



# Robin Hood's Bay Project Appraisal Report

Appendix G: Economic Report

February 2017

Scarborough Borough Council



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February 2017

Scarborough Borough Council

Town Hall, St Nicholas Street, Scarborough. Yorkshire, YO11 2HG



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# 1 Introduction

Robin Hood's Bay Project Appraisal Report (hereafter referred to as the 'PAR') considers the 160m long concrete sea wall within Robin Hood's Bay. This area is within section 25.2 of Scarborough Borough Councils Coastal Strategy Appraisal Report (hereafter referred to as the 'Strategy') (Haskoning 2012).

Robin Hood's Bay is a coastal bay and historic village situated between Scarborough and Whitby on the North Yorkshire coastline. There is a long history of coastal erosion at Robin Hood's Bay. Since a large landslide in 1780 which destroyed much of the original road into the village (King Street), over 200 properties have been lost to cliff erosion. The south part of the village is protected from erosion by a concrete sea wall which is approximately 12m tall and 160m long built circa 1974. This sea wall is abutted by a masonry sea wall at the southern end and a natural shale cliff at the northern end. Erosion continues to be a natural and ongoing process in the northern half of the village. A plan of the frontage is given in Figure 1.1.

The Strategy and previous supporting studies considers Robin Hood's Bay Sea Wall to be in poor condition with an estimated residual life of 15 – 20 years. The Shoreline Management Plan2 (SMP2 - River Tyne to Flamborough Head) policy for the southern half of Robin Hood's Bay over the next 100 years is to Hold the Line (Royal Haskoning, 2007). Capital works are therefore required to extend the residual life of the sea wall for a further 80 years. These are being developed as part of this PAR.

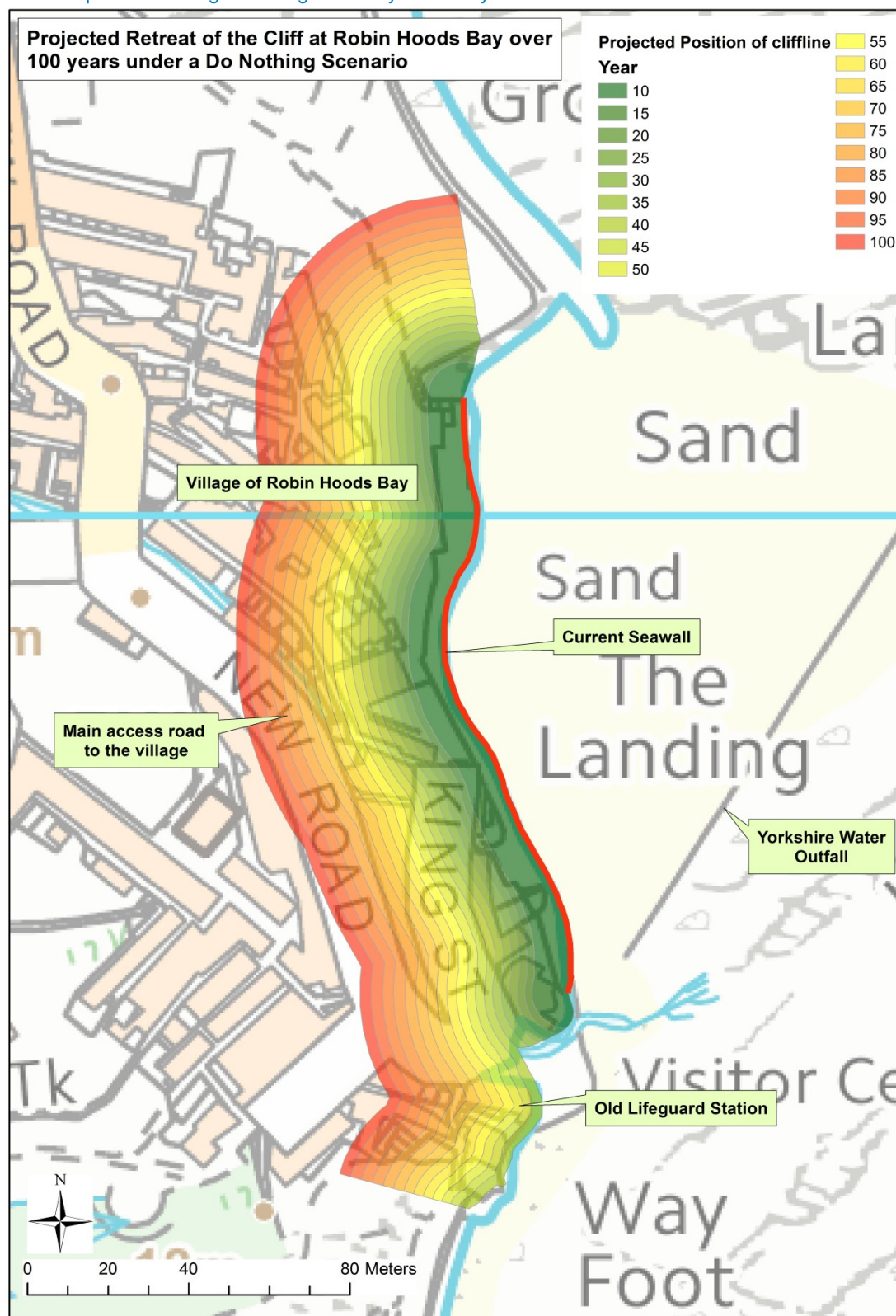
This Economic Appraisal Report presents the calculations and assumptions which have been used in the economic assessment of the shortlisted options which are as follows:

- Option 1 – "Do Nothing" (Used as a baseline for economic appraisal)
- Option 2 – Patch Repairs and Galvanised Anodes
- Option 3 – Replacement of Concrete Panels and Galvanised Anode Protection anodes
- Option 4 - Full Replacement of Concrete Casing

This has been summarised in the main PAR document. This report details the methodologies used to derive the costs and benefits, the main outcomes of the economic analysis and partnership funding analysis including sensitivities.



Figure 1.1: Map of the frontage showing the Study Area. Key sites of interest are also shown.



## 2 Background

### 2.1 Assessment Approach

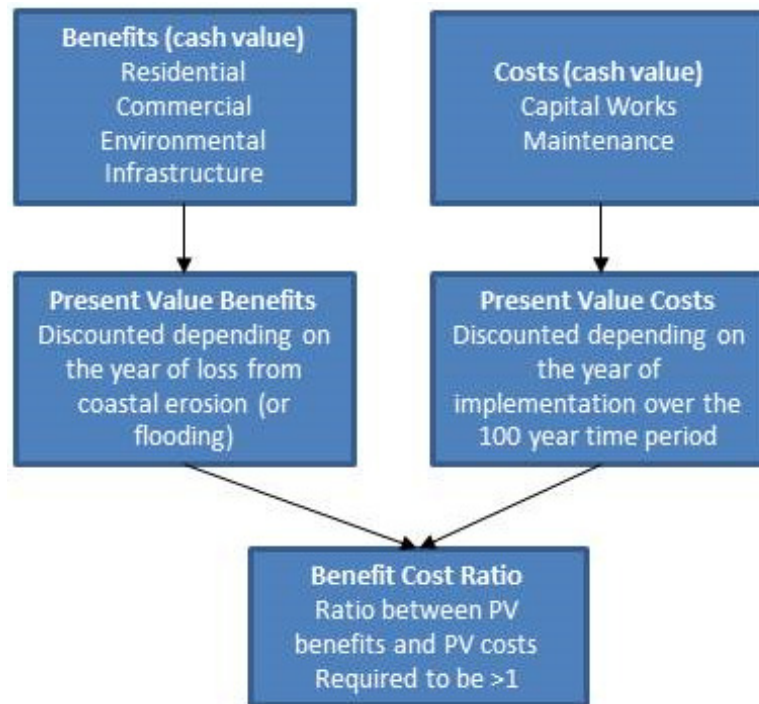
The economic assessment is based on the latest Flood and Coastal Erosion Risk Management Appraisal Guidance [FCERM-AG] (EA, 2010), which provides guidance on the methodology to undertake effective appraisals. The guidance assists in considering economic benefits and losses that arise from particular options.

The economic assessment also utilises the spreadsheet template provided by the Environment Agency (EA 2014), which is the basis on which the Environment Agency will approve proposals and grant funding. The economic assessment includes information from the HM Treasury Green Book (2011) and Multi-coloured Manual (Middlesex University, 2010). It should be noted that the economic assessment was undertaken in line with current DEFRA and treasury guidance (FCRM-AG, 2010).

This economic assessment provides a framework for assessing the advantages and disadvantages of the options by expressing all of the potential effects and benefits of an option in terms of its monetary cost. The assessment considers the value (cost) of the options and whether investment in any option is worthwhile against the benefits. Benefits can include protection of residential and non-residential properties, infrastructure, agricultural land and tourism/ recreation. An option is considered to be 'justified' if the benefits outweigh the costs (i.e. the benefit cost ratio is greater than one).

Costs and benefits can be expressed in terms of their cash value in pounds sterling but also in terms of their Present Value (PV). The Present Value of the future pound is assumed to fall away through time. To include this in the benefit cost ratio the discount factor provided in the HM Treasury Green Book (2011) is applied. The discount rates are included in the benefit cost ratio analysis to allow the uncertainty of the future to be included. This uncertainty is shown to cause a decline in discount rates over time. The HM Treasury Green Book recommends that for benefit cost analysis that accrues for more than 30 years the following discount rates should be used: 3.5% (0 to 30 years), 3% (30 to 75 years) and 2.5% (75 to 100 years). Present value benefits are calculated by discounting which depends on the year of loss of that benefit e.g. the year a house is lost to coastal erosion. Present value costs are calculated by discounting the year in which works are implemented. For example when the works are implemented in year 10 then it is necessary to discount the current cash value to work out how much the scheme will cost in the future (Figure 2.1).

Figure 2.1: Summary of the steps undertaken within an economic assessment. Cash value is the current value of the benefits or the costs. Present value is the discounted value of benefits or costs depending on the year of loss or implementation of works.



## 2.2 Assessment Scenarios

The recommended SMP2 (2007) and Strategy (2012) policy for the frontage is to Hold the Line in the long term (over 100 years), and this policy has been adopted in the PAR. Two assessment scenarios were considered within this economic assessment:

- **The Do Nothing scenario:** The Do Nothing option is the baseline against which all other options to 'Do Something' are assessed and is required when undertaking economic assessment of the options. Adopting a Do Nothing approach would mean the cessation of all maintenance and capital works.
- **The Hold the Line scenario:** This scenario covers the shortlisted options 2 – 4 which are all designed to prevent erosion of the frontage over 100 years. Under this scenario the benefits of implementing the works are calculated as damages avoided (i.e. damages calculated under the Do Nothing scenario).

## 3 Benefits

Benefits (calculated as erosion damages avoided) have been calculated using guidance from the Multi-Coloured Manual (MCM, 2010) and FCRM-AG (2010) and discounted in accordance with the HM Treasury Green Book (2011). An assessment of the potential erosion of the frontage under a Do Nothing scenario has been undertaken and erosion lines were drawn within a Geographic Information System (GIS). Further details on how the erosion lines were calculated and drawn can be found in Appendix K: Erosion Assessment Technical Note.

The base dates for the value of the benefits is the same as has been used for the costs (Feb 2016). The benefits have been calculated from the value of:

- Residential and Commercial properties.
- Recreation/tourism benefits.

### 3.1 Property Benefits

The erosion rates were calculated using the Historical Trend Analysis which was applied using the following equation from SCOPAC Sea Level rise and Global warming, Scenarios, Physical Impacts and Policy Options (Bray, Carter and Hooke, 1992).

$$R2 = (R1/S1).S2$$

Where: S1 is the historical sea level rise

S2 is the future sea level rise

R1 is the historical retreat rate

R2 is the future retreat rate

The historic retreat rate of 0.3 m per year was used, as was outlined in the Strategy (Royal Haskoning, 2012)

The sea level rise scenarios were taken from UK Climate Projections (2009). The future sea level rise rates (2012-2112) vary between 0.005 m per annum to 0.009 m per annum, with a general trend of increasing rates of sea level rise as time progresses. The future erosion rates were then calculated using the equation above. In this assessment it is assumed that failure of the wall causes immediate erosion. It is assumed that when the wall fails there will be a large landslide that will retreat the cliff 5m due to the increased instability. Cumulative erosion rates were then summarised for every 5 years.

A shapefile was downloaded from The National Receptor Database (NRD) and loaded into ArcMap to enable identification of the properties along the frontage. The erosion rates for every 5 years were mapped within GIS. These data were overlaid with the property data to enable calculation of the number of properties at risk of erosion every 5 years (summarised in Table 3.1).

During calculation of the number of properties lost every 5 years due to erosion under a Do Nothing scenario, the properties were categorised as either residential properties or commercial properties.

The total properties at risk are defined as those which would be affected by erosion under a Do Nothing scenario. The year in which an asset is considered to be at risk from erosion is dependent on both the

location of the property and/or when services or infrastructure to the property are lost. Therefore the properties are considered to be at risk when the seaward edge of the property, or the road needed for access to the property comes within 5 m of an erosion line. Therefore in reality some properties may be 'lost' in the assessment before actually falling into the sea. The timing of the loss of property is crucial because it determines the discount value applied during the valuation of assets.

**Table 3.1: Number of residential and commercial properties at risk from erosion under a Do Nothing Scenario**

Year	Residential Properties	Commercial Properties	Total
0-20	8	3	11
21-50	27	2	29
51-100	135	11	146
<b>Total</b>	<b>170</b>	<b>16</b>	<b>186</b>

### 3.1.1 Valuation of Residential Properties

170 residential properties in Robin Hoods Bay are at risk from erosion within the next 100 years. The sum of the values of residential properties that would be affected by erosion under a Do Nothing scenario during each year has been calculated using average property values for Robin Hood's Bay on [www.zoopla.com](http://www.zoopla.com). A review of postcode estimated average property values demonstrates that apart from a few outliers the values are within 10% of this the average for Robin Hood's Bay. A review of aerial photography from the North East Coastal Observatory and the site visit on 10 April 2014 confirms that houses are similar across different areas of the village and the use of an average house price is considered appropriate. The average house prices are shown in Table 3.2.

**Table 3.2: Table to show average values for properties in Robin Hoods Bay**

Property Type	Value (£)
Detached	293032
Semi-Detached	183530
Terraced	176966
Flat	144064

The values were entered into the FCERM – AG spreadsheet (EA, 2014) for each specific year that losses occurred. The discount rate was then applied to each year to determine the Present Value (PV) of the properties lost to erosion.

A deprivation index is applied during the funding spreadsheet calculations for those properties within the highest 20% of socially deprived areas and those which fall within 21% and 40% most deprived areas in England according to the index of multiple deprivation ([opendatacommunities.org/deprivation/map](http://opendatacommunities.org/deprivation/map) accessed July 2015). Robin Hood's Bay is in the 21%-40% most deprived areas in England.

### 3.1.2 Valuation of Non-Residential Properties

#### Commercial Properties (excluding hotels)

16 commercial properties have been identified to be at risk from erosion over the next 100 years under a Do Nothing Scenario in Robin Hood's Bay. Valuation of these properties followed recommendations from



the MCM (2010). The Valuation Office Agency (VOA, [www.voa.gov.uk](http://www.voa.gov.uk)) was used to obtain the rateable value of the property. Multiplying this value by ten gives an approximation of its market value.

### **The Old Coastguard Station**

In a review of the Strategy economics (J. Chatterton Associates, 2012) the National trust who owns the property suggests a re-build cost of £750,000 and a 'comparative selling price' for this unique property of two and a half times this value. This gives a value of £1.9 million.

### **3.2 Other Erosion Benefits**

In addition to residential and commercial properties, there are also likely to be further erosion benefits. Other infrastructure, services and assets of historical importance will be lost over the next 100 years under a 'Do Nothing' option.

Some benefits are easier to place a monetary 'value' on than others. The area is steeped with historical and cultural interest and there is a total of 97 listed buildings within the 100-year erosion outline. The benefit cost analysis cannot fully account for the significance of these assets in relation to other monetised benefits. To avoid double counting it has been assumed that their value is included in the value of tourism to the village. Therefore the benefits are likely to be underestimated and the real benefit cost ratio is likely to be higher than is shown below. Wider socio-economic implications of the Do Nothing option e.g. people, businesses (and jobs) moving away to other towns is also not considered in this assessment.

The majority of infrastructure within the erosion area is local infrastructure serving the adjacent properties. The value of this infrastructure has been assumed to be part of the value of the property and has therefore not been counted. The sea defence does however protect the supply from the north to Yorkshire Water's large offshore sewage outfall. In order to maintain this outfall the network would have to be diverted around the back of the village. This will be a diversion of approximately 200m. A nominal cost of £1.1 million has been estimated for these works based on recent construction of sewage upgrades (Mott MacDonald).

### **3.3 Recreation/Tourism Benefits**

Robin Hood's Bay is a very popular seaside town and benefits from money brought in through tourism. The popularity of the village is demonstrated in the Yorkshire Regional Visitor Survey for Scarborough district for 2009 found that the Expenditure profile for Robin Hood's Bay was more than double that for Yorkshire overall. All shortlisted options have the potential to affect the recreational benefit, it is therefore fundamental that tourism benefits and costs are included in the benefit cost ratio.

The methodology used to calculate the losses or benefits from tourism follows method set out in the MCM (2010) and makes use of the data and detailed methodology used in the Strategy benefit review (J. Chatterton Associates, 2012) to calculate the value of enjoyment. This PAR has updated the data used in the Strategy as this was developed in 2011.

Ideally the Value of Enjoyment is estimated through visitor surveys, however this is an expensive and time consuming process. In the absence of a recent visitor survey values can be taken from other resorts to estimate an equivalent value for the study area. In the Strategy a value of £6.34 was used which was taken

from a study of Cliftonville in the MCM (2005). This has been updated to 2016 prices, by taking the value for Cliftonville in the updated MCM (2014) to give a value of loss of enjoyment of £7.08 per visitor.

The number of visitors to Robin Hood's Bay travelling by car can be estimated by the car park ticket sales available from Scarborough Borough Council. Visitors to the narrow streets must park in either the Station or Bank Top car park. Ticket sales reported in the Strategy gave figures for 2003/04 and 2008/09 of an average of 86,504 cars and 553 coaches. This has been updated with 2013/14 figures of 73,886 cars. These figures have been multiplied by 2 to account for an average of 2 visitors per car, which is a more conservative estimate of the Yorkshire Regional Visitor Survey 2011 which stated that the average party size for the North Yorkshire Moors and Coast is 3.07 visitors. The number of coach tickets is unknown and has been omitted due to its relatively small number.

In addition Robin Hood's Bay is located on two major long distance walking routes Alfred Wainright's coast to coast walk and the Cleveland Way National Trail. The National Trails officer for the North Yorkshire National Park has provided figures of walkers going past the Rocket Field Post just outside Robin Hood's Bay. These two data sources have been combined to provide a total number of visitors per year to the village.

To account for the uncertainties relating to tourism, a sensitivity approach was undertaken where 50% of this total value was taken forward to calculate a value for the annual benefits. The value was calculated by using the value loss/day at Cliftonville in the MCM, as per the Strategy (Table 8.3. MCM, 2014). The values of the tourism benefits are outlined in Table 3.3.

Table 3.3: Annual Tourism values for Robin Hood's Bay

Source	Total Number of visitors per year	Value of loss/day at Cliftonville (MCM, 2014)	Total Value per year	Sensitivity per year
Car Park	147,772	£7.08	£1,046,225	£523,112
Walking Visitors	42,000		£297,360	£148,680
<b>TOTAL</b>	<b>189,772</b>		<b>£1,343,585</b>	<b>£671,792</b>

### 3.4 Summary of Benefits

Table 3.5 below summarises the benefits for the frontage.

Table 3.4: Summary of damages and benefits

	PV Erosion Damages (£k)	PV Erosion Benefits (£k)	PV Tourism Damages (£k)	PV Tourism Benefits (£k)	Total PV Benefits (£k)
Option 1 – Do Nothing	£6,358	0	£14,325	0	0
Options 2 – 4	0	£6,359	0	£14,325	<b>£20,684</b>
Option 5	0	£4,057	0	£10,809	<b>£14,867</b>

## 4 Costs

The Present Value costs of the shortlisted options have been determined by combining the capital and maintenance costs correct as of February 2016 and discounting to the year of implementation. The costs of the options have been estimated and optimised using the Project Team's experience of construction of similar works, information obtained from specialist contractors and SPON'S Civil Engineering Price Book (Langdon, 2014). In order to account for any additional constructability issues and problems associated with the small size of the project, limited access and tidal working a mark-up of 1.5 has been included on costs.

### 4.1 Optimism Bias

A 30% Optimism Bias has been included within the PV costs as is recommended in EA Guidance for the PAR process where contractor input and previous experience enables more realistic cost estimates to be produced. This Optimism Bias is incorporated within the economic assessment to ensure a robust benefit cost ratio is present even with a large uncertainty included in the price. This allows confidence that the scheme is economically justifiable.

### 4.2 Present Value Costs

The capital and maintenance costs for each of the proposed options are presented in Table 4.1 below. Option 1 is the baseline Do Nothing option and therefore has no associated costs (and hence has been excluded from the cost tables below). Capital works include significant upgrades or works to defences. The maintenance costs are then associated with on-going maintenance of the defences throughout the 100 year design life to ensure the standard of protection provided by the defences does not decrease to an unacceptable level. Other costs include surveys, which are important for ongoing monitoring of the effectiveness of the scheme, in addition to upfront costs of detailed design and construction.

A summary of the total calculated Present Value costs over the 100 years for Options 2-4, and over 50 years for Option 5 are presented in Table 4-2.

Table 4.1: PV costs (with no optimism bias) for each short-listed option (excluding Option 1: Do Nothing). All values have been rounded up or down accordingly.

		PV Costs (£k)		Notes
Option		0-9 years	10-100 years (option 2-4) / 10-50 years (option 5)	
Capital costs (£k)	Option 2	254	2134	<ul style="list-style-type: none"> <li>Phase 1 patch repairs and installation of galvanised anodes to 40% of the wall undertaken in Year 1.</li> <li>Phase 2 and 3 undertaken in Years 10, 25. Involves patch repairs and installation of galvanised anodes to 40% of the wall</li> <li>Phase 4 undertaken in Year 40. Involves full replacement of the concrete wall casing.</li> </ul>



Maintenance costs (£k)	Option 3	438	1,812	<ul style="list-style-type: none"> <li>□ Phase 1 replacement of concrete facing panels and installation of galvanised anodes to 30% of the wall undertaken in Year 1.</li> <li>□ Phase 2, 3 and 4 undertaken in Years 10, 25 and 40. Involves replacement of concrete panels and installation of galvanised anodes to 30% of the wall</li> <li>□ Phase 5 undertaken in Year 55. Involves full replacement of the concrete wall casing.</li> </ul>
	Option 4	6,250	0	<ul style="list-style-type: none"> <li>□ Full replacement of the wall in Year 3</li> </ul>
	Option 5	438	633	<ul style="list-style-type: none"> <li>□ Phase 1 replacement of concrete facing panels and installation of galvanised anodes to 30% of the wall undertaken in Year 1.</li> <li>□ Phase 2, 3 and 4 undertaken in Years 10, 25 and 40. Involves replacement of concrete panels and installation of galvanised anodes to 30% of the wall</li> </ul>
	Option 2	0	50	<ul style="list-style-type: none"> <li>□ Undertake routine maintenance to the wall to address health and safety issues every 10 years following full replacement.</li> <li>□ Significant patch repairs and installation of anodes in Year 70 and 85.</li> </ul>
	Option 3	0	21	<ul style="list-style-type: none"> <li>□ Undertake routine maintenance to the wall to address health and safety issues in Year 70, 80 and 90.</li> <li>□ Significant patch repairs and installation of anodes in Year 85.</li> </ul>
Other Costs (£k)	Option 4	0	240	<ul style="list-style-type: none"> <li>□ Undertake routine maintenance to the wall to address health and safety issues in Year 10 and 20</li> <li>□ Significant patch repairs and installation of anodes in Year 30, 45, 60, 75 and 90.</li> </ul>
	Option 5	0	0	<ul style="list-style-type: none"> <li>□ No maintenance costs as the scheme involves capital maintenance</li> </ul>
	Option 2	76	79	<ul style="list-style-type: none"> <li>□ £20k consultant fess for Detailed design of capital maintenance phases</li> </ul>
	Option 3	76	75	<ul style="list-style-type: none"> <li>□ £150k consultant fees for detailed design of wall replacement.</li> </ul>
	Option 4	161	13	<ul style="list-style-type: none"> <li>□ £15k SBC costs for each phase of works.</li> <li>□ £4k for surveys of the wall to ensure structural integrity. Undertaken every 2 years for the first 10 years, then every 5 years.</li> </ul>

Option 5	76	45	<ul style="list-style-type: none"> <li>□ £20k consultant fess for Detailed design of capital maintenance phases</li> <li>□ £15k SBC costs for each phase of works.</li> <li>□ £4k for surveys of the wall to ensure structural integrity. Undertaken every 2 years for the first 10 years, then every 5 years.</li> </ul>
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## 5 Benefit Cost Ratios

In order to compare the different options it is useful to compare the benefit cost ratios. The benefit cost ratio compares the cost of each option over the next 100 years (including design, build and ongoing maintenance), against the benefits (properties that would otherwise be subject to coastal erosion and tourism benefits) over the same period. Table 5.1 presents the benefit cost ratios.

**Table 5.1: Benefit cost ratios for Options 2-4**

Option	PV costs (£k) 30% Bias	Av. BCR
Option 2 – patch repairs and installation of galvanised anodes	£3,402k	6.1
Option 3 – replacement of concrete panels and installation of galvanised anodes	£3,178k	6.5
Option 4 – full replacement of the wall	£8,694k	2.4
Option 5 - replacement of concrete panels and installation of galvanised anodes (excludes future work to replace the wall)	£1,579k	9.4

### 5.1 Sensitivity Testing

Sensitivity testing was also undertaken to consider the business case put forward for all preferred options on the following aspects:

- Increased cost by 25%
- Reduce value of benefits by 25%
- Reduce optimism bias to 0%

A summary of this sensitivity testing is presented in Table 5.2. Results show the options, particularly Option 3 which is the Preferred Option, presents a robust economic case even with increased costs or reduced benefits.

**Table 5.2: Benefit cost ratios for Options 2-4**

Option	Base case (30% Optimism Bias)	Total cost increased by 25%	Reduce value of benefits by 25%	Reducing Optimism Bias to 0%
Option 2 – patch repairs and installation of galvanised anodes	9.1	7.3	6.8	11.8
Option 3 – replacement of concrete panels and installation of galvanised anodes	9.8	7.8	7.3	12.7
Option 4 – full replacement of the wall	3.5	2.8	2.7	4.6

## 6 Flood and Coastal Resilience Partnership Funding

The 'Flood and Coastal Resilience Partnership Funding' approach allows a proportion of Government funding to be made available to any scheme. The amount of funding is assessed relative to the benefits delivered by the scheme including the number of households protected, and the damages being prevented. The 'number of houses protected' within the calculations are the number of houses which would be at risk from erosion under a Do Nothing scenario.

The funding allocations are based on the FDGiA Calculator. This tool identifies the maximum amount of funding available based on Partnership Funding Scores. The overall Partnership Funding Score is related to Outcome Measures (summarised in Table 6.1).

Table 6.1: Table summarising Outcome Measures for Options 2-5

Outcome Measure	Description	Values for Option 2	Values for Option 3	Values for Option 4	Values for Option 5
OM1 – Scheme Details	Input scheme costs, contributions and benefits. Note contributions will include future maintenance costs as these are currently funded by the Local Authority	PV Total Cost: £3,402k PV Total Contributions: £928 PV Total Benefits: £20,684k	PV Total Costs: £3,178k PV Total Contributions: £928 PV Total Benefits: £20,684k	PV Total Costs: £8,685k PV Total Contributions: £928 PV Total Benefits: £20,684k	PV Total Costs: £1,579k PV Total Contributions: £360k PV Total Benefits: £14,867k
OM2 – Houses better protected against flood risk	Houses which would be at risk from flooding under a Do Nothing scenario, sorted on areas of deprivation		N/A		
OM3 – Houses better protected against coastal erosion	Houses which would be at risk from coastal erosion under a Do Nothing scenario, sorted on areas of deprivation	20% most deprived: 0; 21-40% most deprived: 11; 60% least deprived: 0	<b>Year 0-20:</b> <b>Year 21-50:</b> 20% most deprived: 0; 21-40% most deprived: 26; 60% least deprived: 0		
OM4 – Statutory environmental obligations met	Payments from creation or protection of specific habitats		N/A		

Where full funding for Schemes cannot be achieved the project can still go ahead if the costs can be reduced or if other funding contributions can be found.

Outputs from the Partnership Funding Calculator are presented below in Table 6.2.

Table 6.2: Table summarising outcome measures for Options 3-5. Values are rounded up or down to the nearest £1,000.

Option	PV Cost (£k)	Raw PF Score (%)	FDGiA contributions (£)	Further contributions required to achieve 100% PF score
Option 2 – patch repairs and installation of galvanised anodes	£3,402k	47%	£1,616	£1,786
Option 3 – replacement of concrete panels and installation of galvanised anodes	£3,178k	51%		£1,562k
Option 4 – full replacement of the wall	£8,693k	19%		£7,077k
Option 5 - replacement of concrete panels and installation of galvanised anodes (excludes future work to replace the wall)	£1,579,000	77%	£1,219k	£370k

## 7 References

Environment Agency, March 2010, Flood and Coastal Erosion Risk Management Appraisal Guidance (FCERM-AG).

Environment Agency, 2014, Supporting guidance for the flood and coastal erosion risk management appraisal guidance (FCERM-AG). <http://www.environment-agency.gov.uk/research/planning/116707.aspx>  
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# Appendix A. Economic Assessment Spreadsheets



Project Summary Sheet					
<b>Client/Authority</b> Scarborough Borough Council			Prepared (date) 09/06/2015 Printed 23/02/2017 Prepared by LW Checked by Checked date		
<b>Project name</b> Robin Hood's Bay PAR					
<b>Project reference</b> Base date for estimates (year 0) 0 (2016) Scaling factor (e.g. £m, £k, £) £k (used for all costs, losses and benefits) Year 0 30 75 Discount Rate 3.5% 3.00% 2.50% Optimism bias adjustment factor 30%					
<b>Costs and benefits of options</b>					
Option number	Costs and benefits £k				
	Option 1	Option 2	Option 3	Option 4	Option 5
Option name	Do-nothing	Patch repairs, galvanised cathodic protection and cap drainage	Replace whole concrete panels and install cathodic protection	Full replacement of wall (concrete casing - leave mass concrete)	0
AEP or SoP (where relevant)					
<b>COSTS:</b>					
PV capital costs	0	2,389	2,250	6,250	0
PV operation and maintenance costs	0	50	21	240	0
PV other	0	155	151	174	0
Optimism bias adjustment	0	778	727	1,999	0
PV negative costs (e.g. sales)	0	0	0	0	0
PV contributions					
<b>Total PV Costs £k excluding contributions</b>	0	3,402	3,178	8,694	0
<b>Total PV Costs £k taking contributions into account</b>	0	3,402	3,178	8,694	0
<b>BENEFITS:</b>					
PV monetised flood damages					
PV monetised flood damages avoided					
PV monetised erosion damages	20,684	0	0	0	0
PV monetised erosion damages avoided (protected)		20,684	20,684	20,684	
<b>Total monetised PV damages £k</b>	20,684	0	0	0	0
<b>Total monetised PV benefits £k</b>		20,684	20,684	20,684	20,684
PV damages (from scoring and weighting)					
PV damages avoided/benefits (from scoring and weighting)					
PV benefits from ecosystem services					
<b>Total PV damages £k</b>	20,684	0	0	0	0
<b>Total PV benefits £k</b>		20,684	20,684	20,684	20,684
<b>DECISION-MAKING CRITERIA:</b>					
<b>excluding contributions</b>					
<i>Based on total PV benefits (includes benefits from scoring and weighting and ecosystem services)</i>					
Net Present Value NPV		17,282	17,506	11,990	20,684
Average benefit/cost ratio BCR		6.1	6.5	2.4	
Incremental benefit/cost ratio IBCR			0.0	0.0	
Highest bcr					
<i>Based on monetised PV benefits (excludes benefits from scoring and weighting and ecosystem services)</i>					
Net Present Value NPV		17,282	17,506	11,990	20,684
Average benefit/cost ratio BCR		6.1	6.5	2.4	
Incremental benefit/cost ratio IBCR			0.0	0.0	
Highest bcr					
<b>including contributions</b>					
<i>Taking account of contributions (includes benefits from scoring and weighting and ecosystem services)</i>					
Net Present Value NPV		17,282	17,506	11,990	20,684
Average benefit/cost ratio BCR		6.1	6.5	2.4	
Incremental benefit/cost ratio IBCR			0.0	0.0	
Highest bcr					
<i>Based on monetised PV benefits (excludes benefits from scoring and weighting and ecosystem services)</i>					
Net Present Value NPV		17,282	17,506	11,990	20,684
Average benefit/cost ratio BCR		6.1	6.5	2.4	
Incremental benefit/cost ratio IBCR			-	-	-
Highest bcr					
Best practicable environmental option (WFD)					
<b>Brief description of options:</b>					
Option 1	Do-nothing				
Option 2	Patch repairs,				
Option 3	Replace whole				
Option 4	Full replacement of wall (concrete casing - leave mass concrete)				
Option 5					
<b>Comments and assumptions:</b>					

Project Summary Sheet					
Client/Authority Scarborough Borough Council			Prepared (date) 09/06/2015		
Project name Robin Hood's Bay PAR			Printed 23/02/2017		
Project reference			Prepared by LW		
Base date for estimates (year 0)			Checked by		
Scaling factor (e.g. £m, £k, £)			Checked date		
Year					
Discount Rate					
Optimism bias adjustment factor					
Costs and benefits of options					
Costs and benefits £k					
Option number	Option 1	Option 5	0	0	0
Option name	Do-nothing	Replace whole concrete panels and install cathodic protection			
AEP or SoP (where relevant)					
COSTS:					
PV capital costs	0	1,071			
PV operation and maintenance costs	0	0			
PV other	0	121			
Optimism bias adjustment	0	357			
PV negative costs (e.g. sales)	0	0			
PV contributions					
Total PV Costs £k excluding contributions	0	1,579			
Total PV Costs £k taking contributions into account	0	1,549			
BENEFITS:					
PV monetised flood damages					
PV monetised flood damages avoided					
PV monetised erosion damages	14,867	0			
PV monetised erosion damages avoided (protected)		14,867			
Total monetised PV damages £k	14,867	0			
Total monetised PV benefits £k		14,867			
PV damages (from scoring and weighting)					
PV damages avoided/benefits (from scoring and weighting)					
PV benefits from ecosystem services					
Total PV damages £k	14,867	0			
Total PV benefits £k		14,867			
DECISION-MAKING CRITERIA:					
excluding contributions					
Based on total PV benefits (includes benefits from scoring and weighting and ecosystem services)					
Net Present Value NPV		13,287.7			
Average benefit/cost ratio BCR		9.4			
Incremental benefit/cost ratio IBCR					
Highest bcr					
Based on monetised PV benefits (excludes benefits from scoring and weighting and ecosystem services)					
Net Present Value NPV		#REF!	0		
Average benefit/cost ratio BCR		9.4			
Incremental benefit/cost ratio IBCR					
Highest bcr					
including contributions					
Taking account of contributions (includes benefits from scoring and weighting and ecosystem services)					
Net Present Value NPV		#REF!	0		
Average benefit/cost ratio BCR		9.6			
Incremental benefit/cost ratio IBCR					
Highest bcr					
Based on monetised PV benefits (excludes benefits from scoring and weighting and ecosystem services)					
Net Present Value NPV		#REF!	0		
Average benefit/cost ratio BCR		9.6			
Incremental benefit/cost ratio IBCR					
Highest bcr					
Best practicable environmental option (WFD)					
Brief description of options:					
Option 1	Do-nothing				
Option 5	Replace whole				
Comments and assumptions:					

## Appendix B. FDGiA Funding Calculator Spreadsheet

Project Name

Unique Project Number

Robin Hoods Bay PAR

All figures are in £'s

Figures in Blue to be entered onto Medium Term Plan

1/2/3

Key

Input cells

Calculated cells

SUMMARY: prospect of FCRM GiA funding

Raw Partnership Funding Score

47%

1

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

1,786,114

2

Adjusted Partnership Funding Score (PF)

65%

3

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

-

4

Scheme Benefit to Cost Ratio:

6.08

to 1

Effective return to taxpayer:

6.08

to 1

Effective return on contributions:

22.29

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). See NOTE below.

1. Scheme details

Risk Management Authority type of asset maintainer

EA

5

Yes

16

Duration of Benefits (years)

100

7

PV Whole-Life Benefits:

20,684,000

8

PV Costs

PV Appraisal Costs

30,000

9

PV design & Construction Costs

3,307,000

10

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

3,337,000

11

PV Post-Construction Costs

65,000

12

PV Whole-Life Costs:

3,402,000

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.

PV Contributions secured to date

PV Local Levy secured to date

PV Public Contributions secured to date

928,000

14

PV Private Contributions secured to date

16

PV Funding from other Environment Agency functions/sources secured to date

17

PV Total Contributions secured to date

928,000

18

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

NOTE: This scheme is to be maintained by the EA (ref cell 5). Any contributions needed (ref cell 2) are to help fund both up-front costs (cell 11) and future ongoing costs (cell 12) and should be entered into cells(14-17).

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

After

Change due to scheme

Annual damages avoided (£), compared with a household at low risk

150

600

1,350

Qual. benefits (discounted)

OM2 (20%)

OM2 (21-40%)

OM2 (60%)

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

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)

Long-term loss

Medium-term loss

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

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:

Qual. benefits:

Payment rate:

FCRM GiA contribution:

Maximum for Outcomes delivered. The actual value any scheme is eligible for may be less.

**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.

Raw Score	Contribution for 100% Score (£k)
47%	1,786,114
17%	3,525,351
47%	1,786,114
45%	1,859,661
#N/A	#N/A
47%	1,813,246

END OF WORKSHEET

Project Name

Unique Project Number

Robin Hoods Bay PAR

Key

Input cells

Calculated cells

All figures are in £'s  
Figures in Blue to be entered onto Medium Term Plan

SUMMARY: prospect of FCRM GiA funding

Raw Partnership Funding Score	51%(1)	Scheme Benefit to Cost Ratio: 6.51 to 1
External Contribution or saving required to achieve an Adjusted Score of 100%	1,562,114(2)	Effective return to taxpayer: 6.51 to 1
Adjusted Partnership Funding Score (PF)	72%(3)	Effective return on contributions: 22.29 to 1
PV FCRM GiA towards the up-front costs of this scheme (PV Cost for Approval)	- (4)	

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). See NOTE below.

1. Scheme details

Risk Management Authority type of asset maintainer

EA (5)

Yes (6)

Duration of Benefits (years)

100 (7)

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

PV Whole-Life Benefits:

20,684,000 (8)

PV Costs

PV Appraisal Costs

30,000 (9)

PV design & Construction Costs

3,121,000 (10)

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

3,151,000 (11)

PV Post-Construction Costs

27,000 (12)

PV Whole-Life Costs:

3,178,000 (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.

PV Contributions secured to date

PV Local Levy secured to date

PV Public Contributions secured to date

928,000 (14)

PV Private Contributions secured to date

PV Funding from other Environment Agency functions/sources secured to date

928,000 (15)

PV Total Contributions secured to date

928,000 (16)

WARNING: Contributions less than minimum required in cell (2)

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

NOTE: This scheme is to be maintained by the EA (ref cell 5). Any contributions needed (ref cell 2) are to help fund both up-front costs (cell 11) and future ongoing costs (cell 12) 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:	Before	After	Change due to scheme
20% most deprived areas			0 0 0
21-40% most deprived areas			0 0 0
60% least deprived areas			0 0 0
At: Moderate risk Significant risk Very significant risk			
Annual damages avoided (£), compared with a household at low risk			150 600 1,350
Change in household damages, in:	Per year	Over lifetime of scheme	Qual. benefits (discounted)
20% most deprived areas	£ -	£ -	OM2 (20%) £ -
21-40% most deprived areas	£ -	£ -	OM2 (21-40%) £ -
60% least deprived areas	£ -	£ -	OM2 (60%) £ -

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

Number of households in:	Before	Annual damages avoided:	£ 6,000 £ 6,000
20% most deprived areas	26 11	Annual damages avoided	£ 50 £ 20 years
21-40% most deprived areas		Loss expected in	£ 1,184 £ 3,015
60% least deprived areas		Present value of Year 1 loss (i.e. first year damages, discounted based on when loss is expected)	Long-term loss Medium-term loss
Change in household damages, in:	Year 1 loss avoided:	Over lifetime of scheme:	Qual. benefits (discounted):
20% most deprived areas	£ -	£ -	OM3 (20%) £ -
21-40% most deprived areas	£ 63,942	£ 6,394,233	OM3 (21-40%) £ 1,909,533
60% least deprived areas	£ -	£ -	OM3 (60%) £ -

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

Payments under:	Assumed benefits per unit:	Qual. benefits (discounted):
OM4a Hectares of net water-dependent habitat created	£ 15,000	OM4a £ -
OM4b Hectares of net intertidal habitat created	£ 50,000	OM4b £ -
OM4c Kilometres of protected river improved	£ 80,000	OM4c £ -
		OM4 £ -

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	£ 18,774,467	5.56p in the £1	£ 1,043,026
OM2	£ -	45.0	£ -
20% most	£ -	30.0	£ -
21-40%	£ -	20.0	£ -
Least 60%	£ -	45.0	£ -
OM3	£ 1,909,533	30.0	£ 572,860
20% most	£ -	20.0	£ -
21-40%	£ -	100.0	£ -
Least 60%	£ -		
OM4	£ -		
Total	£ 20,684,000		£ 1,615,886

Maximum for Outcomes delivered. The actual value any scheme is eligible for may be less.

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 band  
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 (0k)
51%	1,562,114
17%	3,525,351
47%	1,786,114
45%	1,859,661
#N/A	#N/A
47%	1,813,246

END OF WORKSHEET

Project Name

Unique Project Number

Robin Hoods Bay PAR

All figures are in £'s

Figures in Blue to be entered onto Medium Term Plan

1/2/3

Key

Input cells

Calculated cells

SUMMARY: prospect of FCRM GiA funding

Raw Partnership Funding Score

19%

1

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

7,077,114

2

Adjusted Partnership Funding Score (PF)

21%

3

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

-

4

Scheme Benefit to Cost Ratio:

2.38

to 1

Effective return to taxpayer:

2.38

to 1

Effective return on contributions:

22.29

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). See NOTE below.

1. Scheme details

Risk Management Authority type of asset maintainer

EA

5

Duration of Benefits (years)

100

7

PV Whole-Life Benefits:

20,684,000

8

PV Costs

PV Appraisal Costs

30,000

9

PV design & Construction Costs

8,351,000

10

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

8,381,000

11

PV Post-Construction Costs

312,000

12

PV Whole-Life Costs:

8,693,000

13

PV Contributions secured to date

PV Local Levy secured to date

928,000

14

PV Public Contributions secured to date

928,000

15

PV Private Contributions secured to date

-

16

PV Funding from other Environment Agency functions/sources secured to date

-

17

PV Total Contributions secured to date

928,000

18

WARNING: Contributions less than minimum required in cell (2)

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.

NOTE: This scheme is to be maintained by the EA (ref cell 5). Any contributions needed (ref cell 2) are to help fund both up-front costs (cell 11) and future ongoing costs (cell 12) 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

After

Change due to scheme

Annual damages avoided (£), compared with a household at low risk

150

600

1,350

Qual. benefits (discounted)

OM2 (20%)

OM2 (21-40%)

OM2 (60%)

Change in household damages, in:

20% most deprived areas

21-40% most deprived areas

60% least deprived areas

Per year

Over lifetime of scheme

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

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)

Long-term loss

Medium-term loss

Qual. benefits (discounted)

OM3 (20%)

OM3 (21-40%)

OM3 (60%)

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:

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

Payments under:

OM4a

OM4b

OM4c

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:

Qual. benefits:

Payment rate:

FCRM GiA contribution:

OM1

OM2

OM3

OM4

Total

Maximum for Outcomes delivered. The actual value any scheme is eligible for may be less.

**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 band

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 (£k)
19%	7,077,114
17%	3,525,351
47%	1,786,114
45%	1,859,661
#N/A	#N/A
47%	1,813,246

END OF WORKSHEET

Project Name

Unique Project Number

All figures are in £'s

Figures in Blue to be entered onto Medium Term Plan

Key

Input cells

Calculated cells

SUMMARY: prospect of FCRM GiA funding

Raw Partnership Funding Score	77%	(1)	Scheme Benefit to Cost Ratio: 9.42 to 1
External Contribution or saving required to achieve an Adjusted Score of 100%	367,102	(2)	Effective return to taxpayer: 12.27 to 1
Adjusted Partnership Funding Score (PF)	100%	(3)	Effective return on contributions: 40.50 to 1
PV FCRM GiA towards the up-front costs of this scheme (PV Cost for Approval)	1,211,897	(4)	

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). See NOTE below.

1. Scheme details

Risk Management Authority type of asset maintainer

Duration of Benefits (years)

PV Whole-Life Benefits:

PV Costs

PV Appraisal Costs

PV design & Construction Costs

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

PV Post-Construction Costs

PV Whole-Life Costs:

PV Contributions secured to date

PV Local Levy secured to date

PV Public Contributions secured to date

PV Private Contributions secured to date

PV Funding from other Environment Agency functions/sources secured to date

PV Total Contributions secured to date

LA

50

14,867,000

30,000

1,549,000

1,579,000

1,579,000

0

367,103

367,103

Yes

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

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.

NOTE: This scheme is to be maintained by an RMA other than the EA (ref cell 5). Capital FCRM GiA will fund the appropriate share of the up-front costs (cell 11) with any shortfall needing to be paid for via contributions identified in cells(14-17). Future ongoing costs (cell 12) and any contributions towards them are a matter for local agreement by the RMA and should NOT be included in cells(14-17). It is recommended that the RMA takes the opportunities created during scheme development to separately secure contributions towards future ongoing costs (cell12).

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

Number of households in:	Before	After	Change due to scheme
20% most deprived areas			0
21-40% most deprived areas			0
60% least deprived areas			0
At:	Moderate risk	Moderate risk	Moderate risk
	Significant risk	Significant risk	Significant risk
	Very significant risk	Very significant risk	Very significant risk
Annual damages avoided (£), compared with a household at low risk			150
			600
			1,350
Change in household damages, in:	Per year	Over lifetime of scheme	Qual. benefits (discounted)
20% most deprived areas	£ -	£ -	OM2 (20%) £ -
21-40% most deprived areas	£ -	£ -	OM2 (21-40%) £ -
60% least deprived areas	£ -	£ -	OM2 (60%) £ -

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

Number of households in:	Before	Assumed benefits per unit:	Qual. benefits (discounted):
20% most deprived areas		£ 6,000	£ 6,000
21-40% most deprived areas	26	£ 50	£ 20 years
60% least deprived areas	11	£ 1,184	£ 3,015
Long-term loss	Medium-term loss	Long-term loss	Medium-term loss
Change in household damages, in:	Year 1 loss avoided:	Over lifetime of scheme:	Qual. benefits (discounted):
20% most deprived areas	£ -	£ -	OM3 (20%) £ -
21-40% most deprived areas	£ 63,942	£ 3,197,117	OM3 (21-40%) £ 1,578,900
60% least deprived areas	£ -	£ -	OM3 (60%) £ -

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

Payments under:	Assumed benefits per unit:	Qual. benefits (discounted):
OM4a	£ 15,000	OM4a £ -
OM4b	£ 50,000	OM4b £ -
OM4c	£ 80,000	OM4c £ -
OM4		OM4 £ -

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	£ 13,288,100	5.56p in the £1	£ 738,228
OM2	£ -	45.0	£ -
20% most	£ -	30.0	£ -
21-40%	£ -	20.0	£ -
Least 60%	£ -	45.0	£ -
OM3	£ 1,578,900	30.0	£ 473,670
20% most	£ -	20.0	£ -
21-40%	£ -	100.0	£ -
Least 60%	£ -		
OM4	£ -		
Total	£ 14,867,000		£ 1,211,896

**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 band

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 (0%)
77%	367,102
19%	1,602,075
52%	753,056
52%	753,056
0%	1,579,000
52%	753,056

END OF WORKSHEET