supervision (20%) cost (£M)	Plus Optimism bias 60% cost (£M)		FOOTPRINT IMPACT (Ha)			
RESPONSE OPTIONS																SPA/SSSI	SAC	None
Short Term Option 2. Property resilience for around 10 properties located along the periphery of the playing field. Local road/pavement raising on Ferry Road of up to 0.25m.	Property resilience		Number	4		11660		Short	1	0.046638624	0.05829828	0.069957936	0.111932698			0	0	0
	No road raising required		Length (m)	20		0		Short	1	0	0	0	0			0	0	0
													0.111932698	TOTAL				
Short Term Option 2. Property resilience for around 10 properties located along the periphery of the playing field. Local road/pavement raising on Ferry Road of up to 0.25m.	Property resilience		Number	5		11660		Short	1	0.05829828	0.07287285	0.08744742	0.139915872			0	0	0
	No road raising required		Length (m)	20		0		Short	1	0	0	0	0			0	0	0
													0.139915872	TOTAL				
Short Term Option 2. Property resilience for around 10 properties located along the periphery of the playing field. Local road/pavement raising on Ferry Road of up to 0.25m.	Property resilience		Number	7		11660		Short	1	0.081617592	0.10202199	0.122426388	0.195882221			0	0	0
	No road raising required		Length (m)	20		0		Short	1	0	0	0	0			0	0	0
													0.195882221	TOTAL				
Short Term Option 2. Property resilience for around 10 properties located along the periphery of the playing field. Local road/pavement raising on Ferry Road of up to 0.25m.	Property resilience		Number	8		11660		Short	1	0.093277248	0.11659656	0.139915872	0.223865395			0	0	0
	No road raising required		Length (m)	20		0		Short	1	0	0	0	0			0	0	0
													0.223865395	TOTAL				
Short Term Option 2. Property resilience for around 10 properties located along the periphery of the playing field. Local road/pavement raising on Ferry Road of up to 0.25m.	Property resilience		Number	9		11660		Short	1	0.104936904	0.13117113	0.157405356	0.25184857			0	0	0
	0.1m road raising required		Length (m)	20		129		Short	1	0.002581448	0.004033512	0.004840215	0.007744344			0	0	0.02
													0.259592913	TOTAL				
Short Term Option 2. Property resilience for around 10 properties located along the periphery of the playing field. Local road/pavement raising on Ferry Road of up to 0.25m.	Property resilience		Number	13		11660		Short	1	0.151575528	0.18946941	0.227363292	0.363781267			0	0	0
	0.3m road raising required		Length (m)	20		323		Short	1	0.00645362	0.010083781	0.012100537	0.019360859			0	0	0.02
													0.383142126	TOTAL				



FCRMU approach	Asset Type	Asset reference	Parameter	Amount	Reference	Rate (£/parameter)	HLO	Epoch	Epochal discount factor	Basic construction cost (£M)	Plus Tidal/urban uplift (25% each) cost (£M)	Plus PAR, design and supervision (20%) cost (£M)	Plus Optimism bias 60% cost (£M)			FOOTPRINT IMPACT (Ha)		
RESPONSE OPTIONS																SPA/SSSI	SAC	None
Short Term Option 3. Property resilience for around 20 properties located along the periphery of the	Property resilience		Number	18		11660		Short	1	0.209873808	0.26234226	0.314810712	0.50369714			0	0	0
													0.50369714	TOTAL				
Short Term Option 3. Property resilience for around 20 properties located along the periphery of the	Property resilience		Number	18		11660		Short	1	0.209873808	0.26234226	0.314810712	0.50369714			0	0	0
													0.50369714	TOTAL				
Short Term Option 3. Property resilience for around 20 properties located along the periphery of the	Property resilience		Number	20		11660		Short	1	0.23319312	0.2914914	0.34978968	0.559663488			0	0	0
													0.559663488	TOTAL				
Short Term Option 3. Property resilience for around 20 properties located along the periphery of the	Property resilience		Number	24		11660		Short	1	0.279831744	0.34978968	0.419747616	0.671596186			0	0	0
													0.671596186	TOTAL				



M.6 Powderham Banks



FCRMU approach	Asset Type	Asset reference	Parameter	Amount	Reference	Rate (£/parameter)	HLO	Epoch	Epochal discount factor	Basic construction cost (£M)	Plus Tidal/urban uplift (25% each) cost (£M)	Plus PAR, design and supervision (20%) cost (£M)	Plus Optimism bias 60% cost (£M)		FOOTPRINT IMPACT (Ha)			
RESPONSE OPTIONS																SPA/SSSI	SAC	None
Short Term Option 3. A combination of both options 1 and 2. Medium to Long Term Option 1. 4%AEP SoP.	Earth Embankment	1131801130118R02	Length (km)	0.41	GIS/NFCDD	1166	Maintain	Short to long term	15	0.007170688	0.008963361	0.010756033	0.017209652		0	0	0	
	Earth Embankment	1131801130117R01	Length (km)	0.36	GIS/NFCDD	1166	Maintain	Short to long term	15	0.006296214	0.007870268	0.009444321	0.015110914		0	0	0	
	Canal embankment	1131801130104L01	Length (km)	0.83	GIS/NFCDD	1166	Maintain	Short to long term	15	0.014516272	0.01814534	0.021774408	0.034839052		0	0	0	
	Earth Bank	1131801130106L01	Length (km)	0.18	GIS/NFCDD	1166	Maintain	Short to long term	15	0.003148107	0.003935134	0.004722161	0.007555457		0	0	0	
	Canal embankment	1131801130105L01	Length (km)	0.36	GIS/NFCDD	1166	Maintain	Short to long term	15	0.006296214	0.007870268	0.009444321	0.015110914		0	0	0	
	Earth Embankment With Screeded Stone Rev	1131801130102L01	Length (km)	0.04	GIS/NFCDD	5830	Maintain	Short to long term	15	0.003497897	0.004372371	0.005246845	0.008394952		0	0	0	
	No addition		Length (m)	40	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0		0	0	0	
	Canal embankment	1131801130103L01	Length (km)	0.15	GIS/NFCDD	1166	Maintain	Short to long term	15	0.002623423	0.003279278	0.003935134	0.006296214		0	0	0	
	Maintained Channel	1131801160106L01	Length (km)	0.78	GIS/NFCDD	1166	Maintain	Short to long term	15	0.013641798	0.017052247	0.020462696	0.032740314		0	0	0	
	Earth Embankment	1131801130102R01	Length (km)	0.34	GIS/NFCDD	1166	Maintain	Short to long term	15	0.005946425	0.007433031	0.008919637	0.014271419		0	0	0	
	No addition		Length (m)	340	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0		0	0	0	
	Earth Embankment	1131801000303R01	Length (km)	0.59	GIS/NFCDD	1166	Maintain	Short to long term	15	0.010318796	0.012898494	0.015478193	0.024765109		0	0	0	
	No addition		Length (m)	590	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0		0	0	0	
	Canal Embankment	1131801000302R01	Length (km)	3.23	GIS/NFCDD	1166	Maintain	Short to long term	15	0.056491033	0.070613792	0.08473655	0.13557848		0	0	0	
	No addition		Length (m)	3230	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0		0	0	0	
	Natural Cliff (check elements)	113FAS3351009C01	Length (km)	0.46	GIS/NFCDD	1166	Maintain	Short to long term	15	0.008045163	0.010056453	0.012067744	0.01930839		0	0	0	
	5m widening		Length (m)	460	GIS/NFCDD	1888	Sustain	Short	1	0.868338079	0.868338079	1.042005695	1.667209112		0.23	0	0	
	CC 0.2m addition		Length (m)	460	GIS/NFCDD	0	Sustain	Medium	0.5	0	0	0	0		0	0	0	
	CC 0.5m addition		Length (m)	460	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0		0	0	0	
	Natural Cliff (check elements)	113FAS3351009C02	Length (km)	1.1	GIS/NFCDD	1166	Maintain	Short to long term	15	0.019238432	0.024048041	0.028857649	0.046172238		0	0	0	
	5m widening		Length (m)	1100	GIS/NFCDD	1888	Sustain	Short	1	2.076460624	2.076460624	2.491752748	3.986804397		0.55	0	0	
	CC 0.2m addition		Length (m)	1100	GIS/NFCDD	0	Sustain	Medium	0.5	0	0	0	0		0	0	0	
	CC 0.5m addition		Length (m)	1100	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0		0	0	0	
	Wall + Revetment	113FAS3351009C03	Length (km)	0.35	GIS/NFCDD	5830	Maintain	Short to long term	15	0.030606597	0.038258246	0.045909896	0.073455833		0	0	0	
	CC 0.3m addition		Length (m)	350	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0		0	0	0	
	Toe protection (rock armour)		Length (m)	700	GIS/NFCDD	735	Sustain	Short	1	0.51419083	0.642738537	0.771286245	1.234057992		0.35	0	0	
													7.338880441	TOTAL				

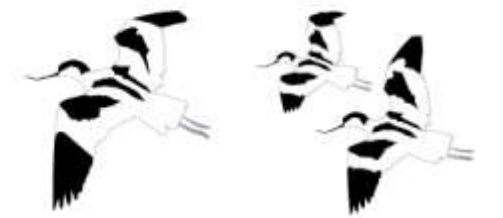




FCRMU approach	Asset Type	Asset reference	Parameter	Amount	Reference	Rate (£/parameter)	HLO	Epoch	Epochal discount factor	Basic construction cost (£M)	Plus Tidal/urban uplift (25% each) cost (£M)	Plus PAR, design and supervision (20%) cost (£M)	Plus Optimism bias 60% cost (£M)		FOOTPRINT IMPACT (Ha)			
RESPONSE OPTIONS																SPA/SSSI	SAC	None
Short Term Option 3. A combination of both options 1 and 2. Medium to Long Term Option 1. 2%AEP SoP.	Earth Embankment	1131801130118R02	Length (km)	0.41	GIS/NFCDD	1166	Maintain	Short to long term	15	0.007170688	0.008963361	0.010756033	0.017209652		0	0	0	
	Earth Embankment	1131801130117R01	Length (km)	0.36	GIS/NFCDD	1166	Maintain	Short to long term	15	0.006296214	0.007870268	0.009444321	0.015110914		0	0	0	
	Canal embankment	1131801130104L01	Length (km)	0.83	GIS/NFCDD	1166	Maintain	Short to long term	15	0.014516272	0.01814534	0.021774408	0.034839052		0	0	0	
	Earth Bank	1131801130106L01	Length (km)	0.18	GIS/NFCDD	1166	Maintain	Short to long term	15	0.003148107	0.003935134	0.004722161	0.007555457		0	0	0	
	Canal embankment	1131801130105L01	Length (km)	0.36	GIS/NFCDD	1166	Maintain	Short to long term	15	0.006296214	0.007870268	0.009444321	0.015110914		0	0	0	
	Earth Embankment With Screeded Stone Rev	1131801130102L01	Length (km)	0.04	GIS/NFCDD	5830	Maintain	Short to long term	15	0.003497897	0.004372371	0.005246845	0.008394952		0	0	0	
	No addition		Length (m)	40	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0		0	0	0	
	Canal embankment	1131801130103L01	Length (km)	0.15	GIS/NFCDD	1166	Maintain	Short to long term	15	0.002623423	0.003279278	0.003935134	0.006296214		0	0	0	
	Maintained Channel	1131801160106L01	Length (km)	0.78	GIS/NFCDD	1166	Maintain	Short to long term	15	0.013641798	0.017052247	0.020462696	0.032740314		0	0	0	
	Earth Embankment	1131801130102R01	Length (km)	0.34	GIS/NFCDD	1166	Maintain	Short to long term	15	0.005946425	0.007433031	0.008919637	0.014271419		0	0	0	
	No addition		Length (m)	340	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0		0	0	0	
	Earth Embankment	1131801000303R01	Length (km)	0.59	GIS/NFCDD	1166	Maintain	Short to long term	15	0.010318796	0.012898494	0.015478193	0.024765109		0	0	0	
	No addition		Length (m)	590	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0		0	0	0	
	Canal Embankment	1131801000302R01	Length (km)	3.23	GIS/NFCDD	1166	Maintain	Short to long term	15	0.056491033	0.070613792	0.08473655	0.13557848		0	0	0	
	No addition		Length (m)	3230	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0		0	0	0	
	Natural Cliff (check elements)	113FAS3351009C01	Length (km)	0.46	GIS/NFCDD	1166	Maintain	Short to long term	15	0.008045163	0.010056453	0.012067744	0.01930839		0	0	0	
	5m widening		Length (m)	460	GIS/NFCDD	2186	Sustain	Short	1	1.005375587	1.005375587	1.206450705	1.930321128		0.23	0	0	
	CC 0.2m addition		Length (m)	460	GIS/NFCDD	0	Sustain	Medium	0.5	0	0	0	0		0	0	0	
	CC 0.5m addition		Length (m)	460	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0		0	0	0	
	Natural Cliff (check elements)	113FAS3351009C02	Length (km)	1.1	GIS/NFCDD	1166	Maintain	Short to long term	15	0.019238432	0.024048041	0.028857649	0.046172238		0	0	0	
	CC 0.2m addition and 5m widening		Length (m)	1100	GIS/NFCDD	2186	Sustain	Short	1	2.404159013	2.404159013	2.884990816	4.615985305		0.55	0	0	
	CC 0.2m addition		Length (m)	1100	GIS/NFCDD	0	Sustain	Medium	0.5	0	0	0	0		0	0	0	
	CC 0.5m addition		Length (m)	1100	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0		0	0	0	
	Wall + Revetment	113FAS3351009C03	Length (km)	0.35	GIS/NFCDD	5830	Maintain	Short to long term	15	0.030606597	0.038258246	0.045909896	0.073455833		0	0	0	
	CC 0.3m addition		Length (m)	350	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0		0	0	0	
	Toe protection (rock armour)		Length (m)	700	GIS/NFCDD	735	Sustain	Short	1	0.51419083	0.642738537	0.771286245	1.234057992		0.35	0	0	
														8.231173365	TOTAL			



FCRMU approach	Asset Type	Asset reference	Parameter	Amount	Reference	Rate (£/parameter)	HLO	Epoch	Epochal discount factor	Basic construction cost (£M)	Plus Tidal/urban uplift (25% each) cost (£M)	Plus PAR, design and supervision (20%) cost (£M)	Plus Optimism bias 60% cost (£M)		FOOTPRINT IMPACT (Ha)			
RESPONSE OPTIONS															SPA/SSSI	SAC	None	
Short Term Option 3. A combination of both options 1 and 2. Medium to Long Term Option 1. 1%AEP SoP.	Earth Embankment	1131801130118R02	Length (km)	0.41	GIS/NFCDD	1166	Maintain	Short to long term	15	0.007170688	0.008963361	0.010756033	0.017209652		0	0	0	
	Earth Embankment	1131801130117R01	Length (km)	0.36	GIS/NFCDD	1166	Maintain	Short to long term	15	0.006296214	0.007870268	0.009444321	0.015110914		0	0	0	
	Canal embankment	1131801130104L01	Length (km)	0.83	GIS/NFCDD	1166	Maintain	Short to long term	15	0.014516272	0.01814534	0.021774408	0.034839052		0	0	0	
	Earth Bank	1131801130106L01	Length (km)	0.18	GIS/NFCDD	1166	Maintain	Short to long term	15	0.003148107	0.003935134	0.004722161	0.007555457		0	0	0	
	Canal embankment	1131801130105L01	Length (km)	0.36	GIS/NFCDD	1166	Maintain	Short to long term	15	0.006296214	0.007870268	0.009444321	0.015110914		0	0	0	
	Earth Embankment With Screeded Stone Rev	1131801130102L01	Length (km)	0.04	GIS/NFCDD	5830	Maintain	Short to long term	15	0.003497897	0.004372371	0.005246845	0.008394952		0	0	0	
	CC 0.3m addition		Length (m)	40	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0		0	0	0	
	Canal embankment	1131801130103L01	Length (km)	0.15	GIS/NFCDD	1166	Maintain	Short to long term	15	0.002623423	0.003279278	0.003935134	0.006296214		0	0	0	
	Maintained Channel	1131801160106L01	Length (km)	0.78	GIS/NFCDD	1166	Maintain	Short to long term	15	0.013641798	0.017052247	0.020462696	0.032740314		0	0	0	
	Earth Embankment	1131801130102R01	Length (km)	0.34	GIS/NFCDD	1166	Maintain	Short to long term	15	0.005946425	0.007433031	0.008919637	0.014271419		0	0	0	
	No addition		Length (m)	340	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0		0	0	0	
	Earth Embankment	1131801000303R01	Length (km)	0.59	GIS/NFCDD	1166	Maintain	Short to long term	15	0.010318796	0.012898494	0.015478193	0.024765109		0	0	0	
	No addition		Length (m)	590	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0		0	0	0	
	Canal Embankment	1131801000302R01	Length (km)	3.23	GIS/NFCDD	1166	Maintain	Short to long term	15	0.056491033	0.070613792	0.08473655	0.13557848		0	0	0	
	CC 0.1m addition		Length (m)	3230	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0		0	0	0	
	Natural Cliff (check elements)	113FAS3351009C01	Length (km)	0.46	GIS/NFCDD	1166	Maintain	Short to long term	15	0.008045163	0.010056453	0.012067744	0.01930839		0	0	0	
	CC 0.1m addition and 5m widening		Length (m)	460	GIS/NFCDD	2186	Sustain	Short	1	1.005375587	1.005375587	1.206450705	1.930321128		0.23	0	0	
	CC 0.2m addition		Length (m)	460	GIS/NFCDD	0	Sustain	Medium	0.5	0	0	0	0		0	0	0	
	CC 0.4m addition		Length (m)	460	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0		0	0	0	
	Natural Cliff (check elements)	113FAS3351009C02	Length (km)	1.1	GIS/NFCDD	1166	Maintain	Short to long term	15	0.019238432	0.024048041	0.028857649	0.046172238		0	0	0	
	CC 0.3m addition and 5m widening		Length (m)	1100	GIS/NFCDD	2352	Sustain	Short	1	2.587565402	2.587565402	3.105078483	4.968125572		0.55	0	0	
	CC 0.2m addition		Length (m)	1100	GIS/NFCDD	0	Sustain	Medium	0.5	0	0	0	0		0	0	0	
	CC 0.4m addition		Length (m)	1100	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0		0	0	0	
	Wall + Revetment	113FAS3351009C03	Length (km)	0.35	GIS/NFCDD	5830	Maintain	Short to long term	15	0.030606597	0.038258246	0.045909896	0.073455833		0	0	0	
	CC 0.3m addition		Length (m)	350	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0		0	0	0	
	Toe protection (rock armour)		Length (m)	700	GIS/NFCDD	735	Sustain	Short	1	0.51419083	0.642738537	0.771286245	1.234057992		0.35	0	0	
														8.583313632	TOTAL			



FCRMU approach	Asset Type	Asset reference	Parameter	Amount	Reference	Rate (£/parameter)	HLO	Epoch	Epochal discount factor	Basic construction cost (£M)	Plus Tidal/urban uplift (25% each) cost (£M)	Plus PAR, design and supervision (20%) cost (£M)	Plus Optimism bias 60% cost (£M)		FOOTPRINT IMPACT (Ha)			
RESPONSE OPTIONS																SPA/SSSI	SAC	None
Short Term Option 3. A combination of both options 1 and 2. Medium to Long Term Option 1. 0.5%AEP SoP.	Earth Embankment	1131801130118R02	Length (km)	0.41	GIS/NFCDD	1166	Maintain	Short to long term	15	0.007170688	0.008963361	0.010756033	0.017209652		0	0	0	
	Earth Embankment	1131801130117R01	Length (km)	0.36	GIS/NFCDD	1166	Maintain	Short to long term	15	0.006296214	0.007870268	0.009444321	0.015110914		0	0	0	
	Canal embankment	1131801130104L01	Length (km)	0.83	GIS/NFCDD	1166	Maintain	Short to long term	15	0.014516272	0.01814534	0.021774408	0.034839052		0	0	0	
	Earth Bank	1131801130106L01	Length (km)	0.18	GIS/NFCDD	1166	Maintain	Short to long term	15	0.003148107	0.003935134	0.004722161	0.007555457		0	0	0	
	Canal embankment	1131801130105L01	Length (km)	0.36	GIS/NFCDD	1166	Maintain	Short to long term	15	0.006296214	0.007870268	0.009444321	0.015110914		0	0	0	
	Earth Embankment With Screeded Stone Rev	1131801130102L01	Length (km)	0.04	GIS/NFCDD	5830	Maintain	Short to long term	15	0.003497897	0.004372371	0.005246845	0.008394952		0	0	0	
	No addition		Length (m)	40	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0		0	0	0	
	Canal embankment	1131801130103L01	Length (km)	0.15	GIS/NFCDD	1166	Maintain	Short to long term	15	0.002623423	0.003279278	0.003935134	0.006296214		0	0	0	
	Maintained Channel	1131801160106L01	Length (km)	0.78	GIS/NFCDD	1166	Maintain	Short to long term	15	0.013641798	0.017052247	0.020462696	0.032740314		0	0	0	
	Earth Embankment	1131801130102R01	Length (km)	0.34	GIS/NFCDD	1166	Maintain	Short to long term	15	0.005946425	0.007433031	0.008919637	0.014271419		0	0	0	
	No addition		Length (m)	340	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0		0	0	0	
	Earth Embankment	1131801000303R01	Length (km)	0.59	GIS/NFCDD	1166	Maintain	Short to long term	15	0.010318796	0.012898494	0.015478193	0.024765109		0	0	0	
	No addition		Length (m)	590	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0		0	0	0	
	Canal Embankment	1131801000302R01	Length (km)	3.23	GIS/NFCDD	1166	Maintain	Short to long term	15	0.056491033	0.070613792	0.08473655	0.13557848		0	0	0	
	CC 0.2m addition		Length (m)	3230	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0		0	0	0	
	Natural Cliff (check elements)	113FAS3351009C01	Length (km)	0.46	GIS/NFCDD	1166	Maintain	Short to long term	15	0.008045163	0.010056453	0.012067744	0.01930839		0	0	0	
	CC 0.2m addition and 5m widening		Length (m)	460	GIS/NFCDD	2352	Sustain	Short	1	1.082072805	1.082072805	1.298487366	2.077579785		0.23	0	0	
	CC 0.2m addition		Length (m)	460	GIS/NFCDD	0	Sustain	Medium	0.5	0	0	0	0		0	0	0	
	CC 0.4m addition		Length (m)	460	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0		0	0	0	
	Natural Cliff (check elements)	113FAS3351009C02	Length (km)	1.1	GIS/NFCDD	1166	Maintain	Short to long term	15	0.019238432	0.024048041	0.028857649	0.046172238		0	0	0	
	CC 0.4m addition and 5m widening		Length (m)	1100	GIS/NFCDD	2519	Sustain	Short	1	2.770971791	2.770971791	3.32516615	5.320265839		0.55	0	0	
	CC 0.2m addition		Length (m)	1100	GIS/NFCDD	0	Sustain	Medium	0.5	0	0	0	0		0	0	0	
	CC 0.4m addition		Length (m)	1100	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0		0	0	0	
	Wall + Revetment	113FAS3351009C03	Length (km)	0.35	GIS/NFCDD	5830	Maintain	Short to long term	15	0.030606597	0.038258246	0.045909896	0.073455833		0	0	0	
	CC 0.4m addition		Length (m)	350	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0		0	0	0	
	Toe protection (rock armour)		Length (m)	700	GIS/NFCDD	735	Sustain	Short	1	0.51419083	0.642738537	0.771286245	1.234057992		0.35	0	0	
													9.082712556	TOTAL				





FCRMU approach	Asset Type	Asset reference	Parameter	Amount	Reference	Rate (£/parameter)	HLO	Epoch	Epochal discount factor	Basic construction cost (£M)	Plus Tidal/urban uplift (25% each) cost (£M)	Plus PAR, design and supervision (20%) cost (£M)	Plus Optimism bias 60% cost (£M)		FOOTPRINT IMPACT (Ha)			
																SPA/SSSI	SAC	None
RESPONSE OPTIONS																		
Short Term Option 3. A combination of both options 1 and 2. Medium to Long Term Option 1. 0.1%AEP SoP.	Earth Embankment	1131801130118R02	Length (km)	0.41	GIS/NFCDD	1166	Maintain	Short to long term	15	0.007170688	0.008963361	0.010756033	0.017209652		0	0	0	
	Earth Embankment	1131801130117R01	Length (km)	0.36	GIS/NFCDD	1166	Maintain	Short to long term	15	0.006296214	0.007870268	0.009444321	0.015110914		0	0	0	
	Canal embankment	1131801130104L01	Length (km)	0.83	GIS/NFCDD	1166	Maintain	Short to long term	15	0.014516272	0.01814534	0.021774408	0.034839052		0	0	0	
	Earth Bank	1131801130106L01	Length (km)	0.18	GIS/NFCDD	1166	Maintain	Short to long term	15	0.003148107	0.003935134	0.004722161	0.007555457		0	0	0	
	Canal embankment	1131801130105L01	Length (km)	0.36	GIS/NFCDD	1166	Maintain	Short to long term	15	0.006296214	0.007870268	0.009444321	0.015110914		0	0	0	
	Earth Embankment With Screeded Stone Rev	1131801130102L01	Length (km)	0.04	GIS/NFCDD	5830	Maintain	Short to long term	15	0.003497897	0.004372371	0.005246845	0.008394952		0	0	0	
	No addition		Length (m)	40	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0		0	0	0	
	Canal embankment	1131801130103L01	Length (km)	0.15	GIS/NFCDD	1166	Maintain	Short to long term	15	0.002623423	0.003279278	0.003935134	0.006296214		0	0	0	
	Maintained Channel	1131801160106L01	Length (km)	0.78	GIS/NFCDD	1166	Maintain	Short to long term	15	0.013641798	0.017052247	0.020462696	0.032740314		0	0	0	
	Earth Embankment	1131801130102R01	Length (km)	0.34	GIS/NFCDD	1166	Maintain	Short to long term	15	0.005946425	0.007433031	0.008919637	0.014271419		0	0	0	
	No addition		Length (m)	340	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0		0	0	0	
	Earth Embankment	1131801000303R01	Length (km)	0.59	GIS/NFCDD	1166	Maintain	Short to long term	15	0.010318796	0.012898494	0.015478193	0.024765109		0	0	0	
	CC 0.3m addition		Length (m)	590	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0		0	0	0	
	Canal Embankment	1131801000302R01	Length (km)	3.23	GIS/NFCDD	1166	Maintain	Short to long term	15	0.056491033	0.070613792	0.08473655	0.13557848		0	0	0	
	CC 0.3m addition		Length (m)	3230	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0		0	0	0	
	Natural Cliff (check elements)	113FAS3351009C01	Length (km)	0.46	GIS/NFCDD	1166	Maintain	Short to long term	15	0.008045163	0.010056453	0.012067744	0.01930839		0	0	0	
	CC 0.3m addition and 5m widening		Length (m)	460	GIS/NFCDD	2352	Sustain	Short	1	1.082072805	1.082072805	1.298487366	2.077579785		0.23	0	0	
	CC 0.3m addition		Length (m)	460	GIS/NFCDD	0	Sustain	Medium	0.5	0	0	0	0		0	0	0	
	CC 0.4m addition		Length (m)	460	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0		0	0	0	
	Natural Cliff (check elements)	113FAS3351009C02	Length (km)	1.1	GIS/NFCDD	1166	Maintain	Short to long term	15	0.019238432	0.024048041	0.028857649	0.046172238		0	0	0	
	CC 0.5m addition and 5m widening		Length (m)	1100	GIS/NFCDD	2519	Sustain	Short	1	2.770971791	2.770971791	3.32516615	5.320265839		0.55	0	0	
	CC 0.3m addition		Length (m)	1100	GIS/NFCDD	0	Sustain	Medium	0.5	0	0	0	0		0	0	0	
	CC 0.4m addition		Length (m)	1100	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0		0	0	0	
	Wall + Revetment	113FAS3351009C03	Length (km)	0.35	GIS/NFCDD	5830	Maintain	Short to long term	15	0.030606597	0.038258246	0.045909896	0.073455833		0	0	0	
	CC 0.2m addition		Length (m)	350	GIS/NFCDD	0	Sustain	Medium	0.5	0	0	0	0		0	0	0	
	CC 0.4m addition		Length (m)	350	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0		0	0	0	
	Toe protection (rock armour)		Length (m)	700	GIS/NFCDD	735	Sustain	Short	1	0.51419083	0.642738537	0.771286245	1.234057992		0.35	0	0	
														9.082712556	TOTAL			



FCRMU approach	Asset Type	Asset reference	Parameter	Amount	Reference	Rate (£/parameter)	HLO	Epoch	Epochal discount factor	Basic construction cost (£M)	Plus Tidal/urban uplift (25% each) cost (£M)	Plus PAR, design and supervision (20%) cost (£M)	Plus Optimism bias 60% cost (£M)		FOOTPRINT IMPACT (Ha)		
RESPONSE OPTIONS															SPA/SSSI	SAC	None

Short Term Option 1. Regulated Tidal Exchange, with a RTE device attached to the existing culvert and the tide flap removed. Dawlish Warren sand spit distal section flattened in 2060. Medium to Long Term Option 1. 20-10% AEP.	Wall	690/1902/01	Length (km)	0.24	GIS/NFCDD	5830	Maintain	Short to long term	15	0.020987381	0.026234226	0.031481071	0.050369714		0	0	0
	CC 0.1m addition		Length (m)	240	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0		0	0	0
	Wall	113FAS3351009C05	Length (km)	0.4	GIS/NFCDD	5830	Maintain	Short to long term	15	0.034978968	0.04372371	0.052468452	0.083949523		0	0	0
	CC 0.2m addition		Length (m)	400	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0		0	0	0
	Wall	113FAS3351009C06	Length (km)	0.64	GIS/NFCDD	5830	Maintain	Short to long term	15	0.055966349	0.069957936	0.083949523	0.134319237		0	0	0
	CC 0.6m addition		Length (m)	640	GIS/NFCDD	0	Sustain	Medium	0.5	0	0	0	0		0	0	0
	CC 0.4m addition		Length (m)	640	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0		0	0	0
	Wall	113FAS3351009C07	Length (km)	0.63	GIS/NFCDD	5830	Maintain	Short to long term	15	0.055091875	0.068864843	0.082637812	0.132220499		0	0	0
	CC 0.3m addition		Length (m)	630	GIS/NFCDD	0	Sustain	Medium	0.5	0	0	0	0		0	0	0
	CC 0.7m addition		Length (m)	630	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0		0	0	0
	Railway embankment	113FAS3351010C01	Length (km)	0.21	GIS/NFCDD	5830	Maintain	Short to long term	15	0.018363958	0.022954948	0.027545937	0.0440735		0	0	0
	CC 0.4m addition		Length (m)	210	GIS/NFCDD	0	Sustain	Medium	0.5	0	0	0	0		0	0	0
	CC 0.4m addition		Length (m)	210	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0		0	0	0
	Localised embankments to manage flooding to road/properties at Powderham Castle, Kenton and the mill, average 0.5m		Length (m)	300	GIS/NFCDD	646	Manage	Short	1	0.193781433	0.193781433	0.23253772	0.372060352		0	0	0.348
	RTE		Number	1	GIS/NFCDD	26967	Manage	Short	1	0.026966783	0.033708479	0.040450175	0.06472028		0	0	0
	ST land compensation		Area (Ha)	32	GIS/NFCDD	15000	Manage	Short	1	0.48	0.48	0.48	0.48		0	0	0





FCRMU approach	Asset Type	Asset reference	Parameter	Amount	Reference	Rate (£/parameter)	HLO	Epoch	Epochal discount factor	Basic construction cost (£M)	Plus Tidal/urban uplift (25% each) cost (£M)	Plus PAR, design and supervision (20%) cost (£M)	Plus Optimism bias 60% cost (£M)		FOOTPRINT IMPACT (Ha)		
RESPONSE OPTIONS															SPA/SSSI	SAC	None

Short Term Option 1. Regulated Tidal Exchange, with a RTE device attached to the existing culvert and the tide flap removed. Dawlish Warren sand spit distal section flattened in 2060. Medium to Long Term Option 1. 4-2% AEP.	Wall	690/1902/01	Length (km)	0.24	GIS/NFCDD	5830	Maintain	Short to long term	15	0.020987381	0.026234226	0.031481071	0.050369714		0	0	0
	CC 0.1m addition		Length (m)	240	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0		0	0	0
	Wall	113FAS3351009C05	Length (km)	0.4	GIS/NFCDD	5830	Maintain	Short to long term	15	0.034978968	0.04372371	0.052468452	0.083949523		0	0	0
	CC 0.2m addition		Length (m)	400	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0		0	0	0
	Wall	113FAS3351009C06	Length (km)	0.64	GIS/NFCDD	5830	Maintain	Short to long term	15	0.055966349	0.069957936	0.083949523	0.134319237		0	0	0
	CC 0.6m addition		Length (m)	640	GIS/NFCDD	0	Sustain	Medium	0.5	0	0	0	0		0	0	0
	CC 0.4m addition		Length (m)	640	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0		0	0	0
	Wall	113FAS3351009C07	Length (km)	0.63	GIS/NFCDD	5830	Maintain	Short to long term	15	0.055091875	0.068864843	0.082637812	0.132220499		0	0	0
	CC 0.3m addition		Length (m)	630	GIS/NFCDD	0	Sustain	Medium	0.5	0	0	0	0		0	0	0
	CC 0.7m addition		Length (m)	630	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0		0	0	0
	Railway embankment	113FAS3351010C01	Length (km)	0.21	GIS/NFCDD	5830	Maintain	Short to long term	15	0.018363958	0.022954948	0.027545937	0.0440735		0	0	0
	CC 0.4m addition		Length (m)	210	GIS/NFCDD	0	Sustain	Medium	0.5	0	0	0	0		0	0	0
	CC 0.4m addition		Length (m)	210	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0		0	0	0
	Localised embankments to manage flooding to road/properties at Powderham Castle, Kenton and the mill, average 0.75m		Length (m)	300	GIS/NFCDD	969	Manage	Short	1	0.29067215	0.29067215	0.34880658	0.558090528		0	0	0.348
	RTE		Number	1	GIS/NFCDD	26967	Manage	Short	1	0.026966783	0.033708479	0.040450175	0.06472028		0	0	0
	ST land compensation		Area (Ha)	32	GIS/NFCDD	15000	Manage	Short	1	0.48	0.48	0.48	0.48		0	0	0
													1.547743281	TOTAL			
												Cost (£K/Ha) for MR	34.46283774				



FCRMU approach	Asset Type	Asset reference	Parameter	Amount	Reference	Rate (£/parameter)	HLO	Epoch	Epochal discount factor	Basic construction cost (£M)	Plus Tidal/urban uplift (25% each) cost (£M)	Plus PAR, design and supervision (20%) cost (£M)	Plus Optimism bias 60% cost (£M)		FOOTPRINT IMPACT (Ha)		
RESPONSE OPTIONS															SPA/SSSI	SAC	None

Short Term Option 1. Regulated Tidal Exchange, with a RTE device attached to the existing culvert and the tide flap removed. Dawlish Warren sand spit distal section flattened in 2060. Medium to Long Term Option 1. 1-0.5% AEP.	Wall	690/1902/01	Length (km)	0.24	GIS/NFCDD	5830	Maintain	Short to long term	15	0.020987381	0.026234226	0.031481071	0.050369714		0	0	0
	CC 0.2m addition		Length (m)	240	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0		0	0	0
	Wall	113FAS3351009C05	Length (km)	0.4	GIS/NFCDD	5830	Maintain	Short to long term	15	0.034978968	0.04372371	0.052468452	0.083949523		0	0	0
	CC 0.3m addition		Length (m)	400	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0		0	0	0
	Wall	113FAS3351009C06	Length (km)	0.64	GIS/NFCDD	5830	Maintain	Short to long term	15	0.055966349	0.069957936	0.083949523	0.134319237		0	0	0
	CC 0.6m addition		Length (m)	640	GIS/NFCDD	0	Sustain	Medium	0.5	0	0	0	0		0	0	0
	CC 0.5m addition		Length (m)	640	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0		0	0	0
	Wall	113FAS3351009C07	Length (km)	0.63	GIS/NFCDD	5830	Maintain	Short to long term	15	0.055091875	0.068864843	0.082637812	0.132220499		0	0	0
	CC 0.3m addition		Length (m)	630	GIS/NFCDD	0	Sustain	Medium	0.5	0	0	0	0		0	0	0
	CC 0.5m addition		Length (m)	630	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0		0	0	0
	Railway embankment	113FAS3351010C01	Length (km)	0.21	GIS/NFCDD	5830	Maintain	Short to long term	15	0.018363958	0.022954948	0.027545937	0.0440735		0	0	0
	CC 0.4m addition		Length (m)	210	GIS/NFCDD	0	Sustain	Medium	0.5	0	0	0	0		0	0	0
	CC 0.5m addition		Length (m)	210	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0		0	0	0
	Localised embankments to manage flooding to road/properties at Powderham Castle, Kenton and the mill, average 1m		Length (m)	400	GIS/NFCDD	1292	Manage	Short	1	0.516750489	0.516750489	0.620100587	0.992160939		0	0	0.5
	RTE		Number	1	GIS/NFCDD	26967	Manage	Short	1	0.026966783	0.033708479	0.040450175	0.06472028		0	0	0
	ST land compensation		Area (Ha)	32	GIS/NFCDD	15000	Manage	Short	1	0.48	0.48	0.48	0.48		0	0	0
													1.981813692	TOTAL			
												Cost (£K/Ha) for MR	48.02753807				



FCRMU approach	Asset Type	Asset reference	Parameter	Amount	Reference	Rate (£/parameter)	HLO	Epoch	Epochal discount factor	Basic construction cost (£M)	Plus Tidal/urban uplift (25% each) cost (£M)	Plus PAR, design and supervision (20%) cost (£M)	Plus Optimism bias 60% cost (£M)		FOOTPRINT IMPACT (Ha)		
RESPONSE OPTIONS															SPA/SSSI	SAC	None

Short Term Option 1. Regulated Tidal Exchange, with a RTE device attached to the existing culvert and the tide flap removed. Dawlish Warren sand spit distal section flattened in 2060. Medium to Long Term Option 1. 0.1% AEP.	Wall	690/1902/01	Length (km)	0.24	GIS/NFCDD	5830	Maintain	Short to long term	15	0.020987381	0.026234226	0.031481071	0.050369714		0	0	0
	CC 0.3m addition		Length (m)	240	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0		0	0	0
	Wall	113FAS3351009C05	Length (km)	0.4	GIS/NFCDD	5830	Maintain	Short to long term	15	0.034978968	0.04372371	0.052468452	0.083949523		0	0	0
	CC 0.4m addition		Length (m)	400	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0		0	0	0
	Wall	113FAS3351009C06	Length (km)	0.64	GIS/NFCDD	5830	Maintain	Short to long term	15	0.055966349	0.069957936	0.083949523	0.134319237		0	0	0
	CC 0.7m addition		Length (m)	640	GIS/NFCDD	0	Sustain	Medium	0.5	0	0	0	0		0	0	0
	CC 0.5m addition		Length (m)	640	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0		0	0	0
	Wall	113FAS3351009C07	Length (km)	0.63	GIS/NFCDD	5830	Maintain	Short to long term	15	0.055091875	0.068864843	0.082637812	0.132220499		0	0	0
	CC 0.4m addition		Length (m)	630	GIS/NFCDD	0	Sustain	Medium	0.5	0	0	0	0		0	0	0
	CC 0.5m addition		Length (m)	630	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0		0	0	0
	Railway embankment	113FAS3351010C01	Length (km)	0.21	GIS/NFCDD	5830	Maintain	Short to long term	15	0.018363958	0.022954948	0.027545937	0.0440735		0	0	0
	CC 0.5m addition		Length (m)	210	GIS/NFCDD	0	Sustain	Medium	0.5	0	0	0	0		0	0	0
	CC 0.5m addition		Length (m)	210	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0		0	0	0
	Localised embankments to manage flooding to road/properties at Powderham Castle, Kenton and the mill, average 1.25m		Length (m)	400	GIS/NFCDD	1590	Manage	Short	1	0.63591354	0.63591354	0.763096248	1.220953996		0	0	0.56
	RTE		Number	1	GIS/NFCDD	26967	Manage	Short	1	0.026966783	0.033708479	0.040450175	0.06472028		0	0	0
	ST land compensation		Area (Ha)	32	GIS/NFCDD	15000	Manage	Short	1	0.48	0.48	0.48	0.48		0	0	0
													2.210606749	TOTAL			
												Cost (£K/Ha) for MR	55.17732112				



M.8 Starcross



FCRMU approach	Asset Type	Asset reference	Parameter	Amount	Reference	Rate (£/parameter)	HLO	Epoch	Epochal discount factor	Basic construction cost (£M)	Plus Tidal/urban uplift (25% each) cost (£M)	Plus PAR, design and supervision (20%) cost (£M)	Plus Optimism bias 60% cost (£M)		FOOTPRINT IMPACT (Ha)		
RESPONSE OPTIONS															SPA/SSSI	SAC	None

Short Term Option 1. Vertical or wave recurve wall raising of up to 0.5m along the harbour walls. Dawlish Warren sand spit distal section flattened in 2060. Medium to Long Term Option 1. Vertical or wave recurve wall raising of between 0-1.5m in the medium to long term. Further raising of the short term Cockwood Harbour works of between 0-1m. 2%AEP SoP.	Railway embankment	113FAS3351010C01	Length (km)	0.96	GIS/NFCDD	5830	Maintain	Short to long term	15	0.083949523	0.104936904	0.125924285	0.201478856		0	0	0
	CC 0.9m addition		Length (m)	960	GIS/NFCDD	0	Improve	Medium	0.5	0	0	0	0		0	0	0
	CC 0.4m addition		Length (m)	960	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0		0	0	0
	Railway embankment	113FAS3351011C01	Length (km)	0.61	GIS/NFCDD	5830	Maintain	Short to long term	15	0.053342926	0.066678658	0.080014389	0.128023023		0	0	0
	CC 0.6m addition		Length (m)	610	GIS/NFCDD	0	Sustain	Medium	0.5	0	0	0	0		0	0	0
	CC 0.4m addition		Length (m)	610	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0		0	0	0
	masonry wall	113FAS3351011C04	Length (km)	0.13	GIS/NFCDD	5830	Maintain	Short to long term	15	0.011368165	0.014210206	0.017052247	0.027283595		0	0	0
	No addition		Length (m)	130	GIS/NFCDD	0	Improve	Short	1	0	0	0	0		0	0	0
	CC 0.3m addition		Length (m)	130	GIS/NFCDD	0	Sustain	Medium	0.5	0	0	0	0		0	0	0
	CC 0.4m addition		Length (m)	130	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0		0	0	0
	masonry wall	113FAS3351011C05	Length (km)	0.11	GIS/NFCDD	5830	Maintain	Short to long term	15	0.009619216	0.01202402	0.014428824	0.023086119		0	0	0
	No addition		Length (m)	110	GIS/NFCDD	0	Improve	Short	1	0	0	0	0		0	0	0
	CC 0.3m addition		Length (m)	110	GIS/NFCDD	0	Sustain	Medium	0.5	0	0	0	0		0	0	0
	CC 0.4m addition		Length (m)	110	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0		0	0	0
	masonry wall	113FAS3351011C03	Length (km)	0.08	GIS/NFCDD	5830	Maintain	Short to long term	15	0.006995794	0.008744742	0.01049369	0.016789905		0	0	0
	No addition		Length (m)	80	GIS/NFCDD	0	Improve	Short	1	0	0	0	0		0	0	0
	CC 0.3m addition		Length (m)	80	GIS/NFCDD	0	Sustain	Medium	0.5	0	0	0	0		0	0	0
	CC 0.4m addition		Length (m)	80	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0		0	0	0
	embankment	113FAS3351011C02	Length (km)	0.07	GIS/NFCDD	1166	Maintain	Short to long term	15	0.001224264	0.00153033	0.001836396	0.002938233		0	0	0
	CC 0.2m addition		Length (m)	70	GIS/NFCDD	164	Improve	Short	1	0.01150808	0.017981376	0.021577651	0.034524241		0	0	0.014
	CC 0.3m addition		Length (m)	70	GIS/NFCDD	0	Sustain	Medium	0.5	0	0	0	0		0	0	0
	CC 0.4m addition		Length (m)	70	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0		0	0	0
	embankment	113FAS3351011C06	Length (km)	0.07	GIS/NFCDD	1166	Maintain	Short to long term	15	0.001224264	0.00153033	0.001836396	0.002938233		0	0	0
	CC 0.2m addition		Length (m)	70	GIS/NFCDD	164	Improve	Short	1	0.01150808	0.017981376	0.021577651	0.034524241		0	0	0.014
	CC 0.3m addition		Length (m)	70	GIS/NFCDD	0	Sustain	Medium	0.5	0	0	0	0		0	0	0
	CC 0.4m addition		Length (m)	70	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0		0	0	0
	Railway embankment	113FAS3351012C01	Length (km)	0.28	GIS/NFCDD	5830	Maintain	Short to long term	15	0.024485278	0.030606597	0.036727916	0.058764666		0	0	0
	No addition		Length (m)	280	GIS/NFCDD	0	Sustain	Medium	0.5	0	0	0	0		0	0	0
	No addition		Length (m)	280	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0		0	0	0
													0.530351113	TOTAL			





FCRMU approach	Asset Type	Asset reference	Parameter	Amount	Reference	Rate (£/parameter)	HLO	Epoch	Epochal discount factor	Basic construction cost (£M)	Plus Tidal/urban uplift (25% each) cost (£M)	Plus PAR, design and supervision (20%) cost (£M)	Plus Optimism bias 60% cost (£M)		FOOTPRINT IMPACT (Ha)						
RESPONSE OPTIONS															SPA/SSSI			SAC		None	

Short Term Option 1. Vertical or wave recurve wall raising of up to 0.5m along the harbour walls. Dawlish Warren sand spit distal section flattened in 2060. Medium to Long Term Option 1. Vertical or wave recurve wall raising of between 0-1.5m in the medium to long term. Further raising of the short term Cockwood Harbour works of between 0-1m. 1%AEP SoP.	Railway embankment	113FAS3351010C01	Length (km)	0.96	GIS/NFCDD	5830	Maintain	Short to long term	15	0.083949523	0.104936904	0.125924285	0.201478856			0	0	0
	CC 0.2m addition		Length (m)	960	GIS/NFCDD	167	Improve	Short	1	0.160063758	0.250099621	0.300119546	0.480191273			0	0	0
	CC 0.8m addition		Length (m)	960	GIS/NFCDD	0	Improve	Medium	0.5	0	0	0	0			0	0	0
	CC 0.4m addition		Length (m)	960	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0			0	0	0
	Railway embankment	113FAS3351011C01	Length (km)	0.61	GIS/NFCDD	5830	Maintain	Short to long term	15	0.053342926	0.066678658	0.080014389	0.128023023			0	0	0
	CC 0.7m addition		Length (m)	610	GIS/NFCDD	0	Sustain	Medium	0.5	0	0	0	0			0	0	0
	CC 0.4m addition		Length (m)	610	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0			0	0	0
	masonry wall	113FAS3351011C04	Length (km)	0.13	GIS/NFCDD	5830	Maintain	Short to long term	15	0.011368165	0.014210206	0.017052247	0.027283595			0	0	0
	No addition		Length (m)	130	GIS/NFCDD	0	Improve	Short	1	0	0	0	0			0	0	0
	CC 0.4m addition		Length (m)	130	GIS/NFCDD	0	Sustain	Medium	0.5	0	0	0	0			0	0	0
	CC 0.4m addition		Length (m)	130	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0			0	0	0
	masonry wall	113FAS3351011C05	Length (km)	0.11	GIS/NFCDD	5830	Maintain	Short to long term	15	0.009619216	0.01202402	0.014428824	0.023086119			0	0	0
	CC 0.1m addition		Length (m)	110	GIS/NFCDD	559	Improve	Short	1	0.061466792	0.096041862	0.115250234	0.184400375			0	0	0
	CC 0.4m addition		Length (m)	110	GIS/NFCDD	0	Sustain	Medium	0.5	0	0	0	0			0	0	0
	CC 0.3m addition		Length (m)	110	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0			0	0	0
	masonry wall	113FAS3351011C03	Length (km)	0.08	GIS/NFCDD	5830	Maintain	Short to long term	15	0.006995794	0.008744742	0.01049369	0.016789905			0	0	0
	CC 0.1m addition		Length (m)	80	GIS/NFCDD	559	Improve	Short	1	0.044703121	0.069848627	0.083818352	0.134109363			0	0	0
	CC 0.4m addition		Length (m)	80	GIS/NFCDD	0	Sustain	Medium	0.5	0	0	0	0			0	0	0
	CC 0.3m addition		Length (m)	80	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0			0	0	0
	embankment	113FAS3351011C02	Length (km)	0.07	GIS/NFCDD	1166	Maintain	Short to long term	15	0.001224264	0.00153033	0.001836396	0.002938233			0	0	0
	CC 0.3m addition		Length (m)	70	GIS/NFCDD	164	Improve	Short	1	0.01150808	0.017981376	0.021577651	0.034524241			0	0	0.014
	CC 0.2m addition		Length (m)	70	GIS/NFCDD	0	Sustain	Medium	0.5	0	0	0	0			0	0	0
	CC 0.5m addition		Length (m)	70	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0			0	0	0
	embankment	113FAS3351011C06	Length (km)	0.07	GIS/NFCDD	1166	Maintain	Short to long term	15	0.001224264	0.00153033	0.001836396	0.002938233			0	0	0
	CC 0.3m addition		Length (m)	70	GIS/NFCDD	164	Improve	Short	1	0.01150808	0.017981376	0.021577651	0.034524241			0	0	0.014
	CC 0.2m addition		Length (m)	70	GIS/NFCDD	0	Sustain	Medium	0.5	0	0	0	0			0	0	0
	CC 0.5m addition		Length (m)	70	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0			0	0	0
	Railway embankment	113FAS3351012C01	Length (km)	0.28	GIS/NFCDD	5830	Maintain	Short to long term	15	0.024485278	0.030606597	0.036727916	0.058764666			0	0	0
	No addition		Length (m)	280	GIS/NFCDD	0	Sustain	Medium	0.5	0	0	0	0			0	0	0
	No addition		Length (m)	280	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0			0	0	0
												1.329052124	TOTAL					



FCRMU approach	Asset Type	Asset reference	Parameter	Amount	Reference	Rate (£/parameter)	HLO	Epoch	Epochal discount factor	Basic construction cost (£M)	Plus Tidal/urban uplift (25% each) cost (£M)	Plus PAR, design and supervision (20%) cost (£M)	Plus Optimism bias 60% cost (£M)		FOOTPRINT IMPACT (Ha)		
RESPONSE OPTIONS															SPA/SSSI	SAC	None

Short Term Option 1. Vertical or wave recurve wall raising of up to 0.5m along the harbour walls. Dawlish Warren sand spit distal section flattened in 2060. Medium to Long Term Option 1. Vertical or wave recurve wall raising of between 0-1.5m in the medium to long term. Further raising of the short term Cockwood Harbour works of between 0-1m. 0.5%AEP SoP.	Railway embankment	113FAS3351010C01	Length (km)	0.96	GIS/NFCDD	5830	Maintain	Short to long term	15	0.083949523	0.104936904	0.125924285	0.201478856		0	0	0
	CC 0.3m addition		Length (m)	960	GIS/NFCDD	167	Improve	Short	1	0.160063758	0.250099621	0.300119546	0.480191273		0.0864	0	0
	CC 0.8m addition		Length (m)	960	GIS/NFCDD	0	Improve	Medium	0.5	0	0	0	0		0	0	0
	CC 0.4m addition		Length (m)	960	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0		0	0	0
	Railway embankment	113FAS3351011C01	Length (km)	0.61	GIS/NFCDD	5830	Maintain	Short to long term	15	0.053342926	0.066678658	0.080014389	0.128023023		0	0	0
	CC 0.8m addition		Length (m)	610	GIS/NFCDD	0	Sustain	Medium	0.5	0	0	0	0		0	0	0
	CC 0.4m addition		Length (m)	610	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0		0	0	0
	masonry wall	113FAS3351011C04	Length (km)	0.13	GIS/NFCDD	5830	Maintain	Short to long term	15	0.011368165	0.014210206	0.017052247	0.027283595		0	0	0
	CC 0.1m addition		Length (m)	130	GIS/NFCDD	559	Improve	Short	1	0.072642572	0.113504019	0.136204822	0.217927716		0	0	0
	CC 0.3m addition		Length (m)	130	GIS/NFCDD	0	Sustain	Medium	0.5	0	0	0	0		0	0	0
	CC 0.5m addition		Length (m)	130	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0		0	0	0
	masonry wall	113FAS3351011C05	Length (km)	0.11	GIS/NFCDD	5830	Maintain	Short to long term	15	0.009619216	0.01202402	0.014428824	0.023086119		0	0	0
	CC 0.1m addition		Length (m)	110	GIS/NFCDD	559	Improve	Short	1	0.061466792	0.096041862	0.115250234	0.184400375		0	0	0
	CC 0.3m addition		Length (m)	110	GIS/NFCDD	0	Sustain	Medium	0.5	0	0	0	0		0	0	0
	CC 0.5m addition		Length (m)	110	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0		0	0	0
	masonry wall	113FAS3351011C03	Length (km)	0.08	GIS/NFCDD	5830	Maintain	Short to long term	15	0.006995794	0.008744742	0.01049369	0.016789905		0	0	0
	CC 0.1m addition		Length (m)	80	GIS/NFCDD	559	Improve	Short	1	0.044703121	0.069848627	0.083818352	0.134109363		0	0	0
	CC 0.3m addition		Length (m)	80	GIS/NFCDD	0	Sustain	Medium	0.5	0	0	0	0		0	0	0
	CC 0.5m addition		Length (m)	80	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0		0	0	0
	embankment	113FAS3351011C02	Length (km)	0.07	GIS/NFCDD	1166	Maintain	Short to long term	15	0.001224264	0.00153033	0.001836396	0.002938233		0	0	0
	CC 0.3m addition		Length (m)	70	GIS/NFCDD	164	Improve	Short	1	0.01150808	0.017981376	0.021577651	0.034524241		0	0	0.014
	CC 0.2m addition		Length (m)	70	GIS/NFCDD	0	Sustain	Medium	0.5	0	0	0	0		0	0	0
	CC 0.5m addition		Length (m)	70	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0		0	0	0
	embankment	113FAS3351011C06	Length (km)	0.07	GIS/NFCDD	1166	Maintain	Short to long term	15	0.001224264	0.00153033	0.001836396	0.002938233		0	0	0
	CC 0.3m addition		Length (m)	70	GIS/NFCDD	164	Improve	Short	1	0.01150808	0.017981376	0.021577651	0.034524241		0	0	0.014
	CC 0.3m addition		Length (m)	70	GIS/NFCDD	0	Sustain	Medium	0.5	0	0	0	0		0	0	0
	CC 0.5m addition		Length (m)	70	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0		0	0	0
	Railway embankment	113FAS3351012C01	Length (km)	0.28	GIS/NFCDD	5830	Maintain	Short to long term	15	0.024485278	0.030606597	0.036727916	0.058764666		0	0	0
	No addition		Length (m)	280	GIS/NFCDD	0	Sustain	Medium	0.5	0	0	0	0		0	0	0
	No addition		Length (m)	280	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0		0	0	0
													1.54697984	TOTAL			



FCRMU approach	Asset Type	Asset reference	Parameter	Amount	Reference	Rate (£/parameter)	HLO	Epoch	Epochal discount factor	Basic construction cost (£M)	Plus Tidal/urban uplift (25% each) cost (£M)	Plus PAR, design and supervision (20%) cost (£M)	Plus Optimism bias 60% cost (£M)		FOOTPRINT IMPACT (Ha)						
RESPONSE OPTIONS															SPA/SSSI			SAC		None	

Short Term Option 1. Vertical or wave recurve wall raising of up to 0.5m along the harbour walls. Dawlish Warren sand spit distal section flattened in 2060. Medium to Long Term Option 1. Vertical or wave recurve wall raising of between 0-1.5m in the medium to long term. Further raising of the short term Cockwood Harbour works of between 0-1m. 0.1%AEP SoP.	Railway embankment	113FAS3351010C01	Length (km)	0.96	GIS/NFCDD	5830	Maintain	Short to long term	15	0.083949523	0.104936904	0.125924285	0.201478856			0	0	0
	CC 0.4m addition		Length (m)	960	GIS/NFCDD	333	Improve	Short	1	0.320127515	0.500199243	0.600239091	0.960382546			0.1152	0	0
	CC 0.8m addition		Length (m)	960	GIS/NFCDD	0	Improve	Medium	0.5	0	0	0	0			0	0	0
	CC 0.3m addition		Length (m)	960	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0			0	0	0
	Railway embankment	113FAS3351011C01	Length (km)	0.61	GIS/NFCDD	5830	Maintain	Short to long term	15	0.053342926	0.066678658	0.080014389	0.128023023			0	0	0
	CC 0.8m addition		Length (m)	610	GIS/NFCDD	0	Sustain	Medium	0.5	0	0	0	0			0	0	0
	CC 0.4m addition		Length (m)	610	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0			0	0	0
	masonry wall	113FAS3351011C04	Length (km)	0.13	GIS/NFCDD	5830	Maintain	Short to long term	15	0.011368165	0.014210206	0.017052247	0.027283595			0	0	0
	CC 0.3m addition		Length (m)	130	GIS/NFCDD	559	Improve	Short	1	0.072642572	0.113504019	0.136204822	0.217927716			0	0	0
	CC 0.3m addition		Length (m)	130	GIS/NFCDD	0	Sustain	Medium	0.5	0	0	0	0			0	0	0
	CC 0.5m addition		Length (m)	130	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0			0	0	0
	masonry wall	113FAS3351011C05	Length (km)	0.11	GIS/NFCDD	5830	Maintain	Short to long term	15	0.009619216	0.01202402	0.014428824	0.023086119			0	0	0
	CC 0.3m addition		Length (m)	110	GIS/NFCDD	559	Improve	Short	1	0.061466792	0.096041862	0.115250234	0.184400375			0	0	0
	CC 0.3m addition		Length (m)	110	GIS/NFCDD	0	Sustain	Medium	0.5	0	0	0	0			0	0	0
	CC 0.5m addition		Length (m)	110	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0			0	0	0
	masonry wall	113FAS3351011C03	Length (km)	0.08	GIS/NFCDD	5830	Maintain	Short to long term	15	0.006995794	0.008744742	0.01049369	0.016789905			0	0	0
	CC 0.3m addition		Length (m)	80	GIS/NFCDD	559	Improve	Short	1	0.044703121	0.069848627	0.083818352	0.134109363			0	0	0
	CC 0.3m addition		Length (m)	80	GIS/NFCDD	0	Sustain	Medium	0.5	0	0	0	0			0	0	0
	CC 0.5m addition		Length (m)	80	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0			0	0	0
	embankment	113FAS3351011C02	Length (km)	0.07	GIS/NFCDD	1166	Maintain	Short to long term	15	0.001224264	0.00153033	0.001836396	0.002938233			0	0	0
	CC 0.5m addition		Length (m)	70	GIS/NFCDD	329	Improve	Short	1	0.023016161	0.035962752	0.043155302	0.069048483			0	0	0.014
	CC 0.3m addition		Length (m)	70	GIS/NFCDD	0	Sustain	Medium	0.5	0	0	0	0			0	0	0
	CC 0.4m addition		Length (m)	70	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0			0	0	0
	embankment	113FAS3351011C06	Length (km)	0.07	GIS/NFCDD	1166	Maintain	Short to long term	15	0.001224264	0.00153033	0.001836396	0.002938233			0	0	0
	CC 0.5m addition		Length (m)	70	GIS/NFCDD	329	Improve	Short	1	0.023016161	0.035962752	0.043155302	0.069048483			0	0	0.014
	CC 0.3m addition		Length (m)	70	GIS/NFCDD	0	Sustain	Medium	0.5	0	0	0	0			0	0	0
	CC 0.4m addition		Length (m)	70	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0			0	0	0
	Railway embankment	113FAS3351012C01	Length (km)	0.28	GIS/NFCDD	5830	Maintain	Short to long term	15	0.024485278	0.030606597	0.036727916	0.058764666			0	0	0
	No addition		Length (m)	280	GIS/NFCDD	0	Sustain	Medium	0.5	0	0	0	0			0	0	0
	No addition		Length (m)	280	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0			0	0	0
													2.096219596	TOTAL				



FCRMU approach	Asset Type	Asset reference	Parameter	Amount	Reference	Rate (£/parameter)	HLO	Epoch	Epochal discount factor	Basic construction cost (£M)	Plus Tidal/urban uplift (25% each) cost (£M)	Plus PAR, design and supervision (20%) cost (£M)	Plus Optimism bias 60% cost (£M)		FOOTPRINT IMPACT (Ha)		
RESPONSE OPTIONS															SPA/SSSI	SAC	None

Short Term Option 2. Road and harbour wall raising to the north and south up to 0.5m. Dawlish Warren sand spit distal section flattened in 2060. Medium to Long Term Option 1. Vertical or wave recurve wall raising of between 0-1.5m in the medium to long term. Further raising of the short term Cockwood Harbour works of between 0-1m. 2%AEP SoP.	Railway embankment	113FAS3351010C01	Length (km)	0.96	GIS/NFCDD	5830	Maintain	Short to long term	15	0.083949523	0.104936904	0.125924285	0.201478856		0	0	0
	CC 0.9m addition		Length (m)	960	GIS/NFCDD	0	Improve	Medium	0.5	0	0	0	0		0	0	0
	CC 0.4m addition		Length (m)	960	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0		0	0	0
	Railway embankment	113FAS3351011C01	Length (km)	0.61	GIS/NFCDD	5830	Maintain	Short to long term	15	0.053342926	0.066678658	0.080014389	0.128023023		0	0	0
	CC 0.6m addition		Length (m)	610	GIS/NFCDD	0	Sustain	Medium	0.5	0	0	0	0		0	0	0
	CC 0.4m addition		Length (m)	610	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0		0	0	0
	masonry wall	113FAS3351011C04	Length (km)	0.13	GIS/NFCDD	5830	Maintain	Short to long term	15	0.011368165	0.014210206	0.017052247	0.027283595		0	0	0
	No addition		Length (m)	130	GIS/NFCDD	0	Improve	Short	1	0	0	0	0		0	0	0
	CC 0.3m addition		Length (m)	130	GIS/NFCDD	0	Sustain	Medium	0.5	0	0	0	0		0	0	0
	CC 0.4m addition		Length (m)	130	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0		0	0	0
	masonry wall	113FAS3351011C05	Length (km)	0.11	GIS/NFCDD	5830	Maintain	Short to long term	15	0.009619216	0.01202402	0.014428824	0.023086119		0	0	0
	No addition		Length (m)	110	GIS/NFCDD	0	Improve	Short	1	0	0	0	0		0	0	0
	CC 0.3m addition		Length (m)	110	GIS/NFCDD	0	Sustain	Medium	0.5	0	0	0	0		0	0	0
	CC 0.4m addition		Length (m)	110	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0		0	0	0
	masonry wall	113FAS3351011C03	Length (km)	0.08	GIS/NFCDD	5830	Maintain	Short to long term	15	0.006995794	0.008744742	0.01049369	0.016789905		0	0	0
	No addition		Length (m)	80	GIS/NFCDD	0	Improve	Short	1	0	0	0	0		0	0	0
	CC 0.3m addition		Length (m)	80	GIS/NFCDD	0	Sustain	Medium	0.5	0	0	0	0		0	0	0
	CC 0.4m addition		Length (m)	80	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0		0	0	0
	embankment	113FAS3351011C02	Length (km)	0.07	GIS/NFCDD	1166	Maintain	Short to long term	15	0.001224264	0.00153033	0.001836396	0.002938233		0	0	0
	CC 0.2m addition		Length (m)	70	GIS/NFCDD	164	Improve	Short	1	0.01150808	0.017981376	0.021577651	0.034524241		0	0	0.014
	CC 0.3m addition		Length (m)	70	GIS/NFCDD	0	Sustain	Medium	0.5	0	0	0	0		0	0	0
	CC 0.4m addition		Length (m)	70	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0		0	0	0
	embankment	113FAS3351011C06	Length (km)	0.07	GIS/NFCDD	1166	Maintain	Short to long term	15	0.001224264	0.00153033	0.001836396	0.002938233		0	0	0
	CC 0.2m addition		Length (m)	70	GIS/NFCDD	164	Improve	Short	1	0.01150808	0.017981376	0.021577651	0.034524241		0	0	0.014
	CC 0.3m addition		Length (m)	70	GIS/NFCDD	0	Sustain	Medium	0.5	0	0	0	0		0	0	0
	CC 0.4m addition		Length (m)	70	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0		0	0	0
	0.1m local road raising		Length (m)	50	GIS/NFCDD	323	Improve	Short	1	0.016148453	0.020185566	0.024222679	0.038756287		0	0	0.01
	Railway embankment	113FAS3351012C01	Length (km)	0.28	GIS/NFCDD	5830	Maintain	Short to long term	15	0.024485278	0.030606597	0.036727916	0.058764666		0	0	0
	No addition		Length (m)	280	GIS/NFCDD	0	Sustain	Medium	0.5	0	0	0	0		0	0	0
	No addition		Length (m)	280	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0		0	0	0
												0.5691074	TOTAL				



FCRMU approach	Asset Type	Asset reference	Parameter	Amount	Reference	Rate (£/parameter)	HLO	Epoch	Epochal discount factor	Basic construction cost (£M)	Plus Tidal/urban uplift (25% each) cost (£M)	Plus PAR, design and supervision (20%) cost (£M)	Plus Optimism bias 60% cost (£M)		FOOTPRINT IMPACT (Ha)		
RESPONSE OPTIONS															SPA/SSSI	SAC	None

Short Term Option 2. Road and harbour wall raising to the north and south up to 0.5m. Dawlish Warren sand spit distal section flattened in 2060. Medium to Long Term Option 1. Vertical or wave recurve wall raising of between 0-1.5m in the medium to long term. Further raising of the short term Cockwood Harbour works of between 0-1m. 1%AEP SoP.	Railway embankment	113FAS3351010C01	Length (km)	0.96	GIS/NFCDD	5830	Maintain	Short to long term	15	0.083949523	0.104936904	0.125924285	0.201478856		0	0	0
	CC 0.2m addition		Length (m)	960	GIS/NFCDD	0	Improve	Short	1	0	0	0	0		0	0	0
	CC 0.8m addition		Length (m)	960	GIS/NFCDD	0	Improve	Medium	0.5	0	0	0	0		0	0	0
	CC 0.4m addition		Length (m)	960	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0		0	0	0
	Railway embankment	113FAS3351011C01	Length (km)	0.61	GIS/NFCDD	5830	Maintain	Short to long term	15	0.053342926	0.066678658	0.080014389	0.128023023		0	0	0
	CC 0.7m addition		Length (m)	610	GIS/NFCDD	0	Sustain	Medium	0.5	0	0	0	0		0	0	0
	CC 0.4m addition		Length (m)	610	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0		0	0	0
	masonry wall	113FAS3351011C04	Length (km)	0.13	GIS/NFCDD	5830	Maintain	Short to long term	15	0.011368165	0.014210206	0.017052247	0.027283595		0	0	0
	No addition		Length (m)	130	GIS/NFCDD	0	Improve	Short	1	0	0	0	0		0	0	0
	CC 0.4m addition		Length (m)	130	GIS/NFCDD	0	Sustain	Medium	0.5	0	0	0	0		0	0	0
	CC 0.4m addition		Length (m)	130	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0		0	0	0
	masonry wall	113FAS3351011C05	Length (km)	0.11	GIS/NFCDD	5830	Maintain	Short to long term	15	0.009619216	0.01202402	0.014428824	0.023086119		0	0	0
	CC 0.1m addition		Length (m)	110	GIS/NFCDD	0	Improve	Short	1	0	0	0	0		0	0	0
	CC 0.4m addition		Length (m)	110	GIS/NFCDD	0	Sustain	Medium	0.5	0	0	0	0		0	0	0
	CC 0.3m addition		Length (m)	110	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0		0	0	0
	masonry wall	113FAS3351011C03	Length (km)	0.08	GIS/NFCDD	5830	Maintain	Short to long term	15	0.006995794	0.008744742	0.01049369	0.016789905		0	0	0
	CC 0.1m addition		Length (m)	80	GIS/NFCDD	0	Improve	Short	1	0	0	0	0		0	0	0
	CC 0.4m addition		Length (m)	80	GIS/NFCDD	0	Sustain	Medium	0.5	0	0	0	0		0	0	0
	CC 0.3m addition		Length (m)	80	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0		0	0	0
	embankment	113FAS3351011C02	Length (km)	0.07	GIS/NFCDD	1166	Maintain	Short to long term	15	0.001224264	0.00153033	0.001836396	0.002938233		0	0	0
	CC 0.3m addition		Length (m)	70	GIS/NFCDD	164	Improve	Short	1	0.01150808	0.017981376	0.021577651	0.034524241		0	0	0.014
	CC 0.2m addition		Length (m)	70	GIS/NFCDD	0	Sustain	Medium	0.5	0	0	0	0		0	0	0
	CC 0.5m addition		Length (m)	70	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0		0	0	0
	embankment	113FAS3351011C06	Length (km)	0.07	GIS/NFCDD	1166	Maintain	Short to long term	15	0.001224264	0.00153033	0.001836396	0.002938233		0	0	0
	CC 0.3m addition		Length (m)	70	GIS/NFCDD	164	Improve	Short	1	0.01150808	0.017981376	0.021577651	0.034524241		0	0	0.014
	CC 0.2m addition		Length (m)	70	GIS/NFCDD	0	Sustain	Medium	0.5	0	0	0	0		0	0	0
	CC 0.5m addition		Length (m)	70	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0		0	0	0
	0.2m local road raising		Length (m)	50	GIS/NFCDD	323	Improve	Short	1	0.016148453	0.020185566	0.024222679	0.038756287		0	0	0.01
	Railway embankment	113FAS3351012C01	Length (km)	0.28	GIS/NFCDD	5830	Maintain	Short to long term	15	0.024485278	0.030606597	0.036727916	0.058764666		0	0	0
	No addition		Length (m)	280	GIS/NFCDD	0	Sustain	Medium	0.5	0	0	0	0		0	0	0
	No addition		Length (m)	280	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0		0	0	0
													0.5691074	TOTAL			



FCRMU approach	Asset Type	Asset reference	Parameter	Amount	Reference	Rate (£/parameter)	HLO	Epoch	Epochal discount factor	Basic construction cost (£M)	Plus Tidal/urban uplift (25% each) cost (£M)	Plus PAR, design and supervision (20%) cost (£M)	Plus Optimism bias 60% cost (£M)		FOOTPRINT IMPACT (Ha)		
RESPONSE OPTIONS															SPA/SSSI	SAC	None

Short Term Option 2. Road and harbour wall raising to the north and south up to 0.5m. Dawlish Warren sand spit distal section flattened in 2060. Medium to Long Term Option 1. Vertical or wave recurve wall raising of between 0-1.5m in the medium to long term. Further raising of the short term Cockwood Harbour works of between 0-1m. 0.5%AEP SoP.	Railway embankment	113FAS3351010C01	Length (km)	0.96	GIS/NFCDD	5830	Maintain	Short to long term	15	0.083949523	0.104936904	0.125924285	0.201478856		0	0	0
	CC 0.3m addition		Length (m)	960	GIS/NFCDD	0	Improve	Short	1	0	0	0	0		0	0	0
	CC 0.8m addition		Length (m)	960	GIS/NFCDD	0	Improve	Medium	0.5	0	0	0	0		0	0	0
	CC 0.4m addition		Length (m)	960	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0		0	0	0
	Railway embankment	113FAS3351011C01	Length (km)	0.61	GIS/NFCDD	5830	Maintain	Short to long term	15	0.053342926	0.066678658	0.080014389	0.128023023		0	0	0
	CC 0.8m addition		Length (m)	610	GIS/NFCDD	0	Sustain	Medium	0.5	0	0	0	0		0	0	0
	CC 0.4m addition		Length (m)	610	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0		0	0	0
	masonry wall	113FAS3351011C04	Length (km)	0.13	GIS/NFCDD	5830	Maintain	Short to long term	15	0.011368165	0.014210206	0.017052247	0.027283595		0	0	0
	CC 0.1m addition		Length (m)	130	GIS/NFCDD	0	Improve	Short	1	0	0	0	0		0	0	0
	CC 0.3m addition		Length (m)	130	GIS/NFCDD	0	Sustain	Medium	0.5	0	0	0	0		0	0	0
	CC 0.5m addition		Length (m)	130	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0		0	0	0
	masonry wall	113FAS3351011C05	Length (km)	0.11	GIS/NFCDD	5830	Maintain	Short to long term	15	0.009619216	0.01202402	0.014428824	0.023086119		0	0	0
	CC 0.1m addition		Length (m)	110	GIS/NFCDD	0	Improve	Short	1	0	0	0	0		0	0	0
	CC 0.3m addition		Length (m)	110	GIS/NFCDD	0	Sustain	Medium	0.5	0	0	0	0		0	0	0
	CC 0.5m addition		Length (m)	110	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0		0	0	0
	masonry wall	113FAS3351011C03	Length (km)	0.08	GIS/NFCDD	5830	Maintain	Short to long term	15	0.006995794	0.008744742	0.01049369	0.016789905		0	0	0
	CC 0.1m addition		Length (m)	80	GIS/NFCDD	0	Improve	Short	1	0	0	0	0		0	0	0
	CC 0.3m addition		Length (m)	80	GIS/NFCDD	0	Sustain	Medium	0.5	0	0	0	0		0	0	0
	CC 0.5m addition		Length (m)	80	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0		0	0	0
	embankment	113FAS3351011C02	Length (km)	0.07	GIS/NFCDD	1166	Maintain	Short to long term	15	0.001224264	0.00153033	0.001836396	0.002938233		0	0	0
	CC 0.3m addition		Length (m)	70	GIS/NFCDD	164	Improve	Short	1	0.01150808	0.017981376	0.021577651	0.034524241		0	0	0.014
	CC 0.2m addition		Length (m)	70	GIS/NFCDD	0	Sustain	Medium	0.5	0	0	0	0		0	0	0
	CC 0.5m addition		Length (m)	70	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0		0	0	0
	embankment	113FAS3351011C06	Length (km)	0.07	GIS/NFCDD	1166	Maintain	Short to long term	15	0.001224264	0.00153033	0.001836396	0.002938233		0	0	0
	CC 0.3m addition		Length (m)	70	GIS/NFCDD	164	Improve	Short	1	0.01150808	0.017981376	0.021577651	0.034524241		0	0	0.014
	CC 0.3m addition		Length (m)	70	GIS/NFCDD	0	Sustain	Medium	0.5	0	0	0	0		0	0	0
	CC 0.5m addition		Length (m)	70	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0		0	0	0
	0.3m local road raising		Length (m)	50	GIS/NFCDD	323	Improve	Short	1	0.016148453	0.020185566	0.024222679	0.038756287		0	0	0.01
	Railway embankment	113FAS3351012C01	Length (km)	0.28	GIS/NFCDD	5830	Maintain	Short to long term	15	0.024485278	0.030606597	0.036727916	0.058764666		0	0	0
	No addition		Length (m)	280	GIS/NFCDD	0	Sustain	Medium	0.5	0	0	0	0		0	0	0
	No addition		Length (m)	280	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0		0	0	0
													0.5691074	TOTAL			



FCRMU approach	Asset Type	Asset reference	Parameter	Amount	Reference	Rate (£/parameter)	HLO	Epoch	Epochal discount factor	Basic construction cost (£M)	Plus Tidal/urban uplift (25% each) cost (£M)	Plus PAR, design and supervision (20%) cost (£M)	Plus Optimism bias 60% cost (£M)		FOOTPRINT IMPACT (Ha)		
RESPONSE OPTIONS															SPA/SSSI	SAC	None

Short Term Option 2. Road and harbour wall raising to the north and south up to 0.5m. Dawlish Warren sand spit distal section flattened in 2060. Medium to Long Term Option 1. Vertical or wave recurve wall raising of between 0-1.5m in the medium to long term. Further raising of the short term Cockwood Harbour works of between 0-1m. 0.1%AEP SoP.	Railway embankment	113FAS3351010C01	Length (km)	0.96	GIS/NFCDD	5830	Maintain	Short to long term	15	0.083949523	0.104936904	0.125924285	0.201478856		0	0	0
	CC 0.4m addition		Length (m)	960	GIS/NFCDD	0	Improve	Short	1	0	0	0	0		0	0	0
	CC 0.8m addition		Length (m)	960	GIS/NFCDD	0	Improve	Medium	0.5	0	0	0	0		0	0	0
	CC 0.3m addition		Length (m)	960	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0		0	0	0
	Railway embankment	113FAS3351011C01	Length (km)	0.61	GIS/NFCDD	5830	Maintain	Short to long term	15	0.053342926	0.066678658	0.080014389	0.128023023		0	0	0
	CC 0.8m addition		Length (m)	610	GIS/NFCDD	0	Sustain	Medium	0.5	0	0	0	0		0	0	0
	CC 0.4m addition		Length (m)	610	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0		0	0	0
	masonry wall	113FAS3351011C04	Length (km)	0.13	GIS/NFCDD	5830	Maintain	Short to long term	15	0.011368165	0.014210206	0.017052247	0.027283595		0	0	0
	CC 0.3m addition		Length (m)	130	GIS/NFCDD	0	Improve	Short	1	0	0	0	0		0	0	0
	CC 0.3m addition		Length (m)	130	GIS/NFCDD	0	Sustain	Medium	0.5	0	0	0	0		0	0	0
	CC 0.5m addition		Length (m)	130	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0		0	0	0
	masonry wall	113FAS3351011C05	Length (km)	0.11	GIS/NFCDD	5830	Maintain	Short to long term	15	0.009619216	0.01202402	0.014428824	0.023086119		0	0	0
	CC 0.3m addition		Length (m)	110	GIS/NFCDD	0	Improve	Short	1	0	0	0	0		0	0	0
	CC 0.3m addition		Length (m)	110	GIS/NFCDD	0	Sustain	Medium	0.5	0	0	0	0		0	0	0
	CC 0.5m addition		Length (m)	110	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0		0	0	0
	masonry wall	113FAS3351011C03	Length (km)	0.08	GIS/NFCDD	5830	Maintain	Short to long term	15	0.006995794	0.008744742	0.01049369	0.016789905		0	0	0
	CC 0.3m addition		Length (m)	80	GIS/NFCDD	0	Improve	Short	1	0	0	0	0		0	0	0
	CC 0.3m addition		Length (m)	80	GIS/NFCDD	0	Sustain	Medium	0.5	0	0	0	0		0	0	0
	CC 0.5m addition		Length (m)	80	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0		0	0	0
	embankment	113FAS3351011C02	Length (km)	0.07	GIS/NFCDD	1166	Maintain	Short to long term	15	0.001224264	0.00153033	0.001836396	0.002938233		0	0	0
	CC 0.5m addition		Length (m)	70	GIS/NFCDD	329	Improve	Short	1	0.023016161	0.035962752	0.043155302	0.069048483		0	0	0.014
	CC 0.3m addition		Length (m)	70	GIS/NFCDD	0	Sustain	Medium	0.5	0	0	0	0		0	0	0
	CC 0.4m addition		Length (m)	70	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0		0	0	0
	embankment	113FAS3351011C06	Length (km)	0.07	GIS/NFCDD	1166	Maintain	Short to long term	15	0.001224264	0.00153033	0.001836396	0.002938233		0	0	0
	CC 0.5m addition		Length (m)	70	GIS/NFCDD	329	Improve	Short	1	0.023016161	0.035962752	0.043155302	0.069048483		0	0	0.014
	CC 0.3m addition		Length (m)	70	GIS/NFCDD	0	Sustain	Medium	0.5	0	0	0	0		0	0	0
	CC 0.4m addition		Length (m)	70	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0		0	0	0
	0.5m local road raising		Length (m)	50	GIS/NFCDD	646	Improve	Short	1	0.032296906	0.040371132	0.048445358	0.077512573		0	0	0.01
	Railway embankment	113FAS3351012C01	Length (km)	0.28	GIS/NFCDD	5830	Maintain	Short to long term	15	0.024485278	0.030606597	0.036727916	0.058764666		0	0	0
	No addition		Length (m)	280	GIS/NFCDD	0	Sustain	Medium	0.5	0	0	0	0		0	0	0
	No addition		Length (m)	280	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0		0	0	0
													0.676912169	TOTAL			



M.9 Dawlish Warren sand spit and village

FCRMU approach	Asset Type	Asset reference	Parameter	Amount	Reference	Rate (£/parameter)	HLO	Epoch	Epochal discount factor	Basic construction cost (£M)	Plus Tidal/urban uplift (25% each) cost (£M)	Plus PAR, design and supervision (20%) cost (£M)	Plus Optimism bias 60% cost (£M)		FOOTPRINT IMPACT (Ha)			
RESPONSE OPTIONS																SPA/SSSI	SAC	None
Options 3,8,12 Central/distal sections managed realignment, proximal section sustained into future. Ground raising around car park. 2%AEP SoP	Railway embankment	113FAS3351012C01	Length (km)	1.55	GIS/NFCDD	5830	Maintain	Short to long term	15	0.135543501	0.169429376	0.203315252	0.325304403		0	0	0	
	Embankment	113FAS3351013C01	Length (km)	0.1	GIS/NFCDD	1166	Maintain	Short to long term	15	0.001748948	0.002186186	0.002623423	0.004197476		0	0	0	
	gabions	113FAS3351013C02	Length (km)	0.09	GIS/NFCDD	0	NAI	Short to long term	15	0	0	0	0		0	0	0	
	wall	113FAS3351013C03	Length (km)	0.03	GIS/NFCDD	0	NAI	Short to long term	15	0	0	0	0		0	0	0	
	gabion wall	113FAS3351013C04	Length (km)	0.18	GIS/NFCDD	0	NAI	Short to long term	15	0	0	0	0		0	0	0	
	wall	113FAS3351013C05	Length (km)	0.12	GIS/NFCDD	0	NAI	Short to long term	15	0	0	0	0		0	0	0	
	wall	113FAS3351013C06	Length (km)	0.02	GIS/NFCDD	0	NAI	Short to long term	15	0	0	0	0		0	0	0	
	gabion revetment	113FAS3351013C07	Length (km)	0.08	GIS/NFCDD	0	NAI	Short to long term	15	0	0	0	0		0	0	0	
	Bank	113FAS3351013C09	Length (km)	1.27	GIS/NFCDD	0	NAI	Short to long term	15	0	0	0	0		0	0	0	
	Recharge/recycling high end estimate	113FAS3351014C01	Volume (m3)	6450	Conceptual model	23	Maintain	Short	15	2.26	3.525224121	4.230268946	6.768430313		0	0	0	
	Natural Cliff	113FBS3351501C01	Length (km)	0.1	GIS/NFCDD	0	Maintain	Short to long term	15	0	0	0	0		0	0	0	
	Rock Armour	113FAS3351015C02	Length (km)	0.28	GIS/NFCDD	5830	Maintain	Short to long term	15	0.024485278	0.030606597	0.036727916	0.058764666		0	0	0	
	concrete wall	113FAS3351015C01	Length (km)	0.41	GIS/NFCDD	5830	Maintain	Short to long term	15	0.035853442	0.044816803	0.053780163	0.086048261		0	0	0	
	Revetment	113FAS3351014C02	Length (km)	0.32	GIS/NFCDD	5830	Maintain	Short to long term	15	0.027983174	0.034978968	0.041974762	0.067159619		0	0	0	
															0	0	0	
	Groyne maintenance		Number	16	GIS/NFCDD	874	Maintain	Short	15	0.209873808	0.26234226	0.314810712	0.50369714		0	0	0	
	Groyne reconstruction		Number	8	GIS/NFCDD	13861	Maintain	Short	0.8	0.08870993	0.110887413	0.133064895	0.212903832		0	0	0	
	Removal of gabions phase 1 (3-7)	Gabions, based on demolition cost per estimated m3	m3	360	GIS/NFCDD	108	NAI	Short	0.8	0.031065734	0.038832168	0.046598601	0.074557762		0	0	0	
	Removal of gabions phase 2 and 3 (7-13)	Gabions, based on demolition cost per estimated m3	m3	360	GIS/NFCDD	108	NAI	Short	0.5	0.019416084	0.024270105	0.029124126	0.046598601		0	0	0	
	0.9m ground raising around car park		Length (m)	350		1130		Short	0.8	0.316509674	0.395637093	0.474764512	0.759623219		0	0.28	0	
	CC 0.25m addition		Length (m)	350		0		Medium	0.5	0	0	0	0		0	0.0525	0	
CC 0.4m addition		Length (m)	350		0		Long	0.2	0	0	0	0		0	0.084	0		
													8.907285292	TOTAL				



FCRMU approach	Asset Type	Asset reference	Parameter	Amount	Reference	Rate (£/parameter)	HLO	Epoch	Epochal discount factor	Basic construction cost (£M)	Plus Tidal/urban uplift (25% each) cost (£M)	Plus PAR, design and supervision (20%) cost (£M)	Plus Optimism bias 60% cost (£M)		FOOTPRINT IMPACT (Ha)		
RESPONSE OPTIONS															SPA/SSSI	SAC	None
Options 3,8,12 Central/distal sections managed realignment, proximal section sustained into future. Ground raising around car park. 1%AEP SoP	Railway embankment	113FAS3351012C01	Length (km)	1.55	GIS/NFCDD	5830	Maintain	Short to long term	15	0.135543501	0.169429376	0.203315252	0.325304403		0	0	0
	Embankment	113FAS3351013C01	Length (km)	0.1	GIS/NFCDD	1166	Maintain	Short to long term	15	0.001748948	0.002186186	0.002623423	0.004197476		0	0	0
	gabions	113FAS3351013C02	Length (km)	0.09	GIS/NFCDD	0	NAI	Short to long term	15	0	0	0	0		0	0	0
	wall	113FAS3351013C03	Length (km)	0.03	GIS/NFCDD	0	NAI	Short to long term	15	0	0	0	0		0	0	0
	gabion wall	113FAS3351013C04	Length (km)	0.18	GIS/NFCDD	0	NAI	Short to long term	15	0	0	0	0		0	0	0
	wall	113FAS3351013C05	Length (km)	0.12	GIS/NFCDD	0	NAI	Short to long term	15	0	0	0	0		0	0	0
	wall	113FAS3351013C06	Length (km)	0.02	GIS/NFCDD	0	NAI	Short to long term	15	0	0	0	0		0	0	0
	gabion revetment	113FAS3351013C07	Length (km)	0.08	GIS/NFCDD	0	NAI	Short to long term	15	0	0	0	0		0	0	0
	Bank	113FAS3351013C09	Length (km)	1.27	GIS/NFCDD	0	NAI	Short to long term	15	0	0	0	0		0	0	0
	Recharge/recycling high end estimate	113FAS3351014C01	Volume (m3)	6450	Conceptual model	23	Maintain	Short	15	2.26	3.525224121	4.230268946	6.768430313		0	0	0
	Natural Cliff	113FBS3351501C01	Length (km)	0.1	GIS/NFCDD	0	Maintain	Short to long term	15	0	0	0	0		0	0	0
	Rock Armour	113FAS3351015C02	Length (km)	0.28	GIS/NFCDD	5830	Maintain	Short to long term	15	0.024485278	0.030606597	0.036727916	0.058764666		0	0	0
	concrete wall	113FAS3351015C01	Length (km)	0.41	GIS/NFCDD	5830	Maintain	Short to long term	15	0.035853442	0.044816803	0.053780163	0.086048261		0	0	0
	Revetment	113FAS3351014C02	Length (km)	0.32	GIS/NFCDD	5830	Maintain	Short to long term	15	0.027983174	0.034978968	0.041974762	0.067159619		0	0	0
	Groyne maintenance		Number	16	GIS/NFCDD	874	Maintain	Short	15	0.209873808	0.26234226	0.314810712	0.50369714		0	0	0
	Groyne reconstruction		Number	8	GIS/NFCDD	13861	Maintain	Short	0.8	0.08870993	0.110887413	0.133064895	0.212903832		0	0	0
	Removal of gabions phase 1 (3-7)	Gabions, based on demolition cost per estimated m3	m3	360	GIS/NFCDD	108	NAI	Short	0.8	0.031065734	0.038832168	0.046598601	0.074557762		0	0	0
	Removal of gabions phase 2 and 3 (7-13)	Gabions, based on demolition cost per estimated m3	m3	360	GIS/NFCDD	108	NAI	Short	0.5	0.019416084	0.024270105	0.029124126	0.046598601		0	0	0
	1m ground raising around car park		Length (m)	350		1292		Short	0.8	0.361725342	0.452156678	0.542588013	0.868140821		0	0.28	0
	CC 0.25m addition		Length (m)	350		0		Medium	0.5	0	0	0	0		0	0.0525	0
	CC 0.4m addition		Length (m)	350		0		Long	0.2	0	0	0	0		0	0.084	0
													9.015802895	TOTAL			



FCRMU approach	Asset Type	Asset reference	Parameter	Amount	Reference	Rate (£/parameter)	HLO	Epoch	Epochal discount factor	Basic construction cost (£M)	Plus Tidal/urban uplift (25% each) cost (£M)	Plus PAR, design and supervision (20%) cost (£M)	Plus Optimism bias 60% cost (£M)		FOOTPRINT IMPACT (Ha)		
RESPONSE OPTIONS															SPA/SSSI	SAC	None
Options 3,8,12 Central/distal sections managed realignment, proximal section sustained into future. Ground raising around car park. 0.5%AEP SoP	Railway embankment	113FAS3351012C01	Length (km)	1.55	GIS/NFCDD	5830	Maintain	Short to long term	15	0.135543501	0.169429376	0.203315252	0.325304403		0	0	0
	Embankment	113FAS3351013C01	Length (km)	0.1	GIS/NFCDD	1166	Maintain	Short to long term	15	0.001748948	0.002186186	0.002623423	0.004197476		0	0	0
	gabions	113FAS3351013C02	Length (km)	0.09	GIS/NFCDD	0	NAI	Short to long term	15	0	0	0	0		0	0	0
	wall	113FAS3351013C03	Length (km)	0.03	GIS/NFCDD	0	NAI	Short to long term	15	0	0	0	0		0	0	0
	gabion wall	113FAS3351013C04	Length (km)	0.18	GIS/NFCDD	0	NAI	Short to long term	15	0	0	0	0		0	0	0
	wall	113FAS3351013C05	Length (km)	0.12	GIS/NFCDD	0	NAI	Short to long term	15	0	0	0	0		0	0	0
	wall	113FAS3351013C06	Length (km)	0.02	GIS/NFCDD	0	NAI	Short to long term	15	0	0	0	0		0	0	0
	gabion revetment	113FAS3351013C07	Length (km)	0.08	GIS/NFCDD	0	NAI	Short to long term	15	0	0	0	0		0	0	0
	Bank	113FAS3351013C09	Length (km)	1.27	GIS/NFCDD	0	NAI	Short to long term	15	0	0	0	0		0	0	0
	Recharge/recycling high end estimate	113FAS3351014C01	Volume (m3)	6450	Conceptual model	23	Maintain	Short	15	2.26	3.525224121	4.230268946	6.768430313		0	0	0
	Natural Cliff	113FBS3351501C01	Length (km)	0.1	GIS/NFCDD	0	Maintain	Short to long term	15	0	0	0	0		0	0	0
	Rock Armour	113FAS3351015C02	Length (km)	0.28	GIS/NFCDD	5830	Maintain	Short to long term	15	0.024485278	0.030606597	0.036727916	0.058764666		0	0	0
	concrete wall	113FAS3351015C01	Length (km)	0.41	GIS/NFCDD	5830	Maintain	Short to long term	15	0.035853442	0.044816803	0.053780163	0.086048261		0	0	0
	Revetment	113FAS3351014C02	Length (km)	0.32	GIS/NFCDD	5830	Maintain	Short to long term	15	0.027983174	0.034978968	0.041974762	0.067159619		0	0	0
															0	0	0
	Groyne maintenance		Number	16	GIS/NFCDD	874	Maintain	Short	15	0.209873808	0.26234226	0.314810712	0.50369714		0	0	0
	Groyne reconstruction		Number	8	GIS/NFCDD	13861	Maintain	Short	0.8	0.08870993	0.110887413	0.133064895	0.212903832		0	0	0
	Removal of gabions phase 1 (3-7)	Gabions, based on demolition cost per estimated m3	m3	360	GIS/NFCDD	108	NAI	Short	0.8	0.031065734	0.038832168	0.046598601	0.074557762		0	0	0
	Removal of gabions phase 2 and 3 (7-13)	Gabions, based on demolition cost per estimated m3	m3	360	GIS/NFCDD	108	NAI	Short	0.5	0.019416084	0.024270105	0.029124126	0.046598601		0	0	0
	1.1m ground raising around car park		Length (m)	350		1441		Short	0.8	0.40343241	0.504290512	0.605148615	0.968237784		0	0.28	0
	CC 0.25m addition		Length (m)	350		0		Medium	0.5	0	0	0	0		0	0.0525	0
	CC 0.4m addition		Length (m)	350		0		Long	0.2	0	0	0	0		0	0.084	0
													9.115899858	TOTAL			



FCRMU approach	Asset Type	Asset reference	Parameter	Amount	Reference	Rate (£/parameter)	HLO	Epoch	Epochal discount factor	Basic construction cost (£M)	Plus Tidal/urban uplift (25% each) cost (£M)	Plus PAR, design and supervision (20%) cost (£M)	Plus Optimism bias 60% cost (£M)		FOOTPRINT IMPACT (Ha)			
																SPA/SSSI	SAC	None
RESPONSE OPTIONS																		
Options 3,8,12 Central/distal sections managed realignment, proximal section sustained into future. Ground raising around car park. 0.1%AEP SoP	Railway embankment	113FAS3351012C01	Length (km)	1.55	GIS/NFCDD	5830	Maintain	Short to long term	15	0.135543501	0.169429376	0.203315252	0.325304403			0	0	0
	Embankment	113FAS3351013C01	Length (km)	0.1	GIS/NFCDD	1166	Maintain	Short to long term	15	0.001748948	0.002186186	0.002623423	0.004197476			0	0	0
	gabions	113FAS3351013C02	Length (km)	0.09	GIS/NFCDD	0	NAI	Short to long term	15	0	0	0	0			0	0	0
	wall	113FAS3351013C03	Length (km)	0.03	GIS/NFCDD	0	NAI	Short to long term	15	0	0	0	0			0	0	0
	gabion wall	113FAS3351013C04	Length (km)	0.18	GIS/NFCDD	0	NAI	Short to long term	15	0	0	0	0			0	0	0
	wall	113FAS3351013C05	Length (km)	0.12	GIS/NFCDD	0	NAI	Short to long term	15	0	0	0	0			0	0	0
	wall	113FAS3351013C06	Length (km)	0.02	GIS/NFCDD	0	NAI	Short to long term	15	0	0	0	0			0	0	0
	gabion revetment	113FAS3351013C07	Length (km)	0.08	GIS/NFCDD	0	NAI	Short to long term	15	0	0	0	0			0	0	0
	Bank	113FAS3351013C09	Length (km)	1.27	GIS/NFCDD	0	NAI	Short to long term	15	0	0	0	0			0	0	0
	Recharge/recycling high end estimate	113FAS3351014C01	Volume (m3)	6450	Conceptual model	23	Maintain	Short	15	2.26	3.525224121	4.230268946	6.768430313			0	0	0
	Natural Cliff	113FBS3351501C01	Length (km)	0.1	GIS/NFCDD	0	Maintain	Short to long term	15	0	0	0	0			0	0	0
	Rock Armour	113FAS3351015C02	Length (km)	0.28	GIS/NFCDD	5830	Maintain	Short to long term	15	0.024485278	0.030606597	0.036727916	0.058764666			0	0	0
	concrete wall	113FAS3351015C01	Length (km)	0.41	GIS/NFCDD	5830	Maintain	Short to long term	15	0.035853442	0.044816803	0.053780163	0.086048261			0	0	0
	Revetment	113FAS3351014C02	Length (km)	0.32	GIS/NFCDD	5830	Maintain	Short to long term	15	0.027983174	0.034978968	0.041974762	0.067159619			0	0	0
	Groyne maintenance		Number	16	GIS/NFCDD	874	Maintain	Short	15	0.209873808	0.26234226	0.314810712	0.50369714			0	0	0
	Groyne reconstruction		Number	8	GIS/NFCDD	13861	Maintain	Short	0.8	0.08870993	0.110887413	0.133064895	0.212903832			0	0	0
	Removal of gabions phase 1 (3-7)	Gabions, based on demolition cost per estimated m3	m3	360	GIS/NFCDD	108	NAI	Short	0.8	0.031065734	0.038832168	0.046598601	0.074557762			0	0	0
	Removal of gabions phase 2 and 3 (7-13)	Gabions, based on demolition cost per estimated m3	m3	360	GIS/NFCDD	108	NAI	Short	0.5	0.019416084	0.024270105	0.029124126	0.046598601			0	0	0
	1.25m ground raising around car park		Length (m)	350		1590		Short	0.8	0.445139478	0.556424347	0.667709217	1.068334747			0	0.28	0
	CC 0.25m addition		Length (m)	350		0		Medium	0.5	0	0	0	0			0	0.0525	0
	CC 0.4m addition		Length (m)	350		0		Long	0.2	0	0	0	0			0	0.084	0
													9.21599682	TOTAL				



FCRMU approach	Asset Type	Asset reference	Parameter	Amount	Reference	Rate (£/parameter)	HLO	Epoch	Epochal discount factor	Basic construction cost (£M)	Plus Tidal/urban uplift (25% each) cost (£M)	Plus PAR, design and supervision (20%) cost (£M)	Plus Optimism bias 60% cost (£M)		FOOTPRINT IMPACT (Ha)			
RESPONSE OPTIONS																SPA/SSSI	SAC	None
Options 3,8,12 Central/distal sections managed realignment, proximal section sustained into future. Ground raising around visitor centre. 2%AEP SoP	Railway embankment	113FAS3351012C01	Length (km)	1.55	GIS/NFCDD	5830	Maintain	Short to long term	15	0.135543501	0.169429376	0.203315252	0.325304403		0	0	0	
	Embankment	113FAS3351013C01	Length (km)	0.1	GIS/NFCDD	1166	Maintain	Short to long term	15	0.001748948	0.002186186	0.002623423	0.004197476		0	0	0	
	gabions	113FAS3351013C02	Length (km)	0.09	GIS/NFCDD	0	NAI	Short to long term	15	0	0	0	0		0	0	0	
	wall	113FAS3351013C03	Length (km)	0.03	GIS/NFCDD	0	NAI	Short to long term	15	0	0	0	0		0	0	0	
	gabion wall	113FAS3351013C04	Length (km)	0.18	GIS/NFCDD	0	NAI	Short to long term	15	0	0	0	0		0	0	0	
	wall	113FAS3351013C05	Length (km)	0.12	GIS/NFCDD	0	NAI	Short to long term	15	0	0	0	0		0	0	0	
	wall	113FAS3351013C06	Length (km)	0.02	GIS/NFCDD	0	NAI	Short to long term	15	0	0	0	0		0	0	0	
	gabion revetment	113FAS3351013C07	Length (km)	0.08	GIS/NFCDD	0	NAI	Short to long term	15	0	0	0	0		0	0	0	
	Bank	113FAS3351013C09	Length (km)	1.27	GIS/NFCDD	0	NAI	Short to long term	15	0	0	0	0		0	0	0	
	Recharge/recycling high end estimate	113FAS3351014C01	Volume (m3)	6450	Conceptual model	23	Maintain	Short	15	2.26	3.525224121	4.230268946	6.768430313		0	0	0	
	Natural Cliff	113FBS3351501C01	Length (km)	0.1	GIS/NFCDD	0	Maintain	Short to long term	15	0	0	0	0		0	0	0	
	Rock Armour	113FAS3351015C02	Length (km)	0.28	GIS/NFCDD	5830	Maintain	Short to long term	15	0.024485278	0.030606597	0.036727916	0.058764666		0	0	0	
	concrete wall	113FAS3351015C01	Length (km)	0.41	GIS/NFCDD	5830	Maintain	Short to long term	15	0.035853442	0.044816803	0.053780163	0.086048261		0	0	0	
	Revetment	113FAS3351014C02	Length (km)	0.32	GIS/NFCDD	5830	Maintain	Short to long term	15	0.027983174	0.034978968	0.041974762	0.067159619		0	0	0	
	Groyne maintenance		Number	16	GIS/NFCDD	874	Maintain	Short to medium	15	0.209873808	0.26234226	0.314810712	0.50369714		0	0	0	
	Groyne reconstruction		Number	8	GIS/NFCDD	13861	Maintain	Short	0.8	0.08870993	0.110887413	0.133064895	0.212903832		0	0	0	
	Removal of gabions phase 1 (3-7)	Gabions, based on demolition cost per estimated m3	m3	360	GIS/NFCDD	108	NAI	Short	0.8	0.031065734	0.038832168	0.046598601	0.074557762		0	0	0	
	Removal of gabions phase 2 and 3 (7-13)	Gabions, based on demolition cost per estimated m3	m3	360	GIS/NFCDD	108	NAI	Short	0.5	0.019416084	0.024270105	0.029124126	0.046598601		0	0	0	
	0.1m ground raising around visitor centre		Length (m)	150		161		Short	0.8	0.019378143	0.024222679	0.029067215	0.046507544		0	0.0675	0	
	CC 0.25m addition		Length (m)	150		0		Medium	0.5	0	0	0	0		0	0.0225	0	
	CC 0.4m addition		Length (m)	150		0		Long	0.2	0	0	0	0		0	0.036	0	
													8.194169618	TOTAL				



FCRMU approach	Asset Type	Asset reference	Parameter	Amount	Reference	Rate (£/parameter)	HLO	Epoch	Epochal discount factor	Basic construction cost (£M)	Plus Tidal/urban uplift (25% each) cost (£M)	Plus PAR, design and supervision (20%) cost (£M)	Plus Optimism bias 60% cost (£M)		FOOTPRINT IMPACT (Ha)			
RESPONSE OPTIONS																SPA/SSSI	SAC	None
Options 3,8,12 Central/distal sections managed realignment, proximal section sustained into future. Ground raising around visitor centre. 1%AEP SoP	Railway embankment	113FAS3351012C01	Length (km)	1.55	GIS/NFCDD	5830	Maintain	Short to long term	15	0.135543501	0.169429376	0.203315252	0.325304403		0	0	0	
	Embankment	113FAS3351013C01	Length (km)	0.1	GIS/NFCDD	1166	Maintain	Short to long term	15	0.001748948	0.002186186	0.002623423	0.004197476		0	0	0	
	gabions	113FAS3351013C02	Length (km)	0.09	GIS/NFCDD	0	NAI	Short to long term	15	0	0	0	0		0	0	0	
	wall	113FAS3351013C03	Length (km)	0.03	GIS/NFCDD	0	NAI	Short to long term	15	0	0	0	0		0	0	0	
	gabion wall	113FAS3351013C04	Length (km)	0.18	GIS/NFCDD	0	NAI	Short to long term	15	0	0	0	0		0	0	0	
	wall	113FAS3351013C05	Length (km)	0.12	GIS/NFCDD	0	NAI	Short to long term	15	0	0	0	0		0	0	0	
	wall	113FAS3351013C06	Length (km)	0.02	GIS/NFCDD	0	NAI	Short to long term	15	0	0	0	0		0	0	0	
	gabion revetment	113FAS3351013C07	Length (km)	0.08	GIS/NFCDD	0	NAI	Short to long term	15	0	0	0	0		0	0	0	
	Bank	113FAS3351013C09	Length (km)	1.27	GIS/NFCDD	0	NAI	Short to long term	15	0	0	0	0		0	0	0	
	Recharge/recycling high end estimate	113FAS3351014C01	Volume (m3)	6450	Conceptual model	23	Maintain	Short	15	2.26	3.525224121	4.230268946	6.768430313		0	0	0	
	Natural Cliff	113FBS3351501C01	Length (km)	0.1	GIS/NFCDD	0	Maintain	Short to long term	15	0	0	0	0		0	0	0	
	Rock Armour	113FAS3351015C02	Length (km)	0.28	GIS/NFCDD	5830	Maintain	Short to long term	15	0.024485278	0.030606597	0.036727916	0.058764666		0	0	0	
	concrete wall	113FAS3351015C01	Length (km)	0.41	GIS/NFCDD	5830	Maintain	Short to long term	15	0.035853442	0.044816803	0.053780163	0.086048261		0	0	0	
	Revetment	113FAS3351014C02	Length (km)	0.32	GIS/NFCDD	5830	Maintain	Short to long term	15	0.027983174	0.034978968	0.041974762	0.067159619		0	0	0	
	Groyne maintenance		Number	16	GIS/NFCDD	874	Maintain	Short to medium	15	0.209873808	0.26234226	0.314810712	0.50369714		0	0	0	
	Groyne reconstruction		Number	8	GIS/NFCDD	13861	Maintain	Short	0.8	0.08870993	0.110887413	0.133064895	0.212903832		0	0	0	
	Removal of gabions phase 1 (3-7)	Gabions, based on demolition cost per estimated m3	m3	360	GIS/NFCDD	108	NAI	Short	0.8	0.031065734	0.038832168	0.046598601	0.074557762		0	0	0	
	Removal of gabions phase 2 and 3 (7-13)	Gabions, based on demolition cost per estimated m3	m3	360	GIS/NFCDD	108	NAI	Short	0.5	0.019416084	0.024270105	0.029124126	0.046598601		0	0	0	
	0.15m ground raising around visitor centre		Length (m)	150		161		Short	0.8	0.019378143	0.024222679	0.029067215	0.046507544		0	0.0675	0	
	CC 0.25m addition		Length (m)	150		0		Medium	0.5	0	0	0	0		0	0.0225	0	
	CC 0.4m addition		Length (m)	150		0		Long	0.2	0	0	0	0		0	0.036	0	
													8.194169618	TOTAL				



FCRMU approach	Asset Type	Asset reference	Parameter	Amount	Reference	Rate (£/parameter)	HLO	Epoch	Epochal discount factor	Basic construction cost (£M)	Plus Tidal/urban uplift (25% each) cost (£M)	Plus PAR, design and supervision (20%) cost (£M)	Plus Optimism bias 60% cost (£M)		FOOTPRINT IMPACT (Ha)			
RESPONSE OPTIONS																SPA/SSSI	SAC	None
Options 3,8,12 Central/distal sections managed realignment, proximal section sustained into future. Ground raising around visitor centre. 0.5%AEP SoP	Railway embankment	113FAS3351012C01	Length (km)	1.55	GIS/NFCDD	5830	Maintain	Short to long term	15	0.135543501	0.169429376	0.203315252	0.325304403		0	0	0	
	Embankment	113FAS3351013C01	Length (km)	0.1	GIS/NFCDD	1166	Maintain	Short to long term	15	0.001748948	0.002186186	0.002623423	0.004197476		0	0	0	
	gabions	113FAS3351013C02	Length (km)	0.09	GIS/NFCDD	0	NAI	Short to long term	15	0	0	0	0		0	0	0	
	wall	113FAS3351013C03	Length (km)	0.03	GIS/NFCDD	0	NAI	Short to long term	15	0	0	0	0		0	0	0	
	gabion wall	113FAS3351013C04	Length (km)	0.18	GIS/NFCDD	0	NAI	Short to long term	15	0	0	0	0		0	0	0	
	wall	113FAS3351013C05	Length (km)	0.12	GIS/NFCDD	0	NAI	Short to long term	15	0	0	0	0		0	0	0	
	wall	113FAS3351013C06	Length (km)	0.02	GIS/NFCDD	0	NAI	Short to long term	15	0	0	0	0		0	0	0	
	gabion revetment	113FAS3351013C07	Length (km)	0.08	GIS/NFCDD	0	NAI	Short to long term	15	0	0	0	0		0	0	0	
	Bank	113FAS3351013C09	Length (km)	1.27	GIS/NFCDD	0	NAI	Short to long term	15	0	0	0	0		0	0	0	
	Recharge/recycling high end estimate	113FAS3351014C01	Volume (m3)	6450	Conceptual model	23	Maintain	Short	15	2.26	3.525224121	4.230268946	6.768430313		0	0	0	
	Natural Cliff	113FBS3351501C01	Length (km)	0.1	GIS/NFCDD	0	Maintain	Short to long term	15	0	0	0	0		0	0	0	
	Rock Armour	113FAS3351015C02	Length (km)	0.28	GIS/NFCDD	5830	Maintain	Short to long term	15	0.024485278	0.030606597	0.036727916	0.058764666		0	0	0	
	concrete wall	113FAS3351015C01	Length (km)	0.41	GIS/NFCDD	5830	Maintain	Short to long term	15	0.035853442	0.044816803	0.053780163	0.086048261		0	0	0	
	Revetment	113FAS3351014C02	Length (km)	0.32	GIS/NFCDD	5830	Maintain	Short to long term	15	0.027983174	0.034978968	0.041974762	0.067159619		0	0	0	
	Groyne maintenance		Number	16	GIS/NFCDD	874	Maintain	Short to medium	15	0.209873808	0.26234226	0.314810712	0.50369714		0	0	0	
	Groyne reconstruction		Number	8	GIS/NFCDD	13861	Maintain	Short	0.8	0.08870993	0.110887413	0.133064895	0.212903832		0	0	0	
	Removal of gabions phase 1 (3-7)	Gabions, based on demolition cost per estimated m3	m3	360	GIS/NFCDD	108	NAI	Short	0.8	0.031065734	0.038832168	0.046598601	0.074557762		0	0	0	
	Removal of gabions phase 2 and 3 (7-13)	Gabions, based on demolition cost per estimated m3	m3	360	GIS/NFCDD	108	NAI	Short	0.5	0.019416084	0.024270105	0.029124126	0.046598601		0	0	0	
	0.25m ground raising around visitor centre		Length (m)	150		323		Short	0.8	0.038756287	0.048445358	0.05813443	0.093015088		0	0.0675	0	
	CC 0.25m addition		Length (m)	150		0		Medium	0.5	0	0	0	0		0	0.0225	0	
	CC 0.4m addition		Length (m)	150		0		Long	0.2	0	0	0	0		0	0.036	0	
													8.240677162	TOTAL				



FCRMU approach	Asset Type	Asset reference	Parameter	Amount	Reference	Rate (£/parameter)	HLO	Epoch	Epochal discount factor	Basic construction cost (£M)	Plus Tidal/urban uplift (25% each) cost (£M)	Plus PAR, design and supervision (20%) cost (£M)	Plus Optimism bias 60% cost (£M)		FOOTPRINT IMPACT (Ha)			
RESPONSE OPTIONS																SPA/SSSI	SAC	None
Options 3,8,12 Central/distal sections managed realignment, proximal section sustained into future. Ground raising around visitor centre. 0.1%AEP SoP	Railway embankment	113FAS3351012C01	Length (km)	1.55	GIS/NFCDD	5830	Maintain	Short to long term	15	0.135543501	0.169429376	0.203315252	0.325304403		0	0	0	
	Embankment	113FAS3351013C01	Length (km)	0.1	GIS/NFCDD	1166	Maintain	Short to long term	15	0.001748948	0.002186186	0.002623423	0.004197476		0	0	0	
	gabions	113FAS3351013C02	Length (km)	0.09	GIS/NFCDD	0	NAI	Short to long term	15	0	0	0	0		0	0	0	
	wall	113FAS3351013C03	Length (km)	0.03	GIS/NFCDD	0	NAI	Short to long term	15	0	0	0	0		0	0	0	
	gabion wall	113FAS3351013C04	Length (km)	0.18	GIS/NFCDD	0	NAI	Short to long term	15	0	0	0	0		0	0	0	
	wall	113FAS3351013C05	Length (km)	0.12	GIS/NFCDD	0	NAI	Short to long term	15	0	0	0	0		0	0	0	
	wall	113FAS3351013C06	Length (km)	0.02	GIS/NFCDD	0	NAI	Short to long term	15	0	0	0	0		0	0	0	
	gabion revetment	113FAS3351013C07	Length (km)	0.08	GIS/NFCDD	0	NAI	Short to long term	15	0	0	0	0		0	0	0	
	Bank	113FAS3351013C09	Length (km)	1.27	GIS/NFCDD	0	NAI	Short to long term	15	0	0	0	0		0	0	0	
	Recharge/recycling high end estimate	113FAS3351014C01	Volume (m3)	6450	Conceptual model	23	Maintain	Short	15	2.26	3.525224121	4.230268946	6.768430313		0	0	0	
	Natural Cliff	113FBS3351501C01	Length (km)	0.1	GIS/NFCDD	0	Maintain	Short to long term	15	0	0	0	0		0	0	0	
	Rock Armour	113FAS3351015C02	Length (km)	0.28	GIS/NFCDD	5830	Maintain	Short to long term	15	0.024485278	0.030606597	0.036727916	0.058764666		0	0	0	
	concrete wall	113FAS3351015C01	Length (km)	0.41	GIS/NFCDD	5830	Maintain	Short to long term	15	0.035853442	0.044816803	0.053780163	0.086048261		0	0	0	
	Revetment	113FAS3351014C02	Length (km)	0.32	GIS/NFCDD	5830	Maintain	Short to long term	15	0.027983174	0.034978968	0.041974762	0.067159619		0	0	0	
	Groyne maintenance		Number	16	GIS/NFCDD	874	Maintain	Short to medium	15	0.209873808	0.26234226	0.314810712	0.50369714		0	0	0	
	Groyne reconstruction		Number	8	GIS/NFCDD	13861	Maintain	Short	0.8	0.08870993	0.110887413	0.133064895	0.212903832		0	0	0	
	Removal of gabions phase 1 (3-7)	Gabions, based on demolition cost per estimated m3	m3	360	GIS/NFCDD	108	NAI	Short	0.8	0.031065734	0.038832168	0.046598601	0.074557762		0	0	0	
	Removal of gabions phase 2 and 3 (7-13)	Gabions, based on demolition cost per estimated m3	m3	360	GIS/NFCDD	108	NAI	Short	0.5	0.019416084	0.024270105	0.029124126	0.046598601		0	0	0	
	0.5m ground raising around visitor centre		Length (m)	150		646		Short	0.8	0.077512573	0.096890717	0.11626886	0.186030176		0	0.0675	0	
	CC 0.25m addition		Length (m)	150		0		Medium	0.5	0	0	0	0		0	0.0225	0	
	CC 0.4m addition		Length (m)	150		0		Long	0.2	0	0	0	0		0	0.036	0	
8.33369225 TOTAL																		



FCRMU approach	Asset Type	Asset reference	Parameter	Amount	Reference	Rate (£/parameter)	HLO	Epoch	Epochal discount factor	Basic construction cost (£M)	Plus Tidal/urban uplift (25% each) cost (£M)	Plus PAR, design and supervision (20%) cost (£M)	Plus Optimism bias 60% cost (£M)		FOOTPRINT IMPACT (Ha)			
RESPONSE OPTIONS																SPA/SSSI	SAC	None

Options 4,8,12 Central section managed realignment, proximal and distal section sustained into future. Ground raising around car park. 2%AEP SoP	Railway embankment	113FAS3351012C01	Length (km)	1.55	GIS/NFCDD	5830	Maintain	Short to long term	15	0.135543501	0.169429376	0.203315252	0.325304403		0	0	0
	Embankment	113FAS3351013C01	Length (km)	0.1	GIS/NFCDD	1166	Maintain	Short to long term	15	0.001748948	0.002186186	0.002623423	0.004197476		0	0	0
	gabions	113FAS3351013C02	Length (km)	0.09	GIS/NFCDD	0	NAI	Short to long term	15	0	0	0	0		0	0	0
	wall	113FAS3351013C03	Length (km)	0.03	GIS/NFCDD	0	NAI	Short to long term	15	0	0	0	0		0	0	0
	gabion wall	113FAS3351013C04	Length (km)	0.18	GIS/NFCDD	0	NAI	Short to long term	15	0	0	0	0		0	0	0
	wall	113FAS3351013C05	Length (km)	0.12	GIS/NFCDD	0	NAI	Short to long term	15	0	0	0	0		0	0	0
	wall	113FAS3351013C06	Length (km)	0.02	GIS/NFCDD	0	NAI	Short to long term	15	0	0	0	0		0	0	0
	gabion revetment	113FAS3351013C07	Length (km)	0.08	GIS/NFCDD	0	NAI	Short to long term	15	0	0	0	0		0	0	0
	Bank	113FAS3351013C09	Length (km)	1.27	GIS/NFCDD	0	NAI	Short to long term	15	0	0	0	0		0	0	0
	Recharge/recycling high end estimate	113FAS3351014C01	Volume (m3)	6450	Conceptual model	23	Maintain	Short	15	2.26	3.525224121	4.230268946	6.768430313		0	0	0
	Natural Cliff	113FBS3351501C01	Length (km)	0.1	GIS/NFCDD	0	Maintain	Short to long term	15	0	0	0	0		0	0	0
	Rock Armour	113FAS3351015C02	Length (km)	0.28	GIS/NFCDD	5830	Maintain	Short to long term	15	0.024485278	0.030606597	0.036727916	0.058764666		0	0	0
	concrete wall	113FAS3351015C01	Length (km)	0.41	GIS/NFCDD	5830	Maintain	Short to long term	15	0.035853442	0.044816803	0.053780163	0.086048261		0	0	0
	Revetment	113FAS3351014C02	Length (km)	0.32	GIS/NFCDD	5830	Maintain	Short to long term	15	0.027983174	0.034978968	0.041974762	0.067159619		0	0	0
	Groyne maintenance		Number	16	GIS/NFCDD	874	Maintain	Short to medium	15	0.209873808	0.26234226	0.314810712	0.50369714		0	0	0
	Groyne reconstruction		Number	8	GIS/NFCDD	13861	Maintain	Short	0.8	0.08870993	0.110887413	0.133064895	0.212903832		0	0	0
	Removal of gabions phase 1 (3-7)	Gabions, based on demolition cost per estimated m3	m3	360	GIS/NFCDD	108	NAI	Short	0.8	0.031065734	0.038832168	0.046598601	0.074557762		0	0	0
	Gabion maintenance (7-11)		Length (km)	0.3	GIS/NFCDD	5830	Maintain	Short to medium te	15	0.026234226	0.032792783	0.039351339	0.062962142		0	0.009	0
	0.9m ground raising around car park		Length (m)	350		1130		Short	0.8	0.316509674	0.395637093	0.474764512	0.759623219		0	0.28	0
	CC 0.25m addition		Length (m)	350		0		Medium	0.5	0	0	0	0		0	0.0525	0
	CC 0.4m addition		Length (m)	350		0		Long	0.2	0	0	0	0		0	0.084	0
													8.923648833	TOTAL			



FCRMU approach	Asset Type	Asset reference	Parameter	Amount	Reference	Rate (£/parameter)	HLO	Epoch	Epochal discount factor	Basic construction cost (£M)	Plus Tidal/urban uplift (25% each) cost (£M)	Plus PAR, design and supervision (20%) cost (£M)	Plus Optimism bias 60% cost (£M)		FOOTPRINT IMPACT (Ha)		
RESPONSE OPTIONS															SPA/SSSI	SAC	None
Options 4,8,12 Central/distal sections managed realignment, proximal and distal section sustained into future. Ground raising around car park. 1%AEP SoP	Railway embankment	113FAS3351012C01	Length (km)	1.55	GIS/NFCDD	5830	Maintain	Short to long term	15	0.135543501	0.169429376	0.203315252	0.325304403		0	0	0
	Embankment	113FAS3351013C01	Length (km)	0.1	GIS/NFCDD	1166	Maintain	Short to long term	15	0.001748948	0.002186186	0.002623423	0.004197476		0	0	0
	gabions	113FAS3351013C02	Length (km)	0.09	GIS/NFCDD	0	NAI	Short to long term	15	0	0	0	0		0	0	0
	wall	113FAS3351013C03	Length (km)	0.03	GIS/NFCDD	0	NAI	Short to long term	15	0	0	0	0		0	0	0
	gabion wall	113FAS3351013C04	Length (km)	0.18	GIS/NFCDD	0	NAI	Short to long term	15	0	0	0	0		0	0	0
	wall	113FAS3351013C05	Length (km)	0.12	GIS/NFCDD	0	NAI	Short to long term	15	0	0	0	0		0	0	0
	wall	113FAS3351013C06	Length (km)	0.02	GIS/NFCDD	0	NAI	Short to long term	15	0	0	0	0		0	0	0
	gabion revetment	113FAS3351013C07	Length (km)	0.08	GIS/NFCDD	0	NAI	Short to long term	15	0	0	0	0		0	0	0
	Bank	113FAS3351013C09	Length (km)	1.27	GIS/NFCDD	0	NAI	Short to long term	15	0	0	0	0		0	0	0
	Recharge/recycling high end estimate	113FAS3351014C01	Volume (m3)	6450	Conceptual model	23	Maintain	Short	15	2.26	3.525224121	4.230268946	6.768430313		0	0	0
	Natural Cliff	113FBS3351501C01	Length (km)	0.1	GIS/NFCDD	0	Maintain	Short to long term	15	0	0	0	0		0	0	0
	Rock Armour	113FAS3351015C02	Length (km)	0.28	GIS/NFCDD	5830	Maintain	Short to long term	15	0.024485278	0.030606597	0.036727916	0.058764666		0	0	0
	concrete wall	113FAS3351015C01	Length (km)	0.41	GIS/NFCDD	5830	Maintain	Short to long term	15	0.035853442	0.044816803	0.053780163	0.086048261		0	0	0
	Revetment	113FAS3351014C02	Length (km)	0.32	GIS/NFCDD	5830	Maintain	Short to long term	15	0.027983174	0.034978968	0.041974762	0.067159619		0	0	0
	Groyne maintenance		Number	16	GIS/NFCDD	874	Maintain	Short	15	0.209873808	0.26234226	0.314810712	0.50369714		0	0	0
	Groyne reconstruction		Number	8	GIS/NFCDD	13861	Maintain	Short	0.8	0.08870993	0.110887413	0.133064895	0.212903832		0	0	0
	Removal of gabions phase 1 (3-7)	Gabions, based on demolition cost per estimated m3	m3	360	GIS/NFCDD	108	NAI	Short	0.8	0.031065734	0.038832168	0.046598601	0.074557762		0	0	0
	Gabion maintenance (7-11)		Length (km)	0.3	GIS/NFCDD	5830	Maintain	Short to medium term	15	0.026234226	0.032792783	0.039351339	0.062962142		0	0	0
	1m ground raising around car park		Length (m)	350		1292		Short	0.8	0.361725342	0.452156678	0.542588013	0.868140821		0	0.28	0
	CC 0.25m addition		Length (m)	350		0		Medium	0.5	0	0	0	0		0	0.0525	0
	CC 0.4m addition		Length (m)	350		0		Long	0.2	0	0	0	0		0	0.084	0
													9.032166436	TOTAL			



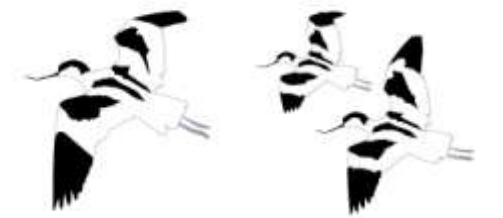
FCRMU approach	Asset Type	Asset reference	Parameter	Amount	Reference	Rate (£/parameter)	HLO	Epoch	Epochal discount factor	Basic construction cost (£M)	Plus Tidal/urban uplift (25% each) cost (£M)	Plus PAR, design and supervision (20%) cost (£M)	Plus Optimism bias 60% cost (£M)		FOOTPRINT IMPACT (Ha)			
RESPONSE OPTIONS																SPA/SSSI	SAC	None
Options 4,8,12 Central/distal sections managed realignment, proximal and distal section sustained into future. Ground raising around car park. 0.5%AEP SoP	Railway embankment	113FAS3351012C01	Length (km)	1.55	GIS/NFCDD	5830	Maintain	Short to long term	15	0.135543501	0.169429376	0.203315252	0.325304403		0	0	0	
	Embankment	113FAS3351013C01	Length (km)	0.1	GIS/NFCDD	1166	Maintain	Short to long term	15	0.001748948	0.002186186	0.002623423	0.004197476		0	0	0	
	gabions	113FAS3351013C02	Length (km)	0.09	GIS/NFCDD	0	NAI	Short to long term	15	0	0	0	0		0	0	0	
	wall	113FAS3351013C03	Length (km)	0.03	GIS/NFCDD	0	NAI	Short to long term	15	0	0	0	0		0	0	0	
	gabion wall	113FAS3351013C04	Length (km)	0.18	GIS/NFCDD	0	NAI	Short to long term	15	0	0	0	0		0	0	0	
	wall	113FAS3351013C05	Length (km)	0.12	GIS/NFCDD	0	NAI	Short to long term	15	0	0	0	0		0	0	0	
	wall	113FAS3351013C06	Length (km)	0.02	GIS/NFCDD	0	NAI	Short to long term	15	0	0	0	0		0	0	0	
	gabion revetment	113FAS3351013C07	Length (km)	0.08	GIS/NFCDD	0	NAI	Short to long term	15	0	0	0	0		0	0	0	
	Bank	113FAS3351013C09	Length (km)	1.27	GIS/NFCDD	0	NAI	Short to long term	15	0	0	0	0		0	0	0	
	Recharge/recycling high end estimate	113FAS3351014C01	Volume (m3)	6450	Conceptual model	23	Maintain	Short	15	2.26	3.525224121	4.230268946	6.768430313		0	0	0	
	Natural Cliff	113FBS3351501C01	Length (km)	0.1	GIS/NFCDD	0	Maintain	Short to long term	15	0	0	0	0		0	0	0	
	Rock Armour	113FAS3351015C02	Length (km)	0.28	GIS/NFCDD	5830	Maintain	Short to long term	15	0.024485278	0.030606597	0.036727916	0.058764666		0	0	0	
	concrete wall	113FAS3351015C01	Length (km)	0.41	GIS/NFCDD	5830	Maintain	Short to long term	15	0.035853442	0.044816803	0.053780163	0.086048261		0	0	0	
	Revetment	113FAS3351014C02	Length (km)	0.32	GIS/NFCDD	5830	Maintain	Short to long term	15	0.027983174	0.034978968	0.041974762	0.067159619		0	0	0	
	Groyne maintenance		Number	16	GIS/NFCDD	874	Maintain	Short	15	0.209873808	0.26234226	0.314810712	0.50369714		0	0	0	
	Groyne reconstruction		Number	8	GIS/NFCDD	13861	Maintain	Short	0.8	0.08870993	0.110887413	0.133064895	0.212903832		0	0	0	
	Removal of gabions phase 1 (3-7)	Gabions, based on demolition cost per estimated m3	m3	360	GIS/NFCDD	108	NAI	Short	0.8	0.031065734	0.038832168	0.046598601	0.074557762		0	0	0	
	Gabion maintenance (7-11)		Length (km)	0.3	GIS/NFCDD	5830	Maintain	Short to medium term	15	0.026234226	0.032792783	0.039351339	0.062962142		0	0	0	
	1.1m ground raising around car park		Length (m)	350		1441		Short	0.8	0.40343241	0.504290512	0.605148615	0.968237784		0	0.28	0	
	CC 0.25m addition		Length (m)	350		0		Medium	0.5	0	0	0	0		0	0.0525	0	
	CC 0.4m addition		Length (m)	350		0		Long	0.2	0	0	0	0		0	0.084	0	
													9.132263399	TOTAL				



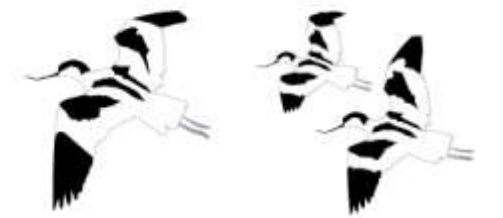
FCRMU approach	Asset Type	Asset reference	Parameter	Amount	Reference	Rate (£/parameter)	HLO	Epoch	Epochal discount factor	Basic construction cost (£M)	Plus Tidal/urban uplift (25% each) cost (£M)	Plus PAR, design and supervision (20%) cost (£M)	Plus Optimism bias 60% cost (£M)		FOOTPRINT IMPACT (Ha)			
RESPONSE OPTIONS																SPA/SSSI	SAC	None
Options 4,8,12 Central/distal sections managed realignment, proximal and distal section sustained into future. Ground raising around car park. 0.1%AEP SoP	Railway embankment	113FAS3351012C01	Length (km)	1.55	GIS/NFCDD	5830	Maintain	Short to long term	15	0.135543501	0.169429376	0.203315252	0.325304403		0	0	0	
	Embankment	113FAS3351013C01	Length (km)	0.1	GIS/NFCDD	1166	Maintain	Short to long term	15	0.001748948	0.002186186	0.002623423	0.004197476		0	0	0	
	gabions	113FAS3351013C02	Length (km)	0.09	GIS/NFCDD	0	NAI	Short to long term	15	0	0	0	0		0	0	0	
	wall	113FAS3351013C03	Length (km)	0.03	GIS/NFCDD	0	NAI	Short to long term	15	0	0	0	0		0	0	0	
	gabion wall	113FAS3351013C04	Length (km)	0.18	GIS/NFCDD	0	NAI	Short to long term	15	0	0	0	0		0	0	0	
	wall	113FAS3351013C05	Length (km)	0.12	GIS/NFCDD	0	NAI	Short to long term	15	0	0	0	0		0	0	0	
	wall	113FAS3351013C06	Length (km)	0.02	GIS/NFCDD	0	NAI	Short to long term	15	0	0	0	0		0	0	0	
	gabion revetment	113FAS3351013C07	Length (km)	0.08	GIS/NFCDD	0	NAI	Short to long term	15	0	0	0	0		0	0	0	
	Bank	113FAS3351013C09	Length (km)	1.27	GIS/NFCDD	0	NAI	Short to long term	15	0	0	0	0		0	0	0	
	Recharge/recycling high end estimate	113FAS3351014C01	Volume (m3)	6450	Conceptual model	23	Maintain	Short	15	2.26	3.525224121	4.230268946	6.768430313		0	0	0	
	Natural Cliff	113FBS3351501C01	Length (km)	0.1	GIS/NFCDD	0	Maintain	Short to long term	15	0	0	0	0		0	0	0	
	Rock Armour	113FAS3351015C02	Length (km)	0.28	GIS/NFCDD	5830	Maintain	Short to long term	15	0.024485278	0.030606597	0.036727916	0.058764666		0	0	0	
	concrete wall	113FAS3351015C01	Length (km)	0.41	GIS/NFCDD	5830	Maintain	Short to long term	15	0.035853442	0.044816803	0.053780163	0.086048261		0	0	0	
	Revetment	113FAS3351014C02	Length (km)	0.32	GIS/NFCDD	5830	Maintain	Short to long term	15	0.027983174	0.034978968	0.041974762	0.067159619		0	0	0	
	Groyne maintenance		Number	16	GIS/NFCDD	874	Maintain	Short	15	0.209873808	0.26234226	0.314810712	0.50369714		0	0	0	
	Groyne reconstruction		Number	8	GIS/NFCDD	13861	Maintain	Short	0.8	0.08870993	0.110887413	0.133064895	0.212903832		0	0	0	
	Removal of gabions phase 1 (3-7)	Gabions, based on demolition cost per estimated m3	m3	360	GIS/NFCDD	108	NAI	Short	0.8	0.031065734	0.038832168	0.046598601	0.074557762		0	0	0	
	Gabion maintenance (7-11)		Length (km)	0.3	GIS/NFCDD	5830	Maintain	Short to medium term	15	0.026234226	0.032792783	0.039351339	0.062962142		0	0	0	
	1.2m ground raising around car park		Length (m)	350		1590		Short	0.8	0.445139478	0.556424347	0.667709217	1.068334747		0	0.28	0	
	CC 0.25m addition		Length (m)	350		0		Medium	0.5	0	0	0	0		0	0.0525	0	
	CC 0.4m addition		Length (m)	350		0		Long	0.2	0	0	0	0		0	0.084	0	
													9.232360361	TOTAL				



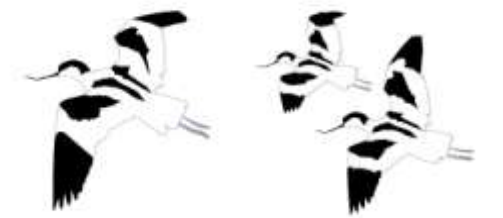
FCRMU approach	Asset Type	Asset reference	Parameter	Amount	Reference	Rate (£/parameter)	HLO	Epoch	Epochal discount factor	Basic construction cost (£M)	Plus Tidal/urban uplift (25% each) cost (£M)	Plus PAR, design and supervision (20%) cost (£M)	Plus Optimism bias 60% cost (£M)		FOOTPRINT IMPACT (Ha)			
RESPONSE OPTIONS																SPA/SSSI	SAC	None
Options 4,8,12 Central section managed realignment, proximal and distal section sustained into future. Ground raising around visitor centre. 2%AEP SoP.	Railway embankment	113FAS3351012C01	Length (km)	1.55	GIS/NFCDD	5830	Maintain	Short to long term	15	0.135543501	0.169429376	0.203315252	0.325304403		0	0	0	
	Embankment	113FAS3351013C01	Length (km)	0.1	GIS/NFCDD	1166	Maintain	Short to long term	15	0.001748948	0.002186186	0.002623423	0.004197476		0	0	0	
	gabions	113FAS3351013C02	Length (km)	0.09	GIS/NFCDD	0	NAI	Short to long term	15	0	0	0	0		0	0	0	
	wall	113FAS3351013C03	Length (km)	0.03	GIS/NFCDD	0	NAI	Short to long term	15	0	0	0	0		0	0	0	
	gabion wall	113FAS3351013C04	Length (km)	0.18	GIS/NFCDD	0	NAI	Short to long term	15	0	0	0	0		0	0	0	
	wall	113FAS3351013C05	Length (km)	0.12	GIS/NFCDD	0	NAI	Short to long term	15	0	0	0	0		0	0	0	
	wall	113FAS3351013C06	Length (km)	0.02	GIS/NFCDD	0	NAI	Short to long term	15	0	0	0	0		0	0	0	
	gabion revetment	113FAS3351013C07	Length (km)	0.08	GIS/NFCDD	0	NAI	Short to long term	15	0	0	0	0		0	0	0	
	Bank	113FAS3351013C09	Length (km)	1.27	GIS/NFCDD	0	NAI	Short to long term	15	0	0	0	0		0	0	0	
	Recharge/recycling high end estimate	113FAS3351014C01	Volume (m3)	6450	Conceptual model	23	Maintain	Short	15	2.26	3.525224121	4.230268946	6.768430313		0	0	0	
	Natural Cliff	113FBS3351501C01	Length (km)	0.1	GIS/NFCDD	0	Maintain	Short to long term	15	0	0	0	0		0	0	0	
	Rock Armour	113FAS3351015C02	Length (km)	0.28	GIS/NFCDD	5830	Maintain	Short to long term	15	0.024485278	0.030606597	0.036727916	0.058764666		0	0	0	
	concrete wall	113FAS3351015C01	Length (km)	0.41	GIS/NFCDD	5830	Maintain	Short to long term	15	0.035853442	0.044816803	0.053780163	0.086048261		0	0	0	
	Revetment	113FAS3351014C02	Length (km)	0.32	GIS/NFCDD	5830	Maintain	Short to long term	15	0.027983174	0.034978968	0.041974762	0.067159619		0	0	0	
	Groyne maintenance		Number	16	GIS/NFCDD	874	Maintain	Short to medium	15	0.209873808	0.26234226	0.314810712	0.50369714		0	0	0	
	Groyne reconstruction		Number	8	GIS/NFCDD	13861	Maintain	Short	0.8	0.08870993	0.110887413	0.133064895	0.212903832		0	0	0	
		Gabions, based on demolition cost per estimated m3													0	0	0	
	Removal of gabions phase 1 (3-7)		m3	360	GIS/NFCDD	108	NAI	Short	0.8	0.031065734	0.038832168	0.046598601	0.074557762		0	0.009	0	
	Gabion maintenance (7-11)		Length (km)	0.3	GIS/NFCDD	5830	Maintain	Short to medium te	15	0.026234226	0.032792783	0.039351339	0.062962142		0	0.0675	0	
	0.1m ground raising around visitor centre		Length (m)	150		161		Short	0.8	0.019378143	0.024222679	0.029067215	0.046507544		0	0.0225	0	
	CC 0.25m addition		Length (m)	150		0		Medium	0.5	0	0	0	0		0	0.036	0	
	CC 0.4m addition		Length (m)	150		0		Long	0.2	0	0	0	0		0			
												8.210533159	TOTAL					



FCRMU approach	Asset Type	Asset reference	Parameter	Amount	Reference	Rate (£/parameter)	HLO	Epoch	Epochal discount factor	Basic construction cost (£M)	Plus Tidal/urban uplift (25% each) cost (£M)	Plus PAR, design and supervision (20%) cost (£M)	Plus Optimism bias 60% cost (£M)		FOOTPRINT IMPACT (Ha)			
RESPONSE OPTIONS																SPA/SSSI	SAC	None
Options 4,8,12 Central section managed realignment, proximal and distal section sustained into future. Ground raising around visitor centre. 1%AEP SoP.	Railway embankment	113FAS3351012C01	Length (km)	1.55	GIS/NFCDD	5830	Maintain	Short to long term	15	0.135543501	0.169429376	0.203315252	0.325304403		0	0	0	
	Embankment	113FAS3351013C01	Length (km)	0.1	GIS/NFCDD	1166	Maintain	Short to long term	15	0.001748948	0.002186186	0.002623423	0.004197476		0	0	0	
	gabions	113FAS3351013C02	Length (km)	0.09	GIS/NFCDD	0	NAI	Short to long term	15	0	0	0	0		0	0	0	
	wall	113FAS3351013C03	Length (km)	0.03	GIS/NFCDD	0	NAI	Short to long term	15	0	0	0	0		0	0	0	
	gabion wall	113FAS3351013C04	Length (km)	0.18	GIS/NFCDD	0	NAI	Short to long term	15	0	0	0	0		0	0	0	
	wall	113FAS3351013C05	Length (km)	0.12	GIS/NFCDD	0	NAI	Short to long term	15	0	0	0	0		0	0	0	
	wall	113FAS3351013C06	Length (km)	0.02	GIS/NFCDD	0	NAI	Short to long term	15	0	0	0	0		0	0	0	
	gabion revetment	113FAS3351013C07	Length (km)	0.08	GIS/NFCDD	0	NAI	Short to long term	15	0	0	0	0		0	0	0	
	Bank	113FAS3351013C09	Length (km)	1.27	GIS/NFCDD	0	NAI	Short to long term	15	0	0	0	0		0	0	0	
	Recharge/recycling high end estimate	113FAS3351014C01	Volume (m3)	6450	Conceptual model	23	Maintain	Short	15	2.26	3.525224121	4.230268946	6.768430313		0	0	0	
	Natural Cliff	113FBS3351501C01	Length (km)	0.1	GIS/NFCDD	0	Maintain	Short to long term	15	0	0	0	0		0	0	0	
	Rock Armour	113FAS3351015C02	Length (km)	0.28	GIS/NFCDD	5830	Maintain	Short to long term	15	0.024485278	0.030606597	0.036727916	0.058764666		0	0	0	
	concrete wall	113FAS3351015C01	Length (km)	0.41	GIS/NFCDD	5830	Maintain	Short to long term	15	0.035853442	0.044816803	0.053780163	0.086048261		0	0	0	
	Revetment	113FAS3351014C02	Length (km)	0.32	GIS/NFCDD	5830	Maintain	Short to long term	15	0.027983174	0.034978968	0.041974762	0.067159619		0	0	0	
	Groyne maintenance		Number	16	GIS/NFCDD	874	Maintain	Short to medium	15	0.209873808	0.26234226	0.314810712	0.50369714		0	0	0	
	Groyne reconstruction		Number	8	GIS/NFCDD	13861	Maintain	Short	0.8	0.08870993	0.110887413	0.133064895	0.212903832		0	0	0	
		Gabions, based on demolition cost per estimated m3													0	0	0	
	Removal of gabions phase 1 (3-7)		m3	360	GIS/NFCDD	108	NAI	Short	0.8	0.031065734	0.038832168	0.046598601	0.074557762		0	0.009	0	
	Gabion maintenance (7-11)		Length (km)	0.3	GIS/NFCDD	5830	Maintain	Short to medium te	15	0.026234226	0.032792783	0.039351339	0.062962142		0			
	0.15m ground raising around visitor centre		Length (m)	150		161		Short	0.8	0.019378143	0.024222679	0.029067215	0.046507544		0	0.0675	0	
	CC 0.25m addition		Length (m)	150		0		Medium	0.5	0	0	0	0		0	0.0225	0	
	CC 0.4m addition		Length (m)	150		0		Long	0.2	0	0	0	0		0	0.036	0	
													8.210533159 TOTAL					



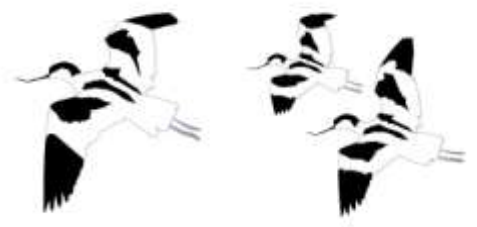
FCRMU approach	Asset Type	Asset reference	Parameter	Amount	Reference	Rate (£/parameter)	HLO	Epoch	Epochal discount factor	Basic construction cost (£M)	Plus Tidal/urban uplift (25% each) cost (£M)	Plus PAR, design and supervision (20%) cost (£M)	Plus Optimism bias 60% cost (£M)		FOOTPRINT IMPACT (Ha)			
RESPONSE OPTIONS																SPA/SSSI	SAC	None
Options 4,8,12 Central section managed realignment, proximal and distal section sustained into future. Ground raising around visitor centre. 0.5%AEP SoP.	Railway embankment	113FAS3351012C01	Length (km)	1.55	GIS/NFCDD	5830	Maintain	Short to long term	15	0.135543501	0.169429376	0.203315252	0.325304403		0	0	0	
	Embankment	113FAS3351013C01	Length (km)	0.1	GIS/NFCDD	1166	Maintain	Short to long term	15	0.001748948	0.002186186	0.002623423	0.004197476		0	0	0	
	gabions	113FAS3351013C02	Length (km)	0.09	GIS/NFCDD	0	NAI	Short to long term	15	0	0	0	0		0	0	0	
	wall	113FAS3351013C03	Length (km)	0.03	GIS/NFCDD	0	NAI	Short to long term	15	0	0	0	0		0	0	0	
	gabion wall	113FAS3351013C04	Length (km)	0.18	GIS/NFCDD	0	NAI	Short to long term	15	0	0	0	0		0	0	0	
	wall	113FAS3351013C05	Length (km)	0.12	GIS/NFCDD	0	NAI	Short to long term	15	0	0	0	0		0	0	0	
	wall	113FAS3351013C06	Length (km)	0.02	GIS/NFCDD	0	NAI	Short to long term	15	0	0	0	0		0	0	0	
	gabion revetment	113FAS3351013C07	Length (km)	0.08	GIS/NFCDD	0	NAI	Short to long term	15	0	0	0	0		0	0	0	
	Bank	113FAS3351013C09	Length (km)	1.27	GIS/NFCDD	0	NAI	Short to long term	15	0	0	0	0		0	0	0	
	Recharge/recycling high end estimate	113FAS3351014C01	Volume (m3)	6450	Conceptual model	23	Maintain	Short	15	2.26	3.525224121	4.230268946	6.768430313		0	0	0	
	Natural Cliff	113FBS3351501C01	Length (km)	0.1	GIS/NFCDD	0	Maintain	Short to long term	15	0	0	0	0		0	0	0	
	Rock Armour	113FAS3351015C02	Length (km)	0.28	GIS/NFCDD	5830	Maintain	Short to long term	15	0.024485278	0.030606597	0.036727916	0.058764666		0	0	0	
	concrete wall	113FAS3351015C01	Length (km)	0.41	GIS/NFCDD	5830	Maintain	Short to long term	15	0.035853442	0.044816803	0.053780163	0.086048261		0	0	0	
	Revetment	113FAS3351014C02	Length (km)	0.32	GIS/NFCDD	5830	Maintain	Short to long term	15	0.027983174	0.034978968	0.041974762	0.067159619		0	0	0	
	Groyne maintenance		Number	16	GIS/NFCDD	874	Maintain	Short to medium	15	0.209873808	0.26234226	0.314810712	0.50369714		0	0	0	
	Groyne reconstruction		Number	8	GIS/NFCDD	13861	Maintain	Short	0.8	0.08870993	0.110887413	0.133064895	0.212903832		0	0	0	
		Gabions, based on demolition cost per estimated m3													0	0	0	
	Removal of gabions phase 1 (3-7)		m3	360	GIS/NFCDD	108	NAI	Short	0.8	0.031065734	0.038832168	0.046598601	0.074557762		0	0.009	0	
	Gabion maintenance (7-11)		Length (km)	0.3	GIS/NFCDD	5830	Maintain	Short to medium te	15	0.026234226	0.032792783	0.039351339	0.062962142		0			
	0.25m ground raising around visitor centre		Length (m)	150		323		Short	0.8	0.038756287	0.048445358	0.05813443	0.093015088		0	0.0675	0	
	CC 0.25m addition		Length (m)	150		0		Medium	0.5	0	0	0	0		0	0.0225	0	
	CC 0.4m addition		Length (m)	150		0		Long	0.2	0	0	0	0		0	0.036	0	
												8.257040703	TOTAL					



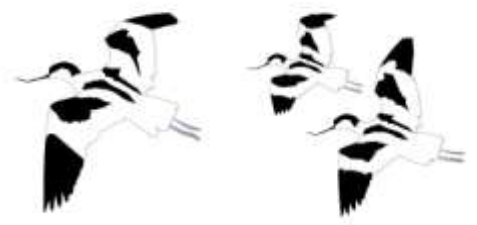
FCRMU approach	Asset Type	Asset reference	Parameter	Amount	Reference	Rate (£/parameter)	HLO	Epoch	Epochal discount factor	Basic construction cost (£M)	Plus Tidal/urban uplift (25% each) cost (£M)	Plus PAR, design and supervision (20%) cost (£M)	Plus Optimism bias 60% cost (£M)		FOOTPRINT IMPACT (Ha)			
RESPONSE OPTIONS																SPA/SSSI	SAC	None

Options 4,8,12 Central section managed realignment, proximal and distal section sustained into future. Ground raising around visitor centre. 0.1%AEP SoP.	Railway embankment	113FAS3351012C01	Length (km)	1.55	GIS/NFCDD	5830	Maintain	Short to long term	15	0.135543501	0.169429376	0.203315252	0.325304403		0	0	0
	Embankment	113FAS3351013C01	Length (km)	0.1	GIS/NFCDD	1166	Maintain	Short to long term	15	0.001748948	0.002186186	0.002623423	0.004197476		0	0	0
	gabions	113FAS3351013C02	Length (km)	0.09	GIS/NFCDD	0	NAI	Short to long term	15	0	0	0	0		0	0	0
	wall	113FAS3351013C03	Length (km)	0.03	GIS/NFCDD	0	NAI	Short to long term	15	0	0	0	0		0	0	0
	gabion wall	113FAS3351013C04	Length (km)	0.18	GIS/NFCDD	0	NAI	Short to long term	15	0	0	0	0		0	0	0
	wall	113FAS3351013C05	Length (km)	0.12	GIS/NFCDD	0	NAI	Short to long term	15	0	0	0	0		0	0	0
	wall	113FAS3351013C06	Length (km)	0.02	GIS/NFCDD	0	NAI	Short to long term	15	0	0	0	0		0	0	0
	gabion revetment	113FAS3351013C07	Length (km)	0.08	GIS/NFCDD	0	NAI	Short to long term	15	0	0	0	0		0	0	0
	Bank	113FAS3351013C09	Length (km)	1.27	GIS/NFCDD	0	NAI	Short to long term	15	0	0	0	0		0	0	0
	Recharge/recycling high end estimate	113FAS3351014C01	Volume (m3)	6450	Conceptual model	23	Maintain	Short	15	2.26	3.525224121	4.230268946	6.768430313		0	0	0
	Natural Cliff	113FBS3351501C01	Length (km)	0.1	GIS/NFCDD	0	Maintain	Short to long term	15	0	0	0	0		0	0	0
	Rock Armour	113FAS3351015C02	Length (km)	0.28	GIS/NFCDD	5830	Maintain	Short to long term	15	0.024485278	0.030606597	0.036727916	0.058764666		0	0	0
	concrete wall	113FAS3351015C01	Length (km)	0.41	GIS/NFCDD	5830	Maintain	Short to long term	15	0.035853442	0.044816803	0.053780163	0.086048261		0	0	0
	Revetment	113FAS3351014C02	Length (km)	0.32	GIS/NFCDD	5830	Maintain	Short to long term	15	0.027983174	0.034978968	0.041974762	0.067159619		0	0	0
	Groyne maintenance		Number	16	GIS/NFCDD	874	Maintain	Short to medium	15	0.209873808	0.26234226	0.314810712	0.50369714		0	0	0
	Groyne reconstruction		Number	8	GIS/NFCDD	13861	Maintain	Short	0.8	0.08870993	0.110887413	0.133064895	0.212903832		0	0	0
	Removal of gabions phase 1 (3-7)	Gabions, based on demolition cost per estimated m3	m3	360	GIS/NFCDD	108	NAI	Short	0.8	0.031065734	0.038832168	0.046598601	0.074557762		0	0	0
	Gabion maintenance (7-11)		Length (km)	0.3	GIS/NFCDD	5830	Maintain	Short to medium term	15	0.026234226	0.032792783	0.039351339	0.062962142		0	0.009	0
	0.5m ground raising around visitor centre		Length (m)	150		646		Short	0.8	0.077512573	0.096890717	0.11626886	0.186030176		0	0.0675	0
	CC 0.25m addition		Length (m)	150		0		Medium	0.5	0	0	0	0		0	0.0225	0
	CC 0.4m addition		Length (m)	150		0		Long	0.2	0	0	0	0		0	0.036	0
													8.350055791	TOTAL			



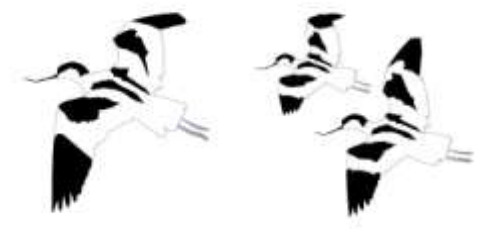


Appendix N : Response Assessment Tables in the Short Term

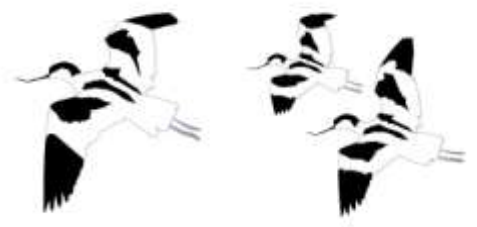




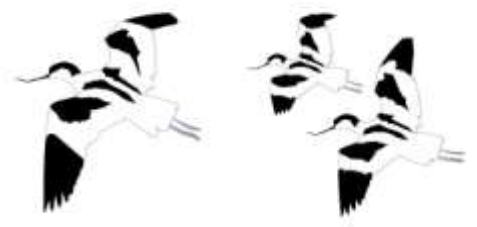
LOCATION				Present Value benefit (£K)								Present Value cost (£K)							
Relevant placename	FCRM unit	A-T option reference	Description	Do Minimum	20% AEP SoP	10% AEP SoP	4% AEP SoP	2% AEP SoP	1% AEP SoP	0.5% AEP SoP	0.1% AEP SoP	Do Minimum	20% AEP SoP	10% AEP SoP	4% AEP SoP	2% AEP SoP	1% AEP SoP	0.5% AEP SoP	0.1% AEP SoP
The Maer	2	ST1	Soft foreshore management, consisting of beach recharge and recycling, with groyne works.	-5,478	5,486	5,486	5,486	5,486	5,486	5,486	5,486	5,482	4,310	4,310	4,310	4,310	4,310	4,310	4,310
Exmouth	03	ST2-1	Property resilience at the eastern end of Camperdown Terrace. Road, pavement, wall and embankment raising along the slipway and boatyard. Improvements to existing assets N-E of the Imperial Recreation Ground.	154,370	154,370	154,370	198,597	208,841	215,108	219,140	222,644	897	897	897	1,273	1,360	1,645	2,241	2,768
		ST2-2	Property resilience at the eastern end of Camperdown Terrace. Road, pavement, wall and embankment raising along the slipway and boatyard. Secondary wall N-E of the Imperial Recreation Ground.	154,370	154,370	154,370	198,597	208,841	215,108	219,140	222,644	897	897	897	1,286	1,519	1,753	2,495	3,192
East bank of the Clyst	08	ST1	Local breaching with new embankment to protect C527 road.	41	1,544	2,009	2,586	2,732	2,815	2,870	2,923	84	2,067	2,067	2,931	2,931	3,737	4,131	4,510
		ST2	Local breaching with C527 road raised on a causeway with culverts.	41	1,544	2,009	2,586	2,732	2,815	2,870	2,923	84	4,960	5,673	5,673	5,673	6,386	7,098	7,432
West bank of the Clyst	11	ST1	Local breaching with flooding constrained by ground levels.	0	700	759	779	789	795	798	1,182	605	775	775	775	775	775	775	880
Topsham	12	ST1	New embankment/wall along landward extent of Topsham playing fields.	258	618	956	1,121	1,669	1,803	1,906	2,026	808	808	1,040	1,040	1,040	1,118	1,118	1,273
	12	ST2	Road raising and property resilience at Topsham playing fields.	258	618	956	1,121	1,669	1,803	1,906	2,026	808	808	920	948	1,004	1,032	1,068	1,191
	12	ST3	Property resilience at Topsham playing fields.	258	618	956	1,121	1,669	1,803	1,906	2,026	808	808	1,312	1,312	1,312	1,312	1,368	1,480
Exminster and Powderham Banks	14	ST3	Toe protection, widening and raising of Powderham Banks	9,443	9,443	9,443	9,443	10,943	11,222	11,413	13,373	7,339	7,339	7,339	7,339	8,231	8,583	9,083	9,083
Kenn Valley	15	ST1	RTE with local protection to access road, properties in Kenton and the mill.	8,070	8,070	8,070	8,070	8,070	8,096	8,132	8,563	990	1,362	1,362	1,548	1,548	1,982	1,982	2,211
Starcross	16	ST1	General raising of harbour walls.	57,300	57,300	57,300	57,300	76,241	78,286	79,594	81,043	461	461	461	461	530	1,329	1,547	2,096
		ST2	Local raising of along the northern and southern harbour walls and roads.	57,300	57,300	57,300	57,300	76,241	78,286	79,594	81,043	461	461	461	461	569	569	569	677
Dawlish Warren	17	ST3A	Embankment raising at car park, beach recharge/recycling, groyne maintenance, and all phases of gabion removal	42,148	42,148	42,148	42,148	48,592	49,012	49,279	50,776	541	8,148	8,148	8,148	8,907	9,016	9,116	9,216
		ST3B	Embankment raising at visitor centre, beach recharge/recycling, groyne maintenance, and all phases of gabion removal	42,148	42,148	42,148	42,148	48,592	49,012	49,279	50,776	541	8,194	8,194	8,194	8,194	8,194	8,241	8,334
		ST4A	Embankment raising at car park, beach recharge/recycling, groyne maintenance, and first phase of gabion removal	77,543	77,543	77,543	77,543	83,987	84,407	84,674	86,171	541	8,164	8,164	8,164	8,924	9,032	9,132	9,232
		ST4B	Embankment raising at visitor centre, beach recharge/recycling, groyne maintenance, and first phase of gabion removal	77,543	77,543	77,543	77,543	83,987	84,407	84,674	86,171	541	8,164	8,164	8,164	8,211	8,211	8,257	8,350



LOCATION				Funding potential	Engineering option and timing
Relevant placename	FCRM unit	A-T option reference	Description		
The Maer	2	ST1	Soft foreshore management, consisting of beach recharge and recycling, with groyne works.	Application of the FCERM-AG rules identifies that the optimised option would be Do Nothing in the short term. However, the Do Nothing would not continue amenity benefit, development potential and also not be environmentally preferable. Do Minimum includes for activities to actively remove failing assets to avoid public health and safety risks, and has the highest cost of all options. Beach recharge/recycling with groyne works is preferred on amenity, development and environmental grounds. FCRM GiA funding would be limited to 5%.	Beach recharge/recyclign with groyne works. This scheme is to be progressed in the next 5-15 years, dependent on funding and potential efficient linkage to Dawlish Warren works.
Exmouth	03	ST2-1	Property resilience at the eastern end of Camperdown Terrace. Road, pave ment, wall and embankment raising along the slipway and boatyard. Improvements to existing assets N-E of the Imperial Recreation Ground.	Application of the FCERM-AG rules identifies that the optimised option would be ST2-1 with 0.1%AEP SoP. Assessment for the potential for FCRM GiA funding indicates 100% of the scheme cost could be FCRM GiA funded.	The engineering works would be property resilience works for around 20 properties at the eastern end of Camperdown Terrace, pavement/road, wall and embankment raising along the slipway and boatyard of 0.5m, and to the north-east of the Imperial Recreation Ground, a 0.5m wave recurve wall addition to the existing revetment. This scheme should be progressed and delivered in the next 5 years.
		ST2-2	Property resilience at the eastern end of Camperdown Terrace. Road, pave ment, wall and embankment raising along the slipway and boatyard. Secondary wall N-E of the Imperial Recreation Ground.		
East bank of the Clyst	08	ST1	Local breaching with new embankment to protect C527 road.	Assessment for the potential for FCRM GiA funding for Option 1 indicates this would amount to ~90% of the scheme costs. It is apparent that this would require partnership contributions to be progressed. Public consultation has indicated that MR would not be acceptable; Do Minimum is the default option.	Continued maintenance of the earth embankment until another acceptable solution can be found.
		ST2	Local breaching with C527 road raised on a causeway with culverts.		
West bank of the Clyst	11	ST1	Local breaching with flooding constrained by ground levels.	Application of the FCERM-AG rules identifies that the optimised option would be realignment with localised IPP (only required at 0.1%AEP SoP). Assessment for the potential for funding indicates 100% of the scheme cost could be FCRM GiA funded.	Property resilience works for up to 4 properties along the extreme fringe of the floodplain at Cotts Farm. This scheme should be progressed and delivered in the next 5 years.
Topsham	12	ST1	New embankment/wall along landward extent of Topsham playing fields.	Application of the FCERM-AG rules identifies that the optimised option would be ST2 with 0.5%AEP SoP. Assessment for the potential for FCRM GiA funding indicates ~40% of the scheme costs could be funded. It is apparent that this would require partnership contributions to be progressed.	Option 2 would require property resilience works for around 9 properties along the playing field and Ferry Road, and local road/pavement raising of 0.1m. The scheme should be progressed in the next 5-15 years.
	12	ST2	Road raising and property resilience at Topsham playing fields.		
	12	ST3	Property resilience at Topsham playing fields.		
Exminster and Powderham Banks	14	ST3	Toe protection, widening and raising of Powderham Banks	Application of the FCERM-AG rules identifies that the optimised SoP would be 2%AEP. However, the similarity of the BCRs for all SoPs (1.3 to 1.5), and Network Rail policy, suggests that 0.1%AEP SoP can be selected. Assessment for the potential for funding indicates ~10% of the scheme costs could be FCRM GiA funded. It is apparent that this would require partnership contributions to be progressed.	This would require works to ensure that the low water channel that is located at the toe of the defence would not pose an erosion risk. This could be achieved via up to 700m of rock armouring. Works to ensure the continued stability of the existing embankments. This could be achieved via landward widening of the banks, potentially incorporating the pedestrian and cycle path networks. The exact nature and extent of the widening will require further geotechnical investigation. Raising of the existing embankment by 0.5m, preferably with a wave recurve wall. The scheme should be progressed in the next 5-15 years.
Kenn Valley	15	ST1	RTE with local protection to access road, properties in Kenton and the mill.	Application of the FCERM-AG rules identifies that the optimised option would be localised embankments and RTE, with extent to be confirmed by further studies. Assessment for the potential for funding indicates 100% of the scheme cost could be FCRM GiA funded.	This would require construction of local embankments or walls potentially of up to 0.75m height, solely relating to the access road to Powderham Castle, properties at Kenton at the extreme fringe of the floodplain, and properties at the mill upstream. This scheme should be progressed and delivered in the next 5 years.
Starcross	16	ST1	General raising of harbour walls.	Application of the FCERM-AG rules identifies that the optimised option would be ST2 with 0.1%AEP SoP. Assessment for the potential for FCRM GiA funding indicates 100% of the scheme cost could be funded.	This would require for Option 1, general harbour wall raising at Cockwood of between 0.3-0.5m, or for Option 2, local raising of 0.5m of the northern and southern harbour walls and adjacent road/pavement. This scheme should be progressed and delivered in the next 5 years.
		ST2	Local raising of along the northern and southern harbour walls and roads.		
Dawlish Warren	17	ST3A	Embankment raising at car park, beach recharge/recycling, groyne maintenance, and all phases of gabion removal	Please see section 5.4 in the main report.	Please see section 5.4 in the main report.
		ST3B	Embankment raising at visitor centre, beach recharge/recycling, groyne maintenance, and all phases of gabion removal		
		ST4A	Embankment raising at car park, beach recharge/recycling, groyne maintenance, and first phase of gabion removal		
		ST4B	Embankment raising at visitor centre, beach recharge/recycling, groyne maintenance, and first phase of gabion removal		



Appendix O : Outline Design and Costing in the Short to Long Term



O.1 The Maer



FCRMU Options	Asset Type	Asset reference	Parameter	Amount	Reference	Rate (£/parameter)	HLO	Period	Epochal discount factor	Basic construction cost (£M)	Plus tidal/urban uplift (25% each) cost (£M)	Plus PAR, design and supervision (20%) cost (£M)	Plus Optimism bias 60% cost (£M)			FOOTPRINT IMPACT (Ha)		
RESPONSE OPTIONS																SPA/SSSI	SAC	None

Option 1. Soft foreshore management, consisting of beach recharge and recycling, with groyne works.	Seawall maintenance	113FAS3351002C01	Length (km)	0.72	GIS/NFCDD	5830	Maintain	Short to long term	30	0.13	0.196756695	0.236108034	0.377772855		0	0	0
	Seawall maintenance	113FAS3351002C02	Length (km)	0.14	GIS/NFCDD	5830	Maintain	Short to long term	30	0.02	0.038258246	0.045909896	0.073455833		0	0	0
	Seawall maintenance	113FAS3351002C03	Length (km)	0.06	GIS/NFCDD	5830	Maintain	Short to long term	30	0.01	0.016396391	0.01967567	0.031481071		0	0	0
	Groyne maintenance		No	6		1166	Maintain	Short to long term	30	0.21	0.327927825	0.39351339	0.629621424		0	0	0
	Groyne reconstruction		No	6		874	Maintain	Short	1	0.01	0.008198196	0.009837835	0.015740536		0	0	0
	Groyne reconstruction		No	6		874	Maintain	Medium	0.5	0.00	0.004099098	0.004918917	0.007870268		0	0	0
	Groyne reconstruction		No	6		874	Maintain	Long	0.2	0.00	0.001639639	0.001967567	0.003148107		0	0	0
	Recharge/ recycling	113FAS3351002C01	Volume (m3)	3562.5	Conceptual model	23	Maintain	Short	15	1.25	1.947071462	2.336485755	3.738377208		0	0	0
	Recharge/ recycling		Volume (m3)	4312.5	Conceptual model	23	Maintain	Medium	10	1.01	1.571320829	1.885584995	3.016935992		0	0	0
	Recharge/ recycling		Volume (m3)	5437.5	Conceptual model	23	Maintain	Long	5	0.63	0.990615305	1.188738367	1.901981386		0	0	0
													9.79638468	TOTAL			



O.2 Exmouth



FCRMU approach	Asset Type	Asset reference	Parameter	Amount	Reference	Rate (£/parameter)	HLO	Epoch	Epochal discount factor	Basic construction cost (£M)	Plus Tidal/urban uplift (25% each) cost (£M)	Plus PAR, design and supervision (20%) cost (£M)	Plus Optimism bias 60% cost (£M)		FOOTPRINT IMPACT (Ha)		
RESPONSE OPTIONS															SPA/SSSI	SAC	None
Short Term Option 2 (Camperdown Terrace) and 1 (Imperial Recreation Ground). Medium to Long Term Option 2 (seaward and landward	Seawall maintenance	113FAS3351002C04	Length (km)	0.17	GIS/NFCDD	5830	Maintain	Short to long term	30	0.029732123	0.046456442	0.05574773	0.089196368		0	0	0
	Seawall maintenance	113FAS3351002C05	Length (km)	0.7	GIS/NFCDD	5830	Maintain	Short to long term	30	0.122426388	0.191291231	0.229549478	0.367279164		0	0	0
	Sheet piled wall maintenance	113FAS3351003C01	Length (km)	0.09	GIS/NFCDD	5830	Maintain	Short to long term	30	0.015740536	0.024594587	0.029513504	0.047221607		0	0	0
	No addition		Length (m)	90	GIS/NFCDD	0	Sustain	Medium	0.5	0	0	0	0		0	0	0
Exmouth Docks improvements to avoid pedestrian/local flooding	CC 0.2m addition		Length (m)	90	GIS/NFCDD	559	Sustain	Long	0.2	0.010058202	0.015715941	0.018859129	0.030174607		0.018	0	0
	Complex Wall maintenance	113FAS3351003C02	Length (km)	1	GIS/NFCDD	5830	Maintain	Short to long term	30	0.17489484	0.273273188	0.327927825	0.52468452		0	0	0
	No addition		Length (m)	150	GIS/NFCDD	0	Improve	Short	1	0	0	0	0		0	0	0
	CC 0.2m addition		Length (m)	1000	GIS/NFCDD	323	Sustain	Medium	0.5	0.16134049	0.252094516	0.302513419	0.48402147		0	0	0.2
	CC 0.5m addition		Length (m)	1000	GIS/NFCDD	645	Sustain	Long	0.2	0.129072392	0.201675613	0.242010735	0.387217176		0	0	0.2
	Complex Wall maintenance	113FAS3351003C03	Length (km)	0.12	GIS/NFCDD	5830	Maintain	Short to long term	30	0.020987381	0.032792783	0.039351339	0.062962142		0	0	0
	CC 0.1m addition		Length (m)	120	GIS/NFCDD	559	Sustain	Medium	0.5	0.033527341	0.05238647	0.062863764	0.100582023		0.024	0	0
	CC 0.3m addition		Length (m)	120	GIS/NFCDD	559	Sustain	Long	0.2	0.013410936	0.020954588	0.025145506	0.040232809		0.024	0	0
Sailing club access road raising	Timber revetment maintenance	113FAS3351003C04	Length (km)	0.08	GIS/NFCDD	5830	NAI	Short to long term	30	0.013991587	0.021861855	0.026234226	0.041974762		0	0	0
	No road raising	113FAS3351003C05	Length (m)	20	GIS/NFCDD	0	Improve	Short	1	0	0	0	0		0	0	0
	Gabion Wall maintenance	113FAS3351003C06	Length (km)	0.06	GIS/NFCDD	5830	NAI	Short to long term	30	0.01049369	0.016396391	0.01967567	0.031481071		0	0	0
	Property resilience	NA	Number	10	GIS/NFCDD	11660	Improve	Short	1	0.11659656	0.182182125	0.21861855	0.34978968		0	0	0
Camperdown Terrace/Shelly Road property resilience and road raising	Property resilience CC	NA	Number	10	GIS/NFCDD	11660	Improve	Medium	0.5	0.05829828	0.091091063	0.109309275	0.17489484		0	0	0
	Property resilience CC	NA	Number	7	GIS/NFCDD	11660	Improve	Long	0.2	0.016323518	0.025505498	0.030606597	0.048970555		0	0	0
	Pitched Stone Revetment maintenance	113FAS3351003C07	Length (km)	0.05	GIS/NFCDD	5830	Maintain	Short to long term	30	0.008744742	0.013663659	0.016396391	0.026234226		0	0	0
	Complex Wall maintenance	113FAS3351003C08	Length (km)	0.08	GIS/NFCDD	5830	Maintain	Short to long term	30	0.013991587	0.021861855	0.026234226	0.041974762		0	0	0
	Masonry Wall maintenance	113FAS3351003C09	Length (km)	0.07	GIS/NFCDD	5830	Maintain	Short to long term	30	0.012242639	0.019129123	0.022954948	0.036727916		0	0	0
	Masonry Wall maintenance	113FAS3351003C10	Length (km)	0.06	GIS/NFCDD	5830	Maintain	Short to long term	30	0.01049369	0.016396391	0.01967567	0.031481071		0	0	0
	Complex Wall maintenance	113FAS3351004C01	Length (km)	0.09	GIS/NFCDD	5830	Maintain	Short to long term	30	0.015740536	0.024594587	0.029513504	0.047221607		0	0	0
	CC 0.1m addition		Length (m)	90	GIS/NFCDD	323	Improve	Short	1	0.029041288	0.045377013	0.054452415	0.087123865		0.018	0	0
Slipway/boatyard road/wall raising	CC 0.3m addition		Length (m)	90	GIS/NFCDD	323	Sustain	Medium	0.5	0.014520644	0.022688506	0.027226208	0.043561932		0.018	0	0
	CC 0.7m addition		Length (m)	90	GIS/NFCDD	968	Sustain	Long	0.2	0.017424773	0.027226208	0.032671449	0.052274319		0.018	0	0
	Gabion toe maintenance	113FAS3351004C02	Length (km)	0.11	GIS/NFCDD	5830	Maintain	Short to long term	30	0.019238432	0.030060051	0.036072061	0.057715297		0	0	0
	No addition		Length (m)	110	GIS/NFCDD	0	Sustain	Short	1	0	0	0	0		0	0	0
	No addition		Length (m)	110	GIS/NFCDD	0	Sustain	Medium	0.5	0	0	0	0		0	0	0
	CC 0.4m addition		Length (m)	110	GIS/NFCDD	645	Sustain	Long	0.2	0.014197963	0.022184317	0.026621181	0.042593889		0.022	0	0
	Revetment maintenance	113FAS3351004C03	Length (km)	0.55	GIS/NFCDD	5830	Maintain	Short to long term	30	0.096192162	0.150300253	0.180360304	0.288576486		0	0	0
North-east Imperial Recreation Ground revetment wave wall raising	Wall maintenance		Length (km)	0.1	GIS/NFCDD	5830	Maintain	Short to long term	30	0.017489484	0.027327319	0.032792783	0.052468452		0	0	0
	No addition		Length (m)	100	GIS/NFCDD	0	Improve	Short	1	0	0	0	0		0	0	0
	CC 0.25m addition		Length (m)	100	GIS/NFCDD	167	Sustain	Medium	0.5	0.008336654	0.013026022	0.015631226	0.025009962		0.02	0	0
	CC 0.25m addition		Length (m)	100	GIS/NFCDD	167	Sustain	Long	0.2	0.003334662	0.005210409	0.006252491	0.010003985		0.02	0	0
	Embankment maintenance	113FAS3351004C04	Length (km)	0.39	GIS/NFCDD	1166	Maintain	Short to long term	30	0.013641798	0.021315309	0.02557837	0.040925393		0	0	0
	No addition		Length (m)	390	GIS/NFCDD	0	Sustain	Short	1	0	0	0	0		0	0	0
	CC 0.5m addition		Length (m)	390	GIS/NFCDD	329	Sustain	Medium	0.5	0.064116448	0.100181951	0.120218341	0.192349345		0.078	0	0
	CC 0.5m addition		Length (m)	390	GIS/NFCDD	329	Sustain	Long	0.2	0.025646579	0.04007278	0.048087336	0.076939738		0.078	0	0
	Embankment maintenance	113FAS3351004C05	Length (km)	0.56	GIS/NFCDD	1166	Maintain	Short to long term	30	0.019588222	0.030606597	0.036727916	0.058764666		0	0	0
	No addition		Length (m)	560	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0		0	0	0
													3.992629707	TOTAL			



FCRMU approach	Asset Type	Asset reference	Parameter	Amount	Reference	Rate (£/parameter)	HLO	Epoch	Epochal discount factor	Basic construction cost (£M)	Plus Tidal/urban uplift (25% each) cost (£M)	Plus PAR, design and supervision (20%) cost (£M)	Plus Optimism bias 60% cost (£M)		FOOTPRINT IMPACT (Ha)		
RESPONSE OPTIONS															SPA/SSSI	SAC	None
Short Term Option 2 (Camperdown Terrace) and 1 (Imperial Recreation Ground). Medium to Long Term Option 2 (seaward and landward	Seawall maintenance	113FAS3351002C04	Length (km)	0.17	GIS/NFCDD	5830	Maintain	Short to long term	30	0.029732123	0.046456442	0.05574773	0.089196368		0	0	0
	Seawall maintenance	113FAS3351002C05	Length (km)	0.7	GIS/NFCDD	5830	Maintain	Short to long term	30	0.122426388	0.191291231	0.229549478	0.367279164		0	0	0
	Sheet piled wall maintenance	113FAS3351003C01	Length (km)	0.09	GIS/NFCDD	5830	Maintain	Short to long term	30	0.015740536	0.024594587	0.029513504	0.047221607		0	0	0
	No addition		Length (m)	90	GIS/NFCDD	0	Sustain	Medium	0.5	0	0	0	0		0	0	0
Exmouth Docks improvements to avoid pedestrian/local flooding	CC 0.3m addition		Length (m)	90	GIS/NFCDD	559	Sustain	Long	0.2	0.010058202	0.015715941	0.018859129	0.030174607		0.018	0	0
	Complex Wall maintenance	113FAS3351003C02	Length (km)	1	GIS/NFCDD	5830	Maintain	Short to long term	30	0.17489484	0.273273188	0.327927825	0.52468452		0	0	0
	CC 0.25m addition		Length (m)	150	GIS/NFCDD	323	Improve	Short	1	0.048402147	0.075628355	0.090754026	0.145206441		0	0	0.03
	No addition		Length (m)	1000	GIS/NFCDD	323	Sustain	Medium	0.5	0.16134049	0.252094516	0.302513419	0.48402147		0	0	0.2
	CC 0.5m addition		Length (m)	1000	GIS/NFCDD	645	Sustain	Long	0.2	0.129072392	0.201675613	0.242010735	0.387217176		0	0	0.2
	Complex Wall maintenance	113FAS3351003C03	Length (km)	0.12	GIS/NFCDD	5830	Maintain	Short to long term	30	0.020987381	0.032792783	0.039351339	0.062962142		0	0	0
	CC 0.2m addition		Length (m)	120	GIS/NFCDD	559	Sustain	Medium	0.5	0.033527341	0.05238647	0.062863764	0.100582023		0.024	0	0
	CC 0.4m addition		Length (m)	120	GIS/NFCDD	1118	Sustain	Long	0.2	0.026821873	0.041909176	0.050291011	0.080465618		0.024	0	0
Sailing club access road raising	Timber revetment maintenance	113FAS3351003C04	Length (km)	0.08	GIS/NFCDD	5830	NAI	Short to long term	30	0.013991587	0.021861855	0.026234226	0.041974762		0	0	0
	road raising 0.1m	113FAS3351003C05	Length (m)	20	GIS/NFCDD	323	Improve	Short	1	0.00645362	0.010083781	0.012100537	0.019360859		0.004	0	0
	Gabion Wall maintenance	113FAS3351003C06	Length (km)	0.06	GIS/NFCDD	5830	NAI	Short to long term	30	0.01049369	0.016396391	0.01967567	0.031481071		0	0	0
	Property resilience	NA	Number	12	GIS/NFCDD	11660	Improve	Short	1	0.139915872	0.21861855	0.26234226	0.419747616		0	0	0
Camperdown Terrace/Shelly Road property resilience	Property resilience CC	NA	Number	10	GIS/NFCDD	11660	Improve	Medium	0.5	0.05829828	0.091091063	0.109309275	0.17489484		0	0	0
	Property resilience CC	NA	Number	7	GIS/NFCDD	11660	Improve	Long	0.2	0.016323518	0.025505498	0.030606597	0.048970555		0	0	0
	Pitched Stone Revetment maintenance	113FAS3351003C07	Length (km)	0.05	GIS/NFCDD	5830	Maintain	Short to long term	30	0.008744742	0.013663659	0.016396391	0.026234226		0	0	0
	Complex Wall maintenance	113FAS3351003C08	Length (km)	0.08	GIS/NFCDD	5830	Maintain	Short to long term	30	0.013991587	0.021861855	0.026234226	0.041974762		0	0	0
	Masonry Wall maintenance	113FAS3351003C09	Length (km)	0.07	GIS/NFCDD	5830	Maintain	Short to long term	30	0.012242639	0.019129123	0.022954948	0.036727916		0	0	0
	Masonry Wall maintenance	113FAS3351003C10	Length (km)	0.06	GIS/NFCDD	5830	Maintain	Short to long term	30	0.01049369	0.016396391	0.01967567	0.031481071		0	0	0
Slipway/boatyard road/wall raising	Complex Wall maintenance	113FAS3351004C01	Length (km)	0.09	GIS/NFCDD	5830	Maintain	Short to long term	30	0.015740536	0.024594587	0.029513504	0.047221607		0	0	0
	CC 0.2m addition		Length (m)	90	GIS/NFCDD	323	Improve	Short	1	0.029041288	0.045377013	0.054452415	0.087123865		0.018	0	0
	CC 0.2m addition		Length (m)	90	GIS/NFCDD	323	Sustain	Medium	0.5	0.014520644	0.022688506	0.027226208	0.043561932		0.018	0	0
	CC 1.1m addition		Length (m)	90	GIS/NFCDD	1291	Sustain	Long	0.2	0.023233031	0.03630161	0.043561932	0.069699092		0.018	0	0
	Gabion toe maintenance	113FAS3351004C02	Length (km)	0.11	GIS/NFCDD	5830	Maintain	Short to long term	30	0.019238432	0.030060051	0.036072061	0.057715297		0	0	0
	No addition		Length (m)	110	GIS/NFCDD	0	Sustain	Short	1	0	0	0	0		0	0	0
	CC 0.1m addition		Length (m)	110	GIS/NFCDD	323	Sustain	Medium	0.5	0.017747454	0.027730397	0.033276476	0.053242362		0.022	0	0
	CC 0.4m addition		Length (m)	110	GIS/NFCDD	645	Sustain	Long	0.2	0.014197963	0.022184317	0.026621181	0.042593889		0.022	0	0
North-east Imperial Recreation Ground revetment wave wall raising	Revetment maintenance	113FAS3351004C03	Length (km)	0.55	GIS/NFCDD	5830	Maintain	Short to long term	30	0.096192162	0.150300253	0.180360304	0.288576486		0	0	0
	Wall maintenance		Length (km)	0.1	GIS/NFCDD	5830	Maintain	Short to long term	30	0.017489484	0.027327319	0.032792783	0.052468452		0	0	0
	CC 0.25m addition		Length (m)	100	GIS/NFCDD	167	Improve	Short	1	0.016673308	0.026052044	0.031262453	0.050019924		0.02	0	0
	No addition		Length (m)	100	GIS/NFCDD	0	Sustain	Medium	0.5	0	0	0	0		0	0	0
	CC 0.25m addition		Length (m)	100	GIS/NFCDD	167	Sustain	Long	0.2	0.003334662	0.005210409	0.006252491	0.010003985		0.02	0	0
	Embankment maintenance	113FAS3351004C04	Length (km)	0.39	GIS/NFCDD	1166	Maintain	Short to long term	30	0.013641798	0.021315309	0.02557837	0.040925393		0	0	0
	No addition		Length (m)	390	GIS/NFCDD	0	Sustain	Short	1	0	0	0	0		0	0	0
	CC 0.6m addition		Length (m)	390	GIS/NFCDD	329	Sustain	Medium	0.5	0.064116448	0.100181951	0.120218341	0.192349345		0.078	0	0
	CC 0.4m addition		Length (m)	390	GIS/NFCDD	329	Sustain	Long	0.2	0.025646579	0.04007278	0.048087336	0.076939738		0.078	0	0
	Embankment maintenance	113FAS3351004C05	Length (km)	0.56	GIS/NFCDD	1166	Maintain	Short to long term	30	0.019588222	0.030606597	0.036727916	0.058764666		0	0	0
	No addition		Length (m)	560	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0		0	0	0
												4.363064849	TOTAL				



FCRMU approach	Asset Type	Asset reference	Parameter	Amount	Reference	Rate (£/parameter)	HLO	Epoch	Epochal discount factor	Basic construction cost (£M)	Plus Tidal/urban uplift (25% each) cost (£M)	Plus PAR, design and supervision (20%) cost (£M)	Plus Optimism bias 60% cost (£M)		FOOTPRINT IMPACT (Ha)			
RESPONSE OPTIONS																SPA/SSSI	SAC	None
Short Term Option 2 (Camperdown Terrace) and 1 (Imperial Recreation Ground). Medium to Long Term Option 2 (seaward and landward	Seawall maintenance	113FAS3351002C04	Length (km)	0.17	GIS/NFCDD	5830	Maintain	Short to long term	30	0.029732123	0.046456442	0.05574773	0.089196368			0	0	0
	Seawall maintenance	113FAS3351002C05	Length (km)	0.7	GIS/NFCDD	5830	Maintain	Short to long term	30	0.122426388	0.191291231	0.229549478	0.367279164			0	0	0
	Sheet piled wall maintenance	113FAS3351003C01	Length (km)	0.09	GIS/NFCDD	5830	Maintain	Short to long term	30	0.015740536	0.024594587	0.029513504	0.047221607			0	0	0
	CC 0.1m addition		Length (m)	90	GIS/NFCDD	559	Sustain	Medium	0.5	0.025145506	0.039289853	0.047147823	0.075436517			0.018	0	0
	CC 0.4m addition		Length (m)	90	GIS/NFCDD	1118	Sustain	Long	0.2	0.020116405	0.031431882	0.037718258	0.060349214			0.018	0	0
Exmouth Docks improvements to avoid pedestrian/local flooding	Complex Wall maintenance	113FAS3351003C02	Length (km)	1	GIS/NFCDD	5830	Maintain	Short to long term	30	0.17489484	0.273273188	0.327927825	0.52468452			0	0	0
	CC 0.25m addition		Length (m)	150	GIS/NFCDD	323	Improve	Short	1	0.048402147	0.075628355	0.090754026	0.145206441			0	0	0.03
	No addition		Length (m)	1000	GIS/NFCDD	0	Sustain	Medium	0.5	0	0	0	0			0	0	0
	CC 0.75m addition		Length (m)	1000	GIS/NFCDD	968	Sustain	Long	0.2	0.193608588	0.302513419	0.363016103	0.580825764			0	0	0.2
	Complex Wall maintenance	113FAS3351003C03	Length (km)	0.12	GIS/NFCDD	5830	Maintain	Short to long term	30	0.020987381	0.032792783	0.039351339	0.062962142			0	0	0
	CC 0.2m addition		Length (m)	120	GIS/NFCDD	559	Sustain	Medium	0.5	0.033527341	0.05238647	0.062863764	0.100582023			0.024	0	0
	CC 0.4m addition		Length (m)	120	GIS/NFCDD	1118	Sustain	Long	0.2	0.026821873	0.041909176	0.050291011	0.080465618			0.024	0	0
	Timber revetment maintenance	113FAS3351003C04	Length (km)	0.08	GIS/NFCDD	5830	NAI	Short to long term	30	0.013991587	0.021861855	0.026234226	0.041974762			0	0	0
Sailing club access road raising	road raising 0.2m	113FAS3351003C05	Length (m)	20	GIS/NFCDD	323	Improve	Short	1	0.00645362	0.010083781	0.012100537	0.019360859			0	0	0.02
Wider Camperdown Terrace road raising	road raising 0.1m	NA	Length (m)	150	GIS/NFCDD	323	Sustain	Medium	0.5	0.024201074	0.037814177	0.045377013	0.072603221			0	0	0.15
Wider Camperdown Terrace road raising	road raising 0.3m	NA	Length (m)	150	GIS/NFCDD	323	Sustain	Long	0.2	0.009680429	0.015125671	0.018150805	0.029041288			0	0	0.15
Camperdown Terrace/Shelly Road property resilience	Gabion Wall maintenance	113FAS3351003C06	Length (km)	0.06	GIS/NFCDD	5830	NAI	Short to long term	30	0.01049369	0.016396391	0.01967567	0.031481071			0	0	0
	Property resilience	NA	Number	15	GIS/NFCDD	11660	Improve	Short	1	0.17489484	0.273273188	0.327927825	0.52468452			0	0	0
	Property resilience CC	NA	Number	9	GIS/NFCDD	11660	Improve	Medium	0.5	0.052468452	0.081981956	0.098378348	0.157405356			0	0	0
	Property resilience CC	NA	Number	44	GIS/NFCDD	11660	Improve	Long	0.2	0.102604973	0.16032027	0.192384324	0.307814919			0	0	0
	Pitched Stone Revetment maintenance	113FAS3351003C07	Length (km)	0.05	GIS/NFCDD	5830	Maintain	Short to long term	30	0.008744742	0.013663659	0.016396391	0.026234226			0	0	0
	Complex Wall maintenance	113FAS3351003C08	Length (km)	0.08	GIS/NFCDD	5830	Maintain	Short to long term	30	0.013991587	0.021861855	0.026234226	0.041974762			0	0	0
	Masonry Wall maintenance	113FAS3351003C09	Length (km)	0.07	GIS/NFCDD	5830	Maintain	Short to long term	30	0.012242639	0.019129123	0.022954948	0.036727916			0	0	0
	Masonry Wall maintenance	113FAS3351003C10	Length (km)	0.06	GIS/NFCDD	5830	Maintain	Short to long term	30	0.01049369	0.016396391	0.01967567	0.031481071			0	0	0
Slipway/boatyard road/wall raising	Complex Wall maintenance	113FAS3351004C01	Length (km)	0.09	GIS/NFCDD	5830	Maintain	Short to long term	30	0.015740536	0.024594587	0.029513504	0.047221607			0	0	0
	CC 0.3m addition		Length (m)	90	GIS/NFCDD	323	Improve	Short	1	0.029041288	0.045377013	0.054452415	0.087123865			0.018	0	0
	CC 0.2m addition		Length (m)	90	GIS/NFCDD	323	Sustain	Medium	0.5	0.014520644	0.022688506	0.027226208	0.043561932			0.018	0	0
	CC 1.1m addition		Length (m)	90	GIS/NFCDD	1291	Sustain	Long	0.2	0.023233031	0.03630161	0.043561932	0.069699092			0.018	0	0
	Gabion toe maintenance	113FAS3351004C02	Length (km)	0.11	GIS/NFCDD	5830	Maintain	Short to long term	30	0.019238432	0.030060051	0.036072061	0.057715297			0	0	0
	CC 0.1m addition		Length (m)	110	GIS/NFCDD	323	Sustain	Short	1	0.035494908	0.055460793	0.066552952	0.106484723			0.022	0	0
	CC 0.1m addition		Length (m)	110	GIS/NFCDD	0	Sustain	Medium	0.5	0	0	0	0			0	0	0
	CC 0.4m addition		Length (m)	110	GIS/NFCDD	645	Sustain	Long	0.2	0.014197963	0.022184317	0.026621181	0.042593889			0.022	0	0
	Revetment maintenance	113FAS3351004C03	Length (km)	0.55	GIS/NFCDD	5830	Maintain	Short to long term	30	0.096192162	0.150300253	0.180360304	0.288576486			0	0	0
North-east Imperial Recreation Ground revetment wave wall raising	Wall maintenance		Length (km)	0.1	GIS/NFCDD	5830	Maintain	Short to long term	30	0.017489484	0.027327319	0.032792783	0.052468452			0	0	0
	CC 0.25m addition		Length (m)	100	GIS/NFCDD	167	Improve	Short	1	0.016673308	0.026052044	0.031262453	0.050019924			0.02	0	0
	No addition		Length (m)	100	GIS/NFCDD	0	Sustain	Medium	0.5	0	0	0	0			0	0	0
	CC 0.25m addition		Length (m)	100	GIS/NFCDD	167	Sustain	Long	0.2	0.003334662	0.005210409	0.006252491	0.010003985			0.02	0	0
	Embankment maintenance	113FAS3351004C04	Length (km)	0.39	GIS/NFCDD	1166	Maintain	Short to long term	30	0.013641798	0.021315309	0.02557837	0.040925393			0	0	0
	CC 0.4m addition		Length (m)	390	GIS/NFCDD	329	Sustain	Short	1	0.128232897	0.200363901	0.240436681	0.38469869			0.078	0	0
	CC 0.3m addition		Length (m)	390	GIS/NFCDD	164	Sustain	Medium	0.5	0.032058224	0.050090975	0.06010917	0.096174673			0.078	0	0
	CC 0.3m addition		Length (m)	390	GIS/NFCDD	164	Sustain	Long	0.2	0.01282329	0.02003639	0.024043668	0.038469869			0.078	0	0
	Embankment maintenance	113FAS3351004C05	Length (km)	0.56	GIS/NFCDD	1166	Maintain	Short to long term	30	0.019588222	0.030606597	0.036727916	0.058764666			0	0	0
	No addition		Length (m)	560	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0			0	0	0
													4.929495893	TOTAL				



FCRMU approach	Asset Type	Asset reference	Parameter	Amount	Reference	Rate (£/parameter)	HLO	Epoch	Epochal discount factor	Basic construction cost (£M)	Plus Tidal/urban uplift (25% each) cost (£M)	Plus PAR, design and supervision (20%) cost (£M)	Plus Optimism bias 60% cost (£M)		FOOTPRINT IMPACT (Ha)			
RESPONSE OPTIONS																SPA/SSSI	SAC	None

Short Term Option 2 (Camperdown Terrace) and 1 (Imperial Recreation Ground). Medium to Long Term Option 2 (seaward and landward	Seawall maintenance	113FAS3351002C04	Length (km)	0.17	GIS/NFCDD	5830	Maintain	Short to long term	30	0.029732123	0.046456442	0.05574773	0.089196368			0	0	0
	Seawall maintenance	113FAS3351002C05	Length (km)	0.7	GIS/NFCDD	5830	Maintain	Short to long term	30	0.122426388	0.191291231	0.229549478	0.367279164			0	0	0
	Sheet piled wall maintenance	113FAS3351003C01	Length (km)	0.09	GIS/NFCDD	5830	Maintain	Short to long term	30	0.015740536	0.024594587	0.029513504	0.047221607			0	0	0
	CC 0.1m addition		Length (m)	90	GIS/NFCDD	559	Sustain	Medium	0.5	0.025145506	0.039289853	0.047147823	0.075436517			0.018	0	0
	CC 0.4m addition		Length (m)	90	GIS/NFCDD	1118	Sustain	Long	0.2	0.020116405	0.031431882	0.037718258	0.060349214			0.018	0	0
Exmouth Docks improvements to avoid pedestrian/local flooding	Complex Wall maintenance	113FAS3351003C02	Length (km)	1	GIS/NFCDD	5830	Maintain	Short to long term	30	0.17489484	0.273273188	0.327927825	0.52468452			0	0	0
	CC 0.5m addition		Length (m)	150	GIS/NFCDD	645	Improve	Short	1	0.096804294	0.151256709	0.181508051	0.290412882			0	0	0.03
	No addition		Length (m)	1000	GIS/NFCDD	0	Sustain	Medium	0.5	0	0	0	0			0	0	0
	CC 0.5m addition		Length (m)	1000	GIS/NFCDD	645	Sustain	Long	0.2	0.129072392	0.201675613	0.242010735	0.387217176			0	0	0.2
	Complex Wall maintenance	113FAS3351003C03	Length (km)	0.12	GIS/NFCDD	5830	Maintain	Short to long term	30	0.020987381	0.032792783	0.039351339	0.062962142			0	0	0
	CC 0.2m addition		Length (m)	120	GIS/NFCDD	559	Sustain	Medium	0.5	0.033527341	0.05238647	0.062863764	0.100582023			0.024	0	0
	CC 0.4m addition		Length (m)	120	GIS/NFCDD	1118	Sustain	Long	0.2	0.026821873	0.041909176	0.050291011	0.080465618			0.024	0	0
	Timber revetment maintenance	113FAS3351003C04	Length (km)	0.08	GIS/NFCDD	5830	NAI	Short to long term	30	0.013991587	0.021861855	0.026234226	0.041974762			0	0	0
Sailing club access road raising	road raising 0.3m	113FAS3351003C05	Length (m)	20	GIS/NFCDD	323	Improve	Short	1	0.00645362	0.010083781	0.012100537	0.019360859			0	0	0.02
Wider Camperdown Terrace road raising	road raising 0.3m	NA	Length (m)	150	GIS/NFCDD	323	Sustain	Medium	0.5	0.024201074	0.037814177	0.045377013	0.072603221			0	0	0.15
Wider Camperdown Terrace road raising	road raising 0.4m	NA	Length (m)	150	GIS/NFCDD	645	Sustain	Long	0.2	0.019360859	0.030251342	0.03630161	0.058082576			0	0	0.15
Camperdown Terrace/Shelly Road property resilience	Gabion Wall maintenance	113FAS3351003C06	Length (km)	0.06	GIS/NFCDD	5830	NAI	Short to long term	30	0.01049369	0.016396391	0.01967567	0.031481071			0	0	0
	Property resilience	NA	Number	22	GIS/NFCDD	11660	Improve	Short	1	0.256512432	0.400800675	0.48096081	0.769537297			0	0	0
	Property resilience CC	NA	Number	2	GIS/NFCDD	11660	Improve	Medium	0.5	0.011659656	0.018218213	0.021861855	0.034978968			0	0	0
	Property resilience CC	NA	Number	44	GIS/NFCDD	11660	Improve	Long	0.2	0.102604973	0.16032027	0.192384324	0.307814919			0	0	0
	Pitched Stone Revetment maintenance	113FAS3351003C07	Length (km)	0.05	GIS/NFCDD	5830	Maintain	Short to long term	30	0.008744742	0.013663659	0.016396391	0.026234226			0	0	0
	Complex Wall maintenance	113FAS3351003C08	Length (km)	0.08	GIS/NFCDD	5830	Maintain	Short to long term	30	0.013991587	0.021861855	0.026234226	0.041974762			0	0	0
	Masonry Wall maintenance	113FAS3351003C09	Length (km)	0.07	GIS/NFCDD	5830	Maintain	Short to long term	30	0.012242639	0.019129123	0.022954948	0.036727916			0	0	0
	Masonry Wall maintenance	113FAS3351003C10	Length (km)	0.06	GIS/NFCDD	5830	Maintain	Short to long term	30	0.01049369	0.016396391	0.01967567	0.031481071			0	0	0
Slipway/boatyard road/wall raising	Complex Wall maintenance	113FAS3351004C01	Length (km)	0.09	GIS/NFCDD	5830	Maintain	Short to long term	30	0.015740536	0.024594587	0.029513504	0.047221607			0	0	0
	CC 0.5m addition		Length (m)	90	GIS/NFCDD	645	Improve	Short	1	0.058082576	0.090754026	0.108904831	0.174247729			0.018	0	0
	CC 0.2m addition		Length (m)	90	GIS/NFCDD	323	Sustain	Medium	0.5	0.014520644	0.022688506	0.027226208	0.043561932			0.018	0	0
	CC 1m addition		Length (m)	90	GIS/NFCDD	1291	Sustain	Long	0.2	0.023233031	0.03630161	0.043561932	0.069699092			0.018	0	0
	Gabion toe maintenance	113FAS3351004C02	Length (km)	0.11	GIS/NFCDD	5830	Maintain	Short to long term	30	0.019238432	0.030060051	0.036072061	0.057715297			0	0	0
	CC 0.1m addition		Length (m)	110	GIS/NFCDD	323	Sustain	Short	1	0.035494908	0.055460793	0.066552952	0.106484723			0.022	0	0
	CC 0.3m addition		Length (m)	110	GIS/NFCDD	323	Sustain	Medium	0.5	0.017747454	0.027730397	0.033276476	0.053242362			0.022	0	0
	CC 0.4m addition		Length (m)	110	GIS/NFCDD	645	Sustain	Long	0.2	0.014197963	0.022184317	0.026621181	0.042593889			0.022	0	0
	Revetment maintenance	113FAS3351004C03	Length (km)	0.55	GIS/NFCDD	5830	Maintain	Short to long term	30	0.096192162	0.150300253	0.180360304	0.288576486			0	0	0
North-east Imperial Recreation Ground revetment wave wall raising	Wall maintenance		Length (km)	0.1	GIS/NFCDD	5830	Maintain	Short to long term	30	0.017489484	0.027327319	0.032792783	0.052468452			0	0	0
	CC 0.5m addition		Length (m)	100	GIS/NFCDD	333	Improve	Short	1	0.033346616	0.052104088	0.062524905	0.100039849			0.02	0	0
	No addition		Length (m)	100	GIS/NFCDD	0	Sustain	Medium	0.5	0	0	0	0			0	0	0
	CC 0.25m addition		Length (m)	100	GIS/NFCDD	167	Sustain	Long	0.2	0.003334662	0.005210409	0.006252491	0.010003985			0.02	0	0
	Embankment maintenance	113FAS3351004C04	Length (km)	0.39	GIS/NFCDD	1166	Maintain	Short to long term	30	0.013641798	0.021315309	0.02557837	0.040925393			0	0	0
	CC 0.5m addition		Length (m)	390	GIS/NFCDD	329	Sustain	Short	1	0.128232897	0.200363901	0.240436681	0.38469869			0.078	0	0
	CC 0.3m addition		Length (m)	390	GIS/NFCDD	164	Sustain	Medium	0.5	0.032058224	0.050090975	0.06010917	0.096174673			0.078	0	0
	CC 0.3m addition		Length (m)	390	GIS/NFCDD	164	Sustain	Long	0.2	0.01282329	0.02003639	0.024043668	0.038469869			0.078	0	0
	Embankment maintenance	113FAS3351004C05	Length (km)	0.56	GIS/NFCDD	1166	Maintain	Short to long term	30	0.019588222	0.030606597	0.036727916	0.058764666			0	0	0
	CC 0.1m addition		Length (m)	560	GIS/NFCDD	164	Sustain	Long	0.2	0.018412929	0.028770201	0.034524241	0.055238786			0.112	0	0
												5.278186359	TOTAL					



FCRMU approach	Asset Type	Asset reference	Parameter	Amount	Reference	Rate (£/parameter)	HLO	Epoch	Epochal discount factor	Basic construction cost (£M)	Plus Tidal/urban uplift (25% each) cost (£M)	Plus PAR, design and supervision (20%) cost (£M)	Plus Optimism bias 60% cost (£M)		FOOTPRINT IMPACT (Ha)			
															SPA/SSSI	SAC	None	
Short Term Option 2 (Camperdown Terrace and Imperial Recreation Ground). Medium to Long Term Option 2 (seaward and landward) Exmouth Docks improvements to avoid pedestrian/local flooding	Seawall maintenance	113FAS3351002C04	Length (km)	0.17	GIS/NFCDD	5830	Maintain	Short to long term	30	0.029732123	0.046456442	0.05574773	0.089196368		0	0	0	
	Seawall maintenance	113FAS3351002C05	Length (km)	0.7	GIS/NFCDD	5830	Maintain	Short to long term	30	0.122426388	0.191291231	0.229549478	0.367279164		0	0	0	
	Sheet piled wall maintenance	113FAS3351003C01	Length (km)	0.09	GIS/NFCDD	5830	Maintain	Short to long term	30	0.015740536	0.024594587	0.029513504	0.047221607		0	0	0	
	No addition		Length (m)	90	GIS/NFCDD	0	Sustain	Medium	0.5	0	0	0	0		0	0	0	
	CC 0.2m addition		Length (m)	90	GIS/NFCDD	559	Sustain	Long	0.2	0.010058202	0.015715941	0.018859129	0.030174607		0.018	0	0	
	Complex Wall maintenance	113FAS3351003C02	Length (km)	1	GIS/NFCDD	5830	Maintain	Short to long term	30	0.17489484	0.273273188	0.327927825	0.52468452		0	0	0	
	No addition		Length (m)	150	GIS/NFCDD	0	Improve	Short	1	0	0	0	0		0	0	0	
	CC 0.2m addition		Length (m)	1000	GIS/NFCDD	323	Sustain	Medium	0.5	0.16134049	0.252094516	0.302513419	0.48402147		0	0	0.2	
	CC 0.5m addition		Length (m)	1000	GIS/NFCDD	645	Sustain	Long	0.2	0.129072392	0.201675613	0.242010735	0.387217176		0	0	0.2	
	Complex Wall maintenance	113FAS3351003C03	Length (km)	0.12	GIS/NFCDD	5830	Maintain	Short to long term	30	0.020987381	0.032792783	0.039351339	0.062962142		0	0	0	
	CC 0.1m addition		Length (m)	120	GIS/NFCDD	559	Sustain	Medium	0.5	0.033527341	0.05238647	0.062863764	0.100582023		0.024	0	0	
	CC 0.3m addition		Length (m)	120	GIS/NFCDD	559	Sustain	Long	0.2	0.013410936	0.020954588	0.025145506	0.040232809		0.024	0	0	
	Timber revetment maintenance	113FAS3351003C04	Length (km)	0.08	GIS/NFCDD	5830	NAI	Short to long term	30	0.013991587	0.021861855	0.026234226	0.041974762		0	0	0	
	Sailing club access road raising	No road raising	113FAS3351003C05	Length (m)	20	GIS/NFCDD	0	Improve	Short	1	0	0	0	0		0	0	0
	Camperdown Terrace/Shelly Road property resilience	Gabion Wall maintenance	113FAS3351003C06	Length (km)	0.06	GIS/NFCDD	5830	NAI	Short to long term	30	0.01049369	0.016396391	0.01967567	0.031481071		0	0	0
		Property resilience	NA	Number	10	GIS/NFCDD	11660	Improve	Short	1	0.11659656	0.182182125	0.21861855	0.34978968		0	0	0
		Property resilience CC	NA	Number	10	GIS/NFCDD	11660	Improve	Medium	0.5	0.05829828	0.091091063	0.109309275	0.17489484		0	0	0
		Property resilience CC	NA	Number	7	GIS/NFCDD	11660	Improve	Long	0.2	0.016323518	0.025505498	0.030606597	0.048970555		0	0	0
		Pitched Stone Revetment maintenance	113FAS3351003C07	Length (km)	0.05	GIS/NFCDD	5830	Maintain	Short to long term	30	0.008744742	0.013663659	0.016396391	0.026234226		0	0	0
		Complex Wall maintenance	113FAS3351003C08	Length (km)	0.08	GIS/NFCDD	5830	Maintain	Short to long term	30	0.013991587	0.021861855	0.026234226	0.041974762		0	0	0
Masonry Wall maintenance		113FAS3351003C09	Length (km)	0.07	GIS/NFCDD	5830	Maintain	Short to long term	30	0.012242639	0.019129123	0.022954948	0.036727916		0	0	0	
Masonry Wall maintenance	113FAS3351003C10	Length (km)	0.06	GIS/NFCDD	5830	Maintain	Short to long term	30	0.01049369	0.016396391	0.01967567	0.031481071		0	0	0		
Slipway/boatyard road/wall raising	Complex Wall maintenance	113FAS3351004C01	Length (km)	0.09	GIS/NFCDD	5830	Maintain	Short to long term	30	0.015740536	0.024594587	0.029513504	0.047221607		0	0	0	
	CC 0.1m addition		Length (m)	90	GIS/NFCDD	323	Improve	Short	1	0.029041288	0.045377013	0.054452415	0.087123865		0.018	0	0	
	CC 0.3m addition		Length (m)	90	GIS/NFCDD	323	Sustain	Medium	0.5	0.014520644	0.022688506	0.027226208	0.043561932		0.018	0	0	
	CC 0.7m addition		Length (m)	90	GIS/NFCDD	968	Sustain	Long	0.2	0.017424773	0.027226208	0.032671449	0.052274319		0.018	0	0	
	Gabion toe maintenance	113FAS3351004C02	Length (km)	0.11	GIS/NFCDD	5830	Maintain	Short to long term	30	0.019238432	0.030060051	0.036072061	0.057715297		0	0	0	
	No addition		Length (m)	110	GIS/NFCDD	0	Sustain	Short	1	0	0	0	0		0	0	0	
	No addition		Length (m)	110	GIS/NFCDD	0	Sustain	Medium	0.5	0	0	0	0		0	0	0	
	CC 0.4m addition		Length (m)	110	GIS/NFCDD	645	Sustain	Long	0.2	0.014197963	0.022184317	0.026621181	0.042593889		0.022	0	0	
North-east Imperial Recreation Ground landward wall/road raising	Revetment maintenance	113FAS3351004C03	Length (km)	0.55	GIS/NFCDD	5830	Maintain	Short to long term	30	0.096192162	0.150300253	0.180360304	0.288576486		0	0	0	
	Wall maintenance		Length (km)	0.15	GIS/NFCDD	5830	Maintain	Short to long term	30	0.026234226	0.040990978	0.049189174	0.078702678		0	0	0	
	New wall 0.2m addition		Length (m)	150	GIS/NFCDD	323	Improve	Short	1	0.048402147	0.075628355	0.090754026	0.145206441		0	0	0.03	
	CC 0.2m addition		Length (m)	150	GIS/NFCDD	323	Sustain	Medium	0.5	0.024201074	0.037814177	0.045377013	0.072603221		0	0	0.03	
	Extended wall 0.3m addition		Length (m)	250	GIS/NFCDD	323	Sustain	Long	0.2	0.016134049	0.025209452	0.030251342	0.048402147		0	0	0.05	
	Embankment maintenance	113FAS3351004C04	Length (km)	0.39	GIS/NFCDD	1166	Maintain	Short to long term	30	0.013641798	0.021315309	0.02557837	0.040925393		0	0	0	
	No addition		Length (m)	390	GIS/NFCDD	0	Sustain	Short	1	0	0	0	0		0	0	0	
	CC 0.5m addition		Length (m)	390	GIS/NFCDD	329	Sustain	Medium	0.5	0.064116448	0.100181951	0.120218341	0.192349345		0.078	0	0	
	CC 0.5m addition		Length (m)	390	GIS/NFCDD	329	Sustain	Long	0.2	0.025646579	0.04007278	0.048087336	0.076939738		0.078	0	0	
	Embankment maintenance	113FAS3351004C05	Length (km)	0.56	GIS/NFCDD	1166	Maintain	Short to long term	30	0.019588222	0.030606597	0.036727916	0.058764666		0	0	0	
	No addition		Length (m)	560	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0		0	0	0	
														4.250061795	TOTAL			





FCRMU approach	Asset Type	Asset reference	Parameter	Amount	Reference	Rate (£/parameter)	HLO	Epoch	Epochal discount factor	Basic construction cost (£M)	Plus Tidal/urban uplift (25% each) cost (£M)	Plus PAR, design and supervision (20%) cost (£M)	Plus Optimism bias 60% cost (£M)		FOOTPRINT IMPACT (Ha)			
RESPONSE OPTIONS																SPA/SSSI	SAC	None
Short Term Option 2 (Camperdown Terrace and Imperial Recreation Ground). Medium to Long Term Option 2 (seaward and landward)	Seawall maintenance	113FAS3351002C04	Length (km)	0.17	GIS/NFCDD	5830	Maintain	Short to long term	30	0.029732123	0.046456442	0.05574773	0.089196368		0	0	0	
	Seawall maintenance	113FAS3351002C05	Length (km)	0.7	GIS/NFCDD	5830	Maintain	Short to long term	30	0.122426388	0.191291231	0.229549478	0.367279164		0	0	0	
	Sheet piled wall maintenance	113FAS3351003C01	Length (km)	0.09	GIS/NFCDD	5830	Maintain	Short to long term	30	0.015740536	0.024594587	0.029513504	0.047221607		0	0	0	
	No addition		Length (m)	90	GIS/NFCDD	0	Sustain	Medium	0.5	0	0	0	0		0	0	0	
	CC 0.3m addition		Length (m)	90	GIS/NFCDD	559	Sustain	Long	0.2	0.010058202	0.015715941	0.018859129	0.030174607		0.018	0	0	
Exmouth Docks improvements to avoid pedestrian/local flooding	Complex Wall maintenance	113FAS3351003C02	Length (km)	1	GIS/NFCDD	5830	Maintain	Short to long term	30	0.17489484	0.273273188	0.327927825	0.52468452		0	0	0	
	CC 0.25m addition		Length (m)	150	GIS/NFCDD	323	Improve	Short	1	0.048402147	0.075628355	0.090754026	0.145206441		0	0	0.03	
	No addition		Length (m)	1000	GIS/NFCDD	323	Sustain	Medium	0.5	0.16134049	0.252094516	0.302513419	0.48402147		0	0	0.2	
	CC 0.5m addition		Length (m)	1000	GIS/NFCDD	645	Sustain	Long	0.2	0.129072392	0.201675613	0.242010735	0.387217176		0	0	0.2	
	Complex Wall maintenance	113FAS3351003C03	Length (km)	0.12	GIS/NFCDD	5830	Maintain	Short to long term	30	0.020987381	0.032792783	0.039351339	0.062962142		0	0	0	
	CC 0.2m addition		Length (m)	120	GIS/NFCDD	559	Sustain	Medium	0.5	0.033527341	0.05238647	0.062863764	0.100582023		0.024	0	0	
	CC 0.4m addition		Length (m)	120	GIS/NFCDD	1118	Sustain	Long	0.2	0.026821873	0.041909176	0.050291011	0.080465618		0.024	0	0	
	Timber revetment maintenance	113FAS3351003C04	Length (km)	0.08	GIS/NFCDD	5830	NAI	Short to long term	30	0.013991587	0.021861855	0.026234226	0.041974762		0	0	0	
Sailing club access road raising	road raising 0.1m	113FAS3351003C05	Length (m)	20	GIS/NFCDD	323	Improve	Short	1	0.00645362	0.010083781	0.012100537	0.019360859		0.004	0	0	
Camperdown Terrace/Shelly Road property resilience	Gabion Wall maintenance	113FAS3351003C06	Length (km)	0.06	GIS/NFCDD	5830	NAI	Short to long term	30	0.01049369	0.016396391	0.01967567	0.031481071		0	0	0	
	Property resilience	NA	Number	12	GIS/NFCDD	11660	Improve	Short	1	0.139915872	0.21861855	0.26234226	0.419747616		0	0	0	
	Property resilience CC	NA	Number	10	GIS/NFCDD	11660	Improve	Medium	0.5	0.05829828	0.091091063	0.109309275	0.17489484		0	0	0	
	Property resilience CC	NA	Number	7	GIS/NFCDD	11660	Improve	Long	0.2	0.016323518	0.025505498	0.030606597	0.048970555		0	0	0	
	Pitched Stone Revetment maintenance	113FAS3351003C07	Length (km)	0.05	GIS/NFCDD	5830	Maintain	Short to long term	30	0.008744742	0.013663659	0.016396391	0.026234226		0	0	0	
	Complex Wall maintenance	113FAS3351003C08	Length (km)	0.08	GIS/NFCDD	5830	Maintain	Short to long term	30	0.013991587	0.021861855	0.026234226	0.041974762		0	0	0	
	Masonry Wall maintenance	113FAS3351003C09	Length (km)	0.07	GIS/NFCDD	5830	Maintain	Short to long term	30	0.012242639	0.019129123	0.022954948	0.036727916		0	0	0	
Masonry Wall maintenance	113FAS3351003C10	Length (km)	0.06	GIS/NFCDD	5830	Maintain	Short to long term	30	0.01049369	0.016396391	0.01967567	0.031481071		0	0	0		
Slipway/boatyard road/wall raising	Complex Wall maintenance	113FAS3351004C01	Length (km)	0.09	GIS/NFCDD	5830	Maintain	Short to long term	30	0.015740536	0.024594587	0.029513504	0.047221607		0	0	0	
	CC 0.2m addition		Length (m)	90	GIS/NFCDD	323	Improve	Short	1	0.029041288	0.045377013	0.054452415	0.087123865		0.018	0	0	
	CC 0.2m addition		Length (m)	90	GIS/NFCDD	323	Sustain	Medium	0.5	0.014520644	0.022688506	0.027226208	0.043561932		0.018	0	0	
	CC 1.1m addition		Length (m)	90	GIS/NFCDD	1291	Sustain	Long	0.2	0.023233031	0.03630161	0.043561932	0.069699092		0.018	0	0	
	Gabion toe maintenance	113FAS3351004C02	Length (km)	0.11	GIS/NFCDD	5830	Maintain	Short to long term	30	0.019238432	0.030060051	0.036072061	0.057715297		0	0	0	
	No addition		Length (m)	110	GIS/NFCDD	0	Sustain	Short	1	0	0	0	0		0	0	0	
	CC 0.1m addition		Length (m)	110	GIS/NFCDD	323	Sustain	Medium	0.5	0.017747454	0.027730397	0.033276476	0.053242362		0.022	0	0	
	CC 0.4m addition		Length (m)	110	GIS/NFCDD	645	Sustain	Long	0.2	0.014197963	0.022184317	0.026621181	0.042593889		0.022	0	0	
	Revetment maintenance	113FAS3351004C03	Length (km)	0.55	GIS/NFCDD	5830	Maintain	Short to long term	30	0.096192162	0.150300253	0.180360304	0.288576486		0	0	0	
North-east Imperial Recreation Ground landward wall/road raising	Wall maintenance		Length (km)	0.15	GIS/NFCDD	5830	Maintain	Short to long term	30	0.026234226	0.040990978	0.049189174	0.078702678		0	0	0	
	New wall 0.3m addition		Length (m)	150	GIS/NFCDD	323	Improve	Short	1	0.048402147	0.075628355	0.090754026	0.145206441		0	0	0.03	
	CC 0.2m addition		Length (m)	150	GIS/NFCDD	323	Sustain	Medium	0.5	0.024201074	0.037814177	0.045377013	0.072603221		0	0	0.03	
	Extended wall 0.4m addition		Length (m)	250	GIS/NFCDD	645	Sustain	Long	0.2	0.032268098	0.050418903	0.060502684	0.096804294		0	0	0.05	
	Embankment maintenance	113FAS3351004C04	Length (km)	0.39	GIS/NFCDD	1166	Maintain	Short to long term	30	0.013641798	0.021315309	0.02557837	0.040925393		0	0	0	
	No addition		Length (m)	390	GIS/NFCDD	0	Sustain	Short	1	0	0	0	0		0	0	0	
	CC 0.6m addition		Length (m)	390	GIS/NFCDD	329	Sustain	Medium	0.5	0.064116448	0.100181951	0.120218341	0.192349345		0.078	0	0	
	CC 0.4m addition		Length (m)	390	GIS/NFCDD	329	Sustain	Long	0.2	0.025646579	0.04007278	0.048087336	0.076939738		0.078	0	0	
	Embankment maintenance	113FAS3351004C05	Length (km)	0.56	GIS/NFCDD	1166	Maintain	Short to long term	30	0.019588222	0.030606597	0.036727916	0.058764666		0	0	0	
	No addition		Length (m)	560	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0		0	0	0	
													4.643889121	TOTAL				



FCRMU approach	Asset Type	Asset reference	Parameter	Amount	Reference	Rate (£/parameter)	HLO	Epoch	Epochal discount factor	Basic construction cost (£M)	Plus Tidal/urban uplift (25% each) cost (£M)	Plus PAR, design and supervision (20%) cost (£M)	Plus Optimism bias 60% cost (£M)		FOOTPRINT IMPACT (Ha)		
RESPONSE OPTIONS															SPA/SSSI	SAC	None
Short Term Option 2 (Camperdown Terrace and Imperial Recreation Ground). Medium to Long Term Option 2 (seaward and landward)	Seawall maintenance	113FAS3351002C04	Length (km)	0.17	GIS/NFCDD	5830	Maintain	Short to long term	30	0.029732123	0.046456442	0.05574773	0.089196368		0	0	0
	Seawall maintenance	113FAS3351002C05	Length (km)	0.7	GIS/NFCDD	5830	Maintain	Short to long term	30	0.122426388	0.191291231	0.229549478	0.367279164		0	0	0
	Sheet piled wall maintenance	113FAS3351003C01	Length (km)	0.09	GIS/NFCDD	5830	Maintain	Short to long term	30	0.015740536	0.024594587	0.029513504	0.047221607		0	0	0
	CC 0.1m addition		Length (m)	90	GIS/NFCDD	559	Sustain	Medium	0.5	0.025145506	0.039289853	0.047147823	0.075436517		0.018	0	0
	CC 0.4m addition		Length (m)	90	GIS/NFCDD	1118	Sustain	Long	0.2	0.020116405	0.031431882	0.037718258	0.060349214		0.018	0	0
Exmouth Docks improvements to avoid pedestrian/local flooding	Complex Wall maintenance	113FAS3351003C02	Length (km)	1	GIS/NFCDD	5830	Maintain	Short to long term	30	0.17489484	0.273273188	0.327927825	0.52468452		0	0	0
	CC 0.25m addition		Length (m)	150	GIS/NFCDD	323	Improve	Short	1	0.048402147	0.075628355	0.090754026	0.145206441		0	0	0.03
	No addition		Length (m)	1000	GIS/NFCDD	0	Sustain	Medium	0.5	0	0	0	0		0	0	0
	CC 0.75m addition		Length (m)	1000	GIS/NFCDD	968	Sustain	Long	0.2	0.193608588	0.302513419	0.363016103	0.580825764		0	0	0.2
	Complex Wall maintenance	113FAS3351003C03	Length (km)	0.12	GIS/NFCDD	5830	Maintain	Short to long term	30	0.020987381	0.032792783	0.039351339	0.062962142		0	0	0
	CC 0.2m addition		Length (m)	120	GIS/NFCDD	559	Sustain	Medium	0.5	0.033527341	0.05238647	0.062863764	0.100582023		0.024	0	0
	CC 0.4m addition		Length (m)	120	GIS/NFCDD	1118	Sustain	Long	0.2	0.026821873	0.041909176	0.050291011	0.080465618		0.024	0	0
	Timber revetment maintenance	113FAS3351003C04	Length (km)	0.08	GIS/NFCDD	5830	NAI	Short to long term	30	0.013991587	0.021861855	0.026234226	0.041974762		0	0	0
Sailing club access road raising	road raising 0.2m	113FAS3351003C05	Length (m)	20	GIS/NFCDD	323	Improve	Short	1	0.00645362	0.010083781	0.012100537	0.019360859		0	0	0.02
Wider Camperdown Terrace road raising	road raising 0.1m	NA	Length (m)	150	GIS/NFCDD	323	Sustain	Medium	0.5	0.024201074	0.037814177	0.045377013	0.072603221		0	0	0.15
Wider Camperdown Terrace road raising	road raising 0.3m	NA	Length (m)	150	GIS/NFCDD	323	Sustain	Long	0.2	0.009680429	0.015125671	0.018150805	0.029041288		0	0	0.15
Camperdown Terrace/Shelly Road property resilience	Gabion Wall maintenance	113FAS3351003C06	Length (km)	0.06	GIS/NFCDD	5830	NAI	Short to long term	30	0.01049369	0.016396391	0.01967567	0.031481071		0	0	0
	Property resilience	NA	Number	15	GIS/NFCDD	11660	Improve	Short	1	0.17489484	0.273273188	0.327927825	0.52468452		0	0	0
	Property resilience CC	NA	Number	9	GIS/NFCDD	11660	Improve	Medium	0.5	0.052468452	0.081981956	0.098378348	0.157405356		0	0	0
	Property resilience CC	NA	Number	44	GIS/NFCDD	11660	Improve	Long	0.2	0.102604973	0.16032027	0.192384324	0.307814919		0	0	0
	Pitched Stone Revetment maintenance	113FAS3351003C07	Length (km)	0.05	GIS/NFCDD	5830	Maintain	Short to long term	30	0.008744742	0.013663659	0.016396391	0.026234226		0	0	0
	Complex Wall maintenance	113FAS3351003C08	Length (km)	0.08	GIS/NFCDD	5830	Maintain	Short to long term	30	0.013991587	0.021861855	0.026234226	0.041974762		0	0	0
	Masonry Wall maintenance	113FAS3351003C09	Length (km)	0.07	GIS/NFCDD	5830	Maintain	Short to long term	30	0.012242639	0.019129123	0.022954948	0.036727916		0	0	0
	Masonry Wall maintenance	113FAS3351003C10	Length (km)	0.06	GIS/NFCDD	5830	Maintain	Short to long term	30	0.01049369	0.016396391	0.01967567	0.031481071		0	0	0
Slipway/boatyard road/wall raising	Complex Wall maintenance	113FAS3351004C01	Length (km)	0.09	GIS/NFCDD	5830	Maintain	Short to long term	30	0.015740536	0.024594587	0.029513504	0.047221607		0	0	0
	CC 0.3m addition		Length (m)	90	GIS/NFCDD	323	Improve	Short	1	0.029041288	0.045377013	0.054452415	0.087123865		0.018	0	0
	CC 0.2m addition		Length (m)	90	GIS/NFCDD	323	Sustain	Medium	0.5	0.014520644	0.022688506	0.027226208	0.043561932		0.018	0	0
	CC 1.1m addition		Length (m)	90	GIS/NFCDD	1291	Sustain	Long	0.2	0.023233031	0.03630161	0.043561932	0.069699092		0.018	0	0
	Gabion toe maintenance	113FAS3351004C02	Length (km)	0.11	GIS/NFCDD	5830	Maintain	Short to long term	30	0.019238432	0.030060051	0.036072061	0.057715297		0	0	0
	CC 0.1m addition		Length (m)	110	GIS/NFCDD	323	Sustain	Short	1	0.035494908	0.055460793	0.066552952	0.106484723		0.022	0	0
	CC 0.1m addition		Length (m)	110	GIS/NFCDD	0	Sustain	Medium	0.5	0	0	0	0		0	0	0
	CC 0.4m addition		Length (m)	110	GIS/NFCDD	645	Sustain	Long	0.2	0.014197963	0.022184317	0.026621181	0.042593889		0.022	0	0
	Revetment maintenance	113FAS3351004C03	Length (km)	0.55	GIS/NFCDD	5830	Maintain	Short to long term	30	0.096192162	0.150300253	0.180360304	0.288576486		0	0	0
North-east Imperial Recreation Ground landward wall/road raising	Wall maintenance		Length (km)	0.15	GIS/NFCDD	5830	Maintain	Short to long term	30	0.026234226	0.040990978	0.049189174	0.078702678		0	0	0
	New wall 0.4m addition		Length (m)	150	GIS/NFCDD	645	Improve	Short	1	0.096804294	0.151256709	0.181508051	0.290412882		0	0	0.03
	CC 0.2m addition		Length (m)	150	GIS/NFCDD	323	Sustain	Medium	0.5	0.024201074	0.037814177	0.045377013	0.072603221		0	0	0.03
	Extended wall 0.5m addition		Length (m)	250	GIS/NFCDD	645	Sustain	Long	0.2	0.032268098	0.050418903	0.060502684	0.096804294		0	0	0.05
	Embankment maintenance	113FAS3351004C04	Length (km)	0.39	GIS/NFCDD	1166	Maintain	Short to long term	30	0.013641798	0.021315309	0.02557837	0.040925393		0	0	0
	CC 0.4m addition		Length (m)	390	GIS/NFCDD	329	Sustain	Short	1	0.128232897	0.200363901	0.240436681	0.38469869		0.078	0	0
	CC 0.3m addition		Length (m)	390	GIS/NFCDD	164	Sustain	Medium	0.5	0.032058224	0.050090975	0.06010917	0.096174673		0.078	0	0
	CC 0.3m addition		Length (m)	390	GIS/NFCDD	164	Sustain	Long	0.2	0.01282329	0.02003639	0.024043668	0.038469869		0.078	0	0
	Embankment maintenance	113FAS3351004C05	Length (km)	0.56	GIS/NFCDD	1166	Maintain	Short to long term	30	0.019588222	0.030606597	0.036727916	0.058764666		0	0	0
	No addition		Length (m)	560	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0		0	0	0
												5.355526607	TOTAL				



FCRMU approach	Asset Type	Asset reference	Parameter	Amount	Reference	Rate (£/parameter)	HLO	Epoch	Epochal discount factor	Basic construction cost (£M)	Plus Tidal/urban uplift (25% each) cost (£M)	Plus PAR, design and supervision (20%) cost (£M)	Plus Optimism bias 60% cost (£M)		FOOTPRINT IMPACT (Ha)			
RESPONSE OPTIONS																SPA/SSSI	SAC	None

Short Term Option 2 (Camperdown Terrace and Imperial Recreation Ground). Medium to Long Term Option 2 (seaward and landward)	Seawall maintenance	113FAS3351002C04	Length (km)	0.17	GIS/NFCDD	5830	Maintain	Short to long term	30	0.029732123	0.046456442	0.05574773	0.089196368			0	0	0
	Seawall maintenance	113FAS3351002C05	Length (km)	0.7	GIS/NFCDD	5830	Maintain	Short to long term	30	0.122426388	0.191291231	0.229549478	0.367279164			0	0	0
	Sheet piled wall maintenance	113FAS3351003C01	Length (km)	0.09	GIS/NFCDD	5830	Maintain	Short to long term	30	0.015740536	0.024594587	0.029513504	0.047221607			0	0	0
	CC 0.1m addition		Length (m)	90	GIS/NFCDD	559	Sustain	Medium	0.5	0.025145506	0.039289853	0.047147823	0.075436517			0.018	0	0
	CC 0.4m addition		Length (m)	90	GIS/NFCDD	1118	Sustain	Long	0.2	0.020116405	0.031431882	0.037718258	0.060349214			0.018	0	0
Exmouth Docks improvements to avoid pedestrian/local flooding	Complex Wall maintenance	113FAS3351003C02	Length (km)	1	GIS/NFCDD	5830	Maintain	Short to long term	30	0.17489484	0.273273188	0.327927825	0.52468452			0	0	0
	CC 0.5m addition		Length (m)	150	GIS/NFCDD	645	Improve	Short	1	0.096804294	0.151256709	0.181508051	0.290412882			0	0	0.03
	No addition		Length (m)	1000	GIS/NFCDD	0	Sustain	Medium	0.5	0	0	0	0			0	0	0
	CC 0.5m addition		Length (m)	1000	GIS/NFCDD	645	Sustain	Long	0.2	0.129072392	0.201675613	0.242010735	0.387217176			0	0	0.2
	Complex Wall maintenance	113FAS3351003C03	Length (km)	0.12	GIS/NFCDD	5830	Maintain	Short to long term	30	0.020987381	0.032792783	0.039351339	0.062962142			0	0	0
	CC 0.2m addition		Length (m)	120	GIS/NFCDD	559	Sustain	Medium	0.5	0.033527341	0.05238647	0.062863764	0.100582023			0.024	0	0
	CC 0.4m addition		Length (m)	120	GIS/NFCDD	1118	Sustain	Long	0.2	0.026821873	0.041909176	0.050291011	0.080465618			0.024	0	0
	Timber revetment maintenance	113FAS3351003C04	Length (km)	0.08	GIS/NFCDD	5830	NAI	Short to long term	30	0.013991587	0.021861855	0.026234226	0.041974762			0	0	0
Sailing club access road raising	road raising 0.3m	113FAS3351003C05	Length (m)	20	GIS/NFCDD	323	Improve	Short	1	0.00645362	0.010083781	0.012100537	0.019360859			0	0	0.02
Wider Camperdown Terrace road raising	road raising 0.3m	NA	Length (m)	150	GIS/NFCDD	323	Sustain	Medium	0.5	0.024201074	0.037814177	0.045377013	0.072603221			0	0	0.15
Wider Camperdown Terrace road raising	road raising 0.4m	NA	Length (m)	150	GIS/NFCDD	645	Sustain	Long	0.2	0.019360859	0.030251342	0.03630161	0.058082576			0	0	0.15
Camperdown Terrace/Shelly Road property resilience	Gabion Wall maintenance	113FAS3351003C06	Length (km)	0.06	GIS/NFCDD	5830	NAI	Short to long term	30	0.01049369	0.016396391	0.01967567	0.031481071			0	0	0
	Property resilience	NA	Number	22	GIS/NFCDD	11660	Improve	Short	1	0.256512432	0.400800675	0.48096081	0.769537297			0	0	0
	Property resilience CC	NA	Number	2	GIS/NFCDD	11660	Improve	Medium	0.5	0.011659656	0.018218213	0.021861855	0.034978968			0	0	0
	Property resilience CC	NA	Number	44	GIS/NFCDD	11660	Improve	Long	0.2	0.102604973	0.16032027	0.192384324	0.307814919			0	0	0
	Pitched Stone Revetment maintenance	113FAS3351003C07	Length (km)	0.05	GIS/NFCDD	5830	Maintain	Short to long term	30	0.008744742	0.013663659	0.016396391	0.026234226			0	0	0
	Complex Wall maintenance	113FAS3351003C08	Length (km)	0.08	GIS/NFCDD	5830	Maintain	Short to long term	30	0.013991587	0.021861855	0.026234226	0.041974762			0	0	0
	Masonry Wall maintenance	113FAS3351003C09	Length (km)	0.07	GIS/NFCDD	5830	Maintain	Short to long term	30	0.012242639	0.019129123	0.022954948	0.036727916			0	0	0
Slipway/boatyard road/wall raising	Masonry Wall maintenance	113FAS3351003C10	Length (km)	0.06	GIS/NFCDD	5830	Maintain	Short to long term	30	0.01049369	0.016396391	0.01967567	0.031481071			0	0	0
	Complex Wall maintenance	113FAS3351004C01	Length (km)	0.09	GIS/NFCDD	5830	Maintain	Short to long term	30	0.015740536	0.024594587	0.029513504	0.047221607			0	0	0
	CC 0.5m addition		Length (m)	90	GIS/NFCDD	645	Improve	Short	1	0.058082576	0.090754026	0.108904831	0.174247729			0.018	0	0
	CC 0.2m addition		Length (m)	90	GIS/NFCDD	323	Sustain	Medium	0.5	0.014520644	0.022688506	0.027226208	0.043561932			0.018	0	0
	CC 1m addition		Length (m)	90	GIS/NFCDD	1291	Sustain	Long	0.2	0.023233031	0.03630161	0.043561932	0.069699092			0.018	0	0
	Gabion toe maintenance	113FAS3351004C02	Length (km)	0.11	GIS/NFCDD	5830	Maintain	Short to long term	30	0.019238432	0.030060051	0.036072061	0.057715297			0	0	0
	CC 0.1m addition		Length (m)	110	GIS/NFCDD	323	Sustain	Short	1	0.035494908	0.055460793	0.066552952	0.106484723			0.022	0	0
	CC 0.3m addition		Length (m)	110	GIS/NFCDD	323	Sustain	Medium	0.5	0.017747454	0.027730397	0.033276476	0.053242362			0.022	0	0
North-east Imperial Recreation Ground landward wall/road raising	CC 0.4m addition		Length (m)	110	GIS/NFCDD	645	Sustain	Long	0.2	0.014197963	0.022184317	0.026621181	0.042593889			0.022	0	0
	Revetment maintenance	113FAS3351004C03	Length (km)	0.55	GIS/NFCDD	5830	Maintain	Short to long term	30	0.096192162	0.150300253	0.180360304	0.288576486			0	0	0
	Wall maintenance		Length (km)	0.25	GIS/NFCDD	5830	Maintain	Short to long term	30	0.04372371	0.068318297	0.081981956	0.13117113			0	0	0
	New wall 0.6m addition		Length (m)	250	GIS/NFCDD	645	Improve	Short	1	0.16134049	0.252094516	0.302513419	0.48402147			0	0	0.05
	CC 0.2m addition		Length (m)	250	GIS/NFCDD	323	Sustain	Medium	0.5	0.040335123	0.063023629	0.075628355	0.121005368			0	0	0.05
	CC0.4m addition		Length (m)	250	GIS/NFCDD	645	Sustain	Long	0.2	0.032268098	0.050418903	0.060502684	0.096804294			0	0	0.05
	Embankment maintenance	113FAS3351004C04	Length (km)	0.39	GIS/NFCDD	1166	Maintain	Short to long term	30	0.013641798	0.021315309	0.02557837	0.040925393			0	0	0
	CC 0.5m addition		Length (m)	390	GIS/NFCDD	329	Sustain	Short	1	0.128232897	0.200363901	0.240436681	0.38469869			0.078	0	0
	CC 0.3m addition		Length (m)	390	GIS/NFCDD	164	Sustain	Medium	0.5	0.032058224	0.050090975	0.06010917	0.096174673			0.078	0	0
	CC 0.3m addition		Length (m)	390	GIS/NFCDD	164	Sustain	Long	0.2	0.01282329	0.02003639	0.024043668	0.038469869			0.078	0	0
	Embankment maintenance	113FAS3351004C05	Length (km)	0.56	GIS/NFCDD	1166	Maintain	Short to long term	30	0.019588222	0.030606597	0.036727916	0.058764666			0	0	0
	CC 0.1m addition		Length (m)	560	GIS/NFCDD	164	Sustain	Long	0.2	0.018412929	0.028770201	0.034524241	0.055238786			0.112	0	0
														5.948676336	TOTAL			



FCRMU approach	Asset Type	Asset reference	Parameter	Amount	Reference	Rate (£/parameter)	HLO	Epoch	Epochal discount factor	Basic construction cost (£M)	Plus Tidal/urban uplift (25% each) cost (£M)	Plus PAR, design and supervision (20%) cost (£M)	Plus Optimism bias 60% cost (£M)		FOOTPRINT IMPACT (Ha)			
RESPONSE OPTIONS																SPA/SSSI	SAC	None
Short Term Option 2 (Camperdown Terrace) and 1 (Imperial Recreation Ground). Medium to Long Term Option 1 (seaward improvements). Exmouth Docks improvements to avoid pedestrian/local flooding	Seawall maintenance	113FAS3351002C04	Length (km)	0.17	GIS/NFCDD	5830	Maintain	Short to long term	30	0.029732123	0.046456442	0.05574773	0.089196368		0	0	0	
	Seawall maintenance	113FAS3351002C05	Length (km)	0.7	GIS/NFCDD	5830	Maintain	Short to long term	30	0.122426388	0.191291231	0.229549478	0.367279164		0	0	0	
	Sheet piled wall maintenance	113FAS3351003C01	Length (km)	0.09	GIS/NFCDD	5830	Maintain	Short to long term	30	0.015740536	0.024594587	0.029513504	0.047221607		0	0	0	
	No addition		Length (m)	90	GIS/NFCDD	0	Sustain	Medium	0.5	0	0	0	0		0	0	0	
	CC 0.2m addition		Length (m)	90	GIS/NFCDD	559	Sustain	Long	0.2	0.010058202	0.015715941	0.018859129	0.030174607		0.018	0	0	
	Complex Wall maintenance	113FAS3351003C02	Length (km)	1	GIS/NFCDD	5830	Maintain	Short to long term	30	0.17489484	0.273273188	0.327927825	0.52468452		0	0	0	
	No addition		Length (m)	150	GIS/NFCDD	0	Improve	Short	1	0	0	0	0		0	0	0	
	CC 0.2m addition		Length (m)	1000	GIS/NFCDD	323	Sustain	Medium	0.5	0.16134049	0.252094516	0.302513419	0.48402147		0	0	0.2	
	CC 0.5m addition		Length (m)	1000	GIS/NFCDD	645	Sustain	Long	0.2	0.129072392	0.201675613	0.242010735	0.387217176		0	0	0.2	
	Complex Wall maintenance	113FAS3351003C03	Length (km)	0.12	GIS/NFCDD	5830	Maintain	Short to long term	30	0.020987381	0.032792783	0.039351339	0.062962142		0	0	0	
	CC 0.1m addition		Length (m)	120	GIS/NFCDD	559	Sustain	Medium	0.5	0.033527341	0.05238647	0.062863764	0.100582023		0.024	0	0	
	CC 0.3m addition		Length (m)	120	GIS/NFCDD	559	Sustain	Long	0.2	0.013410936	0.020954588	0.025145506	0.040232809		0.024	0	0	
	Timber revetment maintenance	113FAS3351003C04	Length (km)	0.08	GIS/NFCDD	5830	NAI	Short to long term	30	0.013991587	0.021861855	0.026234226	0.041974762		0	0	0	
Sailing club access road raising	No road raising	113FAS3351003C05	Length (m)	20	GIS/NFCDD	0	Improve	Short	1	0	0	0	0		0	0	0	
	Gabion Wall maintenance	113FAS3351003C06	Length (km)	0.06	GIS/NFCDD	5830	NAI	Short to long term	30	0.01049369	0.016396391	0.01967567	0.031481071		0	0	0	
Camperdown Terrace/Shelly Road new walls	New wall maintenance		Length (km)	0.26	GIS/NFCDD	5830	Maintain	Medium to long term	15	0.022736329	0.035525514	0.042630617	0.068208988		0.000052	0	0.00026	
	New wall 2.7m		Length (m)	260	GIS/NFCDD	2593	Improve	Medium	0.5	0.337028187	0.526606542	0.63192785	1.01108456		0.052	0	0	
	CC 0.3m addition		Length (km)	260	GIS/NFCDD	559	Sustain	Medium	0.5	0.072642572	0.113504019	0.136204822	0.217927716		0.052	0	0	
	CC 0.5m addition		Length (km)	260	GIS/NFCDD	1118	Sustain	Long	0.2	0.058114057	0.090803215	0.108963858	0.174342172		0.052	0	0	
Slipway/boatyard road/wall raising	Complex Wall maintenance	113FAS3351004C01	Length (km)	0.09	GIS/NFCDD	5830	Maintain	Short to long term	30	0.015740536	0.024594587	0.029513504	0.047221607		0	0	0	
	CC 0.1m addition		Length (m)	90	GIS/NFCDD	323	Improve	Short	1	0.029041288	0.045377013	0.054452415	0.087123865		0.018	0	0	
	CC 0.3m addition		Length (m)	90	GIS/NFCDD	323	Sustain	Medium	0.5	0.014520644	0.022688506	0.027226208	0.043561932		0.018	0	0	
	CC 0.7m addition		Length (m)	90	GIS/NFCDD	968	Sustain	Long	0.2	0.017424773	0.027226208	0.032671449	0.052274319		0.018	0	0	
	Gabion toe maintenance	113FAS3351004C02	Length (km)	0.11	GIS/NFCDD	5830	Maintain	Short to long term	30	0.019238432	0.030060051	0.036072061	0.057715297		0	0	0	
	No addition		Length (m)	110	GIS/NFCDD	0	Sustain	Short	1	0	0	0	0		0	0	0	
	No addition		Length (m)	110	GIS/NFCDD	0	Sustain	Medium	0.5	0	0	0	0		0	0	0	
	CC 0.4m addition		Length (m)	110	GIS/NFCDD	645	Sustain	Long	0.2	0.014197963	0.022184317	0.026621181	0.042593889		0.022	0	0	
North-east Imperial Recreation Ground revetment wave wall raising	Revetment maintenance	113FAS3351004C03	Length (km)	0.55	GIS/NFCDD	5830	Maintain	Short to long term	30	0.096192162	0.150300253	0.180360304	0.288576486		0	0	0	
	Wall maintenance		Length (km)	0.1	GIS/NFCDD	5830	Maintain	Short to long term	30	0.017489484	0.027327319	0.032792783	0.052468452		0	0	0	
	No addition		Length (m)	100	GIS/NFCDD	0	Improve	Short	1	0	0	0	0		0	0	0	
	CC 0.25m addition		Length (m)	100	GIS/NFCDD	167	Sustain	Medium	0.5	0.008336654	0.013026022	0.015631226	0.025009962		0.02	0	0	
	CC 0.25m addition		Length (m)	100	GIS/NFCDD	167	Sustain	Long	0.2	0.003334662	0.005210409	0.006252491	0.010003985		0.02	0	0	
	Embankment maintenance	113FAS3351004C04	Length (km)	0.39	GIS/NFCDD	1166	Maintain	Short to long term	30	0.013641798	0.021315309	0.02557837	0.040925393		0	0	0	
	No addition		Length (m)	390	GIS/NFCDD	0	Sustain	Short	1	0	0	0	0		0	0	0	
	CC 0.5m addition		Length (m)	390	GIS/NFCDD	329	Sustain	Medium	0.5	0.064116448	0.100181951	0.120218341	0.192349345		0.078	0	0	
	CC 0.5m addition		Length (m)	390	GIS/NFCDD	329	Sustain	Long	0.2	0.025646579	0.04007278	0.048087336	0.076939738		0.078	0	0	
	Embankment maintenance	113FAS3351004C05	Length (km)	0.56	GIS/NFCDD	1166	Maintain	Short to long term	30	0.019588222	0.030606597	0.036727916	0.058764666		0	0	0	
	No addition		Length (m)	560	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0		0	0	0	
													4.754120092	TOTAL				



FCRMU approach	Asset Type	Asset reference	Parameter	Amount	Reference	Rate (£/parameter)	HLO	Epoch	Epochal discount factor	Basic construction cost (£M)	Plus Tidal/urban uplift (25% each) cost (£M)	Plus PAR, design and supervision (20%) cost (£M)	Plus Optimism bias 60% cost (£M)		FOOTPRINT IMPACT (Ha)			
RESPONSE OPTIONS																SPA/SSSI	SAC	None
Short Term Option 2 (Camperdown Terrace) and 1 (Imperial Recreation Ground). Medium to Long Term Option 1 (seaward improvements).	Seawall maintenance	113FAS3351002C04	Length (km)	0.17	GIS/NFCDD	5830	Maintain	Short to long term	30	0.029732123	0.046456442	0.05574773	0.089196368			0	0	0
	Seawall maintenance	113FAS3351002C05	Length (km)	0.7	GIS/NFCDD	5830	Maintain	Short to long term	30	0.122426388	0.191291231	0.229549478	0.367279164			0	0	0
	Sheet piled wall maintenance	113FAS3351003C01	Length (km)	0.09	GIS/NFCDD	5830	Maintain	Short to long term	30	0.015740536	0.024594587	0.029513504	0.047221607			0	0	0
	No addition		Length (m)	90	GIS/NFCDD	0	Sustain	Medium	0.5	0	0	0	0			0	0	0
	CC 0.3m addition		Length (m)	90	GIS/NFCDD	559	Sustain	Long	0.2	0.010058202	0.015715941	0.018859129	0.030174607			0.018	0	0
Exmouth Docks improvements to avoid pedestrian/local flooding	Complex Wall maintenance	113FAS3351003C02	Length (km)	1	GIS/NFCDD	5830	Maintain	Short to long term	30	0.17489484	0.273273188	0.327927825	0.52468452			0	0	0
	CC 0.25m addition		Length (m)	150	GIS/NFCDD	323	Improve	Short	1	0.048402147	0.075628355	0.090754026	0.145206441			0	0	0.03
	No addition		Length (m)	1000	GIS/NFCDD	323	Sustain	Medium	0.5	0.16134049	0.252094516	0.302513419	0.48402147			0	0	0.2
	CC 0.5m addition		Length (m)	1000	GIS/NFCDD	645	Sustain	Long	0.2	0.129072392	0.201675613	0.242010735	0.387217176			0	0	0.2
	Complex Wall maintenance	113FAS3351003C03	Length (km)	0.12	GIS/NFCDD	5830	Maintain	Short to long term	30	0.020987381	0.032792783	0.039351339	0.062962142			0	0	0
	CC 0.2m addition		Length (m)	120	GIS/NFCDD	559	Sustain	Medium	0.5	0.033527341	0.05238647	0.062863764	0.100582023			0.024	0	0
	CC 0.4m addition		Length (m)	120	GIS/NFCDD	1118	Sustain	Long	0.2	0.026821873	0.041909176	0.050291011	0.080465618			0.024	0	0
	Timber revetment maintenance	113FAS3351003C04	Length (km)	0.08	GIS/NFCDD	5830	NAI	Short to long term	30	0.013991587	0.021861855	0.026234226	0.041974762			0	0	0
Sailing club access road raising	road raising 0.1m	113FAS3351003C05	Length (m)	20	GIS/NFCDD	323	Improve	Short	1	0.00645362	0.010083781	0.012100537	0.019360859			0	0	0.02
	Gabion Wall maintenance	113FAS3351003C06	Length (km)	0.06	GIS/NFCDD	5830	NAI	Short to long term	30	0.01049369	0.016396391	0.01967567	0.031481071			0	0	0
Camperdown Terrace/Shelly Road new walls	New wall maintenance		Length (km)	0.26	GIS/NFCDD	5830	Maintain	Medium to long term	15	0.022736329	0.035525514	0.042630617	0.068208988			0.000052	0	0.00026
	New wall 2.8m		Length (m)	260	GIS/NFCDD	2593	Improve	Medium	0.5	0.337028187	0.526606542	0.63192785	1.01108456			0.052	0	0
	CC 0.3m addition		Length (km)	260	GIS/NFCDD	559	Sustain	Medium	0.5	0.072642572	0.113504019	0.136204822	0.217927716			0.052	0	0
	CC 0.5m addition		Length (km)	260	GIS/NFCDD	1118	Sustain	Long	0.2	0.058114057	0.090803215	0.108963858	0.174342172			0.052	0	0
Slipway/boatyard road/wall raising	Complex Wall maintenance	113FAS3351004C01	Length (km)	0.09	GIS/NFCDD	5830	Maintain	Short to long term	30	0.015740536	0.024594587	0.029513504	0.047221607			0	0	0
	CC 0.2m addition		Length (m)	90	GIS/NFCDD	323	Improve	Short	1	0.029041288	0.045377013	0.054452415	0.087123865			0.018	0	0
	CC 0.2m addition		Length (m)	90	GIS/NFCDD	323	Sustain	Medium	0.5	0.014520644	0.022688506	0.027226208	0.043561932			0.018	0	0
	CC 1.1m addition		Length (m)	90	GIS/NFCDD	1291	Sustain	Long	0.2	0.023233031	0.03630161	0.043561932	0.069699092			0.018	0	0
	Gabion toe maintenance	113FAS3351004C02	Length (km)	0.11	GIS/NFCDD	5830	Maintain	Short to long term	30	0.019238432	0.030060051	0.036072061	0.057715297			0	0	0
	No addition		Length (m)	110	GIS/NFCDD	0	Sustain	Short	1	0	0	0	0			0	0	0
	CC 0.1m addition		Length (m)	110	GIS/NFCDD	323	Sustain	Medium	0.5	0.017747454	0.027730397	0.033276476	0.053242362			0.022	0	0
	CC 0.4m addition		Length (m)	110	GIS/NFCDD	645	Sustain	Long	0.2	0.014197963	0.022184317	0.026621181	0.042593889			0.022	0	0
	Revetment maintenance	113FAS3351004C03	Length (km)	0.55	GIS/NFCDD	5830	Maintain	Short to long term	30	0.096192162	0.150300253	0.180360304	0.288576486			0	0	0
North-east Imperial Recreation Ground revetment wave wall raising	Wall maintenance		Length (km)	0.1	GIS/NFCDD	5830	Maintain	Short to long term	30	0.017489484	0.027327319	0.032792783	0.052468452			0	0	0
	CC 0.25m addition		Length (m)	100	GIS/NFCDD	167	Improve	Short	1	0.016673308	0.026052044	0.031262453	0.050019924			0.02	0	0
	No addition		Length (m)	100	GIS/NFCDD	0	Sustain	Medium	0.5	0	0	0	0			0	0	0
	CC 0.25m addition		Length (m)	100	GIS/NFCDD	167	Sustain	Long	0.2	0.003334662	0.005210409	0.006252491	0.010003985			0.02	0	0
	Embankment maintenance	113FAS3351004C04	Length (km)	0.39	GIS/NFCDD	1166	Maintain	Short to long term	30	0.013641798	0.021315309	0.02557837	0.040925393			0	0	0
	No addition		Length (m)	390	GIS/NFCDD	0	Sustain	Short	1	0	0	0	0			0	0	0
	CC 0.6m addition		Length (m)	390	GIS/NFCDD	329	Sustain	Medium	0.5	0.064116448	0.100181951	0.120218341	0.192349345			0.078	0	0
	CC 0.4m addition		Length (m)	390	GIS/NFCDD	329	Sustain	Long	0.2	0.025646579	0.04007278	0.048087336	0.076939738			0.078	0	0
	Embankment maintenance	113FAS3351004C05	Length (km)	0.56	GIS/NFCDD	1166	Maintain	Short to long term	30	0.019588222	0.030606597	0.036727916	0.058764666			0	0	0
	No addition		Length (m)	560	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0			0	0	0
													5.054597298	TOTAL				

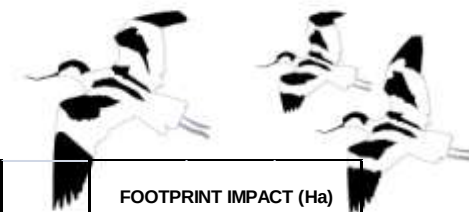


FCRMU approach	Asset Type	Asset reference	Parameter	Amount	Reference	Rate (£/parameter)	HLO	Epoch	Epochal discount factor	Basic construction cost (£M)	Plus Tidal/urban uplift (25% each) cost (£M)	Plus PAR, design and supervision (20%) cost (£M)	Plus Optimism bias 60% cost (£M)		FOOTPRINT IMPACT (Ha)			
RESPONSE OPTIONS																SPA/SSSI	SAC	None
Short Term Option 2 (Camperdown Terrace) and 1 (Imperial Recreation Ground). Medium to Long Term Option 1 (seaward improvements). Exmouth Docks improvements to avoid pedestrian/local flooding	Seawall maintenance	113FAS3351002C04	Length (km)	0.17	GIS/NFCDD	5830	Maintain	Short to long term	30	0.029732123	0.046456442	0.05574773	0.089196368		0	0	0	
	Seawall maintenance	113FAS3351002C05	Length (km)	0.7	GIS/NFCDD	5830	Maintain	Short to long term	30	0.122426388	0.191291231	0.229549478	0.367279164		0	0	0	
	Sheet piled wall maintenance	113FAS3351003C01	Length (km)	0.09	GIS/NFCDD	5830	Maintain	Short to long term	30	0.015740536	0.024594587	0.029513504	0.047221607		0	0	0	
	CC 0.1m addition		Length (m)	90	GIS/NFCDD	559	Sustain	Medium	0.5	0.025145506	0.039289853	0.047147823	0.075436517		0.018	0	0	
	CC 0.4m addition		Length (m)	90	GIS/NFCDD	1118	Sustain	Long	0.2	0.020116405	0.031431882	0.037718258	0.060349214		0.018	0	0	
	Complex Wall maintenance	113FAS3351003C02	Length (km)	1	GIS/NFCDD	5830	Maintain	Short to long term	30	0.17489484	0.273273188	0.327927825	0.52468452		0	0	0	
	CC 0.25m addition		Length (m)	150	GIS/NFCDD	323	Improve	Short	1	0.048402147	0.075628355	0.090754026	0.145206441		0	0	0.03	
	No addition		Length (m)	1000	GIS/NFCDD	0	Sustain	Medium	0.5	0	0	0	0		0	0	0	
	CC 0.75m addition		Length (m)	1000	GIS/NFCDD	968	Sustain	Long	0.2	0.193608588	0.302513419	0.363016103	0.580825764		0	0	0.2	
	Complex Wall maintenance	113FAS3351003C03	Length (km)	0.12	GIS/NFCDD	5830	Maintain	Short to long term	30	0.020987381	0.032792783	0.039351339	0.062962142		0	0	0	
	CC 0.2m addition		Length (m)	120	GIS/NFCDD	559	Sustain	Medium	0.5	0.033527341	0.05238647	0.062863764	0.100582023		0.024	0	0	
	CC 0.4m addition		Length (m)	120	GIS/NFCDD	1118	Sustain	Long	0.2	0.026821873	0.041909176	0.050291011	0.080465618		0.024	0	0	
	Timber revetment maintenance	113FAS3351003C04	Length (km)	0.08	GIS/NFCDD	5830	NAI	Short to long term	30	0.013991587	0.021861855	0.026234226	0.041974762		0	0	0	
	Sailing club access road raising	road raising 0.2m	113FAS3351003C05	Length (m)	20	GIS/NFCDD	323	Improve	Short	1	0.00645362	0.010083781	0.012100537	0.019360859		0	0	0.02
		Gabion Wall maintenance	113FAS3351003C06	Length (km)	0.06	GIS/NFCDD	5830	NAI	Short to long term	30	0.01049369	0.016396391	0.01967567	0.031481071		0	0	0
	Camperdown Terrace/Shelly Road new walls	New wall maintenance		Length (km)	0.26	GIS/NFCDD	5830	Maintain	Medium to long term	15	0.022736329	0.035525514	0.042630617	0.068208988		0.000052	0	0.00026
		New wall 2.9m		Length (m)	260	GIS/NFCDD	2740	Improve	Medium	0.5	0.356202491	0.556566392	0.667879671	1.068607473		0.052	0	0
CC 0.3m addition			Length (km)	260	GIS/NFCDD	559	Sustain	Medium	0.5	0.072642572	0.113504019	0.136204822	0.217927716		0.052	0	0	
CC 0.5m addition			Length (km)	260	GIS/NFCDD	1118	Sustain	Long	0.2	0.058114057	0.090803215	0.108963858	0.174342172		0.052	0	0	
Slipway/boatyard road/wall raising	Complex Wall maintenance	113FAS3351004C01	Length (km)	0.09	GIS/NFCDD	5830	Maintain	Short to long term	30	0.015740536	0.024594587	0.029513504	0.047221607		0	0	0	
	CC 0.3m addition		Length (m)	90	GIS/NFCDD	323	Improve	Short	1	0.029041288	0.045377013	0.054452415	0.087123865		0.018	0	0	
	CC 0.2m addition		Length (m)	90	GIS/NFCDD	323	Sustain	Medium	0.5	0.014520644	0.022688506	0.027226208	0.043561932		0.018	0	0	
	CC 1.1m addition		Length (m)	90	GIS/NFCDD	1291	Sustain	Long	0.2	0.023233031	0.03630161	0.043561932	0.069699092		0.018	0	0	
	Gabion toe maintenance	113FAS3351004C02	Length (km)	0.11	GIS/NFCDD	5830	Maintain	Short to long term	30	0.019238432	0.030060051	0.036072061	0.057715297		0	0	0	
	CC 0.1m addition		Length (m)	110	GIS/NFCDD	323	Sustain	Short	1	0.035494908	0.055460793	0.066552952	0.106484723		0.022	0	0	
	CC 0.1m addition		Length (m)	110	GIS/NFCDD	0	Sustain	Medium	0.5	0	0	0	0		0	0	0	
	CC 0.4m addition		Length (m)	110	GIS/NFCDD	645	Sustain	Long	0.2	0.014197963	0.022184317	0.026621181	0.042593889		0.022	0	0	
North-east Imperial Recreation Ground revetment wave wall raising	Revetment maintenance	113FAS3351004C03	Length (km)	0.55	GIS/NFCDD	5830	Maintain	Short to long term	30	0.096192162	0.150300253	0.180360304	0.288576486		0	0	0	
	Wall maintenance		Length (km)	0.1	GIS/NFCDD	5830	Maintain	Short to long term	30	0.017489484	0.027327319	0.032792783	0.052468452		0	0	0	
	CC 0.25m addition		Length (m)	100	GIS/NFCDD	167	Improve	Short	1	0.016673308	0.026052044	0.031262453	0.050019924		0.02	0	0	
	No addition		Length (m)	100	GIS/NFCDD	0	Sustain	Medium	0.5	0	0	0	0		0	0	0	
	CC 0.25m addition		Length (m)	100	GIS/NFCDD	167	Sustain	Long	0.2	0.003334662	0.005210409	0.006252491	0.010003985		0.02	0	0	
	Embankment maintenance	113FAS3351004C04	Length (km)	0.39	GIS/NFCDD	1166	Maintain	Short to long term	30	0.013641798	0.021315309	0.02557837	0.040925393		0	0	0	
	CC 0.4m addition		Length (m)	390	GIS/NFCDD	329	Sustain	Short	1	0.128232897	0.200363901	0.240436681	0.38469869		0.078	0	0	
	CC 0.3m addition		Length (m)	390	GIS/NFCDD	164	Sustain	Medium	0.5	0.032058224	0.050090975	0.06010917	0.096174673		0.078	0	0	
	CC 0.3m addition		Length (m)	390	GIS/NFCDD	164	Sustain	Long	0.2	0.01282329	0.02003639	0.024043668	0.038469869		0.078	0	0	
	Embankment maintenance	113FAS3351004C05	Length (km)	0.56	GIS/NFCDD	1166	Maintain	Short to long term	30	0.019588222	0.030606597	0.036727916	0.058764666		0	0	0	
	No addition		Length (m)	560	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0		0	0	0	
													5.230614963	TOTAL				

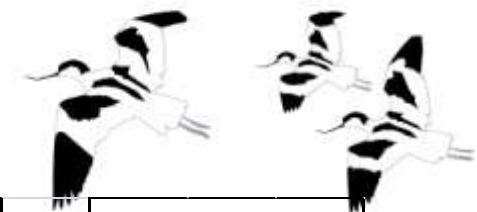


FCRMU approach	Asset Type	Asset reference	Parameter	Amount	Reference	Rate (£/parameter)	HLO	Epoch	Epochal discount factor	Basic construction cost (£M)	Plus Tidal/urban uplift (25% each) cost (£M)	Plus PAR, design and supervision (20%) cost (£M)	Plus Optimism bias 60% cost (£M)		FOOTPRINT IMPACT (Ha)			
RESPONSE OPTIONS																SPA/SSSI	SAC	None
Short Term Option 2 (Camperdown Terrace) and 1 (Imperial Recreation Ground). Medium to Long Term Option 1 (seaward improvements).	Seawall maintenance	113FAS3351002C04	Length (km)	0.17	GIS/NFCDD	5830	Maintain	Short to long term	30	0.029732123	0.046456442	0.05574773	0.089196368		0	0	0	
	Seawall maintenance	113FAS3351002C05	Length (km)	0.7	GIS/NFCDD	5830	Maintain	Short to long term	30	0.122426388	0.191291231	0.229549478	0.367279164		0	0	0	
	Sheet piled wall maintenance	113FAS3351003C01	Length (km)	0.09	GIS/NFCDD	5830	Maintain	Short to long term	30	0.015740536	0.024594587	0.029513504	0.047221607		0	0	0	
	CC 0.1m addition		Length (m)	90	GIS/NFCDD	559	Sustain	Medium	0.5	0.025145506	0.039289853	0.047147823	0.075436517		0.018	0	0	
	CC 0.4m addition		Length (m)	90	GIS/NFCDD	1118	Sustain	Long	0.2	0.020116405	0.031431882	0.037718258	0.060349214		0.018	0	0	
Exmouth Docks improvements to avoid pedestrian/local flooding	Complex Wall maintenance	113FAS3351003C02	Length (km)	1	GIS/NFCDD	5830	Maintain	Short to long term	30	0.17489484	0.273273188	0.327927825	0.52468452		0	0	0	
	CC 0.5m addition		Length (m)	150	GIS/NFCDD	645	Improve	Short	1	0.096804294	0.151256709	0.181508051	0.290412882		0	0	0.03	
	No addition		Length (m)	1000	GIS/NFCDD	0	Sustain	Medium	0.5	0	0	0	0		0	0	0	
	CC 0.5m addition		Length (m)	1000	GIS/NFCDD	645	Sustain	Long	0.2	0.129072392	0.201675613	0.242010735	0.387217176		0	0	0.2	
	Complex Wall maintenance	113FAS3351003C03	Length (km)	0.12	GIS/NFCDD	5830	Maintain	Short to long term	30	0.020987381	0.032792783	0.039351339	0.062962142		0	0	0	
	CC 0.2m addition		Length (m)	120	GIS/NFCDD	559	Sustain	Medium	0.5	0.033527341	0.05238647	0.062863764	0.100582023		0.024	0	0	
	CC 0.4m addition		Length (m)	120	GIS/NFCDD	1118	Sustain	Long	0.2	0.026821873	0.041909176	0.050291011	0.080465618		0.024	0	0	
Sailing club access road raising	Timber revetment maintenance	113FAS3351003C04	Length (km)	0.08	GIS/NFCDD	5830	NAI	Short to long term	30	0.013991587	0.021861855	0.026234226	0.041974762		0	0	0	
	road raising 0.3m	113FAS3351003C05	Length (m)	20	GIS/NFCDD	323	Improve	Short	1	0.00645362	0.010083781	0.012100537	0.019360859		0	0	0.02	
Camperdown Terrace/Shelly Road new walls	Gabion Wall maintenance	113FAS3351003C06	Length (km)	0.06	GIS/NFCDD	5830	NAI	Short to long term	30	0.01049369	0.016396391	0.01967567	0.031481071		0	0	0	
	New wall maintenance		Length (km)	0.26	GIS/NFCDD	5830	Maintain	Medium to long term	15	0.022736329	0.035525514	0.042630617	0.068208988		0.000052	0	0.00026	
	New wall 3m		Length (m)	260	GIS/NFCDD	2740	Improve	Medium	0.5	0.356202491	0.556566392	0.667879671	1.068607473		0.052	0	0	
	CC 0.3m addition		Length (km)	260	GIS/NFCDD	559	Sustain	Medium	0.5	0.072642572	0.113504019	0.136204822	0.217927716		0.052	0	0	
	CC 0.5m addition		Length (km)	260	GIS/NFCDD	1118	Sustain	Long	0.2	0.058114057	0.090803215	0.108963858	0.174342172		0.052	0	0	
Slipway/boatyard road/wall raising	Complex Wall maintenance	113FAS3351004C01	Length (km)	0.09	GIS/NFCDD	5830	Maintain	Short to long term	30	0.015740536	0.024594587	0.029513504	0.047221607		0	0	0	
	CC 0.5m addition		Length (m)	90	GIS/NFCDD	645	Improve	Short	1	0.058082576	0.090754026	0.108904831	0.174247729		0.018	0	0	
	CC 0.2m addition		Length (m)	90	GIS/NFCDD	323	Sustain	Medium	0.5	0.014520644	0.022688506	0.027226208	0.043561932		0.018	0	0	
	CC 1m addition		Length (m)	90	GIS/NFCDD	1291	Sustain	Long	0.2	0.023233031	0.03630161	0.043561932	0.069699092		0.018	0	0	
	Gabion toe maintenance	113FAS3351004C02	Length (km)	0.11	GIS/NFCDD	5830	Maintain	Short to long term	30	0.019238432	0.030060051	0.036072061	0.057715297		0	0	0	
	CC 0.1m addition		Length (m)	110	GIS/NFCDD	323	Sustain	Short	1	0.035494908	0.055460793	0.066552952	0.106484723		0.022	0	0	
	CC 0.3m addition		Length (m)	110	GIS/NFCDD	323	Sustain	Medium	0.5	0.017747454	0.027730397	0.033276476	0.053242362		0.022	0	0	
	CC 0.4m addition		Length (m)	110	GIS/NFCDD	645	Sustain	Long	0.2	0.014197963	0.022184317	0.026621181	0.042593889		0.022	0	0	
	Revetment maintenance	113FAS3351004C03	Length (km)	0.55	GIS/NFCDD	5830	Maintain	Short to long term	30	0.096192162	0.150300253	0.180360304	0.288576486		0	0	0	
North-east Imperial Recreation Ground revetment wave wall raising	Wall maintenance		Length (km)	0.1	GIS/NFCDD	5830	Maintain	Short to long term	30	0.017489484	0.027327319	0.032792783	0.052468452		0	0	0	
	CC 0.5m addition		Length (m)	100	GIS/NFCDD	333	Improve	Short	1	0.033346616	0.052104088	0.062524905	0.100039849		0.02	0	0	
	No addition		Length (m)	100	GIS/NFCDD	0	Sustain	Medium	0.5	0	0	0	0		0	0	0	
	CC 0.25m addition		Length (m)	100	GIS/NFCDD	167	Sustain	Long	0.2	0.003334662	0.005210409	0.006252491	0.010003985		0.02	0	0	
	Embankment maintenance	113FAS3351004C04	Length (km)	0.39	GIS/NFCDD	1166	Maintain	Short to long term	30	0.013641798	0.021315309	0.02557837	0.040925393		0	0	0	
	CC 0.5m addition		Length (m)	390	GIS/NFCDD	329	Sustain	Short	1	0.128232897	0.200363901	0.240436681	0.38469869		0.078	0	0	
	CC 0.3m addition		Length (m)	390	GIS/NFCDD	164	Sustain	Medium	0.5	0.032058224	0.050090975	0.06010917	0.096174673		0.078	0	0	
	CC 0.3m addition		Length (m)	390	GIS/NFCDD	164	Sustain	Long	0.2	0.01282329	0.02003639	0.024043668	0.038469869		0.078	0	0	
	Embankment maintenance	113FAS3351004C05	Length (km)	0.56	GIS/NFCDD	1166	Maintain	Short to long term	30	0.019588222	0.030606597	0.036727916	0.058764666		0	0	0	
	CC 0.1m addition		Length (m)	560	GIS/NFCDD	164	Sustain	Long	0.2	0.018412929	0.028770201	0.034524241	0.055238786		0.112	0	0	
												5.427837753	TOTAL					





FCRMU approach	Asset Type	Asset reference	Parameter	Amount	Reference	Rate (£/parameter)	HLO	Epoch	Epochal discount factor	Basic construction cost (£M)	Plus Tidal/urban uplift (25% each) cost (£M)	Plus PAR, design and supervision (20%) cost (£M)	Plus Optimism bias 60% cost (£M)		FOOTPRINT IMPACT (Ha)			
RESPONSE OPTIONS																SPA/SSSI	SAC	None
Option 1. Rock armouring or revetment raising (to dissipate wave energy) of up to 0.5m to the existing structure. Dawlish Warren sand spit distal section	Railway Embankment with Revetment	113FAS3351005C01	Length (km)	0.59	GIS/NFCDD	5830	Maintain	Short to long term	30	0.103187956	0.128984945	0.154781934	0.247651094		0	0	0	
	Wall	113FAS3351005C02	Length (km)	0.37	GIS/NFCDD	5830	Maintain	Short to long term	30	0.064711091	0.080888864	0.097066636	0.155306618		0	0	0	
	Railway Embankment with Revetment	113FAS3351005C03	Length (km)	0.6	GIS/NFCDD	5830	Maintain	Short to long term	30	0.104936904	0.13117113	0.157405356	0.25184857		0	0	0	
	No addition		Length (m)	600		0	Sustain	Long	0.2	0	0	0	0		0	0	0	
	Timber Wall	113FAS3351005C04	Length (km)	0.08	GIS/NFCDD	5830	Maintain	Short to long term	30	0.013991587	0.017489484	0.020987381	0.033579809		0	0	0	
	Concrete Revetment	113FAS3351005C05	Length (km)	0.22	GIS/NFCDD	5830	Maintain	Short to long term	30	0.038476865	0.048096081	0.057715297	0.092344476		0	0	0	
	Masonry Wall	113FAS3351005C06	Length (km)	0.17	GIS/NFCDD	5830	Maintain	Short to long term	30	0.029732123	0.037165154	0.044598184	0.071357095		0	0	0	
Natural Cliff (check elements)	113FAS3351005C07	Length (km)	0.27	GIS/NFCDD	0	Maintain	Short to long term	30	0	0	0	0		0	0	0		
													0.852087661	TOTAL				
Option 1. Rock armouring or revetment raising (to dissipate wave energy) of up to 0.5m to the existing structure. Dawlish Warren sand spit distal section	Railway Embankment with Revetment	113FAS3351005C01	Length (km)	0.59	GIS/NFCDD	5830	Maintain	Short to long term	30	0.103187956	0.128984945	0.154781934	0.247651094		0	0	0	
	Wall	113FAS3351005C02	Length (km)	0.37	GIS/NFCDD	5830	Maintain	Short to long term	30	0.064711091	0.080888864	0.097066636	0.155306618		0	0	0	
	Railway Embankment with Revetment	113FAS3351005C03	Length (km)	0.6	GIS/NFCDD	5830	Maintain	Short to long term	30	0.104936904	0.13117113	0.157405356	0.25184857		0	0	0	
	CC 0.2m addition		Length (m)	600		323	Sustain	Long	0.2	0.038721718	0.048402147	0.058082576	0.092932122		0.3	0	0	
	Timber Wall	113FAS3351005C04	Length (km)	0.08	GIS/NFCDD	5830	Maintain	Short to long term	30	0.013991587	0.017489484	0.020987381	0.033579809		0	0	0	
	Concrete Revetment	113FAS3351005C05	Length (km)	0.22	GIS/NFCDD	5830	Maintain	Short to long term	30	0.038476865	0.048096081	0.057715297	0.092344476		0	0	0	
	Masonry Wall	113FAS3351005C06	Length (km)	0.17	GIS/NFCDD	5830	Maintain	Short to long term	30	0.029732123	0.037165154	0.044598184	0.071357095		0	0	0	
Natural Cliff (check elements)	113FAS3351005C07	Length (km)	0.27	GIS/NFCDD	0	Maintain	Short to long term	30	0	0	0	0		0	0	0		
													0.945019783	TOTAL				
Option 1. Rock armouring or revetment raising (to dissipate wave energy) of up to 0.5m to the existing structure. Dawlish Warren sand spit distal section	Railway Embankment with Revetment	113FAS3351005C01	Length (km)	0.59	GIS/NFCDD	5830	Maintain	Short to long term	30	0.103187956	0.128984945	0.154781934	0.247651094		0	0	0	
	Wall	113FAS3351005C02	Length (km)	0.37	GIS/NFCDD	5830	Maintain	Short to long term	30	0.064711091	0.080888864	0.097066636	0.155306618		0	0	0	
	Railway Embankment with Revetment	113FAS3351005C03	Length (km)	0.6	GIS/NFCDD	5830	Maintain	Short to long term	30	0.104936904	0.13117113	0.157405356	0.25184857		0	0	0	
	CC 0.3m addition		Length (m)	600		323	Sustain	Long	0.2	0.038721718	0.048402147	0.058082576	0.092932122		0.3	0	0	
	Timber Wall	113FAS3351005C04	Length (km)	0.08	GIS/NFCDD	5830	Maintain	Short to long term	30	0.013991587	0.017489484	0.020987381	0.033579809		0	0	0	
	Concrete Revetment	113FAS3351005C05	Length (km)	0.22	GIS/NFCDD	5830	Maintain	Short to long term	30	0.038476865	0.048096081	0.057715297	0.092344476		0	0	0	
	Masonry Wall	113FAS3351005C06	Length (km)	0.17	GIS/NFCDD	5830	Maintain	Short to long term	30	0.029732123	0.037165154	0.044598184	0.071357095		0	0	0	
Natural Cliff (check elements)	113FAS3351005C07	Length (km)	0.27	GIS/NFCDD	0	Maintain	Short to long term	30	0	0	0	0		0	0	0		
													0.945019783	TOTAL				
Option 1. Rock armouring or revetment raising (to dissipate wave energy) of up to 0.5m to the existing structure. Dawlish Warren sand spit distal section	Railway Embankment with Revetment	113FAS3351005C01	Length (km)	0.59	GIS/NFCDD	5830	Maintain	Short to long term	30	0.103187956	0.128984945	0.154781934	0.247651094		0	0	0	
	Wall	113FAS3351005C02	Length (km)	0.37	GIS/NFCDD	5830	Maintain	Short to long term	30	0.064711091	0.080888864	0.097066636	0.155306618		0	0	0	
	Railway Embankment with Revetment	113FAS3351005C03	Length (km)	0.6	GIS/NFCDD	5830	Maintain	Short to long term	30	0.104936904	0.13117113	0.157405356	0.25184857		0	0	0	
	CC 0.4m addition		Length (m)	600		645	Sustain	Long	0.2	0.077443435	0.096804294	0.116165153	0.185864245		0.3	0	0	
	Timber Wall	113FAS3351005C04	Length (km)	0.08	GIS/NFCDD	5830	Maintain	Short to long term	30	0.013991587	0.017489484	0.020987381	0.033579809		0	0	0	
	Concrete Revetment	113FAS3351005C05	Length (km)	0.22	GIS/NFCDD	5830	Maintain	Short to long term	30	0.038476865	0.048096081	0.057715297	0.092344476		0	0	0	
	Masonry Wall	113FAS3351005C06	Length (km)	0.17	GIS/NFCDD	5830	Maintain	Short to long term	30	0.029732123	0.037165154	0.044598184	0.071357095		0	0	0	
Natural Cliff (check elements)	113FAS3351005C07	Length (km)	0.27	GIS/NFCDD	0	Maintain	Short to long term	30	0	0	0	0		0	0	0		
													1.037951906	TOTAL				
Option 2. Vertical or wave recurve wall additions of up to 0.5m to the existing structure. Dawlish Warren sand spit distal section flattened in 2060. 2%AEP SoP	Railway Embankment with Revetment	113FAS3351005C01	Length (km)	0.59	GIS/NFCDD	5830	Maintain	Short to long term	30	0.103187956	0.128984945	0.154781934	0.247651094		0	0	0	
	Wall	113FAS3351005C02	Length (km)	0.37	GIS/NFCDD	5830	Maintain	Short to long term	30	0.064711091	0.080888864	0.097066636	0.155306618		0	0	0	
	Railway Embankment with Revetment	113FAS3351005C03	Length (km)	0.6	GIS/NFCDD	5830	Maintain	Short to long term	30	0.104936904	0.13117113	0.157405356	0.25184857		0	0	0	
	No addition		Length (m)	600		0	Sustain	Long	0.2	0	0	0	0		0	0	0	
	Timber Wall	113FAS3351005C04	Length (km)	0.08	GIS/NFCDD	5830	Maintain	Short to long term	30	0.013991587	0.017489484	0.020987381	0.033579809		0	0	0	
	Concrete Revetment	113FAS3351005C05	Length (km)	0.22	GIS/NFCDD	5830	Maintain	Short to long term	30	0.038476865	0.048096081	0.057715297	0.092344476		0	0	0	
	Masonry Wall	113FAS3351005C06	Length (km)	0.17	GIS/NFCDD	5830	Maintain	Short to long term	30	0.029732123	0.037165154	0.044598184	0.071357095		0	0	0	
Natural Cliff (check elements)	113FAS3351005C07	Length (km)	0.27	GIS/NFCDD	0	Maintain	Short to long term	30	0	0	0	0		0	0	0		
													0.852087661	TOTAL				
Option 2. Vertical or wave recurve wall additions of up to 0.5m to the existing structure. Dawlish Warren sand spit distal section flattened in 2060. 1%AEP SoP	Railway Embankment with Revetment	113FAS3351005C01	Length (km)	0.59	GIS/NFCDD	5830	Maintain	Short to long term	30	0.103187956	0.128984945	0.154781934	0.247651094		0	0	0	
	Wall	113FAS3351005C02	Length (km)	0.37	GIS/NFCDD	5830	Maintain	Short to long term	30	0.064711091	0.080888864	0.097066636	0.155306618		0	0	0	
	Railway Embankment with Revetment	113FAS3351005C03	Length (km)	0.6	GIS/NFCDD	5830	Maintain	Short to long term	30	0.104936904	0.13117113	0.157405356	0.25184857		0	0	0	
	CC 0.25m addition		Length (m)	600		167	Sustain	Long	0.2	0.02000797	0.025009962	0.030011955	0.048019127		0	0	0	
	Timber Wall	113FAS3351005C04	Length (km)	0.08	GIS/NFCDD	5830	Maintain	Short to long term	30	0.013991587	0.017489484	0.020987381	0.033579809		0	0	0	
	Concrete Revetment	113FAS3351005C05	Length (km)	0.22	GIS/NFCDD	5830	Maintain	Short to long term	30	0.038476865	0.048096081	0.057715297	0.092344476		0	0	0	
	Masonry Wall	113FAS3351005C06	Length (km)	0.17	GIS/NFCDD	5830	Maintain	Short to long term	30	0.029732123	0.037165154	0.044598184	0.071357095		0	0	0	
Natural Cliff (check elements)	113FAS3351005C07	Length (km)	0.27	GIS/NFCDD	0	Maintain	Short to long term	30	0	0	0	0		0	0	0		
													0.900106788	TOTAL				
Option 2. Vertical or wave recurve wall additions of up to 0.5m to the existing structure. Dawlish Warren sand spit distal section flattened in 2060. 0.5%AEP SoP	Railway Embankment with Revetment	113FAS3351005C01	Length (km)	0.59	GIS/NFCDD	5830	Maintain	Short to long term	30	0.103187956	0.128984945	0.154781934	0.247651094		0	0	0	
	Wall	113FAS335100																



O.4 Lympstone

FCRMU approach	Asset Type	Asset reference	Parameter	Amount	Reference	Rate (£/parameter)	HLO	Epoch	Epochal discount factor	Basic construction cost (£M)	Plus Tidal/urban uplift (25% each) cost (£M)	Plus PAR, design and supervision (20%) cost (£M)	Plus Optimism bias 60% cost (£M)		FOOTPRINT IMPACT (Ha)		
RESPONSE OPTIONS															SPA/SSSI	SAC	None
Option 1. Further reconstruction and/or raising of building walls, and reconstruction of the existing flood gates of 0-0.7m by 2110. Dawlish Warren sand spit distal section flattened in 2060. 2%AEP SoP.	MASONRY WALL	113FAS3351006C02	Length (km)	0.04	GIS/NFCDD	5830	Maintain	Short to long term	30	0.006995794	0.010930928	0.013117113	0.020987381		0	0	0
	CC 0.2m addition		Length (m)	40	GIS/NFCDD	559	Sustain	Long	0.2	0.004470312	0.006984863	0.008381835	0.013410936		0.008	0	0
	Masonry Wall	113FAS3351006C03	Length (km)	0.04	GIS/NFCDD	5830	Maintain	Short to long term	30	0.006995794	0.010930928	0.013117113	0.020987381		0	0	0
	CC 0.2m addition		Length (m)	40	GIS/NFCDD	559	Sustain	Long	0.2	0.004470312	0.006984863	0.008381835	0.013410936		0.008	0	0
	Masonry Wall	113FAS3351006C04	Length (km)	0.04	GIS/NFCDD	5830	Maintain	Short to long term	30	0.006995794	0.010930928	0.013117113	0.020987381		0	0	0
	CC 0.2m addition		Length (m)	40	GIS/NFCDD	559	Sustain	Long	0.2	0.004470312	0.006984863	0.008381835	0.013410936		0.008	0	0
	MASONRY WALL	113FAS3351006C05	Length (km)	0.05	GIS/NFCDD	5830	Maintain	Short to long term	30	0.008744742	0.013663659	0.016396391	0.026234226		0	0	0
	No addition		Length (m)	50	GIS/NFCDD	0	Sustain	Medium	0.5	0	0	0	0		0	0	0
	CC 0.5m addition		Length (m)	50	GIS/NFCDD	1118	Sustain	Long	0.2	0.01117578	0.017462157	0.020954588	0.033527341		0.01	0	0
	MASONRY WALL	113FAS3351006C06	Length (km)	0.03	GIS/NFCDD	5830	Maintain	Short to long term	30	0.005246845	0.008198196	0.009837835	0.015740536		0	0	0
	No addition		Length (m)	30	GIS/NFCDD	0	Sustain	Medium	0.5	0	0	0	0		0	0	0
	No addition		Length (m)	30	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0		0	0	0
	MASONRY WALL	113FAS3351006C07	Length (km)	0.05	GIS/NFCDD	5830	Maintain	Short to long term	30	0.008744742	0.013663659	0.016396391	0.026234226		0	0	0
	CC 0.7m addition		Length (m)	50	GIS/NFCDD	1676	Sustain	Medium	0.5	0.041909176	0.065483088	0.078579705	0.125727528		0.01	0	0
	CC 0.5m addition		Length (m)	50	GIS/NFCDD	1118	Sustain	Long	0.2	0.01117578	0.017462157	0.020954588	0.033527341		0.01	0	0
	Masonry Wall, Limekiln.	113FAS3351006C08	Length (km)	0.02	GIS/NFCDD	5830	Maintain	Short to long term	30	0.003497897	0.005465464	0.006558557	0.01049369		0	0	0
	No addition		Length (m)	20	GIS/NFCDD	0	Sustain	Medium	0.5	0	0	0	0		0	0	0
	CC 0.4m addition		Length (m)	20	GIS/NFCDD	1118	Sustain	Long	0.2	0.004470312	0.006984863	0.008381835	0.013410936		0.004	0	0
	Masonry Wall	113FAS3351006C09	Length (km)	0.03	GIS/NFCDD	5830	Maintain	Short to long term	30	0.005246845	0.008198196	0.009837835	0.015740536		0	0	0
	No addition		Length (m)	30	GIS/NFCDD	0	Sustain	Medium	0.5	0	0	0	0		0	0	0
	CC 0.5m addition		Length (m)	30	GIS/NFCDD	1118	Sustain	Long	0.2	0.006705468	0.010477294	0.012572753	0.020116405		0.006	0	0
	Building Walls	113FAS3351006C10	Length (km)	0.02	GIS/NFCDD	5830	Maintain	Short to long term	30	0.003497897	0.005465464	0.006558557	0.01049369		0	0	0
	CC 0.7m addition		Length (m)	20	GIS/NFCDD	1676	Sustain	Medium	0.5	0.01676367	0.026193235	0.031431882	0.050291011		0.004	0	0
	CC 0.5m addition		Length (m)	20	GIS/NFCDD	1118	Sustain	Long	0.2	0.004470312	0.006984863	0.008381835	0.013410936		0.004	0	0
	Natural Cliff	113FAS3351007C01	Length (km)	0.39	GIS/NFCDD	0	Maintain	Short to long term	30	0	0	0	0		0	0	0
	Railway Embankment with Revetment and Wall	113FAS3351007C07	Length (km)	0.39	GIS/NFCDD	5830	Maintain	Short to long term	30	0.068208988	0.106576543	0.127891852	0.204626963		0	0	0
	Replacement of flood gates		Number	7	GIS/NFCDD	500000	Sustain	Long	0.2	0.7	1.09375	1.3125	2.1		0	0	0
													2.802770317	TOTAL			



FCRMU approach	Asset Type	Asset reference	Parameter	Amount	Reference	Rate (£/parameter)	HLO	Epoch	Epochal discount factor	Basic construction cost (£M)	Plus Tidal/urban uplift (25% each) cost (£M)	Plus PAR, design and supervision (20%) cost (£M)	Plus Optimism bias 60% cost (£M)		FOOTPRINT IMPACT (Ha)			
RESPONSE OPTIONS																SPA/SSSI	SAC	None
Option 1. Further reconstruction and/or raising of building walls, and reconstruction of the existing flood gates of 0-0.7m by 2110. Dawlish Warren sand spit distal section flattened in 2060. 1%AEP SoP.	MASONRY WALL	113FAS3351006C02	Length (km)	0.04	GIS/NFCDD	5830	Maintain	Short to long term	30	0.006995794	0.010930928	0.013117113	0.020987381		0	0	0	
	CC 0.3m addition		Length (m)	40	GIS/NFCDD	559	Sustain	Long	0.2	0.004470312	0.006984863	0.008381835	0.013410936		0.008	0	0	
	Masonry Wall	113FAS3351006C03	Length (km)	0.04	GIS/NFCDD	5830	Maintain	Short to long term	30	0.006995794	0.010930928	0.013117113	0.020987381		0	0	0	
	CC 0.3m addition		Length (m)	40	GIS/NFCDD	559	Sustain	Long	0.2	0.004470312	0.006984863	0.008381835	0.013410936		0.008	0	0	
	Masonry Wall	113FAS3351006C04	Length (km)	0.04	GIS/NFCDD	5830	Maintain	Short to long term	30	0.006995794	0.010930928	0.013117113	0.020987381		0	0	0	
	CC 0.2m addition		Length (m)	40	GIS/NFCDD	559	Sustain	Long	0.2	0.004470312	0.006984863	0.008381835	0.013410936		0.008	0	0	
	MASONRY WALL	113FAS3351006C05	Length (km)	0.05	GIS/NFCDD	5830	Maintain	Short to long term	30	0.008744742	0.013663659	0.016396391	0.026234226		0	0	0	
	No addition		Length (m)	50	GIS/NFCDD	0	Sustain	Medium	0.5	0	0	0	0		0	0	0	
	CC 0.5m addition		Length (m)	50	GIS/NFCDD	1118	Sustain	Long	0.2	0.01117578	0.017462157	0.020954588	0.033527341		0.01	0	0	
	MASONRY WALL	113FAS3351006C06	Length (km)	0.03	GIS/NFCDD	5830	Maintain	Short to long term	30	0.005246845	0.008198196	0.009837835	0.015740536		0	0	0	
	No addition		Length (m)	30	GIS/NFCDD	0	Sustain	Medium	0.5	0	0	0	0		0	0	0	
	CC 0.2m addition		Length (m)	30	GIS/NFCDD	559	Sustain	Long	0.2	0.003352734	0.005238647	0.006286376	0.010058202		0.006	0	0	
	MASONRY WALL	113FAS3351006C07	Length (km)	0.05	GIS/NFCDD	5830	Maintain	Short to long term	30	0.008744742	0.013663659	0.016396391	0.026234226		0	0	0	
	CC 0.8m addition		Length (m)	50	GIS/NFCDD	1676	Sustain	Medium	0.5	0.041909176	0.065483088	0.078579705	0.125727528		0.01	0	0	
	CC 0.5m addition		Length (m)	50	GIS/NFCDD	1118	Sustain	Long	0.2	0.01117578	0.017462157	0.020954588	0.033527341		0.01	0	0	
	Masonry Wall, Limekiln.	113FAS3351006C08	Length (km)	0.02	GIS/NFCDD	5830	Maintain	Short to long term	30	0.003497897	0.005465464	0.006558557	0.01049369		0	0	0	
	No addition		Length (m)	20	GIS/NFCDD	0	Sustain	Medium	0.5	0	0	0	0		0	0	0	
	CC 0.4m addition		Length (m)	20	GIS/NFCDD	1118	Sustain	Long	0.2	0.004470312	0.006984863	0.008381835	0.013410936		0.004	0	0	
	Masonry Wall	113FAS3351006C09	Length (km)	0.03	GIS/NFCDD	5830	Maintain	Short to long term	30	0.005246845	0.008198196	0.009837835	0.015740536		0	0	0	
	No addition		Length (m)	30	GIS/NFCDD	0	Sustain	Medium	0.5	0	0	0	0		0	0	0	
	CC 0.6m addition		Length (m)	30	GIS/NFCDD	1118	Sustain	Long	0.2	0.006705468	0.010477294	0.012572753	0.020116405		0.006	0	0	
	Building Walls	113FAS3351006C10	Length (km)	0.02	GIS/NFCDD	5830	Maintain	Short to long term	30	0.003497897	0.005465464	0.006558557	0.01049369		0	0	0	
	CC 0.8m addition		Length (m)	20	GIS/NFCDD	1676	Sustain	Medium	0.5	0.01676367	0.026193235	0.031431882	0.050291011		0.004	0	0	
	CC 0.5m addition		Length (m)	20	GIS/NFCDD	1118	Sustain	Long	0.2	0.004470312	0.006984863	0.008381835	0.013410936		0.004	0	0	
	Natural Cliff	113FAS3351007C01	Length (km)	0.39	GIS/NFCDD	0	Maintain	Short to long term	30	0	0	0	0		0	0	0	
	Railway Embankment with Revetment and Wall	113FAS3351007C07	Length (km)	0.39	GIS/NFCDD	5830	Maintain	Short to long term	30	0.068208988	0.106576543	0.127891852	0.204626963		0	0	0	
	Replacement of flood gates		Number	7	GIS/NFCDD	500000	Sustain	Long	0.2	0.7	1.09375	1.3125	2.1	TOTAL	0	0	0	
													2.812828519	TOTAL				





FCRMU approach	Asset Type	Asset reference	Parameter	Amount	Reference	Rate (£/parameter)	HLO	Epoch	Epochal discount factor	Basic construction cost (£M)	Plus Tidal/urban uplift (25% each) cost (£M)	Plus PAR, design and supervision (20%) cost (£M)	Plus Optimism bias 60% cost (£M)		FOOTPRINT IMPACT (Ha)			
RESPONSE OPTIONS																SPA/SSSI	SAC	None
Option 1. Further reconstruction and/or raising of building walls, and reconstruction of the existing flood gates of 0-0.7m by 2110. Dawlish Warren sand spit distal section flattened in 2060. 0.5%AEP SoP.	MASONRY WALL	113FAS3351006C02	Length (km)	0.04	GIS/NFCDD	5830	Maintain	Short to long term	30	0.006995794	0.010930928	0.013117113	0.020987381			0	0	0
	CC 0.4m addition		Length (m)	40	GIS/NFCDD	1118	Sustain	Long	0.2	0.008940624	0.013969725	0.01676367	0.026821873			0.008	0	0
	Masonry Wall	113FAS3351006C03	Length (km)	0.04	GIS/NFCDD	5830	Maintain	Short to long term	30	0.006995794	0.010930928	0.013117113	0.020987381			0	0	0
	CC 0.3m addition		Length (m)	40	GIS/NFCDD	559	Sustain	Long	0.2	0.004470312	0.006984863	0.008381835	0.013410936			0.008	0	0
	Masonry Wall	113FAS3351006C04	Length (km)	0.04	GIS/NFCDD	5830	Maintain	Short to long term	30	0.006995794	0.010930928	0.013117113	0.020987381			0	0	0
	CC 0.2m addition		Length (m)	40	GIS/NFCDD	559	Sustain	Long	0.2	0.004470312	0.006984863	0.008381835	0.013410936			0.008	0	0
	MASONRY WALL	113FAS3351006C05	Length (km)	0.05	GIS/NFCDD	5830	Maintain	Short to long term	30	0.008744742	0.013663659	0.016396391	0.026234226			0	0	0
	CC 0.2m addition		Length (m)	50	GIS/NFCDD	559	Sustain	Medium	0.5	0.013969725	0.021827696	0.026193235	0.041909176			0.01	0	0
	CC 0.5m addition		Length (m)	50	GIS/NFCDD	1118	Sustain	Long	0.2	0.01117578	0.017462157	0.020954588	0.033527341			0.01	0	0
	MASONRY WALL	113FAS3351006C06	Length (km)	0.03	GIS/NFCDD	5830	Maintain	Short to long term	30	0.005246845	0.008198196	0.009837835	0.015740536			0	0	0
	No addition		Length (m)	30	GIS/NFCDD	0	Sustain	Medium	0.5	0	0	0	0			0	0	0
	CC 0.3m addition		Length (m)	30	GIS/NFCDD	559	Sustain	Long	0.2	0.003352734	0.005238647	0.006286376	0.010058202			0.006	0	0
	MASONRY WALL	113FAS3351006C07	Length (km)	0.05	GIS/NFCDD	5830	Maintain	Short to long term	30	0.008744742	0.013663659	0.016396391	0.026234226			0	0	0
	CC 1m addition		Length (m)	50	GIS/NFCDD	2235	Sustain	Medium	0.5	0.055878901	0.087310783	0.10477294	0.167636704			0.01	0	0
	CC 0.4m addition		Length (m)	50	GIS/NFCDD	1118	Sustain	Long	0.2	0.01117578	0.017462157	0.020954588	0.033527341			0.01	0	0
	Masonry Wall, Limekiln.	113FAS3351006C08	Length (km)	0.02	GIS/NFCDD	5830	Maintain	Short to long term	30	0.003497897	0.005465464	0.006558557	0.01049369			0	0	0
	No addition		Length (m)	20	GIS/NFCDD	0	Sustain	Medium	0.5	0	0	0	0			0	0	0
	CC 0.5m addition		Length (m)	20	GIS/NFCDD	1118	Sustain	Long	0.2	0.004470312	0.006984863	0.008381835	0.013410936			0.004	0	0
	Masonry Wall	113FAS3351006C09	Length (km)	0.03	GIS/NFCDD	5830	Maintain	Short to long term	30	0.005246845	0.008198196	0.009837835	0.015740536			0	0	0
	CC 0.2m addition		Length (m)	30	GIS/NFCDD	559	Sustain	Medium	0.5	0.008381835	0.013096618	0.015715941	0.025145506			0.006	0	0
	CC 0.5m addition		Length (m)	30	GIS/NFCDD	1118	Sustain	Long	0.2	0.006705468	0.010477294	0.012572753	0.020116405			0.006	0	0
	Building Walls	113FAS3351006C10	Length (km)	0.02	GIS/NFCDD	5830	Maintain	Short to long term	30	0.003497897	0.005465464	0.006558557	0.01049369			0	0	0
	CC 0.9m addition		Length (m)	20	GIS/NFCDD	2235	Sustain	Medium	0.5	0.022351561	0.034924313	0.041909176	0.067054682			0.004	0	0
	CC 0.3m addition		Length (m)	20	GIS/NFCDD	559	Sustain	Long	0.2	0.002235156	0.003492431	0.004190918	0.006705468			0.004	0	0
	Natural Cliff	113FAS3351007C01	Length (km)	0.39	GIS/NFCDD	0	Maintain	Short to long term	30	0	0	0	0			0	0	0
	Railway Embankment with Revetment and Wall	113FAS3351007C07	Length (km)	0.39	GIS/NFCDD	5830	Maintain	Short to long term	30	0.068208988	0.106576543	0.127891852	0.204626963			0	0	0
	Replacement of flood gates		Number	7	GIS/NFCDD	500000	Sustain	Long	0.2	0.7	1.09375	1.3125	2.1			0	0	0
													2.945261516	TOTAL				





FCRMU approach	Asset Type	Asset reference	Parameter	Amount	Reference	Rate (£/parameter)	HLO	Epoch	Epochal discount factor	Basic construction cost (£M)	Plus Tidal/urban uplift (25% each) cost (£M)	Plus PAR, design and supervision (20%) cost (£M)	Plus Optimism bias 60% cost (£M)		FOOTPRINT IMPACT (Ha)			
RESPONSE OPTIONS																SPA/SSSI	SAC	None
Option 1. Further reconstruction and/or raising of building walls, and reconstruction of the existing flood gates of 0-0.7m by 2110. Dawlish Warren sand spit distal section flattened in 2060. 0.1%AEP SoP.	MASONRY WALL	113FAS3351006C02	Length (km)	0.04	GIS/NFCDD	5830	Maintain	Short to long term	30	0.006995794	0.010930928	0.013117113	0.020987381			0	0	0
	CC 0.6m addition		Length (m)	40	GIS/NFCDD	1118	Sustain	Long	0.2	0.008940624	0.013969725	0.01676367	0.026821873			0.008	0	0
	Masonry Wall	113FAS3351006C03	Length (km)	0.04	GIS/NFCDD	5830	Maintain	Short to long term	30	0.006995794	0.010930928	0.013117113	0.020987381			0	0	0
	CC 0.5m addition		Length (m)	40	GIS/NFCDD	1118	Sustain	Long	0.2	0.008940624	0.013969725	0.01676367	0.026821873			0.008	0	0
	Masonry Wall	113FAS3351006C04	Length (km)	0.04	GIS/NFCDD	5830	Maintain	Short to long term	30	0.006995794	0.010930928	0.013117113	0.020987381			0	0	0
	CC 0.4m addition		Length (m)	40	GIS/NFCDD	1118	Sustain	Long	0.2	0.008940624	0.013969725	0.01676367	0.026821873			0.008	0	0
	MASONRY WALL	113FAS3351006C05	Length (km)	0.05	GIS/NFCDD	5830	Maintain	Short to long term	30	0.008744742	0.013663659	0.016396391	0.026234226			0	0	0
	CC 0.4m addition		Length (m)	50	GIS/NFCDD	1118	Sustain	Medium	0.5	0.027939451	0.043655392	0.05238647	0.083818352			0.01	0	0
	CC 0.5m addition		Length (m)	50	GIS/NFCDD	1118	Sustain	Long	0.2	0.01117578	0.017462157	0.020954588	0.033527341			0.01	0	0
	MASONRY WALL	113FAS3351006C06	Length (km)	0.03	GIS/NFCDD	5830	Maintain	Short to long term	30	0.005246845	0.008198196	0.009837835	0.015740536			0	0	0
	No addition		Length (m)	30	GIS/NFCDD	0	Sustain	Medium	0.5	0	0	0	0			0	0	0
	CC 0.5m addition		Length (m)	30	GIS/NFCDD	1118	Sustain	Long	0.2	0.006705468	0.010477294	0.012572753	0.020116405			0.006	0	0
	MASONRY WALL	113FAS3351006C07	Length (km)	0.05	GIS/NFCDD	5830	Maintain	Short to long term	30	0.008744742	0.013663659	0.016396391	0.026234226			0	0	0
	CC 1m addition		Length (m)	50	GIS/NFCDD	2235	Sustain	Medium	0.5	0.055878901	0.087310783	0.10477294	0.167636704			0.01	0	0
	CC 0.4m addition		Length (m)	50	GIS/NFCDD	1118	Sustain	Long	0.2	0.01117578	0.017462157	0.020954588	0.033527341			0.01	0	0
	Masonry Wall, Limekiln.	113FAS3351006C08	Length (km)	0.02	GIS/NFCDD	5830	Maintain	Short to long term	30	0.003497897	0.005465464	0.006558557	0.01049369			0	0	0
	CC 0.3m addition		Length (m)	20	GIS/NFCDD	559	Sustain	Medium	0.5	0.00558789	0.008731078	0.010477294	0.01676367			0.004	0	0
	CC 0.4m addition		Length (m)	20	GIS/NFCDD	1118	Sustain	Long	0.2	0.004470312	0.006984863	0.008381835	0.013410936			0.004	0	0
	Masonry Wall	113FAS3351006C09	Length (km)	0.03	GIS/NFCDD	5830	Maintain	Short to long term	30	0.005246845	0.008198196	0.009837835	0.015740536			0	0	0
	CC 0.3m addition		Length (m)	30	GIS/NFCDD	559	Sustain	Medium	0.5	0.008381835	0.013096618	0.015715941	0.025145506			0.006	0	0
	CC 0.6m addition		Length (m)	30	GIS/NFCDD	1118	Sustain	Long	0.2	0.006705468	0.010477294	0.012572753	0.020116405			0.006	0	0
	Building Walls	113FAS3351006C10	Length (km)	0.02	GIS/NFCDD	5830	Maintain	Short to long term	30	0.003497897	0.005465464	0.006558557	0.01049369			0	0	0
	CC 1m addition		Length (m)	20	GIS/NFCDD	2235	Sustain	Medium	0.5	0.022351561	0.034924313	0.041909176	0.067054682			0.004	0	0
	CC 0.4m addition		Length (m)	20	GIS/NFCDD	1118	Sustain	Long	0.2	0.004470312	0.006984863	0.008381835	0.013410936			0.004	0	0
	Natural Cliff	113FAS3351007C01	Length (km)	0.39	GIS/NFCDD	0	Maintain	Short to long term	30	0	0	0	0			0	0	0
	Railway Embankment with Revetment and Wall	113FAS3351007C07	Length (km)	0.39	GIS/NFCDD	5830	Maintain	Short to long term	30	0.068208988	0.106576543	0.127891852	0.204626963			0	0	0
	Replacement of flood gates		Number	7	GIS/NFCDD	500000	Sustain	Long	0.2	0.7	1.09375	1.3125	2.1			0	0	0
														3.047519905	TOTAL			



O.5 Lympstone Commando



FCRMU approach	Asset Type	Asset reference	Parameter	Amount	Reference	Rate (£/parameter)	HLO	Epoch	Epochal discount factor	Basic construction cost (£M)	Plus Tidal/urban uplift (25% each) cost (£M)	Plus PAR, design and supervision (20%) cost (£M)	Plus Optimism bias 60% cost (£M)		FOOTPRINT IMPACT (Ha)			
RESPONSE OPTIONS																SPA/SSSI	SAC	None
Option 1. Rock armouring or revetment raising (to dissipate wave energy) of up to 0.5m to the existing structure. Dawlish Warren sand spit distal section	Railway Embankment with Revetment and Wall	113FAS3351007C07	Length (km)	0.89	GIS/NFCDD	5830	Maintain	Short to long term	30	0.155656408	0.243213137	0.291855764	0.466969223			0	0	0
	No addition		Length (m)	890	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0			0	0	0
	Railway Embankment (check elements)	1131801070101L01	Length (km)	0.4	GIS/NFCDD	5830	Maintain	Short to long term	30	0.069957936	0.109309275	0.13117113	0.209873808			0	0	0
	No addition		Length (m)	400	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0			0	0	0
														0.676843031	TOTAL			
Option 1. Rock armouring or revetment raising (to dissipate wave energy) of up to 0.5m to the existing structure. Dawlish Warren sand spit distal section	Railway Embankment with Revetment and Wall	113FAS3351007C07	Length (km)	0.89	GIS/NFCDD	5830	Maintain	Short to long term	30	0.155656408	0.243213137	0.291855764	0.466969223			0	0	0
	CC 0.2m addition		Length (m)	890	GIS/NFCDD	559	Sustain	Long	0.2	0.099464445	0.155413195	0.186495833	0.298393334			0.445	0	0
	Railway Embankment (check elements)	1131801070101L01	Length (km)	0.4	GIS/NFCDD	5830	Maintain	Short to long term	30	0.069957936	0.109309275	0.13117113	0.209873808			0	0	0
	CC 0.2m addition		Length (m)	400	GIS/NFCDD	559	Sustain	Long	0.2	0.044703121	0.069848627	0.083818352	0.134109363			0.2	0	0
														1.109345728	TOTAL			
Option 1. Rock armouring or revetment raising (to dissipate wave energy) of up to 0.5m to the existing structure. Dawlish Warren sand spit distal section	Railway Embankment with Revetment and Wall	113FAS3351007C07	Length (km)	0.89	GIS/NFCDD	5830	Maintain	Short to long term	30	0.155656408	0.243213137	0.291855764	0.466969223			0	0	0
	CC 0.3m addition		Length (m)	890	GIS/NFCDD	559	Sustain	Long	0.2	0.099464445	0.155413195	0.186495833	0.298393334			0.445	0	0
	Railway Embankment (check elements)	1131801070101L01	Length (km)	0.4	GIS/NFCDD	5830	Maintain	Short to long term	30	0.069957936	0.109309275	0.13117113	0.209873808			0	0	0
	CC 0.3m addition		Length (m)	400	GIS/NFCDD	1118	Sustain	Long	0.2	0.089406242	0.139697254	0.167636704	0.268218727			0.2	0	0
														1.243455092	TOTAL			
Option 1. Rock armouring or revetment raising (to dissipate wave energy) of up to 0.5m to the existing structure. Dawlish Warren sand spit distal section	Railway Embankment with Revetment and Wall	113FAS3351007C07	Length (km)	0.89	GIS/NFCDD	5830	Maintain	Short to long term	30	0.155656408	0.243213137	0.291855764	0.466969223			0	0	0
	CC 0.4m addition		Length (m)	890	GIS/NFCDD	1118	Sustain	Long	0.2	0.198928889	0.310826389	0.372991667	0.596786667			0.445	0	0
	Railway Embankment (check elements)	1131801070101L01	Length (km)	0.4	GIS/NFCDD	5830	Maintain	Short to long term	30	0.069957936	0.109309275	0.13117113	0.209873808			0	0	0
	CC 0.4m addition		Length (m)	400	GIS/NFCDD	1118	Sustain	Long	0.2	0.089406242	0.139697254	0.167636704	0.268218727			0.2	0	0
														1.541848425	TOTAL			
Option 2. Vertical or wave recurve wall additions of up to 0.5m to the existing structure. Dawlish Warren sand spit distal section flattened in 2060.	Railway Embankment with Revetment and Wall	113FAS3351007C07	Length (km)	0.89	GIS/NFCDD	5830	Maintain	Short to long term	30	0.155656408	0.243213137	0.291855764	0.466969223			0	0	0
	No addition		Length (m)	890	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0			0	0	0
	Railway Embankment (check elements)	1131801070101L01	Length (km)	0.4	GIS/NFCDD	5830	Maintain	Short to long term	30	0.069957936	0.109309275	0.13117113	0.209873808			0	0	0
	No addition		Length (m)	400	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0			0	0	0
														0.676843031	TOTAL			
Option 2. Vertical or wave recurve wall additions of up to 0.5m to the existing structure. Dawlish Warren sand spit distal section flattened in 2060.	Railway Embankment with Revetment and Wall	113FAS3351007C07	Length (km)	0.89	GIS/NFCDD	5830	Maintain	Short to long term	30	0.155656408	0.243213137	0.291855764	0.466969223			0	0	0
	Wave recurve 0.25m addition		Length (m)	890	GIS/NFCDD	167	Sustain	Long	0.2	0.029678488	0.046372638	0.055647166	0.089035465			0	0	0
	Railway Embankment (check elements)	1131801070101L01	Length (km)	0.4	GIS/NFCDD	5830	Maintain	Short to long term	30	0.069957936	0.109309275	0.13117113	0.209873808			0	0	0
	Wave recurve 0.25m addition		Length (m)	400	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0			0	0	0
														0.765878497	TOTAL			
Option 2. Vertical or wave recurve wall additions of up to 0.5m to the existing structure. Dawlish Warren sand spit distal section flattened in 2060.	Railway Embankment with Revetment and Wall	113FAS3351007C07	Length (km)	0.89	GIS/NFCDD	5830	Maintain	Short to long term	30	0.155656408	0.243213137	0.291855764	0.466969223			0	0	0
	Wave recurve 0.25m addition		Length (m)	890	GIS/NFCDD	167	Sustain	Long	0.2	0.029678488	0.046372638	0.055647166	0.089035465			0	0	0
	Railway Embankment (check elements)	1131801070101L01	Length (km)	0.4	GIS/NFCDD	5830	Maintain	Short to long term	30	0.069957936	0.109309275	0.13117113	0.209873808			0	0	0
	Wave recurve 0.25m addition		Length (m)	400	GIS/NFCDD	167	Sustain	Long	0.2	0.013338646	0.020841635	0.025009962	0.040015939			0	0	0
														0.805894436	TOTAL			
Option 2. Vertical or wave recurve wall additions of up to 0.5m to the existing structure. Dawlish Warren sand spit distal section flattened in 2060.	Railway Embankment with Revetment and Wall	113FAS3351007C07	Length (km)	0.89	GIS/NFCDD	5830	Maintain	Short to long term	30	0.155656408	0.243213137	0.291855764	0.466969223			0	0	0
	Wave recurve 0.5m addition		Length (m)	890	GIS/NFCDD	333	Sustain	Long	0.2	0.059356977	0.092745276	0.111294332	0.17807093			0	0	0
	Railway Embankment (check elements)	1131801070101L01	Length (km)	0.4	GIS/NFCDD	5830	Maintain	Short to long term	30	0.069957936	0.109309275	0.13117113	0.209873808			0	0	0
	Wave recurve 0.25m addition		Length (m)	400	GIS/NFCDD	167	Sustain	Long	0.2	0.013338646	0.020841635	0.025009962	0.040015939			0	0	0
														0.894929901	TOTAL			



O.6 Exton

FCRMU approach	Asset Type	Asset reference	Parameter	Amount	Reference	Rate (£/parameter)	HLO	Epoch	Epochal discount factor	Basic construction cost (£M)	Plus Tidal/urban uplift (25% each) cost (£M)	Plus PAR, design and supervision (20%) cost (£M)	Plus Optimism bias 60% cost (£M)		FOOTPRINT IMPACT (Ha)			
RESPONSE OPTIONS																SPA/SSSI	SAC	None
Option 1. Rock armouring or revetment raising (to dissipate wave energy) of up to 0.5m to the existing structure. Dawlish Warren sand spit distal section flattened in 2060. 2%AEP SoP	Railway Embankment (check elements)	1131801070101L02	Length (km)	1.41	GIS/NFCDD	5830	Maintain	Short to long term	30	0.246601725	0.385315195	0.462378234	0.739805174			0	0	0
	No addition		Length (m)	1410	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0			0	0	0
	Railway Embankment (check elements)	1131801070201L01	Length (km)	0.37	GIS/NFCDD	5830	Maintain	Short to long term	30	0.064711091	0.101111079	0.121333295	0.194133273			0	0	0
													0.933938446	TOTAL				
Option 1. Rock armouring or revetment raising (to dissipate wave energy) of up to 0.5m to the existing structure. Dawlish Warren sand spit distal section flattened in 2060. 1%AEP SoP	Railway Embankment (check elements)	1131801070101L02	Length (km)	1.41	GIS/NFCDD	5830	Maintain	Short to long term	30	0.246601725	0.385315195	0.462378234	0.739805174			0	0	0
	CC 0.1m addition		Length (m)	1410	GIS/NFCDD	559	Sustain	Long	0.2	0.157578502	0.246216409	0.295459691	0.472735506			0.705	0	0
	Railway Embankment (check elements)	1131801070201L01	Length (km)	0.37	GIS/NFCDD	5830	Maintain	Short to long term	30	0.064711091	0.101111079	0.121333295	0.194133273			0	0	0
													1.406673952	TOTAL				
Option 1. Rock armouring or revetment raising (to dissipate wave energy) of up to 0.5m to the existing structure. Dawlish Warren sand spit distal section flattened in 2060. 0.5%AEP SoP	Railway Embankment (check elements)	1131801070101L02	Length (km)	1.41	GIS/NFCDD	5830	Maintain	Short to long term	30	0.246601725	0.385315195	0.462378234	0.739805174			0	0	0
	CC 0.2m addition		Length (m)	1410	GIS/NFCDD	559	Sustain	Long	0.2	0.157578502	0.246216409	0.295459691	0.472735506			0.705	0	0
	Railway Embankment (check elements)	1131801070201L01	Length (km)	0.37	GIS/NFCDD	5830	Maintain	Short to long term	30	0.064711091	0.101111079	0.121333295	0.194133273			0	0	0
													1.406673952	TOTAL				
Option 1. Rock armouring or revetment raising (to dissipate wave energy) of up to 0.5m to the existing structure. Dawlish Warren sand spit distal section flattened in 2060. 0.1%AEP SoP	Railway Embankment (check elements)	1131801070101L02	Length (km)	1.41	GIS/NFCDD	5830	Maintain	Short to long term	30	0.246601725	0.385315195	0.462378234	0.739805174			0	0	0
	CC 0.3m addition		Length (m)	1410	GIS/NFCDD	559	Sustain	Long	0.2	0.157578502	0.246216409	0.295459691	0.472735506			0.705	0	0
	Railway Embankment (check elements)	1131801070201L01	Length (km)	0.37	GIS/NFCDD	5830	Maintain	Short to long term	30	0.064711091	0.101111079	0.121333295	0.194133273			0	0	0
													1.406673952	TOTAL				



FCRMU approach	Asset Type	Asset reference	Parameter	Amount	Reference	Rate (£/parameter)	HLO	Epoch	Epochal discount factor	Basic construction cost (£M)	Plus Tidal/urban uplift (25% each) cost (£M)	Plus PAR, design and supervision (20%) cost (£M)	Plus Optimism bias 60% cost (£M)		FOOTPRINT IMPACT (Ha)			
RESPONSE OPTIONS																SPA/SSSI	SAC	None
Option 2. Vertical or wave recurve wall additions of up to 0.5m to the existing structure. Dawlish Warren sand spit distal section flattened in 2060. 2%AEP SoP	Railway Embankment (check elements)	1131801070101L02	Length (km)	1.41	GIS/NFCDD	5830	Maintain	Short to long term	30	0.246601725	0.385315195	0.462378234	0.739805174			0	0	0
	No addition		Length (m)	1410	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0			0	0	0
	Railway Embankment (check elements)	1131801070201L01	Length (km)	0.37	GIS/NFCDD	5830	Maintain	Short to long term	30	0.064711091	0.101111079	0.121333295	0.194133273			0	0	0
													0.933938446	TOTAL				
Option 2. Vertical or wave recurve wall additions of up to 0.5m to the existing structure. Dawlish Warren sand spit distal section flattened in 2060. 1%AEP SoP	Railway Embankment (check elements)	1131801070101L02	Length (km)	1.41	GIS/NFCDD	5830	Maintain	Short to long term	30	0.246601725	0.385315195	0.462378234	0.739805174			0	0	0
	Wave recurve 0.25m addition		Length (m)	1410	GIS/NFCDD	167	Sustain	Long	0.2	0.047018729	0.073466764	0.088160117	0.141056186			0	0	0
	Railway Embankment (check elements)	1131801070201L01	Length (km)	0.37	GIS/NFCDD	5830	Maintain	Short to long term	30	0.064711091	0.101111079	0.121333295	0.194133273			0	0	0
													1.074994633	TOTAL				
Option 2. Vertical or wave recurve wall additions of up to 0.5m to the existing structure. Dawlish Warren sand spit distal section flattened in 2060. 0.5%AEP SoP	Railway Embankment (check elements)	1131801070101L02	Length (km)	1.41	GIS/NFCDD	5830	Maintain	Short to long term	30	0.246601725	0.385315195	0.462378234	0.739805174			0	0	0
	Wave recurve 0.25m addition		Length (m)	1410	GIS/NFCDD	167	Sustain	Long	0.2	0.047018729	0.073466764	0.088160117	0.141056186			0	0	0
	Railway Embankment (check elements)	1131801070201L01	Length (km)	0.37	GIS/NFCDD	5830	Maintain	Short to long term	30	0.064711091	0.101111079	0.121333295	0.194133273			0	0	0
													1.074994633	TOTAL				
Option 2. Vertical or wave recurve wall additions of up to 0.5m to the existing structure. Dawlish Warren sand spit distal section flattened in 2060. 01%AEP SoP	Railway Embankment (check elements)	1131801070101L02	Length (km)	1.41	GIS/NFCDD	5830	Maintain	Short to long term	30	0.246601725	0.385315195	0.462378234	0.739805174			0	0	0
	Wave recurve 0.25m addition		Length (m)	1410	GIS/NFCDD	167	Sustain	Long	0.2	0.047018729	0.073466764	0.088160117	0.141056186			0	0	0
	Railway Embankment (check elements)	1131801070201L01	Length (km)	0.37	GIS/NFCDD	5830	Maintain	Short to long term	30	0.064711091	0.101111079	0.121333295	0.194133273			0	0	0
													1.074994633	TOTAL				





O.7 East bank of the Clyst

FCRMU approach	Asset Type	Asset reference	Parameter	Amount	Reference	Rate (£/parameter)	HLO	Epoch	Epochal discount factor	Basic construction cost (£M)	Plus Tidal/urban uplift (25% each) cost (£M)	Plus PAR, design and supervision (20%) cost (£M)	Plus Optimism bias 60% cost (£M)		FOOTPRINT IMPACT (Ha)		
RESPONSE OPTIONS															SPA/SSSI	SAC	None
Short Term Option 1 and Medium to Long Term Option 1. Breach of 100m length in the existing embankment, a new embankment along the north side of the C527 of up to 1.5m to provide continued or improve flood protection to the road and local properties, rock armour protection to the C527 and railway bridges to address erosion risk, and raising of the assets downstream of the C527 bridge (up to 0.5m). Rising ground levels at the landward extent would naturally constrain the extent of inundation. 10% AEP SoP.	Earth Embankment	1131801070204L01	Length (km)	0.78	GIS/NFCDD	1166	Maintain	Short to long term	30	0.027283595	0.042630617	0.051156741	0.081850785		0	0	0
	No EWL impact		Length (m)	780	GIS/NFCDD	0	Sustain	Short	1	0	0	0	0		0	0	0
	CC no addition		Length (m)	780	GIS/NFCDD	0	Sustain	Medium	0.5	0	0	0	0		0	0	0
	CC 0.4m addition		Length (m)	780	GIS/NFCDD	329	Sustain	Long	0.2	0.051293159	0.064116448	0.076939738	0.123103581		0	0	0
	Wall	1131801070202L05	Length (km)	0.04	GIS/NFCDD	5830	Maintain	Short to long term	30	0.006995794	0.010930928	0.013117113	0.020987381		0	0	0
	No EWL impact		Length (m)	40	GIS/NFCDD	0	Sustain	Short	1	0	0	0	0		0	0	0
	CC no addition		Length (m)	40	GIS/NFCDD	0	Sustain	Medium	0.5	0	0	0	0		0	0	0
	CC no addition		Length (m)	40	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0		0	0	0
	Timber Pile Wall With Concrete Cap	1131801070202L06	Length (km)	0.02	GIS/NFCDD	5830	Maintain	Short to long term	30	0.003497897	0.005465464	0.006558557	0.01049369		0	0	0
	No EWL impact		Length (m)	20	GIS/NFCDD	0	Sustain	Short	1	0	0	0	0		0	0	0
	CC no addition		Length (m)	20	GIS/NFCDD	0	Sustain	Medium	0.5	0	0	0	0		0	0	0
	CC no addition		Length (m)	20	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0		0	0	0
	Ramp block wall.	1131801070202L03	Length (km)	0.02	GIS/NFCDD	5830	Maintain	Short to long term	30	0.003497897	0.005465464	0.006558557	0.01049369		0	0	0
	No EWL impact		Length (m)	20	GIS/NFCDD	0	Sustain	Short	1	0	0	0	0		0	0	0
	CC no addition		Length (m)	20	GIS/NFCDD	0	Sustain	Medium	0.5	0	0	0	0		0	0	0
	CC 0.2 addition		Length (m)	20	GIS/NFCDD	164	Sustain	Long	0.2	0.000657605	0.000822006	0.000986407	0.001578251		0	0	0
	Earth Embankment	1131801070202L02	Length (km)	0.05	GIS/NFCDD	1166	Maintain	Short to long term	30	0.001748948	0.002732732	0.003279278	0.005246845		0	0	0
	No EWL impact		Length (m)	50	GIS/NFCDD	0	Sustain	Short	1	0	0	0	0		0	0	0
	CC no addition		Length (m)	50	GIS/NFCDD	0	Sustain	Medium	0.5	0	0	0	0		0	0	0
	CC 0.2 addition		Length (m)	50	GIS/NFCDD	164	Sustain	Long	0.2	0.001644011	0.002055014	0.002466017	0.003945628		0	0	0
	Earth Embankment	1131801070202L01	Length (km)	0.09	GIS/NFCDD	1166	Maintain	Short to long term	30	0.003148107	0.004918917	0.005902701	0.009444321		0	0	0
	No EWL impact		Length (m)	90	GIS/NFCDD	0	Sustain	Short	1	0	0	0	0		0	0	0
	CC no addition		Length (m)	90	GIS/NFCDD	0	Sustain	Medium	0.5	0	0	0	0		0	0	0
	CC no addition		Length (m)	90	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0		0	0	0
	Earth Embankment	Dummy1	Length (km)	0.29	GIS/NFCDD	0	NAI	Short to long term	30	0	0	0	0		0	0	0
	100m long breach in existing embankment u/s of Topsham, Bridge		Length (m)	100		324	Maintain	Short	1	0.03236014	0.050562719	0.060675262	0.09708042		0	0	0
	Rock armour toe protection to abutment		Length (m)	50		2938	Maintain	Short	1	0.146911666	0.229549478	0.275459373	0.440734997		0.025	0	0
	Maintenance of rock armour toe protection to abutment		Length (km)	0.05		5830	Maintain	Short to long term	30	0.008744742	0.013663659	0.016396391	0.026234226		0	0	0
	Rock armour toe protection to Clyst Bridge abutment		Length (m)	50		2938	Maintain	Short	1	0.146911666	0.229549478	0.275459373	0.440734997		0	0	0.025
	Maintenance of rock armour toe protection to Clyst Bridge abutment		Length (km)	0.05		5830	Maintain	Short to long term	30	0.008744742	0.013663659	0.016396391	0.026234226		0	0	0
	ST Realigned embankment maintenance		Length (km)	0.53	GIS/NFCDD	5830	Manage	Short to long term	30	0.092694265	0.115867832	0.139041398	0.222466237		0	0	0
	ST Realigned embankment construction 0.25m height		Length (m)	530	GIS/NFCDD	323	Manage	Short	1	0.171173599	0.213966999	0.256760399	0.410816639		0	0	0.5035
	ST land compensation		Area (Ha)	34.25	GIS/NFCDD	15000	Manage	Short	1	0.51375	0.51375	0.51375	0.51375		0	0	0
													2.445195914	TOTAL			
													Cost (£K/ha) for MR	63.59275157			





FCRMU approach	Asset Type	Asset reference	Parameter	Amount	Reference	Rate (£/parameter)	HLO	Epoch	Epochal discount factor	Basic construction cost (£M)	Plus Tidal/urban uplift (25% each) cost (£M)	Plus PAR, design and supervision (20%) cost (£M)	Plus Optimism bias 60% cost (£M)		FOOTPRINT IMPACT (Ha)			
RESPONSE OPTIONS																SPA/SSSI	SAC	None
Short Term Option 1 and Medium to Long Term Option 1. Breach of 100m length in the existing embankment, a new embankment along the north side of the C527 of up to 1.5m to provide continued or improve flood protection to the road and local properties, rock armour protection to the C527 and railway bridges to address erosion risk, and raising of the assets downstream of the C527 bridge (up to 0.5m). Rising ground levels at the landward extent would naturally constrain the extent of inundation. 4%AEP SoP.	Earth Embankment	1131801070204L01	Length (km)	0.78	GIS/NFCDD	1166	Maintain	Short to long term	30	0.027283595	0.042630617	0.051156741	0.081850785		0	0	0	
	No EWL impact		Length (m)	780	GIS/NFCDD	0	Sustain	Short	1	0	0	0	0		0	0	0	
	CC no addition		Length (m)	780	GIS/NFCDD	0	Sustain	Medium	0.5	0	0	0	0		0	0	0	
	CC 0.5m addition		Length (m)	780	GIS/NFCDD	329	Sustain	Long	0.2	0.051293159	0.064116448	0.076939738	0.123103581		0	0	0	
	Wall	1131801070202L05	Length (km)	0.04	GIS/NFCDD	5830	Maintain	Short to long term	30	0.006995794	0.010930928	0.013117113	0.020987381		0	0	0	
	No EWL impact		Length (m)	40	GIS/NFCDD	0	Sustain	Short	1	0	0	0	0		0	0	0	
	CC no addition		Length (m)	40	GIS/NFCDD	0	Sustain	Medium	0.5	0	0	0	0		0	0	0	
	CC no addition		Length (m)	40	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0		0	0	0	
	Timber Pile Wall With Concrete Cap	1131801070202L06	Length (km)	0.02	GIS/NFCDD	5830	Maintain	Short to long term	30	0.003497897	0.005465464	0.006558557	0.01049369		0	0	0	
	No EWL impact		Length (m)	20	GIS/NFCDD	0	Sustain	Short	1	0	0	0	0		0	0	0	
	CC no addition		Length (m)	20	GIS/NFCDD	0	Sustain	Medium	0.5	0	0	0	0		0	0	0	
	CC no addition		Length (m)	20	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0		0	0	0	
	Ramp block wall.	1131801070202L03	Length (km)	0.02	GIS/NFCDD	5830	Maintain	Short to long term	30	0.003497897	0.005465464	0.006558557	0.01049369		0	0	0	
	No EWL impact		Length (m)	20	GIS/NFCDD	0	Sustain	Short	1	0	0	0	0		0	0	0	
	CC no addition		Length (m)	20	GIS/NFCDD	0	Sustain	Medium	0.5	0	0	0	0		0	0	0	
	CC 0.2 addition		Length (m)	20	GIS/NFCDD	164	Sustain	Long	0.2	0.000657605	0.000822006	0.000986407	0.001578251		0	0	0	
	Earth Embankment	1131801070202L02	Length (km)	0.05	GIS/NFCDD	1166	Maintain	Short to long term	30	0.001748948	0.002732732	0.003279278	0.005246845		0	0	0	
	No EWL impact		Length (m)	50	GIS/NFCDD	0	Sustain	Short	1	0	0	0	0		0	0	0	
	CC no addition		Length (m)	50	GIS/NFCDD	0	Sustain	Medium	0.5	0	0	0	0		0	0	0	
	CC 0.2 addition		Length (m)	50	GIS/NFCDD	164	Sustain	Long	0.2	0.001644011	0.002055014	0.002466017	0.003945628		0	0	0	
	Earth Embankment	1131801070202L01	Length (km)	0.09	GIS/NFCDD	1166	Maintain	Short to long term	30	0.003148107	0.004918917	0.005902701	0.009444321		0	0	0	
	No EWL impact		Length (m)	90	GIS/NFCDD	0	Sustain	Short	1	0	0	0	0		0	0	0	
	CC no addition		Length (m)	90	GIS/NFCDD	0	Sustain	Medium	0.5	0	0	0	0		0	0	0	
	CC no addition		Length (m)	90	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0		0	0	0	
	Earth Embankment	Dummy1	Length (km)	0.29	GIS/NFCDD	0	NAI	Short to long term	30	0	0	0	0		0	0	0	
	100m long breach in existing embankment u/s of Topsham, Bridge		Length (m)	100			324	Maintain	Short	1	0.03236014	0.050562719	0.060675262	0.09708042		0	0	0
	Rock armour toe protection to abutment		Length (m)	50			2938	Maintain	Short	1	0.146911666	0.229549478	0.275459373	0.440734997	0.025	0	0	
	Maintenance of rock armour toe protection to abutment		Length (km)	0.05			5830	Maintain	Short to long term	30	0.008744742	0.013663659	0.016396391	0.026234226		0	0	0
	Rock armour toe protection to Clyst Bridge abutment		Length (m)	50			2938	Maintain	Short	1	0.146911666	0.229549478	0.275459373	0.440734997		0	0	0.025
	Maintenance of rock armour toe protection to Clyst Bridge abutment		Length (km)	0.05			5830	Maintain	Short to long term	30	0.008744742	0.013663659	0.016396391	0.026234226		0	0	0
	ST Realigned embankment maintenance		Length (km)	0.53	GIS/NFCDD		5830	Manage	Short to long term	30	0.092694265	0.115867832	0.139041398	0.222466237		0	0	0
	ST Realigned embankment construction 0.5m height		Length (m)	530	GIS/NFCDD		646	Manage	Short	1	0.342347199	0.427933999	0.513520798	0.821633277		0	0	0.5035
	ST land compensation		Area (Ha)	34.25	GIS/NFCDD		15000	Manage	Short	1	0.51375	0.51375	0.51375	0.51375		0	0	0
														2.856012553	TOTAL			
													Cost (£K/Ha) for MR	75.58739795				



FCRMU approach	Asset Type	Asset reference	Parameter	Amount	Reference	Rate (£/parameter)	HLO	Epoch	Epochal discount factor	Basic construction cost (£M)	Plus Tidal/urban uplift (25% each) cost (£M)	Plus PAR, design and supervision (20%) cost (£M)	Plus Optimism bias 60% cost (£M)		FOOTPRINT IMPACT (Ha)			
RESPONSE OPTIONS																SPA/SSSI	SAC	None
Short Term Option 1 and Medium to Long Term Option 1. Breach of 100m length in the existing embankment, a new embankment along the north side of the C527 of up to 1.5m to provide continued or improve flood protection to the road and local properties, rock armour protection to the C527 and railway bridges to address erosion risk, and raising of the assets downstream of the C527 bridge (up to 0.5m). Rising ground levels at the landward extent would naturally constrain the extent of inundation. 2%AEP SoP.	Earth Embankment	1131801070204L01	Length (km)	0.78	GIS/NFCDD	1166	Maintain	Short to long term	30	0.027283595	0.042630617	0.051156741	0.081850785		0	0	0	
	No EWL impact		Length (m)	780	GIS/NFCDD	0	Sustain	Short	1	0	0	0	0		0	0	0	
	CC no addition		Length (m)	780	GIS/NFCDD	0	Sustain	Medium	0.5	0	0	0	0		0	0	0	
	CC 0.5m addition		Length (m)	780	GIS/NFCDD	329	Sustain	Long	0.2	0.051293159	0.064116448	0.076939738	0.123103581		0	0	0	
	Wall	1131801070202L05	Length (km)	0.04	GIS/NFCDD	5830	Maintain	Short to long term	30	0.006995794	0.010930928	0.013117113	0.020987381		0	0	0	
	No EWL impact		Length (m)	40	GIS/NFCDD	0	Sustain	Short	1	0	0	0	0		0	0	0	
	CC no addition		Length (m)	40	GIS/NFCDD	0	Sustain	Medium	0.5	0	0	0	0		0	0	0	
	CC no addition		Length (m)	40	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0		0	0	0	
	Timber Pile Wall With Concrete Cap	1131801070202L06	Length (km)	0.02	GIS/NFCDD	5830	Maintain	Short to long term	30	0.003497897	0.005465464	0.006558557	0.01049369		0	0	0	
	No EWL impact		Length (m)	20	GIS/NFCDD	0	Sustain	Short	1	0	0	0	0		0	0	0	
	CC no addition		Length (m)	20	GIS/NFCDD	0	Sustain	Medium	0.5	0	0	0	0		0	0	0	
	CC no addition		Length (m)	20	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0		0	0	0	
	Ramp block wall.	1131801070202L03	Length (km)	0.02	GIS/NFCDD	5830	Maintain	Short to long term	30	0.003497897	0.005465464	0.006558557	0.01049369		0	0	0	
	No EWL impact		Length (m)	20	GIS/NFCDD	0	Sustain	Short	1	0	0	0	0		0	0	0	
	CC no addition		Length (m)	20	GIS/NFCDD	0	Sustain	Medium	0.5	0	0	0	0		0	0	0	
	CC 0.3 addition		Length (m)	20	GIS/NFCDD	164	Sustain	Long	0.2	0.000657605	0.000822006	0.000986407	0.001578251		0	0	0	
	Earth Embankment	1131801070202L02	Length (km)	0.05	GIS/NFCDD	1166	Maintain	Short to long term	30	0.001748948	0.002732732	0.003279278	0.005246845		0	0	0	
	No EWL impact		Length (m)	50	GIS/NFCDD	0	Sustain	Short	1	0	0	0	0		0	0	0	
	CC no addition		Length (m)	50	GIS/NFCDD	0	Sustain	Medium	0.5	0	0	0	0		0	0	0	
	CC 0.3 addition		Length (m)	50	GIS/NFCDD	164	Sustain	Long	0.2	0.001644011	0.002055014	0.002466017	0.003945628		0	0	0	
	Earth Embankment	1131801070202L01	Length (km)	0.09	GIS/NFCDD	1166	Maintain	Short to long term	30	0.003148107	0.004918917	0.005902701	0.009444321		0	0	0	
	No EWL impact		Length (m)	90	GIS/NFCDD	0	Sustain	Short	1	0	0	0	0		0	0	0	
	CC no addition		Length (m)	90	GIS/NFCDD	0	Sustain	Medium	0.5	0	0	0	0		0	0	0	
	CC no addition		Length (m)	90	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0		0	0	0	
	Earth Embankment	Dummy1	Length (km)	0.29	GIS/NFCDD	0	NAI	Short to long term	30	0	0	0	0		0	0	0	
	100m long breach in existing embankment u/s of Topsham, Bridge		Length (m)	100			324	Maintain	Short	1	0.03236014	0.050562719	0.060675262	0.09708042		0	0	0
	Rock armour toe protection to abutment		Length (m)	50			2938	Maintain	Short	1	0.146911666	0.229549478	0.275459373	0.440734997	0.025	0	0	
	Maintenance of rock armour toe protection to abutment		Length (km)	0.05			5830	Maintain	Short to long term	30	0.008744742	0.013663659	0.016396391	0.026234226		0	0	0
	Rock armour toe protection to Clyst Bridge abutment		Length (m)	50			2938	Maintain	Short	1	0.146911666	0.229549478	0.275459373	0.440734997		0	0	0.025
	Maintenance of rock armour toe protection to Clyst Bridge abutment		Length (km)	0.05			5830	Maintain	Short to long term	30	0.008744742	0.013663659	0.016396391	0.026234226		0	0	0
	ST Realigned embankment maintenance		Length (km)	0.53	GIS/NFCDD		5830	Manage	Short to long term	30	0.092694265	0.115867832	0.139041398	0.222466237		0	0	0
	ST Realigned embankment construction 0.75m height		Length (m)	530	GIS/NFCDD		969	Manage	Short	1	0.513520798	0.641900998	0.770281197	1.232449916		0	0	0.5035
	ST land compensation		Area (Ha)	34.25	GIS/NFCDD		15000	Manage	Short	1	0.51375	0.51375	0.51375	0.51375		0	0	0
														3.266829191	TOTAL			
													Cost (£K/Ha) for MR	87.58204433				



FCRMU approach	Asset Type	Asset reference	Parameter	Amount	Reference	Rate (£/parameter)	HLO	Epoch	Epochal discount factor	Basic construction cost (£M)	Plus Tidal/urban uplift (25% each) cost (£M)	Plus PAR, design and supervision (20%) cost (£M)	Plus Optimism bias 60% cost (£M)		FOOTPRINT IMPACT (Ha)			
RESPONSE OPTIONS																SPA/SSSI	SAC	None
Short Term Option 1 and Medium to Long Term Option 1. Breach of 100m length in the existing embankment, a new embankment along the north side of the C527 of up to 1.5m to provide continued or improve flood protection to the road and local properties, rock armour protection to the C527 and railway bridges to address erosion risk, and raising of the assets downstream of the C527 bridge (up to 0.5m). Rising ground levels at the landward extent would naturally constrain the extent of inundation. 1%AEP SoP.	Earth Embankment	1131801070204L01	Length (km)	0.78	GIS/NFCDD	1166	Maintain	Short to long term	30	0.027283595	0.042630617	0.051156741	0.081850785		0	0	0	
	EWL impact 0.25m addition		Length (m)	780	GIS/NFCDD	164	Sustain	Short	1	0.128232897	0.160291121	0.192349345	0.307758952		0.0585	0	0	
	CC no addition		Length (m)	780	GIS/NFCDD	0	Sustain	Medium	0.5	0	0	0	0		0	0	0	
	CC 0.5m addition		Length (m)	780	GIS/NFCDD	329	Sustain	Long	0.2	0.051293159	0.064116448	0.076939738	0.123103581		0	0	0	
	Wall	1131801070202L05	Length (km)	0.04	GIS/NFCDD	5830	Maintain	Short to long term	30	0.006995794	0.010930928	0.013117113	0.020987381		0	0	0	
	EWL impact 0.25m addition		Length (m)	40	GIS/NFCDD	164	Sustain	Short	1	0.006576046	0.008220057	0.009864069	0.01578251		0.003	0	0	
	CC no addition		Length (m)	40	GIS/NFCDD	0	Sustain	Medium	0.5	0	0	0	0		0	0	0	
	CC no addition		Length (m)	40	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0		0	0	0	
	Timber Pile Wall With Concrete Cap	1131801070202L06	Length (km)	0.02	GIS/NFCDD	5830	Maintain	Short to long term	30	0.003497897	0.005465464	0.006558557	0.01049369		0	0	0	
	EWL impact 0.25m addition		Length (m)	20	GIS/NFCDD	164	Sustain	Short	1	0.003288023	0.004110029	0.004932034	0.007891255		0.0015	0	0	
	CC no addition		Length (m)	20	GIS/NFCDD	0	Sustain	Medium	0.5	0	0	0	0		0	0	0	
	CC no addition		Length (m)	20	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0		0	0	0	
	Ramp block wall.	1131801070202L03	Length (km)	0.02	GIS/NFCDD	5830	Maintain	Short to long term	30	0.003497897	0.005465464	0.006558557	0.01049369		0	0	0	
	EWL impact 0.25m addition		Length (m)	20	GIS/NFCDD	164	Sustain	Short	1	0.003288023	0.004110029	0.004932034	0.007891255		0.0015	0	0	
	CC no addition		Length (m)	20	GIS/NFCDD	0	Sustain	Medium	0.5	0	0	0	0		0	0	0	
	CC 0.3 addition		Length (m)	20	GIS/NFCDD	164	Sustain	Long	0.2	0.000657605	0.000822006	0.000986407	0.001578251		0	0	0	
	Earth Embankment	1131801070202L02	Length (km)	0.05	GIS/NFCDD	1166	Maintain	Short to long term	30	0.001748948	0.002732732	0.003279278	0.005246845		0	0	0	
	EWL impact 0.25m addition		Length (m)	50	GIS/NFCDD	164	Sustain	Short	1	0.008220057	0.010275072	0.012330086	0.019728138		0.00375	0	0	
	CC no addition		Length (m)	50	GIS/NFCDD	0	Sustain	Medium	0.5	0	0	0	0		0	0	0	
	CC 0.3 addition		Length (m)	50	GIS/NFCDD	164	Sustain	Long	0.2	0.001644011	0.002055014	0.002466017	0.003945628		0	0	0	
	Earth Embankment	1131801070202L01	Length (km)	0.09	GIS/NFCDD	1166	Maintain	Short to long term	30	0.003148107	0.004918917	0.005902701	0.009444321		0	0	0	
	EWL impact 0.25m addition		Length (m)	90	GIS/NFCDD	164	Sustain	Short	1	0.014796103	0.018495129	0.022194155	0.035510648		0.00675	0	0	
	CC no addition		Length (m)	90	GIS/NFCDD	0	Sustain	Medium	0.5	0	0	0	0		0	0	0	
	CC 0.1m addition		Length (m)	90	GIS/NFCDD	164	Sustain	Long	0.2	0.002959221	0.003699026	0.004438831	0.00710213		0	0	0	
	Earth Embankment	Dummy1	Length (km)	0.29	GIS/NFCDD	0	NAI	Short to long term	30	0	0	0	0		0	0	0	
	100m long breach in existing embankment u/s of Topsham, Bridge		Length (m)	100		324	Maintain	Short	1	0.03236014	0.050562719	0.060675262	0.09708042		0	0	0	
	Rock armour toe protection to abutment		Length (m)	50		2938	Maintain	Short	1	0.146911666	0.229549478	0.275459373	0.440734997		0.025	0	0	
	Maintenance of rock armour toe protection to abutment		Length (km)	0.05		5830	Maintain	Short to long term	30	0.008744742	0.013663659	0.016396391	0.026234226		0	0	0	
	Rock armour toe protection to Clyst Bridge abutment		Length (m)	50		2938	Maintain	Short	1	0.146911666	0.229549478	0.275459373	0.440734997		0	0	0.025	
	Maintenance of rock armour toe protection to Clyst Bridge abutment		Length (km)	0.05		5830	Maintain	Short to long term	30	0.008744742	0.013663659	0.016396391	0.026234226		0	0	0	
	ST Realigned embankment maintenance		Length (km)	0.53	GIS/NFCDD	5830	Manage	Short to long term	30	0.092694265	0.115867832	0.139041398	0.222466237		0	0	0	
	ST Realigned embankment construction 0.85m height		Length (m)	530	GIS/NFCDD	969	Manage	Short	1	0.513520798	0.641900998	0.770281197	1.232449916		0	0	0.5353	
	ST land compensation		Area (Ha)	34.25	GIS/NFCDD	15000	Manage	Short	1	0.51375	0.51375	0.51375	0.51375		0	0	0	
													3.66849408	TOTAL				
													Cost (£K/Ha) for MR	87.58204433				





FCRMU approach	Asset Type	Asset reference	Parameter	Amount	Reference	Rate (£/parameter)	HLO	Epoch	Epochal discount factor	Basic construction cost (£M)	Plus Tidal/urban uplift (25% each) cost (£M)	Plus PAR, design and supervision (20%) cost (£M)	Plus Optimism bias 60% cost (£M)		FOOTPRINT IMPACT (Ha)			
RESPONSE OPTIONS																SPA/SSSI	SAC	None
Short Term Option 1 and Medium to Long Term Option 1. Breach of 100m length in the existing embankment, a new embankment along the north side of the C527 of up to 1.5m to provide continued or improve flood protection to the road and local properties, rock armour protection to the C527 and railway bridges to address erosion risk, and raising of the assets downstream of the C527 bridge (up to 0.5m). Rising ground levels at the landward extent would naturally constrain the extent of inundation. 0.5%AEP SoP.	Earth Embankment	1131801070204L01	Length (km)	0.78	GIS/NFCDD	1166	Maintain	Short to long term	30	0.027283595	0.042630617	0.051156741	0.081850785		0	0	0	
	EWL impact 0.5m addition		Length (m)	780	GIS/NFCDD	329	Sustain	Short	1	0.256465794	0.320582242	0.38469869	0.615517905		0.117	0	0	
	CC no addition		Length (m)	780	GIS/NFCDD	0	Sustain	Medium	0.5	0	0	0	0		0	0	0	
	CC 0.5m addition		Length (m)	780	GIS/NFCDD	329	Sustain	Long	0.2	0.051293159	0.064116448	0.076939738	0.123103581		0	0	0	
	Wall	1131801070202L05	Length (km)	0.04	GIS/NFCDD	5830	Maintain	Short to long term	30	0.006995794	0.010930928	0.013117113	0.020987381		0	0	0	
	EWL impact 0.5m addition		Length (m)	40	GIS/NFCDD	329	Sustain	Short	1	0.013152092	0.016440115	0.019728138	0.031565021		0.006	0	0	
	CC no addition		Length (m)	40	GIS/NFCDD	0	Sustain	Medium	0.5	0	0	0	0		0	0	0	
	CC no addition		Length (m)	40	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0		0	0	0	
	Timber Pile Wall With Concrete Cap	1131801070202L06	Length (km)	0.02	GIS/NFCDD	5830	Maintain	Short to long term	30	0.003497897	0.005465464	0.006558557	0.01049369		0	0	0	
	EWL impact 0.5m addition		Length (m)	20	GIS/NFCDD	329	Sustain	Short	1	0.006576046	0.008220057	0.009864069	0.01578251		0.003	0	0	
	CC no addition		Length (m)	20	GIS/NFCDD	0	Sustain	Medium	0.5	0	0	0	0		0	0	0	
	CC no addition		Length (m)	20	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0		0	0	0	
	Ramp block wall.	1131801070202L03	Length (km)	0.02	GIS/NFCDD	5830	Maintain	Short to long term	30	0.003497897	0.005465464	0.006558557	0.01049369		0	0	0	
	EWL impact 0.5m addition		Length (m)	20	GIS/NFCDD	329	Sustain	Short	1	0.006576046	0.008220057	0.009864069	0.01578251		0.003	0	0	
	CC no addition		Length (m)	20	GIS/NFCDD	0	Sustain	Medium	0.5	0	0	0	0		0	0	0	
	CC 0.4m addition		Length (m)	20	GIS/NFCDD	329	Sustain	Long	0.2	0.001315209	0.001644011	0.001972814	0.003156502		0	0	0	
	Earth Embankment	1131801070202L02	Length (km)	0.05	GIS/NFCDD	1166	Maintain	Short to long term	30	0.001748948	0.002732732	0.003279278	0.005246845		0	0	0	
	EWL impact 0.5m addition		Length (m)	50	GIS/NFCDD	329	Sustain	Short	1	0.016440115	0.020550144	0.024660172	0.039456276		0.0075	0	0	
	CC no addition		Length (m)	50	GIS/NFCDD	0	Sustain	Medium	0.5	0	0	0	0		0	0	0	
	CC 0.4m addition		Length (m)	50	GIS/NFCDD	329	Sustain	Long	0.2	0.003288023	0.004110029	0.004932034	0.007891255		0	0	0	
	Earth Embankment	1131801070202L01	Length (km)	0.09	GIS/NFCDD	1166	Maintain	Short to long term	30	0.003148107	0.004918917	0.005902701	0.009444321		0	0	0	
	EWL impact 0.5m addition		Length (m)	90	GIS/NFCDD	329	Sustain	Short	1	0.029592207	0.036990259	0.04438831	0.071021297		0.0135	0	0	
	CC no addition		Length (m)	90	GIS/NFCDD	0	Sustain	Medium	0.5	0	0	0	0		0	0	0	
	CC 0.2m addition		Length (m)	90	GIS/NFCDD	164	Sustain	Long	0.2	0.002959221	0.003699026	0.004438831	0.00710213		0	0	0	
	Earth Embankment	Dummy1	Length (km)	0.29	GIS/NFCDD	0	NAI	Short to long term	30	0	0	0	0		0	0	0	
	100m long breach in existing embankment u/s of Topsham, Bridge		Length (m)	100			324	Maintain	Short	1	0.03236014	0.050562719	0.060675262	0.09708042		0	0	0
	Rock armour toe protection to abutment		Length (m)	50			2938	Maintain	Short	1	0.146911666	0.229549478	0.275459373	0.440734997		0.025	0	0
	Maintenance of rock armour toe protection to abutment		Length (km)	0.05			5830	Maintain	Short to long term	30	0.008744742	0.013663659	0.016396391	0.026234226		0	0	0
	Rock armour toe protection to Clyst Bridge abutment		Length (m)	50			2938	Maintain	Short	1	0.146911666	0.229549478	0.275459373	0.440734997		0	0	0.025
	Maintenance of rock armour toe protection to Clyst Bridge abutment		Length (km)	0.05			5830	Maintain	Short to long term	30	0.008744742	0.013663659	0.016396391	0.026234226		0	0	0
	ST Realigned embankment maintenance		Length (km)	0.53	GIS/NFCDD	5830	Manage	Short to long term	30	0.092694265	0.115867832	0.139041398	0.222466237		0	0	0	
	ST Realigned embankment construction 1m height		Length (m)	530	GIS/NFCDD	1292	Manage	Short	1	0.684694398	0.855867997	1.027041597	1.643266555		0	0	0.583	
	ST land compensation		Area (Ha)	34.25	GIS/NFCDD	15000	Manage	Short	1	0.51375	0.51375	0.51375	0.51375		0	0	0	
													4.479397357	TOTAL				
													Cost (£K/Ha) for MR	99.57669072				



FCRMU approach	Asset Type	Asset reference	Parameter	Amount	Reference	Rate (£/parameter)	HLO	Epoch	Epochal discount factor	Basic construction cost (£M)	Plus Tidal/urban uplift (25% each) cost (£M)	Plus PAR, design and supervision (20%) cost (£M)	Plus Optimism bias 60% cost (£M)		FOOTPRINT IMPACT (Ha)				
																SPA/SSSI	SAC	None	
RESPONSE OPTIONS																			
Short Term Option 1 and Medium to Long Term Option 1. Breach of 100m length in the existing embankment, a new embankment along the north side of the C527 of up to 1.5m to provide continued or improve flood protection to the road and local properties, rock armour protection to the C527 and railway bridges to address erosion risk, and raising of the assets downstream of the C527 bridge (up to 0.5m). Rising ground levels at the landward extent would naturally constrain the extent of inundation. 0.1%AEP SoP.	Earth Embankment	1131801070204L01	Length (km)	0.78	GIS/NFCDD	1166	Maintain	Short to long term	30	0.027283595	0.042630617	0.051156741	0.081850785			0	0	0	
	EWL impact 0.5m addition		Length (m)	780	GIS/NFCDD	329	Sustain	Short	1	0.256465794	0.320582242	0.38469869	0.615517905			0.117	0	0	
	CC no addition		Length (m)	780	GIS/NFCDD	0	Sustain	Medium	0.5	0	0	0	0			0	0	0	
	CC 0.5m addition		Length (m)	780	GIS/NFCDD	329	Sustain	Long	0.2	0.051293159	0.064116448	0.076939738	0.123103581			0	0	0	
	Wall	1131801070202L05	Length (km)	0.04	GIS/NFCDD	5830	Maintain	Short to long term	30	0.006995794	0.010930928	0.013117113	0.020987381			0	0	0	
	EWL impact 0.5m addition		Length (m)	40	GIS/NFCDD	329	Sustain	Short	1	0.013152092	0.016440115	0.019728138	0.031565021			0.006	0	0	
	CC no addition		Length (m)	40	GIS/NFCDD	0	Sustain	Medium	0.5	0	0	0	0			0	0	0	
	CC no addition		Length (m)	40	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0			0	0	0	
	Timber Pile Wall With Concrete Cap	1131801070202L06	Length (km)	0.02	GIS/NFCDD	5830	Maintain	Short to long term	30	0.003497897	0.005465464	0.006558557	0.01049369			0	0	0	
	EWL impact 0.5m addition		Length (m)	20	GIS/NFCDD	329	Sustain	Short	1	0.006576046	0.008220057	0.009864069	0.01578251			0.003	0	0	
	CC no addition		Length (m)	20	GIS/NFCDD	0	Sustain	Medium	0.5	0	0	0	0			0	0	0	
	CC no addition		Length (m)	20	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0			0	0	0	
	Ramp block wall.	1131801070202L03	Length (km)	0.02	GIS/NFCDD	5830	Maintain	Short to long term	30	0.003497897	0.005465464	0.006558557	0.01049369			0	0	0	
	EWL impact 0.5m addition		Length (m)	20	GIS/NFCDD	329	Sustain	Short	1	0.006576046	0.008220057	0.009864069	0.01578251			0.003	0	0	
	CC no addition		Length (m)	20	GIS/NFCDD	0	Sustain	Medium	0.5	0	0	0	0			0	0	0	
	CC 0.6m addition		Length (m)	20	GIS/NFCDD	329	Sustain	Long	0.2	0.001315209	0.001644011	0.001972814	0.003156502			0	0	0	
	Earth Embankment	1131801070202L02	Length (km)	0.05	GIS/NFCDD	1166	Maintain	Short to long term	30	0.001748948	0.002732732	0.003279278	0.005246845			0	0	0	
	EWL impact 0.5m addition		Length (m)	50	GIS/NFCDD	329	Sustain	Short	1	0.016440115	0.020550144	0.024660172	0.039456276			0.0075	0	0	
	CC no addition		Length (m)	50	GIS/NFCDD	0	Sustain	Medium	0.5	0	0	0	0			0	0	0	
	CC 0.6m addition		Length (m)	50	GIS/NFCDD	329	Sustain	Long	0.2	0.003288023	0.004110029	0.004932034	0.007891255			0	0	0	
	Earth Embankment	1131801070202L01	Length (km)	0.09	GIS/NFCDD	1166	Maintain	Short to long term	30	0.003148107	0.004918917	0.005902701	0.009444321			0	0	0	
	EWL impact 0.5m addition		Length (m)	90	GIS/NFCDD	329	Sustain	Short	1	0.029592207	0.036990259	0.04438831	0.071021297			0.0135	0	0	
	CC no addition		Length (m)	90	GIS/NFCDD	0	Sustain	Medium	0.5	0	0	0	0			0	0	0	
	CC 0.4m addition		Length (m)	90	GIS/NFCDD	329	Sustain	Long	0.2	0.005918441	0.007398052	0.008877662	0.014204259			0	0	0	
	Earth Embankment	Dummy1	Length (km)	0.29	GIS/NFCDD	0	NAI	Short to long term	30	0	0	0	0			0	0	0	
	100m long breach in existing embankment u/s of Topsham, Bridge		Length (m)	100			324	Maintain	Short	1	0.03236014	0.050562719	0.060675262	0.09708042			0	0	0
	Rock armour toe protection to abutment		Length (m)	50			2938	Maintain	Short	1	0.146911666	0.229549478	0.275459373	0.440734997			0.025	0	0
Maintenance of rock armour toe protection to abutment		Length (km)	0.05			5830	Maintain	Short to long term	30	0.008744742	0.013663659	0.016396391	0.026234226			0	0	0	
Rock armour toe protection to Clyst Bridge abutment		Length (m)	50			2938	Maintain	Short	1	0.146911666	0.229549478	0.275459373	0.440734997			0	0	0.025	
Maintenance of rock armour toe protection to Clyst Bridge abutment		Length (km)	0.05			5830	Maintain	Short to long term	30	0.008744742	0.013663659	0.016396391	0.026234226			0	0	0	
ST Realigned embankment maintenance		Length (km)	0.53	GIS/NFCDD	5830	Manage	Short to long term	30	0.092694265	0.115867832	0.139041398	0.222466237			0	0	0		
ST Realigned embankment construction 1.25m height		Length (m)	530	GIS/NFCDD	1590	Manage	Short	1	0.84258544	1.0532318	1.26387816	2.022205056			0	0	0.6625		
ST land compensation		Area (Ha)	34.25	GIS/NFCDD	15000	Manage	Short	1	0.51375	0.51375	0.51375	0.51375			0	0	0		
													4.865437988	TOTAL					
												Cost (£K/Ha) for MR	110.6405886						

O.8 Clyst St. Mary



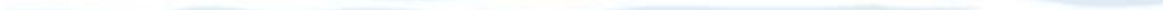
FCRMU approach	Asset Type	Asset reference	Parameter	Amount	Reference	Rate (£/parameter)	HLO	Epoch	Epochal discount factor	Basic construction cost (£M)	Plus Tidal/urban uplift (25% each) cost (£M)	Plus PAR, design and supervision (20%) cost (£M)	Plus Optimism bias 60% cost (£M)		FOOTPRINT IMPACT (Ha)			
RESPONSE OPTIONS																SPA/SSSI	SAC	None
Option 1. Continued maintenance and raising of the Frog Lane and Winslade Barton embankments by between 0-1.5m. The remaining embankments would continue to be unmaintained. 2%AEP SoP	Earth Embankment	Whole of Dummy3	Length (km)	1.68	GIS/NFCDD	1166	Maintain	Short to long term	30	0.058764666	0.073455833	0.088146999	0.141035199			0	0	0
	FCRMU08 0.25m EWL influence		Length (m)	1680	GIS/NFCDD	164	Sustain	Short	1	0.276193932	0.345242414	0.414290897	0.662865436			0	0	0.126
	No addition		Length (m)	1680	GIS/NFCDD	0	Sustain	Medium	0.5	0	0	0	0			0	0	0
	No addition		Length (m)	1680	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0			0	0	0
													0.803900635	TOTAL				
Option 1. Continued maintenance and raising of the Frog Lane and Winslade Barton embankments by between 0-1.5m. The remaining embankments would continue to be unmaintained. 1%AEP SoP	Earth Embankment	Whole of Dummy3	Length (km)	1.68	GIS/NFCDD	1166	Maintain	Short to long term	30	0.058764666	0.073455833	0.088146999	0.141035199			0	0	0
	FCRMU08 0.25m EWL influence		Length (m)	1680	GIS/NFCDD	164	Sustain	Short	1	0.276193932	0.345242414	0.414290897	0.662865436			0	0	0.126
	No addition		Length (m)	1680	GIS/NFCDD	0	Sustain	Medium	0.5	0	0	0	0			0	0	0
	CC 0.1m addition		Length (m)	1680	GIS/NFCDD	82	Sustain	Long	0.2	0.027619393	0.034524241	0.04142909	0.066286544			0	0	0.0504
													0.870187178	TOTAL				
Option 1. Continued maintenance and raising of the Frog Lane and Winslade Barton embankments by between 0-1.5m. The remaining embankments would continue to be unmaintained. 0.5%AEP SoP	Earth Embankment	Whole of Dummy3	Length (km)	1.68	GIS/NFCDD	1166	Maintain	Short to long term	30	0.058764666	0.073455833	0.088146999	0.141035199			0	0	0
	FCRMU08 0.25m EWL influence		Length (m)	1680	GIS/NFCDD	164	Sustain	Short	1	0.276193932	0.345242414	0.414290897	0.662865436			0	0	0.126
	No addition		Length (m)	1680	GIS/NFCDD	0	Sustain	Medium	0.5	0	0	0	0			0	0	0
	CC 0.3m addition		Length (m)	1680	GIS/NFCDD	164	Sustain	Long	0.2	0.055238786	0.069048483	0.082858179	0.132573087			0	0	0.1512
													0.936473722	TOTAL				
Option 1. Continued maintenance and raising of the Frog Lane and Winslade Barton embankments by between 0-1.5m. The remaining embankments would continue to be unmaintained. 0.1%AEP SoP	Earth Embankment	Whole of Dummy3	Length (km)	1.68	GIS/NFCDD	1166	Maintain	Short to long term	30	0.058764666	0.073455833	0.088146999	0.141035199			0	0	0
	FCRMU08 0.25m EWL influence		Length (m)	1680	GIS/NFCDD	164	Sustain	Short	1	0.276193932	0.345242414	0.414290897	0.662865436			0	0	0.126
	CC 0.3m addition		Length (m)	1680	GIS/NFCDD	164	Sustain	Medium	0.5	0.138096966	0.172621207	0.207145449	0.331432718			0	0	0.1512
	CC 0.3m addition		Length (m)	1680	GIS/NFCDD	164	Sustain	Long	0.2	0.055238786	0.069048483	0.082858179	0.132573087			0	0	0.1512
													1.26790644	TOTAL				





FCRMU approach	Asset Type	Asset reference	Parameter	Amount	Reference	Rate (£/parameter)	HLO	Epoch	Epochal discount factor	Basic construction cost (£M)	Plus Tidal/urban uplift (25% each) cost (£M)	Plus PAR, design and supervision (20%) cost (£M)	Plus Optimism bias 60% cost (£M)		FOOTPRINT IMPACT (Ha)			
RESPONSE OPTIONS																SPA/SSSI	SAC	None
Option 2. No maintenance of existing embankments. Construction of revetment along A376 near Clyst St. Mary in the long term. 0.1%AEP SoP	Earth Embankment	Whole of Dummy3	Length (km)	0.3	GIS/NFCDD	300	NAI	Short to long term	30	0.0027	0.003375	0.00405	0.00648			0	0	0
	CC 0.3m addition		Length (m)	300	GIS/NFCDD	164	Sustain	Medium	0.5	0.024660172	0.030825216	0.036990259	0.059184414			0	0	0.027
	CC 0.3m addition		Length (m)	300	GIS/NFCDD	164	Sustain	Long	0.2	0.009864069	0.012330086	0.014796103	0.023673766			0	0	0.027
	1.5m high revetment to existing structure		Length (m)	300	GIS/NFCDD	1574	Sustain	Long	0.2	0.094443214	0.118054017	0.141664821	0.226663713			0	0	0.027
	Maintenance of revetment to existing structure		Length (km)	0.3	GIS/NFCDD	5830	Sustain	Long term	5	0.008744742	0.010930928	0.013117113	0.020987381			0	0	0.000027
														0.316001892	TOTAL			





ATKINS
Halcrow

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O.10 Topsham and Countess Wear

FCRMU approach	Asset Type	Asset reference	Parameter	Amount	Reference	Rate (£/parameter)	HLO	Epoch	Epochal discount factor	Basic construction cost (£M)	Plus Tidal/urban uplift (25% each) cost (£M)	Plus PAR, design and supervision (20%) cost (£M)	Plus Optimism bias 60% cost (£M)	FOOTPRINT IMPACT (Ha)				
RESPONSE OPTIONS														SPA/SSSI			SAC	None
Medium to Long Term Option 1. Wider raising of quay walls in Topsham (along The Strand) of between 0-2m dependent on climate change scenario. The upper limit of raising would be unlikely to be viable on engineering, landscape and operational grounds. 2%AEP SoP	Flood Wall	1131801070102R01	Length (km)	0.42	GIS/NFCDD	5830	Maintain	Short to long term	30	0.073455833	0.114774739	0.137729687	0.220367499	0	0	0		
	Hump In Road	1131801000302L02	Length (km)	0.09	GIS/NFCDD	5830	Maintain	Short to long term	30	0.015740536	0.024594587	0.029513504	0.047221607	0	0	0		
	No addition		Length (m)	90	GIS/NFCDD	0	Sustain	Medium	0.5	0	0	0	0	0	0	0		
	CC 0.2m addition		Length (m)	90	GIS/NFCDD	559	Sustain	Long	0.2	0.010058202	0.015715941	0.018859129	0.030174607	0.018	0	0		
	0	1131801000302L01	Length (km)	0.25	GIS/NFCDD	5830	Maintain	Short to long term	30	0.04372371	0.068318297	0.081981956	0.13117113	0	0	0		
	No addition		Length (m)	250	GIS/NFCDD	0	Sustain	Short	1	0	0	0	0	0	0	0		
	No addition		Length (m)	250	GIS/NFCDD	0	Sustain	Medium	0.5	0	0	0	0	0	0	0		
	CC 0.3m addition		Length (m)	250	GIS/NFCDD	559	Sustain	Long	0.2	0.027939451	0.043655392	0.05238647	0.083818352	0.05	0	0		
	Natural Bank	1131801000302L40	Length (km)	0.21	GIS/NFCDD	0	Maintain	Short to long term	30	0	0	0	0	0	0	0		
	Private Slipway and Storage Yard	1131801000302L39	Length (km)	0.05	GIS/NFCDD	5830	Maintain	Short to long term	30	0.008744742	0.013663659	0.016396391	0.026234226	0	0	0		
	Wall	1131801000302L29	Length (km)	0.09	GIS/NFCDD	5830	Maintain	Short to long term	30	0.015740536	0.024594587	0.029513504	0.047221607	0	0	0		
	Wall	1131801000302L31	Length (km)	0.07	GIS/NFCDD	5830	Maintain	Short to long term	30	0.012242639	0.019129123	0.022954948	0.036727916	0	0	0		
	No addition		Length (m)	70	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0	0	0	0		
	Wall	1131801000302L32	Length (km)	0.04	GIS/NFCDD	5830	Maintain	Short to long term	30	0.006995794	0.010930928	0.013117113	0.020987381	0	0	0		
	No addition		Length (m)	40	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0	0	0	0		
	Wall	1131801000302L34	Length (km)	0.11	GIS/NFCDD	5830	Maintain	Short to long term	30	0.019238432	0.030060051	0.036072061	0.057715297	0	0	0		
	No addition		Length (m)	110	GIS/NFCDD	0	Sustain	Medium	0.5	0	0	0	0	0	0	0		
	CC 0.2m addition		Length (m)	110	GIS/NFCDD	559	Sustain	Long	0.2	0.012293358	0.019208372	0.023050047	0.036880075	0.022	0	0		
	Slipway	1131801000302L35	Length (km)	0.04	GIS/NFCDD	5830	Maintain	Short to long term	30	0.006995794	0.010930928	0.013117113	0.020987381	0	0	0		
	No addition		Length (m)	40	GIS/NFCDD	0	Sustain	Medium	0.5	0	0	0	0	0	0	0		
	CC 0.2m addition		Length (m)	40	GIS/NFCDD	559	Sustain	Long	0.2	0.004470312	0.006984863	0.008381835	0.013410936	0.008	0	0		
	Wall	1131801000302L36	Length (km)	0.1	GIS/NFCDD	5830	Maintain	Short to long term	30	0.017489484	0.027327319	0.032792783	0.052468452	0	0	0		
	No addition		Length (m)	100	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0	0	0	0		
	Wall	1131801000302L37	Length (km)	0.12	GIS/NFCDD	5830	Maintain	Short to long term	30	0.020987381	0.032792783	0.039351339	0.062962142	0	0	0		
	Natural Bank	1131801000302L38	Length (km)	0.09	GIS/NFCDD	0	Maintain	Short to long term	30	0	0	0	0	0	0	0		
	Wall Fronting Gardens	1131801000302L11	Length (km)	0.05	GIS/NFCDD	5830	Maintain	Short to long term	30	0.008744742	0.013663659	0.016396391	0.026234226	0	0	0		
	Wall Fronting Flats	1131801000302L15	Length (km)	0.03	GIS/NFCDD	5830	Maintain	Short to long term	30	0.005246845	0.008198196	0.009837835	0.015740536	0	0	0		
	No addition		Length (m)	30	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0	0	0	0		
	Wall	1131801000302L16	Length (km)	0.07	GIS/NFCDD	5830	Maintain	Short to long term	30	0.012242639	0.019129123	0.022954948	0.036727916	0	0	0		
	No addition		Length (m)	70	GIS/NFCDD	0	Sustain	Short	1	0	0	0	0	0	0	0		
	No addition		Length (m)	70	GIS/NFCDD	0	Sustain	Medium	0.5	0	0	0	0	0	0	0		
	CC 0.3m addition		Length (m)	70	GIS/NFCDD	559	Sustain	Long	0.2	0.007823046	0.01222351	0.014668212	0.023469139	0.014	0	0		
	Surrounding Wall, With Gate in South West Facing Wall	1131801000302L07	Length (km)	0.15	GIS/NFCDD	5830	Maintain	Short to long term	30	0.026234226	0.040990978	0.049189174	0.078702678	0	0	0		
	No addition		Length (m)	150	GIS/NFCDD	0	Sustain	Short	1	0	0	0	0	0	0	0		
	No addition		Length (m)	150	GIS/NFCDD	0	Sustain	Medium	0.5	0	0	0	0	0	0	0		
	CC 0.3m addition		Length (m)	150	GIS/NFCDD	559	Sustain	Long	0.2	0.01676367	0.026193235	0.031431882	0.050291011	0.03	0	0		
	Wall	1131801000302L09	Length (km)	0.02	GIS/NFCDD	5830	Maintain	Short to long term	30	0.003497897	0.005465464	0.006558557	0.01049369	0	0	0		
	No addition		Length (m)	20	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0	0	0	0		
	Wall	1131801000302L08	Length (km)	0.03	GIS/NFCDD	5830	Maintain	Short to long term	30	0.005246845	0.008198196	0.009837835	0.015740536	0	0	0		
	No addition		Length (m)	30	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0	0	0	0		
	Wall With Toe Protection	1131801000302L06	Length (km)	0.04	GIS/NFCDD	5830	Maintain	Short to long term	30	0.006995794	0.010930928	0.013117113	0.020987381	0	0	0		
	Wall With Promenade	1131801000302L05	Length (km)	0.01	GIS/NFCDD	5830	Maintain	Short to long term	30	0.001748948	0.002732732	0.003279278	0.005246845	0	0	0		
	No addition		Length (m)	10	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0	0	0	0		
	Ramp / Slipway	1131801000302L04	Length (km)	0.03	GIS/NFCDD	5830	Maintain	Short to long term	30	0.005246845	0.008198196	0.009837835	0.015740536	0	0	0		
	No addition		Length (m)	30	GIS/NFCDD	0	Sustain	Medium	0.5	0	0	0	0	0	0	0		
	CC 0.2m addition		Length (m)	30	GIS/NFCDD	559	Sustain	Long	0.2	0.003352734	0.005238647	0.006286376	0.010058202	0.006	0	0		
	Wall / Road	1131801000302L28	Length (km)	0.1	GIS/NFCDD	5830	Maintain	Short to long term	30	0.017489484	0.027327319	0.032792783	0.052468452	0	0	0		
	Marina Wall	1131801000302L27	Length (km)	0.05	GIS/NFCDD	5830	Maintain	Short to long term	30	0.008744742	0.013663659	0.016396391	0.026234226	0	0	0		
	Building	1131801000302L26	Length (km)	0.06	GIS/NFCDD	5830	Maintain	Short to long term	30	0.01049369	0.016396391	0.01967567	0.031481071	0	0	0		
	No addition		Length (m)	60	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0	0	0	0		
Quay Wall	1131801000302L25	Length (km)	0.2	GIS/NFCDD	5830	Maintain	Short to long term	30	0.034978968	0.054654638	0.065585565	0.104936904	0	0	0			
No addition		Length (m)	200	GIS/NFCDD	0	Sustain	Medium	0.5	0	0	0	0	0	0	0			
CC 0.2m addition		Length (m)	200	GIS/NFCDD	559	Sustain	Long	0.2	0.022351561	0.034924313	0.041909176	0.067054682	0.04	0	0			
Side Of Building	1131801000302L24	Length (km)	0.02	GIS/NFCDD	5830	Maintain	Short to long term	30	0.003497897	0.005465464	0.006558557	0.01049369	0	0	0			
No addition		Length (m)	20	GIS/NFCDD	0	Sustain	Short	1	0	0	0	0	0	0	0			
No addition		Length (m)	20	GIS/NFCDD	0	Sustain	Medium	0.5	0	0	0	0	0	0	0			
CC 0.3m addition		Length (m)	20	GIS/NFCDD	559	Sustain	Long	0.2	0.002235156	0.003492431	0.004190918	0.006705468	0.004	0	0			
House / Wall	1131801000302L23	Length (km)	0.03	GIS/NFCDD	5830	Maintain	Short to long term	30	0.005246845	0.008198196	0.009837835	0.015740536	0	0	0			
No addition		Length (m)	30	GIS/NFCDD	0	Sustain	Short	1	0	0	0	0	0	0	0			
No addition		Length (m)	30	GIS/NFCDD	0	Sustain	Medium	0.5	0	0	0	0	0	0	0			
CC 0.3m addition		Length (m)	30	GIS/NFCDD	559	Sustain	Long	0.2	0.003352734	0.005238647	0.006286376	0.010058202	0.006	0	0			
Wall / Road	1131801000302L22	Length (km)	0.04	GIS/NFCDD	5830	Maintain	Short to long term	30	0.006995794	0.010930928	0.013117113	0.020987381	0	0	0			
No addition		Length (m)	40	GIS/NFCDD	0	Sustain	Short	1	0	0	0	0	0	0	0			
No addition		Length (m)	40	GIS/NFCDD	0	Sustain	Medium	0.5	0	0</								



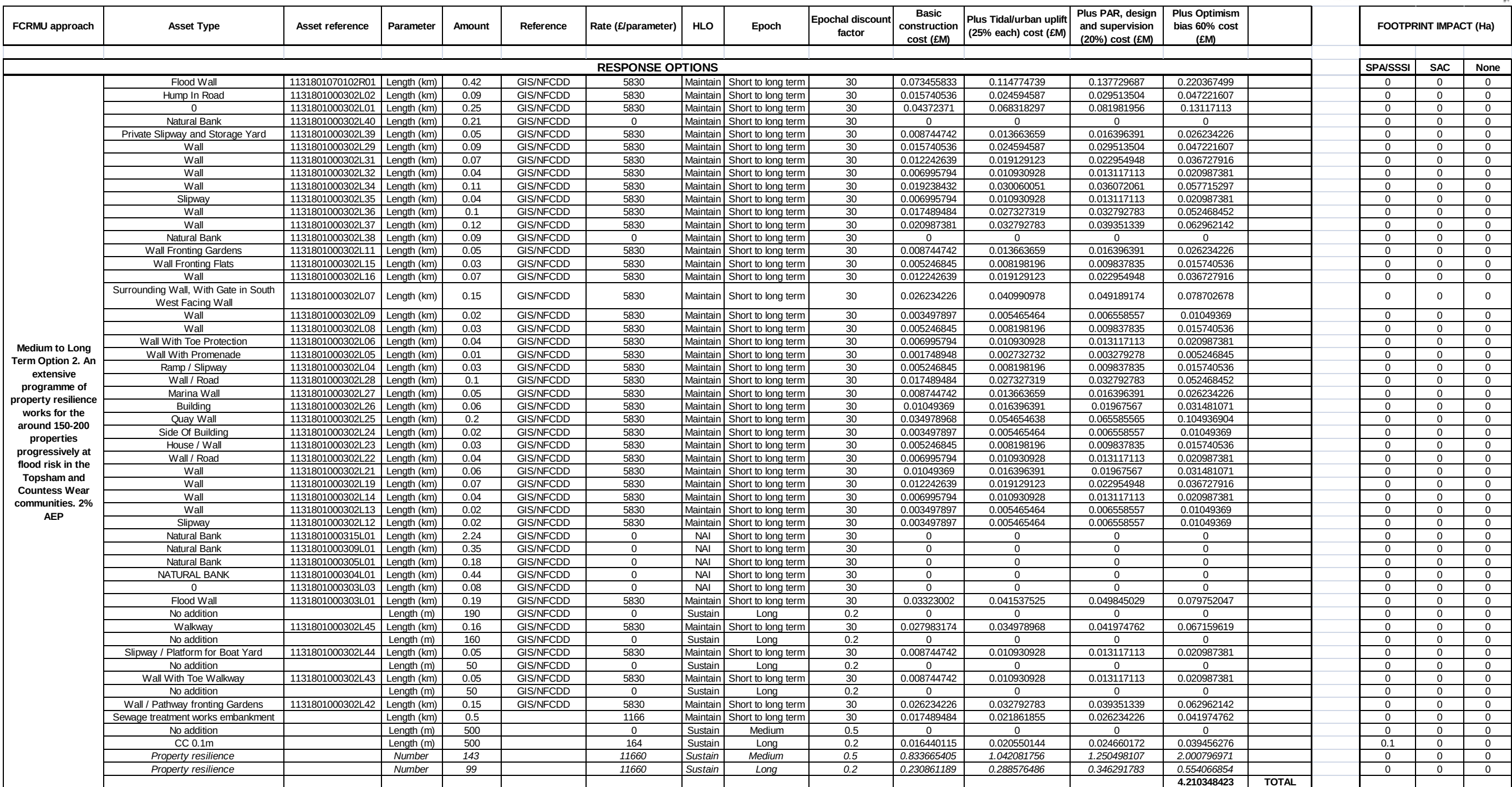
FCRMU approach	Asset Type	Asset reference	Parameter	Amount	Reference	Rate (£/parameter)	HLO	Epoch	Epochal discount factor	Basic construction cost (£M)	Plus Tidal/urban uplift (25% each) cost (£M)	Plus PAR, design and supervision (20%) cost (£M)	Plus Optimism bias 60% cost (£M)		FOOTPRINT IMPACT (Ha)		
RESPONSE OPTIONS															SPA/SSSI	SAC	None
Medium to Long Term Option 1. Wider raising of quay walls in Topsham (along The Strand) of between 0-2m dependent on climate change scenario. The upper limit of raising would be unlikely to be viable on engineering, landscape and operational grounds. 1%AEP SoP	Flood Wall	1131801070102R01	Length (km)	0.42	GIS/NFCDD	5830	Maintain	Short to long term	30	0.073455833	0.114774739	0.137729687	0.220367499		0	0	0
	Hump In Road	1131801000302L02	Length (km)	0.09	GIS/NFCDD	5830	Maintain	Short to long term	30	0.015740536	0.024594587	0.029513504	0.047221607		0	0	0
	No addition		Length (m)	90	GIS/NFCDD	0	Sustain	Medium	0.5	0	0	0	0		0	0	0
	CC 0.3m addition		Length (m)	90	GIS/NFCDD	559	Sustain	Long	0.2	0.010058202	0.015715941	0.018859129	0.030174607		0.018	0	0
	0	1131801000302L01	Length (km)	0.25	GIS/NFCDD	5830	Maintain	Short to long term	30	0.04372371	0.068318297	0.081981956	0.13117113		0	0	0
	No addition		Length (m)	250	GIS/NFCDD	0	Sustain	Short	1	0	0	0	0		0	0	0
	CC 0.2m addition		Length (m)	250	GIS/NFCDD	559	Sustain	Medium	0.5	0.069848627	0.109138479	0.130966175	0.20954588		0.05	0	0
	CC 0.3m addition		Length (m)	250	GIS/NFCDD	559	Sustain	Long	0.2	0.027939451	0.043655392	0.05238647	0.083818352		0.05	0	0
	Natural Bank	1131801000302L40	Length (km)	0.21	GIS/NFCDD	0	Maintain	Short to long term	30	0	0	0	0		0	0	0
	Private Slipway and Storage Yard	1131801000302L39	Length (km)	0.05	GIS/NFCDD	5830	Maintain	Short to long term	30	0.008744742	0.013663659	0.016396391	0.026234226		0	0	0
	Wall	1131801000302L29	Length (km)	0.09	GIS/NFCDD	5830	Maintain	Short to long term	30	0.015740536	0.024594587	0.029513504	0.047221607		0	0	0
	Wall	1131801000302L31	Length (km)	0.07	GIS/NFCDD	5830	Maintain	Short to long term	30	0.012242639	0.019129123	0.022954948	0.036727916		0	0	0
	No addition		Length (m)	70	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0		0	0	0
	Wall	1131801000302L32	Length (km)	0.04	GIS/NFCDD	5830	Maintain	Short to long term	30	0.006995794	0.010930928	0.013117113	0.020987381		0	0	0
	No addition		Length (m)	40	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0		0	0	0
	Wall	1131801000302L34	Length (km)	0.11	GIS/NFCDD	5830	Maintain	Short to long term	30	0.019238432	0.030060051	0.036072061	0.057715297		0	0	0
	No addition		Length (m)	110	GIS/NFCDD	0	Sustain	Medium	0.5	0	0	0	0		0	0	0
	CC 0.3m addition		Length (m)	110	GIS/NFCDD	559	Sustain	Long	0.2	0.012293358	0.019208372	0.023050047	0.036880075		0.022	0	0
	Slipway	1131801000302L35	Length (km)	0.04	GIS/NFCDD	5830	Maintain	Short to long term	30	0.006995794	0.010930928	0.013117113	0.020987381		0	0	0
	No addition		Length (m)	40	GIS/NFCDD	0	Sustain	Medium	0.5	0	0	0	0		0	0	0
	CC 0.3m addition		Length (m)	40	GIS/NFCDD	559	Sustain	Long	0.2	0.004470312	0.006984863	0.008381835	0.013410936		0.008	0	0
	Wall	1131801000302L36	Length (km)	0.1	GIS/NFCDD	5830	Maintain	Short to long term	30	0.017489484	0.027327319	0.032792783	0.052468452		0	0	0
	No addition		Length (m)	100	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0		0	0	0
	Wall	1131801000302L37	Length (km)	0.12	GIS/NFCDD	5830	Maintain	Short to long term	30	0.020987381	0.032792783	0.039351339	0.062962142		0	0	0
	Natural Bank	1131801000302L38	Length (km)	0.09	GIS/NFCDD	0	Maintain	Short to long term	30	0	0	0	0		0	0	0
	Wall Fronting Gardens	1131801000302L11	Length (km)	0.05	GIS/NFCDD	5830	Maintain	Short to long term	30	0.008744742	0.013663659	0.016396391	0.026234226		0	0	0
	Wall Fronting Flats	1131801000302L15	Length (km)	0.03	GIS/NFCDD	5830	Maintain	Short to long term	30	0.005246845	0.008198196	0.009837835	0.015740536		0	0	0
	No addition		Length (m)	30	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0		0	0	0
	Wall	1131801000302L16	Length (km)	0.07	GIS/NFCDD	5830	Maintain	Short to long term	30	0.012242639	0.019129123	0.022954948	0.036727916		0	0	0
	No addition		Length (m)	70	GIS/NFCDD	0	Sustain	Short	1	0	0	0	0		0	0	0
	CC 0.2m addition		Length (m)	70	GIS/NFCDD	559	Sustain	Medium	0.5	0.019557615	0.030558774	0.036670529	0.058672846		0.014	0	0
	CC 0.3m addition		Length (m)	70	GIS/NFCDD	559	Sustain	Long	0.2	0.007823046	0.01222351	0.014668212	0.023469139		0.014	0	0
	Surrounding Wall, With Gate in South West Facing Wall	1131801000302L07	Length (km)	0.15	GIS/NFCDD	5830	Maintain	Short to long term	30	0.026234226	0.040990978	0.049189174	0.078702678		0	0	0
	No addition		Length (m)	150	GIS/NFCDD	0	Sustain	Short	1	0	0	0	0		0	0	0
	CC 0.2m addition		Length (m)	150	GIS/NFCDD	559	Sustain	Medium	0.5	0.041909176	0.065483088	0.078579705	0.125727528		0.03	0	0
	CC 0.3m addition		Length (m)	150	GIS/NFCDD	559	Sustain	Long	0.2	0.01676367	0.026193235	0.031431882	0.050291011		0.03	0	0
	Wall	1131801000302L09	Length (km)	0.02	GIS/NFCDD	5830	Maintain	Short to long term	30	0.003497897	0.005465464	0.006558557	0.01049369		0	0	0
	No addition		Length (m)	20	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0		0	0	0
	Wall	1131801000302L08	Length (km)	0.03	GIS/NFCDD	5830	Maintain	Short to long term	30	0.005246845	0.008198196	0.009837835	0.015740536		0	0	0
	No addition		Length (m)	30	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0		0	0	0
	Wall With Toe Protection	1131801000302L06	Length (km)	0.04	GIS/NFCDD	5830	Maintain	Short to long term	30	0.006995794	0.010930928	0.013117113	0.020987381		0	0	0
	Wall With Promenade	1131801000302L05	Length (km)	0.01	GIS/NFCDD	5830	Maintain	Short to long term	30	0.001748948	0.002732732	0.003279278	0.005246845		0	0	0
	No addition		Length (m)	10	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0		0	0	0
	Ramp / Slipway	1131801000302L04	Length (km)	0.03	GIS/NFCDD	5830	Maintain	Short to long term	30	0.005246845	0.008198196	0.009837835	0.015740536		0	0	0
	No addition		Length (m)	30	GIS/NFCDD	0	Sustain	Medium	0.5	0	0	0	0		0	0	0
	CC 0.3m addition		Length (m)	30	GIS/NFCDD	559	Sustain	Long	0.2	0.003352734	0.005238647	0.006286376	0.010058202		0.006	0	0
	Wall / Road	1131801000302L28	Length (km)	0.1	GIS/NFCDD	5830	Maintain	Short to long term	30	0.017489484	0.027327319	0.032792783	0.052468452		0	0	0
	Marina Wall	1131801000302L27	Length (km)	0.05	GIS/NFCDD	5830	Maintain	Short to long term	30	0.008744742	0.013663659	0.016396391	0.026234226		0	0	0
	Building	1131801000302L26	Length (km)	0.06	GIS/NFCDD	5830	Maintain	Short to long term	30	0.01049369	0.016396391	0.01967567	0.031481071		0	0	0
	No addition		Length (m)	60	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0		0	0	0
	Quay Wall	1131801000302L25	Length (km)	0.2	GIS/NFCDD	5830	Maintain	Short to long term	30	0.034978968	0.054654638	0.065585565	0.104936904		0	0	0
	No addition		Length (m)	200	GIS/NFCDD	0	Sustain	Medium	0.5	0	0	0	0		0	0	0
	CC 0.3m addition		Length (m)	200	GIS/NFCDD	559	Sustain	Long	0.2	0.022351561	0.034924313	0.041909176	0.067054682		0.04	0	0
	Side Of Building	1131801000302L24	Length (km)	0.02	GIS/NFCDD	5830	Maintain	Short to long term	30	0.003497897	0.005465464	0.006558557	0.01049369		0	0	0
	No addition		Length (m)	20	GIS/NFCDD	0	Sustain	Short	1	0	0	0	0		0	0	0
	CC 0.2m addition		Length (m)	20	GIS/NFCDD	559	Sustain	Medium	0.5	0.00558789	0.008731078	0.010477294	0.01676367		0.004	0	0
	CC 0.3m addition		Length (m)	20	GIS/NFCDD	559	Sustain	Long	0.2	0.002235156	0.003492431	0.004190918	0.006705468		0.004	0	0
	House / Wall	1131801000302L23	Length (km)	0.03	GIS/NFCDD	5830	Maintain	Short to long term	30	0.005246845	0.008198196	0.009837835	0.015740536		0	0	0
	No addition		Length (m)	30	GIS/NFCDD	0	Sustain	Short	1	0	0	0	0		0	0	0
	CC 0.2m addition		Length (m)	30	GIS/NFCDD	559	Sustain	Medium	0.5	0.008381835	0.013096618	0.015715941	0.025145506		0.006	0	0
	CC 0.3m addition		Length (m)	30	GIS/NFCDD	559	Sustain	Long	0.2	0.003352734							

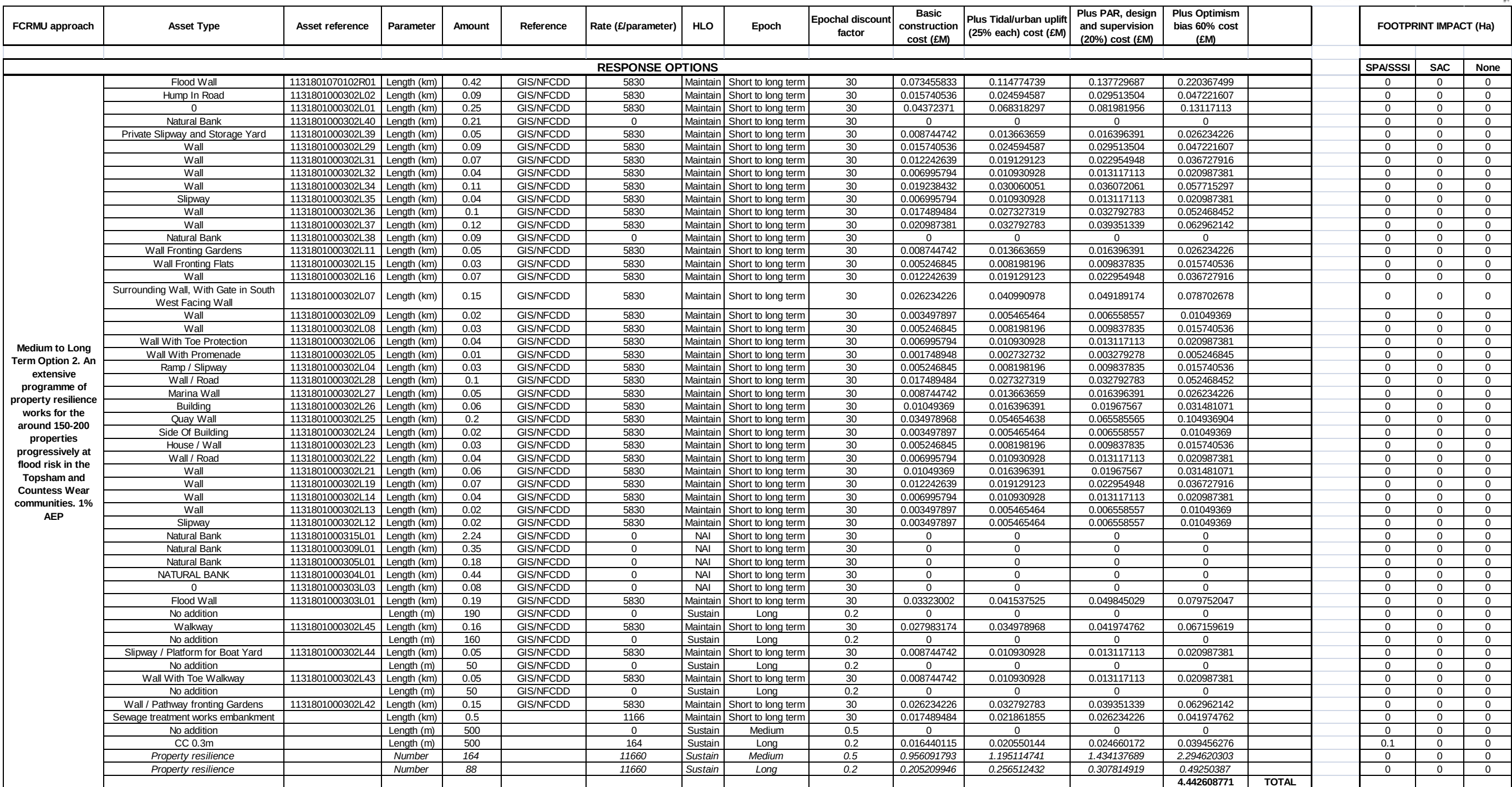


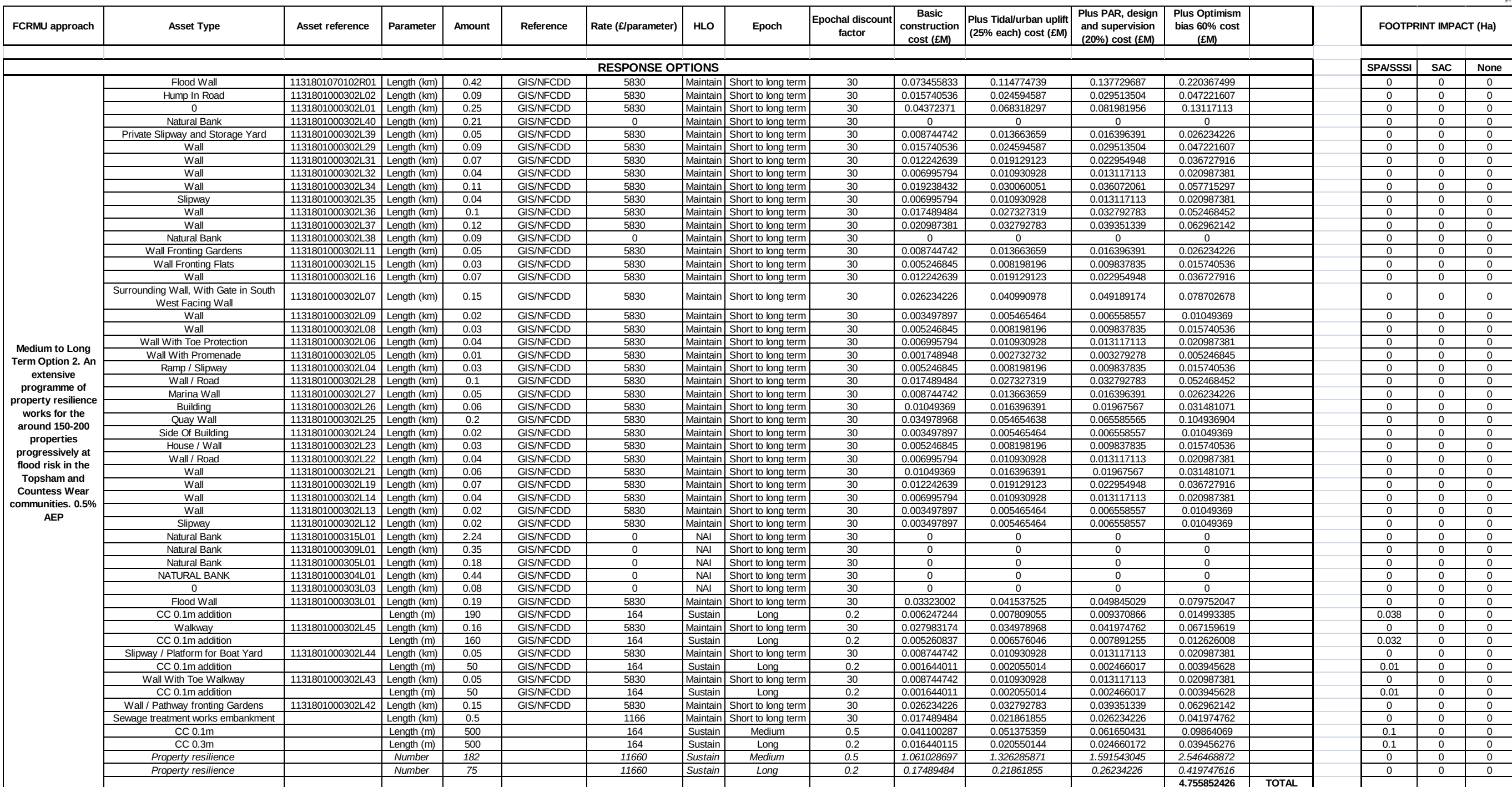
FCRMU approach	Asset Type	Asset reference	Parameter	Amount	Reference	Rate (£/parameter)	HLO	Epoch	Epochal discount factor	Basic construction cost (£M)	Plus Tidal/urban uplift (25% each) cost (£M)	Plus PAR, design and supervision (20%) cost (£M)	Plus Optimism bias 60% cost (£M)		FOOTPRINT IMPACT (Ha)		
RESPONSE OPTIONS															SPA/SSSI	SAC	None
Medium to Long Term Option 1. Wider raising of quay walls in Topsham (along The Strand) of between 0-2m dependent on climate change scenario. The upper limit of raising would be unlikely to be viable on engineering, landscape and operational grounds. 0.5%AEP SoP	Flood Wall	1131801070102R01	Length (km)	0.42	GIS/NFCDD	5830	Maintain	Short to long term	30	0.073455833	0.114774739	0.137729687	0.220367499		0	0	0
	Hump In Road	1131801000302L02	Length (km)	0.09	GIS/NFCDD	5830	Maintain	Short to long term	30	0.015740536	0.024594587	0.029513504	0.047221607		0	0	0
	CC 0.1m addition		Length (m)	90	GIS/NFCDD	559	Sustain	Medium	0.5	0.025145506	0.039289853	0.047147823	0.075436517		0.018	0	0
	CC 0.3m addition		Length (m)	90	GIS/NFCDD	559	Sustain	Long	0.2	0.010058202	0.015715941	0.018859129	0.030174607		0.018	0	0
	0	1131801000302L01	Length (km)	0.25	GIS/NFCDD	5830	Maintain	Short to long term	30	0.04372371	0.068318297	0.081981956	0.13117113		0	0	0
	No addition		Length (m)	250	GIS/NFCDD	0	Sustain	Short	1	0	0	0	0		0	0	0
	CC 0.3m addition		Length (m)	250	GIS/NFCDD	559	Sustain	Medium	0.5	0.069848627	0.109138479	0.130966175	0.20954588		0.05	0	0
	CC 0.3m addition		Length (m)	250	GIS/NFCDD	559	Sustain	Long	0.2	0.027939451	0.043655392	0.05238647	0.083818352		0.05	0	0
	Natural Bank	1131801000302L40	Length (km)	0.21	GIS/NFCDD	0	Maintain	Short to long term	30	0	0	0	0		0	0	0
	Private Slipway and Storage Yard	1131801000302L39	Length (km)	0.05	GIS/NFCDD	5830	Maintain	Short to long term	30	0.008744742	0.013663659	0.016396391	0.026234226		0	0	0
	Wall	1131801000302L29	Length (km)	0.09	GIS/NFCDD	5830	Maintain	Short to long term	30	0.015740536	0.024594587	0.029513504	0.047221607		0	0	0
	Wall	1131801000302L31	Length (km)	0.07	GIS/NFCDD	5830	Maintain	Short to long term	30	0.012242639	0.019129123	0.022954948	0.036727916		0	0	0
	CC 0.1m addition		Length (m)	70	GIS/NFCDD	559	Sustain	Long	0.2	0.007823046	0.0122351	0.014668212	0.023469139		0.014	0	0
	Wall	1131801000302L32	Length (km)	0.04	GIS/NFCDD	5830	Maintain	Short to long term	30	0.006995794	0.010930928	0.013117113	0.020987381		0	0	0
	CC 0.1m addition		Length (m)	40	GIS/NFCDD	559	Sustain	Long	0.2	0.004470312	0.006984863	0.008381835	0.013410936		0.008	0	0
	Wall	1131801000302L34	Length (km)	0.11	GIS/NFCDD	5830	Maintain	Short to long term	30	0.019238432	0.030060051	0.036072061	0.057715297		0	0	0
	CC 0.1m addition		Length (m)	110	GIS/NFCDD	559	Sustain	Medium	0.5	0.030733396	0.048020931	0.057625117	0.092200187		0.022	0	0
	CC 0.3m addition		Length (m)	110	GIS/NFCDD	559	Sustain	Long	0.2	0.012293358	0.019208372	0.023050047	0.036880075		0.022	0	0
	Slipway	1131801000302L35	Length (km)	0.04	GIS/NFCDD	5830	Maintain	Short to long term	30	0.006995794	0.010930928	0.013117113	0.020987381		0	0	0
	CC 0.1m addition		Length (m)	40	GIS/NFCDD	559	Sustain	Medium	0.5	0.01117578	0.017462157	0.020954588	0.033527341		0.008	0	0
	CC 0.3m addition		Length (m)	40	GIS/NFCDD	559	Sustain	Long	0.2	0.004470312	0.006984863	0.008381835	0.013410936		0.008	0	0
	Wall	1131801000302L36	Length (km)	0.1	GIS/NFCDD	5830	Maintain	Short to long term	30	0.017489484	0.027327319	0.032792783	0.052468452		0	0	0
	CC 0.1m addition		Length (m)	100	GIS/NFCDD	559	Sustain	Long	0.2	0.01117578	0.017462157	0.020954588	0.033527341		0.02	0	0
	Wall	1131801000302L37	Length (km)	0.12	GIS/NFCDD	5830	Maintain	Short to long term	30	0.020987381	0.032792783	0.039351339	0.062962142		0	0	0
	Natural Bank	1131801000302L38	Length (km)	0.09	GIS/NFCDD	0	Maintain	Short to long term	30	0	0	0	0		0	0	0
	Wall Fronting Gardens	1131801000302L11	Length (km)	0.05	GIS/NFCDD	5830	Maintain	Short to long term	30	0.008744742	0.013663659	0.016396391	0.026234226		0	0	0
	Wall Fronting Flats	1131801000302L15	Length (km)	0.03	GIS/NFCDD	5830	Maintain	Short to long term	30	0.005246845	0.008198196	0.009837835	0.015740536		0	0	0
	CC 0.1m addition		Length (m)	30	GIS/NFCDD	559	Sustain	Long	0.2	0.003352734	0.005238647	0.006286376	0.010058202		0.006	0	0
	Wall	1131801000302L16	Length (km)	0.07	GIS/NFCDD	5830	Maintain	Short to long term	30	0.012242639	0.019129123	0.022954948	0.036727916		0	0	0
	No addition		Length (m)	70	GIS/NFCDD	0	Sustain	Short	1	0	0	0	0		0	0	0
	CC 0.3m addition		Length (m)	70	GIS/NFCDD	559	Sustain	Medium	0.5	0.019557615	0.030558774	0.036670529	0.058672846		0.014	0	0
	CC 0.3m addition		Length (m)	70	GIS/NFCDD	559	Sustain	Long	0.2	0.007823046	0.01222351	0.014668212	0.023469139		0.014	0	0
	Surrounding Wall, With Gate in South West Facing Wall	1131801000302L07	Length (km)	0.15	GIS/NFCDD	5830	Maintain	Short to long term	30	0.026234226	0.040990978	0.049189174	0.078702678		0	0	0
	No addition		Length (m)	150	GIS/NFCDD	0	Sustain	Short	1	0	0	0	0		0	0	0
	CC 0.3m addition		Length (m)	150	GIS/NFCDD	559	Sustain	Medium	0.5	0.041909176	0.065483088	0.078579705	0.125727528		0.03	0	0
	CC 0.3m addition		Length (m)	150	GIS/NFCDD	559	Sustain	Long	0.2	0.01676367	0.026193235	0.031431882	0.050291011		0.03	0	0
	Wall	1131801000302L09	Length (km)	0.02	GIS/NFCDD	5830	Maintain	Short to long term	30	0.003497897	0.005465464	0.006558557	0.01049369		0	0	0
	CC 0.1m addition		Length (m)	20	GIS/NFCDD	559	Sustain	Long	0.2	0.002235156	0.003492431	0.004190918	0.006705468		0.004	0	0
	Wall	1131801000302L08	Length (km)	0.03	GIS/NFCDD	5830	Maintain	Short to long term	30	0.005246845	0.008198196	0.009837835	0.015740536		0	0	0
	CC 0.1m addition		Length (m)	30	GIS/NFCDD	559	Sustain	Long	0.2	0.003352734	0.005238647	0.006286376	0.010058202		0.006	0	0
	Wall With Toe Protection	1131801000302L06	Length (km)	0.04	GIS/NFCDD	5830	Maintain	Short to long term	30	0.006995794	0.010930928	0.013117113	0.020987381		0	0	0
	Wall With Promenade	1131801000302L05	Length (km)	0.01	GIS/NFCDD	5830	Maintain	Short to long term	30	0.001748948	0.002732732	0.003279278	0.005246845		0	0	0
	CC 0.1m addition		Length (m)	10	GIS/NFCDD	559	Sustain	Long	0.2	0.001117578	0.001746216	0.002095459	0.003352734		0.002	0	0
	Ramp / Slipway	1131801000302L04	Length (km)	0.03	GIS/NFCDD	5830	Maintain	Short to long term	30	0.005246845	0.008198196	0.009837835	0.015740536		0	0	0
	CC 0.1m addition		Length (m)	30	GIS/NFCDD	559	Sustain	Medium	0.5	0.008381835	0.013096618	0.015715941	0.025145506		0.006	0	0
	CC 0.3m addition		Length (m)	30	GIS/NFCDD	559	Sustain	Long	0.2	0.003352734	0.005238647	0.006286376	0.010058202		0.006	0	0
	Wall / Road	1131801000302L28	Length (km)	0.1	GIS/NFCDD	5830	Maintain	Short to long term	30	0.017489484	0.027327319	0.032792783	0.052468452		0	0	0
	Marina Wall	1131801000302L27	Length (km)	0.05	GIS/NFCDD	5830	Maintain	Short to long term	30	0.008744742	0.013663659	0.016396391	0.026234226		0	0	0
	Building	1131801000302L26	Length (km)	0.06	GIS/NFCDD	5830	Maintain	Short to long term	30	0.01049369	0.016396391	0.01967567	0.031481071		0	0	0
	CC 0.1m addition		Length (m)	60	GIS/NFCDD	559	Sustain	Long	0.2	0.006705468	0.010477294	0.012572753	0.020116405		0.012	0	0
	Quay Wall	1131801000302L25	Length (km)	0.2	GIS/NFCDD	5830	Maintain	Short to long term	30	0.034978968	0.054654638	0.065585565	0.104936904		0	0	0
	CC 0.1m addition		Length (m)	200	GIS/NFCDD	559	Sustain	Medium	0.5	0.055878901	0.087310783	0.10477294	0.167636704		0.04	0	0
	CC 0.3m addition		Length (m)	200	GIS/NFCDD	559	Sustain	Long	0.2	0.022351561	0.034924313	0.041909176	0.067054682		0.04	0	0
	Side Of Building	1131801000302L24	Length (km)	0.02	GIS/NFCDD	5830	Maintain	Short to long term	30	0.003497897	0.005465464	0.006558557	0.01049369		0	0	0
	No addition		Length (m)	20	GIS/NFCDD	0	Sustain	Short	1	0	0	0	0		0	0	0
	CC 0.3m addition		Length (m)	20	GIS/NFCDD	559	Sustain	Medium	0.5	0.00558789	0.008731078	0.010477294	0.01676367		0.004	0	0
	CC 0.3m addition		Length (m)	20	GIS/NFCDD	559	Sustain	Long	0.2	0.002235156	0.003492431	0.004190918	0.006705468		0.004	0	0
	House / Wall	1131801000302L23	Length (km)	0.03	GIS/NFCDD	5830	Maintain	Short to long term	30	0.005246845	0.008198196	0.009837835	0.015740536		0	0	0
	No addition		Length (m)	30	GIS/NFCDD	0	Sustain	Short	1	0	0	0	0		0	0	0
	CC 0.3m addition		Length (m)	30	GIS/NFCDD	559											



FCRMU approach	Asset Type	Asset reference	Parameter	Amount	Reference	Rate (£/parameter)	HLO	Epoch	Epochal discount factor	Basic construction cost (£M)	Plus Tidal/urban uplift (25% each) cost (£M)	Plus PAR, design and supervision (20%) cost (£M)	Plus Optimism bias 60% cost (£M)		FOOTPRINT IMPACT (Ha)			
RESPONSE OPTIONS																SPA/SSSI	SAC	None
Medium to Long Term Option 1. Wider raising of quay walls in Topsham (along The Strand) of between 0-2m dependent on climate change scenario. The upper limit of raising would be unlikely to be viable on engineering, landscape and operational grounds. 0.1%AEP SoP	Flood Wall	1131801070102R01	Length (km)	0.42	GIS/NFCDD	5830	Maintain	Short to long term	30	0.073455833	0.114774739	0.137729687	0.220367499		0	0	0	
	Hump In Road	1131801000302L02	Length (km)	0.09	GIS/NFCDD	5830	Maintain	Short to long term	30	0.015740536	0.024594587	0.029513504	0.047221607		0	0	0	
	CC 0.3m addition		Length (m)	90	GIS/NFCDD	559	Sustain	Medium	0.5	0.025145506	0.039289853	0.047147823	0.075436517		0.018	0	0	
	CC 0.3m addition		Length (m)	90	GIS/NFCDD	559	Sustain	Long	0.2	0.010058202	0.015715941	0.018859129	0.030174607		0.018	0	0	
	0	1131801000302L01	Length (km)	0.25	GIS/NFCDD	5830	Maintain	Short to long term	30	0.04372371	0.068318297	0.081981956	0.13117113		0	0	0	
	CC 0.1m addition		Length (m)	250	GIS/NFCDD	559	Sustain	Short	1	0.139697254	0.218276959	0.26193235	0.419091761		0.05	0	0	
	CC 0.3m addition		Length (m)	250	GIS/NFCDD	559	Sustain	Medium	0.5	0.069848627	0.109138479	0.130966175	0.20954588		0.05	0	0	
	CC 0.3m addition		Length (m)	250	GIS/NFCDD	559	Sustain	Long	0.2	0.027939451	0.043655392	0.05238647	0.083818352		0.05	0	0	
	Natural Bank	1131801000302L40	Length (km)	0.21	GIS/NFCDD	0	Maintain	Short to long term	30	0	0	0	0		0	0	0	
	Private Slipway and Storage Yard	1131801000302L39	Length (km)	0.05	GIS/NFCDD	5830	Maintain	Short to long term	30	0.008744742	0.013663659	0.016396391	0.026234226		0	0	0	
	Wall	1131801000302L29	Length (km)	0.09	GIS/NFCDD	5830	Maintain	Short to long term	30	0.015740536	0.024594587	0.029513504	0.047221607		0	0	0	
	Wall	1131801000302L31	Length (km)	0.07	GIS/NFCDD	5830	Maintain	Short to long term	30	0.012242639	0.019129123	0.022954948	0.036727916		0	0	0	
	CC 0.3m addition		Length (m)	70	GIS/NFCDD	559	Sustain	Long	0.2	0.007823046	0.01222351	0.014668212	0.023469139		0.014	0	0	
	Wall	1131801000302L32	Length (km)	0.04	GIS/NFCDD	5830	Maintain	Short to long term	30	0.006995794	0.010930928	0.013117113	0.020987381		0	0	0	
	CC 0.3m addition		Length (m)	40	GIS/NFCDD	559	Sustain	Long	0.2	0.004470312	0.006984863	0.008381835	0.013410936		0.008	0	0	
	Wall	1131801000302L34	Length (km)	0.11	GIS/NFCDD	5830	Maintain	Short to long term	30	0.019238432	0.030060051	0.036072061	0.057715297		0	0	0	
	CC 0.3m addition		Length (m)	110	GIS/NFCDD	559	Sustain	Medium	0.5	0.030733396	0.048020931	0.057625117	0.092200187		0.022	0	0	
	CC 0.3m addition		Length (m)	110	GIS/NFCDD	559	Sustain	Long	0.2	0.012293358	0.019208372	0.023050047	0.036880075		0.022	0	0	
	Slipway	1131801000302L35	Length (km)	0.04	GIS/NFCDD	5830	Maintain	Short to long term	30	0.006995794	0.010930928	0.013117113	0.020987381		0	0	0	
	CC 0.3m addition		Length (m)	40	GIS/NFCDD	559	Sustain	Medium	0.5	0.01117578	0.017462157	0.020954588	0.033527341		0.008	0	0	
	CC 0.3m addition		Length (m)	40	GIS/NFCDD	559	Sustain	Long	0.2	0.004470312	0.006984863	0.008381835	0.013410936		0.008	0	0	
	Wall	1131801000302L36	Length (km)	0.1	GIS/NFCDD	5830	Maintain	Short to long term	30	0.017489484	0.027327319	0.032792783	0.052468452		0	0	0	
	CC 0.3m addition		Length (m)	100	GIS/NFCDD	559	Sustain	Long	0.2	0.01117578	0.017462157	0.020954588	0.033527341		0.02	0	0	
	Wall	1131801000302L37	Length (km)	0.12	GIS/NFCDD	5830	Maintain	Short to long term	30	0.020987381	0.032792783	0.039351339	0.062962142		0	0	0	
	Natural Bank	1131801000302L38	Length (km)	0.09	GIS/NFCDD	0	Maintain	Short to long term	30	0	0	0	0		0	0	0	
	Wall Fronting Gardens	1131801000302L11	Length (km)	0.05	GIS/NFCDD	5830	Maintain	Short to long term	30	0.008744742	0.013663659	0.016396391	0.026234226		0	0	0	
	Wall Fronting Flats	1131801000302L15	Length (km)	0.03	GIS/NFCDD	5830	Maintain	Short to long term	30	0.005246845	0.008198196	0.009837835	0.015740536		0	0	0	
	CC 0.3m addition		Length (m)	30	GIS/NFCDD	559	Sustain	Long	0.2	0.003352734	0.005238647	0.006286376	0.010058202		0.006	0	0	
	Wall	1131801000302L16	Length (km)	0.07	GIS/NFCDD	5830	Maintain	Short to long term	30	0.012242639	0.019129123	0.022954948	0.036727916		0	0	0	
	CC 0.1m addition		Length (m)	70	GIS/NFCDD	559	Sustain	Short	1	0.039115231	0.061117548	0.073341058	0.117345693		0.014	0	0	
	CC 0.3m addition		Length (m)	70	GIS/NFCDD	559	Sustain	Medium	0.5	0.019557615	0.030558774	0.036670529	0.058672846		0.014	0	0	
	CC 0.3m addition		Length (m)	70	GIS/NFCDD	559	Sustain	Long	0.2	0.007823046	0.01222351	0.014668212	0.023469139		0.014	0	0	
	Surrounding Wall, With Gate in South West Facing Wall	1131801000302L07	Length (km)	0.15	GIS/NFCDD	5830	Maintain	Short to long term	30	0.026234226	0.040990978	0.049189174	0.078702678		0	0	0	
	CC 0.1m addition		Length (m)	150	GIS/NFCDD	559	Sustain	Short	1	0.083818352	0.130966175	0.15715941	0.251455056		0.03	0	0	
	CC 0.3m addition		Length (m)	150	GIS/NFCDD	559	Sustain	Medium	0.5	0.041909176	0.065483088	0.078579705	0.125727528		0.03	0	0	
	CC 0.3m addition		Length (m)	150	GIS/NFCDD	559	Sustain	Long	0.2	0.01676367	0.026193235	0.031431882	0.050291011		0.03	0	0	
	Wall	1131801000302L09	Length (km)	0.02	GIS/NFCDD	5830	Maintain	Short to long term	30	0.003497897	0.005465464	0.006558557	0.01049369		0	0	0	
	CC 0.3m addition		Length (m)	20	GIS/NFCDD	559	Sustain	Long	0.2	0.002235156	0.003492431	0.004190918	0.006705468		0.004	0	0	
	Wall	1131801000302L08	Length (km)	0.03	GIS/NFCDD	5830	Maintain	Short to long term	30	0.005246845	0.008198196	0.009837835	0.015740536		0	0	0	
	CC 0.3m addition		Length (m)	30	GIS/NFCDD	559	Sustain	Long	0.2	0.003352734	0.005238647	0.006286376	0.010058202		0.006	0	0	
	Wall With Toe Protection	1131801000302L06	Length (km)	0.04	GIS/NFCDD	5830	Maintain	Short to long term	30	0.006995794	0.010930928	0.013117113	0.020987381		0	0	0	
	Wall With Promenade	1131801000302L05	Length (km)	0.01	GIS/NFCDD	5830	Maintain	Short to long term	30	0.001748948	0.002732732	0.003279278	0.005246845		0	0	0	
	CC 0.3m addition		Length (m)	10	GIS/NFCDD	559	Sustain	Long	0.2	0.00117578	0.001746216	0.002095459	0.003352734		0.002	0	0	
	Ramp / Slipway	1131801000302L04	Length (km)	0.03	GIS/NFCDD	5830	Maintain	Short to long term	30	0.005246845	0.008198196	0.009837835	0.015740536		0	0	0	
	CC 0.3m addition		Length (m)	30	GIS/NFCDD	559	Sustain	Medium	0.5	0.008381835	0.013096618	0.015715941	0.025145506		0.006	0	0	
	CC 0.3m addition		Length (m)	30	GIS/NFCDD	559	Sustain	Long	0.2	0.003352734	0.005238647	0.006286376	0.010058202		0.006	0	0	
	Wall / Road	1131801000302L28	Length (km)	0.1	GIS/NFCDD	5830	Maintain	Short to long term	30	0.017489484	0.027327319	0.032792783	0.052468452		0	0	0	
	Marina Wall	1131801000302L27	Length (km)	0.05	GIS/NFCDD	5830	Maintain	Short to long term	30	0.008744742	0.013663659	0.016396391	0.026234226		0	0	0	
	Building	1131801000302L26	Length (km)	0.06	GIS/NFCDD	5830	Maintain	Short to long term	30	0.01049369	0.016396391	0.01967567	0.031481071		0	0	0	
	CC 0.3m addition		Length (m)	60	GIS/NFCDD	559	Sustain	Long	0.2	0.006705468	0.010477294	0.012572753	0.020116405		0.012	0	0	
	Quay Wall	1131801000302L25	Length (km)	0.2	GIS/NFCDD	5830	Maintain	Short to long term	30	0.034978968	0.054654638	0.065585565	0.104936904		0	0	0	
	CC 0.3m addition		Length (m)	200	GIS/NFCDD	559	Sustain	Medium	0.5	0.055878901	0.087310783	0.10477294	0.167636704		0.04	0	0	
	CC 0.3m addition		Length (m)	200	GIS/NFCDD	559	Sustain	Long	0.2	0.022351561	0.034924313	0.041909176	0.067054682		0.04	0	0	
	Side Of Building	1131801000302L24	Length (km)	0.02	GIS/NFCDD	5830	Maintain	Short to long term	30	0.003497897	0.005465464	0.006558557	0.01049369		0	0	0	
	CC 0.1m addition		Length (m)	20	GIS/NFCDD	559	Sustain	Short	1	0.01117578	0.017462157	0.020954588	0.033527341		0.004	0	0	
	CC 0.3m addition		Length (m)	20	GIS/NFCDD	559	Sustain	Medium	0.5	0.00558789	0.008731078	0.010477294	0.01676367		0.004	0	0	
	CC 0.3m addition		Length (m)	20	GIS/NFCDD	559	Sustain	Long	0.2	0.002235156	0.003492431	0.004190918	0.006705468		0.004	0	0	
	House / Wall	1131801000302L23	Length (km)	0.03	GIS/NFCDD	5830	Maintain	Short to long term	30	0.005246845	0.008							









FCRMU approach	Asset Type	Asset reference	Parameter	Amount	Reference	Rate (£/parameter)	HLO	Epoch	Epochal discount factor	Basic construction cost (£M)	Plus Tidal/urban uplift (25% each) cost (£M)	Plus PAR, design and supervision (20%) cost (£M)	Plus Optimism bias 60% cost (£M)		FOOTPRINT IMPACT (Ha)			
	RESPONSE OPTIONS															SPA/SSSI	SAC	None
Medium to Long Term Option 2. An extensive programme of property resilience works for the around 150-200 properties progressively at flood risk in the Topsham and Countess Wear communities. 0.1% AEP	Flood Wall	1131801070102R01	Length (km)	0.42	GIS/NFCDD	5830	Maintain	Short to long term	30	0.073455833	0.114774739	0.137729687	0.220367499		0	0	0	
	Hump In Road	1131801000302L02	Length (km)	0.09	GIS/NFCDD	5830	Maintain	Short to long term	30	0.015740536	0.024594587	0.029513504	0.047221607		0	0	0	
	0	1131801000302L01	Length (km)	0.25	GIS/NFCDD	5830	Maintain	Short to long term	30	0.04372371	0.068318297	0.081981956	0.13117113		0	0	0	
	Natural Bank	1131801000302L40	Length (km)	0.21	GIS/NFCDD	0	Maintain	Short to long term	30	0	0	0	0		0	0	0	
	Private Slipway and Storage Yard	1131801000302L39	Length (km)	0.05	GIS/NFCDD	5830	Maintain	Short to long term	30	0.008744742	0.013663659	0.016396391	0.026234226		0	0	0	
	Wall	1131801000302L29	Length (km)	0.09	GIS/NFCDD	5830	Maintain	Short to long term	30	0.015740536	0.024594587	0.029513504	0.047221607		0	0	0	
	Wall	1131801000302L31	Length (km)	0.07	GIS/NFCDD	5830	Maintain	Short to long term	30	0.012242639	0.019129123	0.022954948	0.036727916		0	0	0	
	Wall	1131801000302L32	Length (km)	0.04	GIS/NFCDD	5830	Maintain	Short to long term	30	0.006995794	0.010930928	0.013117113	0.020987381		0	0	0	
	Wall	1131801000302L34	Length (km)	0.11	GIS/NFCDD	5830	Maintain	Short to long term	30	0.019238432	0.030060051	0.036072061	0.057715297		0	0	0	
	Slipway	1131801000302L35	Length (km)	0.04	GIS/NFCDD	5830	Maintain	Short to long term	30	0.006995794	0.010930928	0.013117113	0.020987381		0	0	0	
	Wall	1131801000302L36	Length (km)	0.1	GIS/NFCDD	5830	Maintain	Short to long term	30	0.017489484	0.027327319	0.032792783	0.052468452		0	0	0	
	Wall	1131801000302L37	Length (km)	0.12	GIS/NFCDD	5830	Maintain	Short to long term	30	0.020987381	0.032792783	0.039351339	0.062962142		0	0	0	
	Natural Bank	1131801000302L38	Length (km)	0.09	GIS/NFCDD	0	Maintain	Short to long term	30	0	0	0	0		0	0	0	
	Wall Fronting Gardens	1131801000302L11	Length (km)	0.05	GIS/NFCDD	5830	Maintain	Short to long term	30	0.008744742	0.013663659	0.016396391	0.026234226		0	0	0	
	Wall Fronting Flats	1131801000302L15	Length (km)	0.03	GIS/NFCDD	5830	Maintain	Short to long term	30	0.005246845	0.008198196	0.009837835	0.015740536		0	0	0	
	Wall	1131801000302L16	Length (km)	0.07	GIS/NFCDD	5830	Maintain	Short to long term	30	0.012242639	0.019129123	0.022954948	0.036727916		0	0	0	
	Surrounding Wall, With Gate in South West Facing Wall	1131801000302L07	Length (km)	0.15	GIS/NFCDD	5830	Maintain	Short to long term	30	0.026234226	0.040990978	0.049189174	0.078702678		0	0	0	
	Wall	1131801000302L09	Length (km)	0.02	GIS/NFCDD	5830	Maintain	Short to long term	30	0.003497897	0.005465464	0.006558557	0.01049369		0	0	0	
	Wall	1131801000302L08	Length (km)	0.03	GIS/NFCDD	5830	Maintain	Short to long term	30	0.005246845	0.008198196	0.009837835	0.015740536		0	0	0	
	Wall With Toe Protection	1131801000302L06	Length (km)	0.04	GIS/NFCDD	5830	Maintain	Short to long term	30	0.006995794	0.010930928	0.013117113	0.020987381		0	0	0	
	Wall With Promenade	1131801000302L05	Length (km)	0.01	GIS/NFCDD	5830	Maintain	Short to long term	30	0.001748948	0.002732732	0.003279278	0.005246845		0	0	0	
	Ramp / Slipway	1131801000302L04	Length (km)	0.03	GIS/NFCDD	5830	Maintain	Short to long term	30	0.005246845	0.008198196	0.009837835	0.015740536		0	0	0	
	Wall / Road	1131801000302L28	Length (km)	0.1	GIS/NFCDD	5830	Maintain	Short to long term	30	0.017489484	0.027327319	0.032792783	0.052468452		0	0	0	
	Marina Wall	1131801000302L27	Length (km)	0.05	GIS/NFCDD	5830	Maintain	Short to long term	30	0.008744742	0.013663659	0.016396391	0.026234226		0	0	0	
	Building	1131801000302L26	Length (km)	0.06	GIS/NFCDD	5830	Maintain	Short to long term	30	0.01049369	0.016396391	0.01967567	0.031481071		0	0	0	
	Quay Wall	1131801000302L25	Length (km)	0.2	GIS/NFCDD	5830	Maintain	Short to long term	30	0.034978968	0.054654638	0.065585565	0.104936904		0	0	0	
	Side Of Building	1131801000302L24	Length (km)	0.02	GIS/NFCDD	5830	Maintain	Short to long term	30	0.003497897	0.005465464	0.006558557	0.01049369		0	0	0	
	House / Wall	1131801000302L23	Length (km)	0.03	GIS/NFCDD	5830	Maintain	Short to long term	30	0.005246845	0.008198196	0.009837835	0.015740536		0	0	0	
	Wall / Road	1131801000302L22	Length (km)	0.04	GIS/NFCDD	5830	Maintain	Short to long term	30	0.006995794	0.010930928	0.013117113	0.020987381		0	0	0	
	Wall	1131801000302L21	Length (km)	0.06	GIS/NFCDD	5830	Maintain	Short to long term	30	0.01049369	0.016396391	0.01967567	0.031481071		0	0	0	
	Wall	1131801000302L19	Length (km)	0.07	GIS/NFCDD	5830	Maintain	Short to long term	30	0.012242639	0.019129123	0.022954948	0.036727916		0	0	0	
	Wall	1131801000302L14	Length (km)	0.04	GIS/NFCDD	5830	Maintain	Short to long term	30	0.006995794	0.010930928	0.013117113	0.020987381		0	0	0	
	Wall	1131801000302L13	Length (km)	0.02	GIS/NFCDD	5830	Maintain	Short to long term	30	0.003497897	0.005465464	0.006558557	0.01049369		0	0	0	
	Slipway	1131801000302L12	Length (km)	0.02	GIS/NFCDD	5830	Maintain	Short to long term	30	0.003497897	0.005465464	0.006558557	0.01049369		0	0	0	
	Natural Bank	1131801000315L01	Length (km)	2.24	GIS/NFCDD	0	NAI	Short to long term	30	0	0	0	0		0	0	0	
	Natural Bank	1131801000309L01	Length (km)	0.35	GIS/NFCDD	0	NAI	Short to long term	30	0	0	0	0		0	0	0	
Natural Bank	1131801000305L01	Length (km)	0.18	GIS/NFCDD	0	NAI	Short to long term	30	0	0	0	0		0	0	0		
NATURAL BANK	1131801000304L01	Length (km)	0.44	GIS/NFCDD	0	NAI	Short to long term	30	0	0	0	0		0	0	0		
0	1131801000303L03	Length (km)	0.08	GIS/NFCDD	0	NAI	Short to long term	30	0	0	0	0		0	0	0		
Flood Wall	1131801000303L01	Length (km)	0.19	GIS/NFCDD	5830	Maintain	Short to long term	30	0.03323002	0.041537525	0.049845029	0.079752047		0	0	0		
CC 0.3m addition		Length (m)	190	GIS/NFCDD	164	Sustain	Long	0.2	0.006247244	0.007809055	0.009370866	0.014993385		0.038	0	0		
Walkway	1131801000302L45	Length (km)	0.16	GIS/NFCDD	5830	Maintain	Short to long term	30	0.027983174	0.034978968	0.041974762	0.067159619		0	0	0		
CC 0.3m addition		Length (m)	160	GIS/NFCDD	164	Sustain	Long	0.2	0.005260837	0.006576046	0.007891255	0.012626008		0.032	0	0		
Slipway / Platform for Boat Yard	1131801000302L44	Length (km)	0.05	GIS/NFCDD	5830	Maintain	Short to long term	30	0.008744742	0.010930928	0.013117113	0.020987381		0	0	0		
CC 0.3m addition		Length (m)	50	GIS/NFCDD	164	Sustain	Long	0.2	0.001644011	0.002055014	0.002466017	0.003945628		0.01	0	0		
Wall With Toe Walkway	1131801000302L43	Length (km)	0.05	GIS/NFCDD	5830	Maintain	Short to long term	30	0.008744742	0.010930928	0.013117113	0.020987381		0	0	0		
CC 0.3m addition		Length (m)	50	GIS/NFCDD	164	Sustain	Long	0.2	0.001644011	0.002055014	0.002466017	0.003945628		0.01	0	0		
Wall / Pathway fronting Gardens	1131801000302L42	Length (km)	0.15	GIS/NFCDD	5830	Maintain	Short to long term	30	0.026234226	0.032792783	0.039351339	0.062962142		0	0	0		
Sewage treatment works embankment		Length (km)	0.5		1166	Maintain	Short to long term	30	0.017489484	0.021861855	0.026234226	0.041974762		0	0	0		
CC 0.3m		Length (m)	500		164	Sustain	Medium	0.5	0.041100287	0.051375359	0.061650431	0.09864069		0.1	0	0		
CC 0.3m		Length (m)	500		164	Sustain	Long	0.2	0.016440115	0.020550144	0.024660172	0.039456276		0.1	0	0		
Property resilience		Number	228		11660	Sustain	Medium	0.5	1.329200785	1.661500981	1.993801178	3.190081884		0	0	0		
Property resilience		Number	43		11660	Sustain	Long	0.2	0.100273042	0.125341302	0.150409563	0.2406553		0	0	0		
													5.220373121	TOTAL				





O.11 Exminster Marshes and Powderham Banks

FCRMU approach	Asset Type	Asset reference	Parameter	Amount	Reference	Rate (£/parameter)	HLO	Epoch	Epochal discount factor	Basic construction cost (£M)	Plus Tidal/urban uplift (25% each) cost (£M)	Plus PAR, design and supervision (20%) cost (£M)	Plus Optimism bias 60% cost (£M)		FOOTPRINT IMPACT (Ha)			
RESPONSE OPTIONS																SPA/SSSI	SAC	None
Short Term Option 3. A combination of both options 1 and 2. Medium to Long Term Option 1. 2%AEP SoP.	Earth Embankment	1131801130118R02	Length (km)	0.41	GIS/NFCDD	1166	Maintain	Short to long term	30	0.014341377	0.017926721	0.021512065	0.034419305		0	0	0	
	Earth Embankment	1131801130117R01	Length (km)	0.36	GIS/NFCDD	1166	Maintain	Short to long term	30	0.012592428	0.015740536	0.018888643	0.030221828		0	0	0	
	Canal embankment	1131801130104L01	Length (km)	0.83	GIS/NFCDD	1166	Maintain	Short to long term	30	0.029032543	0.036290679	0.043548815	0.069678104		0	0	0	
	Earth Bank	1131801130106L01	Length (km)	0.18	GIS/NFCDD	1166	Maintain	Short to long term	30	0.006296214	0.007870268	0.009444321	0.015110914		0	0	0	
	Canal embankment	1131801130105L01	Length (km)	0.36	GIS/NFCDD	1166	Maintain	Short to long term	30	0.012592428	0.015740536	0.018888643	0.030221828		0	0	0	
	Earth Embankment With Screeded Stone Rev	1131801130102L01	Length (km)	0.04	GIS/NFCDD	5830	Maintain	Short to long term	30	0.006995794	0.008744742	0.01049369	0.016789905		0	0	0	
	No addition		Length (m)	40	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0		0	0	0	
	Canal embankment	1131801130103L01	Length (km)	0.15	GIS/NFCDD	1166	Maintain	Short to long term	30	0.005246845	0.006558557	0.007870268	0.012592428		0	0	0	
	Maintained Channel	1131801160106L01	Length (km)	0.78	GIS/NFCDD	1166	Maintain	Short to long term	30	0.027283595	0.034104494	0.040925393	0.065480628		0	0	0	
	Earth Embankment	1131801130102R01	Length (km)	0.34	GIS/NFCDD	1166	Maintain	Short to long term	30	0.011892849	0.014866061	0.017839274	0.028542838		0	0	0	
	No addition		Length (m)	340	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0		0	0	0	
	Earth Embankment	1131801000303R01	Length (km)	0.59	GIS/NFCDD	1166	Maintain	Short to long term	30	0.020637591	0.025796989	0.030956387	0.049530219		0	0	0	
	No addition		Length (m)	590	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0		0	0	0	
	Canal Embankment	1131801000302R01	Length (km)	3.23	GIS/NFCDD	1166	Maintain	Short to long term	30	0.112982067	0.141227583	0.1694731	0.27115696		0	0	0	
	No addition		Length (m)	3230	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0		0	0	0	
	Natural Cliff (check elements)	113FAS3351009C01	Length (km)	0.46	GIS/NFCDD	1166	Maintain	Short to long term	30	0.016090325	0.020112907	0.024135488	0.038616781		0	0	0	
	5m widening		Length (m)	460	GIS/NFCDD	2186	Sustain	Short	1	1.005375587	1.005375587	1.206450705	1.930321128		0.23	0	0	
	CC 0.2m addition		Length (m)	460	GIS/NFCDD	559	Sustain	Medium	0.5	0.128521473	0.160651842	0.19278221	0.308451536		0	0	0	
	CC 0.5m addition		Length (m)	460	GIS/NFCDD	1118	Sustain	Long	0.2	0.102817179	0.128521473	0.154225768	0.246761229		0	0	0	
	Natural Cliff (check elements)	113FAS3351009C02	Length (km)	1.1	GIS/NFCDD	1166	Maintain	Short to long term	30	0.038476865	0.048096081	0.057715297	0.092344476		0	0	0	
	CC 0.2m addition and 5m widening		Length (m)	1100	GIS/NFCDD	2186	Sustain	Short	1	2.404159013	2.404159013	2.884990816	4.615985305		0.55	0	0	
	CC 0.2m addition		Length (m)	1100	GIS/NFCDD	559	Sustain	Medium	0.5	0.307333958	0.384167447	0.461000937	0.737601499		0	0	0	
	CC 0.5m addition		Length (m)	1100	GIS/NFCDD	1118	Sustain	Long	0.2	0.245867166	0.307333958	0.368800749	0.590081199		0	0	0	
	Wall + Revetment	113FAS3351009C03	Length (km)	0.35	GIS/NFCDD	5830	Maintain	Short to long term	30	0.061213194	0.076516493	0.091819791	0.146911666		0	0	0	
	CC 0.3m addition		Length (m)	350	GIS/NFCDD	559	Sustain	Long	0.2	0.039115231	0.048894039	0.058672846	0.093876554		0	0	0	
	Toe protection (rock armour)		Length (m)	700	GIS/NFCDD	735	Sustain	Short	1	0.51419083	0.642738537	0.771286245	1.234057992		0.35	0	0	
													10.65875432	TOTAL				
Short Term Option 3. A combination of both options 1 and 2. Medium to Long Term Option 1. 1%AEP SoP.	Earth Embankment	1131801130118R02	Length (km)	0.41	GIS/NFCDD	1166	Maintain	Short to long term	30	0.014341377	0.017926721	0.021512065	0.034419305		0	0	0	
	Earth Embankment	1131801130117R01	Length (km)	0.36	GIS/NFCDD	1166	Maintain	Short to long term	30	0.012592428	0.015740536	0.018888643	0.030221828		0	0	0	
	Canal embankment	1131801130104L01	Length (km)	0.83	GIS/NFCDD	1166	Maintain	Short to long term	30	0.029032543	0.036290679	0.043548815	0.069678104		0	0	0	
	Earth Bank	1131801130106L01	Length (km)	0.18	GIS/NFCDD	1166	Maintain	Short to long term	30	0.006296214	0.007870268	0.009444321	0.015110914		0	0	0	
	Canal embankment	1131801130105L01	Length (km)	0.36	GIS/NFCDD	1166	Maintain	Short to long term	30	0.012592428	0.015740536	0.018888643	0.030221828		0	0	0	
	Earth Embankment With Screeded Stone Rev	1131801130102L01	Length (km)	0.04	GIS/NFCDD	5830	Maintain	Short to long term	30	0.006995794	0.008744742	0.01049369	0.016789905		0	0	0	
	CC 0.3m addition		Length (m)	40	GIS/NFCDD	559	Sustain	Long	0.2	0.004470312	0.00558789	0.006705468	0.010728749		0	0	0	
	Canal embankment	1131801130103L01	Length (km)	0.15	GIS/NFCDD	1166	Maintain	Short to long term	30	0.005246845	0.006558557	0.007870268	0.012592428		0	0	0	
	Maintained Channel	1131801160106L01	Length (km)	0.78	GIS/NFCDD	1166	Maintain	Short to long term	30	0.027283595	0.034104494	0.040925393	0.065480628		0	0	0	
	Earth Embankment	1131801130102R01	Length (km)	0.34	GIS/NFCDD	1166	Maintain	Short to long term	30	0.011892849	0.014866061	0.017839274	0.028542838		0	0	0	
	No addition		Length (m)	340	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0		0	0	0	
	Earth Embankment	1131801000303R01	Length (km)	0.59	GIS/NFCDD	1166	Maintain	Short to long term	30	0.020637591	0.025796989	0.030956387	0.049530219		0	0	0	
	No addition		Length (m)	590	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0		0	0	0	
	Canal Embankment	1131801000302R01	Length (km)	3.23	GIS/NFCDD	1166	Maintain	Short to long term	30	0.112982067	0.141227583	0.1694731	0.27115696		0	0	0	
	CC 0.1m addition		Length (m)	3230	GIS/NFCDD	164	Sustain	Long	0.2	0.106203143	0.132753928	0.159304714	0.254887543		0	0	0	
	Natural Cliff (check elements)	113FAS3351009C01	Length (km)	0.46	GIS/NFCDD	1166	Maintain	Short to long term	30	0.016090325	0.020112907	0.024135488	0.038616781		0	0	0	
	CC 0.1m addition and 5m widening		Length (m)	460	GIS/NFCDD	2186	Sustain	Short	1	1.005375587	1.005375587	1.206450705	1.930321128		0.23	0	0	
	CC 0.2m addition		Length (m)	460	GIS/NFCDD	559	Sustain	Medium	0.5	0.128521473	0.160651842	0.19278221	0.308451536		0	0	0	
	CC 0.4m addition		Length (m)	460	GIS/NFCDD	1118	Sustain	Long	0.2	0.102817179	0.128521473	0.154225768	0.246761229		0	0	0	
	Natural Cliff (check elements)	113FAS3351009C02	Length (km)	1.1	GIS/NFCDD	1166	Maintain	Short to long term	30	0.038476865	0.048096081	0.057715297	0.092344476		0	0	0	
	CC 0.3m addition and 5m widening		Length (m)	1100	GIS/NFCDD	2352	Sustain	Short	1	2.587565402	2.587565402	3.105078483	4.968125572		0.55	0	0	
	CC 0.2m addition		Length (m)	1100	GIS/NFCDD	559	Sustain	Medium	0.5	0.307333958	0.384167447	0.461000937	0.737601499		0	0	0	
	CC 0.4m addition		Length (m)	1100	GIS/NFCDD	1118	Sustain	Long	0.2	0.245867166	0.307333958	0.368800749	0.590081199		0	0	0	
	Wall + Revetment	113FAS3351009C03	Length (km)	0.35	GIS/NFCDD	5830	Maintain	Short to long term	30	0.061213194	0.076516493	0.091819791	0.146911666		0	0	0	
	CC 0.3m addition		Length (m)	350	GIS/NFCDD	559	Sustain	Long	0.2	0.039115231	0.048894039	0.058672846	0.093876554		0	0	0	
	Toe protection (rock armour)		Length (m)	700	GIS/NFCDD	735	Sustain	Short	1	0.51419083	0.642738537	0.771286245	1.234057992		0.35	0	0	
													11.27651088	TOTAL				



FCRMU approach	Asset Type	Asset reference	Parameter	Amount	Reference	Rate (£/parameter)	HLO	Epoch	Epochal discount factor	Basic construction cost (£M)	Plus Tidal/urban uplift (25% each) cost (£M)	Plus PAR, design and supervision (20%) cost (£M)	Plus Optimism bias 60% cost (£M)		FOOTPRINT IMPACT (Ha)			
RESPONSE OPTIONS																SPA/SSSI	SAC	None
Short Term Option 3. A combination of both options 1 and 2. Medium to Long Term Option 1. 0.5%AEP SoP.	Earth Embankment	1131801130118R02	Length (km)	0.41	GIS/NFCDD	1166	Maintain	Short to long term	30	0.014341377	0.017926721	0.021512065	0.034419305		0	0	0	
	Earth Embankment	1131801130117R01	Length (km)	0.36	GIS/NFCDD	1166	Maintain	Short to long term	30	0.012592428	0.015740536	0.018888643	0.030221828		0	0	0	
	Canal embankment	1131801130104L01	Length (km)	0.83	GIS/NFCDD	1166	Maintain	Short to long term	30	0.029032543	0.036290679	0.043548815	0.069678104		0	0	0	
	Earth Bank	1131801130106L01	Length (km)	0.18	GIS/NFCDD	1166	Maintain	Short to long term	30	0.006296214	0.007870268	0.009444321	0.015110914		0	0	0	
	Canal embankment	1131801130105L01	Length (km)	0.36	GIS/NFCDD	1166	Maintain	Short to long term	30	0.012592428	0.015740536	0.018888643	0.030221828		0	0	0	
	Earth Embankment With Screeded Stone Rev	1131801130102L01	Length (km)	0.04	GIS/NFCDD	5830	Maintain	Short to long term	30	0.006995794	0.008744742	0.01049369	0.016789905		0	0	0	
	No addition		Length (m)	40	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0		0	0	0	
	Canal embankment	1131801130103L01	Length (km)	0.15	GIS/NFCDD	1166	Maintain	Short to long term	30	0.005246845	0.006558557	0.007870268	0.012592428		0	0	0	
	Maintained Channel	1131801160106L01	Length (km)	0.78	GIS/NFCDD	1166	Maintain	Short to long term	30	0.027283595	0.034104494	0.040925393	0.065480628		0	0	0	
	Earth Embankment	1131801130102R01	Length (km)	0.34	GIS/NFCDD	1166	Maintain	Short to long term	30	0.011892849	0.014866061	0.017839274	0.028542838		0	0	0	
	No addition		Length (m)	340	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0		0	0	0	
	Earth Embankment	1131801000303R01	Length (km)	0.59	GIS/NFCDD	1166	Maintain	Short to long term	30	0.020637591	0.025796989	0.030956387	0.049530219		0	0	0	
	No addition		Length (m)	590	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0		0	0	0	
	Canal Embankment	1131801000302R01	Length (km)	3.23	GIS/NFCDD	1166	Maintain	Short to long term	30	0.112982067	0.141227583	0.1694731	0.27115696		0	0	0	
	CC 0.2m addition		Length (m)	3230	GIS/NFCDD	164	Sustain	Long	0.2	0.106203143	0.132753928	0.159304714	0.254887543		0.646	0	0	
	Natural Cliff (check elements)	113FAS3351009C01	Length (km)	0.46	GIS/NFCDD	1166	Maintain	Short to long term	30	0.016090325	0.020112907	0.024135488	0.038616781		0	0	0	
	CC 0.2m addition and 5m widening		Length (m)	460	GIS/NFCDD	2352	Sustain	Short	1	1.082072805	1.082072805	1.298487366	2.077579785		0.23	0	0	
	CC 0.2m addition		Length (m)	460	GIS/NFCDD	559	Sustain	Medium	0.5	0.128521473	0.160651842	0.19278221	0.308451536		0	0	0	
	CC 0.4m addition		Length (m)	460	GIS/NFCDD	1118	Sustain	Long	0.2	0.102817179	0.128521473	0.154225768	0.246761229		0	0	0	
	Natural Cliff (check elements)	113FAS3351009C02	Length (km)	1.1	GIS/NFCDD	1166	Maintain	Short to long term	30	0.038476865	0.048096081	0.057715297	0.092344476		0	0	0	
	CC 0.4m addition and 5m widening		Length (m)	1100	GIS/NFCDD	2519	Sustain	Short	1	2.770971791	2.770971791	3.32516615	5.320265839		0.55	0	0	
	CC 0.2m addition		Length (m)	1100	GIS/NFCDD	559	Sustain	Medium	0.5	0.307333958	0.384167447	0.461000937	0.737601499		0	0	0	
	CC 0.4m addition		Length (m)	1100	GIS/NFCDD	1118	Sustain	Long	0.2	0.245867166	0.307333958	0.368800749	0.590081199		0	0	0	
	Wall + Revetment	113FAS3351009C03	Length (km)	0.35	GIS/NFCDD	5830	Maintain	Short to long term	30	0.061213194	0.076516493	0.091819791	0.146911666		0	0	0	
	CC 0.4m addition		Length (m)	350	GIS/NFCDD	1118	Sustain	Long	0.2	0.078230462	0.097788077	0.117345693	0.187753109		0	0	0	
	Toe protection (rock armour)		Length (m)	700	GIS/NFCDD	735	Sustain	Short	1	0.51419083	0.642738537	0.771286245	1.234057992		0.35	0	0	
														11.85905761	TOTAL			
Short Term Option 3. A combination of both options 1 and 2. Medium to Long Term Option 1. 0.1%AEP SoP.	Earth Embankment	1131801130118R02	Length (km)	0.41	GIS/NFCDD	1166	Maintain	Short to long term	30	0.014341377	0.017926721	0.021512065	0.034419305		0	0	0	
	Earth Embankment	1131801130117R01	Length (km)	0.36	GIS/NFCDD	1166	Maintain	Short to long term	30	0.012592428	0.015740536	0.018888643	0.030221828		0	0	0	
	Canal embankment	1131801130104L01	Length (km)	0.83	GIS/NFCDD	1166	Maintain	Short to long term	30	0.029032543	0.036290679	0.043548815	0.069678104		0	0	0	
	Earth Bank	1131801130106L01	Length (km)	0.18	GIS/NFCDD	1166	Maintain	Short to long term	30	0.006296214	0.007870268	0.009444321	0.015110914		0	0	0	
	Canal embankment	1131801130105L01	Length (km)	0.36	GIS/NFCDD	1166	Maintain	Short to long term	30	0.012592428	0.015740536	0.018888643	0.030221828		0	0	0	
	Earth Embankment With Screeded Stone Rev	1131801130102L01	Length (km)	0.04	GIS/NFCDD	5830	Maintain	Short to long term	30	0.006995794	0.008744742	0.01049369	0.016789905		0	0	0	
	No addition		Length (m)	40	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0		0	0	0	
	Canal embankment	1131801130103L01	Length (km)	0.15	GIS/NFCDD	1166	Maintain	Short to long term	30	0.005246845	0.006558557	0.007870268	0.012592428		0	0	0	
	Maintained Channel	1131801160106L01	Length (km)	0.78	GIS/NFCDD	1166	Maintain	Short to long term	30	0.027283595	0.034104494	0.040925393	0.065480628		0	0	0	
	Earth Embankment	1131801130102R01	Length (km)	0.34	GIS/NFCDD	1166	Maintain	Short to long term	30	0.011892849	0.014866061	0.017839274	0.028542838		0	0	0	
	No addition		Length (m)	340	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0		0	0	0	
	Earth Embankment	1131801000303R01	Length (km)	0.59	GIS/NFCDD	1166	Maintain	Short to long term	30	0.020637591	0.025796989	0.030956387	0.049530219		0	0	0	
	CC 0.3m addition		Length (m)	590	GIS/NFCDD	164	Sustain	Long	0.2	0.019399336	0.02424917	0.029099004	0.046558406		0.118	0	0	
	Canal Embankment	1131801000302R01	Length (km)	3.23	GIS/NFCDD	1166	Maintain	Short to long term	30	0.112982067	0.141227583	0.1694731	0.27115696		0	0	0	
	CC 0.3m addition		Length (m)	3230	GIS/NFCDD	164	Sustain	Long	0.2	0.106203143	0.132753928	0.159304714	0.254887543		0.646	0	0	
	Natural Cliff (check elements)	113FAS3351009C01	Length (km)	0.46	GIS/NFCDD	1166	Maintain	Short to long term	30	0.016090325	0.020112907	0.024135488	0.038616781		0	0	0	
	CC 0.3m addition and 5m widening		Length (m)	460	GIS/NFCDD	2352	Sustain	Short	1	1.082072805	1.082072805	1.298487366	2.077579785		0.23	0	0	
	CC 0.3m addition		Length (m)	460	GIS/NFCDD	559	Sustain	Medium	0.5	0.128521473	0.160651842	0.19278221	0.308451536		0	0	0	
	CC 0.4m addition		Length (m)	460	GIS/NFCDD	1118	Sustain	Long	0.2	0.102817179	0.128521473	0.154225768	0.246761229		0	0	0	
	Natural Cliff (check elements)	113FAS3351009C02	Length (km)	1.1	GIS/NFCDD	1166	Maintain	Short to long term	30	0.038476865	0.048096081	0.057715297	0.092344476		0	0	0	
	CC 0.5m addition and 5m widening		Length (m)	1100	GIS/NFCDD	2519	Sustain	Short	1	2.770971791	2.770971791	3.32516615	5.320265839		0.55	0	0	
	CC 0.3m addition		Length (m)	1100	GIS/NFCDD	559	Sustain	Medium	0.5	0.307333958	0.384167447	0.461000937	0.737601499		0	0	0	
	CC 0.4m addition		Length (m)	1100	GIS/NFCDD	1118	Sustain	Long	0.2	0.245867166	0.307333958	0.368800749	0.590081199		0	0	0	
	Wall + Revetment	113FAS3351009C03	Length (km)	0.35	GIS/NFCDD	5830	Maintain	Short to long term	30	0.061213194	0.076516493	0.091819791	0.146911666		0	0	0	
	CC 0.2m addition		Length (m)	350	GIS/NFCDD	559	Sustain	Medium	0.5	0.097788077	0.122235097	0.146682116	0.234691386		0	0	0	
	CC 0.4m addition		Length (m)	350	GIS/NFCDD	1118	Sustain	Long	0.2	0.078230462	0.097788077	0.117345693	0.187753109		0	0	0	
	Toe protection (rock armour)		Length (m)	700	GIS/NFCDD	735	Sustain	Short	1	0.51419083	0.642738537	0.771286245	1.234057992		0.35	0	0	
													12.1403074	TOTAL				

O.12 Kenn Valley



FCRMU approach	Asset Type	Asset reference	Parameter	Amount	Reference	Rate (£/parameter)	HLO	Epoch	Epochal discount factor	Basic construction cost (£M)	Plus Tidal/urban uplift (25% each) cost (£M)	Plus PAR, design and supervision (20%) cost (£M)	Plus Optimism bias 60% cost (£M)		FOOTPRINT IMPACT (Ha)		
RESPONSE OPTIONS															SPA/SSSI	SAC	None
Short Term Option 1. Regulated Tidal Exchange, with a RTE device attached to the existing culvert and the tide flap removed. Dawlish Warren sand spit distal section flattened in 2060. Medium to Long Term Option 1. 2% AEP.	Wall	690/1902/01	Length (km)	0.24	GIS/NFCDD	5830	Maintain	Short to long term	30	0.041974762	0.052468452	0.062962142	0.100739428		0	0	0
	CC 0.1m addition		Length (m)	240	GIS/NFCDD	559	Sustain	Long	0.2	0.026821873	0.033527341	0.040232809	0.064372494		0.048	0	0
	Wall	113FAS3351009C05	Length (km)	0.4	GIS/NFCDD	5830	Maintain	Short to long term	30	0.069957936	0.08744742	0.104936904	0.167899047		0	0	0
	CC 0.2m addition		Length (m)	400	GIS/NFCDD	559	Sustain	Long	0.2	0.044703121	0.055878901	0.067054682	0.107287491		0.08	0	0
	Wall	113FAS3351009C06	Length (km)	0.64	GIS/NFCDD	5830	Maintain	Short to long term	30	0.111932698	0.139915872	0.167899047	0.268638474		0	0	0
	CC 0.6m addition		Length (m)	640	GIS/NFCDD	1118	Sustain	Medium	0.5	0.357624969	0.447031211	0.536437454	0.858299926		0.128	0	0
	CC 0.4m addition		Length (m)	640	GIS/NFCDD	1118	Sustain	Long	0.2	0.143049988	0.178812485	0.214574981	0.34331997		0.128	0	0
	Wall	113FAS3351009C07	Length (km)	0.63	GIS/NFCDD	5830	Maintain	Short to long term	30	0.110183749	0.137729687	0.165275624	0.264440998		0	0	0
	CC 0.3m addition		Length (m)	630	GIS/NFCDD	559	Sustain	Medium	0.5	0.176018539	0.220023174	0.264027809	0.422444495		0.126	0	0
	CC 0.7m addition		Length (m)	630	GIS/NFCDD	1676	Sustain	Long	0.2	0.211222247	0.264027809	0.316833371	0.506933394		0.126	0	0
	Railway embankment	113FAS3351010C01	Length (km)	0.21	GIS/NFCDD	5830	Maintain	Short to long term	30	0.036727916	0.045909896	0.055091875	0.088146999		0	0	0
	CC 0.4m addition		Length (m)	210	GIS/NFCDD	1118	Sustain	Medium	0.5	0.117345693	0.146682116	0.176018539	0.281629663		0.042	0	0
	CC 0.4m addition		Length (m)	210	GIS/NFCDD	1118	Sustain	Long	0.2	0.046938277	0.058672846	0.070407416	0.112651865		0.042	0	0
	Localised embankments to manage flooding to road/properties at Powderham Castle, Kenton and the mill, average 0.75m		Length (m)	300		969	Manage	Short	1	0.29067215	0.29067215	0.34880658	0.558090528		0	0	0.348
	CC addition 0.2m		Length (m)	300		164	Manage	Medium	0.5	0.024660172	0.024660172	0.029592207	0.047347531		0	0	0.348
	CC addition 0.4m		Length (m)	300		329	Manage	Long	0.2	0.019728138	0.019728138	0.023673766	0.037878025		0	0	0.348
	Localised embankment maintenance RTE		Length (km)	0.3		1166	Manage	Short to long term	30	0.01049369	0.01049369	0.012592428	0.020147886				
Short Term Option 1. Regulated Tidal Exchange, with a RTE device attached to the existing culvert and the tide flap removed. Dawlish Warren sand spit distal section flattened in 2060. Medium to Long Term Option 1. 1% AEP.	ST land compensation		Area (Ha)	32	GIS/NFCDD	15000	Manage	Short	1	0.026966783	0.033708479	0.040450175	0.06472028		0	0	0
										0.48	0.48	0.48	0.48		0	0	0
													4.794988494	TOTAL			
													Cost (£K/Ha) for MR				
													37.75575779				
	Wall	690/1902/01	Length (km)	0.24	GIS/NFCDD	5830	Maintain	Short to long term	30	0.041974762	0.052468452	0.062962142	0.100739428		0	0	0
	CC 0.2m addition		Length (m)	240	GIS/NFCDD	559	Sustain	Long	0.2	0.026821873	0.033527341	0.040232809	0.064372494		0.048	0	0
	Wall	113FAS3351009C05	Length (km)	0.4	GIS/NFCDD	5830	Maintain	Short to long term	30	0.069957936	0.08744742	0.104936904	0.167899047		0	0	0
	CC 0.3m addition		Length (m)	400	GIS/NFCDD	559	Sustain	Long	0.2	0.044703121	0.055878901	0.067054682	0.107287491		0.08	0	0
	Wall	113FAS3351009C06	Length (km)	0.64	GIS/NFCDD	5830	Maintain	Short to long term	30	0.111932698	0.139915872	0.167899047	0.268638474		0	0	0
	CC 0.6m addition		Length (m)	640	GIS/NFCDD	1118	Sustain	Medium	0.5	0.357624969	0.447031211	0.536437454	0.858299926		0.128	0	0
	CC 0.5m addition		Length (m)	640	GIS/NFCDD	1118	Sustain	Long	0.2	0.143049988	0.178812485	0.214574981	0.34331997		0.128	0	0
	Wall	113FAS3351009C07	Length (km)	0.63	GIS/NFCDD	5830	Maintain	Short to long term	30	0.110183749	0.137729687	0.165275624	0.264440998		0	0	0
	CC 0.3m addition		Length (m)	630	GIS/NFCDD	559	Sustain	Medium	0.5	0.176018539	0.220023174	0.264027809	0.422444495		0.126	0	0
	CC 0.5m addition		Length (m)	630	GIS/NFCDD	1118	Sustain	Long	0.2	0.140814832	0.176018539	0.211222247	0.337955596		0.126	0	0
	Railway embankment	113FAS3351010C01	Length (km)	0.21	GIS/NFCDD	5830	Maintain	Short to long term	30	0.036727916	0.045909896	0.055091875	0.088146999		0	0	0
Short Term Option 1. Regulated Tidal Exchange, with a RTE device attached to the existing culvert and the tide flap removed. Dawlish Warren sand spit distal section flattened in 2060. Medium to Long Term Option 1. 1% AEP.	CC 0.4m addition		Length (m)	210	GIS/NFCDD	1118	Sustain	Medium	0.5	0.117345693	0.146682116	0.176018539	0.281629663		0.042	0	0
	CC 0.5m addition		Length (m)	210	GIS/NFCDD	1118	Sustain	Long	0.2	0.046938277	0.058672846	0.070407416	0.112651865		0.042	0	0
	Localised embankments to manage flooding to road/properties at Powderham Castle, Kenton and the mill, average 0.75m		Length (m)	400	GIS/NFCDD	969	Manage	Short	1	0.387562867	0.387562867	0.46507544	0.744120704		0	0	0.5
	CC addition 0.2m		Length (m)	400		164	Manage	Medium	0.5	0.03288023	0.03288023	0.039456276	0.063130041		0	0	0.464
	CC addition 0.4m		Length (m)	400		329	Manage	Long	0.2	0.026304184	0.026304184	0.031565021	0.050504033		0	0	0.464
	Localised embankment maintenance RTE		Length (km)	0.4		1166	Manage	Short to long term	30	0.013991587	0.013991587	0.016789905	0.026863847				
	ST land compensation		Area (Ha)	32	GIS/NFCDD	15000	Manage	Short	1	0.026966783	0.033708479	0.040450175	0.06472028		0	0	0
										0.48	0.48	0.48	0.48		0	0	0
													4.847165353	TOTAL			
													Cost (£K/Ha) for MR				
													44.66684081				



FCRMU approach	Asset Type	Asset reference	Parameter	Amount	Reference	Rate (£/parameter)	HLO	Epoch	Epochal discount factor	Basic construction cost (£M)	Plus Tidal/urban uplift (25% each) cost (£M)	Plus PAR, design and supervision (20%) cost (£M)	Plus Optimism bias 60% cost (£M)		FOOTPRINT IMPACT (Ha)			
RESPONSE OPTIONS																SPA/SSSI	SAC	None
Short Term Option 1. Regulated Tidal Exchange, with a RTE device attached to the existing culvert and the tide flap removed. Dawlish Warren sand spit distal section flattened in 2060. Medium to Long Term Option 1. 0.5% AEP.	Wall	690/1902/01	Length (km)	0.24	GIS/NFCDD	5830	Maintain	Short to long term	30	0.041974762	0.052468452	0.062962142	0.100739428		0	0	0	
	CC 0.3m addition		Length (m)	240	GIS/NFCDD	559	Sustain	Long	0.2	0.026821873	0.033527341	0.040232809	0.064372494		0.048	0	0	
	Wall	113FAS3351009C05	Length (km)	0.4	GIS/NFCDD	5830	Maintain	Short to long term	30	0.069957936	0.08744742	0.104936904	0.167899047		0	0	0	
	CC 0.4m addition		Length (m)	400	GIS/NFCDD	1118	Sustain	Long	0.2	0.089406242	0.111757803	0.134109363	0.214574981		0.08	0	0	
	Wall	113FAS3351009C06	Length (km)	0.64	GIS/NFCDD	5830	Maintain	Short to long term	30	0.111932698	0.139915872	0.167899047	0.268638474		0	0	0	
	CC 0.7m addition		Length (m)	640	GIS/NFCDD	1676	Sustain	Medium	0.5	0.536437454	0.670546817	0.80465618	1.287449889		0.128	0	0	
	CC 0.5m addition		Length (m)	640	GIS/NFCDD	1118	Sustain	Long	0.2	0.143049988	0.178812485	0.214574981	0.34331997		0.128	0	0	
	Wall	113FAS3351009C07	Length (km)	0.63	GIS/NFCDD	5830	Maintain	Short to long term	30	0.110183749	0.137729687	0.165275624	0.264440998		0	0	0	
	CC 0.4m addition		Length (m)	630	GIS/NFCDD	1118	Sustain	Medium	0.5	0.352037079	0.440046349	0.528055618	0.84488899		0.126	0	0	
	CC 0.5m addition		Length (m)	630	GIS/NFCDD	1118	Sustain	Long	0.2	0.140814832	0.176018539	0.211222247	0.337955596		0.126	0	0	
	Railway embankment	113FAS3351010C01	Length (km)	0.21	GIS/NFCDD	5830	Maintain	Short to long term	30	0.036727916	0.045909896	0.055091875	0.088146999		0	0	0	
	CC 0.5m addition		Length (m)	210	GIS/NFCDD	1118	Sustain	Medium	0.5	0.117345693	0.146682116	0.176018539	0.281629663		0.042	0	0	
	CC 0.5m addition		Length (m)	210	GIS/NFCDD	1118	Sustain	Long	0.2	0.046938277	0.058672846	0.070407416	0.112651865		0.042	0	0	
	Localised embankments to manage flooding to road/properties at Powderham Castle, Kenton and the mill, average 1m			Length (m)	400	GIS/NFCDD	1292	Manage	Short	1	0.516750489	0.516750489	0.620100587	0.992160939		0	0	0.56
	CC addition 0.2m			Length (m)	400		164	Manage	Medium	0.5	0.03288023	0.03288023	0.039456276	0.063130041		0	0	0.464
	CC addition 0.4m			Length (m)	400		329	Manage	Long	0.2	0.026304184	0.026304184	0.031565021	0.050504033		0	0	0.464
	Localised embankment maintenance			Length (km)	0.4		1166	Manage	Short to long term	30	0.013991587	0.013991587	0.016789905	0.026863847				
	RTE			Number	1	GIS/NFCDD	26967	Manage	Short	1	0.026966783	0.033708479	0.040450175	0.06472028		0	0	0
	ST land compensation			Area (Ha)	32	GIS/NFCDD	15000	Manage	Short	1	0.48	0.48	0.48	0.48		0	0	0
														6.054087536	TOTAL			
														Cost (£K/ha) for MR				
													52.41809814					
Short Term Option 1. Regulated Tidal Exchange, with a RTE device attached to the existing culvert and the tide flap removed. Dawlish Warren sand spit distal section flattened in 2060. Medium to Long Term Option 1. 0.1% AEP.	Wall	690/1902/01	Length (km)	0.24	GIS/NFCDD	5830	Maintain	Short to long term	30	0.041974762	0.052468452	0.062962142	0.100739428		0	0	0	
	CC 0.3m addition		Length (m)	240	GIS/NFCDD	559	Sustain	Long	0.2	0.026821873	0.033527341	0.040232809	0.064372494		0.048	0	0	
	Wall	113FAS3351009C05	Length (km)	0.4	GIS/NFCDD	5830	Maintain	Short to long term	30	0.069957936	0.08744742	0.104936904	0.167899047		0	0	0	
	CC 0.4m addition		Length (m)	400	GIS/NFCDD	1118	Sustain	Long	0.2	0.089406242	0.111757803	0.134109363	0.214574981		0.08	0	0	
	Wall	113FAS3351009C06	Length (km)	0.64	GIS/NFCDD	5830	Maintain	Short to long term	30	0.111932698	0.139915872	0.167899047	0.268638474		0	0	0	
	CC 0.7m addition		Length (m)	640	GIS/NFCDD	1676	Sustain	Medium	0.5	0.536437454	0.670546817	0.80465618	1.287449889		0.128	0	0	
	CC 0.5m addition		Length (m)	640	GIS/NFCDD	1118	Sustain	Long	0.2	0.143049988	0.178812485	0.214574981	0.34331997		0.128	0	0	
	Wall	113FAS3351009C07	Length (km)	0.63	GIS/NFCDD	5830	Maintain	Short to long term	30	0.110183749	0.137729687	0.165275624	0.264440998		0	0	0	
	CC 0.4m addition		Length (m)	630	GIS/NFCDD	1118	Sustain	Medium	0.5	0.352037079	0.440046349	0.528055618	0.84488899		0.126	0	0	
	CC 0.5m addition		Length (m)	630	GIS/NFCDD	1118	Sustain	Long	0.2	0.140814832	0.176018539	0.211222247	0.337955596		0.126	0	0	
	Railway embankment	113FAS3351010C01	Length (km)	0.21	GIS/NFCDD	5830	Maintain	Short to long term	30	0.036727916	0.045909896	0.055091875	0.088146999		0	0	0	
	CC 0.5m addition		Length (m)	210	GIS/NFCDD	1118	Sustain	Medium	0.5	0.117345693	0.146682116	0.176018539	0.281629663		0.042	0	0	
	CC 0.5m addition		Length (m)	210	GIS/NFCDD	1118	Sustain	Long	0.2	0.046938277	0.058672846	0.070407416	0.112651865		0.042	0	0	
	Localised embankments to manage flooding to road/properties at Powderham Castle, Kenton and the mill, average 1.25m			Length (m)	400	GIS/NFCDD	1590	Manage	Short	1	0.63591354	0.63591354	0.763096248	1.220953996		0	0	0.62
	CC addition 0.2m			Length (m)	400		164	Manage	Medium	0.5	0.03288023	0.03288023	0.039456276	0.063130041		0	0	0.464
	CC addition 0.4m			Length (m)	400		329	Manage	Long	0.2	0.026304184	0.026304184	0.031565021	0.050504033		0	0	0.464
	Localised embankment maintenance			Length (km)	0.4		1166	Manage	Short to long term	30	0.013991587	0.013991587	0.016789905	0.026863847				
	RTE			Number	1	GIS/NFCDD	26967	Manage	Short	1	0.026966783	0.033708479	0.040450175	0.06472028		0	0	0
	ST land compensation			Area (Ha)	32	GIS/NFCDD	15000	Manage	Short	1	0.48	0.48	0.48	0.48		0	0	0
														6.282880593	TOTAL			
														Cost (£K/ha) for MR				
													59.56788119					

O.13 Starcross



FCRMU approach	Asset Type	Asset reference	Parameter	Amount	Reference	Rate (£/parameter)	HLO	Epoch	Epochal discount factor	Basic construction cost (£M)	Plus Tidal/urban uplift (25% each) cost (£M)	Plus PAR, design and supervision (20%) cost (£M)	Plus Optimism bias 60% cost (£M)		FOOTPRINT IMPACT (Ha)		
RESPONSE OPTIONS															SPA/SSSI	SAC	None
Short Term Option 1. Vertical or wave recurve wall raising of up to 0.5m along the harbour walls. Dawlish Warren sand spit distal section flattened in 2060. Medium to Long Term Option 1. Vertical or wave recurve wall raising of between 0-1.5m in the medium to long term. Further raising of the short term Cockwood Harbour works of between 0-1m. 2%AEP SoP.	Railway embankment	113FAS3351010C01	Length (km)	0.96	GIS/NFCDD	5830	Maintain	Short to long term	30	0.167899047	0.209873808	0.25184857	0.402957712		0	0	0
	CC 0.9m addition		Length (m)	960	GIS/NFCDD	667	Improve	Medium	0.5	0.320127515	0.500199243	0.600239091	0.960382546		0.2592	0	0
	CC 0.4m addition		Length (m)	960	GIS/NFCDD	333	Sustain	Long	0.2	0.064025503	0.080031879	0.096038255	0.153661207		0.3744	0	0
	Railway embankment	113FAS3351011C01	Length (km)	0.61	GIS/NFCDD	5830	Maintain	Short to long term	30	0.106685852	0.133357316	0.160028779	0.256046046		0	0	0
	CC 0.6m addition		Length (m)	610	GIS/NFCDD	333	Sustain	Medium	0.5	0.101707179	0.127133974	0.152560769	0.24409723		0.1098	0	0
	CC 0.4m addition		Length (m)	610	GIS/NFCDD	333	Sustain	Long	0.2	0.040682872	0.05085359	0.061024308	0.097638892		0.183	0	0
	masonry wall	113FAS3351011C04	Length (km)	0.13	GIS/NFCDD	5830	Maintain	Short to long term	30	0.022736329	0.028420412	0.034104494	0.05456719		0	0	0
	No addition		Length (m)	130	GIS/NFCDD	0	Improve	Short	1	0	0	0	0		0	0	0
	CC 0.3m addition		Length (m)	130	GIS/NFCDD	559	Sustain	Medium	0.5	0.036321286	0.045401607	0.054481929	0.087171086		0	0	0.026
	CC 0.4m addition		Length (m)	130	GIS/NFCDD	1118	Sustain	Long	0.2	0.029057029	0.036321286	0.043585543	0.069736869		0	0	0.026
	masonry wall	113FAS3351011C05	Length (km)	0.11	GIS/NFCDD	5830	Maintain	Short to long term	30	0.019238432	0.024048041	0.028857649	0.046172238		0	0	0
	No addition		Length (m)	110	GIS/NFCDD	0	Improve	Short	1	0	0	0	0		0	0	0
	CC 0.3m addition		Length (m)	110	GIS/NFCDD	559	Sustain	Medium	0.5	0.030733396	0.038416745	0.046100094	0.07376015		0	0	0.022
	CC 0.4m addition		Length (m)	110	GIS/NFCDD	1118	Sustain	Long	0.2	0.024586717	0.030733396	0.036880075	0.05900812		0	0	0.022
	masonry wall	113FAS3351011C03	Length (km)	0.08	GIS/NFCDD	5830	Maintain	Short to long term	30	0.013991587	0.017489484	0.020987381	0.033579809		0	0	0
	No addition		Length (m)	80	GIS/NFCDD	0	Improve	Short	1	0	0	0	0		0	0	0
	CC 0.3m addition		Length (m)	80	GIS/NFCDD	559	Sustain	Medium	0.5	0.022351561	0.027939451	0.033527341	0.053643745		0	0	0.016
	CC 0.4m addition		Length (m)	80	GIS/NFCDD	1118	Sustain	Long	0.2	0.017881248	0.022351561	0.026821873	0.042914996		0	0	0.016
	embankment	113FAS3351011C02	Length (km)	0.07	GIS/NFCDD	1166	Maintain	Short to long term	30	0.002448528	0.00306066	0.003672792	0.005876467		0	0	0
	CC 0.2m addition		Length (m)	70	GIS/NFCDD	164	Improve	Short	1	0.01150808	0.017981376	0.021577651	0.034524241		0	0	0.014
	CC 0.3m addition		Length (m)	70	GIS/NFCDD	164	Sustain	Medium	0.5	0.00575404	0.00719255	0.00863106	0.013809697		0	0	0.014
	CC 0.4m addition		Length (m)	70	GIS/NFCDD	329	Sustain	Long	0.2	0.004603232	0.00575404	0.006904848	0.011047757		0	0	0.014
	embankment	113FAS3351011C06	Length (km)	0.07	GIS/NFCDD	1166	Maintain	Short to long term	30	0.002448528	0.00306066	0.003672792	0.005876467		0	0	0
	CC 0.2m addition		Length (m)	70	GIS/NFCDD	164	Improve	Short	1	0.01150808	0.017981376	0.021577651	0.034524241		0	0	0.014
	CC 0.3m addition		Length (m)	70	GIS/NFCDD	164	Sustain	Medium	0.5	0.00575404	0.00719255	0.00863106	0.013809697		0	0	0.014
	CC 0.4m addition		Length (m)	70	GIS/NFCDD	329	Sustain	Long	0.2	0.004603232	0.00575404	0.006904848	0.011047757		0	0	0.014
	Railway embankment	113FAS3351012C01	Length (km)	0.28	GIS/NFCDD	5830	Maintain	Short to long term	30	0.048970555	0.061213194	0.073455833	0.117529333		0	0	0
	No addition		Length (m)	280	GIS/NFCDD	0	Sustain	Medium	0.5	0	0	0	0		0	0	0
	No addition		Length (m)	280	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0		0	0	0
													2.883383494	TOTAL			
Short Term Option 1. Vertical or wave recurve wall raising of up to 0.5m along the harbour walls. Dawlish Warren sand spit distal section flattened in 2060. Medium to Long Term Option 1. Vertical or wave recurve wall raising of between 0-1.5m in the medium to long term. Further raising of the short term Cockwood Harbour works of between 0-1m. 1%AEP SoP.	Railway embankment	113FAS3351010C01	Length (km)	0.96	GIS/NFCDD	5830	Maintain	Short to long term	30	0.167899047	0.209873808	0.25184857	0.402957712		0	0	0
	CC 0.2m addition		Length (m)	960	GIS/NFCDD	167	Improve	Short	1	0.160063758	0.250099621	0.300119546	0.480191273		0.0576	0	0
	CC 0.8m addition		Length (m)	960	GIS/NFCDD	500	Improve	Medium	0.5	0.240095637	0.375149432	0.450179319	0.72028691		0.288	0	0
	CC 0.4m addition		Length (m)	960	GIS/NFCDD	333	Sustain	Long	0.2	0.064025503	0.080031879	0.096038255	0.153661207		0.4032	0	0
	Railway embankment	113FAS3351011C01	Length (km)	0.61	GIS/NFCDD	5830	Maintain	Short to long term	30	0.106685852	0.133357316	0.160028779	0.256046046		0	0	0
	CC 0.7m addition		Length (m)	610	GIS/NFCDD	500	Sustain	Medium	0.5	0.152560769	0.190700961	0.228841154	0.366145846		0.1281	0	0
	CC 0.4m addition		Length (m)	610	GIS/NFCDD	333	Sustain	Long	0.2	0.040682872	0.05085359	0.061024308	0.097638892		0.2379	0	0
	masonry wall	113FAS3351011C04	Length (km)	0.13	GIS/NFCDD	5830	Maintain	Short to long term	30	0.022736329	0.028420412	0.034104494	0.05456719		0	0	0
	No addition		Length (m)	130	GIS/NFCDD	0	Improve	Short	1	0	0	0	0		0	0	0.026
	CC 0.4m addition		Length (m)	130	GIS/NFCDD	1118	Sustain	Medium	0.5	0.072642572	0.090803215	0.108963858	0.174342172		0	0	0.026
	CC 0.4m addition		Length (m)	130	GIS/NFCDD	1118	Sustain	Long	0.2	0.029057029	0.036321286	0.043585543	0.069736869		0	0	0
	masonry wall	113FAS3351011C05	Length (km)	0.11	GIS/NFCDD	5830	Maintain	Short to long term	30	0.019238432	0.024048041	0.028857649	0.046172238		0	0	0
	CC 0.1m addition		Length (m)	110	GIS/NFCDD	559	Improve	Short	1	0.061466792	0.096041862	0.115250234	0.184400375		0	0	0.022
	CC 0.4m addition		Length (m)	110	GIS/NFCDD	1118	Sustain	Medium	0.5	0.061466792	0.076833489	0.092200187	0.1475203		0	0	0.022
	CC 0.3m addition		Length (m)	110	GIS/NFCDD	559	Sustain	Long	0.2	0.012293358	0.015366698	0.018440037	0.02950406		0	0	0
	masonry wall	113FAS3351011C03	Length (km)	0.08	GIS/NFCDD	5830	Maintain	Short to long term	30	0.013991587	0.017489484	0.020987381	0.033579809		0	0	0
	CC 0.1m addition		Length (m)	80	GIS/NFCDD	559	Improve	Short	1	0.044703121	0.069848627	0.083818352	0.134109363		0	0	0.016
	CC 0.4m addition		Length (m)	80	GIS/NFCDD	1118	Sustain	Medium	0.5	0.044703121	0.055878901	0.067054682	0.107287491		0	0	0.016
	CC 0.3m addition		Length (m)	80	GIS/NFCDD	559	Sustain	Long	0.2	0.008940624	0.01117578	0.013410936	0.021457498		0	0	0
	embankment	113FAS3351011C02	Length (km)	0.07	GIS/NFCDD	1166	Maintain	Short to long term	30	0.002448528	0.00306066	0.003672792	0.005876467		0	0	0
	CC 0.3m addition		Length (m)	70	GIS/NFCDD	164	Improve	Short	1	0.01150808	0.017981376	0.021577651	0.034524241		0	0	0.014
	CC 0.2m addition		Length (m)	70	GIS/NFCDD	164	Sustain	Medium	0.5	0.00575404	0.00719255	0.00863106	0.013809697		0	0	0.014
	CC 0.5m addition		Length (m)	70	GIS/NFCDD	329	Sustain	Long	0.2	0.004603232	0.00575404	0.006904848	0.011047757		0	0	0.014
	embankment	113FAS3351011C06	Length (km)	0.07	GIS/NFCDD	1166	Maintain	Short to long term	30	0.002448528	0.00306066	0.003672792	0.005876467		0	0	0
	CC 0.3m addition		Length (m)	70	GIS/NFCDD	164	Improve	Short	1	0.01150808	0.017981376	0.021577651	0.034524241		0	0	0.014
	CC 0.2m addition		Length (m)	70	GIS/NFCDD	164	Sustain	Medium	0.5	0.00575404	0.00719255	0.00863106	0.013809697		0	0	0.014
	CC 0.5m addition		Length (m)	70	GIS/NFCDD	329	Sustain	Long	0.2	0.004603232	0.00575404	0.006904848	0.011047757		0	0	0.014
	Railway embankment	113FAS3351012C01	Length (km)	0.28	GIS/NFCDD	5830	Maintain	Short to long term	30	0.048970555	0.061213194	0.073455833	0.117529333		0	0	0
	No addition		Length (m)	280	GIS/NFCDD	0	Sustain	Medium	0.5	0	0	0	0		0	0	0
	No addition		Length (m)	280	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0		0	0	0
													3.727650907	TOTAL			



FCRMU approach	Asset Type	Asset reference	Parameter	Amount	Reference	Rate (£/parameter)	HLO	Epoch	Epochal discount factor	Basic construction cost (£M)	Plus Tidal/urban uplift (25% each) cost (£M)	Plus PAR, design and supervision (20%) cost (£M)	Plus Optimism bias 60% cost (£M)		FOOTPRINT IMPACT (Ha)			
RESPONSE OPTIONS																SPA/SSSI	SAC	None
Short Term Option 1. Vertical or wave recurve wall raising of up to 0.5m along the harbour walls. Dawlish Warren sand spit distal section flattened in 2060. Medium to Long Term Option 1. Vertical or wave recurve wall raising of between 0-1.5m in the medium to long term. Further raising of the short term Cockwood Harbour works of between 0-1m. 0.5%AEP SoP.	Railway embankment	113FAS3351010C01	Length (km)	0.96	GIS/NFCDD	5830	Maintain	Short to long term	30	0.167899047	0.209873808	0.25184857	0.402957712		0	0	0	
	CC 0.3m addition		Length (m)	960	GIS/NFCDD	167	Improve	Short	1	0.160063758	0.250099621	0.300119546	0.480191273		0.0864	0	0	
	CC 0.8m addition		Length (m)	960	GIS/NFCDD	500	Improve	Medium	0.5	0.240095637	0.375149432	0.450179319	0.72028691		0.3168	0	0	
	CC 0.4m addition		Length (m)	960	GIS/NFCDD	333	Sustain	Long	0.2	0.064025503	0.080031879	0.096038255	0.153661207		0.432	0	0	
	Railway embankment	113FAS3351011C01	Length (km)	0.61	GIS/NFCDD	5830	Maintain	Short to long term	30	0.106685852	0.133357316	0.160028779	0.256046046		0	0	0	
	CC 0.8m addition		Length (m)	610	GIS/NFCDD	500	Sustain	Medium	0.5	0.152560769	0.190700961	0.228841154	0.366145846		0.1464	0	0	
	CC 0.4m addition		Length (m)	610	GIS/NFCDD	333	Sustain	Long	0.2	0.040682872	0.05085359	0.061024308	0.097638892		0.2196	0	0	
	masonry wall	113FAS3351011C04	Length (km)	0.13	GIS/NFCDD	5830	Maintain	Short to long term	30	0.022736329	0.028420412	0.034104494	0.05456719		0	0	0	
	CC 0.1m addition		Length (m)	130	GIS/NFCDD	559	Improve	Short	1	0.072642572	0.113504019	0.136204822	0.217927716		0	0	0.026	
	CC 0.3m addition		Length (m)	130	GIS/NFCDD	1118	Sustain	Medium	0.5	0.072642572	0.090803215	0.108963858	0.174342172		0	0	0.026	
	CC 0.5m addition		Length (m)	130	GIS/NFCDD	1118	Sustain	Long	0.2	0.029057029	0.036321286	0.043585543	0.069736869		0	0	0	
	masonry wall	113FAS3351011C05	Length (km)	0.11	GIS/NFCDD	5830	Maintain	Short to long term	30	0.019238432	0.024048041	0.028857649	0.046172238		0	0	0	
	CC 0.1m addition		Length (m)	110	GIS/NFCDD	559	Improve	Short	1	0.061466792	0.096041862	0.115250234	0.184400375		0	0	0.022	
	CC 0.3m addition		Length (m)	110	GIS/NFCDD	1118	Sustain	Medium	0.5	0.061466792	0.076833489	0.092200187	0.1475203		0	0	0.022	
	CC 0.5m addition		Length (m)	110	GIS/NFCDD	1118	Sustain	Long	0.2	0.024586717	0.030733396	0.036880075	0.05900812		0	0	0	
	masonry wall	113FAS3351011C03	Length (km)	0.08	GIS/NFCDD	5830	Maintain	Short to long term	30	0.013991587	0.017489484	0.020987381	0.033579809		0	0	0	
	CC 0.1m addition		Length (m)	80	GIS/NFCDD	559	Improve	Short	1	0.044703121	0.069848627	0.083818352	0.134109363		0	0	0.016	
	CC 0.3m addition		Length (m)	80	GIS/NFCDD	559	Sustain	Medium	0.5	0.022351561	0.027939451	0.033527341	0.053643745		0	0	0.016	
	CC 0.5m addition		Length (m)	80	GIS/NFCDD	1118	Sustain	Long	0.2	0.017881248	0.022351561	0.026821873	0.042914996		0	0	0	
	embankment	113FAS3351011C02	Length (km)	0.07	GIS/NFCDD	1166	Maintain	Short to long term	30	0.002448528	0.00306066	0.003672792	0.005876467		0	0	0	
	CC 0.3m addition		Length (m)	70	GIS/NFCDD	164	Improve	Short	1	0.01150808	0.017981376	0.021577651	0.034524241		0	0	0.014	
	CC 0.2m addition		Length (m)	70	GIS/NFCDD	164	Sustain	Medium	0.5	0.00575404	0.00719255	0.00863106	0.013809697		0	0	0.014	
	CC 0.5m addition		Length (m)	70	GIS/NFCDD	329	Sustain	Long	0.2	0.004603232	0.00575404	0.006904848	0.011047757		0	0	0.014	
	embankment	113FAS3351011C06	Length (km)	0.07	GIS/NFCDD	1166	Maintain	Short to long term	30	0.002448528	0.00306066	0.003672792	0.005876467		0	0	0	
	CC 0.3m addition		Length (m)	70	GIS/NFCDD	164	Improve	Short	1	0.01150808	0.017981376	0.021577651	0.034524241		0	0	0.014	
	CC 0.3m addition		Length (m)	70	GIS/NFCDD	164	Sustain	Medium	0.5	0.00575404	0.00719255	0.00863106	0.013809697		0	0	0.014	
	CC 0.5m addition		Length (m)	70	GIS/NFCDD	329	Sustain	Long	0.2	0.004603232	0.00575404	0.006904848	0.011047757		0	0	0.014	
	Railway embankment	113FAS3351012C01	Length (km)	0.28	GIS/NFCDD	5830	Maintain	Short to long term	30	0.048970555	0.061213194	0.073455833	0.117529333		0	0	0	
	No addition		Length (m)	280	GIS/NFCDD	0	Sustain	Medium	0.5	0	0	0	0		0	0	0	
	No addition		Length (m)	280	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0		0	0	0	
														3.942896436	TOTAL			
Short Term Option 1. Vertical or wave recurve wall raising of up to 0.5m along the harbour walls. Dawlish Warren sand spit distal section flattened in 2060. Medium to Long Term Option 1. Vertical or wave recurve wall raising of between 0-1.5m in the medium to long term. Further raising of the short term Cockwood Harbour works of between 0-1m. 0.1%AEP SoP.	Railway embankment	113FAS3351010C01	Length (km)	0.96	GIS/NFCDD	5830	Maintain	Short to long term	30	0.167899047	0.209873808	0.25184857	0.402957712		0	0	0	
	CC 0.4m addition		Length (m)	960	GIS/NFCDD	333	Improve	Short	1	0.320127515	0.500199243	0.600239091	0.960382546		0.1152	0	0	
	CC 0.8m addition		Length (m)	960	GIS/NFCDD	500	Improve	Medium	0.5	0.240095637	0.375149432	0.450179319	0.72028691		0.3456	0	0	
	CC 0.3m addition		Length (m)	960	GIS/NFCDD	167	Sustain	Long	0.2	0.032012752	0.040015939	0.048019127	0.076830604		0.432	0	0	
	Railway embankment	113FAS3351011C01	Length (km)	0.61	GIS/NFCDD	5830	Maintain	Short to long term	30	0.106685852	0.133357316	0.160028779	0.256046046		0	0	0	
	CC 0.8m addition		Length (m)	610	GIS/NFCDD	500	Sustain	Medium	0.5	0.152560769	0.190700961	0.228841154	0.366145846		0.1464	0	0	
	CC 0.4m addition		Length (m)	610	GIS/NFCDD	333	Sustain	Long	0.2	0.040682872	0.05085359	0.061024308	0.097638892		0.2196	0	0	
	masonry wall	113FAS3351011C04	Length (km)	0.13	GIS/NFCDD	5830	Maintain	Short to long term	30	0.022736329	0.028420412	0.034104494	0.05456719		0	0	0	
	CC 0.3m addition		Length (m)	130	GIS/NFCDD	559	Improve	Short	1	0.072642572	0.113504019	0.136204822	0.217927716		0	0	0.026	
	CC 0.3m addition		Length (m)	130	GIS/NFCDD	559	Sustain	Medium	0.5	0.036321286	0.045401607	0.054481929	0.087171086		0	0	0.026	
	CC 0.5m addition		Length (m)	130	GIS/NFCDD	1118	Sustain	Long	0.2	0.029057029	0.036321286	0.043585543	0.069736869		0	0	0	
	masonry wall	113FAS3351011C05	Length (km)	0.11	GIS/NFCDD	5830	Maintain	Short to long term	30	0.019238432	0.024048041	0.028857649	0.046172238		0	0	0	
	CC 0.3m addition		Length (m)	110	GIS/NFCDD	559	Improve	Short	1	0.061466792	0.096041862	0.115250234	0.184400375		0	0	0.022	
	CC 0.3m addition		Length (m)	110	GIS/NFCDD	559	Sustain	Medium	0.5	0.030733396	0.038416745	0.046100094	0.07376015		0	0	0.022	
	CC 0.5m addition		Length (m)	110	GIS/NFCDD	1118	Sustain	Long	0.2	0.024586717	0.030733396	0.036880075	0.05900812		0	0	0	
	masonry wall	113FAS3351011C03	Length (km)	0.08	GIS/NFCDD	5830	Maintain	Short to long term	30	0.013991587	0.017489484	0.020987381	0.033579809		0	0	0	
	CC 0.3m addition		Length (m)	80	GIS/NFCDD	559	Improve	Short	1	0.044703121	0.069848627	0.083818352	0.134109363		0	0	0.016	
	CC 0.3m addition		Length (m)	80	GIS/NFCDD	559	Sustain	Medium	0.5	0.022351561	0.027939451	0.033527341	0.053643745		0	0	0.016	
	CC 0.5m addition		Length (m)	80	GIS/NFCDD	1118	Sustain	Long	0.2	0.017881248	0.022351561	0.026821873	0.042914996		0	0	0	
	embankment	113FAS3351011C02	Length (km)	0.07	GIS/NFCDD	1166	Maintain	Short to long term	30	0.002448528	0.00306066	0.003672792	0.005876467		0	0	0	
	CC 0.5m addition		Length (m)	70	GIS/NFCDD	329	Improve	Short	1	0.023016161	0.035962752	0.043155302	0.069048483		0	0	0.014	
	CC 0.3m addition		Length (m)	70	GIS/NFCDD	164	Sustain	Medium	0.5	0.00575404	0.00719255	0.00863106	0.013809697		0	0	0.014	
	CC 0.4m addition		Length (m)	70	GIS/NFCDD	329	Sustain	Long	0.2	0.004603232	0.00575404	0.006904848	0.011047757		0	0	0.014	
	embankment	113FAS3351011C06	Length (km)	0.07	GIS/NFCDD	1166	Maintain	Short to long term	30	0.002448528	0.00306066	0.003672792	0.005876467		0	0	0	
	CC 0.5m addition		Length (m)	70	GIS/NFCDD	329	Improve	Short	1	0.023016161	0.035962752	0.043155302	0.069048483		0	0	0.014	
	CC 0.3m addition		Length (m)	70	GIS/NFCDD	164	Sustain	Medium	0.5	0.00575404	0.00719255	0.00863106	0.013809697		0	0	0.014	
	CC 0.4m addition		Length (m)	70	GIS/NFCDD	329	Sustain	Long	0.2	0.004603232	0.00575404	0.006904848	0.011047757		0	0	0.014	
	Railway embankment	113FAS3351012C01	Length (km)	0.28	GIS/NFCDD	5830	Maintain	Short to long term	30	0.048970555	0.061213194	0.073455833	0.117529333		0	0	0	
	No addition		Length (m)	280	GIS/NFCDD	0	Sustain	Medium	0.5	0	0	0	0		0	0	0	
	No addition		Length (m)	280	GIS/NFCDD	0	Sustain	Long	0.2	0	0	0	0		0	0	0	
														4.254374352	TOTAL			



O.14 Dawlish Warren sand spit and village

FCRMU approach	Asset Type	Asset reference	Parameter	Amount	Reference	Rate (£/parameter)	HLO	Epoch	Epochal discount factor	Basic construction cost (£M)	Plus Tidal/urban uplift (25% each) cost (£M)	Plus PAR, design and supervision (20%) cost (£M)	Plus Optimism bias 60% cost (£M)		FOOTPRINT IMPACT (Ha)		
RESPONSE OPTIONS															SPA/SSSI	SAC	None
Options 3,8,12 Central/distal sections managed realignment, proximal section sustained into future. Ground raising around visitor centre. 2%AEP SoP	Railway embankment	113FAS3351012C01	Length (km)	1.55	GIS/NFCDD	5830	Maintain	Short to long term	30	0.271087002	0.338858753	0.406630503	0.650608805		0	0	0
	Embankment	113FAS3351013C01	Length (km)	0.1	GIS/NFCDD	1166	Maintain	Short to long term	30	0.003497897	0.004372371	0.005246845	0.008394952		0	0	0
	gabions	113FAS3351013C02	Length (km)	0.09	GIS/NFCDD	0	NAI	Short to long term	30	0	0	0	0		0	0	0
	wall	113FAS3351013C03	Length (km)	0.03	GIS/NFCDD	0	NAI	Short to long term	30	0	0	0	0		0	0	0
	gabion wall	113FAS3351013C04	Length (km)	0.18	GIS/NFCDD	0	NAI	Short to long term	30	0	0	0	0		0	0	0
	wall	113FAS3351013C05	Length (km)	0.12	GIS/NFCDD	0	NAI	Short to long term	30	0	0	0	0		0	0	0
	wall	113FAS3351013C06	Length (km)	0.02	GIS/NFCDD	0	NAI	Short to long term	30	0	0	0	0		0	0	0
	gabion revetment	113FAS3351013C07	Length (km)	0.08	GIS/NFCDD	0	NAI	Short to long term	30	0	0	0	0		0	0	0
	Bank	113FAS3351013C09	Length (km)	1.27	GIS/NFCDD	0	NAI	Short to long term	30	0	0	0	0		0	0	0
	Recharge/recycling high end estimate	113FAS3351014C01	Volume (m3)	6450	Conceptual model	23	Maintain	Short	15	2.26	3.525224121	4.230268946	6.768430313		0	0	0
	Natural Cliff	113FBS3351501C01	Length (km)	0.1	GIS/NFCDD	0	Maintain	Short to long term	30	0	0	0	0		0	0	0
	Rock Armour	113FAS3351015C02	Length (km)	0.28	GIS/NFCDD	5830	Maintain	Short to long term	30	0.048970555	0.061213194	0.073455833	0.117529333		0	0	0
	concrete wall	113FAS3351015C01	Length (km)	0.41	GIS/NFCDD	5830	Maintain	Short to long term	30	0.071706884	0.089633606	0.107560327	0.172096523		0	0	0
	Revetment	113FAS3351014C02	Length (km)	0.32	GIS/NFCDD	5830	Maintain	Short to long term	30	0.055966349	0.069957936	0.083949523	0.134319237		0	0	0
	Groyne maintenance		Number	16	GIS/NFCDD	874	Maintain	Short to medium	25	0.34978968	0.4372371	0.52468452	0.839495233		0	0	0
	Groyne reconstruction		Number	8	GIS/NFCDD	13861	Maintain	Short	0.8	0.08870993	0.110887413	0.133064895	0.212903832		0	0	0
	Removal of gabions phase 1 (3-7)	Gabions, based on demolition cost per estimated m3	m3	360	GIS/NFCDD	108	NAI	Short	0.8	0.031065734	0.038832168	0.046598601	0.074557762		0	0	0
	Removal of gabions phase 2 (7-13)	Gabions, based on demolition cost per estimated m3	m3	360	GIS/NFCDD	108	NAI	Short	0.5	0.019416084	0.024270105	0.029124126	0.046598601		0	0	0
	0.1m ground raising around visitor centre		Length (m)	150		129		Short	0.8	0.015502515	0.019378143	0.023253772	0.037206035		0	0.0675	0
	CC 0.25m addition		Length (m)	150		323		Medium	0.5	0.024222679	0.030278349	0.036334019	0.05813443		0	0.0225	0
	CC 0.4m addition		Length (m)	150		646		Long	0.2	0.019378143	0.024222679	0.029067215	0.046507544		0	0.036	0
													9.166782601	TOTAL			
Options 3,8,12 Central/distal sections managed realignment, proximal section sustained into future. Ground raising around visitor centre. 1%AEP SoP.	Railway embankment	113FAS3351012C01	Length (km)	1.55	GIS/NFCDD	5830	Maintain	Short to long term	30	0.271087002	0.338858753	0.406630503	0.650608805		0	0	0
	Embankment	113FAS3351013C01	Length (km)	0.1	GIS/NFCDD	1166	Maintain	Short to long term	30	0.003497897	0.004372371	0.005246845	0.008394952		0	0	0
	gabions	113FAS3351013C02	Length (km)	0.09	GIS/NFCDD	0	NAI	Short to long term	30	0	0	0	0		0	0	0
	wall	113FAS3351013C03	Length (km)	0.03	GIS/NFCDD	0	NAI	Short to long term	30	0	0	0	0		0	0	0
	gabion wall	113FAS3351013C04	Length (km)	0.18	GIS/NFCDD	0	NAI	Short to long term	30	0	0	0	0		0	0	0
	wall	113FAS3351013C05	Length (km)	0.12	GIS/NFCDD	0	NAI	Short to long term	30	0	0	0	0		0	0	0
	wall	113FAS3351013C06	Length (km)	0.02	GIS/NFCDD	0	NAI	Short to long term	30	0	0	0	0		0	0	0
	gabion revetment	113FAS3351013C07	Length (km)	0.08	GIS/NFCDD	0	NAI	Short to long term	30	0	0	0	0		0	0	0
	Bank	113FAS3351013C09	Length (km)	1.27	GIS/NFCDD	0	NAI	Short to long term	30	0	0	0	0		0	0	0
	Recharge/recycling high end estimate	113FAS3351014C01	Volume (m3)	6450	Conceptual model	23	Maintain	Short	15	2.26	3.525224121	4.230268946	6.768430313		0	0	0
	Natural Cliff	113FBS3351501C01	Length (km)	0.1	GIS/NFCDD	0	Maintain	Short to long term	30	0	0	0	0		0	0	0
	Rock Armour	113FAS3351015C02	Length (km)	0.28	GIS/NFCDD	5830	Maintain	Short to long term	30	0.048970555	0.061213194	0.073455833	0.117529333		0	0	0
	concrete wall	113FAS3351015C01	Length (km)	0.41	GIS/NFCDD	5830	Maintain	Short to long term	30	0.071706884	0.089633606	0.107560327	0.172096523		0	0	0
	Revetment	113FAS3351014C02	Length (km)	0.32	GIS/NFCDD	5830	Maintain	Short to long term	30	0.055966349	0.069957936	0.083949523	0.134319237		0	0	0
	Groyne maintenance		Number	16	GIS/NFCDD	874	Maintain	Short to medium	25	0.34978968	0.4372371	0.52468452	0.839495233		0	0	0
	Groyne reconstruction		Number	8	GIS/NFCDD	13861	Maintain	Short	0.8	0.08870993	0.110887413	0.133064895	0.212903832		0	0	0
	Removal of gabions phase 1 (3-7)	Gabions, based on demolition cost per estimated m3	m3	360	GIS/NFCDD	108	NAI	Short	0.8	0.031065734	0.038832168	0.046598601	0.074557762		0	0	0
	Removal of gabions phase 2 (7-13)	Gabions, based on demolition cost per estimated m3	m3	360	GIS/NFCDD	108	NAI	Short	0.5	0.019416084	0.024270105	0.029124126	0.046598601		0	0	0
	0.15m ground raising around visitor centre		Length (m)	150		161		Short	0.8	0.019378143	0.024222679	0.029067215	0.046507544		0	0.0675	0
	CC 0.25m addition		Length (m)	150		323		Medium	0.5	0.024222679	0.030278349	0.036334019	0.05813443		0	0.0225	0
	CC 0.4m addition		Length (m)	150		646		Long	0.2	0.019378143	0.024222679	0.029067215	0.046507544		0	0.036	0
													9.17608411	TOTAL			



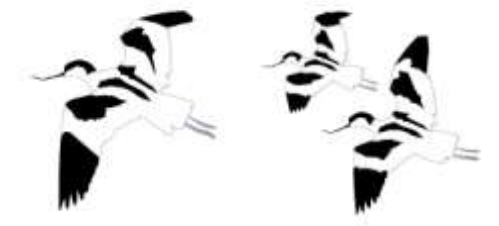
FCRMU approach	Asset Type	Asset reference	Parameter	Amount	Reference	Rate (£/parameter)	HLO	Epoch	Epochal discount factor	Basic construction cost (£M)	Plus Tidal/urban uplift (25% each) cost (£M)	Plus PAR, design and supervision (20%) cost (£M)	Plus Optimism bias 60% cost (£M)		FOOTPRINT IMPACT (Ha)			
RESPONSE OPTIONS																SPA/SSSI	SAC	None
Options 3,8,12 Central/distal sections managed realignment, proximal section sustained into future. Ground raising around visitor centre. 0.5%AEP SoP.	Railway embankment	113FAS3351012C01	Length (km)	1.55	GIS/NFCDD	5830	Maintain	Short to long term	30	0.271087002	0.338858753	0.406630503	0.650608805		0	0	0	
	Embankment	113FAS3351013C01	Length (km)	0.1	GIS/NFCDD	1166	Maintain	Short to long term	30	0.003497897	0.004372371	0.005246845	0.008394952		0	0	0	
	gabions	113FAS3351013C02	Length (km)	0.09	GIS/NFCDD	0	NAI	Short to long term	30	0	0	0	0		0	0	0	
	wall	113FAS3351013C03	Length (km)	0.03	GIS/NFCDD	0	NAI	Short to long term	30	0	0	0	0		0	0	0	
	gabion wall	113FAS3351013C04	Length (km)	0.18	GIS/NFCDD	0	NAI	Short to long term	30	0	0	0	0		0	0	0	
	wall	113FAS3351013C05	Length (km)	0.12	GIS/NFCDD	0	NAI	Short to long term	30	0	0	0	0		0	0	0	
	wall	113FAS3351013C06	Length (km)	0.02	GIS/NFCDD	0	NAI	Short to long term	30	0	0	0	0		0	0	0	
	gabion revetment	113FAS3351013C07	Length (km)	0.08	GIS/NFCDD	0	NAI	Short to long term	30	0	0	0	0		0	0	0	
	Bank	113FAS3351013C09	Length (km)	1.27	GIS/NFCDD	0	NAI	Short to long term	30	0	0	0	0		0	0	0	
	Recharge/recycling high end estimate	113FAS3351014C01	Volume (m3)	6450	Conceptual model	23	Maintain	Short	15	2.26	3.525224121	4.230268946	6.768430313		0	0	0	
	Natural Cliff	113FBS3351501C01	Length (km)	0.1	GIS/NFCDD	0	Maintain	Short to long term	30	0	0	0	0		0	0	0	
	Rock Armour	113FAS3351015C02	Length (km)	0.28	GIS/NFCDD	5830	Maintain	Short to long term	30	0.048970555	0.061213194	0.073455833	0.117529333		0	0	0	
	concrete wall	113FAS3351015C01	Length (km)	0.41	GIS/NFCDD	5830	Maintain	Short to long term	30	0.071706884	0.089633606	0.107560327	0.172096523		0	0	0	
	Revetment	113FAS3351014C02	Length (km)	0.32	GIS/NFCDD	5830	Maintain	Short to long term	30	0.055966349	0.069957936	0.083949523	0.134319237		0	0	0	
	Groyne maintenance		Number	16	GIS/NFCDD	874	Maintain	Short to medium	25	0.34978968	0.4372371	0.52468452	0.839495233		0	0	0	
	Groyne reconstruction		Number	8	GIS/NFCDD	13861	Maintain	Short	0.8	0.08870993	0.110887413	0.133064895	0.212903832		0	0	0	
	Removal of gabions phase 1 (3-7)	Gabions, based on demolition cost per estimated m3	m3	360	GIS/NFCDD	108	NAI	Short	0.8	0.031065734	0.038832168	0.046598601	0.074557762		0	0	0	
	Removal of gabions phase 2 (7-13)	Gabions, based on demolition cost per estimated m3	m3	360	GIS/NFCDD	108	NAI	Short	0.5	0.019416084	0.024270105	0.029124126	0.046598601		0	0	0	
	0.25m ground raising around visitor centre		Length (m)	150		323		Short	0.8	0.038756287	0.048445358	0.05813443	0.093015088		0	0.0675	0	
	CC 0.25m addition		Length (m)	150		323		Medium	0.5	0.024222679	0.030278349	0.036334019	0.05813443		0	0.0225	0	
	CC 0.4m addition		Length (m)	150		646		Long	0.2	0.019378143	0.024222679	0.029067215	0.046507544		0	0.036	0	
	9.222591654 TOTAL																	
Options 3,8,12 Central/distal sections managed realignment, proximal section sustained into future. Ground raising around visitor centre. 0.1%AEP SoP.	Railway embankment	113FAS3351012C01	Length (km)	1.55	GIS/NFCDD	5830	Maintain	Short to long term	30	0.271087002	0.338858753	0.406630503	0.650608805		0	0	0	
	Embankment	113FAS3351013C01	Length (km)	0.1	GIS/NFCDD	1166	Maintain	Short to long term	30	0.003497897	0.004372371	0.005246845	0.008394952		0	0	0	
	gabions	113FAS3351013C02	Length (km)	0.09	GIS/NFCDD	0	NAI	Short to long term	30	0	0	0	0		0	0	0	
	wall	113FAS3351013C03	Length (km)	0.03	GIS/NFCDD	0	NAI	Short to long term	30	0	0	0	0		0	0	0	
	gabion wall	113FAS3351013C04	Length (km)	0.18	GIS/NFCDD	0	NAI	Short to long term	30	0	0	0	0		0	0	0	
	wall	113FAS3351013C05	Length (km)	0.12	GIS/NFCDD	0	NAI	Short to long term	30	0	0	0	0		0	0	0	
	wall	113FAS3351013C06	Length (km)	0.02	GIS/NFCDD	0	NAI	Short to long term	30	0	0	0	0		0	0	0	
	gabion revetment	113FAS3351013C07	Length (km)	0.08	GIS/NFCDD	0	NAI	Short to long term	30	0	0	0	0		0	0	0	
	Bank	113FAS3351013C09	Length (km)	1.27	GIS/NFCDD	0	NAI	Short to long term	30	0	0	0	0		0	0	0	
	Recharge/recycling high end estimate	113FAS3351014C01	Volume (m3)	6450	Conceptual model	23	Maintain	Short	15	2.26	3.525224121	4.230268946	6.768430313		0	0	0	
	Natural Cliff	113FBS3351501C01	Length (km)	0.1	GIS/NFCDD	0	Maintain	Short to long term	30	0	0	0	0		0	0	0	
	Rock Armour	113FAS3351015C02	Length (km)	0.28	GIS/NFCDD	5830	Maintain	Short to long term	30	0.048970555	0.061213194	0.073455833	0.117529333		0	0	0	
	concrete wall	113FAS3351015C01	Length (km)	0.41	GIS/NFCDD	5830	Maintain	Short to long term	30	0.071706884	0.089633606	0.107560327	0.172096523		0	0	0	
	Revetment	113FAS3351014C02	Length (km)	0.32	GIS/NFCDD	5830	Maintain	Short to long term	30	0.055966349	0.069957936	0.083949523	0.134319237		0	0	0	
	Groyne maintenance		Number	16	GIS/NFCDD	874	Maintain	Short to medium	25	0.34978968	0.4372371	0.52468452	0.839495233		0	0	0	
	Groyne reconstruction		Number	8	GIS/NFCDD	13861	Maintain	Short	0.8	0.08870993	0.110887413	0.133064895	0.212903832		0	0	0	
	Removal of gabions phase 1 (3-7)	Gabions, based on demolition cost per estimated m3	m3	360	GIS/NFCDD	108	NAI	Short	0.8	0.031065734	0.038832168	0.046598601	0.074557762		0	0	0	
	Removal of gabions phase 2 (7-13)	Gabions, based on demolition cost per estimated m3	m3	360	GIS/NFCDD	108	NAI	Short	0.5	0.019416084	0.024270105	0.029124126	0.046598601		0	0	0	
	0.5m ground raising around visitor centre		Length (m)	150		646		Short	0.8	0.077512573	0.096890717	0.11626886	0.186030176		0	0.0675	0	
	CC 0.25m addition		Length (m)	150		323		Medium	0.5	0.024222679	0.030278349	0.036334019	0.05813443		0	0.0225	0	
	CC 0.4m addition		Length (m)	150		646		Long	0.2	0.019378143	0.024222679	0.029067215	0.046507544		0	0.036	0	
	9.315606742 TOTAL																	

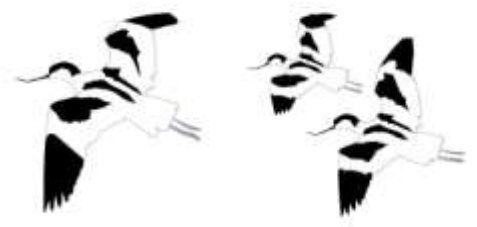


O.15 Dawlish to Holcombe

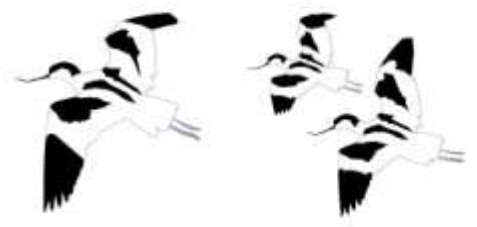
FCRMU approach	Asset Type	Asset reference	Parameter	Amount	Reference	Rate (£/parameter)	HLO	Epoch	Epochal discount factor	Basic construction cost (£M)	Plus Tidal/urban uplift (25% each) cost (£M)	Plus PAR, design and supervision (20%) cost (£M)	Plus Optimism bias 60% cost (£M)		FOOTPRINT IMPACT (Ha)			
RESPONSE OPTIONS																SPA/SSSI	SAC	None
Short, Medium and Long Term Option 1. Vertical or wave recurve wall raising along the railway embankment of between 0.5-2m. 100-4%AEP.	Recurved Wall + Splash Wall + Revetment + Groynes	113FBS3351501C03	Length (km)	1.27	GIS/NFCDD	5830	Maintain	Short to long term	30	0.222116447	0.277645559	0.33317467	0.533079473		0	0	0	
	CC 0.1m addition		Length (m)	1270	GIS/NFCDD	167	Sustain	Short	1	0.211751013	0.330860957	0.397033149	0.635253038		0	0	0	
	CC 0.3m addition		Length (m)	1270	GIS/NFCDD	167	Sustain	Medium	0.5	0.105875506	0.132344383	0.15881326	0.254101215		0	0	0	
	CC 0.3m addition		Length (m)	1270	GIS/NFCDD	167	Sustain	Long	0.2	0.042350203	0.052937753	0.063525304	0.101640486		0	0	0	
	Recurved Wall + Groynes + Revetment + Splash Wall	113FBS3351501C02	Length (km)	0.58	GIS/NFCDD	5830	Maintain	Short to long term	30	0.101439007	0.126798759	0.152158511	0.243453617		0	0	0	
	CC 0.5m addition		Length (m)	580	GIS/NFCDD	167	Improve	Short	1	0.096705187	0.151101855	0.181322226	0.290115561		0	0	0	
	CC 0.3m addition		Length (m)	580	GIS/NFCDD	167	Sustain	Medium	0.5	0.048352593	0.060440742	0.07252889	0.116046224		0	0	0	
	CC 0.3m addition		Length (m)	580	GIS/NFCDD	167	Sustain	Long	0.2	0.019341037	0.024176297	0.029011556	0.04641849		0	0	0	
	Property resilience for 17 properties		Number	17		11660	Sustain	Long	0.2	0.03964283	0.061941923	0.074330307	0.118928491		0	0	0	
													2.339036596	TOTAL				
Short, Medium and Long Term Option 1. Vertical or wave recurve wall raising along the railway embankment of between 0.5-2m. 2-1%AEP.	Recurved Wall + Splash Wall + Revetment + Groynes	113FBS3351501C03	Length (km)	1.27	GIS/NFCDD	5830	Maintain	Short to long term	30	0.222116447	0.277645559	0.33317467	0.533079473		0	0	0	
	CC 0.1m addition		Length (m)	1270	GIS/NFCDD	167	Sustain	Short	1	0.211751013	0.330860957	0.397033149	0.635253038		0	0	0	
	CC 0.3m addition		Length (m)	1270	GIS/NFCDD	167	Sustain	Medium	0.5	0.105875506	0.132344383	0.15881326	0.254101215		0	0	0	
	CC 0.3m addition		Length (m)	1270	GIS/NFCDD	167	Sustain	Long	0.2	0.042350203	0.052937753	0.063525304	0.101640486		0	0	0	
	Recurved Wall + Groynes + Revetment + Splash Wall	113FBS3351501C02	Length (km)	0.58	GIS/NFCDD	5830	Maintain	Short to long term	30	0.101439007	0.126798759	0.152158511	0.243453617		0	0	0	
	CC 0.5m addition		Length (m)	580	GIS/NFCDD	167	Improve	Short	1	0.096705187	0.151101855	0.181322226	0.290115561		0	0	0	
	CC 0.3m addition		Length (m)	580	GIS/NFCDD	167	Sustain	Medium	0.5	0.048352593	0.060440742	0.07252889	0.116046224		0	0	0	
	CC 0.3m addition		Length (m)	580	GIS/NFCDD	167	Sustain	Long	0.2	0.019341037	0.024176297	0.029011556	0.04641849		0	0	0	
	Property resilience for 28 properties		Number	28		11660	Sustain	Long	0.2	0.065294074	0.10202199	0.122426388	0.195882221		0	0	0	
													2.415990326	TOTAL				
Short, Medium and Long Term Option 1. Vertical or wave recurve wall raising along the railway embankment of between 0.5-2m. 0.5-0.1%AEP.	Recurved Wall + Splash Wall + Revetment + Groynes	113FBS3351501C03	Length (km)	1.27	GIS/NFCDD	5830	Maintain	Short to long term	30	0.222116447	0.277645559	0.33317467	0.533079473		0	0	0	
	CC 0.1m addition		Length (m)	1270	GIS/NFCDD	167	Sustain	Short	1	0.211751013	0.330860957	0.397033149	0.635253038		0	0	0	
	CC 0.3m addition		Length (m)	1270	GIS/NFCDD	167	Sustain	Medium	0.5	0.105875506	0.132344383	0.15881326	0.254101215		0	0	0	
	CC 0.3m addition		Length (m)	1270	GIS/NFCDD	167	Sustain	Long	0.2	0.042350203	0.052937753	0.063525304	0.101640486		0	0	0	
	Recurved Wall + Groynes + Revetment + Splash Wall	113FBS3351501C02	Length (km)	0.58	GIS/NFCDD	5830	Maintain	Short to long term	30	0.101439007	0.126798759	0.152158511	0.243453617		0	0	0	
	CC 0.5m addition		Length (m)	580	GIS/NFCDD	167	Improve	Short	1	0.096705187	0.151101855	0.181322226	0.290115561		0	0	0	
	CC 0.3m addition		Length (m)	580	GIS/NFCDD	167	Sustain	Medium	0.5	0.048352593	0.060440742	0.07252889	0.116046224		0	0	0	
	CC 0.3m addition		Length (m)	580	GIS/NFCDD	167	Sustain	Long	0.2	0.019341037	0.024176297	0.029011556	0.04641849		0	0	0	
	Property resilience for 37 properties		Number	37		11660	Sustain	Long	0.2	0.086281454	0.134814773	0.161777727	0.258844363		0	0	0	
													2.478952468	TOTAL				
Short, Medium and Long Term Option 2. Rock armouring or revetment raising along the railway embankment of between 0.5-2m.	Recurved Wall + Splash Wall + Revetment + Groynes	113FBS3351501C03	Length (km)	1.27	GIS/NFCDD	5830	Maintain	Short to long term	30	0.222116447	0.277645559	0.33317467	0.533079473		0	0	0	
	CC 0.1m addition		Length (m)	1270	GIS/NFCDD	559	Sustain	Short	1	0.709662048	1.10884695	1.33061634	2.128986144		0	0	1.27	
	CC 0.3m addition		Length (m)	1270	GIS/NFCDD	559	Sustain	Medium	0.5	0.354831024	0.44353878	0.532246536	0.851594458		0	0	1.27	
	CC 0.3m addition		Length (m)	1270	GIS/NFCDD	559	Sustain	Long	0.2	0.14193241	0.177415512	0.212898614	0.340637783		0	0	1.27	
	Recurved Wall + Groynes + Revetment + Splash Wall	113FBS3351501C02	Length (km)	0.58	GIS/NFCDD	5830	Maintain	Short to long term	30	0.101439007	0.126798759	0.152158511	0.243453617		0	0	0	
	CC 0.5m addition		Length (m)	580	GIS/NFCDD	1118	Improve	Short	1	0.648195257	1.012805088	1.215366106	1.94458577		0	0	0.58	
	CC 0.3m addition		Length (m)	580	GIS/NFCDD	559	Sustain	Medium	0.5	0.162048814	0.202561018	0.243073221	0.388917154		0	0	0.58	
	CC 0.3m addition		Length (m)	580	GIS/NFCDD	559	Sustain	Long	0.2	0.064819526	0.081024407	0.097229288	0.155566862		0	0	0.58	
	Property resilience for c.10 properties		Number	10		11660	Sustain	Long	0.2	0.023319312	0.036436425	0.04372371	0.069957936		0	0	0	
													6.656779196	TOTAL				





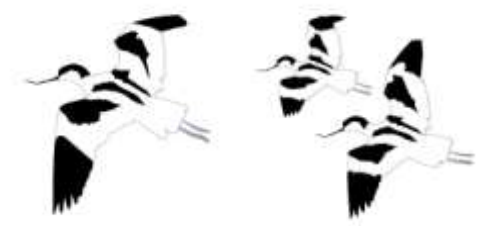


Appendix P : Response Assessment Tables in the Short to Long Term





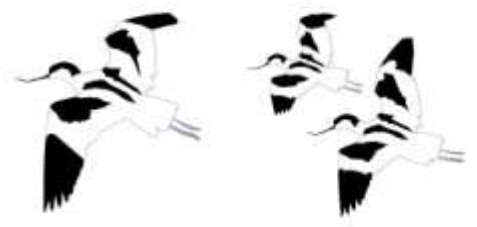
LOCATION				Present Value benefit (£K)					Present Value cost (£K)				
Relevant placename	FCRM unit	A-T option reference	Description	Do Minimum	2% AEP SoP	1% AEP SoP	0.5% AEP SoP	0.1% AEP SoP	Do Minimum	2% AEP SoP	1% AEP SoP	0.5% AEP SoP	0.1% AEP SoP
Sandy Bay	01	ST-LT1	No active intervention	15	15	15	15	15	0	0	0	0	0
The Maer	02	ST-LT2	Continued beach recharge/recycling and groyne maintenance	12,412	12,416	12,416	12,416	12,416	13,525	9,796	9,796	9,796	9,796
Exmouth	03	ST2-1, MT-LT2	Improvements along a mixture of seaward and landward alignments	138,546	320,229	335,722	346,061	353,461	1,794	3,993	4,363	4,929	5,278
		ST2-2, MT-LT2	Improvements along a mixture of seaward and landward alignments	138,546	320,229	335,722	346,061	353,461	1,794	4,250	4,644	5,356	5,949
		ST2-1, MT-LT1	Further improvements along existing seaward alignment	138,546	320,229	335,722	346,061	353,461	1,794	4,754	5,055	5,231	5,428
Courtlands, Lympstone Commando and Exton	04, 06, 07	ST-LT1	Rock armouring or revetment raising	21,742	21,867	21,878	21,904	21,998	2,463	2,463	3,461	3,595	3,986
		ST-LT2	Vertical or wave recurve wall addition.	21,742	21,867	21,878	21,904	21,998	2,463	2,463	2,741	2,781	2,918
Lympstone	05	ST-LT1	Further reconstruction and/or raising of building walls and flood gateys	7,066	20,568	21,213	21,642	21,979	373	2,803	2,813	2,945	3,048
East bank of the Clyst	08	ST-LT1	Further raising of the road embankment and to the south of the C527	-28	7,598	7,827	7,977	8,092	169	3,267	3,668	4,479	4,865
		ST-LT2	Further raising of the causeway and to the south of the C527	-28	7,598	7,827	7,977	8,092	169	5,853			
Clyst St. Mary	09	ST-LT1	Continued maintenance and raising of existing embankments	1,002	3,595	3,655	3,706	3,765	141	804	870	936	1,268
Sowton	10	ST-LT1	No active intervention	157	157	157	157	166	0	0	0	0	0
West bank of the Clyst	11	ST-LT1	Continued property resilience	0	3,323	3,395	3,404	3,412	640	1,391	1,534	1,548	1,674
Topsham	12	ST2, MT-LT1	Wider raising of quay walls	-1,379	15,618	15,999	16,278	16,532	1,322	1,870	2,340	2,966	4,017
		ST2, MT-LT2	Community level property resilience	-1,379	15,618	15,999	16,278	16,532	1,322	4,073	4,305	4,694	5,270
Countess Wear	13	ST-LT1	Wider raising of walls	101	849	870	885	899	294	333	333	467	467
Exminster and Powderham Banks	14	ST3, MT-LT1	Canal, railway and Powderham Banks raising	6,509	32,660	33,824	34,539	35,287	9,534	10,659	11,277	11,859	12,140
Kenn Valley	15	ST-LT1	Continued maintenance and/or raising of local embankments	9,129	13,494	13,723	13,864	13,986	890	4,795	4,847	6,054	6,283
Starcross	16	ST1, MT-LT1	Wider raising of railway embankments and Cockwood harbour walls	94,547	134,340	139,497	142,734	144,968	923	2,883	3,728	3,943	4,254
Dawlish Warren	17	ST3B, MT-LT8-12	See section 5.4 in main report	188	50,205	50,960	51,437	54,670	1,083	9,167	9,176	9,223	9,316
Dawlish to Holcombe	18	As per Network Rail study	As per Network Rail study	0	3,406	3,544	3,629	3,712	0	157	196	227	259



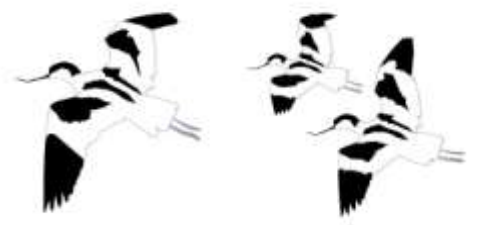
LOCATION				Benefit-Cost Ratios					Incremental Benefit-Cost Ratios				
Relevant placename	FCRM unit	A-T option reference	Description	Do Minimum	2% AEP SoP	1% AEP SoP	0.5% AEP SoP	0.1% AEP SoP	Do Minimum	2% AEP SoP	1% AEP SoP	0.5% AEP SoP	0.1% AEP SoP
Sandy Bay	01	ST-LT1	No active intervention	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
The Maer	02	ST-LT2	Continued beach recharge/recycling and groyne maintenance	0.9	1.3	1.3	1.3	1.3	NA	0.0	#DIV/0!	#DIV/0!	#DIV/0!
Exmouth	03	ST2-1, MT-LT2	Improvements along a mixture of seaward and landward alignments	77.2	80.2	76.9	70.2	67.0	NA	82.7	41.8	18.3	21.2
		ST2-2, MT-LT2	Improvements along a mixture of seaward and landward alignments	77.2	75.3	72.3	64.6	59.4	NA	74.0	39.3	14.5	12.5
		ST2-1, MT-LT1	Further improvements along existing seaward alignment	77.2	67.4	66.4	66.2	65.1	NA	61.4	51.6	58.7	37.5
Courtlands, Lymstone Commando and Exton	04, 06, 07	ST-LT1	Rock armouring or revetment raising	8.8	8.9	6.3	6.1	5.5	NA	#DIV/0!	0.0	0.2	0.2
		ST-LT2	Vertical or wave recurve wall addition.	8.8	8.9	8.0	7.9	7.5	NA	#DIV/0!	0.0	0.6	0.7
Lymstone	05	ST-LT1	Further reconstruction and/or raising of building walls and flood gateys	19.0	7.3	7.5	7.3	7.2	NA	5.6	64.1	3.2	3.3
East bank of the Clyst	08	ST-LT1	Further raising of the road embankment and to the south of the C527	-0.2	2.3	2.1	1.8	1.7	NA	2.5	0.6	0.2	0.3
		ST-LT2	Further raising of the causeway and to the south of the C527	-0.2	1.3	#DIV/0!	#DIV/0!	#DIV/0!	NA	1.3	0.0	#DIV/0!	#DIV/0!
Clyst St. Mary	09	ST-LT1	Continued maintenance and raising of existing embankments	7.1	4.5	4.2	4.0	3.0	NA	3.9	0.9	0.8	0.2
Sowton	10	ST-LT1	No active intervention	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	NA	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
West bank of the Clyst	11	ST-LT1	Continued property resilience	0.0	2.4	2.2	2.2	2.0	NA	4.4	0.5	0.6	0.1
Topsham	12	ST2, MT-LT1	Wider raising of quay walls	-1.0	8.4	6.8	5.5	4.1	NA	31.0	0.8	0.4	0.2
		ST2, MT-LT2	Community level property resilience	-1.0	3.8	3.7	3.5	3.1	NA	6.2	1.6	0.7	0.4
Countess Wear	13	ST-LT1	Wider raising of walls	0.3	2.5	2.6	1.9	1.9	NA	19.0	#DIV/0!	0.1	#DIV/0!
Exminster and Powderham Banks	14	ST3, MT-LT1	Canal, railway and Powderham Banks raising	0.7	3.1	3.0	2.9	2.9	NA	23.2	1.9	1.2	2.7
Kenn Valley	15	ST-LT1	Continued maintenance and/or raising of local embankments	10.3	2.8	2.8	2.3	2.2	NA	1.1	4.4	0.1	0.5
Starcross	16	ST1, MT-LT1	Wider raising of railway embankments and Cockwood harbour walls	102.5	46.6	37.4	36.2	34.1	NA	20.3	6.1	15.0	7.2
Dawlsh Warren	17	ST3B, MT-LT8-12	See section 5.4 in main report	0.2	5.5	5.6	5.6	5.9	NA	6.2	81.2	10.3	34.8
Dawlsh to Holcombe	18	As per Network Rail study	As per Network Rail study	#DIV/0!	21.6	18.1	16.0	14.3	NA	21.6	3.6	2.7	2.7

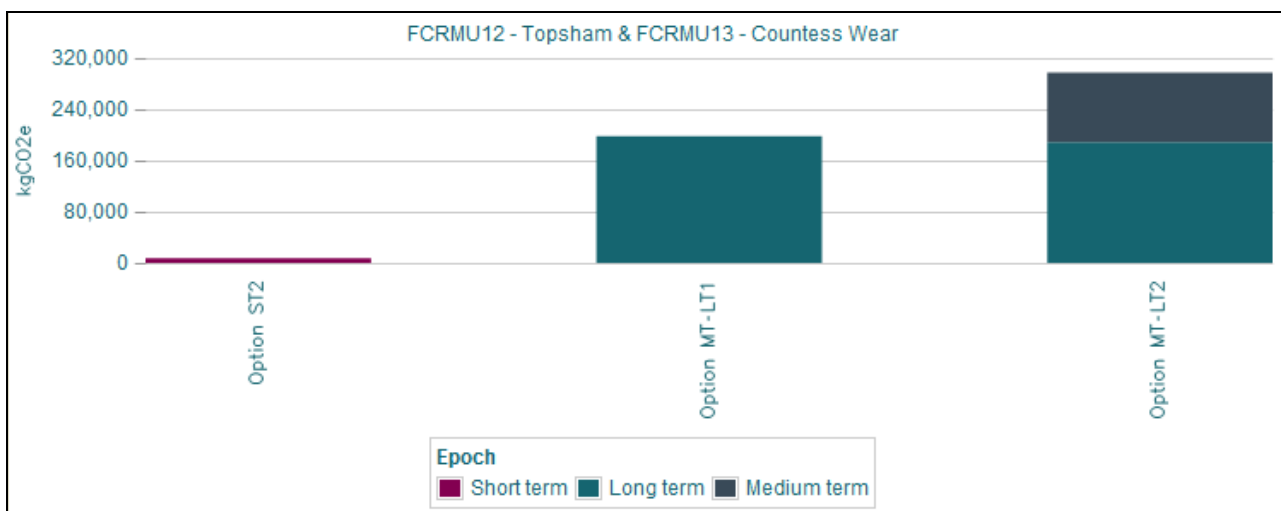
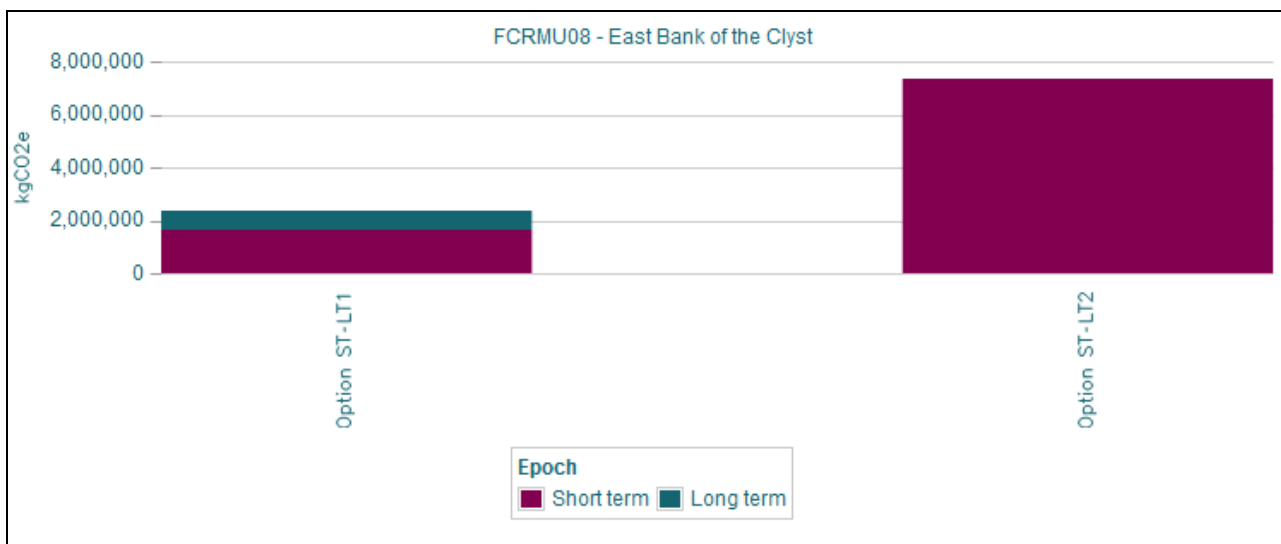
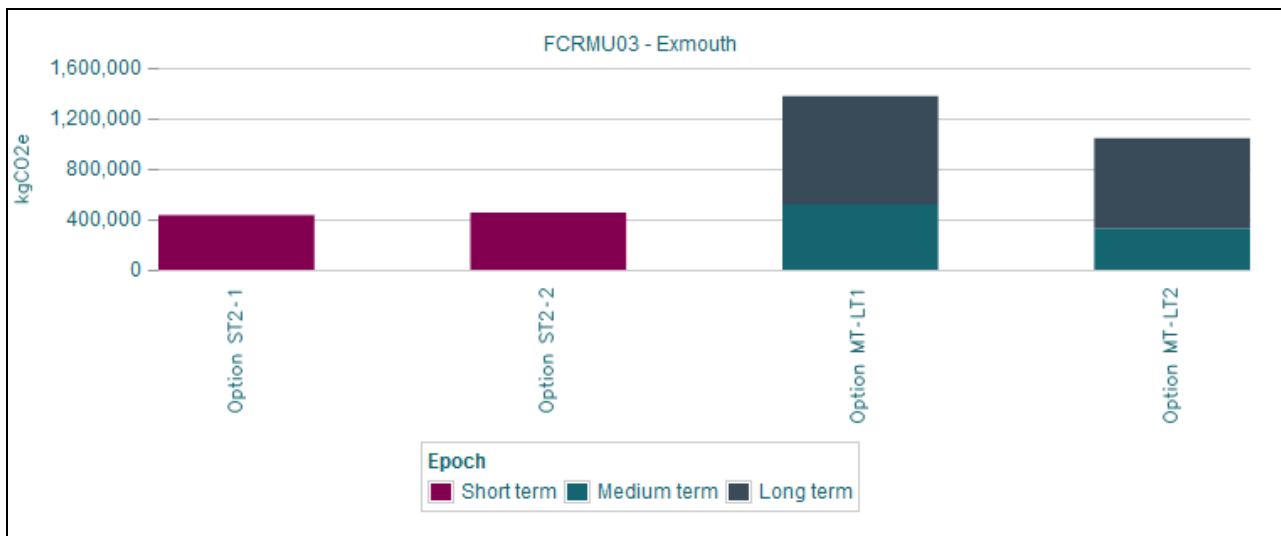
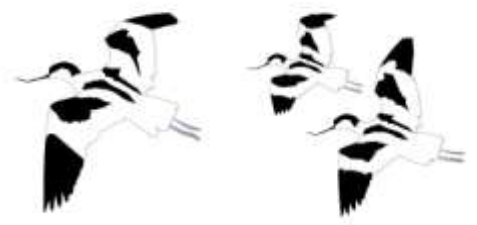


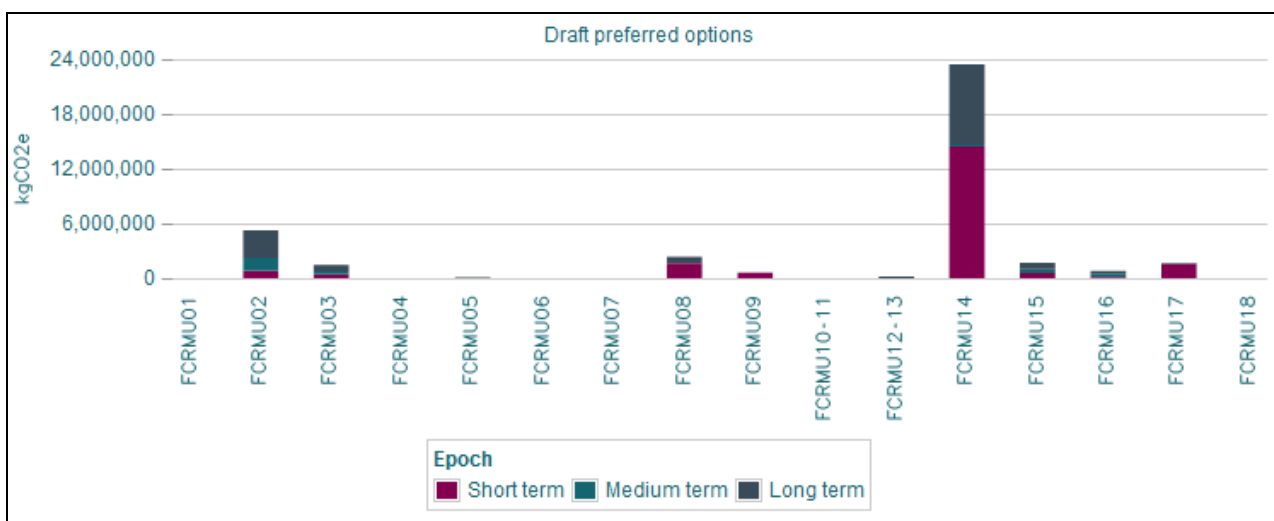
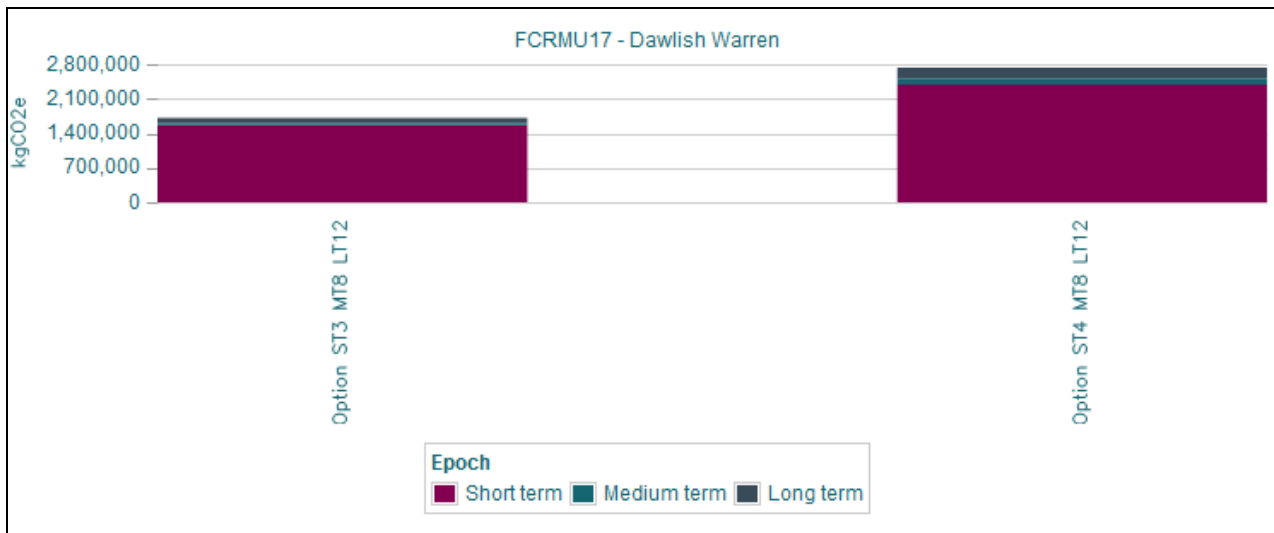
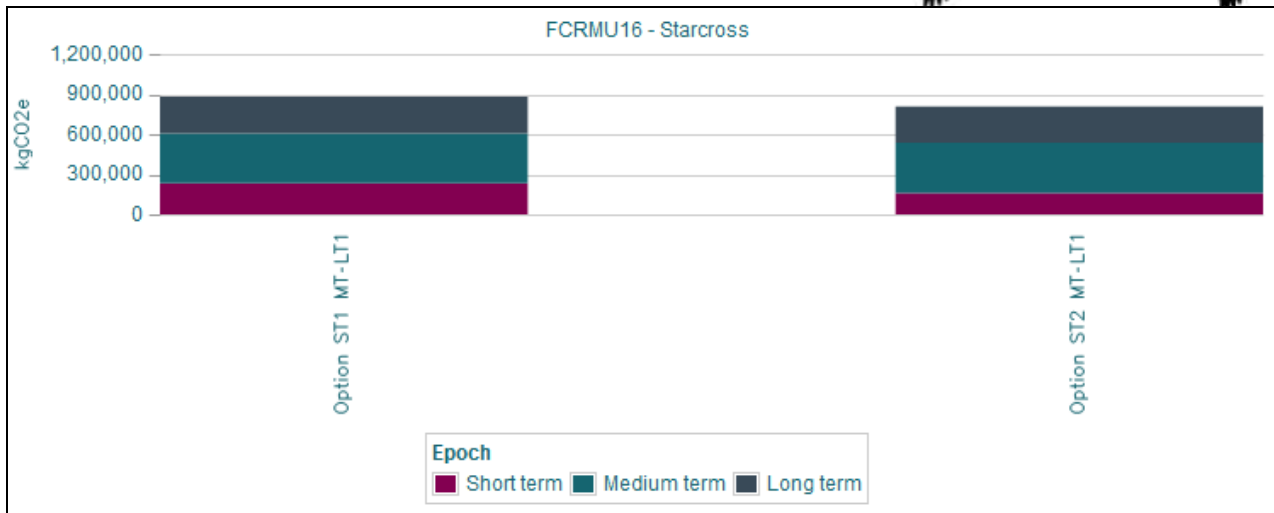
LOCATION				Optimised SoP	Engineering option and epochal timing
Relevant placename	FCRM unit	A-T option reference	Description		
Sandy Bay	01	ST-LT1	No active intervention	No active intervention	No active intervention
The Maer	02	ST-LT2	Continued beach recharge/recycling and groyne maintenance	Costing of the short to long term operations at a strategy level of detail indicates the PVc would be £9.8M. There would be continue to be negligible socio-economic benefit in FCRM terms.	To continue the structural integrity of the seawall, promenade, road and associated infrastructure in the medium to long term would require further beach recharge, recycling and groyne maintenance. It is predicted that beach recharge and recycling operations would need to increase in magnitude and/or frequency as the wave and tidal climate becomes more energetic.
Exmouth	03	ST2-1, MT-LT2	Improvements along a mixture of seaward and landward alignments	Assessment of the PVB, PVc, BCR and iBCR, and application of the FCERM-AG rules identifies that Option 2 would be the least cost solution, and the optimised SoP would continue to be 0.1%AEP in the medium to long term.	This would require between Exmouth Docks and the Sailing Club, variable revetment and wall raising of between 0.5-1m by 2110; along Camperdown Terrace, further property resilience and 0.7m of road raising by 2110; along the slipway and boatyard, further variable embankment and wall raising of between 0.7-1.2m; and along the Imperial Recreation Ground to Withycombe Brook, further variable revetment raising of 0.1-1.1m.
		ST2-2, MT-LT2	Improvements along a mixture of seaward and landward alignments		
		ST2-1, MT-LT1	Further improvements along existing seaward alignment		
Courtlands, Lympstone Commando and Exton	04, 06, 07	ST-LT1	Rock armouring or revetment raising	Assessment of the PVB, PVc, BCR and iBCR, and application of the FCERM-AG rules identifies that the optimised SoP would be 2%AEP. However, there is economic viability to provide a SoP of 0.1%AEP and comply with Network Rail policy (CIRIA, 2010).	2%AEP SoP would require no raising of the existing structures in the short to long term. To comply with Network Rail policy (CIRIA, 2010) and provide 0.1%AEP SoP a wave recurve wall addition of 0.25m along Lympstone Commando and Exton would be required towards 2110.
		ST-LT2	Vertical or wave recurve wall addition.		
Lympstone	05	ST-LT1	Further reconstruction and/or raising of building walls and flood gateys	Assessment of the PVB, PVc, BCR and iBCR, and application of the FCERM-AG rules identifies that the optimised SoP would be 0.5%AEP. However, the similarity of the BCRs for all SoPs (7.2 to 7.5) suggests that 0.1%AEP SoP can be selected.	This would require variable raising of 0.6-1.4m of the existing building walls, and 1m raising of the flood gates.
East bank of the Clyst	08	ST-LT1	Further raising of the road embankment and to the south of the C527	Assessment of the PVB, PVc, BCR and iBCR, and application of the FCERM-AG rules identifies that the optimised SoP for the realignment scheme would be 2% AEP. Public consultation has indicated that MR would not be acceptable; Do Minimum is the default option.	Continued maintenance of the earth embankment until another acceptable solution can be found.
		ST-LT2	Further raising of the causeway and to the south of the C527		
Clyst St. Mary	09	ST-LT1	Continued maintenance and raising of existing embankments	Assessment of the PVB, PVc, BCR and iBCR, and application of the FCERM-AG rules identifies that the optimised SoP would be 2%AEP in the medium to long term.	This would require continued maintenance but no raising of the existing structures.
Sowton	10	ST-LT1	No active intervention	No active intervention	No active intervention
West bank of the Clyst	11	ST-LT1	Continued property resilience	Assessment of the PVB, PVc, BCR and iBCR, and application of the FCERM-AG rules identifies that the optimised SoP for the realignment scheme would be 2% AEP. However, the similarity of the BCRs for all SoPs (2.0 to 2.4) suggests that 0.1%AEP SoP can be selected.	This would require property resilience works towards 2110 to a further 16 properties around Cotts Farm and Newcourt Barton.
Topsham	12	ST2, MT-LT1	Wider raising of quay walls	Assessment of the PVB, PVc, BCR and iBCR, and application of the FCERM-AG rules identifies that Option 1 would be the least cost solution, with an optimised SoP of 2%AEP in the medium to long term.	This would require general raising of existing quay walls of between 0-0.3m towards 2110. It is considered that this magnitude of raising would be practicable within the constrained landscapes of Topsham and Countess Wear. However, if this was found to be impractical, community level property resilience would be required for around 250 properties between 2030 and 2110.
		ST2, MT-LT2	Community level property resilience		
Countess Wear	13	ST-LT1	Wider raising of walls		
Exminster and Powderham Banks	14	ST3, MT-LT1	Canal, railway and Powderham Banks raising	Assessment of the PVB, PVc, BCR and iBCR, and application of the FCERM-AG rules identifies that the optimised SoP would 2% AEP. However, the similarity of the BCRs for all SoPs (2.9 to 3.1) suggests that 0.1%AEP SoP can be selected.	This would require wider raising towards 2110 of the canal banks of up to 0.3m, and a further 0.7m raising of the Powderham Banks.
Kenn Valley	15	ST-LT1	Continued maintenance and/or raising of local embankments	Assessment of the PVB, PVc, BCR and iBCR, and application of the FCERM-AG rules identifies that the optimised SoP for the realignment scheme would increase to 1% AEP.	This would require a further raising of local embankments of up to 1m by 2110. Further to this, the addition of a 0.2-1.1m high wave recurve wall to the existing railway embankments would be required.
Starcross	16	ST1, MT-LT1	Wider raising of railway embankments and Cockwood harbour walls	Assessment of the PVB, PVc, BCR and iBCR, and application of the FCERM-AG rules identifies that the least cost solution would be Option 1, with an optimised SoP of 0.1%AEP in the medium to long term.	This would require addition of a 1.2-1.6m high wave recurve wall to the existing railway embankments and further raising of either Cockwood Harbour option of 0.8m.
Dawlsh Warren	17	ST3B, MT-LT8-12	See section 5.4 in main report	See section 5.4 in main report.	See section 5.4 in main report.
Dawlsh to Holcombe	18	As per Network Rail study	As per Network Rail study	As per Network Rail study	As per Network Rail study

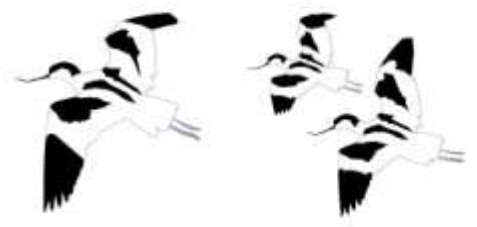


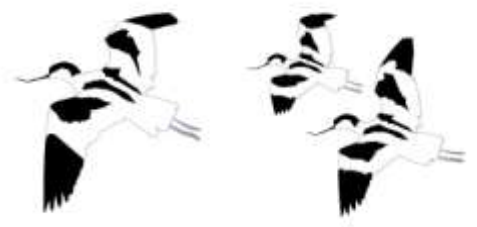
Appendix Q : Carbon Assessment



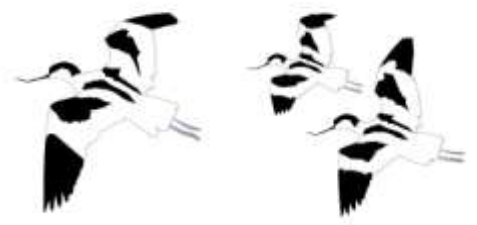








Appendix R : FCRM GiA Calculators





FCRM Partnership Funding Calculator for Flood and Coastal Erosion Risk Management Grant in Aid (FCRM GiA)

Version 7 April 2013

Project Name

Exmouth

Unique Project Reference

Key

Input cells

Calculated cells

All figures are in 'thousands of pounds' (£k)

Figures in Blue to be entered onto MTP

SUMMARY: prospect of FCRM GiA funding

Raw Partnership Funding Score

447% (1)

External Contribution or saving required to achieve an Adjusted Score of 100%

0 (2)

Adjusted Partnership Funding Score (PF)

447% (3)

PV FCRM GiA towards the up-front costs of this scheme (Cost for Approval)

2,768,000 (4)

Scheme Benefit to Cost Ratio:

80.43 to 1

Effective return to taxpayer:

80.43 to 1

Effective return to area:

n/a to 1

Cell (2) shows the minimum amount of contributions and/or reductions in scheme cost that are required to raise the Adjusted PF Score to at least 100%. Further increases on this will improve this scheme's chances of an FCRM GiA allocation in the desired year. Planned savings and contributions should be entered into cells(9,10,12) and cells(14-17).

1. Scheme details

Risk Management Authority type of asset maintainer

EA (5)

Yes (6)

Duration of Benefits (years)

20 (7)

Is evidence available that a Strategic Approach has been taken, and that double counting of benefits has been avoided?

PV Whole-Life Benefits:

(8)

PV Costs

PV Appraisal Costs

0 (9)

PV design & Construction Costs

2,768,000 (10)

Sub Total - PV Cost for Approval (appraisal,design,construction)

2,768,000 (11)

PV Post-Construction Costs

0 (12)

PV Total Whole-Life Costs:

2,768,000 (13)

All costs and benefits must be on a Present Value (PV) Whole-Life basis over the Duration of Benefits period. Where Contributions are identified these should also be on a Present Value basis.

The total value of any necessary contributions will depend on whether maintenance (ongoing costs) is funded through revenue FCRM GiA, or by other means.

This scheme is to be maintained by the EA (ref cell 5). Any contributions needed (ref cell 2) are to help fund both the ongoing and up-front costs (Cost for Approval), and should be entered into cells(14-17).

2. Qualifying benefits under Outcome Measure 2: households better protected against flood risk

Number of households in:

20% most deprived areas

21-40% most deprived areas

60% least deprived areas

Before		
At:	Moderate risk	Significant risk
	1,560	
	Very significant risk	

After		
	Moderate risk	Significant risk
		Very significant risk

Change due to scheme		
	Moderate risk	Significant risk
	0	0
	0	0
	0	-1,560
	Very significant risk	

Annual damages avoided, compared with a household at low risk

0.150	0.600	1.350

Change in household damages, in:

20% most deprived areas

21-40% most deprived areas

60% least deprived areas

Per year	
£	-
£	-
£	936

Over lifetime of scheme

£	-
£	-
£	18,720

Qual. benefits (discounted)

OM2 (20%)	£	-
OM2 (21-40%)	£	-
OM2 (60%)	£	14,239

3. Qualifying benefits under Outcome Measure 3: households better protected against coastal erosion

Number of households in:

20% most deprived areas

21-40% most deprived areas

60% least deprived areas

Before	
-	-
-	-
-	-
Long-term loss	Medium-term loss

Damages per household avoided:

Annual damages avoided

Loss expected in

Present value of Year 1 loss (i.e. first year damages, discounted based on when loss is expected)

£	6	£	6
£	50	£	20
£	1	£	3
Long-term loss	Medium-term loss		

Change in household damages, in:

20% most deprived areas

21-40% most deprived areas

60% least deprived areas

Year 1 loss avoided:	
£	-
£	-
£	-

Over lifetime of scheme:

£	-
£	-
£	-

Qual. benefits (discounted):

OM3 (20%)	£	-
OM3 (21-40%)	£	-
OM3 (60%)	£	-

4. Qualifying benefits under Outcome Measure 4: statutory environmental obligations met

Payments under:

OM4a

OM4b

OM4c

Hectares of net water-dependent habitat created

Hectares of net intertidal habitat created

Kilometres of protected river improved

Assumed benefits per unit:

£

£

£

Qual. benefits (discounted):

OM4a

OM4b

OM4c

OM4

5. Qualifying benefits arising from the overall scheme, for entry into the Medium-Term Plan

OM, deprivation:

OM1

OM2

OM3

OM4

Total

Qual. benefits:

£

£

£

£

£

Payment rate:

5.56p in the £1

45.0

30.0

20.0

45.0

30.0

20.0

100.0

FCRM GiA contribution:

£

£

£

£

£

£

£

£

Maximum for Outcomes delivered

Sensitivity Testing. It is important that users of this calculator appreciate the implications on funding from changes to input data which may become necessary as the project develops and better information is available. Five typical tests are provided below. Users should consider how appropriate these are to their project, what other tests may be appropriate and how best to use the information with all those that may be involved in the project.

As scenario above

Sensitivity 1 - Change in PV Whole Life Cost (25% increase)

Sensitivity 2 - Change in OM2 - 50% of households in Very Significant (Before) risk may already be in Significant Risk

Sensitivity 3 - Change in OM3 - 50% of households in Medium Term loss (Before) may already be in Long Term loss

Sensitivity 4 - Increase Duration of Benefits by 25%

Sensitivity 5 - Reduce Duration of Benefits by 25%

Raw Score	Contribution for 100% Score
447%	0
358%	0
447%	-
447%	-
447%	-
447%	-

END OF WORKSHEET



FCRM Partnership Funding Calculator for Flood and Coastal Erosion Risk Management Grant in Aid (FCRM GiA)

Version 7 April 2013

Project Name

West bank of the Lower Clyst

Unique Project Reference

Key

Input cells

Calculated cells

All figures are in 'thousands of pounds' (£k)

Figures in Blue to be entered onto MTP

SUMMARY: prospect of FCRM GiA funding

Raw Partnership Funding Score 120% (1)

External Contribution or saving required to achieve an Adjusted Score of 100% 0 (2)

Adjusted Partnership Funding Score (PF) 120% (3)

PV FCRM GiA towards the up-front costs of this scheme (Cost for Approval) 880,000 (4)

Scheme Benefit to Cost Ratio: 1.34 to 1
Effective return to taxpayer: 1.34 to 1
Effective return to area: n/a to 1

Cell (2) shows the minimum amount of contributions and/or reductions in scheme cost that are required to raise the Adjusted PF Score to at least 100%. Further increases on this will improve this scheme's chances of an FCRM GiA allocation in the desired year. Planned savings and contributions should be entered into cells(9,10,12) and cells(14-17).

1. Scheme details

Risk Management Authority type of asset maintainer EA (5)

Yes (6)

Duration of Benefits (years) 20 (7)

Is evidence available that a Strategic Approach has been taken, and that double counting of benefits has been avoided?

PV Whole-Life Benefits: 1,182,000 (8)

All costs and benefits must be on a Present Value (PV) Whole-Life basis over the Duration of Benefits period. Where Contributions are identified these should also be on a Present Value basis.

PV Costs

PV Appraisal Costs 0 (9)

PV design & Construction Costs 880,000 (10)

Sub Total - PV Cost for Approval (appraisal,design,construction) 880,000 (11)

PV Post-Construction Costs 0 (12)

PV Total Whole-Life Costs: 880,000 (13)

The total value of any necessary contributions will depend on whether maintenance (ongoing costs) is funded through revenue FCRM GiA, or by other means.

This scheme is to be maintained by the EA (ref cell 5). Any contributions needed (ref cell 2) are to help fund both the ongoing and up-front costs (Cost for Approval), and should be entered into cells(14-17).

PV Contributions secured to date

PV Local Levy secured to date 0 (14)

PV Public Contributions secured to date 0 (15)

PV Private Contributions secured to date 0 (16)

PV Funding from other Environment Agency functions/sources secured to date 0 (17)

PV Total Contributions secured to date 0 (18)

2. Qualifying benefits under Outcome Measure 2: households better protected against flood risk

Number of households in:

20% most deprived areas

21-40% most deprived areas

60% least deprived areas

Before		
4		
At:	Moderate risk	Significant risk

After		
	Moderate risk	Significant risk

Change due to scheme		
0	0	0
0	0	0
-4	0	0
	Moderate risk	Significant risk

Annual damages avoided, compared with a household at low risk 0.150 0.600 1.350

Change in household damages, in:

20% most deprived areas

21-40% most deprived areas

60% least deprived areas

Per year	
£	-
£	-
-£	1

Over lifetime of scheme	
£	-
£	-
-£	12

Qual. benefits (discounted)	
OM2 (20%)	£ -
OM2 (21-40%)	£ -
OM2 (60%)	£ 9

3. Qualifying benefits under Outcome Measure 3: households better protected against coastal erosion

Number of households in:

20% most deprived areas

21-40% most deprived areas

60% least deprived areas

Before	
-	-
-	-
-	-
Long-term loss	Medium-term loss

Damages per household avoided:

Annual damages avoided

Loss expected in

Present value of Year 1 loss (i.e. first year damages, discounted based on when loss is expected)

£	6	£	6
50		20	years
£	1	£	3
Long-term loss		Medium-term loss	

Change in household damages, in:

20% most deprived areas

21-40% most deprived areas

60% least deprived areas

Year 1 loss avoided:	
£	-
£	-
£	-

Over lifetime of scheme:	
£	-
£	-
£	-

Qual. benefits (discounted):	
OM3 (20%)	£ -
OM3 (21-40%)	£ -
OM3 (60%)	£ -

4. Qualifying benefits under Outcome Measure 4: statutory environmental obligations met

Payments under:

OM4a

OM4b

OM4c

21,000.00	Hectares of net water-dependent habitat created
	Hectares of net intertidal habitat created
	Kilometres of protected river improved

Assumed benefits per unit:

£	15
£	50
£	80

Qual. benefits (discounted):

OM4a	£ -
OM4b	£ 1,050,000.00
OM4c	£ -
OM4	£ 1,050,000.00

5. Qualifying benefits arising from the overall scheme, for entry into the Medium-Term Plan

OM, deprivation:		Qual. benefits:	Payment rate:
OM1		£ 131,991	5.56p in the £1
OM2	20% most	£ -	45.0
	21-40%	£ -	30.0
	Least 60%	£ 9	20.0
OM3	20% most	£ -	45.0
	21-40%	£ -	30.0
	Least 60%	£ -	20.0
OM4		£ 1,050,000	100.0
Total		£ 1,182,000	

FCRM GiA contribution:	
£	7,333
£	-
£	-
£	2
£	-
£	-
£	-
£	1,050,000
£	1,057,335

Maximum for Outcomes delivered

Sensitivity Testing. It is important that users of this calculator appreciate the implications on funding from changes to input data which may become necessary as the project develops and better information is available. Five typical tests are provided below. Users should consider how appropriate these are to their project, what other tests may be appropriate and how best to use the information with all those that may be involved in the project.

As scenario above

Sensitivity 1 - Change in PV Whole Life Cost (25% increase)

Sensitivity 2 - Change in OM2 - 50% of households in Very Significant (Before) risk may already be in Significant Risk

Sensitivity 3 - Change in OM3 - 50% of households in Medium Term loss (Before) may already be in Long Term loss

Sensitivity 4 - Increase Duration of Benefits by 25%

Sensitivity 5 - Reduce Duration of Benefits by 25%

Raw Score	Contribution for 100% Score
120%	0
96%	42,665
120%	-
120%	-
8%	813,386
8%	813,577

END OF WORKSHEET



FCRM Partnership Funding Calculator for Flood and Coastal Erosion Risk Management Grant in Aid (FCRM GiA)

Version 7 April 2013

Project Name

Topsham

Unique Project Reference

Key

Input cells

Calculated cells

All figures are in 'thousands of pounds' (£k)

Figures in Blue to be entered onto MTP

SUMMARY: prospect of FCRM GiA funding

Raw Partnership Funding Score

41% (1)

External Contribution or saving required to achieve an Adjusted Score of 100%

159 (2)

Adjusted Partnership Funding Score (PF)

41% (3)

PV FCRM GiA towards the up-front costs of this scheme (Cost for Approval)

- (4)

Scheme Benefit to Cost Ratio:

6.64 to 1

Effective return to taxpayer:

6.64 to 1

Effective return to area:

n/a to 1

Cell (2) shows the minimum amount of contributions and/or reductions in scheme cost that are required to raise the Adjusted PF Score to at least 100%. Further increases on this will improve this scheme's chances of an FCRM GiA allocation in the desired year. Planned savings and contributions should be entered into cells(9,10,12) and cells(14-17).

1. Scheme details

Risk Management Authority type of asset maintainer

EA (5)

Yes (6)

Duration of Benefits (years)

20 (7)

Is evidence available that a Strategic Approach has been taken, and that double counting of benefits has been avoided?

PV Whole-Life Benefits:

1,800 (8)

PV Costs

PV Appraisal Costs

0 (9)

PV design & Construction Costs

271 (10)

Sub Total - PV Cost for Approval (appraisal,design,construction)

271 (11)

PV Post-Construction Costs

0 (12)

PV Total Whole-Life Costs:

271 (13)

All costs and benefits must be on a Present Value (PV) Whole-Life basis over the Duration of Benefits period. Where Contributions are identified these should also be on a Present Value basis.

The total value of any necessary contributions will depend on whether maintenance (ongoing costs) is funded through revenue FCRM GiA, or by other means.

This scheme is to be maintained by the EA (ref cell 5). Any contributions needed (ref cell 2) are to help fund both the ongoing and up-front costs (Cost for Approval), and should be entered into cells(14-17).

PV Contributions secured to date

PV Local Levy secured to date

0 (14)

PV Public Contributions secured to date

0 (15)

PV Private Contributions secured to date

0 (16)

PV Funding from other Environment Agency functions/sources secured to date

0 (17)

PV Total Contributions secured to date

0 (18)

WARNING: Contributions less than minimum required in cell (2)

2. Qualifying benefits under Outcome Measure 2: households better protected against flood risk

Number of households in:

20% most deprived areas

21-40% most deprived areas

60% least deprived areas

Before		
		9
At:	Moderate risk	Significant risk

After		
	Moderate risk	Significant risk

Change due to scheme		
		0
		0
		-9
	Moderate risk	Significant risk

Annual damages avoided, compared with a household at low risk

0.150 0.600 1.350

Change in household damages, in:

20% most deprived areas

21-40% most deprived areas

60% least deprived areas

Per year	
£	-
£	-
£	5

Over lifetime of scheme	
£	-
£	-
£	108

Qual. benefits (discounted)	
OM2 (20%)	£ -
OM2 (21-40%)	£ -
OM2 (60%)	£ 82

3. Qualifying benefits under Outcome Measure 3: households better protected against coastal erosion

Number of households in:

20% most deprived areas

21-40% most deprived areas

60% least deprived areas

Before	
Long-term loss	Medium-term loss

Damages per household avoided:

Annual damages avoided

Loss expected in

Present value of Year 1 loss (i.e. first year damages, discounted based on when loss is expected)

£	6	£	6
	50		20
£	1	£	3
Long-term loss	Medium-term loss		

Change in household damages, in:

20% most deprived areas

21-40% most deprived areas

60% least deprived areas

Year 1 loss avoided:	
£	-
£	-
£	-

Over lifetime of scheme:	
£	-
£	-
£	-

Qual. benefits (discounted):	
OM3 (20%)	£ -
OM3 (21-40%)	£ -
OM3 (60%)	£ -

4. Qualifying benefits under Outcome Measure 4: statutory environmental obligations met

Payments under:

OM4a

OM4b

OM4c

	Hectares of net water-dependent habitat created
	Hectares of net intertidal habitat created
	Kilometres of protected river improved

Assumed benefits per unit:

£	15
£	50
£	80

Qual. benefits (discounted):

OM4a	£ -
OM4b	£ -
OM4c	£ -
OM4	£ -

5. Qualifying benefits arising from the overall scheme, for entry into the Medium-Term Plan

OM, deprivation:

OM1

OM2

OM3

OM4

Total

Qual. benefits:		Payment rate:	
	£		p in the £1
	1,718	5.56	
20% most	£ -	45.0	
21-40%	£ -	30.0	
Least 60%	£ 82	20.0	
20% most	£ -	45.0	
21-40%	£ -	30.0	
Least 60%	£ -	20.0	
	£ -	100.0	
	£ 1,800		

FCRM GiA contribution:

£	95
£	-
£	-
£	-
£	16
£	-
£	-
£	-
£	-
£	-
£	112

Maximum for Outcomes delivered

Sensitivity Testing. It is important that users of this calculator appreciate the implications on funding from changes to input data which may become necessary as the project develops and better information is available. Five typical tests are provided below. Users should consider how appropriate these are to their project, what other tests may be appropriate and how best to use the information with all those that may be involved in the project.

As scenario above

Sensitivity 1 - Change in PV Whole Life Cost (25% increase)

Sensitivity 2 - Change in OM2 - 50% of households in Very Significant (Before) risk may already be in Significant Risk

Sensitivity 3 - Change in OM3 - 50% of households in Medium Term loss (Before) may already be in Long Term loss

Sensitivity 4 - Increase Duration of Benefits by 25%

Sensitivity 5 - Reduce Duration of Benefits by 25%

Raw Score	Contribution for 100% Score
41%	159
33%	227
41%	159
41%	159
390%	-
316%	-

END OF WORKSHEET



FCRM Partnership Funding Calculator for Flood and Coastal Erosion Risk Management Grant in Aid (FCRM GiA)

Version 7 April 2013

Project Name

Powderham Banks

Unique Project Reference

Key

Input cells

Calculated cells

All figures are in 'thousands of pounds' (£k)

Figures in Blue to be entered onto MTP

SUMMARY: prospect of FCRM GiA funding

Raw Partnership Funding Score

9% (1)

External Contribution or saving required to achieve an Adjusted Score of 100%

8,288 (2)

Adjusted Partnership Funding Score (PF)

9% (3)

PV FCRM GiA towards the up-front costs of this scheme (Cost for Approval)

- (4)

Scheme Benefit to Cost Ratio:

1.47 to 1

Effective return to taxpayer:

1.47 to 1

Effective return to area:

n/a to 1

Cell (2) shows the minimum amount of contributions and/or reductions in scheme cost that are required to raise the Adjusted PF Score to at least 100%. Further increases on this will improve this scheme's chances of an FCRM GiA allocation in the desired year. Planned savings and contributions should be entered into cells(9,10,12) and cells(14-17).

1. Scheme details

Risk Management Authority type of asset maintainer

EA (5)

Yes (6)

Duration of Benefits (years)

20 (7)

Is evidence available that a Strategic Approach has been taken, and that double counting of benefits has been avoided?

PV Whole-Life Benefits:

13,373 (8)

PV Costs

PV Appraisal Costs

0 (9)

PV design & Construction Costs

9,083 (10)

Sub Total - PV Cost for Approval (appraisal,design,construction)

9,083 (11)

PV Post-Construction Costs

0 (12)

PV Total Whole-Life Costs:

9,083 (13)

All costs and benefits must be on a Present Value (PV) Whole-Life basis over the Duration of Benefits period. Where Contributions are identified these should also be on a Present Value basis.

The total value of any necessary contributions will depend on whether maintenance (ongoing costs) is funded through revenue FCRM GiA, or by other means.

This scheme is to be maintained by the EA (ref cell 5). Any contributions needed (ref cell 2) are to help fund both the ongoing and up-front costs (Cost for Approval), and should be entered into cells(14-17).

PV Contributions secured to date

PV Local Levy secured to date

0 (14)

PV Public Contributions secured to date

0 (15)

PV Private Contributions secured to date

0 (16)

PV Funding from other Environment Agency functions/sources secured to date

0 (17)

PV Total Contributions secured to date

0 (18)

WARNING: Contributions less than minimum required in cell (2)

2. Qualifying benefits under Outcome Measure 2: households better protected against flood risk

Number of households in:

20% most deprived areas

21-40% most deprived areas

60% least deprived areas

Before		
157		

At:

Moderate risk

Significant risk

Very significant risk

After		

Moderate risk

Significant risk

Very significant risk

Change due to scheme		
0	0	0
0	0	0
-157	0	0

Moderate risk

Significant risk

Very significant risk

Annual damages avoided, compared with a household at low risk

0.150 0.600 1.350

Change in household damages, in:

20% most deprived areas

21-40% most deprived areas

60% least deprived areas

Per year	
£	-
£	-
£	24

Over lifetime of scheme	
£	-
£	-
£	471

Qual. benefits (discounted)	
OM2 (20%)	£ -
OM2 (21-40%)	£ -
OM2 (60%)	£ 358

3. Qualifying benefits under Outcome Measure 3: households better protected against coastal erosion

Number of households in:

20% most deprived areas

21-40% most deprived areas

60% least deprived areas

Before	
-	-
-	-
-	-
Long-term loss	Medium-term loss

Long-term loss

Medium-term loss

Damages per household avoided:

Annual damages avoided

Loss expected in

Present value of Year 1 loss (i.e. first year damages, discounted based on when loss is expected)

£	6	£	6
50		20	years
£	1	£	3
Long-term loss		Medium-term loss	

Long-term loss

Medium-term loss

Change in household damages, in:

20% most deprived areas

21-40% most deprived areas

60% least deprived areas

Year 1 loss avoided:	
£	-
£	-
£	-

Over lifetime of scheme:	
£	-
£	-
£	-

Qual. benefits (discounted):	
OM3 (20%)	£ -
OM3 (21-40%)	£ -
OM3 (60%)	£ -

4. Qualifying benefits under Outcome Measure 4: statutory environmental obligations met

Payments under:

OM4a

OM4b

OM4c

Hectares of net water-dependent habitat created

Hectares of net intertidal habitat created

Kilometres of protected river improved

Assumed benefits per unit:

£	15
£	50
£	80

Qual. benefits (discounted):

OM4a	£ -
OM4b	£ -
OM4c	£ -
OM4	£ -

5. Qualifying benefits arising from the overall scheme, for entry into the Medium-Term Plan

OM, deprivation:

OM1

OM2

OM3

OM4

Total

Qual. benefits:

£ 13,015

£ -

£ -

£ 358

£ -

£ -

£ -

£ -

£ -

£ -

£ -

£ -

£ -

£ -

£ -

£ -

£ -

£ -

£ -

£ -

£ -

£ -

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£ -

£ -

£ -

£ -

£ -

£ -

£ -

Payment rate:

£ 5.56 p in the £1

£ 45.0

£ 30.0

£ 20.0

£ 45.0

£ 30.0

£ 20.0

£ 100.0

£ 13,373

£ -

£ -

£ -

£ -

£ -

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£ -

£ -

FCRM GiA contribution:

£ 723

£ -

£ -

£ -

£ 72

£ -

£ -

£ -

£ -

£ -

£ -

£ -

£ -

£ -

£ -

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Sensitivity Testing. It is important that users of this calculator appreciate the implications on funding from changes to input data which may become necessary as the project develops and better information is available. Five typical tests are provided below. Users should consider how appropriate these are to their project, what other tests may be appropriate and how best to use the information with all those that may be involved in the project.

As scenario above

Sensitivity 1 - Change in PV Whole Life Cost (25% increase)

Sensitivity 2 - Change in OM2 - 50% of households in Very Significant (Before) risk may already be in Significant Risk

Sensitivity 3 - Change in OM3 - 50% of households in Medium Term loss (Before) may already be in Long Term loss

Sensitivity 4 - Increase Duration of Benefits by 25%

Sensitivity 5 - Reduce Duration of Benefits by 25%

Raw Score	Contribution for 100% Score
9%	8,288
7%	10,559
9%	8,288
9%	8,288
19%	7,393
17%	7,584

END OF WORKSHEET



FCRM Partnership Funding Calculator for Flood and Coastal Erosion Risk Management Grant in Aid (FCRM GiA)

Version 7 April 2013

Project Name

Kenn Valley

Unique Project Reference

Key

Input cells

Calculated cells

All figures are in 'thousands of pounds' (£k)

Figures in Blue to be entered onto MTP

SUMMARY: prospect of FCRM GiA funding

Raw Partnership Funding Score 125% (1)

External Contribution or saving required to achieve an Adjusted Score of 100% 0 (2)

Adjusted Partnership Funding Score (PF) 125% (3)

PV FCRM GiA towards the up-front costs of this scheme (Cost for Approval) 1,548,000 (4)

Scheme Benefit to Cost Ratio: 5.21 to 1
Effective return to taxpayer: 5.21 to 1
Effective return to area: n/a to 1

Cell (2) shows the minimum amount of contributions and/or reductions in scheme cost that are required to raise the Adjusted PF Score to at least 100%. Further increases on this will improve this scheme's chances of an FCRM GiA allocation in the desired year. Planned savings and contributions should be entered into cells(9,10,12) and cells(14-17).

1. Scheme details

Risk Management Authority type of asset maintainer EA (5)

Yes (6)

Duration of Benefits (years) 20 (7)

Is evidence available that a Strategic Approach has been taken, and that double counting of benefits has been avoided?

PV Whole-Life Benefits: 8,070,000 (8)

All costs and benefits must be on a Present Value (PV) Whole-Life basis over the Duration of Benefits period. Where Contributions are identified these should also be on a Present Value basis.

PV Costs

PV Appraisal Costs 0 (9)

PV design & Construction Costs 1,548,000 (10)

Sub Total - PV Cost for Approval (appraisal,design,construction) 1,548,000 (11)

PV Post-Construction Costs 0 (12)

PV Total Whole-Life Costs: 1,548,000 (13)

The total value of any necessary contributions will depend on whether maintenance (ongoing costs) is funded through revenue FCRM GiA, or by other means.

This scheme is to be maintained by the EA (ref cell 5). Any contributions needed (ref cell 2) are to help fund both the ongoing and up-front costs (Cost for Approval), and should be entered into cells(14-17).

PV Contributions secured to date

PV Local Levy secured to date 0 (14)

PV Public Contributions secured to date 0 (15)

PV Private Contributions secured to date 0 (16)

PV Funding from other Environment Agency functions/sources secured to date 0 (17)

PV Total Contributions secured to date 0 (18)

2. Qualifying benefits under Outcome Measure 2: households better protected against flood risk

Number of households in:

20% most deprived areas

21-40% most deprived areas

60% least deprived areas

Before			After			Change due to scheme		
						0	0	0
						0	0	0
						-20	0	0
At:	Moderate risk	Significant risk	Very significant risk	Moderate risk	Significant risk	Moderate risk	Significant risk	Very significant risk
Annual damages avoided, compared with a household at low risk			0.150	0.600	1.350			

Change in household damages, in:

20% most deprived areas

21-40% most deprived areas

60% least deprived areas

Per year		Over lifetime of scheme		Qual. benefits (discounted)	
£	-	£	-	OM2 (20%)	£
£	-	£	-	OM2 (21-40%)	£
£	-	£	-	OM2 (60%)	£
-£	3	-£	60		46

3. Qualifying benefits under Outcome Measure 3: households better protected against coastal erosion

Number of households in:

20% most deprived areas

21-40% most deprived areas

60% least deprived areas

Before		After		Qual. benefits (discounted)	
-	-	-	-	OM3 (20%)	£
-	-	-	-	OM3 (21-40%)	£
-	-	-	-	OM3 (60%)	£
Long-term loss	Medium-term loss	Long-term loss	Medium-term loss		
Year 1 loss avoided:		Over lifetime of scheme:			
£	-	£	-		
£	-	£	-		
£	-	£	-		

Change in household damages, in:

20% most deprived areas

21-40% most deprived areas

60% least deprived areas

4. Qualifying benefits under Outcome Measure 4: statutory environmental obligations met

Payments under:

OM4a

OM4b

OM4c

5,000.00 Hectares of net water-dependent habitat created
30,000.00 Hectares of net intertidal habitat created
Kilometres of protected river improved

Assumed benefits per unit:

£ 15
£ 50
£ 80

Qual. benefits (discounted):

OM4a £ 75,000.00
OM4b £ 1,500,000.00
OM4c £ -
OM4 £ 1,575,000.00

5. Qualifying benefits arising from the overall scheme, for entry into the Medium-Term Plan

OM, deprivation:		Qual. benefits:		Payment rate:		FCRM GiA contribution:	
OM1		£	6,494,954	5.56	p in the £1	£	360,831
OM2	20% most	£	-	45.0		£	-
	21-40%	£	-	30.0		£	-
	Least 60%	£	46	20.0		£	9
OM3	20% most	£	-	45.0		£	-
	21-40%	£	-	30.0		£	-
	Least 60%	£	-	20.0		£	-
OM4		£	1,575,000	100.0		£	1,575,000
Total		£	8,070,000			£	1,935,840

Maximum for Outcomes delivered

Sensitivity Testing. It is important that users of this calculator appreciate the implications on funding from changes to input data which may become necessary as the project develops and better information is available. Five typical tests are provided below. Users should consider how appropriate these are to their project, what other tests may be appropriate and how best to use the information with all those that may be involved in the project.

As scenario above

Sensitivity 1 - Change in PV Whole Life Cost (25% increase)

Sensitivity 2 - Change in OM2 - 50% of households in Very Significant (Before) risk may already be in Significant Risk

Sensitivity 3 - Change in OM3 - 50% of households in Medium Term loss (Before) may already be in Long Term loss

Sensitivity 4 - Increase Duration of Benefits by 25%

Sensitivity 5 - Reduce Duration of Benefits by 25%

Raw Score	Contribution for 100% Score
125%	0
100%	0
125%	-
125%	-
29%	1,098,719
29%	1,098,911

END OF WORKSHEET



FCRM Partnership Funding Calculator for Flood and Coastal Erosion Risk Management Grant in Aid (FCRM GiA)

Version 7 April 2013

Project Name

Starcross

Unique Project Reference

Key

Input cells

Calculated cells

All figures are in 'thousands of pounds' (£k)

Figures in Blue to be entered onto MTP

SUMMARY: prospect of FCRM GiA funding

Raw Partnership Funding Score

665% (1)

External Contribution or saving required to achieve an Adjusted Score of 100%

0 (2)

Adjusted Partnership Funding Score (PF)

665% (3)

PV FCRM GiA towards the up-front costs of this scheme (Cost for Approval)

677,000 (4)

Scheme Benefit to Cost Ratio:	119.71	to 1
Effective return to taxpayer:	119.71	to 1
Effective return to area:	n/a	to 1

Cell (2) shows the minimum amount of contributions and/or reductions in scheme cost that are required to raise the Adjusted PF Score to at least 100%. Further increases on this will improve this scheme's chances of an FCRM GiA allocation in the desired year. Planned savings and contributions should be entered into cells(9,10,12) and cells(14-17).

1. Scheme details

Risk Management Authority type of asset maintainer

EA (5)

Yes (6)

Duration of Benefits (years)

20 (7)

Is evidence available that a Strategic Approach has been taken, and that double counting of benefits has been avoided?

PV Whole-Life Benefits:

81,043,000 (8)

All costs and benefits must be on a Present Value (PV) Whole-Life basis over the Duration of Benefits period. Where Contributions are identified these should also be on a Present Value basis.

PV Costs

PV Appraisal Costs

0 (9)

PV design & Construction Costs

677,000 (10)

Sub Total - PV Cost for Approval (appraisal,design,construction)

677,000 (11)

PV Post-Construction Costs

0 (12)

PV Total Whole-Life Costs:

677,000 (13)

The total value of any necessary contributions will depend on whether maintenance (ongoing costs) is funded through revenue FCRM GiA, or by other means.

This scheme is to be maintained by the EA (ref cell 5). Any contributions needed (ref cell 2) are to help fund both the ongoing and up-front costs (Cost for Approval), and should be entered into cells(14-17).

PV Contributions secured to date

PV Local Levy secured to date

0 (14)

PV Public Contributions secured to date

0 (15)

PV Private Contributions secured to date

0 (16)

PV Funding from other Environment Agency functions/sources secured to date

0 (17)

PV Total Contributions secured to date

0 (18)

2. Qualifying benefits under Outcome Measure 2: households better protected against flood risk

Number of households in:

20% most deprived areas

21-40% most deprived areas

60% least deprived areas

Before			After		
At:	Moderate risk	Significant risk	Moderate risk	Significant risk	Very significant risk
		661			

Change due to scheme		
	0	0
	0	0
	0	-661

Annual damages avoided, compared with a household at low risk

0.150	0.600	1.350

Change in household damages, in:

20% most deprived areas

21-40% most deprived areas

60% least deprived areas

Per year		Over lifetime of scheme	
£	-	£	-
£	-	£	-
£	397	£	7,932

Qual. benefits (discounted)	
OM2 (20%)	£ -
OM2 (21-40%)	£ -
OM2 (60%)	£ 6,033

3. Qualifying benefits under Outcome Measure 3: households better protected against coastal erosion

Number of households in:

20% most deprived areas

21-40% most deprived areas

60% least deprived areas

Before	
	-
	-
	-
Long-term loss	
Medium-term loss	

Damages per household avoided:

Annual damages avoided

Loss expected in

Present value of Year 1 loss (i.e. first year damages, discounted based on when loss is expected)

£	6	£	6
	50		20
£	1	£	3
Long-term loss		Medium-term loss	

Change in household damages, in:

20% most deprived areas

21-40% most deprived areas

60% least deprived areas

Year 1 loss avoided:		Over lifetime of scheme:	
£	-	£	-
£	-	£	-
£	-	£	-

Qual. benefits (discounted):	
OM3 (20%)	£ -
OM3 (21-40%)	£ -
OM3 (60%)	£ -

4. Qualifying benefits under Outcome Measure 4: statutory environmental obligations met

Payments under:

OM4a

OM4b

OM4c

	Hectares of net water-dependent habitat created
	Hectares of net intertidal habitat created
	Kilometres of protected river improved

Assumed benefits per unit:

£	15
£	50
£	80

Qual. benefits (discounted):

OM4a	£ -
OM4b	£ -
OM4c	£ -
OM4	£ -

5. Qualifying benefits arising from the overall scheme, for entry into the Medium-Term Plan

OM, deprivation:

OM1

OM2

OM3

OM4

Total

Qual. benefits:

Payment rate:

p in the £1

FCRM GiA contribution:

	£	81,036,967	5.56
20% most	£	-	45.0
21-40%	£	-	30.0
Least 60%	£	6,033	20.0
20% most	£	-	45.0
21-40%	£	-	30.0
Least 60%	£	-	20.0
	£	-	100.0
Total	£	81,043,000	

£	4,502,054
£	-
£	-
£	1,207
£	-
£	-
£	-
£	-
£	-
£	4,503,260

Maximum for Outcomes delivered

Sensitivity Testing. It is important that users of this calculator appreciate the implications on funding from changes to input data which may become necessary as the project develops and better information is available. Five typical tests are provided below. Users should consider how appropriate these are to their project, what other tests may be appropriate and how best to use the information with all those that may be involved in the project.

As scenario above

Sensitivity 1 - Change in PV Whole Life Cost (25% increase)

Sensitivity 2 - Change in OM2 - 50% of households in Very Significant (Before) risk may already be in Significant Risk

Sensitivity 3 - Change in OM3 - 50% of households in Medium Term loss (Before) may already be in Long Term loss

Sensitivity 4 - Increase Duration of Benefits by 25%

Sensitivity 5 - Reduce Duration of Benefits by 25%

Raw Score	Contribution for 100% Score
665%	0
532%	0
665%	-
665%	-
665%	-
665%	-
665%	-



FCRM Partnership Funding Calculator for Flood and Coastal Erosion Risk Management Grant in Aid (FCRM GiA)

Version 7 April 2013

Project Name

Dawlish Warren

Unique Project Reference

Key

Input cells

Calculated cells

All figures are in 'thousands of pounds' (£k)

Figures in Blue to be entered onto MTP

SUMMARY: prospect of FCRM GiA funding

Raw Partnership Funding Score

112% (1)

External Contribution or saving required to achieve an Adjusted Score of 100%

0 (2)

Adjusted Partnership Funding Score (PF)

112% (3)

PV FCRM GiA towards the up-front costs of this scheme (Cost for Approval)

8,334,000 (4)

Scheme Benefit to Cost Ratio:

10.34 to 1

Effective return to taxpayer:

10.34 to 1

Effective return to area:

n/a to 1

Cell (2) shows the minimum amount of contributions and/or reductions in scheme cost that are required to raise the Adjusted PF Score to at least 100%. Further increases on this will improve this scheme's chances of an FCRM GiA allocation in the desired year. Planned savings and contributions should be entered into cells(9,10,12) and cells(14-17).

1. Scheme details

Risk Management Authority type of asset maintainer

EA (5)

Yes (6)

Duration of Benefits (years)

30 (7)

Is evidence available that a Strategic Approach has been taken, and that double counting of benefits has been avoided?

PV Whole-Life Benefits:

86,171,000 (8)

PV Costs

PV Appraisal Costs

0 (9)

PV design & Construction Costs

8,334,000 (10)

Sub Total - PV Cost for Approval (appraisal,design,construction)

8,334,000 (11)

PV Post-Construction Costs

0 (12)

PV Total Whole-Life Costs:

8,334,000 (13)

All costs and benefits must be on a Present Value (PV) Whole-Life basis over the Duration of Benefits period. Where Contributions are identified these should also be on a Present Value basis.

The total value of any necessary contributions will depend on whether maintenance (ongoing costs) is funded through revenue FCRM GiA, or by other means.

This scheme is to be maintained by the EA (ref cell 5). Any contributions needed (ref cell 2) are to help fund both the ongoing and up-front costs (Cost for Approval), and should be entered into cells(14-17).

2. Qualifying benefits under Outcome Measure 2: households better protected against flood risk

Number of households in:

20% most deprived areas

21-40% most deprived areas

60% least deprived areas

Before		
At:	Moderate risk	Significant risk
	115,000	1,563,000
		1,203,000

After		
	Moderate risk	Significant risk
	1,563,000	1,203,000
		-

Change due to scheme		
	Moderate risk	Significant risk
	0	0
	0	0
	1,448,000	-360,000
		-1,203,000

Annual damages avoided, compared with a household at low risk

0.150	0.600	1.350

Change in household damages, in:

20% most deprived areas

21-40% most deprived areas

60% least deprived areas

Per year	
£	-
£	-
£	1,622,850

Over lifetime of scheme	
£	-
£	-
£	48,685,500

Qual. benefits (discounted)	
OM2 (20%)	£ -
OM2 (21-40%)	£ -
OM2 (60%)	£ 31,470,381

3. Qualifying benefits under Outcome Measure 3: households better protected against coastal erosion

Number of households in:

20% most deprived areas

21-40% most deprived areas

60% least deprived areas

Before	
Long-term loss	Medium-term loss

Damages per household avoided:
Annual damages avoided
Loss expected in
Present value of Year 1 loss (i.e. first year damages, discounted based on when loss is expected)

£ 6	£ 6
50	20
£ 1	£ 3
Long-term loss	Medium-term loss

Change in household damages, in:

20% most deprived areas

21-40% most deprived areas

60% least deprived areas

Year 1 loss avoided:	
£	-
£	-
£	-

Over lifetime of scheme:	
£	-
£	-
£	-

Qual. benefits (discounted):	
OM3 (20%)	£ -
OM3 (21-40%)	£ -
OM3 (60%)	£ -

4. Qualifying benefits under Outcome Measure 4: statutory environmental obligations met

Payments under:

OM4a

OM4b

OM4c

Hectares of net water-dependent habitat created
Hectares of net intertidal habitat created
Kilometres of protected river improved

Assumed benefits per unit:

£ 15
£ 50
£ 80

Qual. benefits (discounted):

OM4a	£ -
OM4b	£ -
OM4c	£ -
OM4	£ -

5. Qualifying benefits arising from the overall scheme, for entry into the Medium-Term Plan

OM, deprivation:

OM1

OM2

OM3

OM4

Total

Qual. benefits:		Payment rate:	
			p in the £1
	£ 54,700,619	5.56	
20% most	£ -	45.0	
21-40%	£ -	30.0	
Least 60%	£ 31,470,381	20.0	
20% most	£ -	45.0	
21-40%	£ -	30.0	
Least 60%	£ -	20.0	
	£ -	100.0	
	£ 86,171,000		

FCRM GiA contribution:

£ 3,038,923
£ -
£ -
£ 6,294,076
£ -
£ -
£ -
£ -
£ -
£ 9,332,999

Maximum for Outcomes delivered

Sensitivity Testing. It is important that users of this calculator appreciate the implications on funding from changes to input data which may become necessary as the project develops and better information is available. Five typical tests are provided below. Users should consider how appropriate these are to their project, what other tests may be appropriate and how best to use the information with all those that may be involved in the project.

As scenario above

Sensitivity 1 - Change in PV Whole Life Cost (25% increase)

Sensitivity 2 - Change in OM2 - 50% of households in Very Significant (Before) risk may already be in Significant Risk

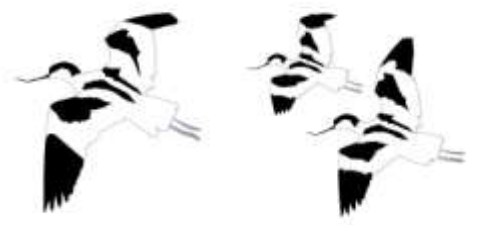
Sensitivity 3 - Change in OM3 - 50% of households in Medium Term loss (Before) may already be in Long Term loss

Sensitivity 4 - Increase Duration of Benefits by 25%

Sensitivity 5 - Reduce Duration of Benefits by 25%

Raw Score	Contribution for 100% Score
112%	0
90%	1,084,501
97%	264,635
112%	-
57%	3,545,616
57%	3,545,826

END OF WORKSHEET





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