

Coastal Schemes with Multiple Funders and Objectives FD2635

Case Study Report 12 Redcar Flood Alleviation Scheme



Artists' impression of the Vertical Pier Regeneration development part of the wider scheme, taken from the Redcar & Cleveland vision 2010

This case study is one of 14 documents supporting the research project Coastal Schemes with Multiple Objectives and Funders - Case Studies FD2635, available from <http://tinyurl.com/6dzyusy>. This research was conducted in 2010/2011 by Maslen Environmental on behalf of Defra and the Environment Agency's Research and Development programme.

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1 Case Study: Redcar Flood Alleviation Scheme

1.1 Introduction

1.1.1 Description

Redcar is a seaside resort in the North East of England. Situated along the North Sea Coast, east of Middlesbrough it attracts over one million visitors annually. Redcar is an area that is vulnerable to flooding and coastal erosion, particularly as a result of severe storm events from the North Sea. Over the last century there have been a number of storm events in the area including those in 1909, 1913, 1925, 1953, 1996, 2006 and 2008. Many of these events caused significant wave action, including 'overtopping', and at times this has resulted in major coastal erosion and seawall damage. Such incidents demonstrate the limited resilience of the existing structure and the need for a more sustainable source of protection from the risks of coastal flooding and erosion.

A new flood alleviation and coastal defence scheme is proposed along a 2,700m stretch of coastline which fronts Redcar Town Centre. Construction started onsite in February 2011 and will take two years to complete. The total budget for this scheme is £29.2 million which is provided by FDGiA and Redcar and Cleveland Borough Council (RCBC). The scheme involves collaborative working between the Environment Agency and RCBC.

The works will include raising the height of the sea wall and the replacement of the revetment. The finished scheme will protect 1162 residential and 307 commercial properties from the risks posed from coastal flooding and erosion. The promenade will be completely redeveloped to encourage more visitors and to minimise the impact of the new raised defences. The sea defences are being led by the Environment Agency and the landscape design by RCBC. A unique feature of the landscape design is the 'Vertical Pier', aiming to create a central point, new performance space with a 360° viewing platform. The coastal defence scheme design aims to complement and form the backbone to the future regeneration of the town. The Redcar Seafronts Creative Hub is promoted separately by RCBC and will cost approximately £8 million. The Redcar Seafront project will strengthen the Tees Valley's creative industries and tourism sector. This project form will provide a high quality workspace to create jobs and help new business start-ups in the digital and arts sector.



Figure 1. Overtopping at Esplanade on 1 March 2006. Photograph courtesy of Dave Cocks, RNLI Redcar

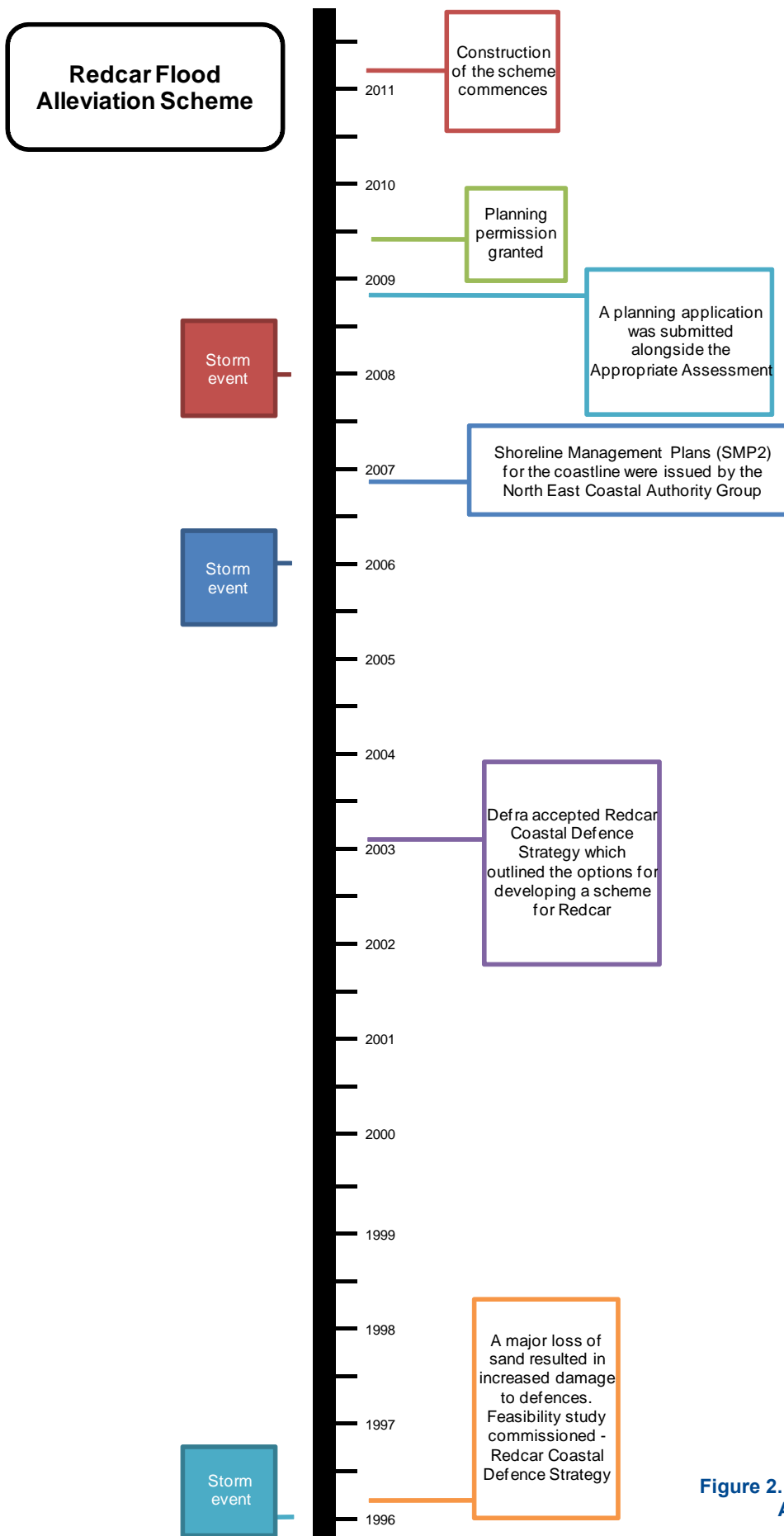


Figure 2. Timeline for Redcar Flood Alleviation Scheme

1.2 Objective Settings

1.2.1 Project Drivers

In 1996 a major loss of sand resulted in increased damage to the defences, this prompted RCBC to commission a feasibility study entitled the 'Redcar Coastal Defence Strategy'. This report was accepted in 2003 by Department for Environment, Food and Rural Affairs (Defra) and it considered the options for developing a scheme for Redcar. Various engineering options were considered at the time of the Redcar Coastal Defence Strategy. The chosen option was to construct a new revetment and seawall and to continue maintenance of the groynes and seawall at the Stray. The proposed scheme will provide a 1 in 300 (0.33% Annual Exceedance Probability (AEP)) for the next 50 years, thereafter adaptation measures will be incorporated to sustain the chosen standard of protection. The finished scheme will protect 1,162 residential and 307 commercial properties from the risks posed from coastal flooding and erosion.

In 2007 the second Shoreline Management Plans (SMP2) for the coastline were issued by the North East Coastal Authority Group. The proposed scheme meets with the 'hold the line' objective identified in the SMP for Redcar.

The sea defence works are part of RCBC vision for the sea front (Redcar Seafront project). The regeneration of the Redcar seafront will begin with the strengthening of the sea defences (Redcar Flood Alleviation Scheme) and will develop the creative industries and tourism sector. It will bring together a series of attractions, events, space and activities for creative people, visitors, residents and businesses. The project is anticipated to entice an estimated projected 2.5 million visitors by 2025 which will support business and create new jobs.

1.2.2 Partnership Objectives

To work together to provide Redcar with a new sea front that will increase visitor numbers, increase local revenue, create jobs and protect the town from flood and coastal erosion.

1.2.3 Project Objectives

The scheme is about protecting the coastline and benefitting the town economically and socially. The key aims and objectives of the project are summarised as:

- To reduce flood and coastal erosion risk to residential and commercial properties and highway and sewer infrastructure; and
- To enhance the Redcar beach frontage in relation to the local economy in respect of tourism, the fishing industry and recreation.

Other objectives include:

- To ensure compatibility of solutions with the SMP2;
- To ensure the planning and implementation of coastal defences does not interfere unduly with the interests of statutory and non-statutory consultees;
- To ensure the proposed scheme is consistent with the nature conservation requirements for the Special Protection Area (SPA).
- To contribute to a healthy, rich and diverse environment and a better quality of life for all people;
- Provide high quality environmental enhancements to attract people to the Redcar seafront;
- Stimulate further regeneration of the town, create more jobs and attract new businesses; and
- RCBC are maintaining an on-going erosion monitoring programme and will determine the need for any future works at a later stage.

The objectives demonstrate the importance of the defences to the local economy, communities and environment of Redcar. Many of the objectives would not be quantified in a normal economic assessment as they have yet to be enabled by the reduced risks of flooding.



Figure 3. Defence Failure at Redcar. Photograph courtesy of Redcar and Cleveland Borough Council

1.3 Partnerships

1.3.1 Building the Partnership

To deliver this project the Environment Agency and RCBC are working with an extended project team, that includes Jacobs and Halcrow (consultants), Birse Coastal, RCBC's Landscape Architects, Smeeden Foreman (contractors) and their engineering consultants Arup. The landscape architects were selected following an international competition adjudicated by the Royal Institute of British Architects (RIBA). The public were consulted on the shortlisted schemes and RCBC used the results to help select the chosen design.

1.3.2 Partnership Working the Governance

The project used two main types of meetings:

1. Environment Agency Project Board who deals with finance, specification, design and programme. RCBC are represented on this board; and
2. Redcar Sea Front Design Panel to judge the RIBA competition, manage the public campaign, deal with the architect deal with costs and timing. RCBC Chief Executive and Ian Hodge (Project Manager) chair this group. Elected members, the Environment Agency, the architect and local businesses sit on this panel.

The extended project team (described in Section **Error! Reference source not found.**) has to work closely together to ensure the scheme will be delivered successfully. Risk workshops were undertaken with all of the extended project team to produce a joint risk register, this ensured that all risks and concerns were recorded and dealt with. Generally the construction risks are shared between Environment Agency and the contractors. The financial risks related for the defence construction are the responsibility of the Environment Agency, whilst the Creative Hub financial risks are the responsibility of RCBC.

As there was a large team this often lead to rather large and long progress meetings. The project team have reduced the progress meeting invitation list and now have smaller concentrated meetings. They found this is a more effective use of time for everyone.

The Environment Agency has appointed Birse a construction, design and management consultancy to deliver the scheme. There is a web based filing centre that is used by the whole team, this has helped to reduce the filing space needed and helps to ensure that everyone is working from the same version of reports, surveys etc.

1.4 Approvals, Planning and Legislation

The scheme is proposed under the Water Resources Act. Consultations have been held with Natural England and their agreement for the scheme has been secured. An appropriate assessment was completed under the Conservation (natural Habitats) Regulations 1994. Approval has been obtained from the Secretary of State for Communities and Local Government to affect the Teesmouth & Cleveland Coast Special Protection Area (SPA) due to an Imperative Reason of Overriding Public Interest (IROPI). This approval accepted that the necessary compensatory measures are in place and that the coherence of the Natura 2000 site will be protected.

A Planning Application was submitted alongside the Appropriate Assessment in October 2008. This project is compliant with the relevant National, Regional, and Local Planning policies thus Planning Permission was granted on 2nd June 2009. At the time of writing this case study report there were still parts of the planning permissions and approvals that are outstanding and incomplete.

Coastal Protection Act, Consent, Crown Consent and FEPA licences were also required.

The Vertical Pier and some small elements of the landscape design still require Planning Permission. This is in progress.

1.5 Funding Arrangements

The scheme is estimated to cost is £29.2million. This includes £25.2million from Defra FDGiA and £4.0 million secured by RCBC (supported by funding from One North East). Additional funding was made available for the scheme from local levy to help RCBC deliver the design competition. The Environment Agency and RCBC are currently agreeing funding profile for the final partnership agreement.

The proposed works will cause direct and indirect loss of SSSI, SPA and Ramsar designated habitats. As part of the draft Tees Strategy the proposed managed realignment compensatory site will incorporate 7ha of mudflat and saltmarsh to compensate for the works at Redcar. Funding is highlighted in the Environment Agency's medium-term plan to create this habitat within the next five years. In this regard the Environment Agency has committed £300,000 which is included within the FDGiA allocation.

The scheme scored Present Value Cost of £28.5million and Present Value benefit of £147m, scoring a benefit / cost ratio of 5.2 (the external funding for the enhanced landscape was not considered in the benefit to cost ratio, hence the difference between Present Value Cost and scheme cost) (see Table 1.1 below).

Location	Redcar Frontage & the Stray
Present Value benefits	£147,000,000
Present Value costs	£28,500,000 (excludes external funding for enhanced landscape)
Net present value benefits	£118,000,000
Benefit cost ratio	5.2
Cost per residential property	£24,500
Outcome Measures	OM1: 0.040 (Economic Benefits), OM2: 0.002, OM2b: 0.011 (Households protected), OM3: 0.014 (Deprived households at risk), OM5: 0.006 (UK Biodiversity Action Plan habitats), Overall OM Prioritisation Score = 2.53

Source: Environment Agency. (2009c) Project Appraisal Report, Redcar Flood Alleviation Scheme (Authority Scheme Reference: IMNE000524) Version 4. Environment Agency, Yorkshire and North East

Table 1-1. Economic Summary (financial values to 3 significant figures)

The Creative Hub is a separate project, but inextricably linked to the scheme as it is on the seafront. Both the Creative Hub and the Vertical Pier will run as standalone business. The Vertical pier is estimated to cost approximately £1.5 million. The architects of both buildings are in regular communication so that the two designs will appear linked. They are proposing a raised walkway over the road between the Hub and the promenade to increase its links to the sea front. The road will be slightly raised to the same height as the pavement.

The additional funds provided by RCBC for the landscaping works have allowed the scheme to deliver much more for Redcar than the Environment Agency would have been able to do with FDGiA. It was felt by the partners that it would be most interesting to find out what the 'real' financial return is from the defences

and improvement. Overtime this is likely to be evident in the visitor numbers and private sector investment in the area.

As the scheme was developed to protect existing properties rather than new development, funding from S106 was not possible.

1.6 Summary of Key Issues

- The scheme encroaches in to the Teesmouth and Cleveland Coast SPA / Ramsar Site, the Environment Agency will be providing 7ha of compensatory habitat for wading birds within the Tees estuary;
- The scheme involves collaborative working between the Environment Agency and RCBC; and the use of numerous consultants and contractors;
- The works will include raising the height of the sea wall and replacement of the revetment to reduce coastal erosion and flood risk; and
- The scheme aims to reduce flood and coastal erosion risk to residential and commercial properties and enhance the beach frontage to stimulate further regeneration of the town, create more jobs and attract new businesses.

1.7 Lessons Learnt

- The scheme met with Northumbria's RFDC objectives;
- The project has multiple objectives including flood risk and coastal erosion management and secondary objectives for regeneration and biodiversity;
- Aligning the partners objectives and the timing were critical to the success of the scheme;
- The success so far is set to open dialogue and close working arrangements between the Environment Agency and RCBC: "The Environment Agency and Redcar and Cleveland Borough Council have a common goal to improve and protect Redcar for the future. Both organisations work in different ways, and we have worked together to align our working procedures to ensure each organisations respective objectives have been met" (Robinson, 2011);
- Previous working relationships between RCBC and the Environment Agency assisted with the partnership working;
- The Environment Agency have reduced the progress meeting invitation list and have smaller concentrated meetings. They found this is a more effective use of time for everyone;
- The scheme led to the empowerment and development of skills of staff involved and elected members; and
- RCBC have a very detailed understanding of coastal process, changes in sea levels in the area, this information has fed into the existing scheme and lead effective design.

1.8 References

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