

Strategic Environmental Assessment of the Orkney Local Development Plan

Appendix B – Environmental Baseline Report

To enable the current state of environment features of Orkney to be assessed, a search has been carried out of a range of baseline data which are relevant to the SEA issues considered in this Environmental Report. A summary is produced in this section which provides a brief description of the key environmental characteristics of Orkney. This allows any existing problems to be identified and provides the benchmark against which the forecast and monitored levels of environmental effects will be evaluated. The following features of the environment are examined:

1. Climatic effects
2. Biodiversity, fauna and flora
3. Water
4. Soil
5. Geology
6. Landscape
7. Cultural heritage
8. Population and human health
9. Material assets

This report provides a baseline under each of these features, together with the relevant Strategic Environmental Assessment objectives which have been identified as criteria against which to assess the possible environmental effects of the Orkney Local Development Plan.

Baseline Overview of Orkney

Number of islands:	70+
Number of inhabited islands:	19
Total (land) area of the Orkney Islands:	990 km ²
Total length of coastline:	over 980 km
Dimensions:	Approximately 85 km north to south and 37 km east to west
Outlying Island with highest population:	Westray
Smallest permanently inhabited island:	Papa Stronsay
Longitude: (Kirkwall)	3° W
Latitude: (Kirkwall)	59°N
Population of Orkney ¹	21,585 (mid-year estimate 30 June 2014)

¹ General Register Office for Scotland

Environmental Baseline, Issues and Objectives by Topic

1 Climatic factors

SEA Objectives
Reduce Scottish greenhouse gas emissions, in line with Government targets.
Support patterns of development which provide safe and convenient opportunities for walking and cycling and facilitate travel by public transport.
Reduce the need to travel.
Reduce the need to use energy.
Increase the use of sustainable techniques in development.
Support the transformational change to a low carbon economy, consistent with national objectives and targets
Promote a precautionary approach to flood risk from all sources.
Address vulnerability in the County to the likely effects of climate change.

1.1 The Enhanced Greenhouse Effect

It is widely accepted that the increasing levels of certain gases in the atmosphere are causing significant changes to global climates by reducing the rate of radiative heat loss from the atmosphere, in turn allowing temperatures around the world to rise. This is generally described as the enhanced greenhouse effect.

The United Nations Convention on Climate Change was established in 1992 as an international framework to agree strategies to reduce emissions of greenhouse gases. The Kyoto Protocol agreement subsequently established a timetable for reducing emissions as well as a framework for the sequestration of carbon by vegetation.

The Climate Change (Scotland) Act 2009 sets a long-term target to reduce Scotland's emissions of greenhouse gas emissions by at least 80% by 2050, as well as an interim target of at least 42% by 2020 and a framework of annual targets intended to drive the policies necessary for achieving the long-term target.

Six gases are considered to contribute towards the greenhouse effect and, of these, carbon dioxide (CO₂) is the most abundant in the earth's atmosphere. Carbon dioxide estimates are monitored on an annual basis and data supporting CO₂ emissions within the scope of influence of Local Authorities are reported for each local authority area in the United Kingdom. Orkney's annual CO₂ emissions for the period 2005 to 2012 are set out in **Table 1.1** below.

Table 1.1 Local Authority CO₂ estimates for Orkney 2005-2012 ²

Year	Industry & commercial	Domestic	Transport	Total	Population (000s mid-year estimate)	tonnes CO ₂ per person
	kt CO ₂					
2005	76.7	76.0	33.8	186.5	20.1	9.3
2006	76.9	80.0	35.1	192.0	20.3	9.4
2007	77.7	78.5	36.0	192.2	20.6	9.3
2008	73.0	79.7	34.6	187.3	20.7	9.0
2009	69.1	73.0	33.4	175.5	20.9	8.4
2010	79.2	78.9	33.9	192.0	21.2	9.0
2011	72.5	71.1	33.0	176.5	21.4	8.2
2012	73.8	75.7	32.2	181.7	21.5	8.4
Scotland total 2012	14,418.6	13,192.2	8,297.7	35,908.5	5,313.6	6.8

Table 1.1 indicates that although there have been minor increases in some years, most notably in 2010, emissions figures for Orkney over this period show an overall decrease from 9.3 to 8.4 tonnes per person.

Domestic emissions are broadly similar to those from industry and commerce and together these sectors account for over 80% of all emissions annually. Orkney's relatively cool climate means space heating is a requirement for most months of the year; a breakdown of the types of central heating systems used here is provided in Table 1.2, along with comparable data for Shetland, the Western Isles and Scotland as a whole.

Table 1.2: Type of central heating by council area, Scotland 2011 ³

	Gas	Electric	Oil	Solid fuel	Other	Multiple types of central heating	No central heating
Scotland	74.2	13.4	5.7	1.1	0.7	2.6	2.3
Orkney	0.5	41.1	36.0	6.3	3.3	7.5	5.3
Shetland	0.6	48.3	27.9	3.2	10.0	5.8	4.1
Western Isles	12.4	25.9	39.7	8.0	1.3	9.9	2.7

With no access to a public gas supply, which would be a lower carbon option, oil and electricity are the main energy sources for central heating in the island areas. In recent years there has been a significant level of renewable energy development in Orkney and during the financial year 2013/14 the county produced more electricity from renewable sources than it consumed.

² Ricardo-AEA May 2014 Local and Regional CO₂ Emissions Estimates for 2005-2012 (Ricardo-AEA/R/3374)

³ Scotland's Census 2011 <http://www.scotlandscensus.gov.uk/r2-downloadable-files>

This has been matched by a shift towards using electricity as an energy source, to make use of locally-produced renewable energy. However, the emissions calculations for electricity usage in the islands fail to take account of this and remain relatively high, as they reflect the significant proportion of electricity that is produced by coal-fired power stations on the UK mainland.

Transport also represents a significant source of emissions, a major factor being the islands' dispersed settlement pattern, which means that the private car is an important form of transport, along with the ferries and internal air service which link the outer isles with the Orkney mainland. Data derived from Scotland's Census 2011 and presented in **Table 1.3** compares population density and car or van ownership figures for Orkney, Shetland and the Western Isles with those on mainland Scotland and finds that the figures for all three island authorities are broadly similar.

Table 1.3: Average number of cars or vans per household by population density by council area, Scotland 2011⁴

	Population density (persons per km ²)	Average no. of cars or vans per household
Scotland	0.7	1.0
Orkney	0.2	1.3
Shetland	0.2	1.3
Western Isles	0.1	1.2

Orkney Islands Council encourages the use of public transport by subsidising a number of bus services in the county. **Table 1.4** illustrates a steady increase in passenger numbers on these services during recent years. It should be noted that this data does not include the main X1 bus service covering the Stromness – Kirkwall – St Margaret's Hope route as it is operated as a fully commercial service.

Table 1.4: Total passenger numbers for subsidised bus services in Orkney⁵

	2010	2011	2012	2013
Passenger numbers on subsidised bus services	77,888	89,043	96,820	110,617

Interest in electric vehicles is also increasing locally and in 2014 the Orkney Renewable Energy Forum established a *My Electric Avenue* project in Orkney which was funded by Ofgem, the industry regulator. The project sought to establish clusters of 10 or more people living in the same area, who would each trial a new all-electric Nissan LEAF five-door family hatchback for between £100 and £120 a month for 18 months. The *My Electric Avenue* initiative runs across the Scottish and Southern Energy network area and is a study into the impact of electric

⁴ <http://www.scotlandscensus.gov.uk/documents/censusresults/release2a/rel2asbfigure21.pdf>

⁵ Transport Service, Orkney Islands Council 2014

vehicles on the local grid. By 31st March 2014 eight new Nissan Leaf cars had been leased under this scheme. Orkney Islands Council currently has six electric vehicles – a car, a pickup and four vans. Funding has been secured to introduce an electric bus during 2015 which will operate on the airport route.

1.2 Renewable energy development

On-shore wind energy

Orkney is widely acknowledged as having some of the best renewable energy resources in the world, from wind, wave and tidal sources and, in the early years of on-shore wind energy development, Burgar Hill in Evie became an important location for the testing of prototype wind turbines. In recent years the onshore wind energy industry has progressed and developed throughout the UK and wind energy now makes a significant contribution to the National Electricity Grid.

Within Orkney a number of large-scale wind turbines are operational and further proposals are at earlier stages in development. In addition, approximately 790 applications have now been approved for the installation of smaller scale turbines, i.e. 5kw to 50kw capacity. Whilst a number of these have yet to be developed, further proposals are currently in the planning system.

The current situation with regard to on-shore wind energy development of over 500kw in Orkney is detailed in **Table 1.5** below.

Table 1.5: Operational grid-connected wind turbines in Orkney December 2012 (0.5MW and over)⁶

Location	No. of Turbines	Capacity (MW)
Burgar Hill	7	15.05
Sanday	4	8.00
Stronsay	3	2.70
Burray	1	0.90
Dounby	1	0.85
Gallo Hill, Westray	1	0.90
Flotta	1	2.00
Hammars Hill	5	4.50
Crowness	1	0.9
Shapinsay	1	0.9
Rousay	1	0.9
Deerness	1	0.9
Eday	1	0.9
Hoy	1	0.9
Totals	29	40.3

⁶ Orkney Islands Council Development Management Service

Marine renewable energy

Orkney is at the forefront of the UK's rapidly developing marine renewable energy industry and is the location for the European Marine Energy Centre. Established in 2003 EMEC provides the world's only multi-berth, purpose-built, open sea test facilities for wave and tidal marine energy converters. EMEC's operations are spread over three sites:

- Wave test sites at Billia Croo, off the west coast of Mainland and in Scapa Flow;
- A tidal test site in the Fall of Warness off the island of Eday and in Shapinsay Sound
- Office and data facilities in Stromness.

Orkney was chosen because of its natural and man-made resources. The wave test site receives uninterrupted Atlantic waves of up to 15m, and at the Eday site tidal streams of up to 4m/second (8 knots) are among the fastest in Europe. Orkney is the most northerly community connected to the UK national grid and has excellent harbour facilities; a significant professional community has also developed which has extensive experience of the renewable energy sector.

Commercial interest in harnessing the energy potential of the marine environment surrounding Orkney is increasing rapidly, and in September 2008 the Crown Estate announced an application process for commercial sea bed lease options in the Pentland Firth and surrounding area for marine energy devices. It was the first marine power location to be made available for commercial development anywhere in the UK. Following a competitive leasing round for demonstration and commercial scale project sites, the Crown Estate entered into agreements for lease for projects with a potential capacity of up to 1,600 MW in the Pentland Firth and Orkney waters.⁷ A map indicating the locations of the Pentland Firth and Orkney Waters Round 1 Development Sites may be viewed on the Crown Estate website at: http://www.thecrownestate.co.uk/media/5729/ei-pentland-firth-and-orkney-waters_a4.pdf

1.2 Flooding

Orkney's average annual rainfall ranges from 861 mm to 1250 mm with the west of the county generally experiencing rather higher rainfall than the east.⁸ Records dating from 1961 indicate that the winter months in Orkney have become wetter and the summer months a little drier.

A number of coastal areas of Orkney are susceptible to inundation by the sea, generally as a result of storm surges combined with high spring tides. During January 2005, when a deep area of low pressure crossed Orkney, bringing strong south-easterly gales which coincided with high spring tides, the villages of St Mary's, Burray and St. Margaret's Hope were severely impacted by coastal flooding. The most recent major flood event occurred in October 2006 when heavy and sustained rain caused widespread flooding throughout Orkney causing damage to many homes and major disruptions to the County's road network.

Areas of both the County's main towns, Kirkwall and Stromness, are at significant risk of coastal, fluvial and drainage flooding and these are indicated in the Strategic Flood Risk Assessments which were prepared in association with Urban Design Frameworks which were prepared for both towns during 2008- 2009. A further Strategic Flood Risk Assessment for the entire Orkney area was undertaken during 2011 in association with preparation of the Local Development Plan 2014. More recently the SEPA Flood Maps have been updated and it is these maps which have been used to assess flood risk in the land allocation options included in the Main Issues Report.

⁷ www.thecrownestate.co.uk

⁸ SNIFFER, 'A handbook of climate trends across Scotland', 2006 www.sniffer.org.uk

1.3 Future Climatic Trends

Recorded weather data confirms that temperatures have indeed increased in the UK over recent decades, but not at the same rate in all regions. Information on climate trends published by the Scotland and Northern Ireland Forum for Environmental Research (SNIFFER)^{9,10} shows that, between 1961 and 2004, the average annual temperature in the north of Scotland increased by 0.92 °C.

The UK Climate Impacts Programme develops future scenarios for climate change; The UKCIP09 climate change scenarios have been developed for a range of different levels of emissions. The following scenarios have been developed for the North of Scotland by 2080 under medium emissions:¹¹

- the central estimate of increase in winter mean temperature is +2.2°C;
- the central estimate of increase in summer mean temperature is +3°C;
- the central estimate of change in winter mean precipitation is +18%;
- the central estimate of change in summer mean precipitation is –12%;

Overall, these predictions indicate that we can expect our summers to become warmer and drier and our winters to become milder and wetter. Other predicted changes to our climate include more frequent extreme weather events such as heavy and prolonged rainfall events. In addition, there is strong evidence that global sea level is rising and will continue to rise during the 21st century.¹² While studies show that sea levels changed little from AD 0 until 1900, sea levels began to climb in the 20th century. The two major causes of global sea-level rise are thermal expansion caused by the warming of the oceans and the loss of land-based ice (such as glaciers and polar ice caps) due to increased melting. Records and research show that sea level has been steadily rising at a rate of 0.04 to 0.1 inches per year since 1900 and this is likely to put many coastal settlements in Orkney at increased risk of coastal inundation.

1.4 Environmental Issues

As a public body, Orkney Islands Council has a duty under Section 4 of the Climate Change (Scotland) Act 2009, when exercising its function to:

- contribute to the delivery of emission reduction targets;
- help deliver any statutory climate change adaptation programme; and
- to do this in a way it considers is most sustainable.

Through its policies the Local Development Plan can encourage a reduction in Orkney's level of greenhouse gas emissions, for example by promoting the appropriate use of renewable and low carbon technologies in new developments as well as encouraging greater use of shelter and solar gain in the siting and design of buildings. The most characteristic feature of the Orkney climate is the frequency of strong winds and the prevailing winds are from between west and south-east for 60% of the year. Winds greater than 8 m s⁻¹ occur for over 30% of the year and gales occur on average for 29 days per year.¹³

⁹ <http://www.scotlandscensus.gov.uk/documents/censusresults/release2a/rel2asbfigure21.pdf>

¹⁰ SNIFFER, 'A handbook of climate trends across Scotland', 2006 www.sniffer.org.uk

¹¹ UK Climate Impacts Programme www.ukcip.org.uk

¹² <http://oceanservice.noaa.gov/facts/sealevel.html>

¹³ May, V.J. and Hansom, J.D. (2003) *Coastal Geomorphology of Great Britain*, Geological Conservation Review Series, No. 28, Joint Nature Conservation Committee, Peterborough, 754 pp.

It can also help influence travel choices by directing future larger scale development towards existing settlements which are located close to scheduled bus routes. This would encourage lower carbon emissions from new build developments, and reduce reliance on the private car. It would also contribute towards more effective transport and service planning, allowing bus services to be adjusted to meet demand.

The renewable energy industry and its likely effects on the natural environment, landscape and employment in Orkney are recognised as one of the Main Issues which will influence development in Orkney for the foreseeable future. The policies and proposals of the Local Development Plan will play a major role in determining how renewable energy developments and their ancillary infrastructure are incorporated into the environment of Orkney.

The predicted changes to our climate include increased storminess and higher rainfall during the months of winter and, in addition, sea levels are gradually rising. These factors indicate that the incidence of flooding is likely to become more frequent and this should be borne in mind when planning for the future pattern of development in Orkney.

The combination of rising sea levels and increased storminess is also likely to escalate rates of coastal erosion. The installation of coastal defence structures may be an option at certain sites; however experience has shown that this carries the risk of displacing the erosive force of the sea to neighbouring parts of the shoreline. Local Development Plan policy should stress the need for planning applications to demonstrate clearly that the design and location of any proposed coastal erosion measures is such that their development will not increase the risk of erosion elsewhere

2. Biodiversity, fauna and flora

SEA Objectives
Conserve protected sites and species.
Safeguard valuable habitat from loss and fragmentation through development.
Protect trees and woodland that have high nature conservation or landscape value.
Protect biodiversity, enabling and encouraging habitat enhancement or restoration where appropriate, and contribute towards achievement of Orkney LBAP actions and targets.
Maintain healthy ecosystems and work with the natural processes which provide important services to communities.

2.1 Designated Sites

The Orkney Islands are particularly valued for their wildlife, and a number of sites are designated for conservation under European and/or national legislation. The following paragraphs provide a brief description of the protected area designations which are in place in Orkney:

- **Natura 2000** is a European network of protected sites which represent areas of the highest value for natural habitats and species of plants and animals which are rare, endangered or vulnerable in the European Community. The term Natura 2000 comes from the 1992 EC Habitats Directive; it symbolises the conservation of precious natural

resources for the year 2000 and beyond into the 21st century. Scotland's Natura 2000 sites will help to protect these important areas now and for generations to come. The Natura 2000 network includes two types of protected area:

- **Special Areas for Conservation (SAC)** are classified under the Habitats Directive for the protection of rare, endangered or vulnerable natural habitats and species of plants or animals (other than birds). These are the 189 habitats listed in Annex I and the 788 species listed in Annex II of the Habitats Directive. Species occurring in Orkney for which the UK has special responsibility include otter, grey seal and common seal.
- **Special Protection Areas (SPA)** are classified under the Birds Directive and are areas which support rare, vulnerable and regularly occurring migratory bird species which are listed in Annex I of the Birds Directive. SPAs are intended to safeguard the habitats of the species for which they are selected and to protect the birds from significant disturbance.
- **Ramsar Sites** are internationally important wetland sites protecting wildfowl habitat.
- **Sites of Special Scientific Interest (SSSI)** represent the best of Scotland's natural heritage and are special for their plants, animals or habitats, their rocks or landforms, or a combination of such natural features. They form a network of the best examples of terrestrial natural features throughout Scotland, and support a wider network across Great Britain and the European Union. Designation of an SSSI is a legal process and sites are protected under the Nature Conservation (Scotland) Act 2004.
- **Local Nature Conservation Sites (LNCS)**

These are sites which have been designated by Orkney Islands Council and were originally listed as Sites of Local Nature Conservation Importance (SLNCI) in the Orkney Local Plan 2004. They are regarded as being worthy of protection for their ornithological, botanical or geological / geomorphological interest. Over 200 local sites were identified in the 2004 Plan and, as part of the Local Development Plan 2014 review process these were surveyed and assessed for their natural heritage value. A number of further sites were proposed for inclusion and these were also surveyed and assessed. A further review of the LNCS was undertaken between 2013 and 2015, focusing on areas which are identified as improved grassland or semi-improved grassland. This review also includes an increased level of consultation with landowners. The suite of LNCS was formally adopted by Orkney Islands Council in April 2017.
- **Local Nature Reserves (LNR)**

These are places with special local natural interest, set up to protect nature and for people to enjoy and appreciate; Orkney has one LNR at Mull Head in the parish of Deerness and a further LNR is proposed at Happy Valley in Stenness.

2.1.1 Internationally and nationally designated sites

The numbers and area of sites in Orkney which are designated at an international or national level for their natural heritage value are summarised in **Table 2.1**

Table 2.1: Internationally and nationally designated sites in Orkney and the area they cover

DESIGNATION	TOTAL NUMBER	AREA WITHIN ORKNEY (HA)	% OF TOTAL AREA OF ORKNEY*
Special Area of Conservation	6	22,790	20.98
Special Protection Area	13	18,308	16.86
Site of Special Scientific Interest	36	24,463	22.52
Ramsar Site	1	1,515	1.39
Local Nature Reserve	1	244	0.22
Area of the Orkney Islands is 108,618 hectares			

*Source – SNH, some designations may overlap and some include areas of sea.

The locations of areas in the Orkney Islands which are designated as SSSI, SPA, SAC or Ramsar sites are shown in Appendix F Map of Orkney.

As the legend to Table 2.1 indicates, some designations overlap, e.g. SSSIs may also be designated as SPAs, SACs and/or Ramsar sites. **Table 2.2** provides a summary of Orkney’s international and national sites, along with the reasons for their designation.

International and national sites undergo a programme whereby the qualifying interests of each site are assessed for their condition – this is known as Site Condition Monitoring. **Table 2.2** which is presented as **Appendix B.1** to this baseline lists the qualifying features of Orkney’s national and international sites, as well as their current condition status.

The distribution and extent of these sites is illustrated in **Appendix F Orkney’s Nationally Designated Natural Heritage Sites**.

2.1.2 Locally designated sites

Outwith the statutorily designated sites the Local Nature Conservation Sites are areas of land and water that are recognised as having high biodiversity value and therefore worthy of protection, albeit at a lower level than that afforded to national and international sites. They contain valuable natural habitats which support a wide range of Orkney’s wildlife and include areas of wetland, heath, coast, unimproved grassland, native woodland, freshwater lochs and burns. **Table 2.3** sets out the habitat types which are found in the LNCS.

Table 2.3: Habitat types for conservation in the Orkney Local Development Plan Local Nature Conservation Sites¹⁴

Aeolianite	Lichen heath	Purple moorgrass and rush pastures
Basin bog	Links	Reedbeds
Blanket bog	Lowland calcareous grassland	Saline lagoons
Burns and canalised burns	Lowland dry acid grassland	Species-rich heath
Coastal saltmarsh	Lowland fens	Treeless woods and dales
Coastal sand dunes	Lowland meadows	Upland birchwoods
Coastal strandline	Machair	Upland calcareous grassland
Coastal vegetated shingle	Maritime cliff and slopes	Upland fens, flushes and swamps
Conifer plantation	Maritime grassland	Upland heathland
Empetrum heath	Maritime heath	Upland willow scrub
Eutrophic standing waters	Mesotrophic lakes	Wet woodland
Inland outcrops and scree habitats	Oligotrophic and dystrophic lakes	
Intertidal mudflats	Ponds	

Note: Habitat types emphasized in **bold** are UK Priority Habitats. The remaining habitats are locally important habitats as identified in the Orkney Local Biodiversity Action Plan.

2.2 Marine Protected Areas

The Marine (Scotland) Act 2010 has established a new power for Marine Protected Areas (MPAs) in the seas around Scotland, to recognise features of national importance and to meet international commitments for developing a network of MPAs. SNH has undertaken reviews of a large number of marine habitats and species in order to identify those it considers to be of greatest marine nature conservation importance in Scottish territorial waters – these are termed Priority Marine Features (PMFs). A number of PMFs are known to occur locally; these include benthic habitats such as horse mussel beds, maerl beds, seagrass beds as well as mobile species such as common and grey seal, sea trout and a number of cetacean species. The list of Priority Marine Features is available on the SNH website and may be accessed at <http://www.snh.gov.uk/docs/A1327320.pdf>. A subset of the PMFs has been used to underpin the selection of Nature Conservation (NC MPAs).

Three NC MPAs have been designated in Orkney waters – these are listed in **Table 2.4** along with a description of their protected features.

¹⁴ Orkney Local Biodiversity Action Plan

Table 2.4 Nature Conservation Marine Protected Areas in Orkney

NC MPA	Protected features
Wyre & Rousay Sounds	Kelp and seaweed communities on sublittoral sediment; maerl beds; Marine Geomorphology of the Scottish Shelf Seabed (calcium carbonate sediments from the eroded shells and skeletons of plants and small animals, such as maerl and bivalve molluscs supply the sandy beaches around Orkney).
Papa Westray	Black guillemot; Marine Geomorphology of the Scottish Shelf Seabed (the action of tides and currents has formed a sand wave field).
North-west Orkney	Sandeels; Marine Geomorphology of the Scottish Shelf Seabed (the action of tides and currents has formed sand banks, sand wave fields & sediment wave fields).

In addition, three proposed Special Protection Areas (pSPA) have been identified in Orkney waters; these cover areas in the Pentland Firth and Scapa Flow as well as an area of inshore waters in the North Isles. Formal consultation on these proposed sites took place in 2016.

2.3 Protected Species

A number of species are listed on Annex IV of the Habitats Directive as species of European Community interest and in need of strict protection. The protective measures required are outlined in Article 12 of the Directive. The species listed on Annex IV whose natural range includes any area in Great Britain are also listed on Schedules 2 (animals) and 4 (plants) of the Habitats Regulations and are specifically protected under Regulations 38-46 and Regulations 10-13 of the Amendment Regulations.¹⁵

All European Protected Species (EPS) are also fully protected under the Wildlife and Countryside Act 1981; however the Regulations provide a greater level of protection, primarily through licensing procedures. For any European Protected Species of animal, the legislation makes it an offence to deliberately or recklessly capture, kill, injure or disturb any such animal. It is also an offence to damage or destroy their 'breeding sites' or 'resting places' (this does not have to be deliberate, reckless or intentional for an offence to have been committed).

For any European Protected Species of plant, the legislation makes it an offence to deliberately or recklessly pick, collect, cut, uproot or destroy any such plant. This applies to all stages of their biological cycle.

European Protected Species include European otter *Lutra lutra*, which is known to be widespread in the Orkney Islands particularly in the vicinity of aquatic environments, as the animals routinely move between marine and freshwater environments. All species of bats are also recognised as EPS and, although not commonly seen, records of bat sightings indicate that the presence in Orkney of a number of species is increasing and it is probable that small numbers breed in the county.¹⁶ Additionally, all species of cetacea are EPS; the Harbour porpoise is frequently seen, particularly in south Scapa Flow¹⁷ and regular sightings are reported of a number of whale and dolphin species passing through Orkney's marine

¹⁵ SNH website: www.snh.gov.uk

¹⁶ Orkney Wildlife Information and Records Centre

¹⁷ Booth, C. & J. Sillocks, Skarfies & Selkies, (2005)

environment. Marine turtles are also designated as EPS and rare sightings have been made in Orkney waters, although more often dead or injured animals are found washed up on the shoreline.

Other protected species that are found in Orkney include many bird species as well as harbour and grey seal.

When originally enacted, the Wildlife and Countryside Act 1981 provided a relatively straightforward source of wildlife law in Great Britain. However, the legal picture is now more complicated. Firstly, the introduction of the Habitats Regulations 1994 created a separate set of rules for those species (and habitats) protected under the Habitats Directive. Secondly, devolution has meant that changes to the 1981 Act (through the Nature Conservation (Scotland) Act 2004 and the Habitats Regulations) have been made differently in Scotland. A table of protected species known to occur naturally in Scotland may be accessed from the SNH website at <http://www.snh.gov.uk/docs/A306244.pdf>. The table indicates how each species is protected; however it is important to note that not all of the species listed occur in Orkney.

The Marine (Scotland) Act 2010 introduced further protection for seals and on the 1st February 2011 it became an offence to kill, injure or take a seal at any time of year except to alleviate suffering or where a licence has been issued to do so. The Act also provides for Scottish Ministers to designate "seal conservation areas". The areas previously covered by the Conservation of Seal (Scotland) Orders namely Shetland, Orkney, the Moray Firth and the East Coast of Scotland have been transcribed into seal conservation areas and in addition the Outer Hebrides has also been scheduled as a seal conservation area under the Marine (Scotland) Act 2010. Marine Scotland must not grant a seal licence authorising the killing or taking of seals in a seal conservation area unless they are satisfied that there is no satisfactory alternative way of achieving the purpose for which the licence is granted, and that the killing or taking authorised by the licence will not be detrimental to the maintenance of the population of any species of seal at a favourable conservation status in their natural range (within the meaning of Article 1(e) of the Habitats Directive).

The Act also provides for additional protection for seals at designated haul out sites where it will become an offence to intentionally or recklessly harass seals. The Scottish Government has recently consulted on which haul out sites should be designated. Details of designated haul-out sites in the Orkney Seal Management Area may be accessed from the Scottish Government website at <http://www.scotland.gov.uk/Resource/0045/00454617.pdf>.

The basking shark *Cetorhinus maximus* is known to inhabit the waters around Orkney¹⁸. This species is listed as a UKBAP and OSPAR species and is protected under the Wildlife and Countryside Act 1981 (as amended in 1985) and CITES²⁷.

2.4 Priority Habitats and Species

Each local authority in Scotland has developed its own Local Biodiversity Action Plan (LBAP) that lists the priority habitats and species for its area. The Orkney Environment Partnership, through its Biodiversity Steering Group, produced the original Orkney Local Biodiversity Action Plan (LBAP) in 2002, a document which identified a total of 83 species and 21 distinct habitats as being of importance in the Orkney Islands. This plan was supplemented by the Orkney LBAP 2008-2011 which focused on ten of these habitats, introducing new sets of targets and actions to be completed during the three year period. The current revision, also focusing on ten habitats, covers the period 2013-2016 and includes lists of habitats and species which occur in Orkney and are identified as Priorities for Conservation on the UK Biodiversity Action Plan and

¹⁸ Orkney Wildlife Information and Records Centre

the Scottish Biodiversity List. All three versions of the Plan may be accessed from the Orkney Islands Council website at www.orkney.gov.uk. Further information on the distribution and abundance of species and habitats throughout the county is available from The Orkney Wildlife Information and Records Centre which is located in the Orkney Library and Archive.

2.5 Wider Countryside Measures

There are a few bird species, either listed on Annex I of the Birds Directive or regularly occurring migratory species, for which Special Protection Areas are not appropriate in Scotland. For some other species, a large proportion of the population is not protected within SPAs. In both these cases, special measures outwith designated areas are of particular significance.¹⁹

Article 10 of the Habitats Directive encourages national governments, through their land-use planning and development policies, to manage landscape features which are of major importance for wild fauna and flora, particularly with a view to improving the ecological coherence of the Natura 2000 site network. Features which are essential for the passage and dispersal of wild species in the countryside, such as river corridors, and features which act as 'stepping stones' between sites such as small woods and ponds, are highlighted as particularly valuable.

In Orkney the identification of Local Nature Conservation Sites is considered to be an effective means of highlighting areas of sensitive habitat out-with the nationally and internationally designated sites.

As well as having its own intrinsic value, the natural environment provides us with a wide range of services and products that support us in our day to day lives and underpin our economy. These are known collectively as ecosystem services. The Ecosystems Services Approach is all about recognising the value of these services so that they can be fully taken into account within policy preparation and decision making as well as 'on the ground' actions. The range of ecosystem services that we routinely benefit from includes:

1. Increased soil fertility through microbial biochemistry and decomposition
2. Water purification through soil processes and natural filtration
3. Flood mitigation by peatlands, wetlands, woodlands and soils
4. Coastal protection by dune systems, shingle/cobble beaches saltmarsh and mudflats
5. Carbon capture and storage in biomass, peat, soils and sediments
6. Landscape features and natural beauty provided by the diversity of vegetation cover and other wildlife
7. Pollination by invertebrate species
8. Protection and preservation of cultural heritage resources
9. The presence of biochemicals which may be used to manufacture medicines, now or in the future;
10. The health and well-being benefits people obtain from ecosystems through recreation, reflection and spiritual enrichment.

¹⁹ SNH website: www.snh.gov.uk

2.6 RSPB Reserves and Scottish Wildlife Trust Sites

The Royal Society for the Protection of Birds (RSPB) manages over 8000 hectares in Orkney²⁰, with most of this land designated as nature reserves. The 13 reserves are at the following locations:

Noup Cliffs, Westray
North Hill, Papa Westray
Trumland, Rousay
Onziebust, Egilsay
Mill Dam, Shapinsay
Marwick, Birsay
Birsay Moors
The Loons, Birsay
Cottasgarth and Rendall Flows
Brodgar, Stenness
Hobbister, Orphir
Copinsay
Hoy

Linga Holm, a small island off the west coast of Stronsay, is owned by the Scottish Wildlife Trust (SWT) and is operated as a sanctuary for grey seal. The SWT also owns areas of land in the parish of Harray and at East Hill, Shapinsay which are of interest for ornithological reasons. A further site owned by the Trust is the Hill of White Hamars in South Walls which features an area of lichen-rich and floristically diverse coastal maritime heath.

2.7 The effects of climate change on biodiversity

Climate change is considered to be the single biggest threat to Scotland's habitats²¹, with potential for these to be altered in a number of different ways. Some may be affected directly, for example existing coastal machair habitats may be lost due to sea-level rise and sand dune habitat may be breached or may move inland. Another consequence of rising temperatures combined with a reduction in rainfall, is that peatland soils and habitats will be damaged by drying out and eroding.

Having enough space will be another factor. Some habitats already suffer from fragmentation and it is recognised that isolated areas of habitat will be more vulnerable to irreversible damage from rapid climate change.

Species are also at risk from the effects of climate change. At the top of the marine food web, seabirds are a visible sign of the changes taking place below the surface. They are sensitive to disruptions in the food chain. Sand eels are disappearing due to dramatic changes in their plankton diet. In turn, birds are not finding enough sand eel food to sustain them and their young.⁹ Kittiwakes, arctic terns, guillemots and shags are among the seabirds that depend on sand eels for adult and chick food, and in recent years the seabird colonies in Orkney have experienced sharp declines in breeding success.

²⁰ RSPB website: www.rspb.org.uk

²¹ Scottish Natural Heritage <http://www.snh.gov.uk/climate-change/impacts-in-scotland/effects/habitats/>

2.8 Invasive Non-Native Species (INNS)

The spread of invasive non-native species also poses a serious threat to biodiversity, both on land and in the water. Plant species already known to be present in Orkney include salmonberry *Rubus spectabilis*, Japanese knotweed *Fallopia japonica* and Himalayan balsam *Impatiens glandulifera*. There is also potential for aquatic species such as New Zealand pygmy weed *Crassula helmsii* to be incorporated into SuDs pond planting schemes, from where they could quite easily spread to natural water bodies, e.g. through fragments attached to birds' feet. In recent years stoats *Mustela erminea* have appeared in Orkney and sightings of the animals have been reported from many parts of the Orkney mainland, as well as some of the Isles. How the animals reached the islands is uncertain and there are considerable concerns about the effect they could have on local wildlife, e.g. its diverse birdlife. The stoat is an efficient hunter which typically feeds on birds and small mammals. Amongst its potential prey is the Orkney vole which is not only unique to Orkney but is also an important source of food for the island's populations of hen harrier and short eared owl.

2.9 Environmental issues

As a public body, Orkney Islands Council has a duty, "...in exercising any functions, to further the conservation of biodiversity so far as it is consistent with the proper exercise of those functions" Nature Conservation (Scotland) Act 2004.

Through its Natural Heritage policies the Local Development Plan should provide effective protection to sites in Orkney which are designated for their natural heritage interest. It should also protect the interests of those species which are afforded legal protection under international and national legislation.

Increased development may result in the loss, fragmentation or disturbance of habitat which, in turn, could impact on priority species in Orkney. The policies and proposals of the Local Development Plan should seek to avoid or minimise adverse effects on habitats and species in the wider countryside and, where appropriate, should identify measures to enhance Orkney's natural heritage.

In its consolidated Scottish Planning Policy (SPP) 2014 the Scottish Government makes reference to the ecosystem services provided by the natural environment and requires the planning system to *take account of the need to maintain healthy ecosystems and work with natural processes which provide important services to communities*. The LDP should promote an ecosystems approach to development management.

In recent years there has been widespread wind energy development in the Orkney countryside, particularly of small and medium sized turbines. Whereas collision risk is probably the most obvious hazard to wildlife, it is also possible that where turbines are sited close to traditional nesting areas they may cause disturbance to breeding birds or discourage them from nesting in these areas.

Larger wind energy developments generally require the construction of additional supporting infrastructure such as access tracks and switchgear buildings; new transmission lines may also be necessary, introducing further collision hazards. These larger developments may be located in environmentally sensitive areas which are particularly vulnerable to disturbance at certain times of year. Whereas planning conditions are routinely imposed, enabling the construction phase to be timed to avoid the breeding season for birds, damage to transmission lines can occur at any time. During winter, when the ground is waterlogged, moorland and heathland habitats in particular are very susceptible to damage from vehicles gaining access to enable

repairs to be undertaken. It is important to note that SPP 2014 advises that consideration should be given to underground grid connections where possible.²²

SPP 2014 guidance for development management notes that where non-native species are present on site, or where planting is required as part of a development, developers should take into account the provisions of the Wildlife and Countryside Act 1981. Through its Natural Heritage policy or Supplementary Guidance the LDP should address development-related invasive non-native species issues.

3. Water

SEA Objectives
Promote the protection and improvement of the water environment, including burns, lochs, estuaries, wetlands, coastal waters and groundwater.
Maintain water abstraction, run-off and recharge within carrying capacity.

3.1 The water environment of Orkney

Orkney has a diverse freshwater and marine water environment. Its catchment areas provide water supplies for people, community services and industry in the islands and the marine environment supports both the shellfish fishing industry and aquaculture. Freshwater watercourses in Orkney generally include freshwater lochs and lochans, streams and drainage ditches, in addition considerable areas of the islands are described as Groundwater Dependent Terrestrial Ecosystems (GDTE) which are waterlogged with areas of standing water for much of the year these. GDTEs are wetlands which critically depend on groundwater flows and/or chemistries²³ and include dune slack, fen, wetland, peat bog, reedbed, saltmarsh, springs, flushes and seepages, swamp, wet grassland, wet heath, wet machair and wet woodland²⁴. In the marine environment there are coastal waters and saline lagoons.

3.2 Water supply

Scottish Water is responsible for the supply of potable water within the county, and operates water treatment plants at Boardhouse and Kirbister Lochs on the Orkney mainland; Saintear Loch on Westray; Bea Loch on Sanday; Sandy Loch which supplies Hoy and Graemsay and Heldale Water which supplies Walls, and Flotta. Properties in North Ronaldsay, Eday and Stronsay are also linked to public water supplies. In Rousay the school is served by a public water supply but otherwise water is sourced from bore holes. Residents of Papa Westray access water from a community water scheme.

In the remaining outlying islands water is supplied from boreholes. In addition, some households continue to rely on private, untreated water supplies and on sources that may be vulnerable to diffuse or single-source pollution.

The whole of Orkney is designated as a Drinking Water Protected Area for groundwater. However, this is the case for all of Scotland. SEPA currently monitors one groundwater location which is the abstraction point for the Highland Park Distillery at HY 44341 09715.

²² Scottish Planning Policy 2014, paragraph 165.

²³ Water Framework Directive UK Technical Advisory Group <http://www.wfduk.org/resources/groundwater-dependent-terrestrial-ecosystem-threshold-values>

²⁴ Scotland's Environment Web

3.3 Foul water treatment

Scottish Water also has responsibility for waste water and, in recent years has upgraded sewerage treatment facilities at a number of locations including: Head of Work, which serves the town of Kirkwall; The Bu, which serves the town of Stromness; St Margaret's Hope; Burray; Holm; Stenness; Dounby; Evie; Finstown, Sanday and Westray. However, in a number of rural settlements foul water drainage facilities are at, or close to, capacity. In others there is no strategic provision for foul water drainage and properties are reliant on private systems, e.g. septic tanks and soakaways. Where a number of houses are in close proximity to each other this can lead to a proliferation of septic tank systems and a significant risk of water pollution, especially during the wetter months when percolation rates within the soil are poor. This has been a particular problem in certain areas and SEPA has designated the following Planning Consultation Areas where proliferation of private waste water systems has led to a cumulative impact on the water environment:

- Pierowall, Westray
- Whitehall, Stronsay
- Birsay
- Tingwall
- Grimeston Road, Harray
- Houton
- Hatston
- Carness
- Berstane
- Burray Village
- Herston
- Longhope

3.4 Water quality and overall status classification in Orkney

The Scottish Environment Protection Agency (SEPA) has primary responsibility for the water environment and, under the Water Environment (Controlled Activities Regulations) (Scotland) 2005, operates as a regulator for abstraction from and discharges to surface and ground waters. A water quality classification system allows SEPA to determine the state of the environment, highlighting areas that need particular protection, and where improvements need to be made. On an annual basis each water body is reported as high, good, moderate, poor or bad.

The **overall status** classification of surface water bodies describes by how much their condition ("status") differs from near natural conditions. Water bodies in a near natural condition are at high status while those whose quality has been severely damaged are at bad status.

The **water quality** classification looks at both biological and chemical indicators of pollution. Water bodies with low levels of pollution are classified as high or good water quality, whereas those with high levels of pollution are classified as poor or bad.

The classification system was devised following EU and UK guidance. It is underpinned by a range of biological quality elements, supported by measurements of chemistry, hydrology (changes to water levels and water flows), morphology (changes to the beds, banks and shores of water bodies) and an assessment of invasive non-native species.

The following settlements are located close to freshwater watercourses that are included in SEPA's monitoring programme:

Burnside (Burn of Netherbrough)
 The Palace (Burn of Boardhouse)
 Lyron (Burn of Sweenalay)
 Burray Village (Burn of Sutherland)
 Stenness Village (Loch of Stenness)

The water quality and overall status classification of monitored watercourses in Orkney, based on the findings of sampling undertaken during 2013 is summarised in **Appendix B.2**.

3.5 Environmental Issues

As a planning authority Orkney Islands Council has a duty to protect and improve Scotland's water environment (The Water Environment and Water Services (Scotland) Act 2003).

Water quality in Orkney is generally good but locally there are waters which are polluted by waste water, effluents and discharges from agriculture, mineral working, and other industries. The EC Water Framework Directive seeks to achieve the continuous improvement of all water bodies through the implementation of River Basin Management Frameworks. Town and country planning has a significant role to play in ensuring an appropriate distribution of land uses and protecting the environment from pollution.

The policies and proposals of the LDP should seek to protect and improve the quality and overall status of the water environment in and around Orkney. Sustainable solutions to waste water treatment should be promoted.

4. Soil

SEA Objectives
Promote the viable use of vacant and derelict land, alleviating pressure on greenfield sites.
Reduce the threat of contamination and seek to protect soils from damage such as erosion or compaction.
Recognise the environmental benefits provided by soils and protect their quality and quantity.

4.1 Soil types

General information on the soil types of Orkney is available from Scottish Natural Heritage Review No 100, Orkney Character Assessment.²⁵ More detailed information is available from the Soil and Land Capability for Agriculture Maps (Orkney and Shetland) and accompanying handbook, both of which are produced by the Macaulay Institute²⁶.

Data is currently not available on the quality of soils in Scotland as no monitoring is carried out on their composition. However, Scotland's Climate Change Programme²⁷ includes plans to

²⁵ Scottish Natural Heritage Review No 100, Orkney Landscape Character Assessment. Land Use Consultants, Glasgow (1998)

²⁶ Soil and Land Capability for Agriculture Maps (Orkney and Shetland) mapsales@macaulay.ac.uk

²⁷ Changing Our Ways, Scotland's Climate Change Programme Scottish Executive (2006)

establish a soil monitoring system, especially with regard to carbon content, and to develop a soil strategy.

4.2 Agricultural Land

Much of the land of the Orkney Islands is fertile agricultural land where farming methods are predominantly intensive. Figures for agricultural land use in Orkney, illustrated in **Table 4.1** show that following a slight increase in 2008, the total land area utilised by agriculture decreased significantly in 2009: the statistics agency believe that this may have been an anomaly caused by changes to data collection and reporting processes, and the subsequent recovery of the reported land use statistics to just above their 2007 levels would appear to bear this out. Grassland and rough grazing continue to dominate agricultural land usage in Orkney.

Table 4.1 Agricultural Land Use in Orkney during the period 2005 - 2012²⁸

LAND USE	TOTAL AREA (HECTARES)							
	2005	2006	2007	2008	2009	2010	2011	2012
Cereals	4,061	4,069	4,240	4,470	4,828	4,460	4,570	4,394
Potatoes	55	42	36	34	34	32	33	38
Stock-feeding crops	443	523	488	483	440	602	606	694
Other crops	82	130	157			196	217	192
Set aside	229	263	269	89				
Fruit and Horticulture						48		
Other vegetables	11	12	12	15	17	10	15	14
Bare fallow	221	231	250	258	205	277	275	277
Total crops, set aside and fallow	5,102	5,270	5,452	5,489	5,721	5,625	5,741	5,641
Grassland	49,266	49,287	49,245	49,562	50,114	49,971	50,298	50,857
Rough grazing	36,525	36,745	36,063	38,451	27,239	27,245	30,548	32,620
Woodland	126	320	134	128	60	80	82	79
Other land	1,344	1,310	1,175	1,331	596	798	1,038	1,006
Common grazing *						2,198	2,277	2,278
Total Land	92,363	92,932	92,068	94,960	83,533	85,917	89,984	92,481

Source: Rural and Environment Research and Analysis Directorate (RERAD)

* Not previously reported

Note: Totals may not always tally due to changes in reporting methods

4.3 Peat and carbon-rich soils

Layers of peat underlie large areas of Orkney, including its moorland hills and peatland basins, where they represent important sinks and storage areas for carbon. Peat forms over periods of hundreds to thousands of years in wet conditions where water saturation causes anoxic conditions and prevents bacteria and fungi from rapidly decomposing the remains of dead plants. Moorland vegetation such as sphagnum moss and heather dies back and accumulates, year on year, becoming compressed and altered and ultimately preserved as layers of peat at a very slow rate of approximately 1 cm in 10 years. Although a very slow process, peat continues to form in these areas where conditions are suitable, and represents an important means of removing carbon dioxide from the atmosphere.

Due to its capacity to absorb and store water, peat also represents a valuable resource for the regulation of water storage. Many plant species and the species which they in turn support are

²⁸ Scottish Agricultural Census 2005-2012

dependent on the chemical and physical properties of peat and cannot survive in other substrates. It is therefore important, where possible, to avoid or minimise the disturbance or loss of peat.

Scottish Natural Heritage has prepared a consolidated spatial dataset of 'carbon rich soil, deep peat and priority peatland habitats' in Scotland derived from existing soil and vegetation data. The new Carbon and Peatland (2014) map²⁹ provides greater understanding of where Scotland's peatlands are to be found and it is envisaged that the new map and data may be used to:

- Provide greater appreciation and transparency around where Scotland's peatland occur
- Support strategies and projects related to the management and restoration of Scotland's peatland habitats
- Support the implementation of the forthcoming Scotland's National Peatland Plan
- Assist in identifying peat and other carbon-rich soils for development planning and development management purposes
- Facilitate mapping of wind farm spatial frameworks in line with the new Scottish Planning Policy (SPP) (2014)
- Inform the siting of proposals that could impact on the soil resource and subsequent mitigation to avoid or reduce such impacts

4.4 Contaminated land

Under Part IIA of the Environmental Protection Act 1990 (as inserted by the Environment Act 1995) each local authority is required to *"cause its area to be inspected from time to time for the purposes of identifying contaminated land"*. The local authority therefore has the responsibility to determine whether any land is contaminated.

Contaminated land is defined as,

"any land which appears to the Local Authority in whose area it is situated to be in such a condition, by reason of substances in, on, or under the land, that

- a) significant harm is being caused or there is a significant possibility of such harm being caused; or*
- b) pollution of controlled waters is being, or is likely to be, caused"*

To ensure compliance, and to deal with contaminated land in the Orkney Islands, Orkney Islands Council Department of Environmental Health has produced a Contaminated Land Strategy³⁰. Information gathered on potential contaminated land sites includes some 37 waste management sites, over 70 Second World War military sites and a number of other sites totalling 149 sites. These sites are listed in a Contaminated Land Register which is maintained by the Environmental Health Department and is available for inspection at the Council Offices.

²⁹ <http://www.snh.gov.uk/planning-and-development/advice-for-planners-and-developers/soils-and-development/cpp/>

³⁰ Contaminated Land Inspection Strategy, Orkney Islands Council, 2003

4.5 Vacant and derelict land

The Scottish Vacant and Derelict Land Survey (SVDLS) is undertaken annually to establish the extent and state of vacant and derelict land in Scotland and the amount of land that has been reclaimed since the previous survey. Its main purpose is to provide a national data source to inform the programming of the rehabilitation, planning and reuse of vacant and derelict sites.

Vacant land is land which is unused for the purposes for which it is held and is viewed as an appropriate site for development. This land must either have had prior development on it or preparatory work has taken place in anticipation of future development. Derelict land (and buildings) is land which has been so damaged by development, that it is incapable of development for beneficial use without rehabilitation. **Table 4.2** illustrates trends in the area of derelict and urban vacant land in Orkney between 2007 and 2013 and sets this in a national context. A Derelict Land Survey is to be undertaken in parallel with the Local Development Plan review process.

Table 4.2 Derelict and Urban Vacant land in Orkney (2007-2013)³¹

Local Authority	Total Derelict and Urban Vacant Land Area (ha)							% Change 2007-13
	2007	2008	2009	2010	2011	2012	2013	
Orkney Islands	42	41	41	44	45	45	43	2%
Scotland	11,379	11,315	11,493	11,455	11,436	11,301	11,114	-2%

During 2013 fifteen sites in Orkney were classified as either derelict or urban vacant land. These are listed below in table 4.3.

Table 4.3 Derelict and Urban Vacant Land in Orkney (2013)²⁷

Site	Location	Area (ha)	Site type
A	Easthill, Kirkwall	0.35	Vacant land
S	Bloomfield Road, St Ola	2.27	Derelict
W	Glaitness Road, St Ola	3.47	Derelict
C	Bloomfield Road, St Ola	1.05	Derelict
Former West Mainland Auction Mart site	Stromness	0.45	Derelict
Former builder's yard	Junction Road, Kirkwall	0.48	Derelict
Former Garden's Bakery	Bridge Street, Kirkwall	0.27	Derelict
Former bus station	Pickaquoy Road, Kirkwall	0.18	Vacant land & buildings
The Crafty caravan site	Glaitness Park, Kirkwall	0.35	Derelict
Land next to The Crafty	Glaitness Park, Kirkwall	0.51	Derelict
Ayre Mills	Ayre Road, Kirkwall	0.13	Derelict
Papdale Farm	Berstane Road, Kirkwall	0.39	Derelict
Former Scarth Centre	Burnmouth Road, Kirkwall	0.26	Vacant land & buildings
Former naval base	Lyness, Hoy	31.77	Derelict
Weyland Farm	Easthill, Kirkwall	1.26	Derelict

³¹ Scottish Vacant and Derelict Land Survey 2013 <http://www.gov.scot/Publications/2014/02/7170>

A number of the above sites are now being redeveloped, for example a new supermarket is under construction on the site of the former West Mainland Auction and plans have been approved for the development of offices and laydown areas on part of the former naval base at Lyness.

4.6 Environmental issues

The policies and proposals of the Local Development Plan should ensure that where possible the siting and design of development does not lead to the degradation of soil quality or result in a loss of peat resources. Where appropriate, the redevelopment of brownfield sites should be encouraged in order to minimise soil sealing and the loss of good quality agricultural land.

5. Geology

SEA Objective
Protect designated and undesignated sites which are recognised and valued for their geological or geomorphological importance.

5.1 Summary of Orkney's geological history^{32,33}

Most of the rocks which make up Orkney as we know it today formed around 400 million years ago during the Devonian Period when Britain was positioned approximately 10° south of the equator and was part of a supercontinent made up of the land masses which are today North America and Northern Europe. At that time there were mountains to the north-west and the open Devonian Sea covered the area that is now southwest England. Between the mountains and the sea was a vast desert plain within which a large, shallow, freshwater lake occupied the topographic lowest levels. This shallow lake, known as Lake Orcadie, extended from Shetland, through Orkney, Caithness and the Moray coast and across to western Norway. It was fed by numerous rivers which flowed down from the western mountains eroding gravel sand and mud and transporting these materials into the lake where they settled out as layers on the lake bed.

The oldest rock exposed in Orkney is the Precambrian Basement Complex, examples of which outcrop around the town of Stromness and on the neighbouring island of Graemsay. These outcrops represent the tops of island hills which were surrounded by Lake Orcadie. In the warm, tropical climate evaporation rates were high and rainfall was seasonally variable and this caused large fluctuations in the depth of the lake and the area that it covered. Mud flats on the lake margins periodically dried out before being inundated again. Evidence for this can be seen today in flagstones where mud cracks are visible which have been filled in by sand. Superimposed on this seasonal cycle were climatic patterns which varied on a much longer timescale, causing the lake to become steadily deeper and wider, at times meeting the edge of the western mountains before retreating to begin the cycle again. These cycles are easily seen in the well exposed coastal cliffs of the West Mainland where the cycle begins with a finely laminated dark grey to black muddy flagstone representing periods of greatest water depth in Lake Orcadie and ends with shallow water lake margin sediments consisting of sands, silts and light grey muds.

³² Geology of Orkney. www.fettes.com/Orkney/geology.htm

³³ Orkney and Shetland a Landscape Fashioned by Geology www.snh.org.uk

At times Lake Orcadie appears to have been very productive and evidence shows that during intervening periods of drought large numbers of fish died, sinking out of the water column to the bed of the lake where they became preserved in the fine-grained muds. Remains of these fish can be seen today as fossil fragments in the flagstone strata known as the Sandwick and Rousay fish beds, which are most clearly visible at Cruaday Quarry in the parish of Sandwick. The discovery of many fossil fish during the extraction of stone for construction purposes led to designation of the quarry as a Site of Special Scientific Interest. Some of the particularly fine specimens recovered from Cruaday are now displayed at the Fossil Centre in Burray along with fossils from other locations in the Orkney and Caithness area.

This cyclicity of lake deposition continued until Upper Devonian times when the waters of Lake Orcadie retreated so far that it became broken up into many small separate lakes in a predominantly desert landscape. This dry period is characterised by sandstones derived from deposits laid down by the large braided rivers which continued to flow from the Western Mountains, and also the sand dunes which migrated across the desert plains. Great thicknesses of sand and gravel were deposited and are preserved, for example, on Orkney's best known natural feature, the Old Man of Hoy, where they rest on a basal plinth of tough lavas that resist erosion by the sea.

Changes in stress within the Earth's crust during Carboniferous to Permian times led to considerable volcanic activity in the area, leaving lavas and vents filled with agglomerate and ash. Intrusive igneous dykes dating from the Younger Permian (250 million years ago) are numerous and can be seen traversing the intertidal areas of many rocky shores. A particularly clear example is found at the Point of Buckquoy in Birsay where the black basalt dyke containing vesicles (bubbles) contrasts strongly with the surrounding paler sedimentary rock.

The formation of depressions in the Earth's crust, where sediments accumulated, continued around Scotland throughout Mesozoic and up to Quaternary times. Economic quantities of oil and gas accumulated in some of these depressions or basins. By the late Permian period, stresses in the Earth's crust created the Viking Graben, a rift valley located in what was to become the North Sea. This event marked the partial break-up of the supercontinent. The rift valley filled with sediments eroded from adjacent areas, including the Orkney-Shetland region, and by early Jurassic times a link with the open sea was established.

Thick sequences of marine sediments accumulated in basins around Britain during Jurassic and Cretaceous times at this time. Tensional stresses were creating a new ocean, the Atlantic, as the supercontinent split apart. North America separated from Africa in the Jurassic (around 165 million years ago) and from Europe in the Late Cretaceous. Europe and North America gradually moved apart as volcanic eruptions added new material along the central spine of the widening ocean – the Mid-Atlantic Ridge.

The earliest stages of stretching and thinning of the Earth's crust near the margin of the emergent ocean allowed molten lava to break through the crust to form a line of volcanoes, for example those running from Skye to Arran. To the present day, we continue to move farther and farther away from America as volcanic eruptions along the Mid-Atlantic Ridge adds new ocean floor, thus forcing the continents apart.

The land mass containing Orkney continued to move northward and during the Quaternary (2.6 millions years ago) its geology became heavily modified by glaciation which smoothed and rounded hills and ridges on land and excavated the major firths of Hoy Sound, Eynhallow Sound and Westray Firth. Local glaciers developed at intervals on the island of Hoy where they carved out striking corries and valleys. As the last ice sheet thinned and retreated, considerable thicknesses of glacial deposits were laid down in hollows. A coastal section at Den Wick in

Deerness contains two superimposed depositions of glacial till. Likewise, cliff sections at Scara Taing in Rousay are important for the exposure of three superimposed tills and the adjacent striated (scratched) bedrock surfaces which provide evidence of fluctuating patterns of ice flow.

Although ice has covered Orkney and Shetland many times during the last two million years and sculpted the landscape, the broad outline of the islands owes much to the action of the wind, rain and sea over the last 150 million years. The sea has cut 'geos', which are long narrow slots following faults and joints, into the cliffed coastline and also eroded 'gloups' (blow-holes), caves and natural arches. The Gloup in Deerness is probably the finest example of a blow hole to be seen in Orkney and in the island of Stronsay a natural arch remains intact at the Vat of Kirbister. As erosion continues, the rock spanning arches protruding from the retreating cliff line often collapses, leaving vertical rock pillars as sea stacks; the most famous of these are the Old Man of Hoy and the Castle of Yesnaby, both formed of sandstone.

The power of the sea during westerly gales is vividly illustrated by the high-level storm beaches formed of large blocks of rock, which have been torn from the cliff by the waves and piled up in crescent-shaped ridges behind the cliff top. An excellent example can be seen at Sacquoy Head on Rousay, where boulders lie as much as 80 metres inland at the top of 18 metre high sea cliffs.

A rise in sea level following the melting of the glaciers about 10,000 years ago was responsible for the drowned landscape of the inner coasts of Orkney. Flooding of the gently undulating Orkney landscape has formed broad open bays, generally backed by sand dunes. Layers of peat, some containing tree trunks and roots, occur beneath the sand and shingle of some modern beaches.

The combined forces of wave action and tidal currents are responsible for the constant reworking of seabed sediments which surround the coasts of Orkney, for example the process of long-shore drift causes sand and gravel to be transported laterally along the shoreline often forming distinctive geomorphological features including narrow spits of shingle or sand. These coastal feature are known as 'ayres' in Orkney, and are commonly found cutting across the seaward ends of shallow bays. In some cases spits may partly, or completely, cut off a sheltered stretch of water from the sea to form a shallow lagoon or 'oyce', which eventually may silt up to become a stretch of fertile land. Spits can also form tombolos, joining islands to offshore isles. The island of Sanday is one of the best locations in Orkney where these and other coastal sand features can be seen.

5.2 Sites designated for their geological / geomorphological importance.

Orkney's geological history is most clearly visible and interpreted along its coastlines where the rock has been subject to sea level change, deformation, erosion and localised deposition; and also in quarries where rock extraction has exposed a sequence of rock strata. A number of sites are designated, either nationally as Sites of Special Scientific Interest and/or Geological Conservation Review Sites; or locally as Local Nature Conservation Sites on account of their geological/geomorphological importance in an Orkney context. A full list of these sites is included in **Table 5.1**.

Table 5.1: Sites in Orkney, that are designated for their geological/geomorphological importance³⁴

SITE	DESIGNATION	GEOLOGICAL/GEOMORPHOLOGICAL INTEREST
Birsay		
Point of	LNCS	Unique exposure demonstrates consequences of

³⁴ JNCC website; also The Orkney Local Development Plan 2014

SITE	DESIGNATION	GEOLOGICAL/GEOMORPHOLOGICAL INTEREST
Buckquoy		oscillation in the level of Lake Orcadie during the Devonian
Whitaloo Point	LNCS	A typical monoclinical fold in Upper Stromness Flags
Deerness		
Denwick	SSSI/GCR	Best example in Orkney of a multiple till section
Point of Ayre	GCR	Area of basaltic lava flow
Taracliff Bay – Newark Bay	GCR	Section showing transition from Rousay Flag series to Lower Eday Flag series
Mirkady Point	LNCS	Shingle spit
Eday		
Greenan Nev Coast,	GCR	Exposure of Eday marls of interest in the study of Palaeo environments
Newbiggin to Neven Point,	LNCS	Good section of the western limb of the Eday Syncline
South Fersness Bay,	GCR	Good section of the western limb of the Eday Syncline
Evie & Rendall		
Links of Aikerness	LNCS	Outcrops of Aeolianite unique in Scotland
Hoy & Graemsay		
Hoy	SSSI / GCR	geology, geomorphology, petrifying tufa springs, (Ward Hill, Enegars Corrie & Dwarfie Hamars) Exposures of the Hoy Volcanics and the Hoy Sandstone in their type area (Old Man of Hoy Coast) Silurian and Devonian volcanic ricks (Too of the Head)
Melsetter Coast section, Hoy	LNCS	Outcrops of the Hoy Lavas
Muckle Head and Selwick	SSSI/ GCR	Geological site due to locally important raised beach deposits
North Coast of Graemsay	LNCS	Exposure of the lower section of the Stromness Flags and crystalline basement
Sanday		
Central Sanday	SSSI/ GCR	Machair and other blown sand and shingle landforms unique in North Scotland.
Doun Helzie,	LNCS	Beach Dune and Machair association
Hegglie Ber,	LNCS	Coarse pebbly and conglomeratic facies of Lower Eday Sandstone
Scar	LNCS	Glacial erratic
Sandwick		
Bay of Skail	SSSI/GCR	Middle Devonian Fish Beds with fossil plant community
Cruaday Quarry	SSSI/GCR	Site is of outstanding geological importance due to exposure and preservation of the Sandwick Fish Beds
Stromness Heaths & Coasts	SSSI/GCR	Coastal geomorphology (West Coast of Orkney) Non-marine Devonian (Yesnaby & Gaulton Coast Section)

SITE	DESIGNATION	GEOLOGICAL/GEOMORPHOLOGICAL INTEREST
Shapinsay		
Vasa Loch	LNCS	Complex cusped foreland
Lairo Water and The Ouse	LNCS	Complex of shingle depositional landforms
South Ronaldsay		
Ayre of Cara	LNCS	Provides opportunity for study of rates of accretion and erosion due to construction of Churchill Barriers
Croo Stone Vent coast section	LNCS	Largest and most complex vent to be found in Orkney
Dam of Hoxa	LNCS	Composite depositional structure
South-east Coast	LNCS	Shows relationship of coastal morphology to geological structure
The Altar	LNCS	Demonstrates the influence of jointing on the resultant coastal landforms
Stromness		
South Stromness Coast	SSSI/ GCR	Crystalline basement rock with overlying Stromness Flags. Lead mineralisation.
Stronsay		
Mill Bay, Stronsay	SSSI/ GCR	Geological: Classic shelly till with palaeo-geomorphological importance.

SSSI: Site of Special Scientific Interest

GCR: Geological Conservation Review site (nationally important Earth Science Site)

LNCS: Local Nature Conservation Site

5.3 Environmental issues

The policies and proposals of the Orkney Local Development Plan should provide effective protection to sites which are designated for their geological or geomorphological interest and which illustrate Orkney's geological history.

6. Landscape

SEA Objectives
Facilitate positive change while maintaining and enhancing distinctive landscape character.
Respect urban form, settlement pattern and identity.
Improve the quality and design of the built environment.

6.1 Orkney landscape character

The relatively unvaried geology of Orkney, along with the modifying effects of glaciation during the last ice age, has resulted in a landscape in which the differences are often subtle rather than dramatic. Physical processes, together with human influences which began when settlers first arrived on the islands over 5,000 years ago, have helped create the diversity of landscapes visible in the Orkney Islands today. The high quality visual amenity of the islands is valued by its

resident population and is a major factor in attracting the thousands of tourists who visit each year.

An assessment of the Orkney landscape which was commissioned by Scottish Natural Heritage³⁵ enables the landscape character to be described within a hierarchical framework which establishes the patterns of landscape variations. Whilst this study is now relatively aged (1998), it has been agreed with SNH that this is the best baseline information that is available. The Report identifies and describes Regional Character Areas, Landscape Character Types and Island Character Areas. Explanations of these classifications are reproduced below from the Orkney Landscape Character Assessment:

REGIONAL CHARACTER AREAS

The Orkney archipelago is recognisable as a distinct landscape 'region', based on the general characteristics of geology, landform, land use and historical associations. It is also the fact that it is a group of islands that contributes to its unity of character, particularly in the importance of the sea. Its isolation from mainland Scotland, yet mutual inter-dependence, has created a strong identity for the county. It is concluded therefore, that the County of Orkney constitutes the 'Orkney Regional Character Area'.

LANDSCAPE CHARACTER TYPES

Landscape character types are tracts of countryside, defined at a more detailed level, which have a distinct character due to particular combinations of landform and land cover and a consistent pattern of constituent elements. Landscape character types are generic: they can be found anywhere distinct combinations of features occur.

ISLAND CHARACTER AREAS

Although there are many similarities between the islands of Orkney, there are also many characteristics which reflect the individual history of each. Each island contains several landscape character types.

This Orkney Landscape Character Assessment identifies a total of 23 landscape character types in the Orkney Islands. These are:

Holms	Whaleback Island landscapes
Ridgeline Island Landscapes	Low Island Pastures
Undulating Island Pastures	Coastal Plain
Coastal Basins	Inclined Coastal Pastures
Coastal Granite Pastures	Isolated Coastal Knolls
Enclosed Bay Landscapes	Coastal Hills and Heath
Cliff Landscapes	Coastal Sand Landscapes
Peatland Basins	Loch Basins
Low Moorland	Plateau Heaths and Pasture
Rolling Hill Fringe	Moorland Hills
Glaciated Valley	Rugged Glaciated Hills

³⁵ Scottish Natural Heritage Review No 100, Orkney Landscape Character Assessment. Land Use Consultants, Glasgow (1998)

6.2 Urban and Rural Development

During the 20th and early 21st centuries a pattern of more intensive development has resulted in a number of changes to the landscape of Orkney, some of which are relevant to preparation of the Orkney Local Development Plan:

- the construction of new buildings that have not always reflected the settlement pattern, scale, design and materials that are appropriate to the landscape character of the area;
- loss or deterioration of some distinctive features such as stone dykes, crofts and other buildings;
- erosion of character due to the addition of wind turbines, telecommunications apparatus, aquaculture developments, roads, and other urbanising features; and
- changes in vegetation cover and field patterns due to more intensive methods of agriculture.

6.3 National Scenic Area

The National Scenic Area (NSA) is Scotland's only national landscape designation. NSAs are those areas of land which are considered of national significance on the basis of their outstanding scenic interest and which must be conserved as part of the country's natural heritage. They have been selected for their characteristic features of scenery comprising a mixture of richly diverse landscapes including prominent landforms, coastline, sea and freshwater lochs, rivers, moorlands and woodlands.

The Hoy and West Mainland NSA, which extends to 16,479 hectares³⁶, is the only area in Orkney to hold this designation and it includes examples of a number of the landscape character types listed above. A map and an explanation of the special qualities of the NSA are included as Appendix B.4 of this report.

6.4 Environmental issues

Since 2011 the islands have witnessed considerable wind energy development with turbines of varying scales and designs and ancillary equipment providing new features in the Orkney landscape. During 2014 a landscape capacity assessment³⁷ was undertaken to consider the capacity of the Orkney Landscape to accommodate onshore wind energy development. The assessment concludes that:

- "There are no areas of Orkney with underlying capacity for the scale of multi-turbine windfarms found in parts of mainland Scotland;
- There are no locations where single wind energy developments greater than 20MW could be accommodated without exceeding the underlying landscape capacity."

The assessment also identifies the main constraints to development as:

- The modest scale and extent of the island landscapes;
- The lack of extensive large-scale uplands into which turbines can be readily absorbed;

³⁶ Scottish Natural heritage www.snh.org.uk

³⁷ Landscape Capacity Assessment for Wind Energy in Orkney, Ironside Farrer (2014)

- The highly dispersed population and patterns of settlement that occur on the islands, resulting in widespread visual sensitivities;
- The presence of areas with outstanding scenic qualities and wildness; the significance of the landscape to the setting of the World Heritage Site; and the sensitive coastline and seascape which is a defining feature of the Orkney islands.

Through its policies and proposals the Local Development Plan should seek to protect the diversity and local distinctiveness of Orkney’s landscapes and ensure that new development is appropriately sited and designed in relation to the surrounding landscape.

7. CULTURAL HERITAGE

SEA objectives
Promote the care and protection of the designated and non-designated historic environment.
Enable positive change in the historic environment which is informed by a clear understanding of the importance of Orkney’s heritage assets and ensures their future use.
Safeguard cultural heritage features and their settings through the responsible design and siting of development.
Protect the integrity and Outstanding Universal Value of the Heart of Neolithic Orkney World Heritage Site.

7.1 Scheduled Monuments and Sites of Archaeological Importance

The “historic environment” is defined in Section 16(3) of the Public Appointments and Public Bodies etc. (Scotland) Act 2003 as “...any or all of the structures and places in Scotland of historical, archaeological or architectural interest or importance”.

The Scottish Historic Environment Policy (SHEP 2011)³⁸ builds on this definition, by recognising that “*Our whole environment, whether rural or urban, on land or under water, has an historic dimension that contributes to its quality and character*”, and by stating that the combined effects of human intervention and natural processes may be seen in “...*our built heritage: ancient monuments, archaeological sites and landscapes, historic buildings, townscapes, parks, gardens and designed landscapes; as well as our marine heritage for example in the form of historic shipwrecks and underwater landscapes which were once dry land.*”

Importantly, SHEP also highlights that “*The context or setting in which specific historic features sit and the patterns of past use are part of our historic environment. The historical, artistic, literary, linguistic and scenic associations of places and landscapes are some of the less tangible elements of the historic environment. These elements make a fundamental contribution to our sense of place and cultural identity.*”

The Orkney Islands have a rich and varied cultural heritage, with a total of 372 Scheduled Monuments (SAM) widely distributed throughout the county, representing periods dating from the Neolithic era to the 20th century. Of these, 38 are in the care of the Scottish Ministers and

³⁸ Scottish Historic Environment Policy 2011

are listed in **Appendix B.5, Orkney Scheduled Monuments in the Care of the Scottish Ministers**. Details of all 363 SAMs can be obtained from PASTMAP³⁹, a free online search service which provides data on Scotland's historic environment. In addition this service contains information relating to more than 3,000 archaeological sites in the County.

7.2 The Heart of Neolithic Orkney World Heritage Site

The Heart of Neolithic Orkney World Heritage Site (WHS), inscribed on the World Heritage List in 1999 by the United Nations Educational, Scientific and Cultural Organisation (UNESCO), is one of only five World Heritage Sites in Scotland. Located in Orkney's West Mainland, the WHS is composed of the chambered tomb of Maeshowe, the Stones of Stenness, the Barnhouse Stone, the Watchstone, the Ring of Brodgar and associated funerary monuments and stone settings, and Skara Brae settlement. The landscape surrounding the WHS is an important element of the site's Outstanding Universal Value (OUV) but does not form part of the site; however it is protected by local development plan policy.

The significance of Orkney's WHS is summed up in the report by the International Council on Monuments and Sites to the World Heritage Committee in which it recommends the Site's inscription:

"The four monuments that make up the Neolithic Heart of Orkney are unquestionably among the most important Neolithic sites in western Europe. They provide exceptional evidence of the material and spiritual standards and beliefs and the social structures of this dynamic period of prehistory."

"The group constitutes a major relict cultural landscape depicting graphically life five thousand years ago in this remote archipelago."

"The monuments of Orkney, dating back to 3000–2000 BC, are outstanding testimony to the cultural achievements of the Neolithic peoples of northern Europe."

7.3 Historic and prehistoric evidence from other important stages in Orkney's history

Even older than Skara Brae are the earliest known dwellings in Orkney - two oblong, stone-built houses which date from approximately 3,600 BC and are located at the Knap o' Howar, on west coast of the island of Papa Westray. Other remains dating from the Neolithic Age (4000-1800BC) include chambered burial cairns such as those found at Wideford, Cuween and Quanterness.

Evidence from the Bronze Age (1800-800BC) in Orkney typically takes the form of burnt mounds of blackened earth, usually found near a source of fresh water, mixed with the remains of heated stones and ash. Beneath these mounds lie the remains of paved areas, usually incorporating a hearth and a stone lined pit. Burnt mounds are generally agreed to be the remains of areas used for heating water.⁴⁰

The Iron Age (800BC – 500AD) is well represented by a number of Earth-houses and Brochs (roundhouses) throughout the islands, e.g. the Grain earth-house which can be seen in the Hatston Industrial Estate on the outskirts of Kirkwall and the Broch of Gurness in Evie.

By the 4th and 5th centuries AD, patterns of farming had changed in Orkney and its Iron Age tribes had become part of the Pictish nation. The most typical relics of this age are ornately carved symbol stones and a fine example was found on the Brough of Birsay.

³⁹ PASTMAP, www.historic-scotland.gov.uk/index/ancientmonuments/searchmonuments.htm

⁴⁰ www.orkneyjar.com

On the Brough of Birsay, an island which is separated from the west mainland at high tide, remains uncovered by archaeologists indicate settlements spanning a number of centuries. It is thought that Christian missionaries may have settled on the site during the fifth century AD. Archaeological excavations on the site also uncovered the remains of oval houses, thought to date from the Pictish period, around 600-700 AD. From the ninth century AD until the twelfth century, the Brough became a Norse community, and visible to this day are the lower courses of an extensive settlement that includes some of the finest examples of Norse hall-houses so far found in Scotland.⁴¹

A prominent feature in the town of Kirkwall is the St Magnus Cathedral, founded in 1137 by Earl Rognvald Kolsson in memory of his uncle Earl Magnus Erlendsson, who had been murdered on the island of Egilsay and subsequently canonised in 1135. Other historic buildings in Kirkwall include the remains of the Bishop's Palace which was built in the mid-12th century and the Earl's Palace which dates from the 17th century.

In the 18th and 19th centuries Orkney became an important location for the kelp making industry and to this day kelp pits can be seen along the coastline of North Ronaldsay, Sanday, Stronsay and elsewhere, where seaweed was burned in order to extract kelp.

During the early 1900s Stromness and the village of Whitehall in Stronsay became busy and vibrant ports during the booming years of the herring fishery.

The history of Orkney during the twentieth century is also well represented, largely due to the strategic importance of the islands during World Wars I and II. Scapa Flow was used as an anchorage for the British Naval Fleet during both wars and a naval base was established at Lyness in Hoy. The remains of other historic buildings dating from this period, for example gun emplacements and camps, are still seen at many coastal locations around Orkney.

7.4 Conservation Areas

Conservation areas are defined as “*areas of special architectural or historical interest, the character or appearance of which it is desirable to preserve or enhance*”.⁴² They are designated by the local planning authority with the aim of preserving their historic character for the enjoyment and benefit of future generations. Conservation areas cover both urban and countryside environments, from the historic cores of cities to isolated rural settlements or landscapes.

The Orkney Local Development Plan 2014 identifies six Conservation Areas: Balfour Village in Shapinsay, St Margaret's Hope in South Ronaldsay and areas within the towns of Kirkwall and Stromness, as well as the island of Eynhallow and an area around the Brodgar part of the WHS.

Once an area has been designated it becomes the duty of the planning authority to pay special attention to the desirability of preserving or enhancing the character and appearance of the area when exercising their powers under the Planning (Listed Buildings and Conservation Areas) (Scotland) Act 1997 and under Part I of the Historic Buildings and Ancient Monuments Act 1953.

7.5 Listed Buildings

Listed buildings are buildings which are of “*special architectural or historic interest*”⁴³ and which represent a highly visible and accessible element of Scotland's cultural heritage. Covering a

⁴¹ www.orkneyjar.com

⁴² Scottish Historic Environment Policy (SHEP) 2011

wide range of uses and periods, together they chart a large part of the history of Scotland and continue to be relevant to all aspects of life, from education to recreation, to defence, industry, homes and worship.

The 'listing' of buildings is carried out by Historic Scotland on behalf of the Scottish Ministers. They are assigned to one of three non-statutory categories (A, B or C). The system in Scotland operates under the Planning (Listed Buildings and Conservation Areas) (Scotland) Act 1997. Listing ensures that a building's special character and interest are taken into account where changes are proposed. Any work which affects the character of a listed building or its setting will require listed building consent, applications for which are, in normal circumstances, dealt with by the planning authority.

Over 600 listed buildings are located throughout the Orkney Islands. Details of these may be obtained from the Historic Scotland website through its listed buildings search facility.

Orkney's rich and varied heritage is also reflected in many other buildings and structures that are found throughout the County. Whilst many of these buildings and structures do not feature on the statutory list of buildings of architectural or historic merit maintained by Historic Scotland, they are valuable none the less and make a significant contribution to the history, character and appearance of both urban and rural Orkney. In order to effectively recognise and preserve this important local heritage an 'Orkney Local List' project has commenced to protect buildings and structures of historic merit.

7.6 Gardens and Designed Landscapes

Gardens and Designed Landscapes are defined as "*grounds that are consciously laid out for artistic effect*"⁴⁴ and may include the settings of important buildings, areas of parkland, woodland, water and formal garden elements. They may also have significant archaeological or scientific interest. The Inventory of Gardens and Designed Landscapes in Scotland is available electronically via the Historic Scotland website and identifies gardens and designed landscapes that are of national significance. Three sites in the Orkney Islands are listed in the Inventory. These are located at Balfour Castle in Shapinsay, Melsetter House in Hoy and Skail House in Sandwick. Legislation was amended in 2011 to give protection to Gardens and Designed Landscapes, national planning policy confirms that maintaining and preserving the quality of the country's heritage are important functions of the planning system. Gardens and Designed landscapes in Orkney cover an area of 176 hectares.⁴⁵

7.7 Marine Protected Areas

The Marine (Scotland) Act 2010 has established a new power for Marine Protected Areas (MPAs) in the seas around Scotland, to recognise features of national importance and to meet international commitments for developing a network of MPAs. Historic Scotland is working with Marine Scotland, Scottish Natural Heritage, and the Joint Nature Conservation Committee on the Scottish Marine Protected Areas Project, to make recommendations to Scottish Ministers on the development of a network of Historic MPAs in the seas around Scotland. During 2015 Historic Scotland merge with RCAHMS to form Historic Environment Scotland, and the new organisation will advise Marine Scotland on HMPA designation.

^{34, 44} Scottish Historic Environment Policy (SHEP) 2011

⁴⁵ Scottish Natural Heritage, www.snh.org.uk

7.8 Buildings at Risk Register

The Buildings at Risk Register for Scotland records buildings of architectural or historic interest in Scotland which are considered to be under threat. In Orkney there are currently 89 buildings listed in the Register; of these, restoration is currently in progress on nine buildings.

7.9 Environmental issues

Inappropriately designed and sited development can impact on historic sites and their settings. These can include measures that are implemented to address other environmental issues; examples may include renewable energy developments which aim to reduce greenhouse gas emissions as well as flood defences to enable communities to adapt to the effects of climate change.

Climate change and, in particular, rising sea levels present a significant challenge to Orkney's cultural heritage. Many of the county's sites, including the Neolithic settlement of Skara Brae, are located in coastal locations where they are vulnerable to erosion by wind and waves, particularly during storm conditions.

The policies and proposals of the Local Development Plan should ensure protection to the historic environment from the adverse effects of development. Particular consideration should be given to protection of the integrity of the Heart of Neolithic Orkney World Heritage Site.

8. Population & human health

SEA objectives
Promote increased availability of affordable housing.
Improve community environments and quality of life.
Protect and enhance human health and promote access to health, social and recreational facilities.
Retain and, where appropriate, improve the quality and quantity of publicly accessible open space.
Provide for easy and safe access to and within green infrastructure, including core paths and other important routes.
Support opportunities for enjoying and learning about Orkney's natural and cultural environments.
Improve social inclusion.

8.1 Population trends

Orkney's population natural growth rate (births minus deaths) remains negative, however the gap has closed significantly and, if the recent overall trend continues, could soon contribute to population growth. Estimated in-migration might be influenced by the difficult conditions

prevailing in the UK economy and the availability in Orkney of relatively accessible and affordable housing. This trend is illustrated in **Table 8.1**.

Table 8.1: Orkney population change 2000-2012⁴⁶

	BIRTHS	DEATHS	NATURAL CHANGE	MIGRATION (NET)	POPULATION
2000	152	195	-43	-63	19,290
2002	164	211	-47	24	19,210
2004	171	217	-46	247	19,500
2006	213	231	-18	194	19,770
2008	214	225	-11	78	19,890
2010	197	213	-16	152	20,110
2012	201	216	-15	107	21,530

Source: General Register Office for Scotland (CGROS)

Note: population and migration figures post 2001 Census are estimates: figures for 2000 to 2008 are 'as at' 30 June; figures for 2010 and 2012 are based on the calendar year. Only biennial figures are shown, so the trends do not tally with the changes in population.

Population information for Scotland's island authorities from the 2011 Census is presented and compared in **Table 8.2**

Table 8.2: Total population of Scotland's island authorities (2011)

	2001	2011	Population change 2001 to 2011	% change 2001 to 2011
Orkney	19,245	21,349	2,104	10.9
Shetland	21,988	23,167	1,179	5.3
Western Isles	26,502	27,684	1,182	4.5

The 2011 Census has also identified changes to the Orkney demographic, as shown in **Table 8.3** below

Table 8.3: Demographic changes in the Orkney population (2001-2011)

Age	2001 Population	% of total 2001 area Population	2011 Population	% of total 2011 area Population	% change 2001 to 2011
5-14	2,600	13.4	2,200	10.3	-14.7
15-39	5,700	29.9	5,800	27.0	0.3
40-64	6,700	34.8	8,000	37.7	20.0
65+	3,200	16.7	4,200	19.8	31.1

⁴⁶ Orkney Economic Review 2012-13 (source General Register Office for Scotland (GROS))

These trends are compared with those for Scotland as a whole in **Table 8.4**. On 11 July 2013, a report in *The Scotsman* newspaper identified Orkney as 'best place for those looking for a job in Scotland', which may partly explain the increase in population aged 40-64.

Table 8.4: Demographic trends in Orkney and Scotland (2001-2011)

Age	% change 2001 to 2011 Orkney	% change 2001 to 2011 Scotland
5-14	-14.7	-10.9
15-39	0.3	-1.8
40-64	20.0	14.4
65+	31.1	10.6

The trend is towards an increasingly ageing population, a trend which is projected to continue. Predictions are highlighted in **Table 8.5**.

Table 8.5: Predicted population changes (%) 2008 to 2023

	All ages	Children 0-15	Working age*	Pensionable age*	Aged 75+
Scotland	5	2	4	14	45
Orkney	8	-1	4	26	73

Pensionable age is assumed to be 65 for men, 60 for women until 2010; assumed that between 2010 and 2020 pensionable age for women increases to 65.

Source: GROS

In its key statistics for local authority areas, the General Register Office for Scotland statistics for has revised its previous predictions for a gradual decrease in population and is now expecting an increase in the County's population up to 2035. The population projections for the period 2015-2035 are shown in **Table 8.6** below.

Table 8.6: Population estimates for Orkney 2015-2035⁴⁷

YEAR	POPULATION ESTIMATE
2015	21,625
2020	21,966
2025	22,374
2030	22,628
2035	22,705

The values shown above do not include the internal population changes which are taking place within the Orkney Islands as a result of migration from the smaller Isles towards the mainland of Orkney. Depopulation of the Isles has given cause for concern for a number of years and initiatives are under way to try to reverse this trend. Changes in population levels of the North and South Isles during the period 1961 to 2011 were collected during the 2001 and 2011 Census and these are shown in **Table 8.7**

⁴⁷ General Register Office for Scotland (GROS) estimates <http://www.gro-scotland.gov.uk/mwg-internal/de5fs23hu73ds/progress?id=ntGhk25ubu>

Table 8.7 Population trends in the Orkney Islands over the period 1961 – 2011⁴⁸

ISLAND	Population					
	1961	1971	1981	1991	2001	2011
Auskerry	3	0	1	3	5	No data
Burray	262	209	283	363	357	409
Cava	0	0	2	2	0	0
Copinsay	3	3	0	0	0	0
Eday	198	179	147	166	121	160
Egilsay	54	39	23	46	37	26
Fara	5	0	0	0	0	0
Flotta	123	73	178	126	81	80
Gairsay	0	7	6	3	3	No data
Graemsay	51	39	21	27	21	28
Hoy	511	419	461	450	392	419
North Ronaldsay	161	134	109	92	70	72
Papa Stronsay	4	3	0	0	10	No data
Papa Westray	139	106	92	85	65	90
Pentland Skerries	3	3	0	0	0	0
Rousay	237	181	209	217	212	216
Sanday	670	592	525	533	478	494
Shapinsay	416	346	329	322	300	307
South Ronaldsay	980	776	891	943	854	909
Stronsay	497	436	420	382	343	353
Sule Skerry	3	5	1	0	0	0
Swona	3	3	0	0	0	0
Westray	872	735	701	704	563	588
Wyre	47	36	21	28	18	29
Mainland Orkney	13,495	12,747	14,000	15,123	15,315	17,169
Total population of Orkney	18,731	17,065	18,420	19,612	19,245	21,349

⁴⁸ Scotland's Census Results Online

Table 8.7 indicates that over the fifty year period between 1961 and 2011 the population of the Orkney mainland increased by more than 2,600. However, during the same period there was a widespread decline in the populations of the smaller isles with only Burray, one of the linked south isles, displaying population growth. Comparison of the 2001 and 2011 census indicates a modest increase in the population of many of the Isles over the ten year period.

8.2 Quality of life in Orkney

Orkney has a wide range of community facilities and services to offer its residents and visitors, more than might be available in some remote areas of the Scottish mainland, and this coupled with the clean environment contributes to a quality of life which is generally good. The 2013 Halifax quality of life survey identified Orkney as the most desirable place to live in Scotland. The survey tracks where living standards are highest in the United Kingdom by ranking local performance across key indicators covering: the labour market, the housing market, the environment, education, health, and personal well-being. The survey is based on data at local authority district (LAD) level and examines all 405 local authorities. However, the dispersed nature of Orkney's communities means that transport is an important factor in island life and the accessibility of transport can be an additional factor, where buses and ferries are not always usable by people with disabilities or mobility difficulties.

8.3 Publicly available open space

Green spaces are areas which are publicly accessible for recreation, relaxation and/or sport. Although green spaces are probably considered more necessary in towns and cities it is also important to include publicly accessible open space in rural settlements where much of the countryside is privately owned and developed for agriculture. In some Orkney settlements the green space may be a school games pitch, other settlements may include a Community Hall with sports pitches and others may incorporate pathways for pedestrians and cyclists. An Open Space audit and Strategy which was prepared by Orkney Islands Council in 2014 will inform future designation of areas of Open Space.

8.4 Life expectancy in Orkney

Life expectancy in the Orkney Islands is among the highest of all Scottish local authorities and **Table 8.8** indicates recent trends in life expectancy at birth. For the period 2008-2010 comparable figures for Scotland are indicated in brackets.

Table 8.8: Life expectancy at birth of residents of the Orkney Islands over the period 2000 – 2010⁴⁹,

Gender	Period					
	2000-2002	2001-2003	2002-2004	2003-2005	2006-2008	2008-2010
Males	75.4	75.9	76.5	76.3	74.4	77.3 (75.8)
Females	81.7	81.0	80.5	81.4	81.4	81.4 (80.3)

⁴⁹ General Register Office for Scotland

8.5 Population structure

The population of Orkney is, however, relatively elderly and the percentage of the total population who are of working age is significantly below the Scottish average. This is illustrated in **Table 8.9** where the age and sex structure of the Orkney Islands is compared with that of Scotland as a whole.

Table 8.9: Age and sex structure of the population of the Orkney Islands (2011)⁵⁰

	Males				Females			
	Average age	% under 16	% working age	% pensionable age	Average age	% under 16	% working age	% pensionable age
Scotland	39	19	67	14	41	17	59	25
Orkney Islands	41	18	65	17	43	17	55	28

8.6 Summary of Orkney health statistics

The Community Health and Wellbeing Profile for Orkney 2010⁵¹ is one of 30 Community Health Partnership area profiles compiled by the Scottish Public Health Observatory Team. The profile comprises 59 indicators of health (e.g. ill-health and injury and mortality) and wider determinants of health (e.g. education, employment & prosperity and environment). The following paragraphs are reproduced from the Orkney CHP:

Mortality

All-cause mortality rates (all ages) are better than the Scottish average, significantly so in the case of females. Mortality rates for all causes (all ages), and coronary heart disease, cancer and cerebrovascular disease (under-75s) are better than average but not significantly so.

Behaviours

An estimated 19.0% of adults smoke, which is significantly better than Scotland as a whole (25%). There have been 54 alcohol-related deaths in the last five years, and the proportion of the population hospitalised for alcohol-related and attributable causes is significantly worse than the Scottish average. By contrast, the proportion of the population hospitalised for drug-related conditions is the lowest of all CHP areas in Scotland. While active travel to work is reported to be common in Orkney, reported sporting participation is significantly lower than the Scotland average.

Ill health & injury and mental health and function

Hospital patient rates for chronic obstructive pulmonary disease (COPD), cerebrovascular disease and emergency admissions are all significantly better (lower) than the Scotland average. Similarly, the prevalence of diabetes is significantly low. However, the rate of patients hospitalised with asthma is third worst of the CHP areas in Scotland. The road traffic accident casualty rate is also significantly worse than average, and Orkney CHP has the highest rate of

⁵⁰ GROS

⁵¹ www.scotpho.org.uk/comparative-health/profiles/2010-chp-profiles

older people hospitalised after a fall in the home. The rate of patients with a psychiatric hospitalisation is less than half the Scotland average.

Social care and housing

In Orkney, only 3.5% of adults claim incapacity benefit or severe disability allowance (Scotland 5.6%). A significantly high percentage of older people receive free personal care at home. Homelessness is the best (lowest) of all council areas. Rates of looked after children and percentages of single adult dwellings are both significantly lower than in Scotland as a whole. An estimated 22.2% of households are experiencing extreme fuel poverty (Scotland 7.5%).

Education, employment and prosperity

Orkney compares favourably to Scotland – often significantly so – for the education and economy indicators. For example, among the working age population, only 12.3% have low or no educational qualifications (Scotland 14.8%); and only 1.4% claim Jobseeker's Allowance (Scotland 4.4%). Income deprivation is significantly better (lower) than the Scotland average.

Crime and environment

Both the crime rate and prisoner population rate are the best (lowest) of any CHP area in Scotland. Being a largely rural island area, two-thirds of the population (67.2%) live in the 15% 'most access deprived' areas in Scotland (Scotland 14.2%). Of all council areas, Orkney has the highest percentage of adults rating their neighbourhood a very good place to live.

Child and maternal health

Childhood immunisation uptake at 24 months is significantly worse than the Scotland average. However, breast screening uptake, mothers smoking during pregnancy, low weight live births and child dental health in primary 1 are all significantly better than the Scotland average, with Orkney among the best of the CHPs. The under-18 teenage pregnancy rate is only one-third of the Scotland rate (13.8 compared to 41.4 per 1,000 females aged 15-17).

8.7 Health and access to Orkney's natural and cultural heritage

Low levels of activity and obesity are two factors which currently contribute to ill health throughout the United Kingdom. National initiatives aim to encourage people to enjoy the outdoors and take more exercise. Through its Core Paths Plan, Orkney Islands Council highlights the many routes and pathways throughout the Orkney mainland and the Isles which are available to walkers of varied abilities, enabling them to experience and appreciate the County's excellent natural and historic resources.

8.8 Environmental issues

It is important that the Local Development Plan continues to promote development which contributes to the quality of life in Orkney and meets the needs of its communities. Through its policies and proposals it should seek to promote sustainable solutions to issues associated with social exclusion. It should protect, and where appropriate, enhance existing areas of publicly accessible and where necessary incorporate further green spaces within its settlement strategy.

Although Orkney has high life expectancy rates and the area has an outstanding natural environment with clean air and water, fine scenery and diverse wildlife, human health can be adversely affected by rural poverty. Contributory factors may include long-term unemployment, lack of affordable housing, isolation from main services and difficulties in travelling to health and educational facilities. In recent years a number of factors have contributed to the increasing need for further housing, e.g. people live longer, elderly people are more likely to be cared for in

their home, relationships break down, and there is a greater level of single occupancy in houses.

The policies and proposals of the Local Development Plan can address these issues by promoting the development of energy-efficient, affordable housing for people at different stages of their lives, where they can easily access transport to their place of employment and to social and health services and facilities.

Preparation of the LDP Main Issues Report and the Sustainable Settlements Strategy was carried out in parallel with and has been informed by preparation of the Housing Needs and Demands Assessment 2009.

9. MATERIAL ASSETS

SEA Objectives
Promote the efficient use of resources and the minimisation of wastes through their re-use or their recovery through recycling, composting or energy recovery, in line with 2020 national targets.
Promote sustainable and efficient use of natural resources.
Optimise the use of existing infrastructure and buildings.

9.1 Waste

Treatment of Municipal Solid Waste

Municipal Solid Waste (MSW) uplifted by Orkney Islands Council is collected and baled at its Waste Transfer Station at Chinglebraes in St Ola, before being transported by sea to Shetland for incineration at the Lerwick Waste to Energy Plant. Heat energy from the incineration process is then used to supply participating properties in the Lerwick District Heating Scheme. **Table 9.1** indicates the amount of waste that was shipped to Shetland during the period 2009 – 2014 for both incineration and landfill.

Table 9.1: Waste shipped from Orkney to Shetland

Year	2009/10	2010/11	2011/12	2012/13	2013	2014
MSW collected (t)¹	15,354	15,604	14,992	14,701	15,141	15,590
Shipped to Shetland (t)	10,006	10,335	10,090	10,162	9,759	10,142
Recyclates (t)	4,284	4,588	4,176	3,412	4,118	2,058

¹MSW = Municipal Solid Waste

Alternate weekly collections (AWC) have been introduced across the Orkney mainland, as well as to the islands of Westray and Shapinsay. It is hoped that this service will be extended to other islands in the future. Under the scheme, residents receive three 140 litre 'wheelie' bins – two for recyclates and one for rubbish. Recyclates collected are paper and thin card, plastic bottles, cans and glass. The scheme enables households to have their waste and recyclates

picked up from their usual collection point and aims to help increase recycling rates in the county, encourage reduced consumption and waste generation, and save on waste collection costs.

Recycling and Composting

The Scottish Government has set annual target rates for the recycling and composting of municipal waste. These targets are based on calendar year data and apply to Scotland as a whole, not to individual local authorities. The targets were revised in January 2008 and are set out in **Table 9.2**.

Table 9.2: Scottish recycling targets⁵²

Calendar year	Recycling and composting target rates
2006	25%
2008	30%
2010	40%
2013	50%
2020	60%
2025	70%

On Mainland Orkney waste recycling facilities are available at five Civic Amenity Sites; these are located at Garson, Stromness; Cursiter Quarry, Firth; Hatston Industrial Estate, on the outskirts of Kirkwall; Bossack, Tankerness; and St Margaret's Hope, South Ronaldsay. Further, smaller waste recycling facilities are located in the Isles and at a number of locations around the mainland. A fortnightly kerbside collection for glass and paper is operational in the main settlements of the mainland.

Recycled glass is transported to Cursiter Quarry where it is crushed for re-use locally, e.g. in the manufacture of concrete. All other recyclate is taken to Chinglebraes Waste Transfer Station to be sorted and baled.

Waste paper and cardboard is baled and transported to mainland UK for reprocessing. Aluminium and steel cans are separated and baled at Chinglebraes. Steel cans are transferred to a local scrap metal dealer and aluminium cans are transported south for reprocessing. A trial project is currently underway to collect and bale certain types of plastic waste.

The Council also aims to cut the amount of food waste in MSW by supplying, free of charge, green cones for use in composting food wastes.

Garden waste is accepted at Bossack where it is composted along with finely shredded wood waste to produce a soil conditioning material which is available free of charge from the Civic Amenity Site.

The Council currently meets its target with respect to recycling, but its next aim will be to increase its recycling rate in order to reduce the amount of waste shipped to Shetland.

⁵² SEPA, www.sepa.org.uk

Landfill

There is currently only one landfill site for inert materials; this is the Council-operated site at Bossack in Tankerness.

9.2 Minerals

Minerals extraction

The mineral deposits which are exploited in Orkney are rock and sand. Rock is quarried from four sites in the West Mainland: the Council's Cursiter Quarry in the parish of Firth, a sandstone quarry; and commercially owned quarries at Heddle, which is also in Firth; Cruaday in the parish of Sandwick; and Gairsty in the parish of Quoyloo.

Commercial sand extraction is permitted from privately-operated sites at the Bu in Burray, Aikers in South Ronaldsay and Noltland in Westray..

Recycling of mineral resources

At Cursiter Quarry there is a reception facility where builders may deposit waste concrete, stone and rubble. This material is then crushed at the quarry and offered for re-sale, which means that significant amounts of material is being re-used rather than sent to landfill.

Road planings are also received at the quarry. In the past these have been crushed and re-sold as recycled road materials. However, in future, road planings will continue to be accepted at the quarry but will be stockpiled on site rather than sold. The current asphalt plant at Cursiter Quarry is due to be replaced and once the new plant is installed it will become standard practice at the quarry to incorporate 25% recycled road planings in the manufacture of new road surface material.

Quantities of both road planings and aggregates recycled are set out in Table 9.3.

Table 9.3: Road Planings and Aggregate recycled by Orkney Islands Council⁵³

Year	Road planings (tonnes)	Aggregate (tonnes)
2013-14	919.9	1009.9
2012-13	2322.1	1827.8
2011-12	778	1360
2010-11	633	1826
2009-10	577	1779
2008-09	1,348	2,434
2007-08	None	1,620
2006-07	625	5,467
2005-06	1,405	3,651
2004-05	2333	5,378
2003-04	4287	1,617

9.3 Environmental issues

The policies of the Local Development Plan can assist in the achievement of national waste targets by adopting a policy approach which will encourage households and businesses to recycle, reuse or compost more waste. Its development planning policies can also encourage

⁵³ Orkney Islands Council Development & Infrastructure

further reuse and recycling of building rubble as secondary aggregate, reducing pressure on minerals extraction sites.

Summary of data collected in compiling the environmental baseline

DATA	SOURCE
Area and population of Orkney	General Register Office for Scotland
CLIMATIC FACTORS	
CO ₂ emissions within the scope of influence of Orkney Islands Council	Ricardo-AEA May 2014 Local and Regional CO ₂ Emissions Estimates for 2005-2012 (Ricardo-AEA/R/3374)
Types of central heating used in Orkney	Scotland's Census 2011 http://www.scotlandscensus.gov.uk/r2-downloadable-files
Average number of cars or vans in Orkney	http://www.scotlandscensus.gov.uk/documents/censusresults/release2a/rel2asbfigure21.pdf
Passenger numbers for subsidised bus services in Orkney	Transport Service, Orkney Islands Council 2014
Operational grid-connected wind turbines in Orkney December 2012 (0.5MW and over)	Orkney Islands Council Development Management Service
Information on lease arrangements for wave and tidal energy development	www.thecrownstate.co.uk
Average rainfall in Orkney	SNIFFER, 'A handbook of climate trends across Scotland', 2006 www.sniffer.org.uk
Information on current climate trends	http://www.scotlandscensus.gov.uk/documents/censusresults/release2a/rel2asbfigure21.pdf
	SNIFFER, 'A handbook of climate trends across Scotland', 2006 www.sniffer.org.uk
Information on sea level rise	National Oceanic and Atmospheric Administration (NOAA) http://oceanservice.noaa.gov/facts/sealevel.html
North of Scotland future climate change scenarios	UK Climate Impacts Programme www.ukcip.org.uk
Passenger numbers at Kirkwall Airport	Transportation Service, Orkney Islands Council 2007/08.

DATA	SOURCE
Information on Orkney's prevailing winds	May, V.J. and Hansom, J.D. (2003) <i>Coastal Geomorphology of Great Britain</i> , Geological Conservation Review Series, No. 28, Joint Nature Conservation Committee, Peterborough, 754 pp.
LOCAL AIR QUALITY	
Discharges to air from major industrial processes	Scottish Pollutant Release Inventory (SEAP), www.sepa.org.uk
Air quality in Orkney	Local Air Quality Management Progress Reports
BIODIVERSITY, FLORA & FAUNA	
Legislation relating to European Protected Species	SNH website: www.snh.gov.uk
List of statutory and non-statutory designated natural heritage sites	Scottish Natural Heritage (SNH) www.snh.gov.uk Orkney Islands Council Local Plan
Lists of Priority habitats in Orkney	Orkney Islands Council Local Biodiversity Action Plan
Information on bat sightings in Orkney	Orkney Wildlife Information and Records Centre
Information on cetacean presence in Orkney	Booth, C. & J. Sillocks, Skarfies & Selkies, (2005)
Information on basking shark presence in Orkney	Orkney Wildlife Information and Records Centre
Measures to protect species outwith designated areas	SNH website: www.snh.gov.uk
Information relating to RSPB reserves in Orkney	RSPB website: www.rspb.org.uk
Climate change and natural heritage	Scottish Natural Heritage http://www.snh.gov.uk/climate-change/impacts-in-scotland/effects/habitats/
WATER	
Water quality data (freshwater and coastal) and Groundwater quality data	Scottish Environment Protection Agency (SEPA)
Definition of Groundwater Dependent Terrestrial Ecosystems	Water Framework Directive UK Technical Advisory Group http://www.wfduk.org/resources/groundwater-dependent-terrestrial-ecosystem-threshold-values
GDTEs present in Orkney	Scotland's Environment Web

DATA	SOURCE
SOIL	
Information relating to Orkney soil types	Soil and land capability for agriculture maps (Orkney and Shetland) mapsales@macaulay.ac.uk
	Scottish Natural Heritage Review No 100, Orkney Landscape Character Assessment. Land Use Consultants, Glasgow (1998)
Plans to establish a soil monitoring system	Changing Our Ways, Scotland's Climate Change Programme, Scottish Executive 2006
Data on Agricultural Land Use in Orkney between 2005-2012	Scottish Agricultural Census 2005 – 2012
Contaminated Land Inspection Strategy 2003	Orkney Islands Council Department of Environmental Health
Derelict and Urban Vacant Land in Orkney	Scottish Vacant and Derelict Land Survey 2013 http://www.gov.scot/Publications/2014/02/7170
GEOLOGY	
Geology of Orkney	www.fettes.com/orkney/geology
Orkney and Shetland a Landscape Fashioned by Geology	www.snh.org.uk
Orkney geological sites	JNCC website The Orkney Local Development Plan 2014
LANDSCAPE	
Information on Landscape Character Assessment	Scottish Natural Heritage Review No 100, Orkney Landscape Character Assessment
Hoy and West Mainland NSA	Scottish Natural heritage www.snh.org.uk
Landscape capacity for wind energy development	Landscape Capacity Assessment for Wind Energy in Orkney, Ironside Farrer (2014)
CULTURAL HERITAGE	
Definition of the historic environment	SHEP 1 (Historic Scotland's policy for the sustainable management of the historic environment)
Overview of Orkney's history and pre-history	www.orkneyjar.com
Lists of Scheduled Monuments and Listed	PASTMAP, www.historic-

DATA	SOURCE
Buildings Information on Conservation Areas and Gardens and Designed Landscapes	scotland.gov.uk/index/ancientmonuments/searchmonuments.htm Scottish Natural Heritage, www.snh.org.uk
POPULATION & HUMAN HEALTH	
Population trends in Orkney	Orkney Economic Review 2012-13 (source General Register Office for Scotland (GROS))
Population estimates for Orkney 2015-2035	General Register Office for Scotland (GROS) estimates http://www.gro-scotland.gov.uk/mwg-internal/de5fs23hu73ds/progress?id=ntGhk25ubu
Population trends in the Orkney Islands over the period 1961 – 2011	Scotland's Census Results Online
Life expectancy at birth of residents of the Orkney Islands over the period 2000 – 2010	General Register Office for Scotland
Age and sex structure of the population of the Orkney Islands (2011)	General Register Office for Scotland
Summary of Orkney health statistics	www.scotpho.org.uk/comparative-health/profiles/2010-chp-profiles
MATERIAL ASSETS	
Treatment of waste produced in Orkney	www.SEPA.org.uk
Scottish waste recycling targets	SEPA, www.sepa.org.uk
Source of aggregates used in Orkney	Orkney Islands Council Roads Department
Road Planings and Aggregate recycled by Orkney Islands Council	Orkney Islands Council Development & Infrastructure
National policy guidance	Scottish Planning Policy 2014