



# Robin Hood's Bay Project Appraisal Report

Appendix H: Cost Breakdown

February 2017

Scarborough Borough Council



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



## Issue and revision record

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# Appendix H: Cost Breakdown



## 1.1 Introduction

This appendix presents the breakdown of the costs associated with Options 1-5:

- 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
- Option 4 - Full Replacement of Concrete Casing
- Option 5 - Replacement of concrete panels and installation of galvanised anodes (excludes future work to replace the wall)

The costs for the options are based on a variety of sources including:

- SPONs
- Supplier estimates ((CRL Concrete repairs, SIKA)
- Previous project experience

The costs are all presented as cash costs rather than PV (Present Value) costs (which are discounted costs calculated in the economic assessment). The costs have been split into three main categories:

- Capital Costs (cost of the main construction works);
- Maintenance Costs (costs to maintain the works over 50 years); and
- PAR to construction costs (costs of consultants and the design phase).

Optimism Bias has been included in these costs as that is applied during the economic assessment, which is included within the PAR document.

## 1.2 Capital Costs

Capital costs have been built up including for the following items:

- Construction costs including materials, delivery, and placing.
- Where appropriate additional allowances have been made to account for the works within the tidal area as well as an additional allowance owing to the extremely limited access and working area available to a contractor to carry out the works.
- Allowances for preliminaries, management fees (including time for ECC PM and Client PM Roles and permitting roles), supervision costs ( ) have been added where appropriate.

Tables 1-4 provide a breakdown of costs derived for the construction of options 2, 3, 4, and 5 for each of the phases of the works.

The baseline date for cost estimates is January 2016.

Table 1: Option 2 costs (Patch Repairs and Galvanised Anodes)

Phase	Item	Cost (£)
<b>Capital Maintenance – Phases 1-3</b> (based on 40% of the cost of works to the whole wall)	Concrete Patch Repairs	£162,659
	Installation of Galvanised Anodes	£22,920
	Preliminaries	£28,000
	Management and Supervision	£25,386
	Contingency	£23,897
	<b>SUB-TOTAL</b>	<b>£262,862</b>
<b>Capital Works - Phase 4</b>	Replacement of the Promenade Parapet wall	£182,158
	Drainage	£14,023
	Replacing the Concrete Wall	£3,759,189
	Install rock anchors	£1,080,000
	Installation of Galvanised Anodes	£377,355
	Preliminaries	£225,000
	Management and Supervision	£661,272
	Contingency	£629,899
	<b>SUB-TOTAL</b>	<b>£6,928,896</b>
<b>TOTAL of all phases</b>		<b>£7,717,482</b>

Note 40% replacement allowed each time to account for the deterioration of patch repairs and surrounding concrete that may require additional repair work prior to full replacement of the wall in year 40.

Table 2: Option 3 costs (Replacement of Concrete Panels and Galvanised Anode Protection)

Phase	Item	Cost (£)
<b>Capital Maintenance – Phases 1-4</b> (based on 30% of the cost of works to the whole wall)	Replacing the Concrete Panels	£303,148
	Installation of Galvanised Anodes	£46,080
	Preliminaries	£21,000
	Management and Supervision	£41,672
	Contingency	£41,190
	<b>SUB-TOTAL</b>	<b>£453,090</b>
<b>Capital Works – Phase 5</b>	Replacement of the Promenade Parapet wall	£182,158
	Drainage	£14,023
	Replacing the Concrete Wall	£3,759,189
	Install rock anchors	£1,080,000
	Installation of Galvanised Anodes	£377,355
	Preliminaries	£225,000
	Management and Supervision	£661,272
	Contingency	£629,899
	<b>SUB-TOTAL</b>	<b>£6,928,896</b>
<b>TOTAL of all phases</b>		<b>£8,741,256</b>

Note 30% replacement allowed each time to account for the deterioration of a number of panels prior to full replacement of the wall in year 55.

Table 3: Option 4 costs (Full Replacement of Concrete Casing)

Phase	Item	Cost (£)
Phase 1 – Capital Works	Replacement of the Promenade Parapet wall	£182,158
	Drainage	£14,023
	Replacing the Concrete Wall	£3,759,189
	Install rock anchors	£1,080,000
	Installation of Galvanised Anodes	£377,355
	Preliminaries	£225,000
	Management and Supervision	£661,272
	Contingency	£629,899
<b>TOTAL</b>		<b>£6,928,896</b>

Table 4: Option 5 costs (Replacement of Concrete Panels and Galvanised Anode Protection)

Phase	Item	Cost (£)
<b>Capital Maintenance</b> – <b>Phases 1-4</b> (based on 30% of the cost of works to the whole wall)	Replacing the Concrete Panels	£303,148
	Installation of Galvanised Anodes	£46,080
	Preliminaries	£21,000
	Management and Supervision	£41,672
	Contingency	£41,190
<b>TOTAL of all phases</b>		<b>£1,812,360</b>

Note 30% replacement allowed each time to account for the deterioration of a number of panels prior to full replacement of the wall in year 55.

### 1.3 Monitoring and maintenance Costs

The maintenance costs are based on discussions with Contractors in addition to the Project Team's previous similar experience. It is assumed that Scarborough Borough Council will cover the costs of the monitoring and maintenance.

The monitoring costs are calculated for ongoing surveys of the seawall during the capital maintenance phases in Options 2, 3 and 5. These surveys are important to ensure that the capital maintenance works are effectively maximising the residual life of the existing asset.

The maintenance costs are calculated once the whole wall casing has been replaced (Phase 4 in Option 2; Phase 5 in Option 3 and Phase 1 in Option 4; no maintenance cost for Option 5 as the wall encasement is not undertaken within the appraisal period). The cost is based on the cost of the Capital maintenance works in Option 2 (Patch repairs and galvanised anodes). The maintenance commences 30 years after construction and is then undertaken every 15 years. However, the wall is expected to last 100 years with minimal maintenance works.

## 1.4 Total Cash Cost

Table 4: Summary of the Cash Costs for Option 2-4 (note this does not include any risk contingency values)

Option	Capital Costs (£k)	Maintenance Costs (£k)	Other (£k)	Total Cash Cost (£k)
Option 2	7,718	536	323	8,577
Option 3	8,742	278	370	9,390
Option 4	6,929	1,324	237	8,490
Option 5	1,812	0	197	2,009

From these total cash costs it can be seen that Option 3 does have the highest cash cost. However this is attributed to there being a further phase of capital maintenance works to maximise the residual life of the of the existing wall and lead to the full replacement of the seawall being undertaken at a later date, which will be discounted to a greater amount than the other options.

## 1.5 Uncertainties in Costings

Costs contained herein have been based on the information available at the time of writing. Where possible previous costings available as part of the project, or held for similar works have been used to benchmark costs.

Given Robin Hood's Bay location, the difficulty in access and limited storage for construction activities, the tidal environment and potential differences in the methodology cost, variations are likely. Adjustments have been applied within the current cost estimates to ensure robust allowances.