

1 Introduction

This report is the culmination of many years of high level study on the north-west coastline. It follows on from the Shoreline Management Plan (SMP) process which was completed in 1999 (refer to SMP documents for Cell 11c and 11d). The contract to complete this Strategy Study was competitively tendered in Autumn 1999 and awarded to Atkins by Barrow Borough Council in spring 2000. The Strategy Study has been completed in stages as described below.

The Walney Island Coastal Management Strategy Study is produced in 2 main Volumes:

- ◆ Volume 1 – “Strategy Development Report” (WS Atkins 2000). This was a scoping study to identify the key issues to plan a suitable strategy study.
- ◆ Volume 2 – “Strategy Recommendations” (this volume).

Volume 2 is purposely set out to separate the initial work presented in Volume 1 (represented in detail within Volume 1) from the subsequent analytical work and recommended strategic approach for Walney Island.

This section of Volume 2 sets the scene for the Strategy Plan. It includes:

- ◆ Discussion of the purpose of a Strategy Study.
- ◆ Definition of the study area.
- ◆ An overview of current knowledge.
- ◆ Key conclusions from Volume 1 of the Strategy Study.
- ◆ Definition of the objectives of the Strategy.
- ◆ Presentation of the report structure.

1.1 Purpose of a Coastal Defence Strategy Study

A coastal defence strategy study (a “Strategy Plan”) develops a long term (in this case 50 years) plan for coastal management for the study area, including all necessary work to meet defined coastal defence objectives. It is designed to provide a framework for policy decision making and action related to both the provision and the management of sustainable coastal defence policies.

The Department of Environment, Food and Rural Affairs (Defra) has overall responsibility for flood defence and coast protection in England and administers grant aid for capital defence schemes. The planning, design, maintenance and operation of defence measures are carried out by the Environment Agency, Internal Drainage Boards and Local Authorities. Barrow Borough Council is the Coast Protection Authority (under the Coast Protection Act 1949) for the entire length of the study area. All flood defences on the island are privately owned.

The most recent Defra guidelines for strategic planning (FCDPAG2) state the following with regard to the establishment of strategic aims and objectives. *“The primary aim (and philosophy) of a coastal defence strategy is to take a strategic overview of the preferred generic option for each Management Unit (MU) along the study coastline (previously identified within the corresponding Shoreline Management Plan – SMP). Against this background, decisions will be made on suitable and sustainable coastal defence schemes.”*

A Strategy plan should now also take into consideration the FCDPAG3 Economic Appraisal “Supplementary Note to Operating Authorities” (March 2003) which outlines revisions to economic appraisal procedures arising from the new HM Treasury “Green Book”.

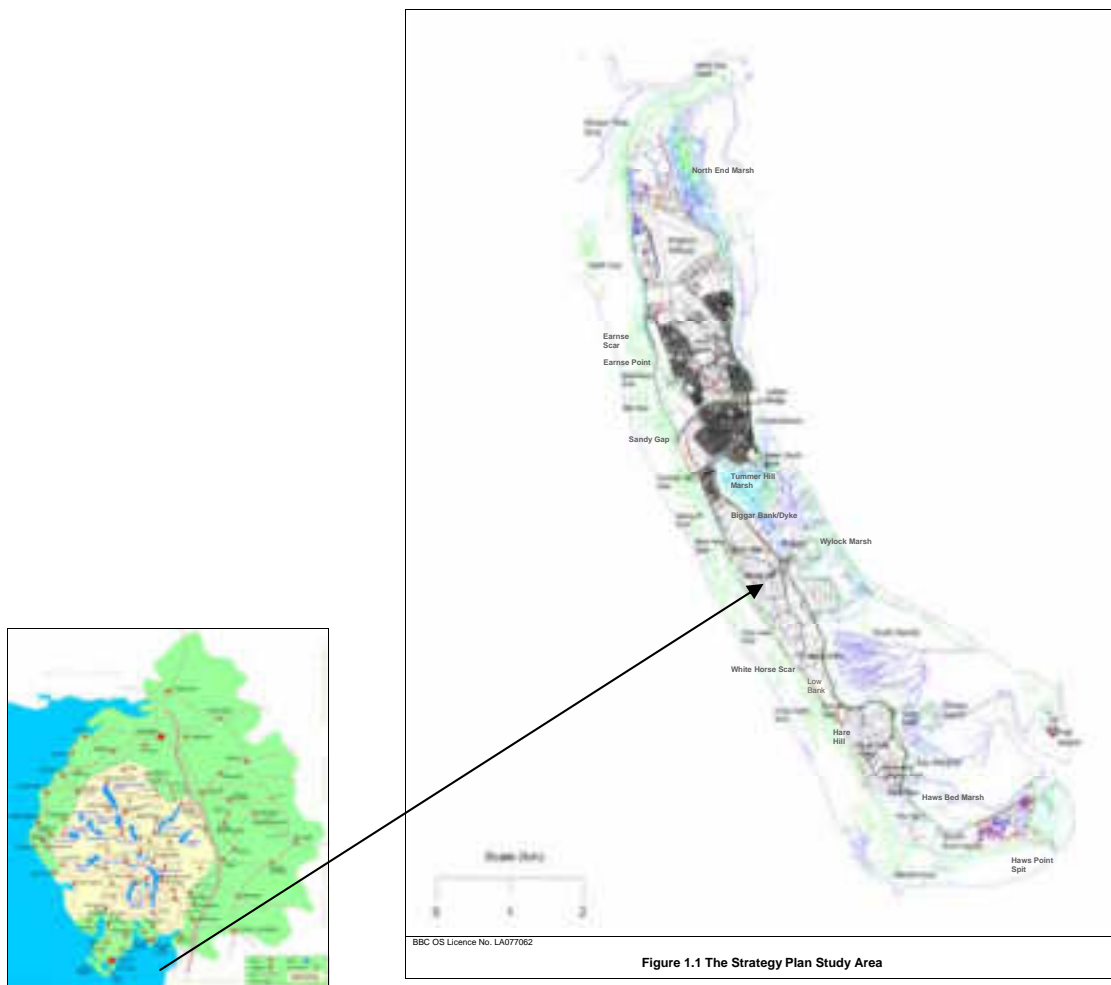
The development of a Strategy Plan may bring to the fore issues such as regional habitat resources that would otherwise not be addressed at a scheme level. In addition, local issues are identified which may also need to be resolved at the local level. Consultation is an essential element of strategy development. This coastal strategy has focused on the importance of consultation and has involved stakeholders in the process at an appropriate time and level. This document has been produced in consultation with all key stakeholders on Walney Island. The outcome of the consultation exercises are included within the decision making process for the short-listed options presented in Section 7.

Further description of shoreline management process within which this study sits is included in the Stage 1 report, specifically the Shoreline Management Plans that this Strategy work has resulted from.

1.2 Extent of Study Area

As a result of wide consultation and subsequent risk management workshops in March 2002, it was decided that the whole of Walney Island be considered by the Strategy Study (no inland limit determined). This is due to the strategic significance of the island as natural breakwater for the mainland (Barrow). This is consistent with the scope of Phase 1 of the study and is also consistent with Defra guidance which states that the landward margin of the flood risk area is the most appropriate boundary line. Consideration in terms of coastal processes dictates that the Duddon Estuary to the north plus the northern half of Morecambe Bay is to be considered in wider strategic decision making.

Figure 1.1 shows the extent of the study area.



1.3 Overview of Current Knowledge

Detailed description of the study area in terms of geology, history, coastal defences, coastal processes, geomorphology, the natural environment and the human and built environment is contained in Volume 1 and specific appendices to Volume 2 (this report). However, for reader convenience, the following section contains a brief summary of current knowledge and data of relevance, taken from Volume 1, on coastal issues relating to Walney Island.

1.3.1 Physical Environment

Walney Island is approximately 13km long and 1.5km wide at its broadest in Vickerstown. It is orientated mainly north-west to south-east, with its northern and southern ends curving eastwards towards the Furness peninsula. Its west coast is exposed to the Irish Sea, whereas its northern end comes under the influence of the Duddon Estuary and its southern end forms the north-western end of the entrance to Morecambe Bay. Its most sheltered east coast faces the Walney Channel.

Walney Island consists of unconsolidated sediments deposited during the last glacial period. As a result of this formation, the Island has always been vulnerable to erosion from external influences. Over the last thousand years, the width of the island has gradually decreased over its southern half while the two extremities have grown. Present understanding of processes indicates that erosion of sediments on the west coast is providing sediment feed to the north and south of the island. Appendix D presents new details on shoreline evolution of Walney Island undertaken for this study.

1.3.2 Human Environment

The predominant settlement is Vickerstown, which is located to the north of the island (see Figure 1.1). In the 1990s its population was over 10,000. There is currently little industry on the island, except for an airfield operated by BAE Systems at the northern end and an active landfill tip between Hillock Whins and Hare Hill.

There are intermittent coastal defences on the west facing coast. Rock revetments are the general form of existing defences. A "T" shaped groyne is located at Earnse Point. Several landfill tips lie adjacent to the west coast, some of which are defended.

1.3.3 Natural Environment

Walney Island is an area of considerable natural importance reflected by the number of national and international designated sites. It is a good example of a barrier island, formed from the re-working of glacial sediments, which is a relatively rare geomorphological feature in Britain. As a consequence, the entire intertidal zone around the island, apart from a central strip between Hillock Whins and Sandy Gap, is designated of international or national conservation importance. The designated sites protect a variety of plant and animal habitats on the island such as, saltmarsh, lagoons, dunes, vegetated shingle, and intertidal flats. These habitats support a variety of birds, grasses, plants, insects and intertidal life forms.

The northern end of the island is part of the Duddon Estuary SSSI, Duddon Estuary SPA, Duddon Estuary Ramsar Site, and Duddon Estuary EMS and cSAC. The south of the island falls under the Morecambe Bay SAC, Morecambe Bay SPA, Morecambe Bay SSSI, South Walney and Piel Channel Flats SSSI, and Morecambe Bay Ramsar Site and EMS. There are two National Nature Reserves on the island, North Walney Nature Reserve and South Walney Nature Reserve.

1.4 Conclusions from Stage 1

The following text is extracted from the Stage 1 Report executive summary.

“ The key to developing a coastal management strategy for Walney Island for the next 50 years is to understand the factors that are currently shaping the island, then to evaluate the effects that intervention would have on these natural processes with a view to identifying the best balance between the two. With regard to coastal process behaviour, the agreed form of behaviour is one of erosion of the west face of the island with redistribution of sediments to the extremities.....

This (Stage 2) examination should identify:

- ◆ *The timescale for any future intervention;*
- ◆ *An improved valuation of the assets being protected;*
- ◆ *The effects on the environment of allowing present conditions to prevail and of pollution from the current and historical landfill tips;*
- ◆ *The environmental effects in terms of a habitat budget any future changes may have.*

In some areas there may be the potential for large scale damages to occur, either in terms of damage to infrastructure and property or due to pollution (from landfill) of the inter-tidal zone. However, at present there is insufficient confidence in our knowledge of existing conditions, or the likely consequences of doing nothing, to enable reliable judgements to be made on the future coastal management strategy for Walney Island. ... It is recommended that further work is required to provide the best baseline position for detailed technical, economic and environmental assessment to be carried out. This work can be split into two discrete categories, as follows:

- ◆ *That necessary to provide sufficient understanding of coastal process and shoreline interaction to improve assessment of the consequences of different options, thus enabling the development of a more robust coastal management strategy; and*
- ◆ *That necessary to allow for on-going review of the Strategy.*

The following elements have been identified within these two categories:

Initial Strategy Development

- ◆ *Improve the understanding of coastal process/shoreline interaction by correlating the available offshore wave data with erosion rates along the island.*
- ◆ *Use of historical and new ground/site investigation information to establish longshore and inshore variance in ground conditions applying.*
- ◆ *Evaluation of land topography, using data from either satellite or photogrammetric techniques, supplemented with physical recording of levels for confirmation.*
- ◆ *Detailed assessment of aerial photographs to establish historical rates of cliff erosion over the past 50 years. This will enable a more robust prediction of likely future behaviour.*
- ◆ *Determination of likely future shoreline evolution utilising the above.*
- ◆ *Habitat audits to identify likely gains/losses in habitats associated with different courses of actions.*
- ◆ *Updating the strategic option assessment and production of the completed Strategy document.*

Long Term Strategy Development (to be refined as Stage 2 progresses)

- ◆ *Improvement of present shoreline monitoring and to quantify sediment movement around the island. ”*

Following discussions after the completion of Stage 1, a scope was agreed for Stage 2 (see Appendix A). As indicated above, this scope included several new studies to improve understanding of coastal processes, human and other environmental assets at risk and the level of this risk that may be likely over the Strategy timeframe. These studies have assisted in forming the basis for appraising the future coastal management options for Walney Island.

1.5 Objectives of the Study

The methodological approach adopted for this study has taken on board the recommendations set out in FCDPAG1 and 2 for Strategic Planning and Appraisal.

A series of study objectives have been set through consultation and discussion with national and local organisations. These are as follows:

Primary Objectives (P)

P1	To minimise the adverse effect that artificial coastal defences have on the natural behaviour of coastal and geomorphological processes across the island.
P2	To maintain Walney Island as a strategic defence to the Port of Barrow and the surrounding area and to avoid adverse interference in port operations as a result of future shoreline management actions.
P3	To define a suitable monitoring system to provide a coherent data base to inform those responsible for implementing strategy recommendations in the future.
P4	To provide an appropriate level of coastal defence around the island in accordance with technical, economic and environmental criteria applying.
P5	To ensure that appropriate flood warning strategies are put in place to minimise any future risk to human life from flooding or erosion
P6	To take appropriate defence measures to prevent future pollution of the shoreline from historic or active landfill sites adjacent to the coast.
P7	To ensure that current and future flood and coastal management takes due consideration of the need to maintain, restore or enhance the internationally and nationally important nature conservation interests on and around Walney Island (SPA, cSAC, Ramsar, NNR, SSSI, European Marine Sites etc) to contribute to the achievement of favourable conditions.
P8	To take due consideration of current Government High Level Targets, regulations, statutes, policies and guidelines associated with flooding and shoreline management.

Secondary Objectives (S)

S1	To take due account of the historic resource of the island in any future shoreline management.
S2	To continue to monitor the effects of the Earnse Point Groyne and its potential effect on downdrift frontages and provide appropriate shoreline management measures where appropriate.
S3	To maintain and where possible improve the provision of appropriate access to properties as well as the foreshore, for use by emergency services vehicles and other shoreline users, subject to environmental restraints applying.
S4	To avoid adverse affects on bathing water and foreshore quality, marine litter and amenity usage as a result of future shoreline management actions.

Appropriate defence options are tested against these agreed objectives in Section 6.

1.6 Report Structure and Option Appraisal

This structure of Volume 2 mirrors the preferred strategic option selection procedure set out in the recent Defra Flood and Coastal Defence Project Appraisal Guidance (1999) and the Supplementary Note to Operating Authorities (Defra March 2003) (see Figure 1.2).

In order to evaluate the generic policy options given in the two SMP's for Walney Island, it is necessary to establish criteria for an appraisal process that applies for potential scheme options and strategies. The criteria adopted in this report are based on the objectives presented above.

The study is undertaken as part of a "bottom up" evaluation process, reviewing key scenarios, notably developing a "do nothing" scenario and establishing whether there is justification for wide-scale (or indeed any) intervention to prevent further erosion of the west coast. This Volume also reviews other non engineering related strategic options, including local self help initiatives, flood warning and forecasting projects and wider community assistance programmes.

These options are described and discussed more fully later in Section 7 and 8 of this Volume.

In order to support the decision process for Volume 2, Barrow Borough Council commissioned Atkins to facilitate a project specific Risk Management workshop. The workshop was structured to follow the FCDPAG4 recommendations for strategic implementation plans. Additionally, it drew upon CIRIA125, Control of Risk – A Guide to the Systematic Management of Risk from Construction. Elements of the practical application of CIRIA125 were drawn from the Environment Agency's publication 'Risk v2.1', published in October 2000 following revision to align the document with FCDPAG4.

The Risk Workshop aimed to identify generic and localised risks associated with the study area. The outcomes of this have been discussed at public presentations in March 2002 and used in the selection criteria for the preferred coastal defence options. Details of this exercise are presented within Appendix G.

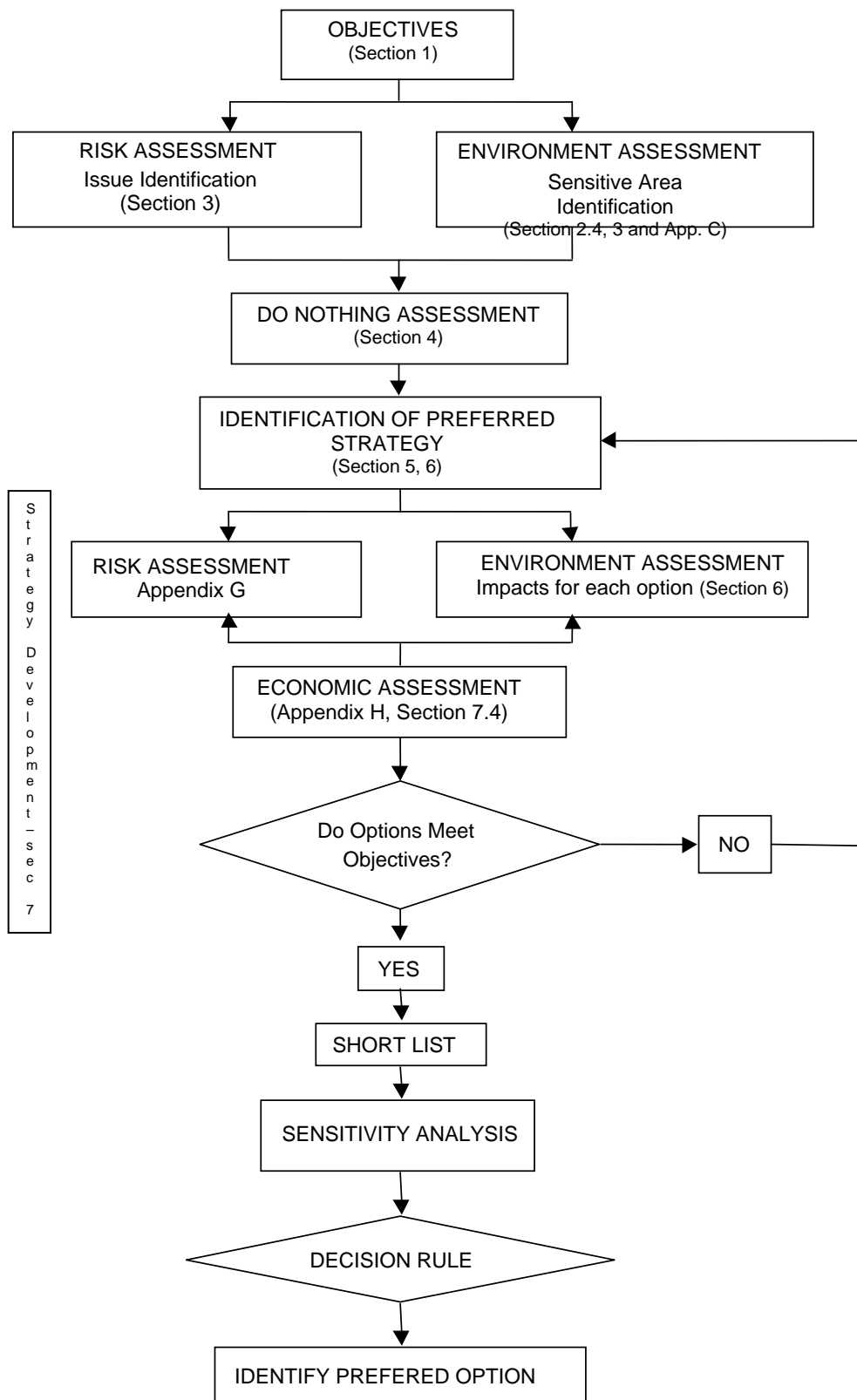


Figure 1.2 FCDPAG Strategic Approach