

## **Appendix H Economic Appraisal**

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## H1 Introduction

A review of economic viability of the preferred plan for each area has been carried out. The review is undertaken in the context of each Management Area taking account of the economic consequences of the intent of management associated with each Policy Unit.

It should be noted that further detailed economic analysis will need to be undertaken in justifying any specific scheme in line with principles set out in the FCDPAG series of guidance.

The aim of the current review is to determine to what degree the intent of management proposed through the preferred policy may be justified in economic terms relating to coast protection or sea defence. In addition the review aims to examine the nature of the economic justification; considering whether that justification lies strongly with the defence of clear direct benefits, in terms of direct flood or erosion risk to assets, or derives from associated damages such as amenity, recreation, traffic disruption or is driven by the aims of other plans.

Various sources of information have been used to develop the review. As part of the SMP2 GIS and analysis procedure, damages have been derived using a 'damage assessment' technique prepared by economics expert, Dr John Chatterton, based on latest economic analysis guidance. Costs have been prepared using the cost guidance provided in the SMP2 guidance (Defra 2006), presented in section H3.

The results of the review are reported in summary tables provided in Annex H1 and the development of these tables is discussed in section H4.

A discussion of sensitivity is provided in section H5 together with an identification of the approach to assessing the future costs of schemes or maintenance. Consideration of the intent of commitment and affordability and is provided in section H6.

References to local studies where appropriate are provided in the summary tables in Annex H1.

## H2 Using of existing information

One source of data to improve the SMP2 economic assessment is further work undertaken in the form of strategies and detailed studies to implement recommendations and address uncertainties identified in SMP1. Since the publication of the SMP1s for Cornwall and the Isles of Scilly in 1999 however, there has been very little in the way of this kind of study undertaken.

These studies would have been able to consider the economic consequence for specific areas in far greater detail than would be appropriate for the SMP2. In particular, this type of study would have been able to determine specific damages relating to flooding due to overtopping and consider damages relating to aspects such as amenity and uses of the coast. In addition this type of study may have developed specific approaches to defence and from this have been able to assess future costs of a scheme at least in outline.

It is therefore important to note that the economics analysis presented in this SMP2 is based on a limited amount of information and is a high level analysis based solely on properties at risk of still water tidal flooding or erosion as determined through SMP2.

## H3 Generation of new data

### Determination of Damages

Damages have been determined based on the risk of flooding and or erosion to properties over the three epochs required for SMP2 using a 'damage assessment' technique prepared by Dr John Chatterton. Numbers of properties at risk have been determined by comparing the National Property Dataset against the maximum flood and erosion extents assuming No Active Intervention. A number of broad assumptions, drawn from the Multi-Coloured Manual and Land Registry have been made to determine commercial and residential average annual damages in May 2009 as follows;

- No Existing Protection
- May 2009 Price base unless otherwise stated
- Once a property is lost through erosion then Annual Average Damages no longer apply, with £175, 549 been used as an average value for residential property loss based on Land Registry information
- Depth of flooding is taken into account based upon scale of flood
- National Property dataset values used for non-residential property

Sea level rise has been considered in the production of the flood and erosion extents and therefore is taken into account in the damage assessment. The approach for generating the flood and erosion extents is discussed in Chapter 3.

Flood extents have been produced for the SMP2 based on extreme still water tide levels. Within the study area however there are some locations that are at risk of flooding caused by wave action. These locations are often not covered by the still water tidal flood extents and so are not counted in the numbers of properties at risk when determining damages. This in turn undervalues the benefits afforded by undertaking investment at the coast and can contribute to artificially low benefit/cost ratios for works at these locations. Locations where this is the case include Sennen Cove and Perranporth in Cornwall and at St Mary's on the Isles of Scilly. The risk from wave action is discussed within Chapter 4 for each location where this is known from observed flood events.

Other economic valuations are also excluded from the economic assessment. This includes transport losses, environmental, heritage and amenity losses.

These exclusions are highlighted within Annex H1 Supporting Economic Appraisal Data: Damages/Benefits and Costs below where relevant. This is to highlight the fact that further economic assessment at these locations could be necessary to capture all the damages for which investment would provide benefit.

## Determination of Costs

There is little information to draw upon to assist with the calculation of costs. Average baseline costs have therefore been used in estimating works. Typically these have been derived from a series of tables for different structure types. For each structure type the cost per metre of defence is estimated based on tidal and wave exposure. The key structure types are shown in the following tables.

It should be noted that a number of high level assumptions must be made in order to derive costs. These include the type and length of structure or intervention required in the future. Where Hold the Line is the preferred policy this information has been taken from the National Flood and Coastal Defence database (NFCDD) in relation to existing defences.

The costing of Managed Realignment requires more assumptions to be made. For example, the future alignment of the shoreline through intervention must be assumed, as must the type of invention required. The costs of removing the existing structures necessary for the realignment are based on the average baseline cost set out below.

## Typical average cost tables, including for optimism bias.

### Rock Revetment £/m

Tidal Exposure	Wave Exposure			
	Very Low	Low	Medium	High
Very Low				
Low		200	500	1000
Medium		1000	2000	4000
High		3000	7000	12500

### Earth Embankment £/m

Tidal Exposure	Wave Exposure			
	Very Low	Low	Medium	High
Very Low				
Low		200	350	1500
Medium		1500	2000	4000
High		3000	3500	6000

### Concrete Seawalls £/m

Tidal Exposure	Wave Exposure			
	Very Low	Low	Medium	High
Very Low	100	150	250	500
Low	200	300	500	1000
Medium	1000	1500	2000	5000
High	2500	4500	7000	12000

### Sheet piled walls £/m

Tidal Exposure	Wave Exposure			
	Very Low	Low	Medium	High
Very Low				
Low		200	400	600
Medium		600	1000	2000
High	600	1000	2000	3500

### Rock Breakwaters £/m

Tidal Exposure	Wave Exposure			
	Very Low	Low	Medium	High
Very Low				
Low		1500	1500	5000
Medium		2000	4000	8000
High		3000	6000	12500

In addition a cost of £2,500/m has been taken for removal of existing structures.

In certain circumstances individual structure costs have been used, to represent the possible use of one off structures.

## H4 Economic appraisal summary table

Annex H1 provides economic summary tables. The results from these are further summarised in the main SMP2 text in Chapter 4.

The tables are produced for each management area. The tables comprise:

- The assessment of damages. Two scenarios are considered for comparison; No Active Intervention and the Preferred Plan. Associated with each damage report is an identification of what additional damages might be considered in relation to the specific scenario. For each scenario total damages are reported with notes to explain how this has been derived from the information.
- The assessment of costs. This is provided for the Preferred Plan. As above the reference with respect to costs is identified and a brief explanation of how this has been used to derive a cost for the Preferred Plan.
- Finally, the table provides a brief comment or discussion in relation to the economic analysis and justification of the preferred policy. Where the Preferred Plan is shown solely from the summary of results not to be economically justified this is highlighted in terms of either additional benefits that might be considered or in terms of other values, which the plan is attempting to address.

## H5 Sensitivity

The critical uncertainties with respect to policy are highlighted and discussed in the main text of the SMP2. With respect to the economics, there is recognised uncertainty particularly in relation to erosion rates and possible timing of required works. Such uncertainty affects both the timing of the occurrence of damages and when works might be required. As such these aspects tend to balance in the economics.

Certainly within the scope of the SMP2, to assess the likely affordability and overall sustainability of policies such issues of timing are already accounted for. Clearly in terms of actual loss and hence planning of individual situations, timing may be important and the SMP2 has recommended monitoring to improve information.

Much uncertainty is related to the cost of implementing the preferred plan. While it is generally not within the remit of the SMP to define specific works (rather it sets the general intent and agenda for management), a high level sensitivity assessment has been undertaken on the costs in order to identify the impact on the benefit cost ratio. This sensitivity assessment includes adding a 60 per cent optimism bias on the present value cost, included for completeness and as a requirement to consider the guidance provided by the Treasury's 'Green Book'. It is important to acknowledge however, that the greatest uncertainty is often the type of work that would actually be carried out under a given policy scenario.

The results of the sensitivity assessment are included within Annex H1.

## H6 Affordability and commitment intent

The aim of the economic analysis is to determine through a broad brush approach to what degree the preferred policy may be justified in economic terms relating to coast protection or sea defence. In many cases the benefit/cost ratio generated through the assessment is very low, with only a few MAs showing a robust benefit/cost ratio. Although the presence of a robust benefit/cost ratio does not mean that funding from the public purse will be necessarily be available, clearly a very low ratio makes public funding highly unlikely.

Where there are known benefits which are not considered within the analysis but which are clearly factors that would need to be considered in future, more detailed economic analysis, these are stated in the notes presented in Annex H1. These factors include properties at risk of flooding from wave action, road and transport assets and environmental assets such as listed buildings and amenity sites.

The Client Steering Group (CSG) has considered the results of the economic assessment of the Preferred Plan. Following this consideration the Preferred Plan has not been altered due to concerns over the benefit/cost ratios generated.

The CSG have approved the Action Plan based on the Preferred Plan. The Action Plan lists the identified measures necessary to implement the intent of management identified by the Preferred Plan. It identifies partners and sources of funding as well as prioritising the actions into Low, Medium and High priorities. Through signing up to the Action Plan, each CSG partner is demonstrating a commitment of intent to undertaking each action, as priorities allow and funding permits.

A wide range of sources of funding have been considered in drawing up the Action Plan, which include Environment Agency Flood and Coastal Risk Management funding, Defra Grant in Aid funding, Plymouth Coastal Observatory, Nation Trust, English Heritage, and landowners such as private developers, the Duchy of Cornwall and Wildlife Trust. While the Action Plan does not commit these organisations to providing funding, it does document the wide range of interests that could be involved with investing in the sustainable management of the coastline. Furthermore the potential sources of funding listed in the Action Plan are not exhaustive. All funding routes should be investigated further as the Action Plan is implemented.

Shoreline management planning is a continuous process. The SMP2 recommends that further detailed economic analysis will need to be undertaken in justifying any specific scheme in line with the principles set out in the FCDPAG series of guidance.

## Annex H1 Supporting Economic Appraisal Data: Damages/Benefits and Costs

The following pages present the supporting Economic appraisal data, summarising damages, costs and cost/benefit values.



**Economic Assessment**

Policy development Zone (PDZ)1

Management Area (MA): 1

Location: Whitsand Bay to Dowderry

Policy Units (PU):1.1, 1.2

**DAMAGES**

Scenario: No Active Intervention

Present value of flooding	No. properties	PVd 2025 (£k)	No. properties	PVd 2055 (£k)	No. properties	PVd 2105 (£k)	Total Present Value (£k)
Flooding damages	0	0.0	0	0.0	0	0.0	0.0
<b>Present value of erosion</b>							
	0-20 yrs		20 to 50 yrs		50 to 100 yrs		
	No. properties	PV for epoch (£k)	No. properties	PV for epoch (£k)	No. properties	PV for epoch (£k)	
	1	133.3	4	245.6	0	0.0	378.9
Total Damages							<b>378.9</b>
<i>Information</i>							

**DAMAGES**

Scenario: Preferred Policy

Present value of flooding	No. properties	PVd 2025 (£k)	No. properties	PVd 2055 (£k)	No. properties	PVd 2105 (£k)	Total Present Value (£k)
Flooding damages	0	0.0	0	0.0	0	0.0	0.0
<b>Present value of erosion</b>							
	0-20 yrs		20 to 50 yrs		50 to 100 yrs		
	No. properties	PV for epoch (£k)	No. properties	PV for epoch (£k)	No. properties	PV for epoch (£k)	
	0	0.0	1	50.0	3	41.5	91.5
Total Damages							<b>91.5</b>
<i>Information</i> Car park & road losses not accounted for. Erosion and flood risk delayed and reduced due to MR policy							

**Costs**

Preferred Policy

Description	PV value (£k)
HTL in first epoch, moving to MH through management of erosion for H&S purposes and for local works to mitigate short term erosion to allow time for future ease of management	
Notes:	
	<b>136.8</b>

**Notes**

Negative benefits in Epoch 3 are a function delayed erosion risks.
Works relate to six defence types at Portwrinkle, moving from HTL to MR, minimal costs assumed in moving to MR

Economics Summary		by 2025	by 2055	by 2105	Total £k PV
Property	Potential NAI Damages (£k PV)	133.3	245.6	0.0	378.9
	Preferred Plan Damages (£k PV)	0.0	50.0	41.5	91.5
	Benefits of preferred plan (£k PV)	133.3	195.6	-41.5	287.4
	Costs of Implementing plan £k PV	94	43	0	137
Benefit/Cost ratio of preferred plan					2.10

Sensitivity Analysis		
Benefit/Cost ratio of preferred plan with costs -20%	Benefit/Cost ratio of preferred plan with costs +20%	Benefit/Cost ratio of preferred plan with costs +60%
2.63	1.75	1.31

**Economic Assessment**

Policy development Zone (PDZ)1

Management Area (MA):

Location: Downderry and Seaton

Policy Units (PU):2.1, 2.2, 2.3

2

**DAMAGES**

Scenario:

No Active Intervention

Present value of flooding	No. properties	PVd 2025 (£k)	No. properties	PVd 2055 (£k)	No. properties	PVd 2105 (£k)	Total Present Value (£k)
Flooding damages	0	0.0	0	0.0	0	0.0	0.0
<b>Present value of erosion</b>							
	0-20 yrs		20 to 50 yrs		50 to 100 yrs		
	No. properties	PV for epoch (£k)	No. properties	PV for epoch (£k)	No. properties	PV for epoch (£k)	
Total Damages	0	0.0	10	544.0	64	1330.9	1875.0
Information							<b>1875.0</b>

**DAMAGES**

Scenario:

Preferred Policy

Present value of flooding	No. properties	PVd 2025 (£k)	No. properties	PVd 2055 (£k)	No. properties	PVd 2105 (£k)	Total Present Value (£k)
Flooding damages	0	0.0	0	0.0	0	0.0	0.0
<b>Present value of erosion</b>							
	0-20 yrs		20 to 50 yrs		50 to 100 yrs		
	No. properties	PV for epoch (£k)	No. properties	PV for epoch (£k)	No. properties	PV for epoch (£k)	
Total Damages	0	0.0	2.5	136.0	16.0	332.7	468.7
Information	Car park & road losses not accounted for. Erosion and flood risk delayed and reduced due to NAI/MR policy. Assume that damages within the epoch are reduced by 75% over full NAI due to the policy of						<b>468.7</b>

**Costs**

Preferred Policy

Description	PV value (£k)
Costs of moving to MR/NAI in Epochs 1-3 at Seaton assumed equivalent to normal maintenance for Epoch 1 only, thereafter no costs	
Costs of MR at Downderry related to wall works in Epoch 2 and rock armour re-alignment works in both Epochs 2&3	<b>868.7</b>

Notes

Economics Summary		by 2025	by 2055	by 2105	Total £k PV
Property	Potential NAI Damages (£k PV)	0.0	544.0	1330.9	1875.0
	Preferred Plan Damages (£k PV)	0.0	136.0	332.7	468.7
	Benefits of preferred plan (£k PV)	0.0	408.0	998.2	1406.2
	Costs of Implementing plan £k PV	520	250	98	869
		Benefit/Cost ratio of preferred plan			1.62

Sensitivity Analysis		
Benefit/Cost ratio of preferred plan with costs -20%	Benefit/Cost ratio of preferred plan with costs +20%	Benefit/Cost ratio of preferred plan with costs +60%
2.0	1.3	1.0

**Economic Assessment**

Policy development Zone (PDZ)1

Management Area

(MA):

3

Location: Seaton to Pencarrow Head

Policy Units (PU):3.1,  
3.2, 3.3, 3.4, 3.5, 3.6,  
3.7, 3.8

**DAMAGES**

Scenario:

No Active Intervention

Present value of flooding	No. properties	PVd 2025 (£k)	No. properties	PVd 2055 (£k)	No. properties	PVd 2105 (£k)	Total Present Value (£k)
Flooding damages	385	2830.3	448	1755.3	542	630.9	5216.5
<b>Present value of erosion</b>							
	0-20 yrs		20 to 50 yrs		50 to 100 yrs		
	No. properties	PV for epoch (£k)	No. properties	PV for epoch (£k)	No. properties	PV for epoch (£k)	
	1	133.3	12	430.3	37	285.4	849.0
Total Damages							<b>6065.5</b>
<i>Information</i>							

**DAMAGES**

Scenario:

Preferred Policy

Present value of flooding	No. properties	PVd 2025 (£k)	No. properties	PVd 2055 (£k)	No. properties	PVd 2105 (£k)	Total Present Value (£k)
Flooding damages	193	1415.1	224	877.7	271	315.5	2608.3
<b>Present value of erosion</b>							
	0-20 yrs		20 to 50 yrs		50 to 100 yrs		
	No. properties	PV for epoch (£k)	No. properties	PV for epoch (£k)	No. properties	PV for epoch (£k)	
	0	0.0		0.0	0	0.0	0.0
Total Damages							<b>2608.3</b>
<i>Information</i>							
Car park & road losses not accounted for. Erosion and flood risk delayed and reduced due to MR policy, meaning on erosion losses in 100yrs							

**Costs**

Preferred Policy

Description	PV value (£k)
Notes: Flood defence works to Looe and Polperro including raising flood walls, flap valves and works to the coast protection/harbour structures	<b>5732.2</b>

**Notes**

B/C ratio below unity as large linear lengths of defences required for future protection due to rivers and unlikely that will be more that 50% effective. Benefits assume future defences only 50% effective & economics sensitive to this number. Complex problem that will require assessment of numerous issues, not simply economics.

Economics Summary		by 2025	by 2055	by 2105	Total £k PV	
<b>Property</b>	Potential NAI Damages (£k PV)	2963.6	2185.7	916.3	6065.5	
	Preferred Plan Damages (£k PV)	1415.1	877.7	315.5	2608.3	
	Benefits of preferred plan (£k PV)	1548.4	1308.0	600.9	3457.3	
	Costs of Implementing plan £k PV	3166	1568	998	5732	
					Benefit/Cost ratio of preferred plan	0.60

Sensitivity Analysis		
Benefit/Cost ratio of preferred plan with costs -20%	Benefit/Cost ratio of preferred plan with costs +20%	Benefit/Cost ratio of preferred plan with costs +60%
0.75	0.50	0.38

**Economic Assessment**

Policy development Zone (PDZ)2

Management Area

(MA):

4

Location: Pencarrow Head to Gribbin

Policy Units (PU):4.1, 4.2, 4.3, 4.4.

**DAMAGES**

Scenario:

No Active Intervention

Present value of flooding	No. properties	PVd 2025 (£k)	No. properties	PVd 2055 (£k)	No. properties	PVd 2105 (£k)	Total Present Value (£k)
Flooding damages	120	1195.4	133	680.0	156	242.4	2117.8
<b>Present value of erosion</b>							
	0-20 yrs		20 to 50 yrs		50 to 100 yrs		
	No. properties	PV for epoch (£k)	No. properties	PV for epoch (£k)	No. properties	PV for epoch (£k)	
	0	0.0	44	1505.5	18	523.5	2029.0
Total Damages							<b>4146.7</b>
<i>Information</i>							

**DAMAGES**

Scenario:

Preferred Policy

Present value of flooding	No. properties	PVd 2025 (£k)	No. properties	PVd 2055 (£k)	No. properties	PVd 2105 (£k)	Total Present Value (£k)
Flooding damages	60	597.7	67	340.0	78	121.2	1058.9
<b>Present value of erosion</b>							
	0-20 yrs		20 to 50 yrs		50 to 100 yrs		
	No. properties	PV for epoch (£k)	No. properties	PV for epoch (£k)	No. properties	PV for epoch (£k)	
	0	0.0	0	0.0	5	145.4	145.4
Total Damages							<b>1204.3</b>
<i>Information</i>							
Car park & road losses not accounted for. Erosion and flood risk delayed and reduced due to MR policy							

**Costs**

Preferred Policy

Description	PV value (£k)
HTL in Polruan and Fowey	
Notes: Long length of estuary defences to maintain	<b>4246.0</b>

**Notes**

B/C ratio below unity is a function of the long stretches of defence along the river that need to be maintained. Full assessment will need to take account of traffic, disruption and impact on local tourism economy.

Economics Summary		by 2025	by 2055	by 2105	Total £k PV
Property	Potential NAI Damages (£k PV)	1195.4	2185.5	765.8	4146.7
	Preferred Plan Damages (£k PV)	597.7	340.0	266.6	1204.3
	Benefits of preferred plan (£k PV)	597.7	1845.5	499.2	2942.4
	Costs of Implementing plan £k PV	2120	1066	1060	4246
Benefit/Cost ratio of preferred plan					0.69

Sensitivity Analysis		
Benefit/Cost ratio of preferred plan with costs -20%	Benefit/Cost ratio of preferred plan with costs +20%	Benefit/Cost ratio of preferred plan with costs +60%
0.87	0.58	0.43

**Economic Assessment**  
Policy development Zone (PDZ)2

Management Area  
(MA):

5

Location: Fowey Estuary

Policy Units (PU):5.1, 5.2, 5.3

**DAMAGES**

Scenario: No Active Intervention

Present value of flooding	No. properties	PVd 2025 (£k)	No. properties	PVd 2055 (£k)	No. properties	PVd 2105 (£k)	Total Present Value (£k)
Flooding damages	175	1074.7	208	677.8	314	357.6	2110.1
<b>Present value of erosion</b>							
	0-20 yrs		20 to 50 yrs		50 to 100 yrs		
	No. properties	PV for epoch (£k)	No. properties	PV for epoch (£k)	No. properties	PV for epoch (£k)	
	0	0.0	0	0.0	0	0.0	0.0
Total Damages							<b>2110.1</b>
<i>Information</i>							

**DAMAGES**

Scenario: Preferred Policy

Present value of flooding	No. properties	PVd 2025 (£k)	No. properties	PVd 2055 (£k)	No. properties	PVd 2105 (£k)	Total Present Value (£k)
Flooding damages	88	537.4	104	338.9	157	178.8	1055.1
<b>Present value of erosion</b>							
	0-20 yrs		20 to 50 yrs		50 to 100 yrs		
	No. properties	PV for epoch (£k)	No. properties	PV for epoch (£k)	No. properties	PV for epoch (£k)	
	0	0.0	0	0.0	0	0.0	0.0
Total Damages							<b>1055.1</b>
<i>Information</i>							
Car park & road losses not accounted for. Erosion and flood risk delayed and reduced due to MR policy							

**Costs**

Preferred Policy		PV value (£k)
Description		
Majority of defences in the vicinity of Lostwithiel		
Notes: Long lengths of River Fowey frontages to maintain		<b>2837.8</b>

**Notes**

High cost of defence management in the vicinity of Lostwithiel results in B/C ratio below unity, particularly as costs increase with sea level rise and the need to continue to protect the low lying town.

Economics Summary		by 2025	by 2055	by 2105	Total £k PV
Property	Potential NAI Damages (£k PV)	1074.7	677.8	357.6	2110.1
	Preferred Plan Damages (£k PV)	537.4	338.9	178.8	1055.1
	Benefits of preferred plan (£k PV)	537.4	338.9	178.8	1055.1
	Costs of Implementing plan £k PV	1417	712	708	2838
Benefit/Cost ratio of preferred plan					0.37

Sensitivity Analysis		
Benefit/Cost ratio of preferred plan with costs -20%	Benefit/Cost ratio of preferred plan with costs +20%	Benefit/Cost ratio of preferred plan with costs +60%
0.46	0.31	0.23

**Economic Assessment**  
Policy development Zone (PDZ)3

Management Area  
(MA):

6

Location: Gribbin Head to Par Docks

Policy Units (PU):6.1, 6.2, 6.3, 6.4

**DAMAGES**

Scenario: **No Active Intervention**

Present value of flooding	No. properties	PVd 2025 (£k)	No. properties	PVd 2055 (£k)	No. properties	PVd 2105 (£k)	Total Present Value (£k)
Flooding damages	407	2882.9	487	1863.2	590	687.2	5433.3
<b>Present value of erosion</b>							
	<b>0-20 yrs</b>		<b>20 to 50 yrs</b>		<b>50 to 100 yrs</b>		
	No. properties	PV for epoch (£k)	No. properties	PV for epoch (£k)	No. properties	PV for epoch (£k)	
	0	0.0	3	140.1	2	27.8	167.9
Total Damages							<b>5601.2</b>
<i>Information</i>							

**DAMAGES**

Scenario: **Preferred Policy**

Present value of flooding	No. properties	PVd 2025 (£k)	No. properties	PVd 2055 (£k)	No. properties	PVd 2105 (£k)	Total Present Value (£k)
Flooding damages	0	0.0	204	1084.0	244	787.2	1871.2
<b>Present value of erosion</b>							
	<b>0-20 yrs</b>		<b>20 to 50 yrs</b>		<b>50 to 100 yrs</b>		
	No. properties	PV for epoch (£k)	No. properties	PV for epoch (£k)	No. properties	PV for epoch (£k)	
	0	0.0	3	140.1	2	27.8	167.9
Total Damages							<b>2039.1</b>
<i>Information</i>							
Car park & road losses not accounted for. Erosion and flood risk delayed and reduced due to MR policy							

**Costs**

Preferred Policy

Description	PV value (£k)
HTL/MR at Polkerris, allowing defences to move landwards. MR moving to NAI at Par Docks. Some cost allowance for realignment to more sustainable position in epoch 1 with NAI in epochs 2 and 3.	
Notes:	<b>774.9</b>

**Notes**

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Economics Summary		by 2025	by 2055	by 2105	Total £k PV
Property	Potential NAI Damages (£k PV)				
		2882.9	2003.3	714.9	5601.2
	Preferred Plan Damages (£k PV)	0.0	1224.1	815.0	2039.1
	Benefits of preferred plan (£k PV)	2882.9	779.3	-100.1	3562.1
	Costs of Implementing plan £k PV	662	87	26	775
Benefit/Cost ratio of preferred plan					4.60

Sensitivity Analysis		
Benefit/Cost ratio of preferred plan with costs -20%	Benefit/Cost ratio of preferred plan with costs +20%	Benefit/Cost ratio of preferred plan with costs +60%
5.75	3.83	2.87

**Economic Assessment**  
Policy development Zone (PDZ)3

**Management Area**  
(MA):

7

Location: Par Docks to Black Head

Policy Units (PU):7.1, 7.2, 7.3, 7.4, 7.5

**DAMAGES**

Scenario: **No Active Intervention**

Present value of flooding	No. properties	PVd 2025 (£k)	No. properties	PVd 2055 (£k)	No. properties	PVd 2105 (£k)	Total Present Value (£k)
Flooding damages	0	0.0	0	0.0	0	0.0	0.0
<b>Present value of erosion</b>	<b>0-20 yrs</b>		<b>20 to 50 yrs</b>		<b>50 to 100 yrs</b>		
	No. properties	PV for epoch (£k)	No. properties	PV for epoch (£k)	No. properties	PV for epoch (£k)	
	0	0.0	0	0.0	0	0.0	0.0
Total Damages							<b>0.0</b>
Information							

**DAMAGES**

Scenario: **Preferred Policy**

Present value of flooding	No. properties	PVd 2025 (£k)	No. properties	PVd 2055 (£k)	No. properties	PVd 2105 (£k)	Total Present Value (£k)
Flooding damages	0	0.0	0	0.0	0	0.0	0.0
<b>Present value of erosion</b>	<b>0-20 yrs</b>		<b>20 to 50 yrs</b>		<b>50 to 100 yrs</b>		
	No. properties	PV for epoch (£k)	No. properties	PV for epoch (£k)	No. properties	PV for epoch (£k)	
	0	0.0	0	0.0	0	0.0	0.0
Total Damages							<b>0.0</b>
Information	Car park & road losses not accounted for. Erosion and flood risk delayed and reduced due to MR policy						

**Costs**

Preferred Policy

Description	PV value (£k)
HTL/MR at Charlestown & MR at Porthpean	
Notes: Majority of costs associated with Charlestown	<b>1740.0</b>

**Notes**

Works would probably require private/ non government funding as assets unlikely to attract purely flood/coastal risk funding.

Economics Summary		by 2025	by 2055	by 2105	Total £k PV
Property	Potential NAI Damages (£k PV)	0.0	0.0	0.0	0.0
	Preferred Plan Damages (£k PV)	0.0	0.0	0.0	0.0
	Benefits of preferred plan (£k PV)	0.0	0.0	0.0	0.0
	Costs of Implementing plan £k PV	895	443	402	1740
		Benefit/Cost ratio of preferred plan			N/A

Sensitivity Analysis		
Benefit/Cost ratio of preferred plan with costs -20%	Benefit/Cost ratio of preferred plan with costs +20%	Benefit/Cost ratio of preferred plan with costs +60%
N/A	N/A	N/A

**Economic Assessment**

Policy development Zone (PDZ)4

Management Area  
(MA):

8

Location: Black Head to Dodman Point

Policy Units (PU):8.1, 8.2, 8.3, 8.4, 8.5

**DAMAGES**

Scenario:

No Active Intervention

Present value of flooding	No. properties	PVd 2025 (£k)	No. properties	PVd 2055 (£k)	No. properties	PVd 2105 (£k)	Total Present Value (£k)
Flooding damages	154	999.2	194	706.1	252	296.1	2001.4
<b>Present value of erosion</b>							
	0-20 yrs		20 to 50 yrs		50 to 100 yrs		
	No. properties	PV for epoch (£k)	No. properties	PV for epoch (£k)	No. properties	PV for epoch (£k)	
	0	0.0	6	220.9	8	110.8	331.7
Total Damages							<b>2333.1</b>
<i>Information</i>							

**DAMAGES**

Scenario:

Preferred Policy

Present value of flooding	No. properties	PVd 2025 (£k)	No. properties	PVd 2055 (£k)	No. properties	PVd 2105 (£k)	Total Present Value (£k)
Flooding damages	77	499.6	97	353.0	126	148.0	1000.7
<b>Present value of erosion</b>							
	0-20 yrs		20 to 50 yrs		50 to 100 yrs		
	No. properties	PV for epoch (£k)	No. properties	PV for epoch (£k)	No. properties	PV for epoch (£k)	
	0	0.0	3	110.5	4	55.4	165.8
Total Damages							<b>1166.5</b>
<i>Information</i>							
Car park & road losses not accounted for. Erosion and flood risk delayed and reduced due to MR policy							

**Costs**

Preferred Policy

Description	PV value (£k)
Various measures required as numerous assets that require maintenance and raising	
Notes: Very high costs associated with the maintenance/management of the harbours of Mevagissey and, to a lesser extent, Gorran Haven	
	<b>5421.7</b>

**Notes**

B/C ratio less than unity relates to the very high cost of maintaining harbours. Investigation into a wide range of funding sources would be required. Analysis does not take account of the heritage & high tourism value of Mevagissey

Economics Summary		by 2025	by 2055	by 2105	Total £k PV	
Property	Potential NAI Damages (£k PV)	999.2	927.0	406.9	2333.1	
	Preferred Plan Damages (£k PV)					
		499.6	463.5	203.4	1166.5	
	Benefits of preferred plan (£k PV)	499.6	463.5	203.4	1166.5	
	Costs of Implementing plan £k PV	3365	1421	636	5422	
					Benefit/Cost ratio of preferred plan	0.22

Sensitivity Analysis		
Benefit/Cost ratio of preferred plan with costs -20%	Benefit/Cost ratio of preferred plan with costs +20%	Benefit/Cost ratio of preferred plan with costs +60%
0.27	0.18	0.13



**Economic Assessment**  
Policy development Zone (PDZ)4

**Management Area**  
(MA):

9

Location: Veryan Bay

Policy Units (PU):9.1, 9.2, 9.3, 9.4, 9.5, 9.6

**DAMAGES**

Scenario: No Active Intervention

Present value of flooding	No. properties	PVd 2025 (£k)	No. properties	PVd 2055 (£k)	No. properties	PVd 2105 (£k)	Total Present Value (£k)
Flooding damages	0	0.0	0	0.0	0	0.0	0.0
<b>Present value of erosion</b>	<b>0-20 yrs</b>		<b>20 to 50 yrs</b>		<b>50 to 100 yrs</b>		
	No. properties	PV for epoch (£k)	No. properties	PV for epoch (£k)	No. properties	PV for epoch (£k)	
	0	0.0	1	70.2	2	27.8	98.0
Total Damages							<b>98.0</b>
Information							

**DAMAGES**

Scenario: Preferred Policy

Present value of flooding	No. properties	PVd 2025 (£k)	No. properties	PVd 2055 (£k)	No. properties	PVd 2105 (£k)	Total Present Value (£k)
Flooding damages	0	0.0	0	0.0	0	0.0	0.0
<b>Present value of erosion</b>	<b>0-20 yrs</b>		<b>20 to 50 yrs</b>		<b>50 to 100 yrs</b>		
	No. properties	PV for epoch (£k)	No. properties	PV for epoch (£k)	No. properties	PV for epoch (£k)	
	0	0.0	0	0.0	0	0.0	0.0
Total Damages							<b>0.0</b>
Information	Car park & road losses not accounted for. Erosion and flood risk delayed and reduced due to MR policy						

**Costs**

Preferred Policy

Description	PV value (£k)
Minor defensive works at Portloe	
Notes:	<b>107.8</b>

**Notes**

B/C ratio is marginal due to the higher costs of pier maintenance.  
Investigation into a wide range of funding sources may be required.

Economics Summary		by 2025	by 2055	by 2105	Total Ek PV
Property	Potential NAI Damages (£k PV)	0.0	70.2	27.8	98.0
	Preferred Plan Damages (£k PV)	0.0	0.0	0.0	0.0
	Benefits of preferred plan (£k PV)	0.0	70.2	27.8	98.0
	Costs of Implementing plan Ek PV	52	25	31	108
		Benefit/Cost ratio of preferred plan			0.91

Sensitivity Analysis		
Benefit/Cost ratio of preferred plan with costs -20%	Benefit/Cost ratio of preferred plan with costs +20%	Benefit/Cost ratio of preferred plan with costs +60%
1.14	0.76	0.57

**Economic Assessment**  
Policy development Zone (PDZ)4

Location: Gerrans Bay

Management Area  
(MA):

10  
Policy Units (PU):10.1, 10.2, 10.3, 10.4

**DAMAGES**

Scenario: No Active Intervention

Present value of flooding	No. properties	PVd 2025 (£k)	No. properties	PVd 2055 (£k)	No. properties	PVd 2105 (£k)	Total Present Value (£k)
Flooding damages	0	0.0	0	0.0	0	0.0	0.0
<b>Present value of erosion</b>							
	0-20 yrs		20 to 50 yrs		50 to 100 yrs		
	No. properties	PV for epoch (£k)	No. properties	PV for epoch (£k)	No. properties	PV for epoch (£k)	
	0	0.0	10	472.3	11	166.3	638.6
Total Damages							<b>638.6</b>
<i>Information</i>							

**DAMAGES**

Scenario: Preferred Policy

Present value of flooding	No. properties	PVd 2025 (£k)	No. properties	PVd 2055 (£k)	No. properties	PVd 2105 (£k)	Total Present Value (£k)
Flooding damages	0	0.0	0	0.0	0	0.0	0.0
<b>Present value of erosion</b>							
	0-20 yrs		20 to 50 yrs		50 to 100 yrs		
	No. properties	PV for epoch (£k)	No. properties	PV for epoch (£k)	No. properties	PV for epoch (£k)	
	0	0.0	3	118.1	3	41.6	159.7
Total Damages							<b>159.7</b>
<i>Information</i>							
Car park & road losses not accounted for. Erosion and flood risk delayed and reduced due to MR policy							

**Costs**

Preferred Policy

Description	PV value (£k)
HTL at Portscatho	
Notes: Small cost included for MR at Pendower East in Epoch1	163.6

**Notes**

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Economics Summary		by 2025	by 2055	by 2105	Total £k PV
Property	Potential NAI Damages (£k PV)	0.0	472.3	166.3	638.6
	Preferred Plan Damages (£k PV)	0.0	118.1	41.6	159.7
	Benefits of preferred plan (£k PV)	0.0	354.2	124.7	479.0
	Costs of Implementing plan £k PV	89	45	30	164
		Benefit/Cost ratio of preferred plan			2.93

Sensitivity Analysis		
Benefit/Cost ratio of preferred plan with costs -20%	Benefit/Cost ratio of preferred plan with costs +20%	Benefit/Cost ratio of preferred plan with costs +60%
3.66	2.44	1.83

**Economic Assessment**  
Policy development Zone (PDZ)5

Management Area  
(MA):

11

Location: Lower Fal

Policy Units (PU):11.1, 11.2, 11.3, 11.4, 11.5, 11.6, 11.7, 11.8, 11.9, 11.10

**DAMAGES**

Scenario: No Active Intervention

Present value of flooding	No. properties	PVd 2025 (£k)	No. properties	PVd 2055 (£k)	No. properties	PVd 2105 (£k)	Total Present Value (£k)
Flooding damages	527	5523.4	635	3366.2	863	1305.6	10195.3
<b>Present value of erosion</b>							
	0-20 yrs		20 to 50 yrs		50 to 100 yrs		
	No. properties	PV for epoch (£k)	No. properties	PV for epoch (£k)	No. properties	PV for epoch (£k)	
	0	0.0	0	0.0	2	12.5	12.5
Total Damages							<b>10207.8</b>
<i>Information</i>							

**DAMAGES**

Scenario: Preferred Policy

Present value of flooding	No. properties	PVd 2025 (£k)	No. properties	PVd 2055 (£k)	No. properties	PVd 2105 (£k)	Total Present Value (£k)
Flooding damages	53	552.3	127	673	173	261	2039
<b>Present value of erosion</b>							
	0-20 yrs		20 to 50 yrs		50 to 100 yrs		
	No. properties	PV for epoch (£k)	No. properties	PV for epoch (£k)	No. properties	PV for epoch (£k)	
	0	0.0	0	0.0	0	0.0	0.0
Total Damages							<b>2039.1</b>
<i>Information</i>							
Car park & road losses not accounted for. Erosion and flood risk delayed and reduced due to MR policy							

**Costs**

Preferred Policy

Description	PV value (£k)
Hold the line of defence and raise defence in the future	
High costs for long linear frontages along estuary, particularly Falmouth and Flushing	<b>7680.3</b>

**Notes**

Marginal B/C ratio marginal, likely to improve with traffic & other infrastructure asset inclusion

Economics Summary		by 2025	by 2055	by 2105	Total £k PV
Property	Potential NAI Damages (£k PV)	5523.4	3366.2	1318.1	10207.8
	Preferred Plan Damages (£k PV)	552.3	673.2	261.1	2039.1
	Benefits of preferred plan (£k PV)	4971.1	2693.0	1057.0	8168.7
	Costs of Implementing plan £k PV	3636	1832	2212	7680
		Benefit/Cost ratio of preferred plan			1.06

Sensitivity Analysis		
Benefit/Cost ratio of preferred plan with costs -20%	Benefit/Cost ratio of preferred plan with costs +20%	Benefit/Cost ratio of preferred plan with costs +60%
1.33	0.89	0.66

**Economic Assessment**  
Policy development Zone (PDZ)5

**Management Area**  
(MA):

12

Location: Upper Fal

Policy Units (PU):12.1, 12.2, 12.3, 12.4, 12.5

**DAMAGES**

Scenario: No Active Intervention

Present value of flooding	No. properties	PVd 2025 (£k)	No. properties	PVd 2055 (£k)	No. properties	PVd 2105 (£k)	Total Present Value (£k)
Flooding damages	539	3944.9	614	2321.1	767	876.6	7142.6
<b>Present value of erosion</b>							
	0-20 yrs		20 to 50 yrs		50 to 100 yrs		
	No. properties	PV for epoch (£k)	No. properties	PV for epoch (£k)	No. properties	PV for epoch (£k)	
	0	0.0	0	0.0	0	0.0	0.0
Total Damages							<b>7142.6</b>
<i>Information</i>							

**DAMAGES**

Scenario: Preferred Policy

Present value of flooding	No. properties	PVd 2025 (£k)	No. properties	PVd 2055 (£k)	No. properties	PVd 2105 (£k)	Total Present Value (£k)
Flooding damages	81	591.7	92	348.2	115	131.5	1071.4
<b>Present value of erosion</b>							
	0-20 yrs		20 to 50 yrs		50 to 100 yrs		
	No. properties	PV for epoch (£k)	No. properties	PV for epoch (£k)	No. properties	PV for epoch (£k)	
	0	0.0	0	0.0	0	0.0	0.0
Total Damages							<b>1071.4</b>
<i>Information</i>							
Car park & road losses not accounted for. Erosion and flood risk delayed and reduced due to MR policy							

**Costs**

Preferred Policy

Description	PV value (£k)
HTL and HTL/MR, with majority of costs related to the Truro area.	
Notes: No major costs allowed for compensatory or mitigation measures in relation to HTL at Truro and coastal squeeze.	<b>3079.1</b>

**Notes**

Robust B/C ratio, with higher ratio for the highly populated areas of Truro. Traffic losses not considered which would inflate B/C ratio.

Economics Summary		by 2025	by 2055	by 2105	Total Ek PV
<b>Property</b>	Potential NAI Damages (£k PV)	3944.9	2321.1	876.6	7142.6
	Preferred Plan Damages (£k PV)	591.7	348.2	131.5	1071.4
	Benefits of preferred plan (£k PV)	3353.1	1973.0	745.1	6071.2
	Costs of Implementing plan Ek PV	1538	773	768	3079
				Benefit/Cost ratio of preferred plan	1.97

Sensitivity Analysis		
Benefit/Cost ratio of preferred plan with costs -20%	Benefit/Cost ratio of preferred plan with costs +20%	Benefit/Cost ratio of preferred plan with costs +60%
2.46	1.64	1.23