Appendix 5 Environmental Baseline

INTRODUCTION

Part 2, Schedule 3 of the Scottish SEA Act requires the Environmental Report to include a description of "the relevant aspects of the current state of the environment and the likely evolution thereof without the implementation of the plan or programme."

This appendix provides:

- the current state of the environment in the study area and the environmental characteristics of the area likely to be significantly affected by the LDP; and
- the existing environmental issues which are relevant to the LDP including those relating to areas of particular environmental importance;
- the evolution of the Shetland environment without the LDP (Refer to Appendix 6);
- Environmental data (quantitative and qualitative) from highlighted sources or from Shetland Biological Records Centre.

Current Environmental Baseline

Biodiversity, Flora and Fauna

Many areas of Shetland are designated under international or national legislation or by SIC. This section describes these areas and highlights their respective level of protection. Information about species which are protected under European or national legislation is also provided, together with further information on priority species and habitats.

Designated Areas

Special Protection Areas (SPAs)
SPAs are protected sites classified in accordance with Article 4 of the EC Directive on the Conservation of Wild Birds (79/409/EEC), also known as the Birds Directive, which came into force in April 1979. They are classified for rare and vulnerable birds, listed in Annex I of the Birds Directive, and for regularly occurring migratory species. Shetland is home to 12 SPAs the full list of which is given in Table 1 and displayed in Figure 1 of the Appendices.

Table 1 Special Protection Areas in Shetland (source SNH)

Site	Description
Noss	High cliffs supporting internationally important breeding populations of migratory seabirds including fulmar (*Fulmarus glacialis*), gannet (*Morus bassanus*), great

Site	Description
	skua (*Catharacta skua*), guillemot (*Uria aalge*), kittiwake (*Rissa tridactyla*) and puffin (*Fratercula arctica*) The site also qualifies for protection due to the internationally important assemblage of seabirds
Fetlar	Heathlands, marshes, cliffs and rocky shores important for breeding birds and waders including internationally important populations of arctic skua (*Stercorarius parasiticus*), arctic tern (*Sterna paradisea*) , dunlin (*Calidris alpina schinzii*) , fulmar (*Fulmarus glacialis*), great skua (*Stercorarius skua*),red-necked phalarope (*Phalaropus lobatus*) ,whimbrel (*Numenius phaeopus*) The site also qualifies for protection due to the internationally important assemblage of seabirds
Hermaness, Saxa Vord and Valla Field	The SPA supports a breeding population of European importance of the Annex I species red-throated diver (*Gavia stellata)*. The site also qualifies under Article 4.2 for its internationally important breeding populations of three migratory seabird species. These are gannet (*Morus bassana)*, great skua (*Catharacta skua)* and puffin (*Fratercula arctica)* SNH have advised that this SPA also qualifies for its populations of guillemot (Uria aalga), shag (Phalacrocorax aristotelis) and fulmar (Fulmarus glacialis)
Fair Isle	Fair Isle supports the entire world population (33 territorial males) of the endemic Fair Isle subspecies of wren *(Troglodytes troglodytes fridariensis)*, and by supporting an internationally important breeding population of arctic tern *(Sterna paradisaea)* Fair Isle also qualifies for protection by regularly supporting internationally important breeding populations of migratory seabirds: including of fulmar *(Fulmarus glacialis)*, shag (*Phalocrocorax aristotelis*) arctic skua (*Stercorarius parasiticus)*, great skua (*Stercorarius skua*), kittiwake (*Rissa tridactyla*), guillemot (*Uria aalge*), razorbill (*Alca torda)* puffins (Fratercula arctica) SNH have advised that this SPA is also designated for its Arctic skua (Stercorarius parasiticus) population.
Foula	Rocky coastline and large areas of moor, supporting internationally important breeding populations of seabirds Foula qualifies for protection by regularly supporting a nationally important population of arctic tern (*Sterna paradisaea*) and a colony of leach's petrel

Site	Description
	(*Oceanodroma leucorhoa*) though the current status of this population is uncertain. Foula also qualifies by regularly supporting internationally important breeding populations of great skua (*Catharacta skua*), guillemot (*Uria aalge*) and puffin (*Fratercula arctica)* SNH have advised that the qualifying species on Foula SPA also include Arctic skua (Stercorarius parasiticus), shag (Phalacrocorax aristotelis), fulmar (Fulmarus glacialis), kittiwake (Rissa tridactyla), Razorbill (Alca torda) and red-throated diver (Gavia stellata).
Mousa	Low grassy island with internationally important breeding colonies of storm petrel (*Hydrobates pelagicus*), and arctic tern (*Sterna paradisaea)*
Ramna Stacks and Gruney	Group of small rocky islets with internationally important colony of leach's petrel (*Oceanodroma leucorhoa*)
Sumburgh Head	Sumburgh Head Special Protection Area consists of cliffs and boulder beaches and qualifies for protection by supporting a nationally important breeding population of arctic tern (*Sterna paradisaea*). The site also qualifies for protection by supporting over 20,000 individual breeding seabirds with approximately 35,000 individuals of eight species, including kittiwake, regularly using the site. The site is also notable for supporting a nationally important population of guillemot (*Uria aalge*) SNH have advised that Sumburgh Head SPA also qualifies for fulmar (Fulmarus glacialis) and kittiwake (Rissa tridactyla)
Ronas Hill, North Roe and Tingon	Areas of blanket bog supporting a nationally important breeding population of red-throated diver (*Gavia stellata)*. The SPA also qualifies for protection by supporting an internationally important breeding population of great skua (*Catharacta skua)*. SNH have advised that the qualifying features of Ronas Hill, North Roe and Tingon SPA include merlin (*Falco columbarius*)
Lochs of Spiggie and Brow	Eutrophic 'machair type' loch regularly supporting nationally important wintering population of Icelandic whooper swans
Papa Stour	Heathland and cliffs supporting a large population of the arctic tern (*Sterna paradisaea*). Papa Stour is one of the few British sites that regularly supports large numbers of this species. Papa Stour SPA also qualifies for protection by regularly supporting a large population of ringed plover (*Charadrius hiaticula*). This is the highest density breeding population in Britain and is one of the highest density populations in Europe
Otterwick and	Comprises two areas of open moorland with numerous

Site	Description
Graveland	pools and lochans on Yell. Inland areas are dominated by blanket bog, with some stretches of dry heather moorland. A band of maritime grassland extends along the coastal stretch to the Graveland peninsula. Breeding population of European importance species red-throated diver

Special Areas of Conservation (SACs)

SACs are designated under the EC Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Fauna and Flora, known as the Habitats Directive. In the UK, sites are protected under The Conservation (Natural Habitats, &c.) Regulations 1994, due to the presence of one or more habitats or species listed in the Directive and management plans are written to ensure 'favourable conservation status.' The 12 SACs in Shetland are listed and described in Table 2 and displayed in Figure 1 in the Appendices.

Table C.2 Special Areas of Conservation in Shetland (source SNH)

Site	Description
Hascosay	Active blanket bog with an intact pool system displaying a range of shallow mud-bottom hollows with typical Shetland blanket bog vegetation and a diverse range of *sphagnum* species SNH have advised that Hascosay SAC is also designated for its otter population as well as for blanket bog.
Keen of Hamar	Vegetated calaminarian grassland area and dry heathland on serpentine bedrock and (base-rich) scree areas that support a unique community of plants including a number of rare northern species and one sub-species Edmondston's chickweed (*Cerastium nigrescens*) found only in Unst
Tingon	An extensive area of active blanket bog dominated by *sphagnum* bog moss in the hollows, undisturbed heather and hare's tail cotton grass. The area includes a large number of pools and lochans; it is also notable for peat mounds supporting vegetation more usually found on dry heaths
Ronas Hill, North Roe	Areas of active blanket bog on lower lying ground and alpine and sub-alpine heaths are present. Also peat mounds capped with a vegetation community more usually associated with dry heaths. Heathlands are generally dominated by heather and carpets of woolly hair moss (with several areas of juniper vegetation). Bog vegetation dominated by heather, hare's tail cotton grass and deer grass, with a well-developed understorey of mosses and liverworts. Pools and oligotrophic lochans provide breeding sites for red throated divers. Acid scree is also a designated feature of the site.

Site	Description
Mousa	The qualifying features of Mousa SAC include reefs and sea caves as well as common seal. Mousa is home to the largest single colony of breeding common seals within Shetland (about 600 breeding females) which represents about 2% of the total UK common seal population
Papa Stour	Exposed rocky coastline fringed by submerged bedrock and boulder reefs. Habitats include extensive kelp forests and deeper reefs dominated by invertebrates such as soft coral. Papa Stour has excellent examples of caves, tunnels and arches, with rich communities of algae and sponges
The Vadills	A complex lagoon system comprised of a number of shallow basins of varying salinity, separated by the sea by shallow rock, boulder or shingle narrows. The area supports a graduation of habitats and a high diversity of communities and species, including several species rare or unknown elsewhere in Shetland
East Mires and Lumbister	Active blanket bog
Yell Sound Coast	Nationally and internationally important population of breeding otters. It is estimated that the site supports at least 192 otters, representing about a quarter of the Shetland population. Common seal is also a qualifying feature of Yell Sound Coast SAC
Fair Isle	European dry heaths; vegetated sea cliffs of the Atlantic and Baltic coasts
North Fetlar	Alkaline fens; European dry heaths
Sullom Voe	Coastal lagoons; large shallow inlets and bays; reefs

The EU Birds Directive also requires steps to be taken to protect birds outwith designated sites. In particular, Article 4.4 requires Member States to strive to avoid pollution or deterioration of the habitat of species listed in Annex 1 of the Directive. The SEA should therefore consider the effects of the MIR on the habitat of Annex 1 species outwith designated sites. The following Annex 1 species nest in Shetland:

- Red-throated diver
- Whooper swan
- Red-necked phalarope
- Manx shearwater
- Merlin
- Common tern
- Storm petrel
- Peregrine
- Arctic tern
- Golden plover
- Leach's Petrel

Several other Annex 1 species occur as migrant or wintering birds.

Sites of Special Scientific Interest (SSSI)
These areas are protected under the Wildlife and Countryside Act (1981) as amended by the Nature Conservation (Scotland) Act 2004. Sites are designated due to the presence of important flora, fauna or geographical features. Shetland has 81 sites designated for the interests listed below in Table 3. Some sites are designated for several reasons.

Table 3 Summary of notified features for SSSIs in Shetland (Source SNH)

Geology (31 sites)	Intertidal Habitats (6 sites)
Geomorphology (7 sites)	Aquatic Flora (6 sites)
Montane habitats (1 site)	Rare Plants (5 sites)
Serpentine Vegetation (4 sites)	Seabirds (9 sites)
Other Heatherland (4 sites)	Wildfowl (3 sites)
Marsh and Meadow (4 sites)	Aquatic Fauna (3 sites)
Limestone and Grassland (1 site)	Mammals (3 sites)
Sand Dune Flora (2 sites)	Trees and Woodland (4 sites)

Ramsar Sites
Ramsar sites are designated under the Convention on Wetlands of International Importance, agreed in Ramsar, Iran, in 1971. Under the Convention wetland is defined as:

"areas of marsh, fen, peatland or water, whether natural or artificial, permanent or temporary, with water that is static or flowing, fresh, brackish or salt, including areas of marine water the depth of which at low tide does not exceed six metres. [wetlands] may incorporate riparian and coastal zones adjacent to the wetlands, and islands or bodies of marine water deeper than six metres at low tide lying within the wetlands"

One site in Shetland - Ronas Hill, North Roe and Tingon -was designated as a Ramsar site in August 1997. It is important primarily for its red-throated divers and the nationally rare Arctic water flea, *Eurycerus elacialis*.

National Nature Reserves (NNR)
NNRs are declared by the statutory country conservation agencies under the National Parks and Access to the Countryside Act 1949 and the Wildlife and Countryside Act 1981. They are managed to conserve their habitats or to provide special opportunities for scientific study of the habitats communities and species represented within them. Shetland has three NNRs:

- Hermaness
- Keen of Hamar
- Noss

Two of Britain's largest seabird colonies can be found at Noss and Hermaness. Rare plants can be found at the Keen of Hamar, one of which, Edmonston's chickweed, found only at one site in the world.

Marine Consultation Areas (MCA)
MCAs are designated due to the quality and sensitivity of the marine environment. There are four MCAs in Shetland and these are listed in Table 4.

Table 4 Marine Consultation Areas in Shetland

Site	Description
Brindister Voe and the Vadills	Brindister Voe includes communities representative of Shetland voes in general. The Vadills comprises the most complex and least disturbed lagoon system in Shetland, unique in the British Isles
Swinister Voe and the Houb of Fora Ness	Swinister Voe is included because of its rich lower shore fauna and flora. The Houb contains communities characteristic of shallow, submerged, extremely sheltered conditions. The gravel rapids community is probably the best such example in Shetland
The Houb, Fugla Ness	The site contains extensive areas of sediment shores, (unusual in Shetland), as well as more widespread boulder/shingle shores
Whiteness Voe	The bay at the head of the Voe is of high scientific interest because it contains the best-developed bed of eel grass in Shetland and because the rich sediments include both widely occurring and rare communities and species

Local Protection Areas (LPA)
These are sites designated by the Council as worthy of protection. Reasons can include scenic or historic value or presence of flora or fauna. It is the Council's policy to keep these areas free from development unless the development provides facilities that benefit the community as a whole.

RSPB Reserves
There are four RSPB reserves in Shetland, which are located at:

- Sumburgh Head (NGR: HU 407 079);
- Mousa (NGR: HU 460 241);
- Fetlar (NGR: HU 619 921); and
- Loch of Spiggie (NGR: HU 371 166).

Table C.5 below summarises the designated sites on Shetland. It should be noted that all NNRs and Ramsar sites and the terrestrial parts of most SPAs and SACs are also notified as SSSIs. The total land coverage of designated areas in Shetland is therefore only slightly greater than the area of SSSIs. There are also a number of marine areas designated as Marine SACs, or proposed as marine extensions to seabird SPAs, which amount to a total area of approximately 440km^2 of inshore waters.

Table 5 Designated Areas

Designation	Total Number	Area within Shetland (ha)	% of Total Area of Shetland
Site of Special Scientific Interest (SSSI)	81	20,138	12.2%
Special Areas of Conservation (SAC)	12	15,348	9.3%
Special Protection Areas (SPA)	12	15,157	9.2%
Ramsar	1	5,470	3.3%
Marine Consultation Areas	4	Info not available	Info not available
National Nature Reserve (NNR)	3	1,307	0.8%

Protected Species

It will be important to consider the effects of any proposals on European and nationally protected species in the area. European species are given a high level of protection under Council Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Fauna and Flora which is transposed into UK law by The Conservation (Natural Habitats &c) Regulations 1994. These species include otter and cetaceans, both of which occur on Shetland or its surrounding sea. Since 1980, eighteen species of cetacean have been recorded along the coast or in nearshore waters (within 60 km of the coast). Of these, eight species (29% of the UK cetacean fauna) are either present throughout the year or recorded annually as seasonal visitors, these include the humpback whale (*Megaptera novaeangliae*), minke whale (*Balaenoptera acutorostrata*), long-finned pilot whale (*Globicephala melas*), killer whale (*Orcinus orca),* risso's dolphin (*Grampus griseus),* white-beaked dolphin (*Lagenorhynchus albirostris*), atlantic white-sided dolphin (*Lagenorhynchus acutus)* and harbour porpoise (*Phocoena phocoena*). Disturbance to any of these species requires a license from the Scottish Government and demonstration that no reasonable alternative exists and that proposals would not affect the conservation status of the species.

A number of animal and plant species are protected under the Wildlife and Countryside Act 1981 as amended by the Nature Conservation (Scotland) Act 2004. Species protected under the Wildlife and Countryside Act 1981 which occur in Shetland are as follows:

Schedule 1 (breeding birds):

- Red-throated diver
- Black-tailed godwit
- Greenshank
- Merlin
- Peregrine
- Leach's petrel
- Red-necked phalarope
- Whooper swan
- Whimbrel

Schedule 5 (other animals):

- Cetaceans
- Otter
- Freshwater pearl mussel

Schedule 8 (plants):

- *Arenaria norvegicus* (Norwegian sandwort)
- *Hieracium attenuatifolium* (Weak-leaved hawkweed)
- *Hieracium northroense* (North Roe hawkweed)
- *Hieracium zetlandicum* (Shetland Hawkweed)

Although not all of these species occur across Shetland, some, such as otter have been recorded on a regular basis.

Priority Habitats and Species

The Nature Conservation (Scotland) Act 2004 places an obligation on all public bodies to further the conservation of biodiversity, particularly in respect of habitats and species listed in the SBS. The Scottish Biodiversity List is a list of flora, fauna and habitats considered by the Scottish Ministers to be of principal importance for biodiversity conservation. The list includes many species and habitats, both terrestrial and marine, which occur in Shetland.

As part of the Living Shetland *draft* Local Biodiversity Action Plan, priority habitats and species have been identified. Priority habitats include roadside verges, machair, herb-rich meadows, wet meadows and arable crops. In some cases, habitat action plans have been developed. Table C.6 lists the priority species for which specific action plans have been developed.

Table C.6 Species Action Plans in Shetland

List of Species Action Plans in Shetland	
Arable weeds	Bumblebees
Harbour porpoise	Oysterplant

Skylark	Arctic char
Breeding waders	Red necked phalarope
Merlin	Farmlands birds
Hawkweeds	Red-throated diver
Eider	

Source: Living Shetland: Action for Shetland's Biodiversity (2004)Shetland Local Biodiversity Action Plan

The presence of some species in Shetland is highly significant in a national context, for example 90% of the UK population of the red-necked phalarope is present in Shetland. Similarly, Shetland is home to approximately 90% of the UK's whimbrel population. Coastal cliffs provide important nesting sites for breeding seabirds. Shetland is home to one tenth of the total seabird population of Britain; in excess of one million birds from 22 species. The varied coastline of Shetland supports diverse habitats and species. Voes (inlets/sea lochs) provide shelter and muddy conditions exist at the heads of some of the longer voes, which are inhabited by species such as cockles and lugworms. In deep water, reefs are formed from large horse mussels. Sandeels, which are an important food source for Shetland's many seabirds, mammals, and commercial fish stocks are supported by finite offshore supplies of sand.

Population and Human Health

Background

Shetland's population has fallen by four percent over the last 25 years, an average of 35 people a year. The trend towards centralisation of the population towards Lerwick and within a 15 to 20 minute commute of Lerwick continues.

Around 41 percent of the population now lives in Lerwick. Since 1991, Shetland's population aged over 65 has risen by 31 percent and the progression of an ageing population looks set to continue, with the population of over 50s increasing by 1.9 percent in the last year[1].

Accessibility and Social Exclusion

A recent report[2] by SIC found that a section of the Shetland community, namely those without easy access to private car use, have difficulty in accessing certain services and opportunities. This affects peoples' opportunity to access employment, education, social events and to purchase healthy food at a reasonable cost. This is a particular problem for those in outlying communities or those with mobility problems.

Health and Healthy Lifestyles

[1] Shetland islands council (2003) *Shetland in Statistics (30th edition)*. ISBN 0 904562 40 9. Available at: http://www.shetland.gov.uk/council/documents/18170-Shet-in-Statistics.pdf
[2] Deprivation and Social Exclusion in Shetland, Shetland Islands Council, 2006

The following data (Tables 7, 8, & 9) provide an overview of the proportions of people who are in good and poor health. When viewing these figures, it is important to take into account that the population is declining and aging.

Table 7 Health Statistics for Shetland

Health Issues	Statistics for Shetland
Average age of a person with good health	59.58
Average age of a person with a limiting long term illness	32.29
Percentage of economically inactive people who are permanently sick/disabled	15.45
Percentage of households with one or more carers resident	15.45
General health - % Good % Fairly good % Not good	71.72 21.55 6.73
Percentage of population with a limiting long term illness	15.74
Percentage of population that does not have a limiting long term illness	84.26
Life Expectancy at birth (2002-4)	74.2

Source: Scottish Executive Statistics. http://www.scotland.gov.uk/Topics/Statistics/

Table 8 All Heart Diseases Standardised Mortality Rate Per 100,000 Population <75

Year	1995	1996	1997	1998	1999	2000	2001	2002	2003
Shetland	123.6	147.8	152.8	133.1	86.1	88.0	53.8	85.2	86.0

Source: Shetland Islands Council Health & Community Care Plan 2005 - 08

Table 9 Stroke/Cerebrovascular Standardised Mortality Rate Per 100,000 Population <75

Year	1995	1996	1997	1998	1999	2000	2001	2002	2003
Shetland	42.8	45.0	18.8	28.9	19.2	31.1	35.8	13.2	17.0

*Due to the small numbers the figures should be interpreted with caution
Source: Shetland Islands Council Health & Community Care Plan 2005 - 08

Employment

Table 10 shows the breakdown of male and female employment in Shetland by Industrial Group. It should be noted that Census of Employment figures only include employees. Sectors with high levels of self-employment such as agriculture and fishing are therefore often under-represented in the figures.

Table 10 Male and Female Employment in Shetland by Industrial Group (1993)

Standard Industrial Classification Grouping	Male %	Female %
Agriculture and Fishing	4%	1%
Energy and Water	13%	2%
Manufacturing	10%	7%
Construction	12%	8%
Distribution, Hotels and Restaurants	13%	26%
Transport & Communications	21%	4%
Banking, Finance and Insurance	14%	8%
Public admin, Education and Health	11%	39%
Other services	3%	5%

Source: Shetland Island Council (2003)

Soils and Geology

The majority of the rocks of Shetland are part of an old, deeply eroded mountain chain called the Caledonian Orogenic Belt which was raised up as a mountain block between 400 and 600 million years ago. This same mountain chain forms most of Norway, Scotland and Northern Ireland. In the south-eastern and western parts of Shetland, these rocks have been overlain by sedimentary rocks of old sandstone age. These rocks were laid down and folded during the Devonian era around 400 million years ago. Running north-south through Shetland are several tear faults where blocks of rock have been displaced by movements of the earth's crust. The principal fault of this type is the walls Boundary fault. This fault is thought to be the northern extension of the Great Glen fault found on mainland Scotland.

Metamorphic schist and gneiss extends from Fitful Head and the Clift Hills of south Mainland, through central Mainland and the coastal portion of north Mainland, east to the islands of Whalsay and Out Skerries and north to the island of Yell and the western parts of Fetlar and Unst. In central Mainland, the metamorphosed-siliceous sedimentary rocks are interspersed with bands of crystalline metamorphosed limestone which have been eroded to form a series of valleys. Superficial deposits of glacial drift, boulder clay and alluvium overlie bedrock in places, particularly on low lying areas, and the higher ground is commonly blanketed with peat. The eastern parts of Unst and Fetlar are characterised by serpentine and gabbro bedrock with a surface layer of shattered rock and glacial drift.

Much of the north Mainland, west of the Walls Boundary fault (from Ronas Hill and the North Roe plateau to the island of Muckle Roe), consists of red granite and other igneous rocks. These rocks are overlain with superficial deposits of peat, boulder clay and glacial drifts. The cliffs of Eshaness and

the island of Papa Stour are formed by lavas and tuffs (volcanic ash) of old red sandstone age. The West Mainland is characterised by folded sandstone of old red sandstone age, with granite in the extreme south. The area is overlain by peat and areas of boulder clay. The south eastern coastal strip of mainland (from Sumburgh Head northwards to Lerwick), and the adjacent islands of Bressay, Mousa and Noss are formed of gently inclined sandstones, flagstones and conglomerates of old red sandstone age. In places the sandstone is interbedded with limestone and mudstone. These rocks are overlain by significant areas of boulder clay and other glacial drifts. The outlying islands of Fair Isle and Foula are formed predominantly of sandstone.

Shetland has recently become a UNESCO European Geopark, using its exceptional geological heritage to promote sustainable development, particularly in the field of tourism and education. Shetland's earth heritage is therefore potentially of economic importance as well as academic interest. Inappropriate development can be damaging to earth heritage if it destroys or obscures geological features, however if development is appropriate and sympathetic to its surroundings it can also be beneficial in restoring those sites that have been damaged in the past [3].

Peat

The Soil Survey of Scotland 1:250000 Soil Map provides information on generic soil types for the islands and this, accompanied by local knowledge, could be used to identify areas where deep peat and overburden are likely to be encountered (and from a plan-making view-point these areas should be avoided). Applicants should consult this at an early stage of the design of their proposal.

Vegetation

Shetland's vegetation is dominated by peatland, heather moorland and Montane habitats. Improved rough grassland is concentrated along the coast, around the voes and in the valleys. The best agricultural land available in Shetland, improved grassland and good rough grassland, can be found in the valleys of the central Mainland; along the south and east coasts of the southern Mainland; in eastern regions of Unst and Fetlar; and along the Walls boundary fault. These are the areas of greatest agricultural production.

Shetland's flora is impoverished in comparison to that of mainland Britain. This is largely due to the climate and the islands' isolation. Shetland has the highest average humidity in Britain. This, combined with its salt-laden atmosphere, limits the botanical diversity and the scope for crop growing in the Islands.

Shetland is predominantly treeless. There is plantation woodland Kergord in the Weisdale valley and small patches of trees are scattered throughout Shetland in various sheltered locations. Although these are the most visible

[3] Shetland Islands Council (2001) *Report of Survey for The Shetland Structure Plan 2001-2016*

trees in Shetland, they are mainly non-native species. There is a large number of remaining native trees, particularly in the north, west and central Mainland which are of greater ecological importance. These are generally small and occur singly or occasionally in small groups, often in exposed situations, on cliff ledges, in ravines and on holms in lochs which are inaccessible to grazing animals[13].

Agricultural Land

In recent years there has been a decline in agricultural activity. As detailed in Table C.12, the total land used for tillage in Shetland was almost 437 hectares in 2001. This figure fell to 400 by 2003. Intensive sheep farming has increased its dominance of the agricultural economy, particularly over the past 30 years. Crofting comprises a small percentage of the farmed land on Shetland and is used mainly for rough grazing for sheep, although small scale crofting activities have been widely recognised as having an important role in the care and enhancement of the environment and wildlife habitats.

The amount of land suitable for agriculture in Shetland is limited and as such, fertilisation and reseeding of moorland has been used to increase agricultural productivity. The amount classed as improved or good grassland is also somewhat limited. Farmers have been encouraged to manage land in a more environmentally sensitive manner since Shetland was designated an Environmentally Sensitive Area (under the Agriculture Act 1986) in 1993[4].

Table 11 Agricultural Land Use in Shetland

Agricultural Land Use Practice	Hectares
Vegetables for human consumption	17.35
Other crops	2.31
Bare fallow	131.59
Total tillage	436.51
Grass under 5 years old	2,580.61
Arable	3,017.12
Total crops and grass	22,016.11
Sole right rough grazing	56,179.8

Source: Environmental Report: Strategic Environmental Assessment of the Shetland Regional Transport Strategy. Shetland Islands Council 2006

Water

Surface Water Quality

In order to support the aim of the Water Framework Directive (WFD) (that all water bodies are of good ecological status, or similar objective, by 2015) SEPA monitors water quality and classifies all rivers, lochs, transitional, coastal and groundwater bodies based on an ecological classification system with five quality classes. The classification system is underpinned

[4] Environmentally Sensitive Areas (Shetland Islands) Designation Order 1993

by a range of biological quality elements, supported by measurements of chemistry, hydrology (changes to levels and flows) and morphology (changes to the shape and function of water bodies)[5].

The River Basin Management Plan for the Scotland River Basin District and the draft Area Management Plans describe environmental objectives for each water body to protect and improve the water environment and a Programme of Measures to progress towards achieving these environmental objectives. Shetland is included in the Orkney and Shetland Area Management Plan and according to this the overall the assessment of the water environment on Shetland and Orkney shows that 82% (by number) of surface water bodies are at good or high status. The Orkney and Shetland Area Management Plan highlights that point source pollution from septic tanks and small treatment works is a specific issue for Shetland. Table C.12 shows water quality information along with the total length and number of watercourses in Shetland that have been classified under the WFD[6]. Water quality information is not readily available for all the watercourses in Shetland, only those above the size threshold necessary to be included in the WFD classification system. Those watercourses for which water quality information is available are shown in Table C.13[7].

Table 12: Summary of the current quality of surface waters in Shetland

	Total length/area (number of water bodies)	High status	Good status	Moderate status	Poor status	Bad status
Burns	108km (17)	0	69km (11)	33km (5)	6km (1)	0
Lochs	3580km^2 (65)	3279km^2 (29)	271km^2 (33)	30km^2 (3)	0	0
Estuary	3580km (65)	3279km (29)	271km (33)	30km (3)	0	0

Table 13 Water Quality Monitoring in Shetland

Surface Water Body Monitored	Classification
Burn of Mailand / Burn of Caldback	Good ecological Potential
Loch of Cliff	Good
Easter Burn of Bouster	Good
Burn of Roerwater	Poor
Burn of Arisdale	Good
Eela Water	Good
Burn of Laxobigging	Poor

[5] UK Technical Advisory Group on the Water Framework Directive (2007) Recommendations on Surface Water ClassificationSchemes for the purposes of the Water Framework Directive. Available at: http://www.wfduk.org/
[6] SEPA (2009) Orkney and Shetland Draft Area Management Plan 2009–2015
[7] SEPA Water Quality Classification (2008 Data) Interactive Map

Surface Water Body Monitored	Classification
Laxo Burn / Gossawater Burn	Good
Burn of Grunnafirth / Burn of Forse	Good
Stromfirth Burn	Good
Burn of Weisdale	Moderate
South Burn of Burrafirth	Good
Loch of Vaara	Good
Loch of Girlsta	Good
Gibbie Law s Burn	Good
Burn of Strand / Burn of Griesta	Good
Burn of Dale	Good
Burn of Laxdale / Burn of Voxter	Good
Loch of Spiggie	Poor
Burn of Hillwell - u/s Loch of Spiggie	Good

The Public Water Supply

The public water supply is extracted from 24 lochs and burns (See Table 14) and piped to one of 21 treatment works. In addition, seven water supply zones have a total of 17 service reservoirs. Table C.15 gives details of the treatment works and their use.

Table 14 Water Sources in Shetland

Water Bodies Used as Sources	Water Available per Day (M lpd)*	Associated Water Treatment Works
Arthur's Loch	0.10	West Burrafirth
Bu Water	0.20	Whalsay
Burn of Channerwick	0.30	Sandwick
Burn of Geosetter	0.10	Bigton
Burn of Greystanes	0.20	Sandwick
Burn of Laxdale	0.20	Cunningsburgh
Eela Water	2.50	Sullom Voe II
Gorda Water	0.20	Papa Stour
Helliers Water	0.50	Unst
Laxo Burn	0.60	Mid Yell
Loch of Brindister	1.20	Lerwick
Loch of Brough	0.70	Bressay
Loch of Brough	0.50	Cullivoe
Loch of Brow	0.40	Sumburgh
Loch of Huesbreck	0.50	Sumburgh
Loch of Huxter	1.50	Whalsay
Loch of Kettlester	1.22	South Yell
Loch of Watlee	1.00	Unst
Roer Water	4.55	Sullom Voe II
Sandy Loch	6.20	Lerwick
Skerries Reservoir	0.03	Skerries
Skutes Water	0.70	Fetlar
Springs Burn	0.06	Foula

Water Bodies Used as Sources	Water Available per Day (M lpd)*	Associated Water Treatment Works
Vaadal Burn	0.06	Fair Isle

M lpd - million litres per day
Source: Report of Survey for The Shetland Structure Plan 2001-2016

Table 15 Water Treatment and Usage in Shetland

Water Treatment Works	Population Served	Average Water Consumption (M lpd)	Average Daily Demand as % of Capacity
Bigton	170	0.06	60
Bressay	330	0.10	67
Cullivoe	260	0.06	60
Cunningsburgh	450	0.13	87
Fair Isle	70	0.02	33
Fetlar	100	0.04	40
Foula	50	0.01	20
Lerwick	9,000	5.32	78
Mid Yell	550	0.25	50
Papa Stour	40	0.05	100
Sandness*	150	0.04	80
Sandwick	840	0.24	48
Skeld and Reawick*	400	0.10	50
Skerries	90	0.02	67
South Yell	300	0.10	83
Sullom Voe II	3,600	3.30	55
Sumburgh	1,500	0.47	78
Unst	1,000	0.46	92
Walls*	400	0.12	80
West Burrafirth	30	0.02	67
Whalsay	1,020	0.27	54

* These works will be abandoned when the West Mainland Water Scheme is completed.
Source: Report of Survey for the Shetland Structure Plan 2001-2016

Flooding and Surface Run-Off

The most common cause of historical flooding events in Shetland has been inundation by the sea. However, the trend has shifted in recent times and heavy rainfall is now the cause of the majority of incidents. Burns in Shetland tend to be short and steep, which can increase flood risk during heavy rainfalls. This is likely to be exacerbated by climate change in the future, as predictions for Shetland are for extended periods of drought followed with more severe bursts of rain[8].

[8] Shetland Islands Council (2007) 6th Biennial Flooding Report from Shetland Islands Council to The Scottish Government. Available at: http://www.shetland.gov.uk/developmentplans/Information.asp

The Development Plans Service at SIC is carrying out a survey of watercourses that are likely to be affected by future development. From this, the capacity of watercourses to carry surface water discharge from developments will be determined. The survey work undertaken so far has targeted areas under the greatest development pressure to enable Shetland Islands Council to determine the likelihood of a flood threat or risk.

Vulnerability to the Effects of Climate Change

Although the relative significance of rainfall-related flooding events has increased, coastal-related flooding is still a highly significant issue and again, climate change is predicted to cause further problems. Shetland is thought to be sinking at a rate of approximately 2 to 3 millimeters (mm) per year and sea level rise over the next century has been predicted to be between 0.5 and 1m. Even at present, storm hazard on Shetland is potentially greater than anywhere else in the UK and maximum wave heights around Shetland have been rising in recent decades. In addition, increases in the frequency and severity of storms are predicted, with coastal water extreme levels forecasted to become 5 to 10 times more likely by the 2050. The combination of the above factors will extend the inward limit of storm driven water and whilst this is not a problem for many areas of Shetland's rocky coastlines, voe heads could be significantly affected due to the funneling of storm surges.

The River and Coastal Flood Map (Scotland) indicates that the main risk of flooding in Shetland is coastal[9]. Existing coastal defences will need to be replaced or modified to adapt to the effects of climate change. A study entitled Climate Change: Flooding Occurrences Review found that within the next century, the effects of climate change could make most of Scotland's coasts below the 5 metre contour more vulnerable to flood risk[10]. Erosion of beaches from rising sea levels and increased wave action is a current problem which is predicted to become more significant in coming years. Offshore sediment supplies are finite and the potential for natural recharging of these beaches is therefore limited. Human activity such as provision of coastal defences and other physical structures can cause additional erosion[11].

Fishing and Aquaculture Industries

In 2003, a total of 31,659,776 tonnes of wet fish was landed in Shetland. The seas around Shetland are spawning and nursery areas for Norway pout, lemon sole, haddock, herring, sandeel and whiting. The fishing industry is supported by the following species:

- pelagic fishery – mackerel, herring, blue whiting;

[9] SEPA (Web Resource) River and Coastal Flood Map (Scotland) Available to view at: http://www.multimap.com/clients/places.cgi?client=sepa
[10] Werrity et. al. (2002) *Climate Change: Flooding Occurrences Review* Scottish Executive Central Research Unit
[11] ZETtrans (2006) *Environmental Report: Strategic Environmental Assessment of the Shetland Regional Transport Strategy.*

- white fishery – haddock, cod, anglerfish, nephrops; and
- inshore fishery – scallops, crabs, lobsters, nephrops.

Fish farms occupy many of the suitable voes and produce salmon, sea-trout, char, halibut, cod and shellfish. Mussels are the most commonly farmed seafood in the voes. Membership of the Shetland Salmon Farmers' Association, in 2002/2003 (the most recent figures published), stood at 46 salmon farms and six smolt hatcheries. This represents 100 per cent of production in Shetland equating to a total of 59,295 tonnes of gutted fish[12].

The European Community Shellfish Waters Directive 79/923/EEC, was adopted in 1979 to protect and, where necessary, improve the quality of waters where shellfish grow and to contribute to the high quality of directly edible shellfish products. In response to the requirements of the Shellfish Waters Directive SEPA has developed Pollution Reduction Plans for designated shellfish waters in Scotland. The location of Designated Shellfish Waters in Shetland is shown in Table 16.

Table 16: Designated Shellfish Waters in Shetland and their Location

Site Name	Location Information
Basta Voe, Yell	An area west of line drawn between (HU) 454887, 1194881 (Basta Ness) and (HU) 453684, 1193861 and extending to MHWS. This designation supersedes existing SWD site at Yell.
Busta Voe, Linga Voe and Olna Firth	An area north of a line drawn between HU 335 632 (Pobies Geo) and HU 368 632 and extending to MLWS.
Clift sound	An area bounded by a line drawn between (HU) 439111, 1134807 to (HU) 440068, 1134793, and a line from (HU) 438081, 1131274 to (HU) 439096, 1131197, extending to MHWS.
Colla Firth	An area south of a line drawn between HU 444 700 and HU 451 700 and extending to MLWS.
Gruting Voe	An area north of a line drawn between HU 256 474 (heock Ness) and HU 261 471 extending to MLWS but excluding Olas Voe.
Ronas Voe	An area to the east of a line drawn between HU 310 811 and HU 320 806 and extending to MLWS.
Ura Firth	An area inshore of a line drawn between HU 292 777 and HU 294 763 (Fissla Taing) and extending to MLWS.

[12] Shetland Aquaculture (2009*) Statistics: Production Figures.* Available at: http://www.shetlandaquaculture.com/production-figures

Vaila Sound, Shetland	An area inshore of a line drawn between the ponts HU 236 470 and HU 246 470 and between HU 225 472 and HU 223 474
Voe of Clousta	An area bounded by a line drawn between HU 305 600 and HU 306 600 and between HU 290 588 (Green Point) and HU 290 582
Whale Firth	An area south of a line drawn between HU 464 960 and HU 468 960.

Marine Pollution

Marine pollution arises from various different sources including domestic sewage, industrial waste, naturally occurring nutrients and ballast discharged offshore by oil tankers. Other forms of pollution are those caused by noise and light; these are especially relevant in terms of aquaculture. Eutrophication, the enrichment of water, is the consequence of high levels of pollution from too many sewage outfalls and badly positioned septic tanks[13].

Air Quality

Background

The Air Quality Strategy provides a framework for air quality control through air quality management and air quality standards. These and other air quality standards and their objectives have been enacted in Scotland through the Air Quality (Scotland) Regulations 1997, as amended, most recently in 2002. The Environment Act 1995 requires Local Authorities to undertake air quality reviews.

In areas where an air quality objective is not anticipated to be met, Local Authorities are required to establish Air Quality Management Areas (AQMA) and to develop and implement Air Quality Action Plans that detail the measures to be taken to work towards reducing pollution levels to below the objective targets.

The main industrial area on the islands is the Gremista and Green Head Industrial Estate to the north of Lerwick. There is a high concentration of regulated activity in this area including a landfill site, energy recovery plant and an oil-fired power station. The Sullom Voe oil terminal handles around 25 million tonnes of oil each year and also contains a power station that supplies some of the islands electricity. Other industrial processes include quarrying, mineral processes and fish processing activities.

Air Quality Management in Shetland

The 1995 report, 'Review and Assessment of Air Quality in Shetland'[13], presents air quality monitoring results and information on possible pollutant sources for Shetland. The second round of the review and assessment process was completed in 2003. The report concluded that there was no risk of exceedance of any of the relevant objectives in the assessment years. Consequently, no Air Quality Management Areas (AQMAs) were declared and no Air Quality Management Plans (AQMPs) are in place. There are no existing air quality constraints or significant areas of pollution in Shetland.

The LAQM Progress Report (2007) provides an update on pollutant monitoring data and information on industrial, transport, commercial and domestic atmospheric emissions. The report notes that a recent assessment of atmospheric emissions from the Lerwick Power Station predicted exceedences of the NO_2 1-hour mean objective in areas around the power station. The report concludes that there are no predicted exceedences of other NAQS objectives in Shetland.

Climatic Factors

Under the Kyoto Protocol the UK Government is committed to reducing greenhouse gas emissions by 12.5% below 1990 levels. The UK Government also set a more ambitious domestic target of reducing CO_2 emissions by 20% below 1990 levels by 2010. The Climate Change (Scotland) Act 2009 received Royal Assent on August 5, 2009 and has introduced a statutory target to reduce Scotland's greenhouse gas emissions by at least 80 per cent by 2050.

The Climate Change (Scotland) Act 2009 sets an interim target that the net Scottish CO_2 emissions account for the year 2020 is at least 42% lower than the baseline. In order to achieve this annual targets resulting in a year on year reduction of emissions must be set by Scottish Ministers.

The SIC Corporate Plan sets a target of reducing Shetland's CO_2 emissions by 30% by 2020. The SIC Sustainable Development Implementation Plan contains actions to ensure implementation on SIC's Climate Declaration.

The SNIFFER 2006 publication *'A handbook of climate trends across Scotland'*[14] presents the changes in climate across Scotland in the last century and provides a benchmark against which to measure future climate change.

Table 17 presents a summary of the findings contained within the SNIFFER 2006 report relevant to the North region, of which Shetland is part. More detailed technical analysis of the changes in climate across Scotland can

13 Shetland Islands Council Environment and Transportation Department – Operations Division (2007) *'Air Quality in Shetland – Review and Assessment'*

14 Barnett, C., J. Hossell, M. Perry, C. Procter and G. Hughes (2006) *A handbook of climate trends across Scotland.* SNIFFER project CC03, Scotland & Northern Ireland Forum for Environmental Research, 62pp.

be found by referring to the SNIFFER publication *'Patterns of Climate Change across Scotland: Technical Report'*[15].

Table 17 Summary of Climate Change Trends Within the Shetland Region

Variable	Change by season	Trend for North Region[16]	Expected future trend (from UKCIP02 scenarios)
↑ upward trend ↓ downward trend			
Annual Average Temperature	Annual	↑	Possible increase in all seasons, greater in south than north. This matches the trends already seen.
24-hour minimum temperature	Annual	↑	Maximum temperatures may increase in all seasons. The range of possible increases is smallest in winter and greatest in autumn. This matches the trends that have already been seen.
24-hour minimum temperature	Annual	↑	The minimum temperature may increase more in winter than summer. This generally matches the trends already seen.
Daily temperature range	Annual	↑	This range may increase most in summer. No trend has been found in the information available for summer, but some regions are showing an increasing trend in other seasons.
Heating degree days	Annual	↓	This may reduce in the future, which is in line with the trend already seen, but the possible reduction by the 2080s is 50% to 300% greater than that experienced so far.
Length of the growing season	Annual	↑	A possible increase in the length of the growing season of 20 to 60 days by the 2080s. A similar trend has already been seen but the spatial pattern is different.
Growing	Start	↓	Estimates for the start of the

[15] Barnett, C., J. Hossel, M. Perry, C. Procter and G. Hughes (2006) *Patterns of Climate Change across Scotland: Technical Report.* SNIFFER Project CC03, Scotland & Northern Ireland Forum for Environmental Research, 102pp.
[16] Note that the Eastern Region extends into Aberdeenshire

Variable	Change by season	Trend for North Region[16]	Expected future trend (from UKCIP02 scenarios)
↑ upward trend ↓ downward trend			
season start and end dates	End	↑	growing season are similar to those that have already been seen, but suggest a later end to the growing season than has been seen to date.
Average precipitation total	Annual	↑	Winter months may become wetter while summer months may be drier than at present. The spatial pattern of change expected is the opposite of the trend that has already been seen.
Snow cover	Annual	↓	The UKCIP02 scenarios present a different measure but winter snowfall may reduce by 50% or more across Scotland by the 2080s Medium/High scenario. The spatial pattern of possible change is again different from the trend already seen.
Average rainfall intensity	Annual	No trend detectable	The intensity of rainfall may increase in winter months. A contrasting change between the east and west is expected, with most extreme changes taking place in eastern Scotland.

Material Assets

Background

Scotland's Sustainable Development Strategy highlights that current lifestyle patterns are unsustainable, and discusses their global significance. It also sets out a number of priorities to help reduce the "global footprint". A major challenge is to move towards more sustainable consumption and production. This will include reducing inefficient use of resources; looking at the impact of products and materials across their whole life-cycle and encouraging people to think about the social and environmental consequences of their purchasing choices.

Minerals

Table 18 shows that Shetland is a net exporter of aggregates, most of which are high quality roadstone chippings extracted from Brindister quarry. Imports are predominantly sand and are likely to continue. The Scottish Government has agreed to a ban on subtidal aggregate extraction (hydraulic dredging) around Shetland to protect shellfish beds and prevent

damage to Shetland's marine environment. Near Quendale, some commercial sand extraction occurs but the possible exacerbation of coastal erosion limits the potential for further extraction.

Table 18: Aggregate/Mineral Imports and Exports (tonnes)

Year	Imports	Exports
1996	6,875	13,623
1997	9,789	29,814
1998	8,757	33,476
1999	3,924	22,467

Source: Report of Survey for The Shetland Structure Plan 2001-2016

The only commercial talc quarry currently operates at Cross Geo on Unst. Talc deposits, with potential for extraction, are located on Fetlar and Unst and near Cunningsburgh. Shetland produced 12,000 tonnes of talc in 1986, almost all of it from Unst; this represented over 99% of total UK production. Talc production increased until 1990 but has since fallen and is likely to remain at approximately 5,500 tonnes per annum over the coming years.

A survey carried out in 1996 by the council into potential sources of flagstones in Shetland identified a number of locations that may have the potential to be quarried for local use.

There has been copper mining at Sandwick and Quendale in the past. Chromite was quarried around Baltasound during the 19th century. Iron ores are associated with copper ores at Sandwick and Levenwick. Magnetite was mined at Sullom during the 1950s. In the 1970s some interest was shown in exploiting copper in the Vidlin area, but no development followed. Non-commercial deposits of other minerals (e.g. baryte and kaolin) occur in Shetland. Surveys have suggested that gold could potentially be exploited in parts of the Mainland and Unst[9].

Waste Management

There are limitations to imposing waste minimisation and use of recycled resources given Shetland's remote location and relatively small community. Currently the majority of waste is sent to landfill on a single landfill site to the north of Lerwick. Not all sustainable measures used for waste management on mainland Scotland are suitable for Shetland (Any materials for recycling have to be transported by vehicle to a central collection point in Shetland and then onwards by sea for 250 miles to Aberdeen. A final road journey is then required to the factory of destination. As can be envisaged the costs of such a journey both actually and in environmental terms are high) and have caused some problems in the past in terms of monitoring.

Cultural Heritage

Background

Shetland possesses a rich heritage and is home to many sites of historical value including Viking settlements, brochs, standing stones, ancient crofts and ruined chapels. These are all important contributors to Shetland's strong and unique cultural identity. A number of areas and features have been designated due to their historical importance.

Designated Areas

Scheduled Monuments

Scheduled monuments are given legal protection under the Ancient Monuments and Archaeological Areas Act 1979 as they are considered to be of national importance. Shetland currently has 365 scheduled ancient monuments which fall under the categories shown in Table C.19. The location of Scheduled Monuments on Shetland is shown in Figure D.2.

Table 19 Scheduled Ancient Monuments in Shetland

Classification	Number of Sites in Shetland
Prehistoric: ritual and funerary	95
Prehistoric: domestic and defensive	205
Crosses and carved stones	2
Secular	41
Ecclesiastical	22
Industrial	12
20th Century Military and Related	1

Source: Historic Scotland

Conservation Areas

A Conservation Area is 'an area of special architectural or historic interest, the character and appearance of which it is desirable to preserve or enhance' (Planning (Listed Buildings and Conservation Areas) Act 1990). There are three Conservation Areas in Shetland, two in Lerwick and one in Scalloway.

Listed Buildings

Buildings are listed by Historic Scotland for their special architectural or historic interest. They are assigned to one of three categories depending on relative importance:

- **Category A** - Of national or international importance either historic or architectural, or fine little-altered examples of a particular period, style or building type;

- **Category B** - Of regional or more than local importance, or major examples of a particular period, style or building type which may have been altered; and

- **Category C** - Of local importance, lesser examples of any period, style or building type, as originally constructed or altered; and simple, traditional buildings grouped well with other in categories A and B or part of a planned group such as an estate or industrial complex.

The current (2012) number of listed buildings in the Shetland Islands is 343, in the following categories:

- Category A: 13
- Category B: 173
- Category C: 157

Table 20 indicates the number and grading of listed buildings in each Shetland district.

Table 20 Listed Buildings in Shetland

Location	Cat A	Cat B	Cat C	Total
Bressay	1	10	3	**14**
Delting	0	10	4	**14**
Dunrossness	2	19	8	**29**
Fetlar	1	2	4	**7**
Lerwick	2	57	46	**105**
Lerwick Landward	0	1	1	**2**
Nesting	0	14	8	**22**
Northmavine	0	10	8	**18**
Sandsting & Aithsting	1	7	6	**14**
Tingwall	2	10	29	**41**
Unst	3	10	12	**25**
Walls & Sandness	0	13	10	**23**
Yell	1	10	18	**29**

Source: Planning Service, Shetland Islands Council 2012

Shetland Sites and Monuments Record

In addition to designated areas and buildings, the Shetland Amenity Trust maintains the Sites and Monuments Record. This holds records of all known sites, ranging from pre-historic to the Cold War. There are currently 7,229 recorded sites and these are detailed in Table 21below.

Table 21 Shetland Sites and Monuments Record

Classification	Number of Sites in Shetland
Broch / possible broch	141
Chambered cairns	118
Souterrains	26

Classification	Number of Sites in Shetland
Fishing stations	32
Burnt mounds	340
Viking / Norse houses	52
Military remains	436
Wheelhouses	7

Source: Environmental Report: Strategic Environmental Assessment of the Shetland Regional Transport Strategy. Shetland Islands Council. 2006

Locally Important Archaeological Sites

In addition to the protected sites listed above, there is also the potential for development related activities to affect Shetland's many archaeological sites. Shetland's rich archaeological heritage includes Viking sites, standing stones, ancient crofts and ruined chapels. Whilst many sites are identified within the Sites and Monuments Record, there is the potential for unknown archaeological sites to be affected.

Designated Wrecks

There are two protected wrecks in Shetland waters which have been designated due to their importance in terms historical and archaeological value. These have exclusion zones surrounding the wrecks, within which it is an offence, without a licence, to tamper with, damage or remove any objects or part of the vessel or to carry out any diving or salvage operation. The wrecks are the Wrangles Palais, which sank in 1687 (100m exclusion zone) and the Kennemerland, which sank in 1664 (250m exclusion zone)[5].

Gardens and Designed Landscapes

There are four sites designated as Gardens and Designed Landscapes from the Inventory of Gardens and Designed Landscapes in Scotland can be found in the Shetland Islands[17]. They are;

- Belmont House (NGR: HP 563 009);
- Brough Lodge(NGR: HU 579 926);
- Lunna House (NGR: HU 486 691); and
- Gardie House (NGR: HU 487 421).

Landscape

Landscape Character

SNH, in conjunction with partner councils, has undertaken detailed review and classification of the various landscape areas and types in Scotland. The Shetland landscape character assessment[18], identifies seven primary landscape types which are further subdivided into detailed landscape character areas. Inland landscapes are characterised by rolling hills, heather and rough grassland with historic buildings and features. Historic

[17] Historic Scotland (2009) *PASTMAP*. Available at:www.pastmap.org.uk
[18] Gillespies (1998) A Landscape Assessment of The Shetland Isles. Scottish Natural Heritage, Review No 93

land use practices, particularly crofting and peat cutting, have helped to create the diverse landscapes. These landscape types are listed below:

- Coastal edge
- Farmed and settled lowlands and coast
- Farmed and settled voes and sounds
- Inland valleys
- Major uplands
- Peatland and moorland
- Undulating moorland with lochs

Designated Areas

National Scenic Areas (NSA)
These are areas of exceptional scenic value and comprise some of the best examples of Scotland's landscapes. Presently NSAs are primarily regulated through planning controls. National Scenic Areas are regulated through the Town and Country Planning (Scotland) Act 1997. One NSA in Shetland covers seven of Shetland's finest sections of coastline[19]. The locations of the seven zones are listed below:

- Hermaness (including Muckle Flugga and the western slopes of Saxa Vord);
- Fethaland (broad coastal strip from Uyea to Burravoe in Northmavine);
- Eshaness (including Hillswick Ness and the intervening coastline);
- Muckle Roe (western half of the island);
- Foula;
- Fair Isle; and
- South West Mainland (from Fitful Head to Weisdale Voe and Skeld and including Burra, Trondra and the islands to the north).

Tree Preservation Orders (TPO)
Under the Town and Country Planning (Scotland) Act 1997, SIC must be given prior notification of intended works to protected trees. It is an offence to chop down, top, lop or wilfully destroy trees protected by a TPO without consent. There are 4 TPOs in Shetland.

The Shetland Islands Council, Westerloch, Lerwick, Tree Preservation Order No. 1, 1997

The Shetland Islands Council, Montfield, Lerwick, Tree Preservation Order No. 1, 2001

The Shetland Islands Council, Sycamore Avenue and Ingaville House, Scalloway, Tree Preservation Order, 2006

The Shetland Islands Council, Smiddy Closs, Scalloway, Tree Preservation Order, 2010

Local Protection Areas

[19] Scottish Natural Heritage (2009) *SNH Information service. http://www.snh.org.uk/snhi/*

These areas are detailed in the Section above in relation to biodiversity. LPAs may also be designated by Shetland Islands Council for their landscape value.