

REPORT

North Bay Urgent Wall Improvements Phase 2 Outline Business Case

Economic Assessment Report

Client: Scarborough Borough Council

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1 INTRODUCTION

The purpose of this report is to outline the methodology used for the economic assessment for the North Bay Urgent Wall Improvements Phase 2 Outline Business Case (OBC).

The economic assessment for this project builds up on the economic assessments carried out for the 2009 Strategic Appraisal Report (StAR) for the Scarborough Coastal Defence Strategy: Holbeck to Scalby Mills¹, and the North Bay Urgent Wall Improvements Phase 1 Project Appraisal Report (PAR). The details of the strategic economic assessment can be found in Appendix C of the StAR.

The strategic economic assessment was carried out using a probabilistic approach based on seawall failure and landslide scenarios. Damages were assessed from a variety of receptors; property, recreation and amenity, and traffic disruption.

The economic assessment for the OBC takes the strategic assessment probabilistic methodology and updates the input data for the various types of damage receptor based on the most up to date information available. No changes to the assumed probabilities have been made.

The economic assessment has been updated to a Q1 2023 base date.

¹ Scarborough Coastal Defence Strategy Review: Holbeck to Scalby Mills, Strategy Appraisal Report. October 2009. Version 3.1.

2 Methodology

2.1 General

Damages have been calculated using the Multi Coloured Manual (MCM) and the Green Book (HM Treasury, 2020). These documents have been used in combination with the latest guidance from the Environment Agency and Defra.

Damages have been calculated for the 100 year appraisal period and discount rates starting at 3.5% and reducing to 2.5% have been applied.

The area at risk was derived as part of the Phase 1 PAR completed in 2012. The area at risk has been based on the information presented in the approved StAR. The area highlighted in the Key Plan of the 2009 StAR as being at risk of erosion for the two management units being considered has been taken. This area has been checked against the area of benefits taken for the East Pier, Castle Headland and the Holms Coast Protection Scheme² that was completed in 2005 to ensure that double counting of benefits does not occur. The area included within the OBC economic assessment is shown in Appendix A.

2.2 Property

2.2.1 Residential

The National Receptor Dataset (NRD2014) has been used to identify the number and type of residential properties affected within the at-risk area. There are 38 residential properties (including 25 properties in the Sands development) potentially at risk in the North Bay Cliffs Management Unit, and 186 residential properties in the Clarence Gardens Management Unit (MU).

The number of residential properties in the Clarence Gardens MU is less than that included in the Strategy. This is due to the reduced size of the benefit area to ensure that double counting of benefits from the East Pier, Castle Headland and the Holms Coast Protection Scheme does not occur.

Market values for the majority of the residential properties have been assigned to the properties according to type of property using the most up to date data (December 2022) on the Land Registry website for the Scarborough local authority area, as shown in Table 2-1. The values for the Scarborough Local Authority area are lower than North Yorkshire as a whole, but when checked against study area specific data³ from the Zoopla property website they appear to be appropriate although slightly conservative.

Market values for the residential properties within the Sands development are outlined in Section 2.2.2 below.

² Benefit area of the East Pier, Castle Headland and the Holms coast protection scheme shown in Figure A1 of Scarborough Coast Protection Benefit-Cost Analysis Review Report – January 2003. High Point Rendell. (Document Reference 1586/R003)

³ Property values for North Cliff Avenue, Green Howards Drive, Queens Parade, and North Marine Road. Peasholm Gap (The Sands) has been excluded as being atypical.

Table 2-1 Comparison of Average Residential Property Market Values for North Bay, Scarborough

Property Type	Land Registry – December 2022	
	Scarborough	North Yorkshire
Detached	£ 351,104	£439,686
Semi-detached	£ 234,313	£276,804
Terrace	£ 190,531	£229,426
Flat	£ 139,907	£162,752
ALL	£ 220,465	£287,418

2.2.2 The Sands

The Sands development was not completed at the time the economic assessment was carried out for the 2009 StAR. However, an allowance was included in the assessment for the development of £20M.

The Sands development was completed in November 2008 and consists of 106 apartments (mix of one, two and three bedrooomed, plus four two-bedrooomed penthouse suites), five commercial units including a mini supermarket and cafe, and 166 renovated beach chalets with a new Beach Management Centre.

The apartments are new build luxury accommodation in a prime location on the seafront. As such the average value for a flat for the North Yorkshire region is likely to underestimate the market value of these properties. A more accurate market value has therefore been established for the Sands development properties. Market values for the residential properties within the Sands development have been derived as an average value from the 22 sales recorded since 2015; giving a market value of £282k, as shown in Table 2-2. This period has been selected to reflect the general trend of increasing house prices since the construction of the development was completed in 2008. A shorter time period would not contain enough data points to be statistically relevant. The average of the initial sale price of the Sands properties as 'new build' properties was £231k⁴. Although the market value of the apartments will vary according to size (one, two or three bedrooms) it is not known how many of each size of apartment there are. Therefore, an average value has been assigned to all apartments.

Table 2-2 Average Market Values for The Sands development, Peasholm Gap, Scarborough

Scenario	No. Sales	Average Price
All sales (2008-2022)	118	£240,633
'New Build' sales	86	£230,976
2015 – 2021 sales	22	£282,205

Of the 100 apartments currently 81 are being used as holiday let properties (as determined by being registered on the VOA website for business rates) and the remaining 25 are solely residential premises. This is an increase in the ratio of holiday lets to residential compared to the assessment undertaken in 2012 for the Phase 1 PAR, when there were 60 holiday lets registered on the VOA website for business rates.

⁴ Based on the records of 86 sales between 2008 and 2010 classified as 'New Build' on www.rightmove.com

Using the standard method for estimating the value of commercial properties using the rateable value results in a value of between £46k and £146k for the holiday let apartments at the Sands, this would give a total value of £5,552k for the 81 units. This is considerably less than the market value the properties would be sold for. As these apartments are identical to the residential apartments and are contained within the same two buildings, and upon resale could easily become residential, it is felt more appropriate to assign the residential value of £282k to the 81 holiday let apartments, this gives a total value of £22,859k.

2.2.3 Beach Chalets

The 166 beach chalets that were renovated as part of the Sands development were marketed for sale at £36k each in 2010, giving a total market value of £6.0 million. However, to provide a more conservative estimate the value assigned to these units has been derived using the rateable value methodology. The chalets do not appear on the Valuation Office website so the footprint of the chalets has been obtained (2.4m x 2.7m) and the average rateable value per m² for the Yorkshire & Humber region has been applied from the 2022 MCM Handbook (£64.48/m²). The multiplier to convert the rateable value into a market value has been taken from the 2022 MCM Handbook. The value of the chalets included within the economic assessment is therefore £1.0 million (6.48 x 64.48 x 15 x 166).

2.2.4 Commercial

The commercial properties within the at risk area were identified at the Phase 1 PAR stage using a combination of data sources:

- The National Receptor Dataset
- The properties listed with having business rates on the Valuation Office website (www.voa.gov.uk)
- Various online satellite imagery tools
- Site visit

Within the North Bay Cliffs MU there are 13 commercial properties (in addition to the 81 holiday let apartments in the Sands development) potentially at risk. In the Clarence Gardens MU there are 68 commercial properties potentially at risk.

Market values for these properties have been derived using the rateable value statistics on the Valuation Office website. Market value is taken as 15 x rateable value of the property as recommended in the 2022 MCM Handbook.

Where commercial properties have been identified that are not recognised on the Valuation Office website a market value has been assigned from a nearby commercial property of a similar type and size.

2.3 Mental Health

Intangible mental health losses due to coastal erosion have been applied to all affected residential properties (excluding the Sands holiday let properties) using the methodology outlined in Advice for Flood

and Coastal Erosion Risk Management: Mental Health Costs of Flooding and Erosion (*Environment Agency, 2020b*) based on the property type and year of loss. The guidance gives a value per adult of £9,546 at a 2018 price date, uplifted to 2023 base date using the GDP Deflator Index⁵ gives a value of £11,205 per adult.

This value is multiplied by the number of adults per property. For this assessment the national averages by property type for England shown in Table 2-3 were used as given in the guidance.

Table 2-3 National average number of adults per property in England

Property type	Number of adults per property
Average (all categories)	1.85
Detached	2.01
Semi-detached	2.00
Terraced	1.95
Bungalow	1.99
Flat	1.45

2.4 Recreation & Amenity

The calculation of the recreation and amenity damages in the 2009 StAR economic assessment has been retained and simply updated with more recent information on the number of visitors to the resort of Scarborough. The damages were estimated using two methods; the additional cost of visitors having to travel to an alternative destination (Whitby or Filey), and the reduction in the value of enjoyment (VoE) of visitors using an alternative destination based on figures for VoE presented in the MCM. The damages used in the StAR were the lower bound figure from the two methodologies, which were the additional travel costs (£2.40 per visitor).

The StAR economic assessment used the assumption (based on information from SBC tourism department) that 35% of visitors came to Scarborough because of 'resort factors'. This economic update has assumed there is no change to the figure of 35%. Data presented in the Economic Impact of Tourism on Scarborough 2019⁶ shows that the annual number of visitor days to the Scarborough district is 10.24M⁷. For this economic assessment it has been assumed that only 50% of these visitor days are spent in the town of Scarborough. Therefore, under the Do Nothing scenario it can be assumed that the 35% of visitors who are motivated by 'resort factors' would no longer visit Scarborough, this results in the total number of visitors affected of 1.792M.

The total damage across the full strategy frontage would therefore be £4,301k a year. The damages were distributed uniformly across the 12 management units (MU) in the StAR as no information was available on the breakdown of visitors to different sections of the frontage and those visiting would generally need to

⁵ Nov 2022 GDP Deflator Index is the latest available: 2023 = 108.097, 2018 = 92.095, uplift factor = 1.1738

⁶ The Economic Impact of Tourism on Scarborough 2019, prepared by Tourism South East

⁷ 2019 has been selected as baseline year as tourism data for 2020 & 2021 will be heavily influenced by the COVID-19 pandemic and will not be representative.

travel through several of the MUs in order to reach the MU of their choice. This approach has been replicated in the economic assessment for the PAR, giving an annual damage per MU of £358k.

Under the Do Nothing scenario the annual recreation and amenity damages would apply each year of the appraisal period after a major failure has occurred on that frontage. Therefore, the damages for each of the MU being considered in the PAR discounted over 100 years are £10,684k.

2.5 Traffic Disruption

The traffic disruption damages come from the loss of Royal Albert Drive (immediately behind the seawalls) should the seawall fail. This is part of the major route around the headland from North Bay to South Bay; this route includes Marine Drive which was protected by the East Pier, Castle Headland and the Holms Coast Protection Scheme, completed in 2005.

As part of the justification for the East Pier, Castle Headland and the Holms Coast Protection Scheme the traffic disruption damages for the entire route around the North Bay frontage were calculated over 10 years as £59,984k⁸ at 2001 prices. The Strategy identified that 29% of the road traffic damages could be attributed to Royal Albert Drive, which is within the Clarence Gardens management unit.

For the Phase 2 OBC economic assessment the road traffic damages have been uplifted using the GDP Deflator Index to a 2023 base date⁹ giving a total value of £100,086k and the 29% applied to give a value of £19,134k applicable to the Clarence Gardens management unit.

2.6 Services

Yorkshire Water invested in the region of £110million along the north-east coast in advance of the Revised Bathing Water Directive which came into effect in 2015, with a significant proportion in the Scarborough area (greater than £50M). Part of the investment in their infrastructure is in the vicinity of the scheme proposed by this OBC, and some of their assets are protected by the coast defence structures. Therefore should the coastal defence assets fail then the Yorkshire Water services would be at risk of erosion, this would have a major impact as they are part of the critical infrastructure for the town, and may also result in pollution in the North Bay.

The 2012 Phase 1 PAR assumed that the value of the Yorkshire Water assets being protected by the seawalls was £5M. In the absence of any more detailed information, this value has been uplifted to a 2023 base date using the GDP Deflator Index¹⁰ to give a value of £6,453k.

⁸ East Pier, Castle Headland and the Holms Engineers Report 2001

⁹ Nov 2022 GDP Deflator Index is the latest available: 2023 = 108.097, 2001 = 64.785, uplift factor = 1.6686

¹⁰ Nov 2022 GDP Deflator Index is the latest available: 2023 = 108.097, 2012 = 83.760, uplift factor = 1.2906

3 DAMAGE ASSESSMENT RESULTS

The results of the Do Nothing damage assessment for the North Bay Cliffs and Clarence Gardens management units are shown in Table 3-1 for the cash (undiscounted) values of the different damage receptors. These values have then been used to update the inputs into the spreadsheets from the Strategy for the probabilistic determination of the Present Value Damages. The present value (discounted) damages for the Phase 2 OBC economic assessment are shown in Table 3-2.

Table 3-1 Do Nothing cash damage values for damage receptors

Damage Receptor	North Bay Cliffs Management Unit	Clarence Gardens Management Unit
Residential Property	£9,439k	£28,269k
Commercial Property	£28,722k	£8,114k
Mental Health	£849k	£4,166k
Recreation & Amenity	£10,685k	£10,685k
Traffic Disruption	-	£29,025k
Services	-	£6,453k
TOTAL	£49,695k	£86,712k

Table 3-2 Present Value Benefits of Preferred Strategic Option for the updated Phase 2 OBC economic assessment

Option	North Bay Cliffs Management Unit	Clarence Gardens Management Unit
Do Nothing PV Damages	£42,621k	£59,036k
Preferred Strategic Option (Option 3) PV Damages	£1,089k	£2,451k
Preferred Strategic Option (Option 3) PV Benefits	£41,532k	£56,585k
	£98,117k	

The PV Benefits (discounted) included within the 2012 Phase 1 PAR were £78.5M (Table 3-3), and those within the 2009 StAR were £68.4M (Table 3-4). The increase is due to the rise in property values, inflation uplifts for the traffic, tourism, and services damage receptors, and the additional inclusion of the mental health damages.

Table 3-3 Present Value Benefits of Preferred Strategic Option included in the updated 2012 Phase 1 PAR economic assessment

Option	North Bay Cliffs Management Unit	Clarence Gardens Management Unit
Do Nothing PV Damages	£34,935k	£46,483k
Preferred Strategic Option (Option 3) PV Damages	£1,067k	£1,722k
Preferred Strategic Option (Option 3) PV Benefits	£33,868k	£44,661k
	£78,529k	

Table 3-4 Present Value Benefits of Preferred Strategic Option included in the 2009 StAR economic assessment

Option	North Bay Cliffs Management Unit	Clarence Gardens Management Unit
Do Nothing PV Damages	£22,461k	£52,135k
Preferred Strategic Option (Option 3) PV Damages	£2,286k	£3,884k
Preferred Strategic Option (Option 3) PV Benefits	£20,174k	£48,250k
	£68,424k	

4 COST-BENEFIT ASSESSMENT

A cost-benefit assessment (CBA) has been carried out for this Phase 2 OBC in accordance with the Flood and Coastal Erosion Risk Management Appraisal Guidance. A summary of the results is shown in Table 4-1.

The baseline for a CBA is the Do Nothing which is the 'walk-away' option and assumes no further maintenance or asset management actions are carried out. The 'Do Minimum' option is defined as the minimum action or intervention needed to ensure that the legal requirements or performance of an asset is met. Option 1 Phased Repair Scheme is the minimum amount of intervention that can be carried out whilst maintaining the current standard of service of the asset system in North Bay.

Table 4-1 Summary of Cost-Effective Analysis

Option		PV Damages	PV Benefits	PV Costs	Incremental PV Cost	BCR
	Do Nothing	£98,117k	-	-	-	-
1	Phased Repair Scheme	£0k	£98,117k	£20,988k	-	4.67
2	Full Repair Scheme	£0k	£98,117k	£21,403k	£415k	4.58
3	Capital Scheme	£0k	£98,117k	£31,578k	£10,175k	3.11

From Table 4-1 it can be seen that Option 1 Phased Repair Scheme has the highest benefit-cost ratio. The incremental PV cost to the next option is significant at £415k but there are no significant additional benefits from Option 2. Although Option 3 offers the additional benefits of reducing the wave overtopping sooner and requires less interventions and therefore disruption, the incremental PV cost is very high at £10,175k and is therefore not justified at this time.

Option 1 Phased Repair Scheme therefore remains the economically preferred option, as previously recommended by the 2012 Phase 1 PAR.

5 Partnership Funding Calculator

5.1 Apportionment

For application in the FDGiA Partnership Funding Calculator the present value benefits of **£98,117k** need adjusting for two factors; benefit period and proportion of frontage.

The benefit period is the duration until the next major intervention on the assets. This is taken as 20 years, as that is the point at which the capital scheme would be required (2042). Taking the present value benefits over the first 20 years reduces the benefits to **£92,451k**.

As the scheme proposed in the North Bay Walls Urgent Improvements Phase 2 OBC does not cover the full length of the frontage in the two management units the benefits have been factored according to the proportion of the frontage being included in the phase. The Phase 2 scheme will carry out improvement works to 10% of the Clarence Gardens frontage and 48% of the North Bay Cliffs frontage. Therefore, the PV benefits and number of properties protected by the scheme have been factored accordingly, resulting in a revised PV benefit of **£24,795k**.

By factoring the benefits in this way it avoids claiming more benefits than necessary, and removes the risk of double counting of benefits for the future wall improvement and capital phases of the scheme.

In addition the net carbon value of the scheme has been included within the OM1A benefit value in the Partnership Funding Calculator. This takes into account the carbon avoided due to preventing erosion of properties (taking only the properties included within the Partnership Funding Calculator and not the full property count), and the carbon costs of construction. This reduces the overall OM1A benefits to **£23,679k**.

Only the costs associated with the Phase 2 portion of the scheme have been included within the calculator up to year 20.

5.2 Deprivation

The study area is covered by three Lower Super Output Areas (LSOA), these have different scores on the Index of Multiple Deprivation which cover all three bands used within the FDGiA Partnership Funding calculator, as shown in Table 5-1.

Table 5-1 Index of Multiple Deprivation 2019 (IMD) for Study Area

LSOA Code	LSOA Name	IMD Rank	IMD Score	No. Residential Properties (Households)	
				North Bay Cliffs MU (48% of frontage)	Clarence Gardens MU (10% of frontage)
E01027846	Scarborough 006C	6,252	19.04%	25 (12)	19 (0)
E01027847	Scarborough 006D	585	1.78%	0	168 (19)
E01027848	Scarborough 006E	24,115	73.42%	13 (6)	0

Note: numbers in brackets show number of households included within the FDGiA Partnership Funding calculations factored according to proportion of frontage included within scheme.

5.3 Calculator Results

A summary of the FDGiA Partnership Funding calculator is shown in Table 5-2 and the output from the spreadsheet is included in Appendix C.

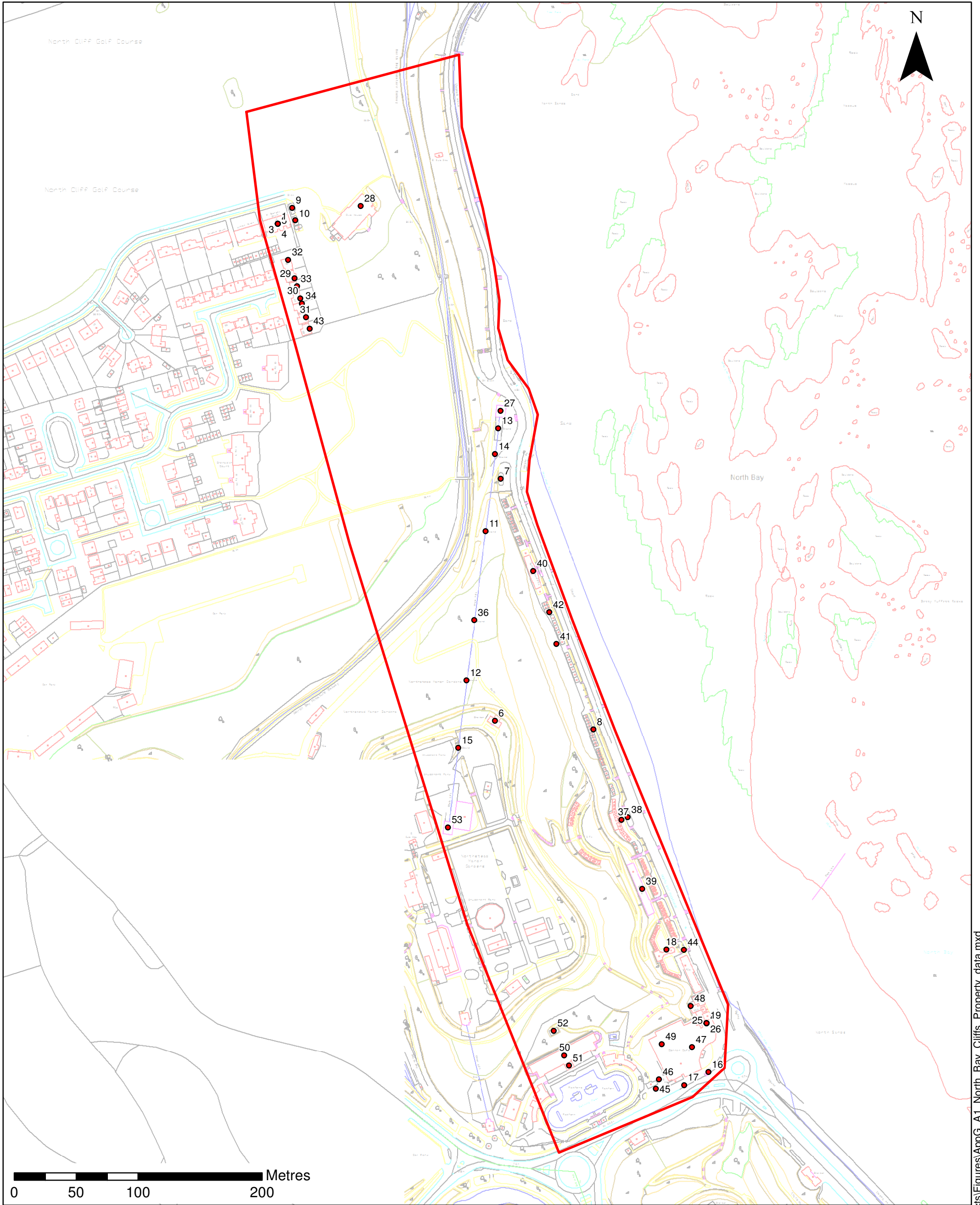
Table 5-2 Summary of Partnership Funding Calculator for North bay Urgent Wall Improvements Phase 2

Outcome Measures		Number	Qualifying Benefits	FDGiA Contribution
OM1a (Economic Benefit)			£21,403k	£1,284k
OM1b (People related impacts)			£352k	£70k
OM2 (Households better protected against flooding)	20% most deprived areas	0	£0	£0
	21-40% most deprived areas	0	£0	£0
	60% least deprived areas	0	£0	£0
OM3 (Households better protected against coastal erosion)	20% most deprived areas	31	£1,612k	£725k
	21-40% most deprived areas	0	£0k	£0k
	60% least deprived areas	6	£312k	£62k
OM4 (Statutory Environmental Obligations Met)			£0	£0
Maximum FDGiA Contribution				£2,142k
Raw OM Score				132%
Cost saving and/or external contribution required				£0k
Scheme Contributions Secured				£0k
Adjusted OM Score				132%
FDGiA required for next phase				£1,466k

Appendix A

Figures

Study Area



Key:

Benefit Area

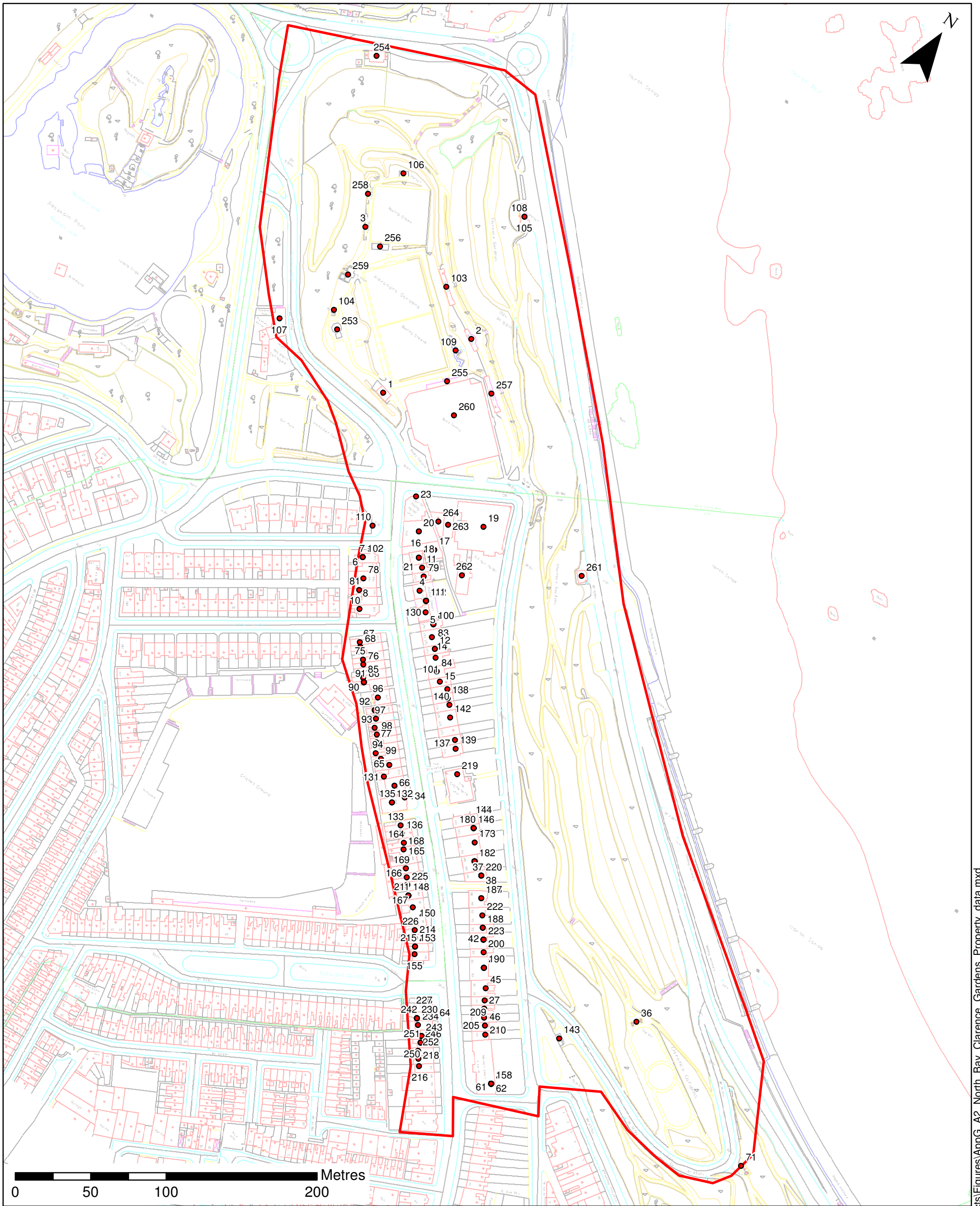
Title:
Benefit Area: Cliffs

Project:
North Bay PAR - Cliffs


Client:
Scarborough Borough Council

Date: March 2012		Scale at A3: 1:2,800
Figure: A1	Drawn: TC	Checked: EH





Key:

 Benefit Area

Title:
Benefit Area:
Clarence Gardens

Project:
North Bay PAR -
Clarence Gardens

Client:
Scarborough Borough Council

Date: March 2012		Scale at A3: 1:2,300
Figure: A2	Drawn: TC	Checked: EH

