Angus Council

Angus Shoreline Management Plan SMP2

SEA Environmental Baseline Report
(Theme Review)

Contents Amendment Record

This report has been issued and amended as follows:

Issue	Revision	Description	Date	Approved by
I	0	Draft for client review (to accompany scoping report)	May 2012	JF

Halcrow Group Limited (A CH2M Hill Company)

Burderop Park, Swindon, Wiltshire SN4 0QD

Tel +44 (0)1793 812479 Fax +44 (0)1793 812089

www.halcrow.com

A CH2M Hill Company

Table of Contents

D.1 Introduction

This Appendix contains the Strategic Environmental Asssesment (SEA) Environmental Baseline Report (Theme Review), which primarily identifies key features along the Angus coast from Milton Ness in the North to Broughty Ferry Castle, Dundee, in the South, and details why these features are important to stakeholders.

In accordance with the Defra Shoreline Management Plan (SMP) guidance (Defra, 2006a) a "feature" is something tangible that provides a service to society in one form or another, or more simply benefits society in some way by its very existence. It is the sustainable management of these features that adds value to our coastline in terms of social, economic and environmental value. To establish the benefits that each feature provides it is necessary to establish why the feature is important and who benefits from the features identified, e.g. individuals, local residents or wider society.

To underpin the assessment of these features and their associated benefits, the Theme Review identifies the key characteristics and importance of features for the Natural Environment, Landscape Character, Historic Environment, Land Use, Infrastructure and Material Assets, and Population and Health. For consistency with the Baseline Processes Report (Appendix C) these themes are discussed by Coastal Process Unit (CPU) (see Figure D1).

The inland boundary of the study area for this SMP2 theme review will be similar to that used in the Angus SMP1, but revised to take into consideration land use, the natural environment, historical and archaeological features that may be affected by flooding or erosion over 100 years, as shown in Figures D2 to D7. Environmental, heritage, landscape and land use features and assets lying wholly or partly within this area have been included in this Theme Review.

This SEA Environmental Baseline Report (Theme Review) builds on the environmental information presented in the Angus SMP1 (Angus Council 2004). Information from this review will be used as a basis for developing future policy options and assessing the impacts and suitability of these options. This document will also form the basis for intial consultation with the statutory Consultation Authorities (Scottish Natural Heritage, Scottish Environmental Protection Agency and Historic Scotland) and will be used to obtain a formal Scoping Opinion on the scope and level of detail to be provided in the Environmental Report for the SMP2.

D.2 Natural Environment

D.2.1 General

As part of developing shoreline management policies it is important to understand the relationship between areas of value to nature and geological conservation and coastal processes, and to understand how coastal management can alter coastal processes and impact upon the natural environment.

This section reviews the status of the 'natural' features present on the shoreline from Milton Ness to Broughty Ferry and includes areas designated for their international and national conservation importance.

The Angus SMP2 coastline stretches for almost 79km and is one of the UK's richest stretches of coast for its natural environment. The SMP coast from Broughty Ferry Castle, Dundee to Milton Ness, Aberdeenshire provides a wide diversity of species and habitat, including low-lying sandy beaches, sand dunes and links areas, intertidal mud/sand flats and rocky shorelines and cliffs. This diversity of habitats, species, landforms and rock exposures has resulted in over 60% of the Angus SMP2 coastline being designated for its nature conservation value.

The following sections describe the environmental assets and associated designations within the SMP area that need to be taken into account when the appropriate strategic policy option for each process unit is evaluated.

Maps illustrating the different environment designations found within the SMP area are located in Annex D.1.

D.2.2 Biodiversity, Flora and Fauna

D.2.2.1 Protected Areas

The natural environment is protected at international, national, regional and local levels. In the UK, protection of the natural environment and compliance with international agreements is achieved through a mixture of legislation, regulations, statutory designations and voluntary management schemes.

The UK's natural environment and biodiversity is protected on a site-based system. This however, does not necessarily mean that an area with no designation has no environmental importance.

The ecological and geological importance of the shoreline is recognised in a number of designated conservation sites, as follows.

D.2.2.2 International Conservation Designations

International designations include Special Protection Areas (SPA) designated under the EC Birds Directive 1979 and Special Areas of Conservation (SAC) designated under the EC Habitats Directive, 1992. These designations are regulated in Scotland under the The Conservation (Natural Habitats and c) Regulations 1994 (as amended). Ramsar Sites are designated under the Convention on Wetlands of International Importance, signed at Ramsar in 1971.

Article 6 of the Habitats Directive determines the relationship between conservation and site use and requires that "*any plan or project not directly connected with or necessary to the conservation of a European site (i.e. an internationally designated conservation site) but likely to have a significant effect thereon, either individually or in combination with other plans or projects, shall be subject to appropriate assessment of its implications for the site in view of the site's conservation objectives*". Consequently, a Habitats Regulations Appraisal (HRA) of the SMP will be carried out for this SMP2 **(Appendix J)**, where appropriate.

The internationally designated sites in the SMP2 area are shown in Table 2.1 and on Figure D2.

Table 2.1 International Conservation Designations along the Angus SMP2 Coastline

Designation	Site name	Reason for designation	Location
Special Area of Conservation (SAC)	Barry Links SAC	Coastal dune heathland Shifting dunes Dune grassland Humid dune slacks Shifting dunes with marram	CPU7
	Firth of Tay and Eden Estuary SAC	The Firth of Tay and Eden Estuary site was designated as a SAC because it is a large geomorphologically complex estuarine system that contains considerable intact natural characteristics. Subtidal sandbanks Estuaries Intertidal mudflats and sandflats Common seal *Phoca vitulina*	CPU7 and CPU8
Special Protection Area (SPA)	Montrose Basin SPA	Supports over 20,000 waterfowl and aggregations of non-breeding birds including Eider *Somateria mollissima,* Knot *Calidris canutus*, Wigeon *Anus penelope*, Pink-footed goose *Anser brachyrhynchus,* Redshank *Tringa totanus,* Oystercatcher *Haematopus ostralegus* and Greylag goose *Anser anser.*	CPU2
	Firth of Tay & Eden Estuary SPA (and Barry Links)	Supports internationally important numbers of non-breeding waterfowl and aggregations of non-breeding birds including Eider *Somateria mollissima,* Marsh harrier *Circus aeruginosus,* Little tern *Sterna albifrons,* Bar-tailed godwit *Limosa lapponica*, Common scoter *Melanitta nigra*, Cormorent *Phalacrocorax carbo,* Goldeneye *Bucephala clangula,* Goosander *Mergus merganser, and* Grey plover *Pluvialis squatarola.*	CPU7 and CPU8
Ramsar Site	Montrose Basin	Supports over 20,000 waterfowl including many internationally important species, thus qualifying as a Wetland of International Importance.	CPU2
	Firth of Tay and Eden Estuary	Supports internationally important numbers of non-breeding waterfowl.	CPU7 and CPU8

D.2.2.3 National Conservation Designations

National conservation designations include Sites of Special Scientific Interest (SSSIs) notified under the Wildlife and Countryside Act 1981 and regulated under the Countryside and Rights of Way Act 2000 and National Nature Reserves (NNRs), which are notified and regulated under the National Parks and Access to the Countryside Act 1949 and the Wildlife and Countryside Act 1981.

The national designations in the SMP2 area are shown in Table 2.2 and on Figure D2.

Table 2.2 National Conservation Designations along the Angus SMP2 Coastline

Designation	Site Name	Reason for designation	Location
Site of Special Scientific Interest (SSSI)	St Cyrus and Kinnaber Links	One of the richest, most important sites for wild plants and animals on the north-east coast of Scotland. Notified for its coastal cliffs and dunes, vascular plants and lichens, breeding birds and insects.	CPU1
	Montrose Basin	Inter-tidal mudflats, saltmarsh, marsh, saline lagoons, vascular plants, breeding wildfowl and wintering waders, stratigraphy.	CPU2
	Rickle Craig- Scurdie Ness	Saltmarsh, coastal grassland, snails, geology.	CPU3
	Whiting Ness – Ethie Haven	Coastal grassland, cliffs (rock-ledge plant communities), Bryophyte, Invertebrates and breeding birds (the largest breeding seabird colony in Tayside) including Turnstones, Sandpipers. As well as various invertebrates including Lepidoptera. Old Red Sandstone igneous Non-marine Devonian stratigraphy.	CPU4 CPU5
	Elliot Links	Stable sand dune system and abandoned river meanders, which support important open dune and fen plant communities and invertebrates.	CPU6
	Easthaven	Greater Yellow Rattle (Rhinanthus angustifolius) and sand dune habitats	CPU6
	Barry Links	SSSI for its dune habitats and landforms, vascular plants, bryophytes, invertebrates and breeding birds.	CPU7
	Barry Buddon (west part of the site)	Barry Links is an SSSI for its dune habitats and landforms, vascular plants, bryophytes, invertebrates and breeding birds.	CPU8
	Monifieth Bay	Inter-tidal habitat and feeding area for internationally important numbers of wintering waders and ducks.	CPU8
National Nature Reserve (NNR)	North St Cyrus	Important Flora and Fauna.	CPU1

D.2.2.4 Local Conservation Designations

Statutory Local Nature Reserves (LNR) and non-statutory Scottish Wildlife Sites (SWTs), which are present within the SMP2 area are listed in Table 2.3 and shown on Figure D3.

Table 2.3 Regional and Local Conservation Designations along the Angus SMP2 Coastline

Designation	Site name	Reason for designation	Location
Local Nature Reserve (LNR)	Montrose Basin	Reed swamps, plant communities, wildfowl and waders and invertebrates	CPU2
SWT Nature	St Cyrus	Landscape and conservation value	CPU1

Designation	Site name	Reason for designation	Location
Reserve	Montrose Basin	Nature conservation value	CPU2
	Seaton Cliffs	Geodiversity value – see Table 2.11 in the Earth Heritage chapter	CPU5

D.2.2.5 Coastal habitats and species

The types of coastal habitats that are present within each CPU in the SMP2 area are summarised in Table 2.4 (with further detail provided in Annex D2).

Table 2.4 Summary of Coastal Habitat.

CPU	Sand dune	Cliff and rocky shore	Saltmarsh	Estuary mud / sand flat	Wet grassland
1	✓	✓	✓	✓	X
2	✓	X	✓	✓	✓
3	X	✓	X	X	X
4	✓	✓	X	X	X
5	X	✓	X	X	X
6	✓	✓	X	X	X
7	✓	✓	X	✓	X
8	✓	✓	X	✓	X

Sand Dunes:

There are three main dune systems in Angus: Charleton and Kinnaber Links to Montrose Bay, Lunan Bay and Buddon Ness; Dunes also extend along the coastal frontage between Arbroath and Carnoustie, at Monifieth and Broughty Ferry, Dundee. ,These dune systems cover a total area of approximately 2197ha (about 7% of the Scottish dune resource). The majority of sand dunes in Angus are vegetated (1728ha), with 398ha having some degree of development and 92ha used as arable or fallow land, which leaves only 9ha without vegetation or development or being used as fallow or arable land (Angus Council, 2004).

One of the largest sand dune systems in Britain is found within the SMP area at Buddon Ness. This Links area was designated as Barry Links SSSI for its dunes, vascular plants, bryophytes, invertebrates, breeding birds and landforms. It is also notified as a SAC for its sand dune habitats, and the inter-tidal part of the site is within the Firth of Tay and Eden Estuary SPA.

The sand dune habitat within the SMP area supports many important invertebrate species, including butterflies moths, grasshoppers, earwigs and several beetles. Several nationally and internationally recognised species of plants are also found on the dune systems, including the Greater Yellow Rattle *Rhinanthus angustifolius* at East Haven - the only natural population in Scotland and one of only eight sites in the UK.

Dune habitats located within each CPU are described further in Annex D2.

Cliff and Rocky Shores:

The significant lengths of coastal cliffs in Angus are found to the north and south of Lunan Bay. Rocky shore or cliffs run from Scurdie Ness to Rickle Craig in the north and from Ethie Haven to Arbroath in the south, totalling over 18km (Angus Council, 2004).

The high diversity of species and plant communities is related to the considerable habitat diversity and to the action and interaction of various ecological gradients. The volcanic lava and red sandstone cliffs of the Angus coast are relatively resistant to wave action – erosion in places may inhibit the establishment of some vegetation types, other plants are specially adapted to this environment. This erosion also makes the area more geologically diverse.

Whiting Ness to Ethie Haven is the longest stretch of sea cliff and rocky shore in Angus (11km). The grassland and rock-ledge plant communities along the cliff habitat support many uncommon plant species such as Long-Bracted Sedge *Carex lepidocarpa*, Maiden Pink and Hairy Violet; these species are found on the grassland sections. Sea Spleenwort and Pellitory-of-the-wall tend to grow on cliff ledges and in caves. Scottish Scurvy Grass *Cochleria scotica* was also recorded on the Angus cliffs in 1960, but has not been recorded since.

The SMP cliff habitat also supports a large breeding seabird colony, with internationally important numbers of over wintering Turnstones and Purple Sandpipers. Large numbers of Kittiwakes, Puffins and Razorbills also use the cliff habitat. Invertebrates including populations of Small Blue Butterfly are also found at the Arbroath Cliffs.

Cliff and rock shore habitat located within each CPU are described further in Annex D4.

Estuarine Mud/ Sand Flat, Salt Marsh and Wet Grassland:

Montrose Basin is one of the finest examples of an enclosed estuarine basin in the UK. This basin is an important estuary for nature conservation and is located entirely within the SMP area (Angus Council, 20004). A large proportion of Montrose Basin is inter-tidal with a high biological productivity and abundance of organisms. Mudflats are the dominant habitat in the inter-tidal areas of Montrose Basin.

Intertidal habitats are particularly valuable for wintering waterfowl with populations at over 34,000 recorded in the Outer Tay estuary at Monifieth Bay and 20,000 in Montrose Basin. Mud and sand flats provide essential feeding and resting areas for internationally important populations of migrant and wintering waterfowl. Internationally and nationally important species that regularly use the mud and sand flats of Angus include Pink-footed and Greylag Geese, Mute Swans, Shelducks, Widgeon, Eider, Goosander, Knot, Bar-tailed Godwit, Redshank, Sandwich tern, Common tern and Arctic Tern. Approximately 1% of the total European population of Common seal is also found in the Tay estuary and on the sand flats at Monifieth Bay.

The mudflats of Montrose Basin also support two of only three Zostera species that occur in the UK, Narrow-Leafed Eelgrass *Zostera angustifolia* and Common Eelgrass *Zostera Marina*, which provide sheltered nursery areas for fish such as Pollack, Two-Spotted Goby, Pipe Fish and various Wrasse.

Saltmarshes are normally found on the upper vegetated areas of inter-tidal mudflats and consist of a community of salt tolerant plants. The three main areas of saltmarsh in Angus are located at Montrose Basin (58ha), Boddin Point - Scurdie Ness (1ha) and the mouth of Lunan Burn (4ha) (Angus Council, 2004).

Smaller areas of saltmarsh vegetation occur throughout the SMP area, particularly at the mouths of rivers and streams, where there is fresh water seepage onto the beach or shallow sediments occur. A small area of perched saltmarsh is present within Rickle Craig to Scurdie Ness SSSI. Perched Saltmarsh is an EU priority habitat under the Habitats directive. The only recorded wet grassland site within the SMP area is found on the western shore of Montrose basin. The site, although small (c.5ha), is important as wet grassland is one of the most rapidly diminishing types of habitat in the UK and this is the only recorded area in Angus. There has been little systematic surveying of coastal wet grassland in Scotland therefore the full extent of this habitat within the SMP area is not known.

Estuarine mud/sand flat, saltmarsh and wet grassland habitats located within each CPU are described further in Annex D2.

D.2.3 Earth Heritage, Soils and Geology

D.2.3.6 Overview

The earth science interest of the coastline includes stratigraphic features, which are reflected in the designation of geological SSSIs, Geological Conservation Review (GCR) sites and Regionally Important Geological Sites (RIGS).

The designated earth heritage sites of national or international importance display sediments, rocks, fossils, and features of the landscape that make a special contribution to our understanding and appreciation of earth science and the geological history of Britain.

Natural erosion and deposition processes are key drivers in maintaining the geological interest of the coastline. Elsewhere, erosion in the SMP2 area exposes rock sequences in the cliff faces.

D.2.3.7 Overview of Geological features

Table 2.5 summarises the geological features present along the Angus SMP2 coastal frontage.

Table 2.5 Geological features present along the Angus SMP2 Coastline.

CPU	Geological features present
CPU1	Milton Ness consists of basic volcanic lava of Devonian age (ca. 350 million years old). West of Milton Ness the cliffs follow a fault-line trend between the Upper and Lower Red Sandstone series. Seaward of the cliffs the material is largely glacial and post-glacial drift from three major ice sheets that traversed this area during the Ice Age. During this period, and in the 10,000 years since, this debris has been periodically reworked by the sea to produce a suite of shingle ridges and spits, which have since been raised above sea level. Sand dunes and links have since formed on top of these. The most significant raised beach within CPU 1 is the Littorina Beach, where most of the sand dune system and grassy links are now established.
CPU2	Periodic deglaciation during the Ice Age, and since it ended, has caused the land surface to rise relative to the sea, leaving a prominent series of raised shorelines around Montrose, marking former positions of the coastline. These can be seen clearly to the north of the basin. At a GCR site at Maryton (in the south-west of Montrose Basin) a cliff section through the coastal sediments provides an important stratigraphic site for the study of relative sea level movements during the Holocene (the last 10,000 years) in the Montrose area. The section provides one of the best exposures in Eastern Scotland of the deposits (a sandy layer) of the main post-glacial transgression and the only exposure of the deposits from a tsunami, which hit the eastern and northern coasts of Scotland approximately 7,000 years ago.
CPU3	There are two GCR sites within the Rickle Craig - Scurdie Ness SSSI. The Scurdie Ness – Usan Harbour GCR site provides the best section through Old Red Sandstone lavas and associated sedimentary rocks of the Montrose Volcanic Formation in Scotland. These rocks were formed about 410 million years ago, with lavas being erupted from a volcano (the Montrose Volcanic Centre) to the north-east. During periods of no volcanic activity, sediments containing pebbles of volcanic rock collected in lakes and rivers flowing over the lavas. After the lavas had been erupted, mineral-rich fluids flowing through the rocks deposited silica in cavities forming agates. The area around Scurdie Ness is a GCR site in its own right for its mineralogy – due to the presence of these agates (some of which are gem quality) within the lavas.
CPU4	No significant features present

CPU	Geological features present
CPU5	The geological features in CPU 5 are important for studying stratigraphy and the palaeogeographic evolution and volcanic environments of the Midland Valley. Whiting Ness GCR site shows the contrast between the far-travelled sands of the Lower Old Red Sandstone sequence and Upper Old Red Sandstone pebbles, which are of a more local origin. This, and the unconformity separating these beds, provides a clear demonstration that the Midland Valley Devonian consists of two separate episodes of sedimentation. Black Rock to East Comb GCR site exhibits fine coastal exposures of the Ethie Lavas. These are a series of Basic Andesites belonging to the Montrose Volcanic Formation, intercalated with sandstone, siltstones and agglomerates of the Lower Devonian Arbuthnott Group, whose characteristics suggest extrusion of lava onto or magma into, wet sediment. The site has important research potential for studies on Lower Devonian volcanic environments. The area from Whiting Ness to Carlingheugh Bay, which has excellent educational potential, has been named a Regionally Important Geological Site (RIGS) by Tayside RIGS group.
CPU6	The coastline of CPU 6 consists of a prominent rock platform, with patchy sand cover, backed by one or more raised shorelines and, to the south, a locally developed relic cliff line. None of the geological features are of sufficient importance to warrant designation.
CPU7	Barry Links is one of the largest and, from a geomorphologic perspective, most important beach / dune related landform systems in Scotland. The sand dune complex rests on estuarine clay and sand, and raised beach sediments. These sediments were deposited under changing relative sea level and climatic conditions, following deglaciation of the last Scottish ice sheet between 16,000 – 6,500 years ago. Vast quantities of glacially deposited sand were transported onshore by post-glacial seas which flooded the newly glaciated coastal zone. As sea levels subsequently fell these sediments were exposed to wind action and provided the main sediment source for the evolution of the beach-dune-links complex visible on the foreland today. Of particular note is a suite of parabolic dunes, elongated 'hairpin' landforms with an exceptionally consistent shape; these are among the best-preserved dunes of this type in Britain. The extensive sand banks and bars deposited within the Tay estuary and offshore during and after the deglaciation of the area, were, and are, a significant secondary source of sand. It is suggested that initially, extensive foredune ridges were deposited around the seaward edge of the Ness. Sand blown inland from these dune ridges was redeposited over the older, gently undulating deposits to form the characteristic inland coastal sand plain, known as links. As relative sea level continued to fall the inter-tidal zone increased in extent enabling the sand dunes to move across the newly exposed coastal edge. Grey dunes were subsequently formed in the lee of the new foredune ridges. Blowouts formed as the evolution of the system continued, becoming orientated along the direction of the dominant wind from the Southwest. As the sand from these blowouts was deposited downwind, Vshaped parabolic dunes formed and migrated across the extensive links plain towards the north-east. Sand continued to be blown inland from both these and other seaward dune ridges, and was redeposited on the link surface as low hillocks, adding to the topographic variability of the beach-dune-links complex. Both the parabolic dunes and the deflation slack are now largely vegetated. Those areas of active geomorphologic processes, which remain, for example erosion or accretion of sand, are mainly on the coastal fringe or on the remaining active parabolic dune which is mobile and blowing eastwards into the sea off Carnoustie. These areas support a frequently changing pattern of embryonic dunes, bare dunes, Marram covered dunes and small dune slacks. Although Barry has reworking of sand, it currently has no net accretion. On areas without coastal protection at Barry, the sand naturally undergoes cycles of erosion and accretion. During summer embryonic dunes accrete on the upper beaches, but during the winters erosion occurs, the beach level drops and sand is lost to the sea or blown inland.
CPU8	Barry Links is one of the largest and, from a geomorphologic perspective, most important beach / dune related landform systems in Scotland. The sand dune complex rests on estuarine clay and sand, and raised beach sediments. These sediments were deposited under changing relative sea level and climatic conditions, following

CPU	Geological features present
	deglaciation of the last Scottish ice sheet between 16,000 – 6,500 years ago. Vast quantities of glacially deposited sand were transported onshore by post-glacial seas which flooded the newly glaciated coastal zone. As sea levels subsequently fell these sediments were exposed to wind action and provided the main sediment source for the evolution of the beach-dune-links complex visible on the foreland today. Of particular note is a suite of parabolic dunes, elongated 'hairpin' landforms with an exceptionally consistent shape; these are among the best-preserved dunes of this type in Britain. The extensive sand banks and bars deposited within the Tay estuary and offshore during and after the deglaciation of the area, were, and are, a significant secondary source of sand. It is suggested that initially, extensive foredune ridges were deposited around the seaward edge of the Ness. Sand blown inland from these dune ridges was redeposited over the older, gently undulating deposits to form the characteristic inland coastal sand plain, known as links. As relative sea level continued to fall the inter-tidal zone increased in extent enabling the sand dunes to move across the newly exposed coastal edge. Grey dunes were subsequently formed in the lee of the new foredune ridges. Blowouts formed as the evolution of the system continued, becoming orientated along the direction of the dominant wind from the Southwest. As the sand from these blowouts was deposited downwind, Vshaped parabolic dunes formed and migrated across the extensive links plain towards the north-east. Sand continued to be blown inland from both these and other seaward dune ridges, and was redeposited on the link surface as low hillocks, adding to the topographic variability of the beach-dune-links complex. Both the parabolic dunes and the deflation slack are now largely vegetated. Those areas of active geomorphologic processes, which remain, for example erosion or accretion of sand, are mainly on the coastal fringe or on the remaining active parabolic dune which is mobile and blowing eastwards into the sea off Carnoustie. These areas support a frequently changing pattern of embryonic dunes, bare dunes, Marram covered dunes and small dune slacks. Although Barry has reworking of sand, it currently has no net accretion. On areas without coastal protection at Barry, the sand naturally undergoes cycles of erosion and accretion. During summer embryonic dunes accrete on the upper beaches, but during the winters erosion occurs, the beach level drops and sand is lost to the sea or blown inland. On the Monifieth end of the site, a spit has moved northwards, past the Buddon Burn, creating a lagoon and an area of mobile dunes

D.2.3.8 Geological designations

Table 2.6 lists the GCRs and RIGS present along the Angus SMP2 coastal frontage. These are presented on Figure D3.

Table 2.6 Geological designations along the Angus SMP2 Coastline.

Designation	Site name	Reason for designation	Location
Geological Conservation Review Site	Montrose Basin	Stratigraphical/Maryton exposures	CPU2
	Rickle Craig- Scurdie Ness	Old Red Sandstone Lavas, mineralogy	CPU3
	Whiting Ness	Non-marine Devonian stratigraphy	CPU5
	Black Rock to East Comb	Old Red Sandstone Igneous	CPU5
	Barry Links	Coastal geomorphology	CPU7
	Barry Buddon	Coastal geomorphology	CPU8
Regionally Important Geological Site	Whiting Ness – Carlingheugh Bay	Old Red Sandstone Igneous	CPU5

D.2.4 Air and Climate

There is increasing concern that climate change is accelerating towards higher temperatures and it is now generally accepted that global warming is taking place. Global warming is predicted to increase pressure on coastal defences in the SMP area due to rising sea levels from thermal expansion and the melting of glaciers. Consequently, conflicts between coastal defence and protection of the coastline are likely to increase in the SMP2 area.

Assuming a future with medium-high global emission production, using the most recent climate change projections for the UKCP09, changes to Angus' climate are likely to include (Angus Council 2011): -

- Temperature: The annual temperature on Scotland's East coast may rise by up to 3.5°C in the summer and 2.5°C in the winter by the 2080s, becoming warmer in summer and winter months.
- Rainfall: While winters may become wetter, summers will become generally drier across Scotland by the 2080s; the pattern of change may not be the same across Scotland. The Defra funded UK Climate Impact Programme (UKCP09) estimates eastern Scotland may experience the most extreme percentage changes in precipitation and going against these trends, a decrease in winter and an increase in summer.
- Snow cover: Average snowfall may decrease, perhaps by up to 90% less depending on the location, and snowless winters may become normal in some parts by the 2080s; snowfall is likely to reduce by 50% or more across all of Scotland, particularly in eastern Scotland where it may reduce by up to 90% by the 2080s.
- Growing season: Scotland's growing season may become longer, by between 20 and 60 days by 2080.
- Sea level: It is predicted that Scotland's sea levels may rise relative to the land, in some areas. By 2080 the current estimates range between 0 and 600mm sea level rise. 0.4% of Angus is classed by the Scottish Executive as at risk from coastal flooding.

In addition, an increase in the magnitude and frequency of storm surges in the future is likely to increase extreme water levels and wave heights, which could potentially affect the coastline; however, any predicted future changes cannot be predicted with certainty.

As air quality and noise levels will not influence or be affected by the recommendations of this SMP, further consideration will not be given to potential issues relating to these receptors. Specific issues will be considered as part of the environmental assessment of any detailed projects arising from the SMP or future strategies.

D.2.5 Water

D.2.5.1 Water Quality

The following Directives apply to tidal waters:

- 2000/60/EC Water Framework Directive, implemented in Scotland through the Water Environment and Water Services (Scotland) Act 2003
- 76/64/EEC Directive on dangerous substances discharged into the aquatic environment
- 91/271/EEC Urban Waste Water Treatment Directive
- 79/923/EEC Directive on the quality required of Shellfish waters

- 2006/7/EC Bathing Water Directive, implemented in Scotland through the Bathing Waters (Scotland) Regulations 2008

Water quality within the SMP2 area is relatively high, as there are no stretches of seriously polluted water. As well as the European water quality directives listed above, local standards are set by SEPA. These exist so that local impacts and water quality, which may not be significant at international and national levels, can still be managed appropriately. SEPA's objective is to improve the quality of all waters so that they attain Class A or B quality wherever reasonably practicable.

Estuarine and coastal waters of poorer water within the SMP2 area are generally related to sewage and storm sewage discharges associated with the nearby towns. A number of wastewater treatment plants serving the towns of Arbroath, Carnoustie and Montrose, which discharge into the coastal waters, have been recently introduced in the SMP2 area. These help to address improvements in these discharges in order to meet SEPA's Environmental Quality Objectives (EQO) and the requirements of the Urban Waste Water Treatment Directive (UWWTD). Effectively all sewage debris related to the down-grading of estuarine and coastal waters along the coast is now treated by wastewater plants with the exception of one or two small isolated coastal settlements.

Table 2.7 provides an overview of water quality issues in each CPU. Locations of sewage outfalls and pumping stations are provided in Table 5.6.

Table 2.7 Water Quality Issues along the Angus SMP2 Coastline

CPU	Water Quality Issues
1	Montrose Beach is a designated bathing water site which is currently monitored by SEPA. The beach was rated excellent in 2011 with a G rating which indicates that the sample meets the EC Guideline Standards: less than or equal to 100 Escherichia coli per 100ml and less than or equal to 100 intestinal enterococci per 100ml. A primary sewage treatment works was constructed (2002) within the site of the old Montrose airfield. All raw sewage for the Montrose area is now treated at this plant and effluent discharged into the South Esk. Within the unit there are three sewage outfalls and one industrial outfall at GlaxoSmithKline. Of the three outfalls, two of these are Combined Storm Overflows (CSOs); these are regarded as a source of water pollution.
2	As with CPU1 Montrose Basin has been affected in the past by untreated sewage effluent from the various outfalls down stream. Following the construction of the new secondary sewage treatment works this should now be reduced considerably. GlaxoSmithKline discharge pH neutralised waste for two hours at a time on an ebbing tide. Such effluent therefore should have only a minor effect on the Basin. To reflect the diversity and importance of the natural life found within the basin, the Montrose Basin has been designated under EC Shellfish Harvesting Directive 91/492/EEC, laying down the health conditions for the production and placing on the market of live bivalve molluscs.
3	CPU3 has no designated bathing water sites or sites which are currently monitored. There are no sewage treatment outfalls or pumping stations located within the unit.
4	The beach at Lunan Bay is a designated bathing water site monitored by SEPA throughout the bathing season. The beach was rated excellent in 2011 with a G rating which indicates that the sample meets the EC Guideline Standards: less than or equal to 100 Escherichia coli per 100ml and less than or equal to 100 intestinal enterococci per 100ml. There are no sewage treatment outfalls or pumping stations located within the unit.
5	There are no beaches within CPU5 that are designated or monitored. The water quality at Lunan Bay gives a good indication of what the water quality will be in this CPU.
6	The Tay WasteWater Treatment Works (TWWTW) located at Hatton midway between Arbroath and Carnoustie was completed in 2004.

CPU	Water Quality Issues
	Sewage from all the major settlements between Arbroath and Dundee is pumped to Hatton where it is treated and effluent discharged via a long sea outfall. The associated pipe infrastructure is located within agricultural land and along the foreshore within this unit. The beach at West Links, Arbroath is a designated bathing water site monitored by SEPA throughout the bathing season. The beach was rated excellent in 2011 with a G rating which indicates that the sample meets the EC Guideline Standards: less than or equal to 100 Escherichia coli per 100ml and less than or equal to 100 intestinal enterococci per 100ml. There are two other beaches within the unit monitored by SEPA: Arbroath Victoria Park and Easthaven. The waters off Arbroath are also designated under the Shellfish Waters Directive (79/923/EEC).
7	The beach at Carnoustie has been identified as a designated bathing beach for purposes of EC Bathing Waters Directive. The beach was rated good in 2011 with a M rating which indicates that the sample meets the EC Manadatory Standard of less than or equal to 2,000 Escherichia coli per 100ml.
8	The waters within CPU8 are considered to be estuarine in nature. The beaches at Monifieth and Broughty Ferry are designated bathing water sites monitored by SEPA throughout the bathing season. Both beaches were rated excellent in 2011 with a G rating which indicates that the sample meets the EC Guideline Standards: less than or equal to 100 Escherichia coli per 100ml and less than or equal to 100 intestinal enterococci per 100ml.

D.2.5.2 Bathing Waters

There are six EC designated bathing waters in the SMP2 area at Montrose, Lunan Bay (North), Arbroath (West Links), Carnoustie, Monifieth and Broughty Ferry, as shown on Figure D4.

Montrose has consistently achieved an 'excellent' quality standard since 1999 and in 2005 was awarded Blue Flag status.

Table 2.13 summarises beaches within the SMP2 area where SEPA monitor bathing water quality.

Table 2.13 EC Designated Bathing Water Results, SEPA 2012 (http://www.sepa.org.uk/water/bathing_waters)

CPU	Site Tested	Results (2011)
1	Montrose	Excellent
4	Lunan Bay	Excellent
6	Arbroath West Links	Excellent
7	Carnoustie	Good
8	Monifieth	Excellent
8	Broughty Ferry	Excellent

D.2.5.3 Water Framework Directive Assessment

A Water Framework Directive (WFD) assessment is being prepared by Halcrow and will be available for viewing in **Appendix K** of the SMP2.

All rivers, lakes, estuaries, coastal waters and groundwater within the study area must achieve a standard of 'good status' by 2015 under the terms of the EU Water Framework Directive (WFD); whereby 'status' is a measure of ecological, chemical, hydrological and morphological quality in surface waters.

This WFD-related assessment will take into consideration the potential effects of SMP policy options on the ecological quality elements of any coastal and transitional water bodies directly affected by the SMP, and the

associated water bodies which may also experience indirect effects. Potential effects on ecological quality elements are likely to be associated with changes in hydrological regimes and water body morphology – including such factors as changes in current velocities, sediment accretion/erosion, water quality (turbidity, salinity) and tidal inundation.

The WFD-related assessment will also consider whether the SMP policies may have adverse consequences for water bodies protected under other EU legislation, in particular SPAs and SACs (related to the Birds Directive and Habitats Directive, respectively). Additionally, the potential for changes in groundwater bodies will be considered insofar as such changes could affect dependent ecology (i.e. groundwater dependent ecosystems).

D.3 Landscape Character and Visual Amenity

D.3.1 General

The way shorelines are managed may have an impact on the landscape of an area. The significance of this will depend upon the type of management employed and the importance placed upon a particular landscape. The visual appearance of the natural and built landscape is an important factor in determining its appeal to residents and visitors.

This section reviews the status of the existing landscape character of the SMP2 shoreline.

Maps illustrating the different landscape designations within the SMP2 area are located in Annex 1.

D.3.2 Landscape and Visual Amenity

D.3.2.1 Overview

There are no national (e.g. National Scenic Areas) or local (e.g. Special Landscape Areas) designations along the Angus SMP2 frontage. There are no Important Gardens or Designed Landscapes within the SMP area.

The SMP2 area falls within three Landscape Character Zones, as defined by Angus Council (2011): -

(a) coast with sand (14a) – Montrose, Lunan Bay, Elliott and Barry Links

(b) coast with cliffs (14b) – Usan, Auchmithie and Carnoustie

(c) lowland basin (15) – Montrose Basin

The Angus SMP2 Coastline, which stretches for 79km, is diverse and comprises several notable landscape features, as shown in Table 3.1.

Table 3.1 Landscape Features

Landscape Features	Description
Wide Sandy Bays	There are wide sandy beaches in the SMP2 area at Lunan Bay and between Montrose to St Cyrus.
Estuaries and estuarine mudflats	Although most of the river mouths have estuarine conditions, extensive mudflats are only found on the Angus coast at Montrose Basin a fully enclosed, estuarine mud flat system, which is the only one of its kind on the East Coast of Scotland.
Sand Dune Systems and Links	There are 2196.8ha of dune resource along the Angus coast, much of which is of high landscape value. Large expanses of sand dunes and links are found between Monifieth and Carnoustie (especially at Barry Links) and between Montrose and Kinnaber, with smaller areas at Elliot and Lunan Bay.

Maritime Cliffs and Rocks	The only coastal cliffs in Angus flank Lunan Bay, running from Ferryden (close to Montrose), to the north end of Lunan bay and from the south end of Lunan Bay to Victoria Park in Arbroath. There is also an area of exposed rocky coastline north of Carnoustie. To the southern end of the cliffs, old red sandstone predominates, creating a coastline of dark red cliffs up to 30m high, indented with small slacks and inlets. Further north, around Lunan Bay and northwards to Montrose are more resistant lava and tuffs, with promontories, low cliffs and a rocky shoreline. The rocks exhibit spectacular erosion features, cliff-top forts, natural harbours and fishing villages, with productive farming up to the cliff edge

A summary of the key landscape characteristics of each CPU area is provided in Table 3.2.

Table 3.2 Landscape descriptions

CPU	Landscape characteristics
CPU1	Montrose Bay is the most northerly CPU and the cliffs west of Milton Ness, which are located in Aberdeenshire, are the northern boundary of the SMP. The scenic attractiveness of this area owes much to the contrast between St Cyrus beach, stretching for 3.5km from in front of the high Heughs of St Cyrus cliffs to the River North Esk. These cliffs are higher (60-75m) than the southern cliffs between Lunan Bay and Arbroath, because the andesitic lavas in the north are more resistant to erosion than the basaltic lava flows in the south. Its dune belt is narrowest in front of the high cliffs to the north and progressively widens southwards, with Marram Grass on the crest and back slope; a second belt of dunes established with gorse is also present here. A rocky foreshore exists at the northernmost end of St Cyrus beach. In the southern part of St Cyrus and Kinnaber Links SSSI, a predominantly wide dune system with an area of saltmarsh at the dynamic mouth of the River North Esk exists. Stake nets, which are used for fishing, dominate the intertidal zone. Montrose town and associated developments dominate the landscape south of the River North Esk. A narrow strip of mobile dunes run along the edge of the South and East Links and part of the North Links, near to the north car park. The GlaxoSmithKline Site at the mouth the River South Esk is conspicuous in the southern part of CPU 1.
CPU2	Montrose Basin is a relatively undeveloped, undisturbed natural estuarine ecosystem. While relatively flat, and dominated by tidal mudflats, it is by no means featureless. At low tide a mosaic of mudflats, sands, mussel beds, channels and areas of algae create a varied landscape. Montrose town with its tall spire, the Harbour and the main East Coast Railway bind the Basin along its eastern side. The north shore of the Basin is agricultural land, mostly used for arable farming. The A935 Brechin - Montrose road acts as the northern landward boundary of CPU 2. The Scottish Wildlife Trust visitor centre and car park can be seen on the southern shore.
CPU3	Scurdie Ness to Boddin Point is one of two significant lengths of rocky shore within the SMP area. It is predominantly wave-cut rock platform and cliffs with a beach at Fishtown of Usan. Usan, 5km south of Montrose, is a small beach area (70m x 20m wide) of coarse sand and shingle. At scattered locations along CPU 3, notably on and around the old Lime Kiln on Boddin Point, species-rich grassland is present.
CPU4	Lunan Bay is a slightly concave beach area (3.5km) flanked at either end by cliff headlands. The wide intertidal sand beach gently slopes into the sea and is backed by a dune ridge and raised beach (8m OD), up to 300m wide in parts. The dune ridge is at its highest (12m) and widest (100m) in the northern part of the bay. South of Lunan water, the high dune ridge stops abruptly opposite Redcastle Farm and is replaced by low narrow dunes. Approximately 250m from High Water Mark (HWM), fossil cliffs are present at the landward edge of a raised beach. The raised beach widens to about 300m and curves to within 50m of the HWM approximately 1.5km south of Lunan water. Also at the southernmost end of Lunan Bay are two small settlements; Corbie Knowe and Ethie Haven.
CPU5	Lang Craig to Whiting Ness is the longest continuous stretch of sea cliffs and rocky shore in Angus (11km). Reaching heights of up to 50m, the relatively soft Old Red Sandstone cliffs display a spectacular series of erosion features including, sea stacks, blowholes, caves, wave cut platforms and arches, which all contribute

CPU	Landscape characteristics
	to the outstanding and unique landscape. Auchmithie is a small village and harbour that occupies an indentation in the cliffs 5km northeast of Arbroath. The village is perched on the cliff almost 40m above the narrow beach (10-20m) of coarse sand and shingle that sits behind an extensive rock platform.
CPU6	An extensive marine abrasion platform fringed by a narrow strip of sand, runs along the northern extent of CPU 6. Arbroath Harbour has been built in a gap in the platform. West of the Harbour the marine abrasion platform is covered by an accumulation of sand, which is the main recreational beach for Arbroath. The beach is fronted by a sandy inter-tidal area west of Arbroath that stretches for 200m at low tide and is backed by a storm beach of boulder and shingle. This beach runs south for 3km before the platform reappears. Elliot Links SSSI, south of Arbroath, is 150m wide at its northern and southern points, narrowing to 70m wide midway. The seaward edge of the links is generally a narrow strip of moderately vegetated dune ridge. Inland of the dune ridge is a stable dune area with several abandoned river meanders. Cobble and shingle storm beaches, between 20 and 30m wide, are piled up in front of the links area along the backshore except where they are breached by the Elliot Water. The marine abrasion platform continues from 1.5km south of Elliot Links until the soft coast reappears close to Carnoustie, except for two small gaps in the platform at East Haven and West Haven. All along the coast from Carnoustie to Arbroath, a narrow strip of sand runs along the back of the rock platform.
CPU7	Carnoustie beach, at the western end of the inter-tidal rock platform, is almost 600m long and has an obvious upper and lower beach. The lower wet beach has a shallow gradient in comparison to the upper beach, which is much steeper. From here, much of the eastern edge of Barry Links has been protected from erosion by a large prominent riprap defence.
CPU8	Approximately 7.2km in length running from Buddon Ness to Broughty Ferry Castle, including Barry Sands West, Monifieth Bay and Broughty Ferry Beach, CPU 8 is the southern-most CPU in the SMP. Barry sands west is a continuation of the beach at Buddon Ness and has a low gradient and narrow intertidal area (<200m). Monifieth Bay has a low, wide (400-500m) intertidal beach and a sandy upper beach, which is being actively eroded. The Bay runs between Buddon Burn and the Dighty Water at Barnhill. The Dighty Water splits Monifieth Beach from the beach that runs west to Broughty Ferry. West of the Dighty Water the upper beach is steeply sloping compared to the flatter lower beach. However, both have a relatively high shingle and boulder content. The beach becomes sandier and is backed by a low dune belt vegetated with Sea Lyme grass and backed by an extensive links area. Incorporated within the links area are playing fields, a road and esplanade. Progressing west towards Broughty Castle a wide (200m) fine sand beach gently slopes until directly in front of the Castle.

D.4 Historic Environment

D.4.1 Introduction

The Angus coast has a particularly rich archaeological and historic legacy and is representative of most of Scotland's past. This section reviews the heritage features found between Milton Ness and Broughty Ferry, including both archaeological and historic elements in the terrestrial and marine environment. A summary of the statutory designations, which exist to protect important historic buildings and monuments, are outlined in Table 4.1.

Heritage maps showing features of historical importance (including the designated and non-designated sites and assets identified below) are shown on Figure D5 in Annex D.1.

D.4.2 Terrestrial

D.4.2.1 Overview of designated heritage assets

(a) Scheduled Monuments

There are 21 Scheduled Monuments (SMs) located within the SMP2 area, as summarised in Table 4.1 and shown on Figure D5.

Table 4.1 Scheduled Monument Sites

CPU	Site reference #	Grid reference #	Scheduled Monument
1	NO76SW0010	NO 7259 6209	Little Kinnaber, palisaded enclosure (Prehistoric)
	NO76SW0030	NO 7274 6218	Fisherhills, Fort (Prehistoric)
	NO76SW0012	NO 7287 6216	Fisherhills, Barrows cemetery (Prehistoric)
2	NO65NE0021	NO 6886 5955	Roman Camp (Dun)
3	-	-	-
4	NO65SE0015	NO 6966 5256	Buckiemill (Unknown)
	NO65SE0010	NO 6873 5190	Red Castle (Medieval from 1100AD)
	NO64NE0016	NO 6834 4922	Newbarns (Recent 20th Century)
	NO64NE0004	NO 6918 4891	Corbie Knowe (Unknown)
	NO65SE0018	NO 6871 5086	Red Castle, barrows
	NO64NE0047	NO 6862 4953	Crop mark site
	NO64NE0048	NO 6878 4934	Crop mark site
5	NO74NW0001	NO 7031 4796	St Murdochs Chapel (Post Medieval)
	NO74NW0002	NO 7013 4739	Red Head (Prehistoric period uncertain)
	NO64NE0007	NO 6970 4644	Prail Castle (Unknown)
	NO64NE0008	NO 6928 4600	West Mains of Ethie (Prehistoric period uncertain)
	NO64SE0005	NO 6807 4342	Lud Castle (Prehistoric period uncertain)
	NO64SE0002	NO 6689 4202	Maiden Castle, East Seaton (Prehistoric period uncertain)
	NO64SE0004	NO 6819 4415	Castle Rock, Auchmithie
6	NO64SW0009	NO 6257 4029	Site of Hospital of St John the Baptist
7	-	-	-
8	NO43SE0010	NO 4650 3045	Broughty Ferry Castle
		NO 4653 3046	Submarine Miners Depot

It should be noted that scheduled sites of national importance within the SMP area account for only a small fraction (approximately 5%) of the sites that Aberdeenshire Archaeological Service (AAS) (consultants for Angus Council) would classify as important sites in Angus.

(b) Listed Buildings

There are 25 Listed Buildings within the SMP2 area, as shown on Table 4.2 and on Figure D5.

Table 4.2 Listed Buildings

CPU	Listed Building	A listed	B listed	C listed
1	Montrose Air Station	1 structure	3 structures	3 structures
	House of Kinnaber	House of Kinnaber	Walled Garden	Rose Cottage
2	Road Bridge at Dun			1 structure
	Bridge of Dun		Telephone Kiosk	
	Old Toll House, Sleepyhillock		1 structure	
	Old Montrose		Gate Piers	
	Old Montrose House		Grieves Cottage	
	Scurdie Ness East Beacon		1 structure	
	Scurdie Ness West Beacon		1 structure	
3	Boddin Point		Old Lime Kilns	
	Scurdie Ness Lighthouse		1 structure	
	Usan Chapel Mill		1 structure	
	Fishtown of Usan			Towers, Cottages, Ice House, Salt pan
	Fishtown of Usan			Harbour
	Chapel of St Skate		2 structures	
4	Red Castle	2 structures		
5	St Murdochs Chapel		1 structure	
6	Bell Rock Lighthouse, Entrance Lodges		1 structure	
	Bell Rock Lighthouse, Signal Tower		1 structure	
7	-	-	-	-
8	Broughty Ferry Castle	1 structure		
	Broughty Ferry Harbour		1 structure	
	Broughty Ferry Submarine Miners Depot		1 structure	
	Broughty Ferry Harbour Lampstandards		3 structures	
	Broughty Ferry Esplanade Beach Shelter			1 structure

D.4.2.2 Overview of local non-designated archaeological assets

A list of the Sites of Local Importance within each CPU is included in Table 4.3 and shown on Figure D5.

Table 4.3 Sites of Local Importance

CPU	Site reference #	Grid reference #	Sites of Local Importance
1	NO76SW0071	NO72666215	Crop mark of a barrow
	NO76SW0046	NO73006193	Crop mark site of a souterrain
	NO76SW0072	NO73366220	World War II Coastal defence
	NO75NW0031	NO72556001	Air field
2	NO65NE0015	NO 6974 5782	Dronners Dyke

CPU	Site reference #	Grid reference #	Sites of Local Importance
	NO75NW0098	NO 7316 5678	Johney Mains Harbour
	NO65NE0073	NO 6851 5929	Prehistoric crop marks features situated to the north of the basin.
	NO65NE0028	NO 6888 5929	
	NO65NE0030	NO 6913 5933	
	NO65NE0076	NO 6939 5924	
	NO65NE0071	NO 6718 5840	Crop marks at Drum
	NO75NW0148	NO 7020 5660	Salt pans
3	NO75SW0002	NO 7151 5395	Chapel of St Skae
	NO75NW0016	NO 7328 5669	Scurdie Ness Earthen Fort (Post-Medieval)
	NO75NW0017	NO 7296 5570	St Mary's Chapel (Post-Medieval)
	NO75SW0013	NO 7131 5344	Boddin Harbour Ice House, and Towers (Post Medieval from 1560)
	NO75SW0010	NO 7118 5348	Boddin Harbour (Post Medieval from 1560)
	NO75SW0001	NO 7099 5355	Black Jack Castle (Post Medieval from 1560)
	NO75SW0009	NO 7135 5334	Boddin Point Lime Kilns (Post Medieval from 1560)
4	NO64NE0064	NO 6849 4978	Crop mark site
	NO65SE0045	NO 6882 5120	Anti-tank blocks
5	NO64SE0008	NO 6721 4290	Forbidden Cave (Prehistoric period uncertain)
	NO64SE0009	NO 6820 4420	Auchmithie Harbour
	NO64SE0010	NO 6700 4320	Gaylet Pot
		NO 6647 4130	Needles E'e (Noted for geological importance)
		NO 6695 4179	Deil's Heid (Noted for geological importance)
6	NO64SE0015	NO 6591 4107	Whiting Ness Standing Structure (Post Medevial)
	NO64SE0012	NO 6596 4109	Whiting Ness, Crop Mark (Prehistoric Period Uncertain)
	NO64SE0003	NO 6587 4116	St Ninian's Well (Medieval)
	NO64SW0025	NO 6440 4050	Old Arbroath Harbour
	NO64SW0028	NO 6420 4050	Arbroath Harbour
	NO64SE0011	NO 6560 4130	Remains found, possible Iron age cemetery
	NO64SW0010	NO 6269 4007	Cemetery
	NO64SW0129	NO 6286 4018	Cemetery
	NO63NW0019	NO 6098 3741	Anti-tank blocks
	NO53NE0069	NO 5867 3565	Crop mark site
7	NO53SE0011	NO 5705 3452	Pillbox
	NO53NE0076	NO 5786 3507	Pillbox
8	NO53SW0056	NO 5420 3340	Barry Camp
	NO53SW0056	NO 5200 3280	Buddon Camp
	NO53SW0021	NO 5390 3098	Buddon Ness, Old High Lighthouse
	NO53SW0055	NO 5420 3080	Buddon Ness, Low Lighthouse
	NO53SW0022	NO 5339 3107	Buddon Ness, Ice House
	NO43SE0067	NO 4640 3047	Broughty Ferry Harbour

CPU	Site reference #	Grid reference #	Sites of Local Importance
	NO43SE0045	NO 4663 3053	Old Tower Mill

D.4.2.3 Overview of archaeological assets

Table 4.4 provides a summary of the archaeology located in each CPU.

Table 4.4 Summary of archaeology along the Angus SMP2 Coastline

CPU	Archaeology summary
1	There are three Scheduled Monuments (SMs) in this unit, which are all cropmark sites identified by aerial photography, with little remains visible on the ground. As well as these national sites there are a number of sites, which are of more local, historical and archaeological importance. There are two areas within the unit that contain listed buildings, these are at Montrose Air Station and House of Kinnaber. On the site of the former Montrose Air Station there are seven buildings dated between 1913 and 1942 that have been listed for their historical significance. There are three elements of the House of Kinnaber, which are listed for their historical significance and date back to 1680.
2	The unit contains only one SM. This is a Roman camp identified through aerial photography at Dun 2.5km west of Montrose and 200m north of the basin. The site was discovered in the early 1970s and tested by excavation. A shard of Samian pottery was found, dated between AD70-90, placing the site firmly in the 1st Century AD. Although this is the only SM in this CPU there are a number of sites in and around the Basin which are recognised for their local importance. These sites are a mixture of physical features and cropmark sites mostly identified from aerial photography with little remaining visible on the ground. The sites include various prehistoric crop mark features along the north and west of the Basin and salt pans to the south of the Basin. The latter are particularly vulnerable to erosion and flooding. The only remaining visible feature (low tide) is Dronners Dyke, a piled construction of stones running from east to west across the basin. It was built between 1687 and the summer of 1688 but was never completed. The high tides and storms of the following autumn destroyed the structure and it was never rebuilt. The purpose of the dyke was to drain and reclaim the northern half of the basin for agricultural purposes. Montrose Conservation Area is designated in recognition of its special architectural and historic interest. In January 2011 there was a public consultation on an amendment to the boundary of this Conservation Area to ensure archaeologically sensitive areas are protected and that the character of the area is preserved or enhanced in time to come.
3	The unit is rich with cultural heritage, although to date these have not been listed as SMs. The majority of the sites are physical features with substantial remains visible on the ground. The remains of a square earthen fort can be found just south of the South Esk Estuary. Outside the enclosure and facing the mouth of the river, was an earthen rampart. Tradition states that it was used in Cromwell's time and was fortified in 1745 and around 1770 a beacon was erected on the site. South of the fort, at the Mains of Usan, is located the Chapel of St Mary's, which is now the burial place of the Scotts and Lennys of the district. The ancient ruins of the Chapel of St Skae and its graveyard are situated at the southern extremity of this CPU, just to the north of Boddin point. As well as being sites of local interest, there are a number of sites and features that are listed. These sites stretch from the north of the unit at Scurdie Ness to the south of the unit at Rickle Craig. Of this stretch the most concentrated site is around the settlement of Usan. The majority of the sites are post – medieval.
4	Like CPU3 and much of the northern section of the Angus coast, the unit is rich with cultural heritage, It contains several sites which to date have been recognised of being of national importance and scheduled accordingly as SMs These sites are a mixture of structures and cropmark, which are visible on the ground. Buckiemill is situated in the northern part of the Bay. This earthwork occupies a small promontory which is bounded by cliffs on all sides except the North where there is a natural gully separating it from the main sea cliffs. The cliff section on the east suggests that the gully has been artificially deepened. Further south of Buckiemill located on the cliff top at the mouth of the Lunan water is Redcastle. Like Buckiemill, Redcastle is situated on a promontory and isolated by a ditch. William the Lion founded it as a hunting seat in the 12th Century. It was besieged in 1579 and was a ruin by 1770 although still partly roofed. The remains now consist of a possibly 13th Century fragment of the massive enceinte and the ruin of the 15th Century tower. The

CPU	Archaeology summary
	site is privately owned and is regularly visited although access is difficult. A cropmark at Newbarns was tentatively identified as that of a souterrain, with the remains of a surface structure close by. The souterrain measures about 15m in length and is sited on a gentle southfacing slope. At the southern end of the bay is located an artificial mound called Corbie Knowe, which is thought to have been a "Danish Fort". Corbie Knowe is a small artificial mound perched high above the beach, on the seaward side it slopes steeply merging with the natural slope. Other Scheduled Monument sites include Crop Mark sites of prehistoric date. As well as the scheduled sites, there are a number of sites of local interest located within the bay area. These include World War II anti-tank blocks at Lunan Water, which are very vulnerable to erosion.
5	CPU5 contains seven sites that have been recognised to be of national importance and scheduled accordingly as SMs. St Murdochs Chapel is situated at Ethie in the north of the unit. Only the east gable still remains of Ethie parish church which was dedicated to St. Murdoch, the building originally measured 57 feet by 22 feet and was surrounded by a small triangular burial ground. Red Head is situated south of St Murdochs adjacent to the coast. The Red Head promontory is cut off by a single rampart and a broad ditch much obscured by recent slit trenches and observation posts. The fortifications of Prail Castle lie on the Cairnock Head. The ditch, rampart and the foundations of the tower and other buildings are still visible. West Mains of Ethie is a promontory fort formed by triple banks 1.5m high and ditches across the base of the headland, broken by a centrally placed entrance, which is approached by a causeway. Lud Castle is also a promontory fort formed by isolating a promontory, with 100 feet high precipitous cliff sides, accessed by means of a single rampart at the top of a grassy slope on the seaward side of a narrow neck of land. Castle Rock lies just south of the harbour at Auchmithie. Maiden Castle comprises the remains of an ancient fort sitting on Seaton Cliffs above the caves.
6	At present only one site is recognised as a SM. This is the site of the hospital of St John The Baptist. In addition, a selection of physical features and cropmark sites are also recognised for their importance in a local context. This area is particularly important as it contains many burial grounds. A skeleton was found at Victoria Park and it is thought that this may indicate the presence of an Iron Age cemetery. Many Iron Age Cemeteries lie in sandy areas such as this, which are not suitable for cultivation. Two other cemeteries are also known in the area. In 1993 a local school teacher found what was believed to be the site of a Bronze Age cist at the cliffs of Whiting Ness below the nature trail. Three stone box-like structures were described as eroding out of the cliffs, two of these were excavated by museum staff. On top of the cliff at Whiting Ness, a cropmark of an enclosure is visible and is thought to be of prehistoric date. At the end of Victoria Park, Arbroath, is the site of St Ninian's Well. The site of the Chapel consecrated in 1485 is supposed to be in the area but the exact site has never been identified. The well was a small hollow scooped out from the cliff face, with a reputation for curing various diseases. The well now consists of a metal pipe protruding from a rectangular stone slab, which is set into the grassy bank. The area around Arbroath harbour is rich with sites of local interest. The Old Harbour was built at Arbroath in 1394 to the east of the present harbour and in front of the Old Shorehead. The wooden pier extended in a south-west direction from the foot of the High Street at Danger Point. The existing Arbroath harbour was built in 1840; a tidal harbour, which is still in use today. Like at Lunan Bay, anti-tank blocks present in this CPU are particularly vulnerable to erosion due to their close proximity to the coast. Arbroath has three Conservation Areas. The Abbey to Harbour Conservation Area is the largest and was first designated in 1973 due to its long and interesting past beginning in medieval times. It was considered an abbatial burgh and recieived formalroyal burgh status in 1599. West Port Conservation Area is located to the west of the town centre, situated on a rise running down from the railway station to the town's modern day port. At one time, West Port would have been one of three ports servicing the harbour. Keptie Pond Conservation Area is a planned residential area. The development of the area at a single period of time has provided a congruent visual appearance with unique architectural detailing. The boundaries to all three conservation areas were revised in Novermber 2011 and went out to consultation in January 2012.
7	The only archaeological or cultural heritage sites within CPU7 are two pillboxes at Carnoustie and Panbride House, which could be subject to erosion at some point in the future. Barry and Buddon camps are located across the CPU7 and CPU8 boundaries. See below for details.

CPU	Archaeology summary
8	CPU8 contains two sites which to date have been recognised to be of national importance and scheduled accordingly as Scheduled Monuments. Broughty Castle was built in 1496 and allowed to fall into decay after 1603. The castle was reconstructed and extended following purchase by the government in 1855. It has now been completely restored and operates as a museum. The former submarine miner's depot and enclosing walls constructed in 1888 forms the remaining part of a depot constructed for the Tay Division Submarine Miners RE (Volunteers). As well as the scheduled sites there are a number of historical and geological local sites of interest located within the unit. Barry Links contains a number of sites of interest although these are not readily accessible to the public due to the restriction placed by the military. Barry Links is home to a military training area with two large army camps (Barry and Buddon Camps), small arms ranges, assault courses and an airfield. The camp is recognised for its military importance within the 20th Century. Also on the links area are located a number of lighthouses at Buddon Ness. The high lighthouse is a tall circular tower built by the Stevensons in the mid 18th Century. The low lighthouse was built by the Stevensons in the 19th Century and is a circular building like the high lighthouse. Further south an icehouse is built into the dunes. Broughty Ferry harbour was constructed in 1851 and is an interesting harbour, consisting of two piers and the quayed side of a natural headland forming an irregularly shaped basin. To the west of the basin is a short pier with a timber end. Near Broughty Ferry Castle is the site of an old tower mill of around the eighteenth Century. The circular tower mill was demolished in the late nineteenth. Broughty Ferry Conservation Area was designated in August 1997 due to the 15th century Castle, history as a Victorian and Edwardian seatside resort, and the old fishing village and harbour areas.

AAS believes that World War II artefacts such as pillboxes are most at risk form coastal erosion in the SMP2 area; however they are also the least documented.

D.4.3 Marine

The marine environment along the SMP2 coastline is likely to have preserved countless underwater artefacts and potentially contains many buried landscapes. There is also potential for marine wrecks in the SMP2 area.

D.5 Land Use, Infrastructure and Material Assets

D.5.1 Land Use

D.5.1.1 Introduction

This section reviews the status of the built environment and current land use within the study area.

Sustainable coastal erosion and flood risk management for appropriate land use is one of the main objectives of SMP2, in order for the study area to continue to function and meet social and economic needs. Figure D6 in Annex D.1 illustrates current land use within the SMP2 area.

D.5.1.2 Overview of Current Land Uses

For the purpose of this SMP, land use classification has been divided into four categories, as defined in SMP1:-

- **Developed**
  - Residential - properties within towns and small settlements but not individual buildings including farm properties.
  - Industrial - large industrial complexes, and energy generation.
- **Undeveloped**
  - Rural – agriculture.
  - Residential- individual properties such as farm buildings.
- **Recreational – see chapter D6.2**
  - Formal and informal recreation: coastal walks, playing fields, golf courses.
  - Visitor attractions.
- **Other**
  - Military – MoD and defence

The types of current land use within each CPU are summarised in Table 5.1.

Table 5.1 Land Use Types along the Angus SMP2 coastline

CPU	Developed	Recreational	Undeveloped	Other - Military
1	✓	✓	✓	X
2	✓	✓	✓	X
3	X	✓	✓	X
4	X	✓	✓	X
5	✓	✓	✓	X
6	✓	✓	✓	X
7	✓	✓	X	✓
8	✓	✓	X	✓

Table 5.2 provides summary descriptions of the land use in each CPU.

Table 5.2 Summary of Land Use along the Angus SMP2 Coastline

CPU	Land Use

CPU	Land Use
1	Montrose Bay is situated on a very low lying sand spit with a combination of industrial, recreational and agricultural land use. The town of Montrose is the main residential and commercial area within the unit. GlaxoSmithKline industrial complex is located to the south of the bay at the mouth of the River South Esk and adjacent to Montrose Port. Immediately north of GlaxoSmithKline is the Council-run Caravan Park, leading to the beach pavilion and Splash Area and further north are Montrose Links Golf Courses. Beyond the golf course lies Charleton and Kinnaber links, partially wooded with the remainder used as rough pasture grazing.
2	Land use within the unit is largely mixed. The basin is used for a variety of recreational purposes, largely because it is a Local Nature Reserve with a number of international and national designations. The Eastern Shore of the basin is dominated by the town of Montrose, hosting a mixture of residential industrial/commercial development, with the Main East Coast Railway situated adjacent to the foreshore. The remaining land is mainly rural with large areas of agriculture, populated with a number of small settlements at Tayock (north shore) and Dun (west shore), with a further number of private/farm dwellings scattered around the basin.
3	Agriculture is the predominant land use within the unit. The area is sparsely populated containing a number of farmhouses, cottages and the small settlement of Usan.
4	Agriculture is the predominant land use within the unit of Lunan Bay, however the beach area of the bay is very popular for recreational activities all year round, with increased activity in the summer. The foreshore is also used for commercial salmon fishing. There are several farm houses and cottages located along the unit, with a small community of holiday homes located in the southern corner at both Corbie Knowe and Ethie Haven.
5	The predominant land use between Lang Craig and Whiting Ness is agricultural. There is one small harbour located at Auchmithie, which also contains the main residential area within the unit, with further farm and private dwellings located along the unit. The dominant cliff area provides a number of recreational activities.
6	The land use between Whiting Ness and West Haven is a mixture of residential and recreational with a large proportion used for agriculture. The residential areas include the large town of Arbroath in the north of the unit and the small coastal settlement of East Haven located to the south. The remainder of the unit is sparsely populated with a few farm dwellings. Arbroath is the largest town within Angus and supports a large proportion of the residential, recreational and commercial interests within the unit and along the Angus Coast. The main East Coast railway line runs close to the coastline along this CPU, south of Arbroath.
7	The land use within this unit is largely mixed. The land use at West Haven is residential with a recreational beach. The frontage at Carnoustie is mainly recreational with golf courses and a high amenity beach with a number of leisure facilities. To the south end of the unit is the extensive military training range and camp at Barry Buddon.
8	CPU8 is the southern most CPU and Broughty Ferry Castle, situated at its southern boundary, also marks the southern limit of the SMP2 area. Stretching for approximately 7.2km Monifieth Bay is sand and dune beach backed by links areas. The land within this CPU is predominately used for leisure and recreation purposes often backed by residential settlements, with the exclusion of the northern 4km, which is part of MoD owned Barry Links and the Barry Buddon Training camp. The main East Coast Railway Line runs very close to the coast along part of the unit.

D.5.1.3 Developed Land

Residential

Properties at risk of coastal erosion or coastal flooding will be identified at a later stage in the SMP2 development process.

Industrial

Although employment land is available within the towns, the only industrial area that immediately abuts the coast is the GlaxoSmithKline site, a 45 acre site (www.gsk.com) at the southern boundary of CPU1. This site, which manufactures Active Pharmaceutical Ingredients, is bounded to the south by the River South Esk, to the east by Montrose beach and to the north by a caravan park.

D.5.1.4 Undeveloped Land

Rural – Agriculture

Agricultural land forms a large part of the UK and Government policy aims to protect agricultural land from inappropriate development. Where the loss of agricultural land is unavoidable, the poorest quality land should be developed, unless other sustainability considerations indicate otherwise.

Agriculture is one of the main industries within the area with a large proportion of coastal land used for farming. Much of the coastal farmland is classified as Prime Agricultural Land (Classes 1, 2 and 3.1) (Macauley Land Use Research Institute, Land Capability Classification for Agriculture) where there are few physical restrictions on its use, and mixed and arable farming are the dominant types of farming. Given that prime quality land covers only 5.7% of Scotland's land surface and is considered as a scarce national resource, the Angus coastal strip is of importance. Some 41.5% of all Class 1 agricultural land in Scotland is located in or adjacent to CPU6.

One issue noted is the current practice by coastal farmers of cultivating their land right up against the edge of the coast. This is not seen as being particularly useful for farmers or the coast protection authority, especially as by leaving a 2-3m buffer strip of land between their cultivated field and the coastal edge, farmers could prevent exacerbating erosion and therefore accelerated loss of their land.

Table 5.3 provides summary descriptions of the agricultural activities in each CPU.

Table 5.3 Agricultural Activities along the Angus coastal frontage

CPU	Agricultural Activities
1	The agricultural land within the unit is of varying quality. Land at Charleton and Kinnaber is low lying and low-quality land (grades 5 & 6), used for rough pasture, with small plantations of coniferous and deciduous trees. Around St Cyrus and the North Esk river agricultural land is of a much higher quality - grades 2 & 3 capable of supporting a wide / moderate range of arable crops.
2	The agricultural land around the basin is low lying with the majority being grade 3 used mainly for grazing, with a number of grade 2 stretches located in the south east corner of the basin utilised for arable farming. Due to the low-lying nature of the area, fields close to the shore have a tendency to flood during wet periods.
3	The agricultural land situated between Scurdie Ness and Boddin Point is of good agricultural quality with the majority being grade 3, and a small area of grade 2 located around the Usan area.

CPU	Agricultural Activities
4	The agricultural land within the unit is of good quality, with approximately a 25-75% split between grade 2 and 3 land. The majority of the grade 3 being located adjacent to the coast and the grade 2 situated landward and at the northern and southern extremes of the bay.
5	The agricultural land within the unit is of good quality, with approximately a 25-75% split between grade 2 and 3 land. The majority of the grade 3 is located adjacent to the coast in the central section of the unit. The grade 2 land, like Lunan Bay is situated at the northern and southern ends of the unit (Lang Craig and Whiting Ness).
6	The agricultural land within the unit is of a major contrast. The land located adjacent to the shore is low-lying grade 4 land, mainly used for rough grazing purposes. The land situated directly behind on the raised beach is grade 1 and is some of the best found within Scotland (some 41.5% of all grade 1 agricultural land in Scotland is located in or close to this area) supporting a high yield of varying crops.
7	None
8	None

Residential – individual farm properties
Properties at risk of coastal erosion or coastal flooding will be identified at a later stage in the SMP2 development process.

D.5.1.5 Military – MoD and Defence

In addition to ports, harbours and industry, the military training area (approximately 930ha) of Barry Buddon (CPU7) is a significant land use. The Camp and training ground occupy the entire Barry Buddon peninsula and are owned by the Ministry of Defence (MoD).

Barry Links has been used as a military training ground since 1865. It was purchased in 1892 and is currently one of the main training areas for Scotland with 22 ranges, which can accommodate a variety of weapons from pistol and rifle to sub-machine gun, grenade and anti-tank mortar. There are also six dry training areas used for a variety of exercises from battle simulation to orienteering.

A wide variety of other activities also take place within the training area. Beach landings take place, mainly between the two lighthouses. Parachute jumps are made onto the site, and a grass airstrip has been made for the planes to pick up troops. Most of the vehicles using the site are restricted to the network of tarmac and hard-core tracks, but in late November and early December snow-cat training takes place and these vehicles are allowed off the tracks into specified areas. No access is allowed onto approximately 70 hectares because the area contains the remains of live ammunition. The entire site is used for military activity. The access restrictions placed on the site have enhanced its natural heritage value.

D.5.1.6 Contaminated Land

Angus Council has not designated any sites within the SMP2 area as 'Contaminated', but there is potential for areas of made ground or contaminated land to be present.

D.5.2 Fisheries

The commercial fishing industry was once one of the main components of the local economy. Following the decline of the industry only very limited commercial white fish landings take place within the SMP2 area; although there still remain a number of boats registered to the harbours at Montrose and Arbroath (see Figure D7).

With the exception of Arbroath, where commercial shell fishing continues to take place year round with 17 vessels registered to the harbour, most fishing (mainly shellfish) is now undertaken as a part-time or seasonal activity. Salmon and sea trout are also caught in the North and South Esk Rivers, Montrose Basin, Lunan Bay and the Tay for commercial and recreational purposes.

Table 5.4 provides summary descriptions of the fishing activities in each CPU.

Table 5.4 Fishing Activities along the Angus SMP2 coastline

CPU	Fishing Activities
1	Both the South and North Esk Rivers are very important salmon fishing rivers. Situated at the mouth of the River North Esk are a number of fishing bothies and salmon netting stations. These stations have been fished for a number of years, a practice that continues today. Upstream of their outlets both rivers are popular with anglers.
2	The Basin has traditionally been important for salmon and sea trout fishing, both having been fished commercially since 1836. In recent years the numbers caught have declined, however net fishing still continues within the season. Sport fishing for salmon and sea trout is also important, particularly between Dun Bridge and Old Montrose. There are several riparian owners of fishing rights along the south Esk within the reserve. Apart from those owned by Joseph Johnston and Sons Ltd, all are leased by Montrose and District Angling Association. In the past the Basin was used by a local company to farm mussels to provide East Coast long line fishermen with bait. Although this has since ceased as a commercial activity, the annual harvest is now only for recreational fishing bait, and amounts to about 4 tonnes. Owing to sewage pollution, the mussels grown on the Basin are said to be unfit for human consumption. Although a local company in the 1980s attempted to farm and transport mussels to cleaner waters on the west coast, this proved unsuccessful.
3	Traditionally fishing played an important part in the economy of this area with a number of small boats operating along this section, with the focus being the Fishtown of Usan. Unfortunately this has long since ceased to be an integral part in the local community with only one registered boat operating out of Usan on a part time basis fishing mainly for lobsters. A number of unregistered boats are known to operate in the area.
4	The bay is very popular for salmon fishing with netting stations placed to the north and south of the Lunan Water. Fish numbers declined in the 1980s and netting ceased to operate for a number of years. Until recently the fishing rights were held by Joseph Johnston and Sons Ltd, these are now held by Redcastle Salmon Fisheries Ltd and Usan Boat Services. In the recent years salmon fishing has started to operate again on a commercial basis during the season (16th Feb – 31st Aug).
5	Traditionally Auchmithie was a small fishing settlement supporting the local community over the years. However, the number of boats operating out of the harbour has reduced, like the other small harbours within the SMP area there are now just 2 or 3 boats, operating on a part-time basis fishing for lobster.
6	The fishing port of Arbroath is located within CPU6. This was once a primary industry for the town, landing haddock and other white fish at a daily market. Following the decline of the fishing industry the harbour no longer operates a commercial fish market, although there are still a small number of fishing vessels registered to the harbour, who land their catch at ports further north. Nowadays the only commercial fishing taking place is for shellfish such as prawns, crab, and lobster.
7	None
8	None

D.5.3 Infrastructure

D.5.3.7 Ports and Harbours

Table 5.5 provides a summary of the ports and harbours within the SMP2 area.

Table 5.5 Ports and Harbours along the Angus SMP2 coastline

CPU	Ports and Harbours	Description
1	Montrose Port:	Commercial – industrial seaport - plays an integral part within the Montrose economy, providing import and export services for various agricultural and oil related businesses located within the area. Approximately 40% of annual port traffic is oil related with the port providing a base for major oilrig support vessels.
2	None	
3	Usan	Small natural harbour
4	Boddin	Small natural harbour
5	Auchmithie	Small natural harbour
6	Arbroath	Fishing Port - Arbroath was once a large fishing harbour although the fishing fleet has declined over recent years. There are still a small number of fishing vessels registered to the harbour, who land their catch at ports further north. The majority of the traffic in the harbour today is made up of vessels operating angling/day trips and private recreational vessels. Arbroath Harbour operates a commercial slipway utilised by a wide range of vessels for refitting etc. The harbour has increasingly become popular with visiting yachts. With this in mind and the decline of the commercial fishing industry there are currently redevelopment plans under consideration for the regeneration of the harbour to increase the leisure activity. Floating pontoons and a new harbour lock gate were installed in 2004.
7	None	
8	None (Broughty Ferry Harbour lies to the west of the SMP2 boundary)	

D.5.3.8 Road and Rail Transport

There are no motorways within the SMP area. The A92 (now a dual carriageway) and A932 are major transport corridors connecting the study area to other parts of the country (see Figure D7).

Minor roads (e.g. Nathere Dysart Road and Arbroath Road) provide access to settlements and some other locations along the coastline, whereas other parts of the coast are accessible only on foot or by sea.

The East Coast railway line generally runs parallel to the coast in the SMP2 area.

D.5.3.9 Sewage Outfall and Pumping Stations

Table 5.6 summarises the location of sewage outfall and pumping stations in the SMP2 area (see Figure D7).

Table 5.6 Location of Sewage Outfall and Pumping Stations

CPU	Location	Sewage Outfall	Pumping Station
1	St Cyrus	Untreated	
	Montrose Airfield (MWWTW)		Main Treatment Works
	Cobden Street, Montrose (MWWTW)	Main Outfall (CSO-Combined storm outfall)	
	West End Park, Montrose (MWWTW)	CSO	
2	Rossie Island, Montrose (MWWTW)	CSO (Combined storm outfall)	
	Ferryden Pier (MWWTW)	CSO	
	River St, Ferryden (MWWTW)	CSO	
5	Auchmithie	Septic Tank	
6	Victoria Park, Arbroath	CSO (Combined storm outfall)	
	Danger Point	CSO	
	Inchcape Park, Arbroath (TWWTW)	CSO (long and short sea outfall)	
	Queens Drive, Arbroath	CSO	
	West Links, Arbroath	CSO	
	Hatton (TWWTW)	Long Sea	Main Treatment Works
	Easthaven	Septic Tank	
7	Ballaster Park, West Haven	CSO (Combined storm outfall)	
8	Marine Avenue, Monifieth	CSO (Combined storm outfall)	
	Grange Road, Monifieth	CSO	
	Dighty Burn, Monifieth	Short Sea	
	South Balmossie, Monifieth	Long Sea	
	Broughty Castle, Broughty Ferry	Short Sea	

D.5.4 Land Reclamation and Dredging

Details of land reclamation and dredging within the SMP2 area are described in Table 5.7.

Table 5.7 Land reclamation and dredging

CPU	Description
1	In 1974 the southern channel of the River South Esk was blocked and the land reclaimed around Rossie Island to establish the southern part of the port. This area now provides oil supply vessel bunkering and storage facilities, timber storage areas, and office accommodation. Since 1986 the channel servicing the port has been dredged to 5.5m below Chart Datum (CD) to maintain the required navigation depth. Dredging takes place in the summer only with the material dumped (under licence) offshore at Lunan Bay. Dredged quantities from the South Esk Channel in 2001 were 45,000m^3 for beach recharge material as part of the GlaxoSmithKline protection works.
2	As discussed under CPU1, land reclamation took place in 1974, closing off the southern channel of the South Esk at Inch Bridge. Other areas of land around the basin have been reclaimed over the years. These include a number of embankments constructed as far back as 1832 enclosing and reclaiming land to prevent the flooding of agricultural land.

CPU	Description
	Over the years these have been moved seaward to reclaim increasing amounts of land with the most prominent structure being the Lurgies Sea wall. In more recent years between the 1950s and1973 the north eastern part of the basin was used as a municipal rubbish tip with approximately 7.3 hectares of spoil being reclaimed between the Tayock Burn and railway.
3	None
4	At present the material dredged annually from the South Esk navigation channel at Montrose Port is deposited offshore of Lunan Bay under current licensing agreements.
5 – 7	None
8	There are various sections of the unit that have been created through reclaiming land. The existing recreational facilities at Monifieth Bay have been constructed on an existing landfill site, which was in operation between 1920 and 1930. The dune slacks at Monifieth bay were also used as landfill sites and capped with soil. Evidence of this was seen through the exposed beach face at Tayview Caravan Park adjacent to the recreational area prior to the defence works being constructed in 2004.

D.6 Population and Human Health

D.6.1 Urban Areas

This section reviews the populations and residential settlements along the coastline in the SMP2 area, which is a popular place for people to live.

Nearly two thirds of the Angus population live on or near the coast (Angus Council 2011) with the four main towns along the coastal corridor comprising Arbroath (the largest town in Angus), Montrose, Carnoustie and Monifieth (on the edge of Dundee), as well as several smaller settlements and historic fishing villages, all of which have strong links with the sea.

Table 6.1 provides details of the broad population of the main settlements within the SMP2 study area (see Figure D1).

Table 6.1 Population figures for the four main coastal towns in Angus (Angis Council 2001)

CPU	Town	Population	% of population of Angus
1	Montrose	11,742	10.83%
6	Arbroath	22,785	21.01%
7	Carnoustie	10,561	9.74%
8	Monifieth	8,098	7.47%

Sustainable coastal erosion and flood risk management of these settlements is one of the main objectives of SMP2, in order to meet social and economic needs.

D.6.2 Health

Flooding events/ coastal erosion can have adverse impacts upon human health and significant socio-economic consequences. Flooding affects people both physically (e.g. through loss of property, injuries and potentially

loss of life) and psychologically (e.g. impacts on human health such as emotional distress can be caused by the event itself, as well as the fear of a flooding event). Socio-economic factors such as the financial burden (e.g. loss of property, the cost of repairs after a flood event, changes in insurance and loss of jobs where businesses are affected) created by flooding or erosion can continue to have an impact well after the event has occurred.

Access to healthcare services needs to be maintained during flood events.

D.6.3 Tourism and Recreation

Table 6.2 describes the tourist and recreation assets in each CPU within the SMP2 area.

Table 6.2 Tourism and recreation

CPU	Description
1	The links area within Montrose has been well developed for land-based recreation and tourism. The existing beach pavilion area was refurbished in 1998, upgrading the existing facilities to provide children's play area, paddling pool, refurbished café, small amusement arcade and additional car parking. Further development in 2002 provided play facilities for the disabled on the site of an old amusement arcade. From this area formal access is gained to the sandy beach running the length of the unit, which is popular with both locals and visitors during the summer period. Montrose beach achieved Blue Flag status in 2004 - an internationally recognised symbol of a well-managed beach where water quality meets the maximum legal EU standards and sound environmental management of the beach is promoted. To the south of the Splash area lies the Council run caravan park catering for summer visitors, which also has formal access to the beach. To the north are situated two 18-hole golf courses; these are long established, well known courses with the Medal course chosen for the 1999 Open pre-qualifying rounds. Located behind the golf courses are recreational playing fields and a private golf driving range. To the extreme north of the unit at St Cyrus is the national nature reserve, providing facilities for visitors to view the local wildlife. Montrose Sports Centre closed in February 2011 for 21 months to allow extensive works to build a new pool. The Sports Centre is due to open again in October 2012. Occasionally windsurfers visit the bay area. Although this is infrequent and not widely publicised, the bay offers ideal conditions for various water sport activities. Popular recreation and tourism pursuits in CPU1 include: • Walking – Shoreline, Charleton and Kinnaber links • Golf Courses – Montrose Medal and Broomfield courses • Bird Watching – St Cyrus Local Nature Reserve • Sight Seeing / Monuments – Montrose Air Station • Visitor Attractions – Montrose Slash Area, Leisure Centre, East Links pitch and putt, trampolines etc. • Water Sports – Montrose bay
2	The Montrose Basin LNR provides a range of recreation and tourism interests. The Scottish Wildlife visitor centre, situated on the south bank of the basin, attracts a variety of visitors. On the west shore is the Montrose Sailing Club where the majority of small boating activities take place within the basin. These activities are restricted to the South Esk channel and generally occur between April and September. Water-skiing, jet skiing and speed boating are prohibited. In the north east corner is Tayock Caravan Park, which is used throughout the summer period by tourists. Travellers also use this area. In the north west corner of the basin is the small settlement of Bridge of Dun, is home to the Caledonian Steam Railway, which operates between Bridge of Dun and Brechin during the summer months and is a very popular tourist attraction.

CPU	Description
	Pedestrian access is permitted on the west and east shores with a number of popular spots, although it is known that all areas of the basin are used for informal recreation such as dog walking. Other activities around the basin include wildfowling, bait-digging and angling. At present wildfowling is the only recreational use of the reserve, which is managed with approximately 250 people per season receiving permits to shoot. Popular recreation and tourism pursuits in CPU2 include: • Walking – Montrose Basin • Wildfowling – Montrose Basin • Bird Watching – Montrose basin • Bait-digging – Montrose Basin • Sailing / boating – Montrose Basin • Angling – Montrose basin • Windsurfing / canoeing – Montrose Basin • Visitor Attractions – SWT Visitor Centre, Caledonian Rainway (Dun)
3	Recreational activities within the area are limited to informal activities such as coastal walks along the cliffs. The cliff area along this unit is designated as a SSSI and the base-rich nature of the underlying rock has allowed locally rare, species-rich grassland vegetation to establish itself making it popular with visitors. Of a more unusual nature the area has been known for the collection of precious gems. Popular recreation and tourism pursuits in CPU3 include: • Walking – clifftop walks, access along parts of the unit • Beach - Usan • Sight Seeing – throughout the unit
4	Lunan Bay has remained undeveloped with very little recreation or tourism facilities, apart from formal access and parking facilities. It remains one of the most popular recreational bathing waters within the Angus area, offering a sheltered bay location with fine sand and shallow waters, which could rival any Mediterranean resort. Due to its popularity, human erosion of the dunes continues to be a serious problem. An attempt to address this problem has been through the construction of formal access to the beach by boardwalks running from the car park to various locations on the beach. Nonetheless there are still numerous informal path networks within the dune system, which continue to be used. The area is popular all year round for dog walking, horse-riding pursuits, sand sailing etc. Due to its sheltered nature the bay is also popular with surfers and wind surfers alike. Although not permitted the beach and dune areas are often used by off road motorcycles and 4x4 quad bikes. Corbie Knowe, located in the southern end of the bay, is a collection of holiday homes that have been utilised at weekends and holiday periods for the last 40-50years. Prior to this (1920's) the area was used as a camping ground. Ethie Haven, located around the cliff headland south of Corbie Knowe, was once a permanent settlement but now like Corbie Knowe is utilised as weekend and holiday retreats only. Various farm dwellings and properties within the area also provide self catering and bed and breakfast facilities. A coastal footpath has been constructed by a group of residents from the Corbie Knowe holiday homes who set up the Keillor Trust, they maintain the path between themselves and Ethie Haven as well as trying to care for the natural environment of the area. Popular recreation and tourism pursuits in CPU4 include: • Walking – clifftop walks, beach walks • Horse Riding – Beach • Water Sports – Windsurfing, surfing, sand sailing, sea kayaking • Bathing – Lunan Bay • Sight Seeing / Monuments – Red Castle

CPU	Description
5	The cliff area attracts many visitors, both locals and tourists. The cliff walk is widely used because it is located close to Arbroath and it offers access to the coast, with views, archaeological interests, bird watching etc. The wildlife interest is well known and resulted in the layout of a Nature Trail by Scottish Wildlife Trust in 1971. With much of the section also designated as a SSSI site partly for its geological cliff features, the area offers spectacular series of rock cliff erosion features including, sea stacks, blowholes and caves. The shingle beach at Auchmithie is also very popular for recreational purposes. Popular recreation and tourism pursuits in CPU5 include: • Walking – Clifftop walks, Arbroath to Auchmithie • Bird Watching – beach • Recreation Beach – Auchmithie • Sight Seeing / Monuments – Various sites within unit • Sea Angling - Cliffs
6	Arbroath is the main provider of recreational and tourist facilities within the unit, and has been a popular tourist destination since the 1950s attracting visitors from all over Scotland on an annual basis. Following the introduction of affordable foreign holidays, its popularity as a holiday destination has declined from its heyday of the 1950s, 1960s and 1970s however the town still continues to attract visitors. Arbroath offers a wide variety of tourism and recreational activities, Victoria Park (East Links) in the north provides access along the promenade to the cliff top walk located within CPU5, backed by a large common used for informal recreation activity, picnicking and football. South of Victoria Park is the harbour, which provides facilities for visiting yachts and a large number of recreational vessels. The west links area of Arbroath has recently been developed and offers a wide range of recreational facilities including a promenade with access to the recreational beach. The unit also has a golf course located to the south of Arbroath at Elliot and an informal coastal walk for its entire length. Popular recreation and tourism pursuits in CPU6 include: • Walking – Coastal Walk (Arbroath – West Haven) • Golf Courses – Arbroath Golf courses (Elliot) • Bord Watching – Arbroath to West Haven • Sight Seeing / Monuments – Signal Tower Museum, Arbroath harbour area • Visitor Attractions – Arbroath West Links Recreation Area – Pitch and Putt, Crazy golf, Trampolines, Play Area, Miniture Railway, Paddling Pool, Signal Tower Museum, Refreshment Kiosk • Water Sports – Pleaseure trips, canoeing and boating alongside cliffs
7	Carnoustie is the main settlement within the unit and offers a wide range of recreational and tourism facilities. The main attraction to the town is its golfing heritage with three golf courses available. The Championship Medal Course attracts national and international visitors with an increased interest since the British Open in 1999. For this event a luxury hotel was constructed adjacent to the course providing excellent accommodation and conference facilities. The Golf links host a number of Open tournaments each year which continue to be very popular. The main area backing the beach frontage has also been upgraded over the years and includes the leisure centre, all-weather outdoor playing surfaces, children's play area, sailing club, paddling pool, car park facilities and seafront walk. From this area access can be gained to the sandy beach, which extends for the majority of the unit, through various stepped access, with the provision of a slipway for boating activities. Due to the location of the military training area within the unit, beach access to the southern end of the unit is restricted. A coastal footpath is provided which extends from the MoD boundary along the beach frontage to West Haven. Carnoustie Bay with its sheltered environment is well used for boating activities by the local sailing club also popular with a number of other water sports enthusiasts as it provides a reasonably sheltered environment for surfing, wind surfing, para-surfing and canoeing.

CPU	Description
	Popular recreation and tourism pursuits in CPU7 include: • Walking – Coastal Walk (Burry Burn – West Haven) • Golf Courses – 3 Golf courses • Visitor Attractions – Leisure Centre • Water Sports – Various boating activities (sailing, canoeing, canoe surfing, surfing, wind surfing, para-surfing)
8	Leisure and recreational facilities predominate within the majority of CPU8. Informal recreation pursuits such as walking, including dog walking and cycling are very popular as are the playing fields and other recreation facilities. Riverview playing fields are regularly used by amateur football teams, as are the esplanade playing fields. The coastal foot/cycle access that runs from the edge of the Riverview playing fields to the start of Tayview Caravan Park and from the western edge of Tayview Caravan Park to Broughty Ferry castle and beyond is also very popular with locals and visitors to the area. Monifieth Golf Course and its proximity to many of the top courses in Scotland, including Carnoustie and Montrose also encourages visitors to the area. There are several formal recreation and play areas, such as the current recreational seafront development at Monifieth. The new work includes a skate park, play areas for toddlers and teenagers, putting, lookout tower, path network, improved toilet facilities, increased parking and traffic calming. Broughty Ferry links offer several leisure facilities including tennis courts and putting, however it is most popular for its water sports including several motorised activities. Broughty Ferry beach achieved Blue Flag status in 2004; an Internationally recognised symbol of a well managed beach where water quality meets the maximum legal EU standards and sound environmental management of the beach is promoted. Monifieth Bay is home to two camping and caravan sites, Riverview and Tayview Caravan Parks. Both sites are busy throughout the holiday seasons providing facilities for year round static caravans as well as touring caravans. Tourism accommodation is also available at the southern end of the CPU with several guesthouses and Bed and Breakfast establishments along the Esplanade. Popular recreation and tourism pursuits in CPU8 include: • Walking – Shoreline Monifieth and Broughty Ferry • Golf Courses – Monifieth Medal and Ashludie courses • Bird watching – Monfieth Bay • Sight Seeing / Monuments – Broughty Castle • Visitor Attractions – Monifieth Seafront area. Broughty Ferry pitch and putt, tennis courts and trampolines • Water Sports – Broughty Ferry

D.7 Policy, Plans and Programme Review

D.7.1 Overview

A review of other plans, policies and programmes (PPPs), which are relevant to the Angus SMP2 has been carried out to identify environmental issues, which may provide constraints or synergies within the SMP. The documents of relevance to the plan (including international, national, regional and local policy and development frameworks) are provided in Annex D.3.

It is important to recognise that the 100 year time horizon of the SMP2 is well beyond the time scale of most current development plans. The SMP therefore not only needs to have regard to planned development during later stages of development but also should serve as an influence on the longer term location, scale and nature of future development in the coastal zones.

The purpose of this section is to provide an overview of relevant planning policies at international, national, regional and local level, and to identify proposals for development in the coastal zone contained in existing and emerging planning documents.

Future built development and land use change will be managed through the statutory planning system, so that planning applications will be determined having regard to national, regional and local policies.

D.8 Glossary

Abbreviation	Term	Definition
AAS	Aberdeenshire Archaeological Service	A service provided by Aberdeenshire Council's Infrastructure Services that locates, evaluates, safeguards and explains all known archaeological sites within the area.
CIP	Climate Impacts Programme	UKCIP helps organisations to adapt the way they work in order to deal with the impacts of a changing climate.
CPU	Coastal Policy Unit	These are lengths of shoreline in which the physical processes are relatively independent from the processes operating in an adjacent CPU, but the boundary between them is not totally "sediment tight".
EQO	Environmental Quality Objectives	Classification system for assessing the quality of surface waters
GCR	Geological Conservation Review site	A site of geological importance that shows key scientific elements of the earth heritage of Britain. These sites display sediments, rocks, fossils and features of the landscape that make a special contribution to the understanding and appreciation of earth science and the geological history of Britain.
HRA	Habitat Regulations Assessment	An assessment made under the Habitat Regulations 2004 (as amended) to determine whether a development will have an 'adverse effect' on the integrity of a European site/
LNR	Local Nature Reserve	These are established by local authorities in consultation with SNH. These sites are generally of local significance and also provide important opportunities for public employment, recreation and interpretation. This is a non-statutory designation.
MoD	Ministry of Defence	The MoD is the United Kingdom government department responsible for implementation of government defence policy and therefore manages the day to day running of the armed forces, contingency planning and defence procurement.
PPG	Planning Policy Guidance	Planning Policy Guidance Notes (PPGs) and their replacements Planning Policy Statements (PPSs) are prepared by the government after public consultation to explain statutory provisions and provide guidance to local authorities and others on planning policy and the operation of the planning system.
PPP	Plans, Policies and Programmes	N/A
Ramsar	Ramsar Site	Wetland sites, especially waterfowl habitats, designated under the Ramsar Convention as wetlands of international importance.
RIGS	Regionally Important Geological Site	Locally designated sites of local, national and regional importance for geodiversity (geology and geomorphology) in the UK
SAC	Special Area of Conservation	This designation aims to protect habitats or species of European importance and can include Marine Areas. SACs are designated under the EC Habitats Directive (92/43/EEC) and will form part of the Natura 2000 site network. All SAC sites are also protected as SSSI, except those in the marine environment below the Mean Low Water (MLW).
SEA	Strategic Environmental Assessment	A process of incorporating environmental considerations into policies, plans, programmes and strategies
SEPA	Scottish Environmental Protection Agency	Scotland's environmental regulator to protect and improve Scotland's environment
SM	Scheduled Monument	Scheduled monuments are nationally important archaeological sites which have been awarded Scheduled status in order to protect and preserve the site for the educational and cultural benefit of future generations.

Abbreviation	Term	Definition
SMP	Shoreline Management Plan	A non-statutory document that sets out strategic level guidance designed to assist coastal defence decision making for a defined length of coast over a defined period.
SPA	Special Protection Area	Internationally important sites, set up to establish a network of protected areas for birds.
SSSI	Site of Special Scientific Interest	These sites, notified by SNH, represent some of the best examples of Britain's natural features including flora, fauna, and geology. This is a statutory designation.
SWT	Scottish Wildlife Trust	Independent organisation that campaign to protect and enhance wildlife and in some cases manage nature reserves.
UWWTD	Urban Waste Water Treatment Directive	European Union directive concerning the collection, treatment and discharge of urban waste water and the treatment and discharge of waste water from certain industrial sectors
WFD	Water Framework Directive	European Union directive which commits European Union member states to achieve good qualitative and quantitative status of all water bodies (including marine waters up to one nautical mile from shore) by 2015
WWTW	Wastewater Treatment Works	Works to treat wastewater

D.9 Sources of Information

D.9.1 Baseline Information

Baseline information provides the basis for predicting effects on the environment and helps to identify any relevant environmental trends and existing problems that may be affected by the plan. The sources of information used in compiling this baseline Theme Review report are shown below: -

- Angus Council (2011): State of the Environment Report for Angus 2011
- Angus Council (2004): Angus Shoreline Management Plan 1
- SEPA, SNH and Historic Scotland (2011): The Scottish Strategic Environmental Assessment Review, SEPA, Stirling
- www.snh.gov.uk
- www.sepa.org.uk
- www.historic-scotland.gov.uk

D.9.2 Difficulties experienced in obtaining data

The Theme Review has been prepared on the basis of publicly available information. It is recognised that during the development of this SMP2 and consultation with stakeholders, information used during the SEA may change and additional information may become available. It is assumed that the baseline information used in the SEA is up to date, reliable and unbiased.

Where data gaps or lack of understanding exist, then uncertainty is introduced into the SEA. These 'data gaps' and areas of uncertainty will be considered at each stage during the SEA process.

Angus Council

Angus Shoreline Management Plan SMP2

ANNEX D1 - Maps

Environmental Designations

Land Use

Heritage Designations

Landscape Designations

Angus Council

Angus Shoreline Management Plan SMP2

ANNEX D2 – Habitats and Species

ANNEX D2 HABITATS AND SPECIES

Sand Dune Habitats

Table D4.1 Main Dune Areas in the Angus SMP2 Coastline

Area	Description
Charleton & Kinnaber Links to Montrose Bay	This is a bay dune and spit complex that covers 479 ha, extending 6km south from the River North Esk to Montrose. It consists of foredune, spit, sand-covered shingle, conifer plantations, acidic dune grassland, patches of heath and amenity grassland.
Lunan Bay	A Bay dune and spit system that has a frontage of 3.5km around the mouth of the Lunan Water. It is dominated by ungrazed, semi-fixed dune vegetation, and although nature conservation interest is only moderate, it is a popular site for informal recreation due to the high regard that locals and visitors have for its wide sandy bay.
Buddon Ness	Open coast and Ness system is one of the largest sites on the East coast (1641.4 ha) extending for almost 23km. Forming a narrow belt of open dune coast for much of this distance, the site is almost 4km wide where a very large foreland system (Barry Buddon) has developed at the mouth of the River Tay. This area is home to several important sites for nature conservation, including Elliot Links, East Haven, Barry Links and Monifieth Bay.

Table D4.2 Sand Dune Habitat along the Angus SMP2 Coastline

CPU	Sand dune habitat and species present
CPU1	Dunes run most of the length of CPU 1. Dune grasses including Sand Couch Grass (Elymus farctus), Marram (Ammophilia arenaria) and Lyme grass (Elymus arenarius) dominate the sand dune system north of the River North Esk. As these dunes grade into fixed dunes further inland, they become more diverse, with Rest Harrow (Onouis respens), Nottingham Catchfly (Silene nutans), Clustered Bellflower (Campanula glomerata), Hairy Violet (Viola hirta) and Maiden Pink (Dianthus deltoides) among the flowering plants. St Cyrus and Kinnaber Links is one of the richest coastal habitats in the North East of Scotland. Over 300 species of plants have been recorded, including Nottingham Catchfly, Hairy Violet, Wild Liquorice (Astragalus glycophyllos), Henbane (Hyoscyamus niger), Maiden Pink and Clustered Bellflower, many of which are at their Northern limit in the UK. The northern extent of Montrose Bay and Kinnaber Links supports a lichen rich dune heathland, foreshore and Saltmarsh, including two nationally rare lichen species. Some 60 species of birds regularly breed in the area, including Grey Partridge (Perdix perdix), Whitethroat (Sylvia communis), Stonechat (Saxicola torquata). The site is also one of the most diverse sites in East Scotland for moth and butterfly species, including the rare Small Blue Butterfly.
CPU2	None
CPU3	None
CPU4	The sand dune system to the north and south of the Lunan water consists of mobile dunes backed by an established links area. In the northern section the crest and back slope of the dune ridge is covered with a thick mantle of Marram Grass. Inland of the mobile dunes the habitat changes into a shorter dune pasture area, which is partially covered by bushes and trees, Hawthorn, Briar, Sycamore and Willow. Small mammals like voles, mice and rabbits graze on the short turf of the landward dune edge, which attracts larger predators such as foxes. Birds typically seen at Lunan Bay include Skylark and Meadow Pipit. The dune habitat also supports a number of invertebrate species, including grasshoppers, earwigs, many species of beetle, butterflies and moths.
CPU5	Carlingheugh Bay and Castlesea Bay are the only areas in CPU 5 where sand dunes have developed. Salt

CPU	Sand dune habitat and species present
	tolerant Sea Sandwort (Honkenya peploides) and Sea Rocket (Cakile maritima) grow on the foreshore. Marram and Lyme Grass are present within the mobile sand dune communities. Some locally rare plant species occur here, including Purple Milk-vetch (Astragalus danicus), Clustered Bellflower (Campanula glomerata) and Early Purple-orchid (Orchis mascula).
CPU6	Elliot has a stable sand dune system with abandoned river meanders that supports open dune and fen plant communities, which are uncommon in Angus. The site supports several rare plant communities, including the nationally scarce Sea Pea (Lathyrus japonicus) and Small Scabious. Many invertebrates are found in the rich sand dune habitat, particularly butterflies such as Ringlet, Small Blues, Small Heath and Common Blue. Little tern have bred here in the past. At East Haven, as with much of this CPU, a sand cliff 1-2m high runs along the back of the beach, with a seasonally established strandline covered by creeping Sea Sandwort, and an area of fore dunes with Lyme Grass along the front. A flat links area covered with Marram Grass here contains Scotland's only natural population of the flowering plant The Greater Yellow Rattle.
CPU7	Barry Sands East to Buddon Ness is a wide (330m), gently sloping (1o) continuous beach backed by a large rip-rap coastal defence. A dynamic area with parabolic dunes is to the south of the defence, and submerged and inter-tidal sandbanks, the most notable being Gaa Sands, are present near the shore. Inland from the belt of any remaining dunes and coastal defence is an extensive, low, undulating links (< 6m), known as Barry Links. This SSSI and cSAC encompasses the major part of a triangular "Ness" type sand dune system and contains a full series of acid dune communities, including mobile, grassland, heath, damp and dry dune slacks. Secondary birch woodland and scattered patches of birch and willow scrub. Many birds typical of sand dunes breed here, including lapwing and ringed plover, and Little Terns have bred here in the past. The intertidal area is part of the Firth of Tay and Eden Estuary SPA as it supports internationally important numbers of winter waders and wildfowl, including Eider and Sanderling.
CPU8	The dunes from Buddon Ness to the Buddon Burn is a westward continuation of the sand dune system in CPU 7, although the main dune line is lower (3-5m) and continues to reduce towards Monifieth. A narrow (<50m wide) seaward belt of young dunes and a landward belt of higher (average 6-8m) more established dunes are also present in this area. A continuous covering of short turf or Marram Grass is present on most of the mature dunes. The dune belt stops adjacent to Monifieth recreational links area and reappears almost in the middle of the Bay, where the dunes are generally low (1m) and are protected in parts. A large dune area almost in the middle of Monifieth Bay has been planted with stabilising vegetation, Marram Grass. The dune belt stops approximately 100m West of the Dighty Water reappearing adjacent to the Esplanade, Broughty Ferry. The dune belt is more established in this section (15m wide and 1-2m high) and is dominated by Lyme Grass. The dune belt again stops abruptly 200m short of Broughty Ferry Castle

Table D4.3 Cliff and Rocky Shore Habitat along the Angus SMP2 Coastline

CPU	Cliff and rocky shore habitat and species present
CPU1	Although their instability means detailed study has not been possible, the cliffs above St Cyrus beach are known to have a high diversity of species and plant communities due to the considerable variety of conditions. On drier, barer ledges and slopes Nottingham Catchfly grows, with Soft Trefoil (Trifolium striatum), Rough Trefoil (Trifolium scabrum) and Wild Onion (Allium vineale). Further north, where cliff slopes come closer to the sea, Henbane grows, with Wild Liquorice, Hairy St John's Wort (Hypericum hirsutum) and Kidney Vetch (Anthyllis vulneraria) in more sheltered areas. The eroding cliffs enrich the slopes below and though dominated by bracken (Pteridium aquilinum) later in the season, spring flowering Primrose (Primula vulgaris), Cowslip (Primula veris) and the hybrid False Oxlip (Primula vulgaris x veris) are seen.
CPU2	None
CPU3	Scurdie Ness to Boddin Point is a continuous length of rocky shore approximately 4km long.

CPU	Cliff and rocky shore habitat and species present
	The base-rich nature of the underlying rock has allowed locally rare, species-rich grassland vegetation to establish itself in this area, notably on and around the old lime kiln on Boddin Point, and on the more friable volcanic rocks. Plant species present include Kidney Vetch, Clustered Bellflower, Fairy Flax (Linum catharticum), Carline Thistle (Carlina vulgaris), Burnet Saxifrage Pimpinella saxifraga) and the nationally scarce Nottingham Catchfly.
CPU4	Cliff headlands bound Lunan Bay and fossil cliffs run along the back of the raised beach ranging from 250m-50m landward of the HWM. The southern upper raised beach (15m OD) sits on the fossil cliffs and consists of rough pasture, inland a continuation of the raised beach forms part of Redcastle Farm.
CPU5	The grassland habitat above and among the cliffs supports rare and uncommon species of plants, including Long-Bracted Sedge, Maiden Pink, Clustered Bellflower and Hairy Violet. Many salt tolerant plant species, such as Sea Spleenwort (Asplenium marinum) and Pellitory-of-the-wall (Parietaria diffusa) are found along the cliffs and in caves. Mosses and liverworts also occur along the cliffs including some very rare species, like the nationally rare Porella obtusata. Whiting Ness to Ethie Haven SSSI is also home to the largest breeding seabird colony in Tayside, with large numbers of Kittiwakes (Rissa tridactyla), Puffins (Fratercula artica), Razorbills (Alca torda), Herring Gulls, Fulmars, Guillemots. The cliffs also support nationally important numbers of over wintering Turnstones (Arenaria interpres) and Purple Sandpipers (Calidris maritima), which feed and roost on the rocky shoreline. It is also noted for its grassland and rock-ledge plant communities, including Maiden Pink, Hairy Violet and Pellitory-of-the-wall and its geology. Insects including an endangered beetle and the nationally rare Small Blue Butterfly (Cupido minimus), Grayling (Hipparchia semele) and Small Pearl-bordered Fritillaries have been found here, mosses and liverworts are also present.
CPU6	An extensive marine abrasion platform backed by several storm beaches consisting of boulders and shingle runs along almost the entire length of CPU 6. This acts as a breakwater for waves before they reach the sandy shore.
CPU7	There is a small inter-tidal rock platform in front of Carnoustie within CPU 7.
CPU8	None present

Table D4.4 Estuarine mud / sand flat, saltmarsh and wet grasland Habitat along the Angus SMP2 Coastline

CPU	Estuarine mud / sand flat, saltmarsh and wet grasland and species present
CPU1	The small North Esk estuary supports various habitats including, sub tidal sandbanks, inter tidal mud and sand flats, eel or seagrass (Zostera) beds, shingle and saltmarsh, all of which support many species. The remains of a saltmarsh are present at the mouth of the River North Esk and contain characteristic saltmarsh species such as Sea Aster (Aster tripolium), Common, and Frosted Orache (Atriplex patula and A.laciniata).
CPU2	The Basin is a fully functioning and sustainable enclosed basin estuary, which predominantly consists of inter-tidal mud flats. It exhibits a range of internationally and nationally important animal and plant species. Among the most notable of these are wintering and breeding waterfowl and waders, including Mute Swan, Pink Footed Goose, Shelduck, Widgeon, Eider, Goosander, Knot and Redshank. In addition to those birds that use the basin for breeding, approximately 49 species of bird listed as internationally rare or vulnerable regularly use the basin for feeding and resting, including Osprey, Whooper Swan and Kingfisher. Montrose Basins' tidal mudflats support an abundance of organisms and a sparse but extensive community of eelgrasses (Zostera species) and marine algae (including Enteromorpha and Cladophora species). Many invertebrates of national and regional importance have been identified within the mudflats and due to the presence of several nationally rare habitats, such as the ungrazed saltmarsh, it is assumed that the basin

CPU	Estuarine mud / sand flat, saltmarsh and wet grasland and species present
	supports many additional invertebrate species that have yet to be identified. The north west corner of the Basin contains a combination of flat arable land, unimproved grassland and the basin's saltmarsh resource, dissected by the River South Esk and one of its old courses. The saltmarsh habitat present in the west and south east of Montrose basin, which accounts for around half of all saltmarsh within Dundee and Angus (52 ha), exhibits a succession of vegetation communities, from pioneer saltmarsh to grassland.
CPU3	Small, scattered areas of saltmarsh exist along the length of CPU 3 generally occurring as perched saltmarsh, which is locally very rare. Perched saltmarsh occurs on rocky ground on or just below the High Water Mark, and is very different from estuarine saltmarsh that has formed on silty ground on the fringes of the Montrose Basin. Four main types of saltmarsh communities have been identified as subcommunities of Red Fescue (Festuca rubra) saltmarsh, with another community, which is not known elsewhere in Angus. In areas regularly drenched with sea spray, species such as Scots Lovage (Ligusticum scoticum) and Thrift (Armeria maritima) and Sea Campion (Silene Maritima) may also be found. The fragmented nature of the saltmarshes, and their susceptibility to erosion, makes these communities vulnerable.
CPU4	An extensive area of inter-tidal sand flats runs virtually uninterrupted for 3.5 km of Lunan Bay. The sand flats reach up to 300m in width and are gently sloping.
CPU5	Three saltmarsh communities are present in CPU 5, which although small and lacking in species diversity are locally significant. They are located at Dickmonts Den where Common Couch (Elymus repens) saltmarsh is present; and Kirk Loch and just south of Castlesea Bay where Red Fescue (Festuca Rubra) saltmarsh, Saltmarsh Rush (Juncus gerardii) sub-community is found.
CPU6	An area of inter-tidal sands is still evident within the harbour at Arbroath. Sand flats with localised shingle deposits accumulate the length of the marine abrasion platform during the summer months. These are often lost in winter due to severe weather conditions, which also cause the beach to drop dramatically.
CPU7	There is very little of this habitat except around the mouth of the Barry Burn.
CPU8	Monifieth Bay inter-tidal area stretches along the coast for almost 6km. It is preceded by narrow (200m) inter-tidal sand flat at Buddon Ness, which gains width towards Monifieth reaching a greatest width of 1km from the HWMOST. Many species of wintering waders and Sea Duck rely on the sand flats for feeding grounds, including internationally important numbers of Sanderling and Eider. Remnants of a Saltmarsh are present close to the Buddon Burn. The intertidal area is part of the Firth of Tay and Eden Estuary SPA as it supports internationally important numbers of winter waders and wildfowl, including Eider and Sanderling.

Angus Council

Angus Shoreline Management Plan SMP2

ANNEX D3 – Plan, Policy and Programme Review

Annex D.3. Relevant National, Regional and Sub-Regional Planning Policy by Coastal Section in SMP2 Area

Document	Summary	Relevance	CPU
International Planning Policy			
European Habitats Directive (92/43/EEC)	Aims to ensure the protection of biodiversity by conserving natural habitats of wild flora and fauna. It requires Special Areas of Conservation (SACs) to be identified, which form a network of protected areas called Natura 2000 along with Special Protection Areas (SPAs). Also aims to maintain or restore in a favourable condition designated natural habitat types and habitats of designated species listed in Annex I and II of the directive respectively.	The SMP2 will consider the European sites within the SMP2 area, together with their qualifying natural habitats and species. The SMP2 will recommend appropriate measures to avoid deterioration of these habitats and avoid disturbance of scheduled, scarce or rare species.	All
The EC Directive on the Conservation of Wild Birds (79/409/EEC)	The Directive provides a framework for the conservation and management of human interactions with wild birds in Europe. It sets broad objectives for a wide range of activities in order to sustain populations of naturally occurring wild birds. The key aim is to sustain habitats in order to maintain populations at ecologically and scientifically sound levels.	The SMP2 will consider the impact of its policies on wild birds and their habitats and should ensure their protection.	All
Wildlife and Countryside Act (as amended) 1981	Principal legislative mechanism for the protection of wildlife in UK. Requires any land that is identified as being of special interest by reason of any of its flora, fauna, geological or physiographical features to be classified as a Site of Special Scientific Interest (SSSI) and afforded certain protection against damaging measures. Requires strict protection of species under Schedules 1, 5 and 8 except in exceptional circumstances.	There are a number of sites designated under this Act within the SMP2 boundary. The SMP2 will recognise their statutory importance in terms biodiversity and strive to ensure they are adequately protected.	All
The Conservation (Natural Habitats and c) Regulations 1994	The Regulations make it an offence (subject to exceptions) to deliberately capture, kill, disturb, or trade in the animals listed in Schedule 2, or pick, collect, cut, uproot, destroy, or trade in the plants listed in Schedule 4. However, these actions can be made lawful through the granting of licenses by the appropriate authorities.	The SMP2 will consider the protection and conservation of plant and animal species.	All

Document	Summary	Relevance	CPU
	Licenses may be granted for a number of purposes (such as science and education, conservation, preserving public health and safety), but only after the appropriate authority is satisfied that there are no satisfactory alternatives and that such actions will have no detrimental effect on wild population of the species concerned.		
Water Framework Directive 2000	Addresses the issues of flooding, Sustainable Urban Drainage Systems (SUDS), water quality, treatment of waste water, bathing water quality, groundwater protection and River Basin Management Plans.	The SMP2 will seek to avoid negative impacts to water quality and assist in flood risk management.	All
Ramsar Convention 1971	Provides the framework for national action and international cooperation for the conservation and wise use of wetlands and their resources.	The SMP2 will seek to avoid negative impacts to wetlands.	2, 7 and 8
National Planning Policy			
National Planning Framework for Scotland 2 (2009)	The second National Planning Framework (NPF2) was adopted in June 2009 and sets out Scotland's spatial development until 2030. It identifies the high-level, long-term issues that impact on the development of Scotland in physical and land use terms with the purpose of enabling Scotland to reach its full potential in social, environmental and economic terms. Marine and Coastal Environment is specifically addressed with the emphasis on the sustainable management and development of coastal areas.	The SMP2 will seek to incorporate the principles and objectives set by the NPF2.	All
SPP1: The Planning System 2010	The SPP sets out; • the Scottish Government's view of the purpose of planning; • the core principles for the operation of the system and the objectives for key parts of the system; • statutory guidance on sustainable development and planning under Section 3E of the Planning etc. (Scotland) Act 2006; • concise subject planning policies, including the implications for development planning and development management; and, • the Scottish Government's expectations of the intended outcomes of the planning system.	The SMP2 will incorporate the appropriate principles and objectives set by SPP1	All
Climate Change	The Act sets a framework for greenhouse gas emissions reductions in Scotland by setting an	The SMP2 will seek to assist in meeting the	All

Document	Summary	Relevance	CPU
(Scotland Act 2009)	interim 42 per cent reduction target for 2020, with the power for this to be varied based on expert advice, and an 80 per cent reduction target for 2050. To help ensure the delivery of these targets, this part of the Act also requires that the Scottish Ministers set annual targets, in secondary legislation, for Scottish emissions from 2010 to 2050.	reduction targets identified in the Act.	
Scottish Biodiversity Strategy - Scotland's Biodiversity It's in your Hands(2004)	The biodiversity strategy sets out a framework for 35 years to 'to conserve Biodiversity for the health, enjoyment and well being of the people of Scotland now and in the future'. The strategy sets out five main objectives • conserve what we have; • sustain healthy ecosystems; • create networks and connections not a piecemeal approach; • engage more people; and, • promote sustainable development.	The SMP2 should ensure that biodiversity is protected and where appropriate enhanced.	All
Scottish Historic Environment Policy (SHEP) 2009	SHEP is the overarching policy statement for the historic environment. It is now one consolidated document replacing series of free-standing publications. It provides a framework for more detailed strategic policies and operational policies that inform the day to day work of a range of organisations that have a role and interest in managing the historic environment. These include the Scottish Government, local authorities and the range of bodies that are accountable to Scottish Ministers. SHEP is intended to sit alongside and complement the Scottish Planning Policy series and other relevant Ministerial policy documents.	The SMP2 should ensure the conservation of historic areas and areas of cultural significance.	All
National Marine Plan Pre-Consultation Draft 2011	The National Marine Plan will set out: • Policies for sustainable development of Scotland's seas; • Policies on Nature Conservation Marine Protected Areas (MPAs) and other relevant conservation sites;	The SMP2 will incorporate appropriate principles ad objectives from the National Marine Plan Draft.	All

Document	Summary	Relevance	CPU
	• Economic, social and marine ecosystem objectives and further objectives for the mitigation and adaption of climate change; • The condition of the Scottish marine area (or region) including a summary of the significant pressures and human impacts on the relevant area.; and, • Information relating to the policies appropriate to the plan.		
PAN 60 Planning for Natural Heritage 2000	PAN 60 provides advice on how development and the planning system can contribute to the conservation, enhancement, enjoyment and understanding of Scotland's natural environment and encourages developers and planning authorities to be positive and creative in addressing natural heritage issues.	The SMP2 will seek to conserve and enhance the natural environment.	All
SNH Guidance: A guide to managing coastal erosion in beach / dune systems	Reviews the options available for managing erosion. Offers guidance on how to select or design the most appropriate response to a particular situation. Describes and illustrates how each erosion management technique might best be designed so as to minimise damage to natural heritage and reduce the potential for altering shoreline evolution elsewhere.	SNH guidance relating to coastal erosion and defence will be adopted in the development of the SMP2.	All
Regional and Local Policy			
Dundee and Angus Structure Plan 2001-2016	The purpose of this Structure Plan is to provide a long term vision for the area and to set out the broad land use planning strategy guiding development and change. This Plan, in turn, sets the context for Local Plans, which translate the strategy into more detail. This will be superseded by the Tayplan Strategic Development Plan when adopted.	The SMP2 will seek to support the environmental objectives within the structure plan.	All
Tayplan's Proposed Strategic Development Plan 2012 -2032	Sets out longer term vision for Angus, Dundee City, Perth and Kinross and North Fife. Sets out policies for where development should be over the next 20 years and how to shape better quality places by the location, design and layout of development from the outset.	The SMP2 will reflect Tayplan's objective to protect areas vulnerable to coastal erosion, flood risk and rising sea levels; including the undeveloped coast and to ensure flood risk is not exacerbated.	All
Angus Local Plan Review (2009)	The plan provides the detailed policy framework to guide future development, land use and investment in Angus for the period to 2011.	The SMP2 will be developed in accordance with the objectives of and policies contained in the Angus Local Plan, and will assist in protecting valued infrastructure, public amenity areas and material assets from flood and erosion damage.	All

Document	Summary	Relevance	CPU
Dundee Local Plan 2005	The plan provides the detailed policy framework to guide future development, land use and investment in Dundee for the period to 2011.	The SMP2 will be developed accordance with the objectives of and policies contained in the Dundee Local Plan, and will assist in protecting valued infrastructure, public amenity areas and material assets from flood and erosion damage.	8
Dundee Local Development Plan Main Issues Report (MIR) 2011	The new Local Development Plan for Dundee will set out a strategy to guide future development within the City for a period of five years and provide broad indications of growth for up to 10 years in the future. The MIR provides a summary of the key issues to be considered within the proposed plan.	The SMP2 will seek to support the environmental objectives within the MIR.	8
Aberdeenshire Local Plan 2006	The plan provides the detailed policy framework to guide future development, land use and investment in Aberdeenshire for the period to 2011.	The SMP2 will be developed in accordance with the objectives of and policies contained in the Aberdeenshire Local Plan, and will assist in protecting valued infrastructure, public amenity areas and material assets from flood and erosion damage.	1
Angus Single Outcome Agreement (SOA) 2009-2012	The SOA is the vision for the Angus area and the strategic priorities that need to be addressed to achieve this vision, as agreed by the Community Planning Partners and expressed as outcomes to be delivered by the partners, both individually and jointly.	The SMP2 core objectives will reflect the appropriate SOA outcomes.	All
Tayside Local Biodiversity Action Plan	Sets out Tayside biodiversity strategy; including species and habitat action plans.	The SMP2 will ensure that biodiversity is protected and where appropriate enhanced, where feasible.	All
Dundee and Angus Tourism Partnership 'A Strategy for Growth' 2007 to 2010	The strategy sets out a framework to best support the national and regional tourism growth agenda.	The SMP2 will seek to assist in sustainable growth of tourism in the area.	All
Angus Health Improvement Plan	The Angus Health Improvement Plan (AHIP) sets out the aims and objectives for health improvement in Angus. An Action Plan that details specific projects and initiatives and their	The SMP2 will seek to facilitate opportunities for increased physical	All

Document	Summary	Relevance	CPU
2009-2012	expected outcomes	activity.	
Angus Countryside Access Plan 2007-2012	The plan sets out policies that seek to guide the development, management and promotion of countryside access opportunities within the Angus area. A key priority is the continued development of the Angus Coastal Path.	The SMP2 will seek to align with the plan objectives for the Angus Coastal Path.	All
Dundee Coastal Study 2011	Provide a framework for future adoption of localised coastal flood and erosion prevention schemes. Such schemes may be required to provide a consistent level of flood and erosion protection to assets along the Dundee City coastal frontage.	As the SMP2 boundary overlaps the Dundee Local Authority boundary, this study will be reviewed to inform the SMP2.	8
Local Flood Risk Management Plans and Assessments	As a response to the Flood Risk Management (Scotland) Act 2009, local authorities are working to prepare localised flood management plans and flood risk assessments. These plans and assessments are currently being developed for the Angus Council area.	The SMP2 should reflect or contribute to any local flood risk assessments or flood management plans.	All
Angus Core Path Plan 2010	Developed under the requirements of the Land reform (Scotland) Act 2003, the Core Paths Plan sets a system of paths for the purpose of giving the public reasonable access throughout the Angus area.	The SMP2 will seek to aid the development of the core path network.	All