

# ORKNEY ISLANDS COUNCIL - HARBOUR AUTHORITY

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## Draft Orkney Harbours Masterplan Phase 1

### Strategic Environmental Assessment - Environmental Report

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## DOCUMENT RELEASE FORM

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Draft Orkney Harbours Masterplan Phase 1

Strategic Environmental Assessment - Environmental Report

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## NON TECHNICAL SUMMARY

This document has been prepared for Orkney Islands Council Harbour Authority (OICHA) by Intertek Energy and Water Consultancy Services (Intertek). It is the Environmental Report resulting from the Strategic Environmental Assessment (SEA) of the Draft Orkney Harbours Masterplan Phase 1.

### Purpose of this Environmental Report

This Non-Technical Summary (NTS) provides the process, methods, outcomes and future stages of the SEA which has been undertaken for the Draft Orkney Harbours Masterplan Phase 1 (hereafter referred to as 'Orkney Harbours Masterplan').

A SEA is an environmental assessment of Plans, Programmes and Strategies (PPS) and is undertaken in parallel with the preparation of the PPS to ensure that any environmental effects are considered during its preparation and adoption. It is required under the European Commission (EC) SEA Directive (2001/42/EC), which has been transposed into Scottish law via the Environmental Assessment (Scotland) Act 2005.

The aim of the NTS is to assist the reader in understanding what the potential environmental effects of implementing the Orkney Harbours Masterplan are likely to be if such a policy is adopted by Orkney Islands Council (OIC).

The Environmental Report is the main consultation document of the SEA and provides a description of the environment of Orkney in terms of an environmental baseline and the assessment of potential significant environmental effects, alongside proposed measures to mitigate and monitor environmental effects during the lifetime of the Orkney Harbours Masterplan.

### Context and Objectives of Orkney Harbours Masterplan

OICHA is responsible for the safe, economic and environmentally sustainable operation of the 29 piers and harbours in the Orkney Islands. OICHA, the statutory harbour authority as set in the 1974 Orkney County Council Act, is the responsible authority.

OICHA has a diverse business base and plays a fundamental role in supporting many key sectors in the Orkney economy and island communities. The range of ports and harbours is diverse, in terms of structure, size and nature of operational activity. The Oil Port of Scapa Flow hosts multiple ship-to-ship (STS) transfer operations of crude oil and vessels serving the Flotta Oil Terminal. It also accommodates oil rigs and platforms at anchor during downtimes in the sector. The major harbours of Hatston, Kirkwall and Stromness accommodate a range of operational activity across many sectors, e.g. cruise ship, marina, ferries, fishing, aquaculture, renewables and cargo. There are many smaller piers and harbours throughout the North and South Isles as well as across the Orkney Mainland: many of these accommodate life line island ferry services, aquaculture, fishing and marine leisure activities. Many of these piers are critical in ensuring the future viability of island or remote communities.

OICHA is in the process of developing an Orkney Harbours Masterplan for the future development of harbours and piers within the Orkney Islands. This will provide a structured framework for the physical development and transformation of Orkney's harbours over a 20-year period. The Orkney Harbours Masterplan will enable the OICHA to make informed decisions to meet changing markets, grow new markets, and safeguard Orkney's harbours as essential economic drivers and community assets for future generations. Further diversification and growth in harbour activities will not only safeguard existing jobs but create many more and in doing so strengthen the viability and sustainability of the local community for the longer term, making Orkney an attractive place to live, work and do business.

The Orkney Harbours Masterplan has been developed using a multi-faceted methodology:

- Development of a multi-criteria assessment framework to consider proposals at a high level;
- Tailored stakeholder engagement to explore and validate issues, constraints and potential options; and
- Alignment with Treasury's Greenbook guidance on the development of Strategic Outline Cases (SOCs) and Outline Business Cases (OBCs). The content of this Orkney Harbours Masterplan aligns closely with what is required of an SOC.

A review of the Orkney Harbours Masterplan relationship with other PPS was undertaken as part of this assessment, which enabled relevant environmental protection objectives to be identified and taken into account in preparation of the Orkney Harbours Masterplan. Environmental protection objectives identified included: protection of various aspects of biodiversity, flora and fauna, cultural heritage and water quality, controls for carbon emissions, prevention of pollution and promotion of sustainable communities.

## Current Environmental Conditions and SEA Objectives

An environmental baseline was prepared for the relevant SEA environmental receptors. The baseline will inform the environmental assessment that evaluates the environmental effects that could result from implementation of the Orkney Harbours Masterplan. Environmental receptors, which are the most sensitive to the potential effects of the Orkney Harbours Masterplan, are *Air, Biodiversity, Flora and Fauna, Water, Climatic Factors, Soils, Landscape, Material Assets, Cultural heritage, Cross-sectorial, Population and Human Health*. Assessment of likely significant effects on the environment was carried out against a range of SEA objectives for these topics.

The environmental baseline identified a number of environmental problems that have been deemed relevant for the Orkney Islands and the surrounding areas including:

- Deterioration of seabird populations;
- Deposition of fish wastes from aquaculture and interaction with wild fish populations;
- Deterioration of harbour seal (*Phocoena phocoena*) populations, in Orkney and North Scotland;
- Introductions of invasive non-native species (NNS);
- Damage caused by anchors and moorings;
- Physical effects of scallop dredging;
- Background levels of oil spillage and seepage;
- Pollution from shipping;
- Agricultural runoff;
- Marine litter;
- High carbon emissions from harbour fleet and ferries;
- Relatively high carbon footprint;
- Increased risk of flooding at a number of locations due to climate change sea level rise;
- Increased risk of coastal erosion at a number of locations due to combination of rising sea levels and increased storminess;
- Growing trend in waste produced; and

- Potential effect of disturbance to areas of contaminated land.

The SEA objectives used in the assessment were:

1. To maintain or improve air quality and reduce emissions of key pollutants.
2. Avoid damage to the biodiversity, flora and fauna within the vicinity of the Orkney Islands.
3. Prevent introduction of new invasive species into the Orkney Islands.
4. Minimise greenhouse gases emissions and the Port's carbon footprint.
5. Prevent damage to or loss of heritage features including maritime heritage.
6. Protect the landscape/seascape character and visual amenity in the vicinity of the area.
7. Promote the sustainable use and management of material assets.
8. To meet the objectives of the Zero Waste Plan.
9. Improve the safety record of the harbours and improve safety for the sea users.
10. Protect and improve human health and wellbeing through improved environmental quality.
11. Maintain or improve soil quality and prevent any further degradation of soils.
12. Protect and enhance the state of the water environment.

## Alternatives Considered

An initial long list of options to be considered was derived from stakeholder discussion and workshops, internal discussions with OICHA and staff, market assessment and desk-based research and review. A number of these options were screened out of further environmental assessment, as they did not meet the objectives of the Orkney Harbours Masterplan or were not feasible. All options, included in the initial long list of potential options, were considered to have the potential to result in a negative impact on the environment. Any option included within the Orkney Harbours Masterplan will have some impact on the environment to varying extents, therefore environmental appraisal of the options was not considered in this initial shortlisting phase. Based on this, a high-level assessment to select the preferred options mainly focused on their technical appraisal. Many of the options rejected initially were either technically not viable or did not deliver against the Orkney Harbours Masterplan's outline requirements and/or objectives. The options (hereafter referred to as proposals) taken forward to the assessment of likely significant effects on the environment were:

Location	Proposals
Kirkwall Pier	<ul style="list-style-type: none"> <li>▪ New multi-purpose quayside infrastructure</li> <li>▪ Waterfront development and marina expansion (through reclamation)</li> <li>▪ Improving quayside layout and traffic management</li> <li>▪ Improvements to fish landing areas</li> <li>▪ Dredging to provide deeper water</li> </ul>
Hatston	<ul style="list-style-type: none"> <li>▪ New multi-purpose deep water quayside infrastructure</li> <li>▪ Reclamation and land available for development</li> <li>▪ Reconfiguration of marshalling areas and access routes</li> <li>▪ New passenger reception facility.</li> </ul>
Scapa Pier	<ul style="list-style-type: none"> <li>▪ Pier extension and dredging to provide deeper water</li> </ul>

Location	Proposals
	<ul style="list-style-type: none"> <li>Marine leisure slipway/pontoons</li> </ul>
Stromness & Copland's Dock	<ul style="list-style-type: none"> <li>Improvements to Copland's Dock</li> <li>Reclamation to create additional development area</li> <li>Improvements to shoreside layout &amp; traffic management</li> </ul>
Scapa Deep Water Pier	<ul style="list-style-type: none"> <li>New deep-water quayside infrastructure</li> <li>5+ hectares of laydown area</li> </ul>

## Environmental Assessment Findings

Assessment of the likely significant environmental effects of the above selected proposals concluded that there is the potential for negative effects on air, biodiversity, flora and fauna, climatic factors, cultural heritage, landscape, material assets, population and human health, soils and water from implementation of the Orkney Harbours Masterplan. These potential impacts are mainly resulting from activities during the construction phase. Potential impacts on the SEA topics are summarised below:

- **Air:** Negative effects on air include increased emissions and dust (during construction); change to local air quality; and additional traffic (sea and road) following implementation of the developments could lead to higher future emissions during the operation phase.
- **Biodiversity, Flora and Fauna:** Negative effects on biodiversity, flora and fauna may include underwater noise and visual impacts resulting in disturbance of birds and marine mammals; direct habitat loss and disturbance; effects on designated sites (indirectly through vessel movements or disturbance or loss of habitats and species during construction and operation); and the potential introduction and spread of invasive NNS. All the Masterplan proposals are located with a Proposed Special Protection Area (pSPA). Kirkwall and Hatston are located within the North Orkney pSPA and Scapa Pier, Stromness and Scapa Deep Water Pier are located with the Scapa Flow pSPA.
- **Climatic Factors:** Negative effects on climatic factors include increase in Green House Gas (GHG) and carbon footprint during construction and operation.
- **Cultural Heritage:** Potential negative effects on cultural heritage include disturbance of archaeology during construction; and long-term effects due to change in the cultural setting.
- **Landscape:** Potential negative effects on landscape include changes to landscape character; effects on national scenic area; and general deterioration of visual amenity / seascape.
- **Material Assets:** Negative effects on material assets could arise due to an increase in waste due to dredging and additional vessels visiting the harbour and piers.
- **Population and Human Health:** Negative effects on human health and population include effects on the safety of harbour users as introduction of new structures presented physical barriers affecting navigation. This could lead to an increase in accidents. In addition, increased vessel movements due to additional traffic could lead to an increase in accidents and incidents. There could also be health effects from increased dust and emissions and disturbance and nuisance impacts from construction and increased shipping traffic. Benefits include sustainable use of material assets through the enhancement of existing port facilities. The development and enhancement of facilities could lead to employment opportunities (both during construction and operation), the success or failure of port developments could lead to an increase or decrease in commercial activity.
- **Soils:** Negative effects on soils include introduction of new sources of pollution, erosion of coastline due to changes in wave climate and effects on soil function and land use changes.

- **Water:** Negative effects on water include degradation of water quality due to short term mobilisation of contaminated sediments and turbidity impacts; hydrodynamic changes due to changes to the shoreline and dredging; and follow on morphological changes, though these are expected to be minor. In addition, degradation of water quality through accidental release of fuel or vessel containment.

## Cumulative and Synergistic effects

Cumulative and synergistic effects were also considered. Cumulative effects could arise from the combined effects of the development of the Orkney Harbours Masterplans proposals and other plans and activities within the area. Synergistic effects could arise from interactions between activities leading to a greater overall effect than the sum of the individual effects. Activities and developments that were considered included marine renewable developments, other port and harbour developments, cable installations and general shipping.

The assessment found the following:

- The simultaneous construction of several proposals identified in the Orkney Harbours Masterplan is likely to lead to the greatest cumulative negative effects on the wider environment.
- Development of the Orkney Harbours Masterplan proposals and other projects could lead to cumulative negative effects on air, biodiversity, flora and fauna, climatic factors, material assets, population and human health, soils and water.
- It is likely that good planning and timing of works will minimise the potential for negative cumulative and in-combination effects.

There is inevitably uncertainty in predicting cumulative and synergistic effects and determining their significance due to the strategic nature of this study and the current lack of detailed proposal plans and timelines. In addition, uncertainty can arise due to the variation in natural systems and their interactions, a lack of reliable and up to date information, sufficient scientific agreement regarding cause-effect relationships and the inability to adequately understand and represent complex systems and the potential implications of cumulative and synergistic effects on these systems.

## Mitigation Measures

Measures envisaged to prevent, reduce and as fully as possible offset any significant adverse environmental effects of implementing the Orkney Harbours Masterplan were numerous and include the following:

- All works and planning of works should be undertaken with respect to all relevant legislation, licencing and consent requirements and recommended best practice;
- The timing of construction works should be planned to avoid any potential for negative cumulative impacts or inter-relationships with other schemes, plans or projects;
- Development of a Construction Environmental Management Plan at project level, detailing how impacts on biodiversity, flora and fauna would be avoided / mitigated;
- Appointment of Ecological Clerk of Works (ECOW) for each construction project;
- Surveys could be undertaken to determine European Protected Species (EPS) and basking sharks presence in areas where development is proposed;
- Where works may generate loud underwater noise (e.g. blasting or pile driving), a marine mammal observer would be present. Pre-search will be done prior to commencing the work to ensure no cetaceans or otter are within 500m of the operations for a 30 minutes duration. If no cetaceans / otter are sighted, a soft-start procedure will be followed;
- Consideration should be given to seasonal restrictions to avoid periods when birds are present and undertake works during less sensitive periods;

- Surveys (ecological and environmental baseline) should be commissioned where necessary;
- Implementation of dredging mitigation strategy and implementation of good practices;
- Dredging activities should be timed so as to not disturb migrating fish and nesting birds;
- Habitat survey of the area would be commissioned;
- Implementation of Ballast Water Management Plan and industry standard ballast water management practices;
- Cleaning of equipment and plant machinery with management practices to prevent the spread of invasive NNS;
- Undertake an archaeological survey. If archaeological features are identified construction should be supervised by a qualified archaeologist and combined with sensitive construction methods and restoration to minimise potential damages;
- Undertake landscape and visual assessment;
- Undertake navigational risk assessments;
- Undertake road traffic assessments;
- Noise-producing activities such as piling should only take place during daylight hours and monitoring of these activities should occur;
- Land take should be kept to a minimum;
- Re-use of dredged materials where possible (e.g. for shoreline reclamation);
- The inclusion of sustainable drainage systems should be considered at the planning stage of the new developments;
- Development of a dredging mitigation strategy to ensure potential impacts from sediment re-suspension and distribution of contaminated sediments minimised;
- Undertake Water Framework Directive (WFD) Assessment for all developments;
- Completion of all relevant licensing and permitting for dredging activities;
- Water quality impacts should be kept to a minimum by ensuring good management and planning of projects.
- Using Best Available Techniques / Technologies (BAT) at all times;
- Preparation of emergency response plans and accident prevention procedures;
- Good working practices including; silt traps, hydrocarbon interceptors, appropriate storage of fuel, oils and chemicals, provision of spill kits and plant washing facilities;
- Identification of historically contaminated areas;
- Each development should be subject to a detailed Flood Risk Assessment at the planning phase;
- Detailed surveys and hydrodynamic modelling should be undertaken to inform design to ensure there are no negative impacts on coastal processes;
- Disposal of dredge spoil should be carried out in licensed areas where it would not impact negatively upon vulnerable marine habitats or the activities of other users of the sea; and
- At the Environmental Impact Assessment (EIA) stage, engineering designs will be finalised and the mitigation measure refined.

## Monitoring Programme

As the responsible authority, OICHA will monitor the significant environmental effects of the implementation of the Orkney Harbours Masterplan. In order to monitor significant environmental effects and unforeseen significant adverse effects of the Masterplans Proposals development a monitoring framework has been proposed. This framework contains information on remedial actions which may be required following detection of unforeseen adverse effects. A summary of the proposed monitoring framework is presented below.

What is being monitored?	Data source	Summary of monitoring and proposed remedial actions
Air Quality	Scottish Environment Protection Agency (SEPA) reporting	GHG emissions, dust and noise to be monitored during construction.
NNS Presence	OIC Marine Invasive NNS survey	Presence and trends of marine Invasive NNS in Scapa Flow monitored and reported to Orkney Marine Environment Protection Committee.  Any detected Invasive NNS will be reported to GB NNS Secretariat for risk assessment and action plans.  OICHA will follow the guidance of GB NNS Secretariat.
Disturbance of EPS and other important species	Traffic volumes - continuous	Shipping traffic volumes to be monitored.
	Cetaceans, seal & otters - Annual	Populations of cetaceans, seals and otters will continue to be monitored.
Special Areas of Conservation (SAC) and Special Protection Area (SPA) site condition	Scottish Natural Heritage (SNH) site condition monitoring	Status, condition, area and number of species for all European sites.
Flame shell and Seagrass beds	Orkney Biodiversity Action Plan (OBAP)	Monitoring of habitat and species supported by habitat as set out in the OBAP.
Carbon emissions	OIC Carbon Management Programme	Carbon dioxide emissions from tug boats and harbour craft monitored to ensure Carbon Management Programme targets are met.
Waste by-products	OIC Waste Plan and monitoring and reporting	Quantities of waste by-products produced during construction and by vessels monitored.
Accidents and Incidents	OIC Accidents and Incidents monitoring and reporting	Impacts on safety of harbour users will be recorded.  Number and type of accidents and incidents monitored will include any accidents due to navigational changes.
Soil and sediment	OIC monitoring and reporting / SEPA	Potential contamination of soils and sediments to be monitored.
Coastal erosion	Orkney Local Development Plan	Rates and areas of coastal erosion rates within the Orkney Islands.

What is being monitored?	Data source	Summary of monitoring and proposed remedial actions
Water quality	WFD water quality reporting	Water quality of coastal and transitional waters to be monitored to fulfil the WFD monitoring requirements to ensure thresholds are not exceeded. Parameters monitored include; benthic invertebrates, phytoplankton, macroalgae, physio-chemical.

## How to comment on this Report

This Environmental Report has been published alongside the Draft Orkney Harbours Masterplan. Both are available to download from [www.orkneyharbours.com](http://www.orkneyharbours.com)

Hard copies of the Draft Orkney Harbours Masterplan and the Environmental Report will be available for viewing, free of charge, at the following locations:

- Customer Services, Orkney Islands Council, School Place, Kirkwall, Orkney, KW15 1NY,
- Orkney Library, 44 Junction Road, Kirkwall, Orkney, KW15 1AG,
- Stromness Library, Warehouse Buildings, 2 – 12 Victoria Street, Stromness, Orkney, KW16 3AA, and
- On-board the Orkney Mobile Library Service.

The documents are available during the normal opening hours of these facilities.

**You are hereby invited to express your views on this Environmental Report and the Draft Orkney Harbours Masterplan. Please send your comments by email to [anne@fisheradvisory.com](mailto:anne@fisheradvisory.com) or by post to Orkney Islands Council, Marine Services, Harbour Authority Building, Scapa, Orkney, KW15 1SD.**

The consultation period runs from 10<sup>th</sup> June 2019 until 22<sup>nd</sup> July 2019. Any comments that you wish to make should be submitted by email or in writing no later than **Monday 22<sup>nd</sup> July 2019**.

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## GLOSSARY

### **BAP**

Biodiversity Action Plan

### **BWM**

Ballast Water Management

### **BWM Convention**

International Convention for the Control and Management of Ships' Ballast Water and Sediments 2004

### **CD**

Chart Datum

### **Consultation Authorities**

Scottish Natural Heritage, Scottish Environment Protection Agency and Historic Environment Scotland

### **Defra**

Department for Environment, Food & Rural Affairs

### **EC**

European Commission

### **EMODnet**

European Marine Observation and Data Network

### **EPS**

European Protected Species

### **ER**

Environmental Report

### **GHG**

Green House Gas

### **HMS**

Her Majesty's Ship

### **HRA**

Habitats Regulation Appraisal

### **HSE**

Health and Safety Executive

### **IMO**

International Maritime Organisation

### **JNCC**

Joint Nature Conservation Committee

### **LBAP**

Local Biodiversity Action Plan

### **MarLin**

Marine Life Information Network

### **MARPOL**

International Convention for the Prevention of Pollution from Ships

### **MEPC**

Marine Environment Protection Committee

### **MOD**

Ministry of Defence

### **MPA**

Marine Protected Area

### **NHS**

National Health Service

### **NNS**

Non-native species

### **OBC**

Outline Business Cases

### **OBRC**

Orkney Biological Records Centre

### **OFA**

Orkney Fisheries Association

### **OIC**

Orkney Islands Council

### **OICHA**

Orkney Islands Council Harbour Authority

### **OSPAR**

Oslo and Paris Conventions

### **OMEPC**

Orkney Marine and Environmental Protection Committee

**PAIH**

Potential Annex I Habitat

**PMF**

Priority Marine Feature

**PPS**

Plan, Programme or Strategy

**pSPA**

Proposed Special Protection Area

**Ramsar**

Ramsar sites are wetlands of international importance designated under the Ramsar Convention (Iran, 1971)

**RBMP**

River Basin Management Plan

**RSPB**

Royal Society for the Protection of Birds

**SAC**

Special Areas of Conservation

**SAHFOS**

Sir Alister Hardy Foundation for Ocean Science

**SCI**

Site of Community Importance

**SEA**

Strategic Environmental Assessment

**SEPA**

Scottish Environment Protection Agency

**SMRU**

Sea Mammal Research Unit

**SNH**

Scottish Natural Heritage

**SOC**

Strategic Outline Cases

**SPA**

Special Protection Area

**SSSI**

Site of Special Scientific Interest

**STS**

Ship-to-Ship

**UK BAP**

UK Biodiversity Action Plan

**UNESCO**

United Nations Educational, Scientific and Cultural Organization

**WFD**

Water Framework Directive

# 1. INTRODUCTION

This document has been prepared for Orkney Islands Council Harbour Authority (OICHA) by Intertek Energy and Water Consultancy Services (Intertek). It is the Environmental Report resulting from the Strategic Environmental Assessment of the Draft Orkney Harbours Masterplan Phase 1, hereafter referred to as 'Orkney Harbours Masterplan'.

## 1.1 Background Information

Orkney Islands Council (OIC) is the Statutory Harbour Authority responsible for the safe and efficient operation of the 29 piers and harbours located throughout the Orkney Islands.

The range of ports and harbours is diverse, in terms of structure, size and nature of operational activity.

The Oil Port of Scapa Flow hosts multiple ship-to-ship (STS) transfer operations of crude oil and vessels serving the Flotta Oil Terminal. It also accommodates rigs and platforms at anchor during downtimes in the sector.

The major harbours of Hatston, Kirkwall and Stromness accommodate a range of operational activity across many sectors – cruise, marina, ferries, fishing, aquaculture, renewables and cargo.

There are many smaller piers and harbours throughout the North and South Isles as well as across the Orkney Mainland: many of these accommodate life line island ferry services, aquaculture, fishing and marine leisure activities. Many of these piers are critical in ensuring the future viability of island or remote communities.

OICHA has a diverse business base and plays a fundamental role in supporting many key sectors in the Orkney economy and island communities.

## 1.2 Draft Orkney Harbours Masterplan

### 1.2.1 Overview

OICHA is in the process of developing a Orkney Harbours Masterplan for the future development of harbours and piers within the Orkney Islands area.

The fundamental purpose of the Orkney Harbours Masterplan is to provide a **structured framework for the physical development and transformation of Orkney's harbours over a 20-year period**. It will enable the OICHA to make informed decisions to meet changing markets, grow new markets, and safeguard Orkney's harbours as essential economic drivers and community assets for future generations. Further diversification and growth in harbour activities will not only safeguard existing jobs but create many more and in doing so strengthen the viability and sustainability of the local community for the longer term, making Orkney an attractive place to live, work and do business.

The Orkney Harbours Masterplan has been developed using a multi-faceted methodology:

- Development of a multi-criteria assessment framework to consider proposals at a high level.
- Tailored stakeholder engagement to explore and validate issues, constraints and potential options.
- Alignment with Treasury's Greenbook guidance on the development of Strategic Outline Cases (SOCs) and Outline Business Cases (OBCs). The content of this Orkney Harbours Masterplan aligns closely with what is required of an SOC.

## 1.3 Purpose of this Environmental Report

As part of the preparation of the Orkney Harbours Masterplan, OICHA (the Responsible Authority) is carrying out a Strategic Environmental Assessment (SEA). The SEA has been undertaken in parallel with the development of the Draft Orkney Harbours Masterplan. The SEA fulfils the requirement of EU Directive 2001/42/EC on the assessment of the effects of certain plans and programmes on the environment (the SEA Directive), as transposed into Scottish Law by the Environmental Assessment (Scotland) Act 2005. SEA is a systematic method for considering the likely environmental effects of a Plan, Programme or Strategy (PPS). SEA aims to:

- integrate environmental factors into PPS preparation and decision-making;
- improve PPS and enhance environmental protection;
- increase public participation in decision making; and
- facilitate openness and transparency of decision-making.

The key SEA stages are shown in table 1-1 below.

**Table 1-1 Key Stages of an SEA**

Stage	Details
Screening	determining whether the PPS is likely to have significant environmental effects and whether an SEA is required
Scoping	deciding on the scope and level of detail of the Environmental Report, and the consultation period for the report – this is done in consultation with Scottish Natural Heritage (SNH), The Scottish Ministers (Historic Environment Scotland) and the Scottish Environment Protection Agency (SEPA) (the ‘Consultation Authorities’)
Environmental Report	publishing an Environmental Report on the PPS and its environmental effects, and consulting on that report
Adoption	providing information on: the adopted PPS; how consultation comments have been taken into account; and methods for monitoring the significant environmental effects of the implementation of the PPS
Monitoring	monitoring significant environmental effects in such a manner so as to also enable the Responsible Authority (in this case OICHA) to identify any unforeseen adverse effects at an early stage and undertake appropriate remedial action.

The purpose of this Environmental Report is to:

- provide information on the Orkney Harbours Masterplan;
- identify, describe and evaluate the likely significant effects of the PPS and its reasonable alternatives;
- provide an early and effective opportunity for the Consultation Authorities and the public to offer views on any aspect of this Environmental Report.

## 1.4 Scoping Report Consultation

In order to obtain local input into the assessment methodology scope and baseline data, the Scoping Report (Intertek, 2018) was issued to Consultation Authorities in November 2018, as required by the Environmental Assessment (Scotland) Act 2005.

Consultation Authorities are:

- Scottish Natural Heritage (SNH)
- Scottish Environment Protection Agency (SEPA)
- Historic Environment Scotland

The Scoping comments received from the consultation authorities are summarised in Appendix D, along with how the comments were taken into account in the preparation of this SEA.

## **1.5 Scoping in and out of the SEA Topics**

In accordance with Schedule 2 of the Environmental Assessment (Scotland) Act 2005, OICHA has considered whether the environmental effects (both positive and negative) of the Orkney Harbours Masterplan are likely to be significant on the individual SEA topics listed in Schedule 3 of the Environmental Assessment (Scotland) Act 2005.

All SEA topics have been screened into the assessment as at this stage it cannot be ruled out that significant environmental effects will not occur. The SEA topics are:

- Air
- Biodiversity, Flora and Fauna
- Climatic Factors
- Cultural Heritage
- Landscape
- Material Assets
- Population
- Human Health
- Soils
- Water

## 2. OUTLINE OF THE ORKNEY HARBOURS MASTERPLAN

Schedule 3 of the Environmental Assessment (Scotland) Act 2005 requires that the Environmental Report includes “an outline of the contents and main objectives of the plan or programme”. The purpose of this section is to explain the nature, contents, objectives and timescales of the Orkney Harbours Masterplan.

### 2.1.1 Approach

The Orkney Harbours Masterplan is being developed using a multi-faceted methodology:

- Multi-criteria assessment framework to consider proposals at a high level.
- Tailored stakeholder engagement to explore and validate issues, constraints and potential options.
- Alignment with Treasury’s Greenbook guidance on the development of Strategic Outline Cases (SOCs) and Outline Business Cases (OBCs). The content of this Orkney Harbours Masterplan aligns closely with what is required of an SOC.

### 2.1.2 Optioneering process and identification/assessment of alternatives

An initial long list of potential options has been derived, this list was informed by the following:

- stakeholder discussion and workshops;
- internal discussions with OICHA and staff;
- market assessment; and
- desk-based research and review.

These mostly comprised improvements to existing harbour infrastructure such as new quays, dredging or provision of new facilities such as leisure pontoons. The location of each of these options is shown in Figure 2-1.

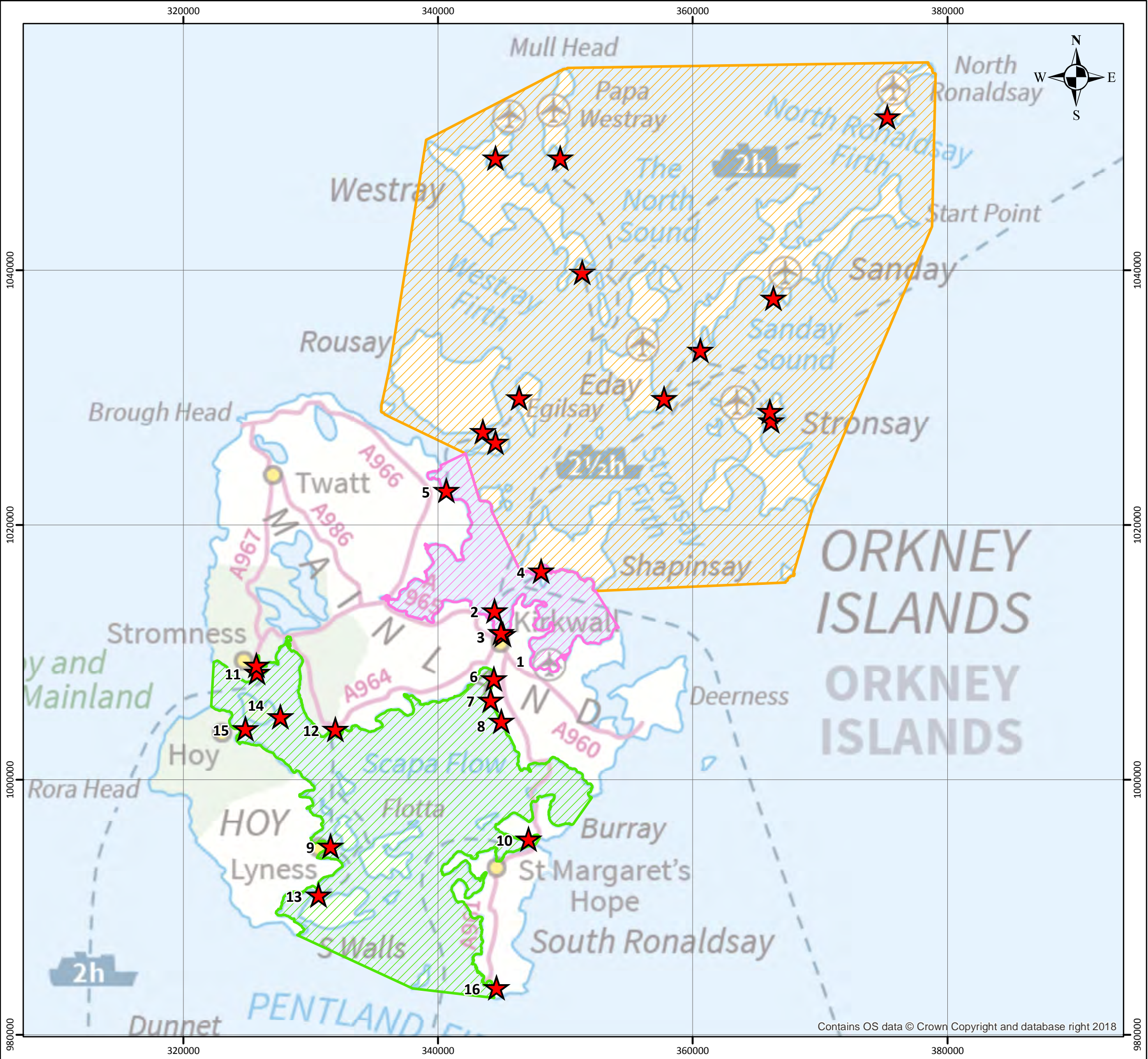
These options will be subject to an initial high-level qualitative assessment to assess how well they deliver against a set of outline requirements and overarching objectives. Table 2-1 provides a short description of each of the potential options.

**Table 2-1 Long List of Proposals Considered in the Draft Orkney Harbours Masterplan**

Geographical Area	Map ID	Initial Long List of Pier/Harbour Locations for Enhancement	Description
Kirkwall Bay & Tingwall	1	Kirkwall Pier	New quayside infrastructure, reclamation and marina expansion.
	2	Hatston	New quayside infrastructure, reclamation and areas identified for particular uses, such as boat repair, aquaculture, freight handling, etc.
	3	Hatston Slip	Potential enhancements included improving the surface of the slipway, provision of shore facilities, slipway extension and provision of boat repair facilities.

Geographical Area	Map ID	Initial Long List of Pier/Harbour Locations for Enhancement	Description
	4	Shapinsay	Potential enhancements included reconfiguration of the ferry terminal and parking areas.
	5	Tingwall	Consideration of options to improve wave climate and create more berthing space which could be done through building new quayside infrastructure or extending the existing pier, coupled with landside reclamation.
<i>Scapa Flow</i>	6	Scapa Pier	Extension of existing pier, with dredging and reclamation to create laydown area and marine berths.
	7	New Scapa Quay (10m depth)	New quayside infrastructure with depth of -10m chart datum (CD) and circa 5 hectares of laydown area.
	8	New Scapa Quay (20m depth)	New quayside infrastructure with depth of -20m CD and circa 5 hectares of laydown area.
	9	Lyness	Creation of hard standing area.
	10	Burray	Quay extension and dredging.
	11	Stromness	Reclamation and infilling between fenders at Copland's Dock and marina expansion in Stromness.
	12	Houton	Additional berthing space for small boats.
	13	Longhope	Additional berthing space for small boats.
	14	Graemsay	Additional berthing space for small boats.
	15	Moaness	Additional berthing space for small boats.
	16	Burwick	Enhancements to quayside infrastructure for ferry services.
<i>North Isles</i>	n/a	All harbours	Enhancements to quayside infrastructure.

\*Note: not all locations are labelled on the map



ORKNEY HARBOURS PORT  
MASTERPLAN 2020-2040

Figure 2-1: Geographical Extent of the Orkney Harbours Port Masterplan and Proposal Locations

- Legend**
- ★ Potential Pier/Harbour Locations for Enhancement
- Geographical Areas**
- Kirkwall Bay and Tingwall
  - North Isles
  - Scapa Flow



NOTE: Not to be used for Navigation

Date	Thursday, January 31, 2019 11:22:20
Projection	British_National_Grid
Spheroid	Airy_1830
Datum	D_OSGB_1936
Data Source	OSOD; ESRI; OIC;
File Reference	J:\P2214\Mxd\Report\Environmental_Report\Geographical_Extent.mxd
Created By	Chris Goode
Reviewed By	Emma Langley
Approved By	Beth Monkman



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### 2.1.3 Orkney Harbours Masterplan Horizon

The OICHA felt that now was the right time to consider developing a longer-term strategy for enhancing and investing in Orkney's harbours and piers. Whilst there has been considerable success recently in attracting new business and grant funding towards infrastructure developments, this Orkney Harbours Masterplan will be the first long-term strategy developed.

The Orkney Harbours Masterplan will cover a 20-year period (2020 – 2040), taking into consideration how projects can be phased and what funding is available. A detailed financial and economic assessment will enable a clear focus on the likely impacts associated with each proposal, which will enable a robust phasing plan to be developed.

## 2.2 Aims and Objectives of the Orkney Harbours Masterplan

The outline aims of the Orkney Harbours Masterplan are presented in Table 2-2.

**Table 2-2 Orkney Harbours Masterplan Aims**

Outline Requirements	
A.	Address wave climate and weather issues where relevant
B.	Enable Orkney to become a preferred supply base location for offshore Oil and Gas
C.	Enable Orkney to attract more rigs/platforms for repair, supplies and crew changes
D.	Improve the usability of pier infrastructure for smaller boats
E.	Provide necessary infrastructure to enhance resilience of Orkney's fuel supply now and potential diversification in the future
F.	Provide necessary infrastructure to safeguard and attract renewable energy activity and technologies
G.	Enable sustainable growth in cruise
H.	Enhance marine leisure and tourism in Orkney
I.	Facilitate potential growth in fishing
J.	Encourage new developments in boat repair market supply chain
K.	Safeguard and grow aquaculture activity and supply chain development in a manner that is compatible with harbour operations
L.	Facilitate growth in freight traffic and increase efficiency of freight handling
M.	Remove conflicts between pedestrians and operational activity
N.	Improve safety for all harbour users
O.	Improve local character and visual amenity for residents and visitors
P.	Improve integration with transport networks
Q.	Address accessibility issues
R.	Meet future requirements of external and internal ferry services and their users

## 3. CONTEXT

The purpose of this section is to explain the context of the Orkney Harbours Masterplan. This section provides a summary of the relationship between the Orkney Harbours Masterplan and relevant PPS; an list of the environmental baseline for the area the plan covers; an assessment of the limitations of the data; a list of current environmental problems within the area; the likely evolution of the environment implementation of the Orkney Harbours Masterplan; and the SEA objectives to be assessed in this ER.

### 3.1 Relationship with Other PPS and Environmental Protection Objectives

Schedule 3 of the Environmental Assessment (Scotland) Act 2005 requires that the ER includes an outline of the Orkney Harbours Masterplans relationships with other relevant PPS, and how environmental protection objectives have been taken into account in the Orkney Harbours Masterplans preparation. This section covers these issues and describes the policy context within which the Orkney Harbours Masterplan operates, and the constraints and targets that this context imposed on the Orkney Harbours Masterplan.

Appendix A lists all the PPS which have been reviewed alongside the Orkney Harbours Masterplan, identifies their environmental objectives and summarises how they affect or are affected by the Orkney Harbours Masterplan. A summary of the key points from this are listed in Table 3-1. Some of the key points listed are not directly environmental objectives, but they may be indirectly linked to environmental objectives.

**Table 3-1 Summary of Key Plans, Programmes and Legislation Relevant to the Orkney Harbours Masterplan**

	<b>Name of Plan, Programme or Strategy (PPS)</b>
International and EU	<p>Communication 'Towards an EU Strategy on Invasive Species' (EU COM(2008) 789)</p> <p>Council Directive 2006/7/EC The Revised Bathing Water Directive</p> <p>Council Directive 2002/49/EC, Environmental Noise Directive</p> <p>Council Directive 2008/50/EC, The Ambient Air Quality and Cleaner Air for Europe Directive</p> <p>Council Directive 2008/56/EC, The Marine Strategy Framework Directive</p> <p>Council Directive 2008/98/EC, The Waste Framework Directive</p> <p>Council Directive 2009/147/EC, The Birds Directive</p> <p>Council Directive 2014/89/EU, Maritime Spatial Planning Directive</p> <p>Council Directive 91/492/EEC, The Shellfish Waters Directive</p> <p>Council Directive 92/43/EEC, The Habitats Directive</p> <p>Council Directive 2000/60/EC, The Water Framework Directive (WFD)</p> <p>EU Biodiversity Strategy to 2020</p> <p>Council Directive 2007/60/EC, EU Floods Directive</p> <p>EU Sustainable Development Strategy (EU SDS) 2006</p> <p>European Landscape Convention</p> <p>IMO International Convention for the Control and Management of Ships Ballast Water &amp; Sediments 2004</p> <p>IMO MARPOL Annex VI Prevention of Air Pollution from Ships 1997</p> <p>MARPOL Annex I Chapter 8 – Prevention of Pollution during transfer of oil cargo between oil tankers at sea 2009</p>

	<b>Name of Plan, Programme or Strategy (PPS)</b>
	<p>Second European Climate Change Programme [ECCP II] 2005</p> <p>Soil Thematic Strategy [COM(2006) 231]</p> <p>Taking Sustainable Use of Resources Forward: A Thematic Strategy on the prevention and recycling of waste (EU COM(2005) 666)</p> <p>The Convention Concerning the Protection of the World Cultural and Natural Heritage, Paris 1975 (UNESCO World Heritage Convention)</p> <p>The Convention of the Conservation of European Wildlife and Natural Habitats (1979)</p> <p>The Convention on the Conservation of Migratory Species of Wild Animals (1979)</p> <p>The Convention on Wetlands of International Importance especially as Waterfowl Habitat (Ramsar, 1971)</p> <p>UN Convention on Biological Diversity (Rio, 1992)</p> <p>United Nations Framework Convention on Climate Change (Rio de Janeiro 1992)</p> <p>World Heritage Convention</p> <p>Agreement on the Conservation of Small Cetaceans of the Baltic and North Seas 1992 (ASCOBANS)</p> <p>The Convention for the Protection of the Marine Environment of the North-east Atlantic 1992 (The OSPAR Convention)</p>
National	<p>2020 Routemap for Renewable Energy in Scotland (2011)</p> <p>A Consultation on the 2020 Challenge for Scotland's Biodiversity (2012)</p> <p>Ancient Monuments and Archaeological Areas Act 1979</p> <p>Aquaculture Growth Strategy</p> <p>Better Bathing Waters: Meeting the Challenges of the Revised Bathing Water Directive in Scotland 2006</p> <p>Choosing our future: Scotland's Sustainable Development Strategy (2005)</p> <p>Climate Change (Scotland) Act 2009</p> <p>Climate Change Delivery Plan for Scotland 2009</p> <p>Communication from the Commission to the European Parliament and the Council – Building a sustainable future for aquaculture [COM(2009)162]</p> <p>Decommissioning Action Plan</p> <p>Electricity Generation Policy Statement</p> <p>The Merchant Shipping (Prevention of Oil Pollution) (Amendment) Regulations 2005</p> <p>The Merchant Shipping and Fishing Vessels (Port Waste Reception Facilities) Regulation 2009</p> <p>Guidance on the assessment of alien species pressures – UK TAG 2013</p> <p>Historic Scotland's Marine Heritage Strategy 2012-15</p> <p>Invasive Non-Native Species Framework Strategy for Great Britain (Defra, 2008)</p> <p>Low Carbon Transport Innovation Strategy</p> <p>Marine (Scotland) Act 2010</p> <p>Marine Bird proposed Special Protection Areas</p> <p>National Infrastructure Plan</p> <p>National Planning Framework 3</p> <p>National Planning Framework for Scotland (NPF2) (2009)</p> <p>National Transport Strategy</p>

	<b>Name of Plan, Programme or Strategy (PPS)</b>
	Nature Conservation (Scotland) Act 2004 The Conservation of Habitats and Species Regulations 2017 Protection of Military Remains Act 1986 River Basin Management Plan (RBMP) 2015-2027 for the Scotland river basin district Scotland's Economic Strategy Scotland's National Marine Plan Scotland's Zero Waste Plan 2010 Scottish Action Plan Health & Safety Scottish Biodiversity List (Published 2013) Scottish Ferries Plan Scottish Government Economic Strategy 2011 Scottish Government's Energy Strategy Scottish Historic Environment Policy (SHEP) Scottish Marine Nature Conservation Strategy Scottish Marine Protection Areas (MPA) Project 2012 Scottish Planning Policy 2010 Subsea Engineering Action Plan The Bathing Waters (Scotland) Regulations 2008 The Conservation (Natural Habitats, &c.) Amendment (Scotland) Regulations 2019 The Conservation of Habitats and Species Regulations 2017 The Scottish Government's Climate Change Plan The UK National Ecosystem Assessment 2014 The Water Environment (Controlled Activities) (Scotland) Regulations 2011 (CAR) The Water Environment and Water Services (Scotland) (WEWS) Act 2003 UK Marine and Coastal Access Act 2009 UK Marine Monitoring and Assessment Strategy (UKMMAS) UK Post 2010 Biodiversity Framework (2012) Vision 2035 Oil & Gas UK Wildlife and Countryside Act 1981 Wildlife and Natural Environment (Scotland) Act 2011
Regional	HIE Operating Plan HITRANS Regional Transport Strategy Orkney & Shetland Area Waste Plan (2003) Orkney and Shetland Area Management Plan 2010-2015 Our Islands Our Future Joint Statement Pentland Firth and Orkney Waters Spatial Plan (PFOW)
Local	Empowering Communities in Orkney Kirkwall Urban Development Framework OIC Aquaculture Supplementary Guidance 2017 OIC Corporate Strategic Plan 2017-2023 Orkney Community Plan Orkney Hydrogen Economic Strategy

	<b>Name of Plan, Programme or Strategy (PPS)</b>
	Orkney Island Council Plan 2013 – 2018
	Orkney Islands Council Carbon Management Programme, Strategy and Implementation Plan 2007
	Orkney Local Biodiversity Action Plan (2018-2022)
	Orkney Local Development Plan 2017
	Orkney Sustainable Energy Strategy
	Scapa Flow Landscape Partnership Scheme
	North Isles Landscape Partnership Scheme
	Stromness Urban Development Framework

## 3.2 Environmental Baseline

Schedule 3 of the Environmental Assessment (Scotland) Act 2005 requires that the ER includes a description of “the relevant aspects of the current state of the environment and the likely evolution without implementation of the plan or programme”, and “the environmental characteristics of areas likely to be significantly affected”. This section aims to describe the environmental context within which the Orkney Harbours Masterplan operates and the constraints and targets that this context imposes on the Policy.

A detailed review of the baseline environment can be found in Appendix B, along with tables and figures detailing the main findings of the review. The following sections summarise Appendix B.

Table 3-2 summarises, for each identified SEA topic, the baseline data subject areas and lists the principal data sources for each subject.

**Table 3-2 Baseline data sources**

<b>SEA Topic</b>	<b>Environmental Baseline Data</b>	<b>Data Sources</b>
Biodiversity, flora and fauna	European and National Designated Sites: Marine Protected Area (MPA), Special Areas of Conservation (SAC), Site of Special Scientific Interest (SSSI), Special Protection Area (SPA), RAMSAR	SNH, Joint Nature Conservation Committee (JNCC), Marine Scotland’s National Marine Plan interactive (NMPI) tool
	European Protected Species	JNCC
	Priority Marine Features	Marine Scotland, SHN, JNCC
	Benthic Habitats	Marine Life Information Network (MarLin), Murray, Dalkin, Fortune and Begg (1999), European Marine Observation and Data Network (EMODnet)
	Birds	JNCC, Royal Society for the Protection of Birds (RSPB), Wildfowl and Wetlands Trust, British Trust for Ornithology, Scottish Ornithologists Club, SNH, Birdlife International
	Fish and Shellfish	SEPA, Marine Scotland

SEA Topic	Environmental Baseline Data	Data Sources
	Planktonic Communities	Sir Alister Hardy Foundation for Ocean Science (SAHFOS), Research Reports
	Marine Mammals	Sea Mammal Research Unit, JNCC, Local biodiversity action plan, Scottish Forum, National Biodiversity Network, SNH
	Aquaculture	Marine Scotland, The Scottish Government
	Invasive Species	MarLin, JNCC, Marine Scotland, SNH, OIC, Marine Pathways newsletter
Population	Population Density	Orkney Economic Review
	Population Demographics	General Register Office for Scotland
	Economic Output	Office of National Statistics
	Employment	Scottish Neighbourhood Statistics Work Orkney
Human Health	Life Expectancy	Orkney Community Planning Partnership
	Health and Safety	Various other Scottish Statistic sources Harbour Authority/OIC annual reports Health and Safety Executive (HSE)
Water	Water Quality	SEPA
	Surface Water, Ground Water and Coastal Water	SEPA
	Oil	SEPA
	Amenity Usage (divers, water sports)	SEPA, SNH
	Metals and Other Pollutants	SEPA
	Flood Risk	SEPA
Climatic Factors	Harbour Fleet Emissions	OIC
Material Assets	Current Infrastructure	OIC
	Energy	OIC
	Waste Statistics	SEPA/Audit Scotland
Cultural Heritage	Wrecks (including Scheduled Monuments)	Historic Environment Scotland
	World Heritage Sites	Historic Environment Scotland
	Protected Areas and World Heritage Sites	Historic Environment Scotland, UNESCO
	Controlled Sites (including designated war graves)	Historic Environment Scotland
Soil	Geological and Soil Features	British Geological Survey, Department for Environment, Food & Rural Affairs (Defra)
	Soil Contamination	SEPA, OIC

SEA Topic	Environmental Baseline Data	Data Sources
Air	Air Quality	OIC, SEPA, Defra
Landscape	Landscape Character Assessment	SNH

### 3.3 Limitations of the Data

The following summarises the gaps and/or limitations of the SEA baseline data, and how this assessment addressed these shortcomings:

- Local data was not always available for all parameters over a period of time long enough to determine trends. For example, the Orkney Biological Records Centre (OBRC) did not have 10 years' worth of data on otter sightings; the period of sightings available was limited to 2010 to 2012. This data is considered the best data available and therefore suitable for analysing the short-term sightings.
- Recent data for cetacean sightings were not obtained during the preparation of the ER. Data for the period 2002-2009 were used in this report. Publicly available data on sightings from Sea Watch (2019) were used to confirm that sightings information for the 2002-2009 period were relevant. It is recommended that recent data on cetacean sightings is obtained while an Environmental Impact Assessment (EIA) report is prepared for the selected Masterplan options.
- Where it was not possible to obtain detailed local data, secondary data sources were utilised, including reports on the state of the environment commissioned by SNH, JNCC and Marine Scotland. These reports contain a variety of datasets which were the best data available and are considered reliable for the assessment of the state of the environment.
- There were no specific data on the offshore benthic habitats or planktonic communities for the immediate Orkney area and in addition there was a lack of data on the current state of benthic habitats and planktonic communities and potential future population trends. Hence data was collated from secondary sources. These included a report commissioned by SNH on benthic species and habitats around the Orkney Islands (Moore, 2010), a report commissioned by JNCC on the Northern North Sea benthic habitats (Eleftheriou et al., 2004) and a report on plankton in the Northern North Sea by Johns (2004). These reports contain the best information available on benthic habitats and planktonic communities in the interest area and are well known and peer reviewed sources of information and therefore considered suitable for use in this SEA.

### 3.4 Environmental Problems

Schedule 3 paragraph 4 of the Environmental Assessment (Scotland) Act 2005 requires that the Environmental Report includes a description of existing environmental problems, in particular those relating to any areas of particular environmental importance. The purpose of this section is to explain how existing environmental problems will affect or be effected by the Orkney Harbours Masterplan, and whether the Orkney Harbours Masterplan is likely to aggravate, reduce or otherwise affect existing environmental problems. Existing environmental problems that have been deemed relevant for the Orkney Islands and the surrounding areas are summarised in Table 3-3.

**Table 3-3 Environmental problems relevant to the Orkney Harbours Masterplan**

SEA Topic	Environmental Problem	Implications for the Orkney Harbours Masterplan
Biodiversity, flora and fauna	Maintenance of condition of designated sites, under the requirements of the EC Habitat and Bird Directives.	The proposed developments implemented through the Orkney Harbours Masterplan must adhere to appropriate legislation and seek not to adversely impact the integrity of designated sites. A Habitats Regulation Appraisal (HRA) will be carried out for the Orkney Harbours Masterplan.
	Maintenance of condition as per designated sites conservation objectives.	
	Deterioration of seabird populations. Current status of breeding seabird populations shows many concerns with a predicted deterioration of trends.	The Orkney Harbours Masterplan must seek to not adversely affect seabird habitats and protected sites and disrupt seabird populations.
	Deposition of fish wastes from aquaculture and interaction with wild fish populations	The Orkney Harbours Masterplan must seek to not adversely affect wild fish populations and their habitats.
	Effects on non-designated but important habitats and species such as those identified for protection under proposed MPAs and Annex I Habitats (including potential habitats). Habitats and species identified as requiring further protection.	The Orkney Harbours Masterplan must seek to protect the species and habitats identified as proposed MPAs and Annex I Habitats (including potential habitats).
	Deterioration of harbour seal populations, in Orkney and North Scotland.	The Orkney Harbours Masterplan must ensure protected species and their habitats are not adversely impacted.
	Introductions of invasive NNS.	The Orkney Harbours Masterplan must seek to minimise NNS introduction risks.
	Damage caused by anchors and moorings	The Orkney Harbours Masterplan must ensure that seabed disturbance is kept to a minimum.
	Physical effects of scallop dredging	The Orkney Harbours Masterplan must ensure that the impacts on dredging activities on seabed habitats are kept as low as possible.
Population	Ageing population – decline in proportion of population which is economically active.	The developments proposed by the Orkney Harbours Masterplan should support economic development and employment within the Orkney Islands.
Water	Background levels of oil spillage and seepage. ACOPS (2011) identify that oil spills occur from accidents handling oil.	The Orkney Harbours Masterplan should seek to prevent pollution of the seas from chemicals and oil during construction and operation.
	Pollution from shipping	

SEA Topic	Environmental Problem	Implications for the Orkney Harbours Masterplan
	Agricultural runoff	The Orkney Harbours Masterplan should seek to prevent any additional pollution to sea from runoff.
	Marine litter is a persistent and widespread problem and the evidence is clear to see on many of Orkney's shorelines.	The Orkney Harbours Masterplan should seek to avoid marine littering during construction and operation.
Climatic Factors	High carbon emissions from harbour fleet and ferries.	The Orkney Harbours Masterplan should seek to monitor and reduce emissions, so that increased shipping activity does not lead to a reduction in air quality.
	Relatively high carbon footprint.	Orkney Harbours Masterplan proposals should be designed to be energy efficient and consider the sustainable use of building materials, incorporation of renewable energy technologies into new developments.
	A number of areas in Orkney are at increased risk of flooding due to climate change sea level rise.	Orkney Harbours Masterplan proposals should include coastal defence to ensure risk of flooding is controlled.
	A number of locations are at increased risk of coastal erosion due to combination of rising sea levels and increased storminess.	Orkney Harbours Masterplan proposals should include coastal defence to ensure coastal erosion is controlled.
Material Assets	Growing trend in waste produced.	The Orkney Harbours Masterplan should ensure waste is minimised during construction and operation.
Soil	Potential effect of identified contaminated land.	The Orkney Harbours Masterplan should take contaminated land issues into consideration when proposing new land allocations.
Landscape	There is a need to protect and enhance the quality and distinctiveness of Orkney's landscapes and townscapes.	The Orkney Harbours Masterplan and its proposals should encourage the appropriate siting, design and scale of development in relation to the surrounding landscape, including nationally or locally designated landscape areas.
Cultural Heritage	Orkney's rich cultural heritage is displayed in its many archaeological sites and historic buildings Development can result in the loss of or damage to, historic environment features or may affect their setting.	The Orkney Harbours Masterplan should seek to maintain and where appropriate enhance Orkneys high quality cultural heritage.

### 3.5 Likely Evolution of the Environment without implementation of the Orkney Harbours Masterplan

Schedule 3 of the Act requires that the likely evolution of the state of the environment without implementation of the Orkney Harbours Masterplan must be included in the ER. The likely future changes to the area are described below:

#### **Biodiversity, flora and fauna**

- Increase in plankton blooms and plankton biomass.
- Deterioration of seabird populations.
- Deterioration of harbour seals populations.
- Deterioration of sharks and rays.
- Impacts resulting from ocean acidification especially those on calcareous organisms.
- Shift in warm water species northwards due to ocean warming i.e. increased numbers of basking shark and a potential decline in cold water species.
- NNS introductions are likely to continue and established species may become more widespread with a decline in native species.
- Damage caused by anchors and moorings and scallop dredging will continue to impact seabed habitats.

#### **Population**

- There are indications that by 2026 the population of Orkney is predicted to see an increase of 0.5%. With a 7% increase of those persons of pensionable age, a 1% decrease of those persons of working age and a decrease of 5% in children under 16 (National Records of Scotland, 2017).
- Inner and outer isles are likely to become increasingly depopulated as people move to the mainland.
- Marine renewables industry is expected to become an increasingly important source for employment.

#### **Human health**

- Current high life expectancy, high standards of living and standards of health and safety are expected to continue into the future.

#### **Water**

- Coastal water quality under the WFD is predicted by SEPA to be High by 2027, with the exception of Scapa Flow which is predicted to be Good.
- Groundwater WFD Status is predicted to remain Good in 2027.
- Increasing fish waste from aquaculture.
- Agricultural runoff will continue to impact water quality and biodiversity.
- If shipping and oil and gas infrastructure increases in the area, then there is potential for an increase in the number of oil and chemical spills. This is identified by Baxter et al, (2011).
- Marine litter will continue to be a widespread problem.
- Coastal inundation (flooding) by the sea due to storm surges and high spring tides.

### Climatic Factors

- Reduction in the CO<sub>2</sub> emissions produced by harbour craft and tugs will continue in line with the OIC Carbon Management Programme.
- Reductions in emissions are dependent on the efficiency of individual craft, the size of the fleet and number of vessel movements.
- Predicted changes to climate in Orkney include increased storminess and higher rainfall during the months of winter and, in addition, sea levels are gradually rising.
- Increased storminess and rising sea level leading to increased risk of coastal erosion.

### Material assets

- Marine renewables will enable growth in infrastructure around Orkney.
- Increase in the number of fish farms in the Orkney Islands.

### Cultural heritage

- Scapa Flow will continue to attract divers to the maritime heritage.

### Air

- Future air quality trends (slow increase in emissions) are likely to continue.

## 3.6 Environmental Topic Inter-Relationships

Inter-relationships between the environmental topics listed in Schedule 3 of the Environmental Assessment (Scotland) Act 2005 have been considered and are presented in Table 3-4. The green boxes identify when inter-relationships occur between topics.

**Table 3-4 Consideration of SEA topic inter-relationships**

TOPIC	Air	Biodiversity, flora and fauna	Climatic Factors	Cultural Heritage	Landscape	Material Assets	Population & Human Health	Soils	Water
Air									
Biodiversity, Flora and Fauna	Y								
Climatic Factors	Y	Y							
Cultural Heritage	N	Y	Y						
Landscape	Y	Y	Y	Y					
Material Assets	Y	Y	Y	Y	Y				
Population & Human Health	Y	Y	Y	Y	Y	Y			
Soils	Y	Y	Y	Y	Y	Y	Y		
Water	N	Y	Y	Y	Y	Y	Y	Y	

There is the potential for all topics to interact with each other with the exception of:

- Air and Cultural Heritage
- Air and Water

### 3.7 SEA Objectives

The assessment will be undertaken for a set of environmental objectives. These have been derived from the review of (a) relevant PPS, (b) the environmental baseline and (c) associated environmental issues.

The SEA objectives used in this assessment of alternatives are listed in Table 3-5. These objectives take into account the inter-relationships identified above.

**Table 3-5 SEA Environmental Objectives**

SEA Topic	SEA Objective
Air	1. To maintain or improve air quality and reduce emissions of key pollutants
Biodiversity, Flora and Fauna	2. Avoid damage to the biodiversity, flora and fauna within the vicinity of the Orkney Islands
	3. Prevent introduction of new invasive species into the Orkney Islands
Climatic Factors	4. Minimise greenhouse gases emissions and the Port's carbon footprint
Cultural Heritage	5. Prevent damage to or loss of heritage features including maritime heritage
Landscape	6. Protect the landscape/seascape character and visual amenity in the vicinity of the area
Material Assets	7. Promote the sustainable use and management of material assets
	8. To meet the objectives of the Zero Waste Plan
Population and Human Health	9. Improve the safety record of the harbours and improve safety for the sea users
	10. Protect and improve human health and wellbeing through improved environmental quality
Soils	11. Maintain or improve soil quality and prevent any further degradation of soils
Water	12. Protect and enhance the state of the water environment.

## 4. ASSESSMENT OF ENVIRONMENTAL EFFECTS

The purpose of this section is to describe the various proposals and the assessment methods. This section also predicts and evaluates as far as possible the environmental effects of the preferred proposals described below. The assessment includes direct, indirect, cumulative and synergistic effects.

### 4.1 Identification of Assessment Alternatives

The initial long list of potential options was derived and informed by the outcome of stakeholder discussion and workshops, internal discussions with OICHA and staff, a market assessment and desk-based research and review.

These options were subject to an initial high-level qualitative assessment to assess how well they deliver against the set of outline requirements and overarching objectives set out in Section 3 above.

All options, included in the initial long list of potential options, are considered to have the potential to result in a negative impact on the environment. Any option included within the Orkney Harbours Masterplan will have some impact on the environment to varying extents, therefore environmental appraisal of the options was not considered in this initial shortlisting phase. Based on this, a high-level assessment to select the preferred options mainly focused on their technical appraisal. Many of the options rejected initially were either technically not viable or did not deliver against the Orkney Harbours Masterplans outline requirements and/or objectives.

The Orkney Harbours Masterplan objectives were considered for identifying the viable options. These objectives are:

- **Commercial:** to establish a strategic framework and vision that will guide future infrastructure investment decisions towards a coordinated and sustainable future.
- **Financial:** to safeguard and enhance the financial sustainability of the harbour business within the context of a competitive business environment.
- **Socio-economic:** to support and enhance the socio-economic prosperity and social well-being of local communities.
- **Environmental:** to safeguard and support the long-term productivity of the coastal and marine environment through best practice and strong environmental stewardship.

The outcomes of this qualitative assessment is presented in Table 4-1 and this presents a list of “preferred proposals” to be assessed against the SEA Objectives. A number of proposals were discounted on the grounds that there is other work underway at present to determine harbour infrastructure requirements for the inter-isle ferry fleet replacement programme – until the outcome of that work is known it is not possible to consider enhancements to those infrastructures.

**Table 4-1 Qualitative Assessment of Long List Potential Options for the Orkney Harbours Masterplan**

Geographical Area	Long List of Pier/Harbour Locations for Enhancement	Assessment against Orkney Harbours Masterplan requirements and objectives	To be Assessed in SEA (Yes/No)
Kirkwall Bay & Tingwall	Kirkwall Pier	High score against outline requirements/objectives.	Yes
	Hatston	High score against outline requirements/objectives.	Yes
	Hatston Slip	Low score against outline requirements/objectives. Technical feasibility: very shallow depth of water constrains development at this location.	No
	Shapinsay	Cannot develop options as harbour infrastructure requirements for new ferry vessels unknown at present.	No
	Tingwall	Cannot develop options as harbour infrastructure requirements for new ferry vessels unknown at present.	No
Scapa Flow	Scapa Pier	High score against outline requirements/objectives.	Yes
	New Scapa Quay (10m depth)	Discounted when assessed alongside Hatston and New Scapa Quay (-20m) proposals.	No
	New Scapa Quay (20m depth)	High score against outline requirements/objectives.	Yes
	Lyness	Originally no development at Lyness was considered. However, this has been revised and a proposal for creating more hardstanding area will be included in the Orkney Harbours Masterplan as a longer-term proposal. At the time of writing and preparation of the SEA Lyness was excluded.	No
	Stromness & Copland's Dock	High score against outline requirements/objectives.	Yes
	Houton	Low score against outline requirements/objectives. Cannot develop options as harbour infrastructure requirements for new ferry vessels unknown at present.	No
	Longhope	Low score against outline requirements/objectives. Cannot develop options as harbour infrastructure requirements for new ferry vessels unknown at present.	No
	Graemsay	Low score against outline requirements/objectives. Cannot develop options as harbour infrastructure requirements for new ferry vessels unknown at present.	No
	Moaness	Low score against outline requirements/objectives. Cannot develop options as harbour infrastructure requirements for new ferry vessels unknown at present.	No
	Burray	Low score against outline requirements/objectives. Technical feasibility issues given age of existing pier.	No
	Burwick	Low score against outline requirements/objectives. Technical feasibility: issues associated with creating an all-year round terminal.	No
North Isles	All isles harbours/piers	Cannot develop options as harbour infrastructure requirements for new ferry vessels unknown at present.	No

## 4.2 Assessment Methods

Impacts relating to the issues addressed by the SEA objectives above will be considered and an overall appraisal of the option against the objective will be made using the following scale:

<b>Substantially supports SEA objective</b> – is considered significant, e.g. beneficial impacts are substantial, substantially accelerate an improving trend, substantially decelerate a declining trend, substantially support delivery of a declared objective.
<b>Supports SEA objective</b> - but not to a significant extent, e.g. beneficial impacts are not substantial, do not substantially accelerate an improving trend, do not substantially decelerate a declining trend, do not substantially support from delivery of a declared objective
<b>Neutral contribution to SEA objective</b> – either no impacts or on balance (taking account of positive and negative impacts) a neutral contribution.
<b>Detracts from SEA objective</b> – but not to a significant extent, e.g. adverse impacts are not substantial, do not substantially decelerate an improving trend, do not substantially accelerate a declining trend, do not substantially detract from delivery of a declared objective.
<b>Substantially detracts from SEA objective</b> – is considered significant, e.g. adverse impacts are substantial, substantially decelerate an improving trend, substantially accelerate a declining trend, substantially detract from delivery of a declared objective.

## 4.3 Preferred Proposals to be Considered Further

The options to be considered in the detailed environmental assessment comprise proposals at five harbour locations in Orkney: Kirkwall, Hatston, Stromness & Copland's Dock, Scapa Pier; and a new Deep Water Quay further along the coast from Scapa Pier (See Figure 4-1). Table 4-2 provides a summary of these proposals. More detail and proposed site layouts are provided in Appendix C.

**Table 4-2 Overview of Orkney Harbours Masterplan proposals to be assessed**

Location	Proposals
Kirkwall Pier	<ul style="list-style-type: none"> <li>New multi-purpose quayside infrastructure</li> <li>Waterfront development and marina expansion (through reclamation)</li> <li>Improving quayside layout and traffic management</li> <li>Improvements to fish landing areas</li> <li>Dredging to provide deeper water</li> </ul>
Hatston	<ul style="list-style-type: none"> <li>New multi-purpose deep water quayside infrastructure</li> <li>Reclamation and land available for development</li> <li>Reconfiguration of marshalling areas and access routes</li> <li>New passenger reception facility.</li> </ul>
Scapa Pier	<ul style="list-style-type: none"> <li>Pier extension and dredging to provide deeper water</li> <li>Marine leisure slipway/pontoons</li> </ul>
Stromness & Copland's Dock	<ul style="list-style-type: none"> <li>Improvements to Copland's Dock</li> <li>Reclamation to create additional development area</li> <li>Improvements to shoreside layout &amp; traffic management</li> </ul>

Location	Proposals
Scapa Deep Water Pier	<ul style="list-style-type: none"> <li>▪ New deep-water quayside infrastructure</li> <li>▪ 5+ hectares of laydown area</li> </ul>

Table 4-3 provides a summary of land coverage, the nature of land, and ownership (where known) for the five proposals to be assessed further.

**Table 4-3 Land coverage, nature and ownership**

Proposed location	Land coverage, nature and ownership
Kirkwall	<p>There is existing harbour infrastructure at Kirkwall, which will be extended northwards. Reclamation would be required to create the waterfront area, inshore of the existing marina.</p> <p>All land and existing infrastructures are owned by OIC.</p>
Hatston	<p>There is existing harbour infrastructure at Kirkwall as well as a sizeable industrial estate and land earmarked for harbour-related activity. Additional quayside infrastructure would be built to the existing infrastructure and additional land area created through reclamation.</p> <p>All land and existing infrastructure is owned by OIC.</p>
Stromness & Copland's Dock	<p>Some reclamation is proposed adjacent to the existing harbour infrastructure at Copland's Dock.</p> <p>All land and existing infrastructure is owned by OIC.</p>
Scapa Pier	<p>There is an existing quay at Scapa Pier which would be extended, with dredging. Reclamation at the shore is proposed to create more laydown space and marina berths/slipway.</p> <p>All land and existing infrastructure is owned by OIC.</p>
Scapa Deep Water Pier	<p>There is no existing infrastructure at this location and the land is in private ownerships. Contact will be made with the landowner in advance of the Harbour Sub Committee.</p> <p>The proposal comprises the creation of 5+ hectares of laydown area and the creation of an access road.</p>



ORKNEY HARBOURS PORT  
MASTERPLAN 2020-2040

Figure 4-1: Options for Environmental  
Assessment

Legend  
★ Options for Assessment



NOTE: Not to be used for Navigation

Date	Thursday, January 31, 2019 10:39:17
Projection	British_National_Grid
Spheroid	Airy_1830
Datum	D_OSGB_1936
Data Source	OSOD; ESRI
File Reference	J:\P2214\Mxd\Report\Environmental_Report\Assessment_Locations.mxd
Created By	Chris Goode
Reviewed By	Emma Langley
Approved By	Beth Monkman



intertek

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## 4.4 Assessment of Preferred Proposals

A high-level assessment of each of the five options within the Orkney Islands was undertaken. The full assessment record is presented in Appendix C, along with a project description and proposed site layout for each proposal. It should be noted that limited information about each option is known at this stage, such as project design, construction methodology, material to be used and timing. It is anticipated that a more detailed environmental assessment will be undertaken at the project level, e.g. EIA.

Table 4-4 presents a summary of the results for each proposal and the SEA objectives, prior to the implementation of any mitigation measures. Residual impacts are not considered in this report but should be considered at the EIA Stage once detailed proposal plans and proposed mitigation measures are known.

**Table 4-4 Summary of the results of the assessment by proposal and objective**

Objective	Scapa Pier	Scapa Deep Water Pier	Hatston	Kirkwall	Stromness
1. To maintain or improve air quality and reduce emissions of key pollutants.	Detracts	Detracts	Detracts	Detracts	Detracts
2. Avoid damage to the biodiversity, flora and fauna within the vicinity of the Orkney Islands.	Substantially detracts	Substantially detracts	Detracts	Substantially detracts	Substantially detracts
3. Prevent introduction of new invasive species into the Orkney Islands.	Detracts	Detracts	Detracts	Detracts	Detracts
4. Minimise greenhouse gases emissions and the Port's carbon footprint.	Detracts	Detracts	Detracts	Detracts	Detracts
5. Prevent damage to or loss of heritage features including maritime heritage.	Neutral	Detracts	Neutral	Detracts	Neutral
6. Protect the landscape/seascape character and visual amenity in the vicinity of the area.	Detracts	Substantially detracts	Detracts	Detracts	Detracts
7. Promote the sustainable use and management of material assets.	Substantially supports	Neutral	Substantially supports	Substantially supports	Substantially supports
8. To meet the objectives of the Zero Waste Plan.	Detracts	Detracts	Neutral	Detracts	Neutral
9. Improve the safety record of the harbours and improve safety for the sea users.	Detracts	Detracts	Detracts	Neutral	Detracts
10. Protect and improve human health and wellbeing through improved environmental quality.	Neutral	Detracts	Neutral	Neutral	Neutral
11. Maintain or improve soil quality and prevent any further degradation of soils.	Detracts	Substantially detracts	Detracts	Detracts	Substantially detracts
12. Protect and enhance the state of the water environment.	Detracts	Detracts	Detracts	Detracts	Detracts

## 4.5 Summary of Effects

There is the potential for negative effects on air, biodiversity, flora and fauna, climatic factors, cultural heritage, landscape, material assets, population and human health, soils and water from implementation of the Orkney Harbours Masterplan.

These potential impacts are mainly resulting from activities during the construction phase. Good planning and selection of mitigation measures and implementation of them will mitigate many of these potential negative effects.

Potential impacts on the SEA topics are summarised below:

- **Air:** Negative effects on air include increased emissions and dust (during construction); change to local air quality; and additional traffic (sea and road) following implementation of the developments could lead to higher future emissions during the operation phase.
- **Biodiversity, Flora and Fauna:** Negative effects on biodiversity, flora and fauna may include underwater noise and visual impacts resulting in disturbance of birds and marine mammals; direct habitat loss and disturbance; removal of prey species; effects on designated sites (indirectly through vessel movements or disturbance or loss of habitats and species during construction and operation); and the potential introduction and spread of invasive NNS. All the Masterplan proposals are located with a pSPA. Kirkwall and Hatston are located within the North Orkney pSPA and Scapa Pier, Stromness and Scapa Deep Water Pier are located with the Scapa Flow pSPA.
- **Climatic Factors:** Negative effects on climatic factors include increase in Green House Gas (GHG) and carbon footprint during construction and operation.
- **Cultural Heritage:** Potential negative effects on cultural heritage include disturbance of archaeology during construction; and long-term effects due to change in the cultural setting.
- **Landscape:** Potential negative effects on landscape include changes to landscape character; effects on national scenic area; and general deterioration of visual amenity / seascape.
- **Material Assets:** Negative effects on material assets could arise due to an increase in waste due to dredging and additional vessels visiting the harbour and piers.
- **Population and Human Health:** Negative effects on human health and population include effects on the safety of harbour users as introduction of new structures presented physical barriers affecting navigation. This could lead to an increase in accidents. In addition, increased vessel movements due to additional traffic could lead to an increase in accidents and incidents. There could also be health effects from increased dust and emissions and disturbance and nuisance impacts from construction and increased shipping traffic. Benefits include sustainable use of material assets through the enhancement of existing port facilities. The development and enhancement of facilities could lead to employment opportunities (both during construction and operation), the success or failure of port developments could lead to an increase or decrease in commercial activity.
- **Soils:** Negative effects on soils include introduction of new sources of pollution, erosion of coastline due to changes in wave climate and effects on soil function and land use changes.
- **Water:** Negative effects on water include degradation of water quality due to short term mobilisation of contaminated sediments and turbidity impacts; hydrodynamic changes due to changes to the shoreline and dredging; and follow on morphological changes, though these are expected to be minor. In addition, degradation of water quality through accidental release of fuel or vessel containment.

## 4.6 Cumulative Assessment

Schedule 3 of the Environmental Assessment (Scotland) Act 2005 requires assessment of likely significant effects on the environment from cumulative and synergistic effects. This section assessed and presents the likely cumulative and synergistic effects of the Orkney Harbours Masterplan's proposed developments and other projects in the area. These effects are defined below:

- **Cumulative / in-combination effects:** Effects that result from incremental changes caused by other past, present or reasonably foreseeable actions together with the project. These occur when two or more environmental effects combine to have a greater effect.
- **Synergistic effects:** when individual effects interact with each other to produce a total effect greater than the sum of the individual effects, so that the nature of the final effect is different to the nature of the individual effects.

The assessment of cumulative effects should therefore consider whether other plans or projects would make potential effects more likely to occur; would make potential effects more likely to occur at a significant level; or would generate any new or different effects. Effects arising from different activities within a project or from different projects may be simply additive (i.e. similar type of effect on same receptors), be more adverse than the sum of the parts (synergistic) (i.e. different type of effect on same receptors) or be less than would be expected if the known effects of the individual substances are added together (antagonistic).

The simultaneous construction of several proposals identified in the Orkney Harbours Masterplan is likely to lead to the greatest cumulative negative effects on the wider environment unless the proposals are well phased and planned. This will minimise and eliminate the potential for these to cause combined construction effects.

Cumulative effects could also arise from the Orkney Harbours Masterplan proposals and other plans and activities within the area. Synergistic effects could arise from interactions between activities leading to a greater overall effect than the sum of the individual effects.

To determine the likely significant cumulative and synergistic environmental effects, the following activities and developments were considered:

- Marine renewable developments
- Other port and harbour developments
- Cable installations
- General shipping

Projects in pre-application, application and post-consent were reviewed in the Orkney Islands and larger developments in Northern Scotland. The projects which are considered most likely to lead to cumulative effects are listed in Table 4-5. The projects Table 4-5 below were identified from the Marine Scotland Licensing Information website (The Scottish Government, 2019). Projects in Orkney and in the North of Scotland are considered in this Table.

These projects could lead to cumulative negative effects on air, biodiversity, flora and fauna, climatic factors, material assets, population and human health, soils and water. It is likely that good planning and timing of works will minimise the potential for negative cumulative and in-combination effects.

The projects identified with the potential to cause cumulative effects will be reviewed further during the EIA process and the potential for cumulative effects with the selected Orkney Harbours Masterplan proposal will be assessed in detail.

**Table 4-5 Projects considered to lead to cumulative effects**

<b>Project</b>	<b>Status</b>	<b>Application type</b>	<b>Location</b>
Moray West Offshore Windfarm	Application	Renewables, wind	Moray
Brims (Cantick Head) Tidal Development	Application	Renewables, tidal	Pentland Firth
Moray East Offshore Windfarm	Post-consent	Renewables, wind	Moray
MeyGen Tidal Energy Project	Post-consent	Renewables, tidal	Pentland Firth
Caithness Orkney HDVC Cable	Pre-application	Subsea Cable (interconnector): Development and reinforcement of onshore grid including substations Subsea connection	Landfall at Warebeth (Billia Croo)
Shetland HVDC Connection	Pre-application	Subsea Cable (interconnector)	Wick to Shetland
Havfrue Telecommunications cable	Pre-application	Subsea Cable (telecommunication)	Route north of Orkney, between Shetland and Orkney
Orkney Connection Project	Pre-application	Subsea Cable (interconnector): Land cables and overhead power lines	Mainland Orkney and subsea routes
Costa Head Wave Farm	Pre-application	Renewables, wave	North of Mainland Orkney
Marwick Head Wave Farm	Pre-application	Renewables, wave	West Orkney
West Orkney South Wave Energy Site	Pre-application	Renewables, wave	West Orkney
Westray South	Pre-application	Renewables, tidal	Westray
Churchill Barriers	Pre-application	Renewables, tidal	Scapa Flow
Ness of Duncansby Tidal Array	Pre-application	Renewables, tidal	Pentland Firth
St. Ola Pier Redevelopment, Scrabster	Pre-application	Construction, alteration or improvement	Scrabster (mainland Scotland)
EMEC	Various	Renewables, tidal and wave	Orkney Islands

## 4.7 Habitats Regulations Appraisal

HRA is required for any plan or project which has the potential to affect a Natura 2000 site, no matter how far away from that site. HRA screening is the first stage of the HRA process which determines whether an Appropriate Assessment (AA) is required. If it is determined the plan or project will have a likely significant effect on a Natura 2000 site, then an Appropriate Assessment must be undertaken. This HRA screening will determine whether an AA is required for the Orkney Harbours Masterplan.

This section presents a summary of the HRA screening.

### 4.7.1 Masterplan Proposals Considered

The Masterplan Proposals assessed in this HRA screening were:

- Kirkwall Pier
- Hatston
- Lyness
- Scapa Pier
- Stromness & Copland's Dock
- Scapa Deep Water Pier

### 4.7.2 HRA Screening Methods

The HRA process covered the following steps:

1. Identification of relevant sites
2. Identification of potential pressures
3. Identification of sensitive receptors
4. Identification of a pathway for effect
5. Screening the plan for likely significant effects
6. In-combination effects

### 4.7.3 Screening

88 sites were included in the screening and were assessed to determine if there was the potential for an interaction between the Masterplans proposals and the sites' qualifying features (pressure-receptor pathway). Information on the project activities was compared with information regarding the conservation feature e.g. species foraging distances, spatial extent of habitats etc. Where an interaction between the project activities and the conservation features is possible, the potential significance of the effect was considered.

### 4.7.4 Assessment of Likely Significant Effects

Following identification of the pressure-receptor pathways, the sites and features were assessed in respect to the determination of likely significant effects (LSE). A LSE is defined as one that cannot be ruled out on the basis of objective information. The test is a 'likelihood' of effects rather than a 'certainty' of effects. Where the proposed Masterplan Proposal(s) is likely to undermine the site's conservation objectives, it must be considered likely to have a significant effect on the site. The assessment of that risk was made in the light, amongst other things, of the characteristics and specific environmental conditions of the site concerned.

The initial screening identified 15 sites with the potential for LSE. The pressures on these sites were reviewed, taking into consideration the zones of influence (where available), sensitivity of conservation features and the Masterplan Proposal's description.

The pressures which were considered further were:

- Changes to underwater noise
- Introduction of light
- Death or injury by collision
- Visual disturbance
- Introduction or spread of non-indigenous species
- Loss or damage to benthic habitats through removal of/deposit of materials on the seabed; abrasion or penetration of seafloor sediments; smothering or siltation; water flow (tidal current) changes – local; water clarity changes (changes to prey availability).

An in-combination assessment was undertaken for each of the above pressures to determine if any elements of the Masterplan Proposals were likely to have a significant effect on any interest feature in-combination with other projects and plans in the area.

#### **4.7.5 Conclusion**

At the plan stage the specification and design of the Masterplan Proposals and the construction methods is not known in detail and therefore the potential for LSE on the conservation objectives for a number of pressures could not be ruled out.

It should be noted that the HRA screening stage does not include any mitigation measures designed to avoid or reduce the harmful effects of a plan or project on a Natura site.

The assessment of LSE concluded that the following sites and pressures should be subjected to an Appropriate Assessment:

- Visual disturbance:
  - Hoy SPA
  - Hoy SSSI
  - North Orkney pSPA
  - Orkney Mainland Moors SPA
  - Scapa Flow pSPA
  - West Mainland Moorlands SSSI
- Introduction of light:
  - North Orkney pSPA
  - Scapa Flow pSPA
- Introduction or spread of non-indigenous species:
  - Loch of Stenness SAC

## 5. ASSESSMENT CONCLUSION

This section describes the measures proposed to mitigate the significant adverse environmental effects identified and presents a framework for monitoring the potential environmental effects of the Orkney Harbours Masterplan.

### 5.1 Measures Envisaged for the Prevention, Reduction and Offsetting of Any Significant Adverse Effects

Schedule 3 paragraph 7 of the Environmental Assessment (Scotland) Act 2005 requires an explanation of “the measures envisaged to prevent, reduce and as fully as possible offset any significant adverse effects on the environment of implementing the plan or programme”. This section describes the measures proposed to manage, by preventing, reducing or offsetting, the significant adverse environmental effects identified for the Orkney Harbours Masterplan.

#### 5.1.1 Mitigation and Enhancement Measures

Mitigation measures will be selected during the EIA process at a project level and through detailed planning and design – when the specifics of the developments can be optimised through detailed feasibility studies and design in order to limit the potential impacts on sensitive receptors.

The timing of construction works should be planned to avoid any potential for negative cumulative impacts or inter-relationships with other schemes, plans or projects.

This section provides initial consideration of potential mitigation measures that could be implemented, should one or more of the options within the draft Orkney Harbours Masterplan be taken forward. At the EIA stage engineering designs will be finalised and the mitigation measure refined. The residual impacts remaining will be assessed following the implementation of mitigation measures. Residual impacts are not considered in this report.

All works and planning of works should be undertaken with respect to all relevant legislation, licencing and consent requirements and recommended best practice.

**Table 5-1 Measures envisaged for the prevention, reduction and offsetting of any significant adverse effects**

SEA Topic	Issue / Impact Identified	Mitigation Measure	Lead Authority	Proposed Timescale
Air	Localised short-term effects of dust due to construction work.	Construction sites will be damped down in periods of dry weather.	Contractor	During the construction phase.
Air	Localised short-term effects of dust due to construction work.	All equipment to be used will be subject to regular audits to ensure compliance. Good operating practices and maintenance programmes of all equipment to be used.	OIC Contractor	During the construction phase
Biodiversity, Flora and Fauna	Works involving excavation and soil disturbance cause physical damage to and loss of habitats and, if active remediation is not	Design / implementation of schemes should minimise disturbance to biodiversity as well as wildlife protection measures.	OIC	During the design optimisation

SEA Topic	Issue / Impact Identified	Mitigation Measure	Lead Authority	Proposed Timescale
	<p>carried out, these habitats may not return to their former condition.</p> <p>Construction of Scapa Deep Water Pier would lead to damage to and loss of habitat in Gaitnip Hill Local Nature Conservation.</p>	<p>Development of a Construction Environmental Management Plan at project level, detailing how impacts on biodiversity, flora and fauna should be avoided / mitigated.</p> <p>Where there is uncertainty concerning the appropriate method to be used, advice should be sought from the relevant regulator.</p> <p>Appointment of Ecological Clerk of Works (ECoW) for each construction project.</p>		
Biodiversity, Flora and Fauna	Impacts to European Protected Species (otter and cetaceans) through underwater sound changes during construction and operations.	Surveys could be undertaken to determine European Protected Species (EPS) and basking sharks presence in areas where development is proposed.	OIC	During EIA
		Where necessary application made for EPS licence to disturb EPS.	OIC	During EIA
		<p>Where works may generate loud underwater noise (e.g. blasting or pile driving), a marine mammal observer should be present. Pre-search will be done prior to commencing the work to ensure no cetaceans or otter are within 500m of the operations for a 30 minutes duration. If no cetaceans / otter are sighted, a soft-start procedure will be followed.</p> <p>Appointment of ECoW for each construction project.</p>	OIC	During construction
Biodiversity, Flora and Fauna	Disturbance to birds during construction.	<p>Consideration should be given to seasonal restrictions to avoid periods when birds are present in the Scapa Flow pSPA and North Orkney pSPA.</p> <p>Construction works could be undertaken during less sensitive periods.</p> <p>Appointment of ECoW for each construction project.</p>	OIC	During the construction

SEA Topic	Issue / Impact Identified	Mitigation Measure	Lead Authority	Proposed Timescale
Biodiversity, Flora and Fauna	Disturbance to birds during operation.	Consideration will be given to limit vessel speed. Consultation with key parties to identify embedded mitigation measures.	OIC	Ongoing
Biodiversity, Flora and Fauna	Impacts of dredging on flora and fauna.	Surveys (ecological and environmental baseline) should be commissioned where necessary. Implementation of dredging mitigation strategy and implementation of good practices. Dredging activities should be timed so as to not disturb migrating fish and nesting birds. Consultation with SNH on methodology and appropriate timing to cause least damage, habitat loss and sedimentation.	OIC	During the design optimisation / EIA
Biodiversity, Flora and Fauna	Habitat disturbance and loss due to shoreline reclamation.	Habitat survey of the area should be commissioned.	OIC	During EIA
		After construction landscaping, revegetation and habitat enhancement should be undertaken in line with appropriate guidelines. Appointment of ECoW for each construction project.	Contractor	During the construction
Biodiversity, Flora and Fauna	Impacts on conservation objectives of designated sites (e.g. pSPA) from construction and operations.	Undertaking an HRA of each development. Good planning and timing of works and good construction and management practices to keep impacts to a minimum. Appointment of ECoW for each construction project.	OIC	Ongoing
Biodiversity, Flora and Fauna	Introduction of invasive species during construction and operations.	Implementation of Ballast Water Management Plan and industry standard ballast water management practices.	OIC	Ongoing
		Cleaning of equipment and plant machinery with management practices to prevent the spread of invasive species.	Contractor	During the construction

SEA Topic	Issue / Impact Identified	Mitigation Measure	Lead Authority	Proposed Timescale
Cultural Heritage	Construction can result in the loss of or damage to, historic environment features or may affect their setting.	Local Plan Policy LP/T3 Roads states that "The Council will seek to ensure that: (I) the construction of new roads or (II) road improvements in environmentally sensitive areas, are undertaken in a manner which is sensitive to the natural heritage (including landscape character) <b>and/or historic environment of the surrounding area.</b>	OIC	During the design optimisation
Cultural Heritage	Possible presence of undiscovered archaeology.	Undertake an archaeological survey.	OIC	During EIA
Cultural Heritage	Construction of new infrastructure resulting in damage to, or loss of, cultural heritage, including the maritime heritage.	Local Plan Policy LP/T3 Roads states that "The Council will seek to ensure that: (I) the construction of new roads or (II) road improvements in environmentally sensitive areas, <b>are undertaken in a manner which is sensitive to the natural heritage</b> (including landscape character) and/or historic environment of the surrounding area.  Any cultural features identified in the EIA and planning phase should be feed into the detailed design.	OIC	During the design optimisation
		If archaeological features are identified construction should be supervised by a qualified archaeologist and combined with sensitive construction methods and restoration to minimise potential damages.	Contractor	During the construction
Cultural Heritage	Changes to cultural setting due to presence of new infrastructure (e.g. impacts on conservation areas).	Impacts kept to a minimum through sensitive design and planning.	OIC	During the design optimisation
Landscape	Construction of new infrastructure may potentially cause negative impact on	Local Plan Policy LP/T3 Roads states that "The Council will seek to ensure that: (I) the construction of new roads or (II) road improvements in environmentally sensitive areas,	OIC	During the design optimisation

SEA Topic	Issue / Impact Identified	Mitigation Measure	Lead Authority	Proposed Timescale
	landscape during construction.	are undertaken in a manner which is sensitive to the natural heritage ( <b>including landscape character</b> ) and/or historic environment of the surrounding area.		
		Impacts kept to minimum through good site practice and planning and adoption of Construction Best Practice.	Contractor	During the construction
Landscape	Negative impacts on landscape during operational phases.	Impacts kept to a minimum through sensitive design and planning.	OIC	Ongoing
		Undertake landscape and visual assessment.	OIC	During EIA
Material Assets	Extensions to existing piers, construction of new facilities and any new access roads would require use of non-renewable resources (e.g. sand and aggregates).	Where possible, rock and aggregate for any construction work should be sourced locally. Where possible the use of secondary aggregate will be considered. It is also anticipated that a proportion of dredged materials could be re-used for developments.	OIC	During the construction
Material Assets	Disturbance of local infrastructure during construction (e.g. shops and amenity areas).	Good site management, traffic and construction management plans and public consultation will enable impacts to be kept to a minimum. Adoption of Construction Best Practice.	Contractor	During the construction
Population and human health	Uncertainty over potential vessel collisions with new piers/extended piers.	Undertake navigational risk assessments.	OIC	During the design optimisation
Material Assets	Increase in waste generation.	Waste management plan should be reviewed in light of the Orkney Harbours Masterplan to assess how best to accommodate additional predicted waste.	OIC	Ongoing
Population and human health	Uncertainty over potential road safety.	Undertake road traffic assessments.	OIC	During the design optimisation

SEA Topic	Issue / Impact Identified	Mitigation Measure	Lead Authority	Proposed Timescale
Population and human health	Health and safety risks due to presence of new infrastructure.	Good construction management practices and adoption of Construction Best Practice. Recording of all incidents.	OIC/Contractor	Ongoing
Population and human health	Disturbance and nuisance impacts from construction and operation on local communities.	Disturbances should be kept to a minimum through implementation of good working practices, planning and timing. Noise-producing activities such as piling should only take place during daylight hours and monitoring of these activities should occur. Adoption of Construction Best Practice. Continued liaison with local communities regarding air, noise and vibration emissions resulting from construction and operations.	OIC	During the construction and ongoing maintenance.
Soils	Construction of new access roads would require land take and lead to land use changes and loss of soils.	Land take should be kept to a minimum.	OIC	During the design optimisation
Soils	Removal of seabed sediments from dredging.	Re-use of dredged materials where possible (e.g. for shoreline reclamation).	OIC	During the design optimisation and construction.
Soils	Contamination of sediments.	Good management and planning to minimise contamination. Development and implementation of environmental management plan prior to construction.	OIC	Ongoing
Soils	Disturbance to and loss of peat.	Good construction practices to minimise damage and loss of sensitive soils and habitat.	OIC	During the design optimisation and construction.
Water	Drainage of surface water from roads and other developed areas.	The inclusion of sustainable drainage systems should be considered at the planning stage of the new developments.	OIC	During the design optimisation

SEA Topic	Issue / Impact Identified	Mitigation Measure	Lead Authority	Proposed Timescale
Water	Construction or maintenance dredging has the potential to result in increased suspended solids in water column and impact hydrodynamics.	Development of a dredging mitigation strategy to ensure potential impacts from sediment re-suspension and distribution of contaminated sediments minimised.  Designs should aim to ensure that WFD objectives are not compromised.  Undertake WFD Assessment for all developments.	OIC	During the design optimisation
		Completion of all relevant licensing and permitting for dredging activities.  Timings of dredging to be planned appropriately.	OIC	During the construction and ongoing maintenance.
Water	Temporary disturbance of water quality during construction.	Ensuring good management and planning should keep water quality impacts to a minimum. Using Best Available Techniques / Technologies (BAT) at all times.	Contractor	During the construction
Water	Potential for pollution incidents during construction and operation.	Strict planning and management of construction activities.  Preparation of emergency response plans and accident prevention procedures.  Good working practices including; silt traps, hydrocarbon interceptors, appropriate storage of fuel, oils and chemicals, provision of spill kits and plant washing facilities.	OIC	During the construction and ongoing maintenance.
		Identification of historically contaminated areas.	OIC	During the design optimisation
Water	Potential for flood risk.	Each development should be subject to a detailed Flood Risk Assessment at the planning phase.	OIC	During the design optimisation
Water	Potential for alterations to coastal processes.	Detailed surveys and hydrodynamic modelling should be undertaken to inform design to ensure there are no negative impacts on coastal processes.	OIC	During the design optimisation
Cross-sectorial	Dredging required around certain piers in	Disposal of dredge spoil should be carried out in licensed areas	OIC	During the construction

SEA Topic	Issue / Impact Identified	Mitigation Measure	Lead Authority	Proposed Timescale
	order to accommodate larger vessels impacting flora and fauna.	where it would not impact negatively upon vulnerable marine habitats or the activities of other users of the sea.		and ongoing maintenance.

## 5.2 Monitoring

This section identifies a framework for monitoring the potential environmental effects of the Orkney Harbours Masterplan. Section 19 of the Environmental Assessment (Scotland) Act 2005 requires monitoring of the significant environmental effects of the implementation of the Orkney Harbours Masterplan, in order to identify, at an early stage, unforeseen adverse effects and to be able to undertake appropriate remedial action.

Information gathered as a result of monitoring enables OIC to track the environmental effects of the Orkney Harbours Masterplan, gauge the effectiveness of any mitigation measures employed, identify unforeseen effects and manage any uncertainty encountered in the assessment process. The proposed SEA monitoring activities are set out in Table 5-2.

Following identification of any unforeseen significant adverse effects the Orkney Harbours Masterplan will be modified to provide remedial actions or mitigation measure to prevent, reduce or offset these effects. This will be undertaken in consultation with other bodies and the public where appropriate.

**Table 5-2 Proposed SEA monitoring framework for the Orkney Harbours Masterplan**

SEA Topic	What is being monitored?	Data source	Summary of monitoring and proposed remedial actions	Responsibility and Timescales
Air	Air Quality	SEPA reporting	GHG emissions, dust and noise to be monitored during construction.	SEPA - ongoing
Biodiversity , Flora and Fauna	NNS Presence	OIC Marine Invasive NNS survey	Presence and trends of marine Invasive NNS in Scapa Flow monitored and reported to Orkney Marine Environment Protection Committee.  Any detected Invasive NNS will be reported to GB NNS Secretariat for risk assessment and action plans.  OIC Harbour Authority will follow the guidance of GB NNS Secretariat.	OIC Harbour Authority - ongoing
	Disturbance of EPS and other	Traffic volumes - continuous	Shipping traffic volumes to be monitored.	OIC Harbour Authority - ongoing

SEA Topic	What is being monitored?	Data source	Summary of monitoring and proposed remedial actions	Responsibility and Timescales
	important species	Cetaceans, seal & otters - Annual	Populations of cetaceans, seals and otters will continue to be monitored.	OBRC, SMRU and JNCC - ongoing
	SAC and SPA site condition	SNH site condition monitoring	Status, condition, area and number of species for all European sites.	SNH – at appropriate intervals for each feature
Climate Factors	Carbon emissions	OIC Carbon Management Programme	Carbon dioxide emissions from tug boats and harbour craft monitored to ensure Carbon Management Programme targets are met.	OIC Harbour Authority - ongoing
Material Assets	Waste by-products	OIC Waste Plan monitoring and reporting	Quantities of waste by-products produced during construction and by vessels monitored.	OIC Harbour Authority - ongoing
Population and Human Health	Accidents and Incidents	OIC Accidents and Incidents monitoring and reporting	Impacts on safety of harbour users will be recorded.  Number and type of accidents and incidents monitored will include any accidents due to navigational changes.	OIC Harbour Authority - ongoing
Soils	Soil and sediment	SEPA	Potential contamination of soils and sediments to be monitored.	SEPA - ongoing
	Coastal erosion	Orkney Local Development Plan	Rates and areas of coastal erosion rates within the Orkney Islands.	SEPA, OIC
Water	Water quality	RBMP / WFD water quality reporting	Water quality of coastal and transitional waters to be monitored to fulfil the WFD monitoring requirements to ensure thresholds are not exceeded. Parameters monitored include; benthic invertebrates, phytoplankton, macroalgae, physio-chemical.	SEPA - ongoing

## 6. NEXT STEPS

Table 6-1 lists future milestones in the development of the Orkney Harbours Masterplan and its SEA, and the dates when these are expected to be completed.

The Draft Orkney Harbours Masterplan and SEA Environmental Report will undergo a 6 week period of consultation from 10<sup>th</sup> June 2019 until 22<sup>nd</sup> July 2019.

**You are hereby invited to express your views on this Environmental Report and the Draft Orkney Harbours Masterplan. Please send your comments by email to [anne@fisheradvisory.com](mailto:anne@fisheradvisory.com) or by post to:**

**Orkney Islands Council,  
Marine Services,  
Harbour Authority Building,  
Scapa,  
Orkney,  
KW15 1SD**

Once the final Orkney Harbours Masterplan has been finalised and adopted, the monitoring framework set out within the SEA ER will be used to assess the impacts of the implementation of the Orkney Harbours Masterplan.

**Table 6-1 Anticipated plan-making and SEA milestones**

<b>Actions</b>	<b>Timeline</b>
Consultation on the SEA Environmental Report and Orkney Harbours Masterplan	10th June 2019 to 22nd July 2019 (6 weeks)
Post Adoption SEA Statement and Final Orkney Harbours Masterplan	Q4 2019

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# Appendix A

## Plan, Policy and Strategy Review

## A.1 PLAN, POLICY AND STRATEGY REVIEW

**Table 6-2 Relevant plans, programmes and strategies (PPS) and environmental protection objectives, and their relationship with the Orkney Harbours Masterplan (ordered chronologically)**

Name of plan, programme or strategy (PPS)	Main environmental objectives or requirements of PPS	How PPS and its objectives may affect or may be affected by Orkney Harbours Masterplan
2020 Routemap for Renewable Energy in Scotland (2011)	An update and extension of the Scottish Renewables Action Plan 2009, reflecting the challenges for new renewable energy targets.  The Pentland Firth and Orkney waters were identified in the Scottish Government's Strategic Environmental Assessment of Marine Renewables (2007) as areas of high energy resource for wave and tidal power.	The Orkney Harbours Masterplan needs to consider the leases to marine renewable and predicted growth in this area.
A Consultation on the 2020 Challenge for Scotland's Biodiversity (2012)	An update to strategy document 'Scotland's Biodiversity – It's In Your Hands (2004)'. Scotland confirms a commitment to its rich and diverse natural habitats and considers it key to its economic future. Chapter 6 contains relevant marine policy suggestions including the implementation of a rapid-response framework to prevent colonisation of invasive new species in Scotland's seas.	The Orkney Harbours Masterplan will minimise the risk of introducing non-native invasive species through good controls and support the aims of monitoring programmes and rapid-response frameworks suggested by the strategy.
Agreement on the Conservation of Small Cetaceans of the Baltic and North Seas 1992 (ASCOBANS)	Agreement to protect whales, seals and dolphins from human activities including shipping and fishing. Aim is to achieve and maintain a favourable conservation status for small cetaceans.	The Orkney Harbours Masterplan should not affect cetaceans or impair their habitats from development of new infrastructure.
Ancient Monuments and Archaeological Areas Act 1979	This Act makes provision for the investigation, preservation and recording of matters of archaeological/historical interest and for the regulation of operations or activities affecting such matters.	The Orkney Harbours Masterplan must not affect historic wrecks. The remains of the German High Seas Fleet are protected as Scheduled Monuments under this Act.
Aquaculture Growth to 2030	The Strategy identifies key actions required to double the economic contribution of the industry.	The Orkney Harbours Orkney Harbours Masterplan must seek to not adversely affect the sustainable development of aquaculture.
Better Bathing Waters: Meeting the Challenges of the	Scottish Government strategy setting out a framework to meet the challenges associated with the revised Bathing	The Orkney Harbours Masterplan will seek to not

<b>Name of plan, programme or strategy (PPS)</b>	<b>Main environmental objectives or requirements of PPS</b>	<b>How PPS and its objectives may affect or may be affected by Orkney Harbours Masterplan</b>
Revised Bathing Water Directive in Scotland 2006	Waters Directive. Implementation requires partnership between Government, SEPA, local authorities, beach owners, Scottish Water and others.	affect the Governments Bathing Water strategy.
Choosing our future: Scotland's Sustainable Development Strategy (2005)	Sets out the actions which take into account the UK Framework for Sustainable Development. Priorities of the Strategy include: Sustainable consumption and production Climate change and energy Natural resource protection and environmental enhancement Sustainable communities Highlights that economic growth is paramount but must be done without environmental damage in order to preserve resources for future generations.	The Orkney Harbours Masterplan should seek to support sustainable development of the Orkney Islands, while not adversely affecting production, climate change, and natural resources. The Orkney Harbours Masterplan should also aim to enhance environmental protection and improve the quality of the environment.
Climate Change (Scotland) Act 2009	Aims at reducing greenhouse gas emissions. Includes an emissions target set for 2050 for a reduction of at least 80% from the baseline year, 1990. Requires Ministers to report emissions annually.	The Orkney Harbours Masterplan should support low carbon technologies where applicable and monitoring and reporting emissions from the harbour fleet annually.
Climate Change Delivery Plan for Scotland 2009	Sets out the high level measures required in each sector to meet Scotland's statutory climate change targets, to 2020 and in the long term. The plan includes measure for reducing emissions from shipping (under transport sector). It is noted that transporting cargo via ships is the most low carbon method currently available for long-distance movement.	The Orkney Harbours Masterplan will seek to help reduce emissions from shipping activities through the use of low carbon technologies.
Communication 'Towards an EU Strategy on Invasive Species' (EU COM(2008) 789)	The EU is currently working on dedicated legislation on Invasive alien species, due in 2013. The communication presenting policy options for an EU Strategy on Invasive species recommends a three stage hierarchical approach based on prevention, early detection and eradication, and control.	The Orkney Harbours Masterplan must minimise and prevent the risk of introducing non-native invasive species through adequate measures and good controls.
Communication from the Commission to the European	Provides new impetus to the sustainable development of European	The Orkney Harbours Masterplan must seek to not

Name of plan, programme or strategy (PPS)	Main environmental objectives or requirements of PPS	How PPS and its objectives may affect or may be affected by Orkney Harbours Masterplan
Parliament and the Council – Building a sustainable future for aquaculture [COM(2009)162]	<p>Aquaculture. Strategy has three key elements:</p> <p>Help sector become more competitive through support from research and development and better spatial planning</p> <p>Ensure sustainability by maintaining environmentally friendly production methods</p> <p>Improve governance and ensure there is a business friendly environment at all levels</p>	adversely affect the sustainable development of aquaculture.
Council Directive (2006/7/EC) The Revised Bathing Water Directive	<p>The revised Directive introduces tougher standards for bathing water quality but is only based on two microbiological parameters, intestinal enterococci and Escherichia coli. Puts in place three compliance categories, excellent, good and sufficient, as well as poor. Requires countries to ensure bathing water standards are of sufficient standard by 2015 and measures are taken to increase quality. The goal is to protect human health.</p> <p>Areas recognised as recreational waters (areas of sea or river commonly used for water contact sports or any activity with the risk of ingestion of water) are also required to achieve the mandatory microbiological bathing water standards.</p>	<p>The Orkney Harbours Masterplan must not affect the microbiological standards for designated bathing waters in the area and recognised recreational waters.</p> <p>The Orkney Harbours Masterplan should aim to protect the human health of sea users.</p>
Council Directive 2000/60/EC The Water Framework Directive (WFD)	<p>Comprehensive water regulation based on catchment rather than national boundaries. WFD requires countries to adopt river basin management plans, sets a target for all water bodies to try to achieve a 'good' standard by 2015.</p> <p>The WFD does not specifically reference invasive species but lists anthropogenic impacts to be listed as significant pressures.</p>	The Orkney Harbours Masterplan will seek to not affect the water quality status of Orkney Islands and the surrounding waters and should aim to work towards improving the water quality status.
Council Directive 2002/49/EC, Environmental Noise Directive	The Directive relates to the management and assessment of environmental noise. The Environmental Noise Directive has three main aims:	The Orkney Harbours Masterplan must seek to support these objectives.

Name of plan, programme or strategy (PPS)	Main environmental objectives or requirements of PPS	How PPS and its objectives may affect or may be affected by Orkney Harbours Masterplan
	<p>the determination of exposure to environmental noise</p> <p>ensuring that information on environmental noise and its effects is made available to the public</p> <p>preventing and reducing environmental noise where necessary and preserving environmental noise quality where it is good</p>	
<p>Council Directive 2008/50/EC          The Ambient Air Quality and Cleaner Air for Europe Directive</p>	<p>The Directive was adopted for ambient air quality which it will following using the key elements:</p> <p>that most of existing legislation be merged into a single directive (except for the fourth daughter directive) with no change to existing air quality objectives*</p> <p>New air quality objectives for PM2.5 (fine particles) including the limit value and exposure related objectives – exposure concentration obligation and exposure reduction target</p> <p>the possibility to discount natural sources of pollution when assessing compliance against limit values</p> <p>possibility for time extensions of three years (PM10) or up to five years (NO<sub>2</sub>, benzene) for complying with limit values, based on conditions and the assessment by the European Commission.</p>	<p>The Orkney Harbours Masterplan must seek to support these objectives on air quality and pollution.</p>
<p>Council Directive 2008/56/EC,  <b>The Marine Strategy Framework</b></p>	<p>Outlines a transparent, legislative framework for an ecosystem-based approach to the management of human activities which supports the sustainable use of marine goods and services. The overarching goal is to achieve ‘Good Environmental Status’ (GES) by 2020 across Europe’s marine environment. One of the descriptors for GES is non-indigenous species.</p>	<p>The Orkney Harbours Masterplan should seek to implement an ecosystem-based approach to management of the harbour and pier development.</p> <p>The Orkney Harbours Masterplan must not lower the baseline environmental status of Orkney and the surrounding waters and must seek to enable achievement and maintenance of a GES.</p>
<p>Council Directive 2008/98/EC,  <b>The Waste Framework Directive</b></p>	<p>The Directive aims to create a recycling society in Europe. It sets out the waste hierarchy: prevention, reuse and</p>	<p>The Orkney Harbours Masterplan needs to consider</p>

Name of plan, programme or strategy (PPS)	Main environmental objectives or requirements of PPS	How PPS and its objectives may affect or may be affected by Orkney Harbours Masterplan
	preparation for reuse, recycle, recovery, disposal.	the waste hierarchy principles to minimise waste.
Council Directive 2009/147/EC, The EC <b>Birds Directive</b>	The Directive affords protection to migratory bird species and their habitats and has led to the creation of Special Protection Areas (SPAs). Together, SACs and SPAs make up the Natura 2000 network.  All SPAs in the area are listed in Appendix B.	The Orkney Harbours Masterplan must consider the potential effects to SPAs and its species to ensure policy activities do not adversely affect protected areas.
Council Directive 2014/89/EU, Maritime Spatial Planning	The Directive sets down the EU common approach to planning of Maritime areas. It seeks to enable public authorities to organise human activities in the marine area to meet various ecological, economical and social objectives.	The Orkney Harbours Masterplan should have regard for their implications for marine spatial planning in the Orkney Islands.
Council Directive 91/492/EEC, <b>The Shellfish Waters Directive</b>	The Shellfish Waters Directive sets water quality standards for designated shellfish waters. Its goal is to ensure the shellfish are safe for human consumption.	The Orkney Harbours Masterplan will seek to not affect water quality in designated shellfish growing areas. There is currently only one Shellfish Water designated in Orkney which has shown compliance with the guideline standard for faecal coliforms.
Council Directive 92/43/EEC, The EC <b>Habitats Directive</b>	Aims to promote maintenance of biodiversity by introducing robust protection of habitats and species designated within its Annexes considered of European importance. The Directive has created a network of Special Conservation Areas (SACs) for habitats listed on Annex I and for species listed in Annex II.  All SACs in the area are listed in Appendix D.  All Potential Annex I Habitats in the area are listed in Appendix D.	The Orkney Harbours Masterplan will consider the potential effects to SACs and its protected species and ensure that Policy activities do not adversely affect protected areas and species.  The Orkney Harbours Masterplan will be subjected to an 'Appropriate Assessment' under Article 6(3) of the Habitats Directive.
Decommissioning Action Plan	The Action plan sets out the actions that will be undertaken to support development within the oil and gas decommissioning sector and to maximise opportunities for the Scottish supply chain.	The Orkney Harbours Masterplan should aim to provide facilities to help Orkney position itself well for the oil and gas decommissioning industry.

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Electricity Generation Policy Statement	The Scottish Government's Electricity Generation Policy Statement (2013) examines the way in which Scotland generates electricity and considers the changes which will be necessary to meet the targets which the Scottish Government has established.	The Orkney Harbours Masterplan should support the measures proposed within the Policy Statement.
Empowering Communities in Orkney	This is a project which seeks to influence and shape the policies that affect the county's fragile island communities. Key objectives include: increasing employment opportunities and increasing sustainability.	The Orkney Harbours Masterplan should seek to help deliver the objectives around employment.
EU Biodiversity Strategy to 2020	The EU Biodiversity Strategy aims to halt the loss of biodiversity and the degradation of ecosystem services in Europe by 2020 and restore them. There are six main targets, and 20 actions to help Europe reach its goal. Targets cover management of fish stocks, controls invasive alien species introductions, use of green infrastructure and protection for ecosystems.	The Orkney Harbours Masterplan will help to control invasive alien species introductions and protect ecosystems in order to halt loss of biodiversity and the degradation of ecosystems.
EU Floods Directive (2007/60/EC)	This Directive provides a framework for the assessment and management of flood risks, aiming to reduce the adverse consequences associated with flooding for human health, the environment, cultural heritage and economic activity.	The Orkney Harbours Masterplan should consider the implications of the flood risk arising from proposals.
EU Sustainable Development Strategy (EU SDS) 2006	Ensures protection of the environment and its resources for future generations while improving the quality of life for Europe's inhabitants. Sets out a coherent strategy of how the EU will more effectively commit to meet the challenges of sustainable development. Sets overall objectives and concentrates actions on key priorities of: Climate change and clean energy Sustainable transport Sustainable consumption & production Conservation and management of natural resources Public Health	The Orkney Harbours Masterplan should seek to support these objectives.

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	<p>Social inclusion, demography and migration</p> <p>Global poverty and sustainable development challenges</p>	
European Landscape Convention [ETS No. 176]	The Convention is aimed at: the protection, management and planning of all landscapes and raising awareness of the value of a living landscape.	The Orkney Harbours Masterplan has the potential to have impacts on landscape and visual amenity. The Orkney Harbours Masterplan should aim to achieve sustainable development based on a balanced and harmonious relationship between social needs, economic activity and the environment.
Guidance on the assessment of alien species pressures – UK TAG 2013	<p>UK TAG was created to assist the Water Framework Directive (WFD) implementation in the UK by providing guidance notes.</p> <p>Provides guidance on the pressures of alien species on water bodies, details impacts of a variety of alien species and identifies pressure thresholds at which water bodies are at risk of failing the environmental objectives of the WFD.</p> <p>High, medium and low risk alien species are identified in a risk assessment. High impact species are identified as alien species, known to be invasive, which have caused documented harm in habitats where they have become established.</p>	The Orkney Harbours Masterplan must ensure thresholds identified in the UK TAG Guidance are not reached in relation to alien species introductions.
HIE Operating Plan 2016-2019	Current priorities for sustainable economic growth include, supporting businesses, strengthening communities and developing regional growth.	The Orkney Harbours Masterplan will seek to deliver these priorities for the Orkney Islands.
Historic Scotland's Marine Heritage Strategy 2012-15	Strategy sets out Historic Scotland's priorities for protecting, managing and promoting marine heritage under new marine legislation.	The Orkney Harbours Masterplan should seek to not adversely affect marine heritage and support the objectives set out in the Strategy.
HITRANS Regional Transport Strategy	The strategy provides a vision for improved interconnectivity within the region to enable growth and other key outcomes.	The Orkney Harbours Masterplan should seek to help deliver improved interconnectivity in the region where suitable.

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IMO MARPOL Annex VI Prevention of Air Pollution from Ships 1997	<p>Sets limits on sulphur oxide (SO<sub>x</sub>) and nitrogen oxide (NO<sub>x</sub>) emissions from ship exhausts and prohibits deliberate emissions of ozone depleting substances.</p> <p>Revision in 2008 introduces further reduction globally in emissions of SO<sub>x</sub>, NO<sub>x</sub> and particulate matter and the introduction of emission control areas to reduce emissions of pollutants further in designated sea areas. The North Sea is designated as an emission control area for emissions of SO<sub>x</sub>. Limit applicable for SO<sub>x</sub> emissions are 1.00%, reducing to 0.10% from 2015.</p>	<p>The Orkney Harbours Masterplan will comply with existing emissions regulations and ensure reductions in SO<sub>x</sub> emissions are in line with MARPOL Annex VI.</p>
International Convention for the Control and Management of Ships Ballast Water & Sediments 2004	<p>Aims to prevent the spread of harmful aquatic organisms from one region to another, by establishing standards and procedures for the management and control of ships' ballast water and sediments.</p> <p>Under the Convention all ships in international traffic are required to manage their ballast water and sediments to certain standards. All ships will have to carry a BWM plan, a ballast water record book and an international BWM certificate. Ballast water standards will be phased in over a period of time. As an intermediate solution ships should exchange ballast water mid-ocean, with the aim of treatment onboard in the future. Parties are given the option to take additional measures which are subject to criteria of the convention and IMO Guidelines.</p>	<p>The Orkney Harbours Masterplan should take into account the provisions set out in the Convention.</p>
International Convention on the Control of Pollution from Ships (MARPOL 73/78, as amended)	<p>The Convention includes regulations aimed at preventing and minimising pollution from ships - both accidental pollution and that from routine operations. Includes six technical Annexes:</p> <p>Regulations for the prevention of pollution by oil</p> <p>Regulations for the control of pollution by Noxious Liquid Substances in Bulk</p>	<p>The Orkney Harbours Masterplan will be in agreement with MARPOL's pollution regulations.</p>

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	<p>Prevention of pollution by harmful substances carried by sea</p> <p>Prevention of pollution by sewage from ships</p> <p>Prevention of pollution by garbage from ships</p> <p>Prevention of air pollution from ships</p>	
Invasive Non-Native Species Framework Strategy for Great Britain (Defra, 2008)	<p>Strategy provides a strategic framework to minimise the risks posed and reduce the negative impacts caused by invasive non-native species. The review mentions that ballast water is one of the main marine pathways for introduction of non-native species. Strategy recognises that the IMO BWM Convention has undertaken significant work to minimise and remove the risk of introductions through ballast water.</p>	<p>The Orkney Harbours Masterplan will bring in the controls suggested by the IMO BWM Convention to reduce and remove the risk of invasive non-native species introductions.</p>
Kirkwall Urban Development Framework	<p>The Urban Design Framework (UDF) sets out land use planning policy and development land allocations for Kirkwall, along with details on the preferred design and siting of new development within the Town.</p>	<p>The Orkney Harbours Masterplan provides proposals to address the harbour area and the Hatston Industrial Estate area. It should seek to design developments within the preferred design.</p>
Low Carbon Transport Innovation Strategy	<p>UK Department for Transport document setting out ways to approach carbon emissions reduction in transportation. Acknowledges that shipping is relatively efficient but that an international agreement (via the IMO) is needed to encourage emissions reductions as international trade continues to grow.</p>	<p>The Orkney Harbours Masterplan should support low carbon technologies where applicable.</p>
Marine (Scotland) Act 2010	<p>The Act includes provisions for planning, licensing of marine activities, regulation of fisheries, and the protection of the marine environment and its wildlife, including seals. Contains new powers to designate MPAs.</p> <p>The Act replaces the Conservation of Seals Act 1970 and offers improved protection for seals.</p>	<p>The Orkney Harbours Masterplan should seek to not affect MPAs, and the marine environment and its wildlife, fisheries or other marine activities.</p> <p>Seals are present within the area and therefore should be protected against marine activities including shipping. The Orkney Harbours Orkney Harbours Masterplan will seek to protect seals from adverse effects.</p>

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Marine Bird proposed Special Protection Areas	The aim of the programme is to protect some of Britain's most important coastal and offshore waters for marine birds. Any sites designated will become part of the EC Birds Directive and will be afforded protection.	The Orkney Harbours Masterplan must consider the potential effects to pSPAs and its species to ensure policy activities do not adversely affect proposed protected areas.
National Infrastructure Delivery Plan 2016-2021	The plan provides details of how the government will support the delivery of key infrastructure projects and programmes to the end of this Parliament. The Plan seeks to encourage sustainable port development that will cater for long term growth	The Orkney Harbours Masterplan seeks to deliver long term growth of the port sector in the Orkney Islands.
National Planning Framework 3 (NPF3)	NPF3 provides a statutory framework for Scotland's long-term spatial development. The NPF sets out the Scottish Government's spatial development priorities for the next 20-30 years.	The Orkney Harbours Masterplan should reflect the strategy and projects designated as national developments in their vision statements and proposals.
National Planning Framework for Scotland (NPF2) (2009)	Aims to achieve sustainable development. Covers transport, health and economic issues necessary for growth as well as infrastructure for power, water and waste. Environmental concerns are addressed. Scapa Flow Container Shipping Facility is listed as a priority project of international importance for strategic economic reasons. Shipping tonnage is expected to increase and Scapa Flow's natural deep water harbour and location on a major shipping route, positions Scotland to benefit financially in the future. Preparation of NPF3 began in autumn 2012.	The Orkney Harbours Masterplan supports the Government's objectives.
Nature Conservation (Scotland) Act 2004	Scotland's modifications to the Wildlife and Countryside Act (1981). The Act further increases the protection of SSSIs, strengthens wildlife enforcement legislation and amends legislation on Nature Conservation Orders. All SSSI sites in the area are listed in Appendix B.	The Orkney Harbours Masterplan must ensure potential effects to legally protected conservation sites are minimised.
North Isles Landscape Partnership Scheme (NILPS)	The NILPS will deliver projects that will promote the heritage, landscape and	The Orkney Harbours Masterplan will seek to feed

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	culture of the area. It seeks to support life in Orkney's North Isles, while conserving and raising awareness of their distinctive identities, heritage and culture.	into the scheme where possible and support the area through suitable shipping and marine industry.
OIC Aquaculture Supplementary Guidance 2017	Sets out criteria for planning applications for aquaculture and indicates areas of potential sensitivity, including designated and protected areas.	The Orkney Harbours Masterplan recognises that aquaculture is an important source of economy for the Orkney Islands and seeks to not adversely affect the quality of fish and shellfish farmed within the area.
OIC Corporate Strategic Plan 2017 - 2023	Identifies key priorities as the items most in need of improvement, due to their importance to the Orkney way of life. Key priorities are: care for our older and other vulnerable people sustainable communities planning and affordable housing transport networks schools and community facilities improved services and facilities through increased joint working	The Orkney Harbours Masterplan will aim to support these goals through increased investment in the Orkney Islands. The Orkney Harbours Masterplan will support this development by making it more economical for ships to use Scapa Flow.
Orkney & Shetland Area Waste Plan (2003)	Aims to contribute to sustainable development for the area by developing waste management systems that will control waste generation, reduce the environmental impacts of waste production, improve resource efficiency, stimulate investment and maximise the economic opportunities arising from waste. The plan helps to ensure progress towards sustainable waste management in Scotland and in achievement of the EU landfill reduction targets by 2020.	The Orkney Harbours Masterplan needs to consider the waste hierarchy principles to minimise waste and help Orkney reach its targets.
Orkney and Shetland Area Management Plan 2010-2015	Coordinated by SEPA, produced in partnership with members of the Orkney and Shetland Area Advisory Groups this plan aims to maintain and improve the ecological status of the rivers, lochs, estuaries, coastal waters and groundwater areas in Orkney and Shetland. This plan is supplementary to the RBMP for the river basin region of	The Orkney Harbours Masterplan must not affect the goal to achieve a 'good' or 'high' water classifications in all the water bodies of Orkney by 2027.

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	Scotland. A local action plan which aims to help deliver Water Framework Directive requirements. Goal is to maintain good or high classification status and to secure improvements to water bodies which are at less than good ecological status. In both Orkney and Shetland, the aim is for 100% of water bodies to reach good or high ecological status by 2027.	
Orkney Community Plan 2018-2021	The Plan encompasses the long-term vision for Orkney and sets out local priorities for the next three years.	The Orkney Harbours Masterplan should take into account the local priorities for the Orkney Islands and be in line with the long-term vision for the area.
Orkney Hydrogen Economic Strategy	The Strategy sets out objectives in relation to the use of hydrogen and reduction of carbon emissions.	The Orkney Harbours Masterplan will seek to consider the use of hydrogen in its proposals.
Orkney Island Council Plan 2013 – 2018	The plan provides the main priorities for OIC for the 5 year period, this includes economic development and low carbon footprint.	The Orkney Harbours Masterplan will provide proposals to assist with economic growth in the shipping sector.
Orkney Islands Council Carbon Management Programme, Strategy and Implementation Plan 2007	Aims to identify the environmental and commercial risk to Orkney Islands Council resulting from the use of energy and fuels in the Council's day to day operations. Commitment to reducing carbon emissions by 11% by 2014 and a scaled reduction in household waste over the next decade.  2011-12 audit figures indicate OIC are on target to meet the 11% reduction goal.	The Orkney Harbours Masterplan should aim to help reduce the emissions from shipping in align with the Carbon Management Programme.
Orkney Local Biodiversity Action Plan (2018-2022)	Identifies local actions which will contribute to the conservation of species and habitats identified as being at risk or threatened in the UK. The LBAP contains Habitat Action Plans for a wide range of habitats. Every three years ten habitats are targeted for further action.	The Orkney Harbours Masterplan must ensure identified species and habitats are not adversely affected.  The Orkney Harbours Masterplan will seek to not adversely affect achievement of the actions set in the Orkney Local BAP and not impact the implementation of HAPs.

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Orkney Sustainable Energy Strategy 2017-2025	This is an update to the previous Sustainable Energy Strategy, its key aims include reducing of Orkney's carbon footprint, addition of renewable energy resources and energy efficiency.	The Orkney Harbours Masterplan will seek to help support the key aims by ensuring energy efficiency is at the core of proposals.
Our Islands Our Future - Joint Statement	This is a working group for the island councils, Orkney, Shetland and Comhairle nan Eilean Siar. The three authorities are working closely together to identify shared opportunities and challenges. The joint mission statement sets out their intention to engage with political leaders and decision makers.	The Orkney Harbours Masterplan should seek to consider the "thoughts for the future" raised in the Joint Statement in development of the proposals.
Pentland Firth and Orkney Waters Marine Spatial Plan (PFOW)	The PFOW promotes the sustainable management and development of the marine environment and incorporate economic, environmental and social considerations into marine development decision making. Developed a strategic decision making framework for licensing and other consent applications in the marine area and promote sustainable economic growth and management of the marine environment.	The Orkney Harbours Masterplan must not interfere with the Pilot Marine Spatial Plan and should aim to observe the plans provision with respect to restricted areas.
Protection of Military Remains Act 1986	Provides protection for the wreckage of designated military vessels. Any military aircraft that's crashed is automatically protected, whereas vessels need to be designated individually. Primary reason for designation of vessels is for war graves. It is illegal to interfere with remains of military aircraft and vessels without a licence.	The Orkney Harbours Masterplan must not affect historic wrecks. Two wrecks are designated as controlled sites under the protection of the Act in Scapa Flow, including the Royal Oak, 1939. These wrecks have a 200 m exclusion zone. Harbour operations and construction must take into account these restrictions.
River Basin Management Plan (RBMP) 2015-2027 for the Scotland river basin district	Drafted by SEPA in response to the WFD and Ministerial Publication 'The Scotland River Basin District (Classification of Water Bodies) Directions 2009'.  Sets out phased targets for classification of water bodies up to 2027 and aims to protect and enhance water bodies currently assessed as good or high status, while restoring others.	The Orkney Harbours Masterplan must not hinder the RBMP from reaching its target classifications and should seek to improve water quality wherever possible by reducing the likelihood of oil spill through implementing superior shipping management and removing the chances of pollution from contaminated sediments.

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Scapa Flow Landscape Partnership Scheme	Heritage Lottery Funded partnership supporting 48 programmes to communicate the uniqueness of Scapa Flow's nature, history and people. Led by OIC, SNH and RSPB. Landscape is central to all programmes. Strategy aims to create a deeper and more unified understanding of the Scapa Flow area's landscape, including the natural, built, and historical landscapes, and to promote and support its sustainable management, use and enjoyment by as many people possible – locally, nationally and across the world.	The Orkney Harbours Masterplan should further the aims of the scheme and not compromise the qualities of Scapa Flow.
Scotland's Economic Strategy	Strategy for delivering faster sustainable growth through key strategic priorities: Supportive business environment <ul style="list-style-type: none"> <li>▪ Transition to a low carbon economy</li> <li>▪ Learning, skills and well-being</li> <li>▪ Infrastructure development and place</li> <li>▪ Effective government</li> <li>▪ Equity</li> </ul>	The Orkney Harbours Masterplan proposals should deliver these broad priorities including adequate provision of infrastructure and services to meet community needs and access to open space.
Scotland's National Marine Plan	The plan covers the inshore water and offshore waters of Scotland. The aim is that the Scottish marine planning system should promote development and activities that support sustainable economic growth.	The Orkney Harbours Masterplan should be compatible with the objectives of Scotland's National Marine Plan.
Scotland's National Transport Strategy	The Strategy sets the long term vision for our transport policies. There are five strategic objectives that underpin the Purpose and describe the kind of Scotland we want to live in.	The Orkney Harbours Masterplan should support the policies of the current National Transport Strategy.
Scotland's Zero Waste Plan 2010	Replaces the National Waste Plan for Scotland (2003). In response to the EU Waste Directive sets out Scottish Government's vision for a zero waste strategy society.	The Orkney Harbours Masterplan needs to consider the waste hierarchy principles to minimise waste to landfill and help Scotland reach its target of zero waste.
Scottish Action Plan on Health & Safety	Promotes the benefits of good H&S management to Scottish businesses and Scotland's economy. Two areas of actions are:	The Orkney Harbours Masterplan will comply with Health and Safety regulations

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	<p>improved information, advice and training to workers and businesses including greater engagement by a range of public, private and voluntary sector bodies</p> <p>improved regulation, investigation, prosecution and sanctioning.</p>	during construction of any proposals.
Scottish Biodiversity List (Published 2013)	The Scottish Biodiversity List is a list of animals, plants and habitats that Scottish Ministers consider to be of principle importance for biodiversity conservation in Scotland. The aim of the list is to help public bodies to comply with biodiversity commitments by identifying species and habitats which are the highest priority for biodiversity conservation in Scotland.	The Orkney Harbours Masterplan will seek to not affect the species and habitats listed on the Scottish Biodiversity List.
Scottish Energy Strategy	<p>The 2050 vision for Scotland is built around the following six priorities:</p> <ul style="list-style-type: none"> <li>Consumer engagement and protection</li> <li>Innovative local energy systems</li> <li>Energy efficiency</li> <li>Renewable and low carbon solutions</li> <li>System security and flexibility</li> <li>Oil and gas industry strengths</li> </ul>	The Orkney Harbours Orkney Harbours Masterplan should seek to support the key priorities of the strategy.
Scottish Ferries Plan (2013-2022)	The Ferries Plan sets out strategic guidance for the provision of ferry services in Scotland over the next 10 years.	The Orkney Harbours Masterplan should complement any changes to ferry provisions in the Orkney Islands.
Scottish Government Economic Strategy 2011	<p>Lists six strategic priorities to accelerate recovery, drive sustainable growth and develop a more resilient and adaptable economy.</p> <ul style="list-style-type: none"> <li>supportive business environment;</li> <li>transition to a low carbon economy;</li> <li>learning, skills and well-being;</li> <li>infrastructure development and place;</li> <li>effective government, and</li> <li>Equity</li> </ul>	The Orkney Harbours Masterplan will support these priorities by increasing the strategic value of Scapa Flow as a trans-shipping port on a major shipping route which, in turn, should attract more investment and job opportunities.
Scottish Historic Environment Policy (SHEP)	<p>Sets out a policy framework for the historic environment, taking account for:</p> <ul style="list-style-type: none"> <li>the Marine Historic Environment Policy</li> </ul>	The Orkney Harbours Masterplan will take into account the requirements of the various Acts set out in the SHEP.

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	<p>the provisions of the Historic Environment (Amendment) (Scotland) Act 2011</p> <p>the provisions of the Marine Scotland Act 2010 (under the Marine Scotland Act 2010 Historic MPAs can be designated by Ministers, there are currently no designated Historic MPAs).</p>	
Scottish Marine Nature Conservation Strategy	<p>Strategy sets out aims and objectives for protecting and enhancing marine biodiversity. The strategy will help to meet national and international obligations, including the achievement of GES under the Marine Strategy Framework Directive. The strategy included development of a list of Priority Marine Features (PMF). SNH and JNCC recommend a prioritised list of marine features in Scotland, containing 80 habitats and species. It is intended that the list of PMFs will be used as the basis for focusing future marine conservation action via a three-pillar approach i.e. species measures, site-based measures and wider seas policies and measures.</p>	<p>The Orkney Harbours Masterplan will seek to have no implications or impacts on either the aims and objectives set out in the Marine Nature Conservation Strategy or the status of any PMFs.</p>
Scottish Marine Protection Areas (MPA) Project 2012	<p>The Project is a joint effort between Marine Scotland, SNH, JNCC, Historic Scotland and SEPA. It advises Scottish Ministers on the selection of MPAs under the Marine (Scotland) Act and the UK Marine and Coastal Access Act in Scottish seas. .</p>	<p>The Orkney Harbours Masterplan should aim to not affect any of the MPAs within the area.</p>
Scottish Planning Policy 2010	<p>Notes that all development plans impact Scotland's Zero Waste Plan by increasing the amount of waste to be treated. The planning process needs to include enough time to allow waste reduction measures to be upgraded to accommodate increases.</p> <p>Sustainable development of coastal areas is important contributor to economic growth. Development plans should identify suitable coastal areas for development. Identification of suitable locations should be based on clear understanding of the physical, environmental. Economic and social</p>	<p>The Orkney Harbours Masterplan should take into account the principle that any new development needs to consider all infrastructure requirements.</p> <p>The Orkney Harbours Masterplan should utilise suitable coastal areas for development if required and seek to protect the coastal environment whenever possible.</p>

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	characteristics and likely effects of climate change. Development plans should protect the coastal environment wherever possible.	
Second European Climate Change Programme [ECCP II] 2005	The Programme provides targets to enable the EU to meet its climate and energy targets for 2020. These are known as the "20-20-20" targets.	The Orkney Harbours Masterplan should aim to contribute towards climate change action through management and mitigation of greenhouse gas emissions.
Soil Thematic Strategy [COM(2006) 231] and [COM(2006) 232]	The strategy seeks to afford a high level of soil protection and explains the measures that must be taken to achieve this. It sets out the common principles for protecting soils across the EU.	The Orkney Harbours Masterplan should take the principles for protecting soil into account, including; <ul style="list-style-type: none"> <li>▪ Preventing further soil degradation and preserving its functions and</li> <li>▪ Restoring degraded soils to a level of functionality consistent at least with current and intended use</li> </ul>
Stromness Urban Development Framework	The Urban Design Framework (UDF) sets out land use planning policy and development land allocations for Stromness.	The Orkney Harbours Masterplan must seek to support the development framework's policies and proposals for Stromness and the area Garson.
Subsea Engineering Action Plan	Action plan created by Scottish Enterprise for Scotland's important subsea sector. It provides actions which aim to obtain a larger proportion of the subsea engineering market share.	Proposals will be considered to help meet the aims of the Action Plan.
Taking Sustainable Use of Resources Forward: A Thematic Strategy on the prevention and recycling of waste (EU COM(2005) 666)	Sets out guidelines for EU action and describes methods for waste management improvement. Aim is to reduce negative impact on the environment caused by waste via recycling.  Acknowledges that unsustainable trends in waste generation continue and are symptomatic of uneconomic usage of materials. Stresses the need for better regulation and setting targets.	The Orkney Harbours Masterplan needs to consider the waste hierarchy principles to minimise waste and support Scotland and Orkney reach its targets.
The Bathing Waters (Scotland) Regulations 2008	Scotland's implementation of the Bathing Waters Directive. Key features include increased provision of public	The Orkney Harbours Masterplan should not affect the bathing waters in the area

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	information and tighter microbiological standards to be met by 2015.	nor areas used for recreational diving.
The Conservation (Natural Habitats, &c.) Amendment (Scotland) Regulations 2019	<p>Amendment of The Conservation (Natural Habitats, &amp;c.) Regulations 1994 to comply with EC Habitats Directive to include protection for sea birds and marine habitats.</p> <p>Transposes the Habitats Directive into UK and Scottish law for land and inshore waters. Schedule 2 relates to European Protected Species (EPS) (fauna or animal species), Schedule 3 relates to animal EPS (fauna species) in Annex VI of the Habitats and Species Directive and Schedule 4 relates to plant EPS. Only some of the species listed on these Schedules occur in Scotland. Part II of the Regulations relates to protection of certain habitats and describes how SACs are selected and designated. Protected sites are designated for habitats listed on Annex I and species on Annex II of the Habitats Directive. Part III of the regulations details the protection given to species (flora and fauna).</p>	<p>The Orkney Harbours Masterplan must seek to not adversely affect European Protected sites and European Protected Species.</p> <p>The Orkney Harbours Masterplan must seek to not adversely affect tidal and coastal nature reserves, especially those used by sea birds as breeding grounds.</p>
The Conservation of Habitats and Species Regulations 2017	Transposes the Habitats Directive into UK law for UK offshore waters (i.e. 12 nautical miles from the coast and out to 200 nm or the limit of the UK Continental Shelf. Regulations enable the designation and protection of areas that host habitats and species of European importance in the offshore marine area.	The Orkney Harbours Masterplan must seek to not adversely affect protected species and habitats in the offshore marine area.
The Conservation of Habitats and Species Regulations 2017	The Habitats Directive is transposed into Scottish Law through the Habitats Regulations 2010 in relation to reserved matters. Provides regulations for the protection of European Designated sites and EPS	The Orkney Harbours Masterplan must seek to not adversely affect European Protected sites and European Protected Species
The Convention Concerning the Protection of the World Cultural and Natural Heritage, Paris 1975 (UNESCO World Heritage Convention)	Heart of Neolithic Orkney constitutes a major prehistoric cultural landscape from 5000 years ago. The designated World Heritage Site covers the western side of Mainland Orkney incorporating Loch of Stenness and Loch of Harray, Graemsay and northern Hoy.	The Orkney Harbours Masterplan must not affect coastal areas included in the World Heritage Site.

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The Convention for the Protection of the Marine Environment of the North-east Atlantic 1992 (The <b>OSPAR Convention</b> )	<p>Aim is to prevent and eliminate pollution and to protect the maritime area against the adverse effects of human activities. OSPAR Convention contains a series of Annexes covering:</p> <ul style="list-style-type: none"> <li>Prevention and elimination of pollution from land-based sources</li> <li>Prevention and elimination of pollution by dumping or incineration</li> <li>Prevention and elimination of pollution from offshore sources; and</li> <li>Assessment of the quality of the marine environment</li> </ul> <p>All parties in the Convention take all steps possible to prevent and eliminate marine pollution.</p>	<p>The Orkney Harbours Masterplan will seek to monitor shipping activities and aspire to ensure the aims of the OSPAR Convention are achieved.</p>
The Convention of the Conservation of European Wildlife and Natural Habitats (1979)	<p>Principal aims are to ensure conservation and protection of wild plant and animal species and their natural habitats. Implemented within the European Union as Council Directive 79/43/EEC as the EC Habitats Directive (1992). Member states report every six years on progress towards conservation of natural habitats.</p>	<p>The Orkney Harbours Masterplan will seek to identify potential effects on protected plant and animal species and implement monitoring programmes to monitor the potential effects of the Policy's implementation.</p>
The Convention on the Conservation of Migratory Species of Wild Animals (1979)	<p>Recognises the sensitivity of migratory animals and increasing human pressure on their migratory routes. It establishes protection of migratory routes through international cooperation and encourages conservation of their breeding habitats. The Convention was transposed into UK law as the Wildlife and Countryside Act (1981). Four legally binding protection agreements were signed of which two are relevant to Scotland: the African-Eurasian Migratory Waterbird Agreement (AEWA) and the Agreement on the Conservation of Small Cetaceans in the Baltic and North Seas (ASCOBANS).</p>	<p>The Orkney Harbours Masterplan will ensure the Convention and associated relevant agreements will be complied with as far as possible with respect to wild animals.</p>
The Convention on Wetlands of International Importance especially as Waterfowl Habitat (Ramsar, 1971)	<p>Advocates the protection of wetlands as crucial ecosystems and recognises that they are under threat from human activities.</p> <p>All Ramsar sites in the study area are listed in Appendix B.</p>	<p>The Orkney Harbours Masterplan will seek to minimise the potential effects to Ramsar sites from future development.</p>

<b>Name of plan, programme or strategy (PPS)</b>	<b>Main environmental objectives or requirements of PPS</b>	<b>How PPS and its objectives may affect or may be affected by Orkney Harbours Masterplan</b>
The Merchant Shipping (Prevention of Oil Pollution) (Amendment) Regulations 2005	The Regulations transpose into UK law requirements of EC and international law for the accelerated phasing-out of single hull tankers. Regulations apply to all UK ships and all non-UK ships entering or leaving UK jurisdictions. Ships shall prevent pollution of the marine environment due to discharges of oil from single hull tankers.	The Orkney Harbours Masterplan must be in agreement with Merchant Shipping Pollution Regulations.
The Merchant Shipping and Fishing Vessels (Port Waste Reception Facilities) Regulation 2009	UK Law incorporating EU Directive to provide harbour reception facilities for onboard waste. Require harbour authorities to implement an approved port waste management plan and imposes a duty for harbour authorities and terminal operators to impose charges to cover the costs of waste reception facilities for various wastes, including bilge water.	The Orkney Harbours Masterplan should operate in parallel with OIC Port Waste Management Plan.
The Orkney Local Development Plan 2017	Sets out policies, specific land use proposals, and allocations for the development and use of land in Orkney in order to guide planning decisions.	The Orkney Harbours Masterplan must comply with land use regulations and planning controls.
The Scottish Government's Climate Change Plan 2018-2032	The plan sets out how Scotland's Government will continue to drive down emissions over the period.	The Orkney Harbours Masterplan should aim to contribute towards climate change action through management and mitigation of greenhouse gas emissions.
The UK National Ecosystem Assessment 2011	Provides an overview of the state of the environment and values it in economic and social terms. Chapter 12 states that more data is needed for the assessment of marine environments, previously considered less important than land habitats.	The Orkney Harbours Masterplan must anticipate more emphasis on marine ecosystems in the future and seek to not adversely affect the marine ecosystem.
The UK National Ecosystem Assessment 2014	The UK National Ecosystem Assessment (UK NEA) was the first analysis of the UK's natural environment in terms of the benefits it provides to society and continuing economic prosperity.	The proposed developments should be consistent with the Ecosystem Approach.
The Water Environment (Controlled Activities) (Scotland) Regulations 2011 (CAR)	Regulations implement pollution controls over water activities, in order to protect, improve and promote sustainable use of Scotland's water environment. This includes wetlands,	The Regulations should be taken into account in drafting the Orkney Harbours Masterplan.

<b>Name of plan, programme or strategy (PPS)</b>	<b>Main environmental objectives or requirements of PPS</b>	<b>How PPS and its objectives may affect or may be affected by Orkney Harbours Masterplan</b>
	rivers, lochs, transitional waters (estuaries), coastal waters and groundwater.	
The Water Environment and Water Services (Scotland) (WEWS) Act 2003	Transposes the WFD into Scottish law. WEWS Act gives Scottish ministers powers to introduce regulatory controls over water activities, in order to protect, improve and promote sustainable use of Scotland's water environment. It institutes a register of protected areas: for the protection of economically significant aquatic species, recreational waters, nutrient sensitive areas, and for the protection of habitats and species.	The Orkney Harbours Orkney Harbours Masterplan will aim to ensure protected species, recreational waters and nutrient sensitive areas are not affected by the development of new facilities.
UK Marine and Coastal Access Act 2009	The Act provides legal mechanisms to help ensure clean, healthy, safe, productive and biologically diverse oceans and seas by putting into place a new system for improved management and protection of the marine and coastal environment. Contains new powers to designate Marine Protected Areas (MPAs).	The Orkney Harbours Masterplan will meet legal measures set by the Act to ensure clean, healthy, safe, productive and biologically diverse oceans and seas.  The Orkney Harbours Masterplan should seek to not affect future MPAs.
UK Marine Monitoring and Assessment Strategy (UKMMAS)	Aims to shape the UK's capability to provide, and respond, within a changing climate, to the evidence required for sustainable development within a clean, healthy, safe, productive and biologically diverse marine ecosystem and within one generation to make a real difference.  Managed by Defra, its goal is to have an efficient monitoring programme to back up its management activities.	The Orkney Harbours Masterplan will seek to monitor shipping activities and aspire to ensure the aim of the UKMMAS is achieved.
UK Post 2010 Biodiversity Framework (2012)	UK Biodiversity Framework sets a broad framework for enabling action to:  set out a shared vision and priorities for UK-scale activities  identify priority work at UK level required to help deliver the EU biodiversity strategy  Identifies threatened species that require action.	The Orkney Harbours Masterplan will seek to not affect any species on the threatened list, the majority of which are land-based.

Name of plan, programme or strategy (PPS)	Main environmental objectives or requirements of PPS	How PPS and its objectives may affect or may be affected by Orkney Harbours Masterplan
UN Convention on <b>Biological Diversity</b> (Rio, 1992)	Contracting Parties are required to create and enforce national strategies and action plans to conserve, protect and enhance biological diversity. International commitment was updated in Aichi, Japan in 2010 and, through publication of the EU Biodiversity Strategy, extended to 2020. Recent emphasis is on economic advantages of biodiversity as 'natural capital'. The EU addresses biodiversity through the Habitats Directive and the creation of the Natura 2000 network of conservation areas.	The Orkney Harbours Masterplan will aim to conserve biodiversity.
United Nations Framework Convention on Climate Change (Rio de Janeiro 1992)	A non-binding goal to stabilise emissions at 1990 levels from the year 2000 onwards. Member states were asked to measure their greenhouse gas emissions and incorporate policy for their reduction in legislation. The Kyoto protocol (1997) followed to strengthen this commitment from industrialised countries. The UK ratified the Kyoto agreement in 2002 and addresses issues in the Climate Change (Scotland) Act 2009.	The Orkney Harbours Masterplan should support low carbon technologies where applicable.
Vision 2035 Oil & Gas UK	The Vision will help shape the oil and gas sector in the UK and the purpose is to: Provide direction and instil confidence Inspire transformation and drive collaboration Create competitive advantage Secure investment and drive value	Proposals will be considered to help meet the aims of the vision and to enable greater share of the oil and gas sector.
Wildlife and Countryside Act 1981	Implementation of the Bern Convention into UK law in combination with The Conservation (Natural Habitats & c.) Regulations (1994). Provides land management law for conservation purposes and protection for wild birds, animals and plants. The Act protects native species and enhances the protection of Site of Special Scientific Interest (SSSIs). Section 14 of the Act makes it illegal to knowingly introduce certain non-native species. Section 36 allows for marine nature reserves.	The Orkney Harbours Masterplan must consider the potential impacts to native species and minimise the risk of introducing non-native species through adequate measures and good controls. The Orkney Harbours Masterplan must consider the potential effects to SSSIs and ensure these are minimised.

Name of plan, programme or strategy (PPS)	Main environmental objectives or requirements of PPS	How PPS and its objectives may affect or may be affected by Orkney Harbours Masterplan
Wildlife and Natural Environment (Scotland) Act 2011	Among other things the Act brings into law provisions for greater protection of wild birds and makes it an offence to introduce non-native invasive species. The Act aims to prevent release and spread of non-native species (NNS) into areas where they could cause damage to native species and habitats and ensures rapid adequate/effective response is taken when new NNS populations are identified/established.	The Orkney Harbours Masterplan will minimise the risk of introducing NNS through good controls and must seek to protect habitats of wild birds.
World Heritage Convention [WHC-2005/WS/02]	The Convention aims to ensure the identification, protection, conservation, presentation and transmission to future generations of cultural and natural heritage and ensure that effective and active measures are taken for these.	The Orkney Harbours Masterplan should ensure that sites of cultural and natural heritage are protected from loss or damage resulting from development proposals.

# Appendix B

## ENVIRONMENTAL BASELINE

## B.1 BIODIVERSITY, FLORA AND FAUNA

### B.1.1 European and Nationally Designated Sites

The Orkney Islands are valued for the abundance of birds and marine wildlife that inhabit the islands throughout the year. As such the SEA study area includes a range of protected sites designated under European, International and national legislation. The SEA study area includes the Orkney Islands and adjacent waters, the Pentland Firth, the northern North Sea to the east of the Orkney Islands and the coastal regions of North Scotland and North-east Scotland. The following baseline description of designated sites (both existing and future designations) covers the main types of biodiversity designations found in this study area.

#### Existing Designations

The main relevant protected site designations are as follows:

**Natura 2000:** Under the Habitats Directive (Council Directive 92/43/EC) and Birds Directive (Council Directive 2009/147/EC) Europe's most valuable habitats and species are protected through the designation of Special Areas of Conservation and Special Protection Areas. Together these sites make up the Natura 2000 network. The aim of the Natura 2000 network is to ensure the long-term survival of European threatened species and habitats.

- **Special Areas of Conservation (SACs)** for habitats listed on Annex I and for species listed on Annex II of the Habitats Directive.
- **Special Protection Areas (SPAs)** classified under Article 4 of the Birds Directive.
  - Potential SPAs (pSPAs), in the process of being classified as SPAs under Article 4 of the Birds Directive. pSPAs are not yet fully designated and are subject to public consultations.
- **Site of Community Importance (SCI)** are sites selected as potential SACs that have been adopted by the European Commission but not yet formally designated by the member states government.

**Ramsar sites** are designated under the Convention on Wetlands (Ramsar, Iran, 1971), known as the "Ramsar Convention" to protect wetlands of international importance. In Scotland all Ramsar sites are also either SACs or SPAs. Although there is no specific legal framework that safeguards Scottish Ramsar sites, they are afforded the same protection as the Natura sites they overlap.

**Sites of Special Scientific Interest (SSSI)** are nationally important areas of land and water (above mean low water) in Great Britain. In Scotland SSSIs are designated by Scottish Natural Heritage (SNH) under the Nature Conservation (Scotland) Act 2004. SSSIs are protected by law and it is an offence for any person to intentionally or recklessly damage the protected natural features of a SSSI. SSSIs in Scotland are those areas that SNH considers to best represent Scottish natural heritage for its diversity of plants, animals, habitats, geology, landforms or a combination of these natural features. Most of the terrestrial Natura sites in Scotland are also SSSIs.

**Nature Conservation Marine Protected Areas (NCMPA)** are nationally designated areas in Scottish waters, under the Marine (Scotland) Act and the UK Marine and Coastal Access Act. A total of 30 NCMPAs have been designated, of which 13 are offshore. These sites have been designated for the protection of a range of marine habitats, species and geodiversity.

Orkney also contains a **National Scenic Area**, Hoy and West Mainland, and two **Local Nature Reserve**, Mull Head (SNH, 2013a) and Happy Valley, which was designated in August 2017.

The number of designated sites within each category in the study area is summarised in Table B.1. For the purposes of this study the sites which have been included are:

- All sites of the Orkney Islands and adjacent waters whose designating features could potentially interact with the marine environment.
- Sites on Islands surrounding the Orkney Islands such as the Fair Isles, Pentland Firth Islands, Stroma, Sule Skerry and Sule Stack.
- Waters to the east of Orkney in the northern North Sea
- Sites along the north and north east coast of Scotland including sites with a marine component, coastal designated sites and rivers which are connected to the sea

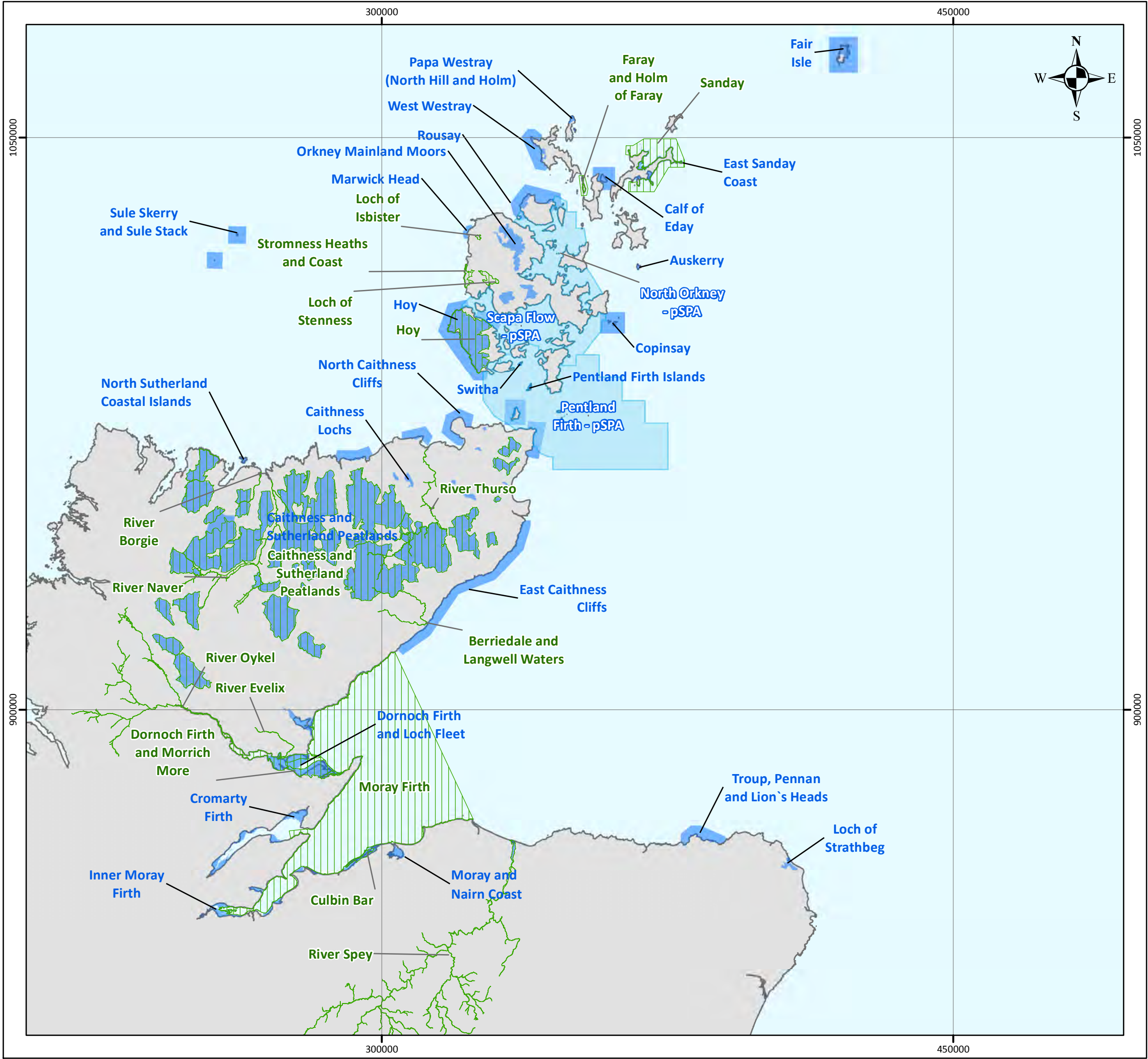
**Table B-1 Number of designations in the Orkney Islands and SEA study area**

<b>Designation</b>	<b>Orkney Islands (land and offshore sites)</b>	<b>SEA Study Area (marine)</b>
SAC	6	17
SCI	0	2
SPA	13	25
pSPA	2	2
Ramsar	1	7
SSSI	36	33
NCMPA	4	11

From these designations the following have been mapped in Figure B-1 – B-5 and their designating features presented in Table B-2:

- All designations in the Orkney Islands;
- All designations in close proximity to the Orkney Islands; and
- All SPAs and Ramsar sites within the study area.

All SACs within the study area which have a marine component (designated for marine features); are designated for the presence of European Protected Species (EPS) (Annex IV species) or the presence of Annex II species.



ORKNEY HARBOURS PORT  
MASTERPLAN 2020-2040

Figure B-1: Natura 2000 Sites

Legend

- SPA
- pSPA
- SAC

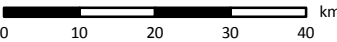


NOTE: Not to be used for Navigation

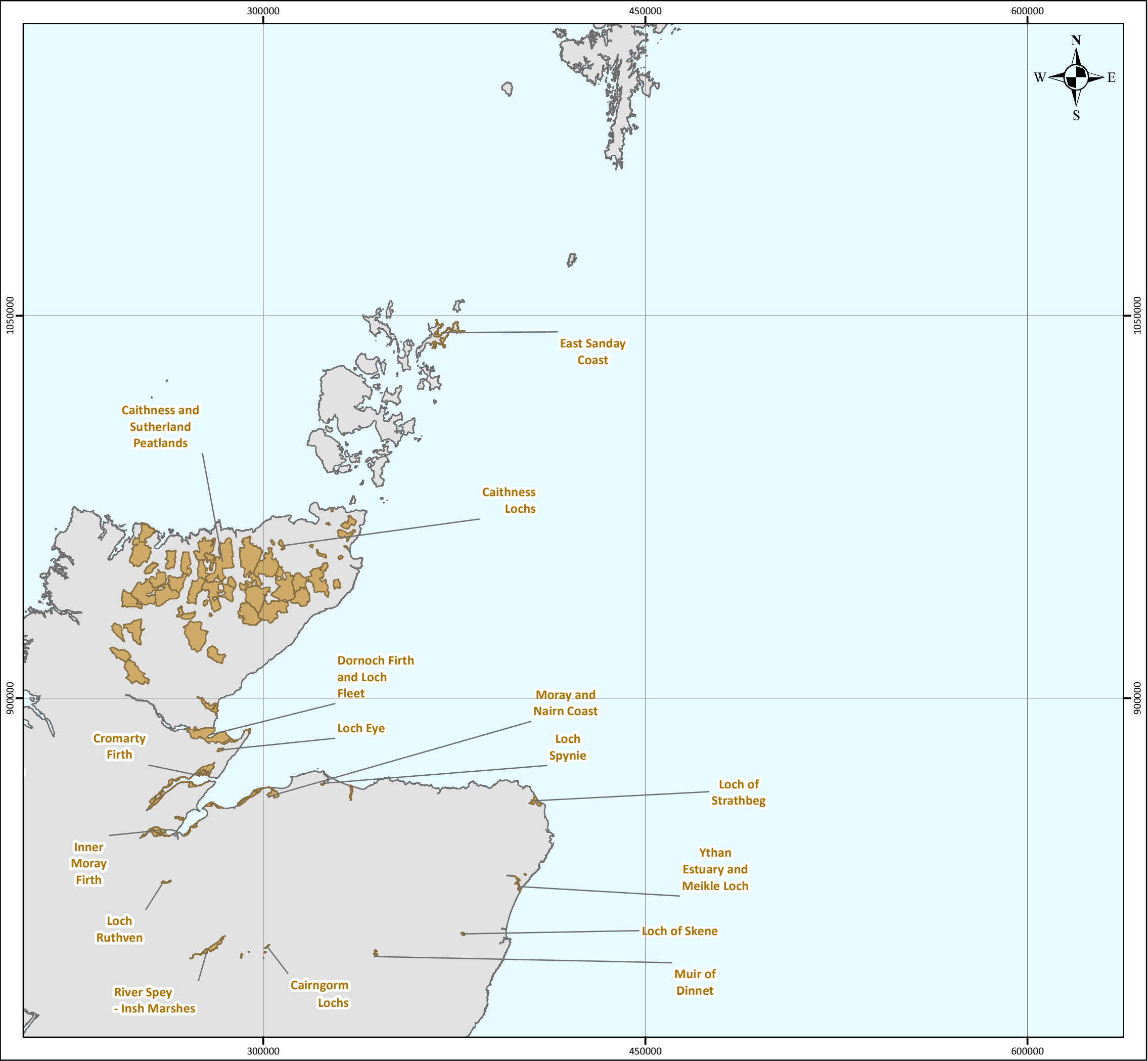
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Data Source	JNCC; SNH; OSOD; ESRI
File Reference	J:\P2214\Mxd\Report\Environmental_Report\AppB\B-1_Natura_2000_Sites.mxd
Created By	Chris Goode
Reviewed By	Emma Langley
Approved By	Beth Monkman



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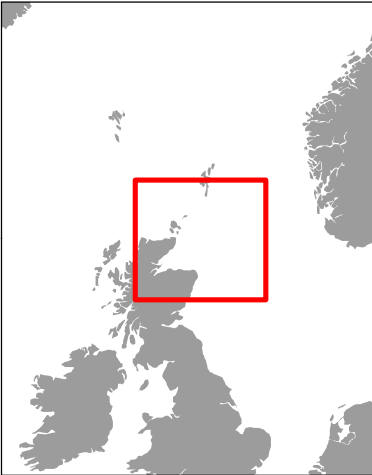


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Figure B-2: RAMSAR Sites

**Legend**  
Ramsar



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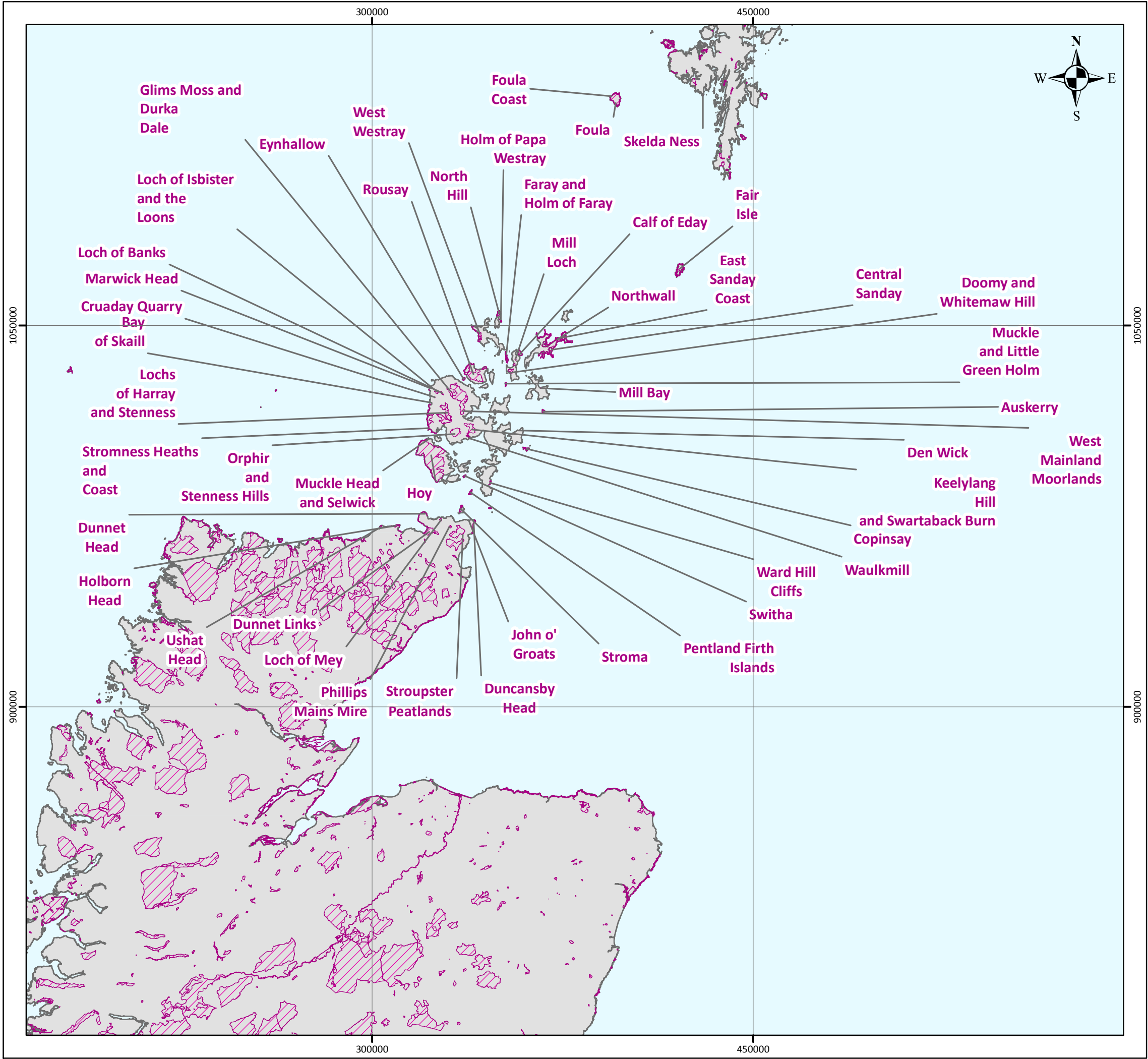
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Spheroid	Airy_1830
Datum	D_OSGB_1936
Data Source	SNH; OSOD; ESRI;
File Reference	J:\P2214\Mxd\Report\Environmental_Report\AppB\B-2_RAMSAR_Sites.mxd
Created By	Chris Goode
Reviewed By	Emma Langley
Approved By	Beth Monkman



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0 10 20 30 40 km

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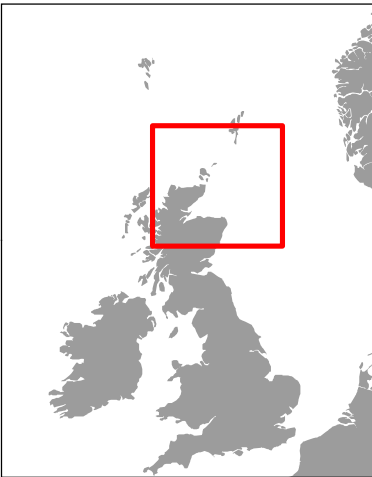
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Figure B-3: SSSI Sites

## Legend

SSSI



NOTE: Not to be used for Navigation

Date	Wednesday, February 20, 2019 07:41:53
Projection	British_National_Grid
Spheroid	Airy_1830
Datum	D_OSGB_1936
Data Source	SNH; OSOD; ESRI
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Created By	Chris Goode
Reviewed By	Emma Langley
Approved By	Beth Monkman



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0 10 20 30 40 km

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**Table B-2 Existing Designated sites in vicinity of the SEA study area (JNCC, 2017; SNH 2017a; JNCC, 2018, SNH 2017b;)**

	Designation	Site Name	Designating features and comments
Orkney	SPA	Auskerry	<p>Article 4.1 qualification of Directive (79/409/EEC) supporting populations of European importance Annex I species during the breeding season</p> <ul style="list-style-type: none"> <li>Arctic Tern (<i>Sterna paradisaea</i>), 780 pairs representing at least 1.8% of the breeding population in Great Britain</li> <li>Storm Petrel (<i>Hydrobates pelagicus</i>), 3,600 pairs representing at least 4.2% of the breeding population in Great Britain</li> </ul> <p>The site is important as a nesting area for a number of breeding seabirds. These birds feed outside the SPA in the waters surrounding the islands, as well as more distant waters.</p>
Orkney	SSSI	Auskerry	<p>Qualifying features: Breeding Storm Petrel (<i>Hydrobates pelagicus</i>), breeding Arctic Tern (<i>Sterna paradisaea</i>).</p>
Orkney	SPA	Calf of Eday	<p>Article 4.2 qualification of Directive (79/409/EEC) Assemblage qualification: A seabird assemblage of international importance.</p> <ul style="list-style-type: none"> <li>During the breeding season, the area regularly supports 30,000 individual seabirds including: Guillemot (<i>Uria aalge</i>), Kittiwake (<i>Rissa tridactyla</i>), Great Black-backed Gull (<i>Larus marinus</i>), Cormorant (<i>Phalacrocorax carbo</i>), Fulmar (<i>Fulmarus glacialis</i>).</li> </ul> <p>The site is of importance as a nesting area for breeding seabirds, which feed in surrounding waters outside the SPA and use most of the island for loafing.</p>
Orkney	SSSI	Calf of Eday	<p>200-300 pairs of breeding cormorant. Supports 30,000 breeding birds from 12 different species. UK's largest colony of great black-backed gulls (<i>Larus marinus</i>).</p>
Orkney	SSSI	Central Sanday	<p>Coastal geomorphology of Scotland (coastal sedimentary landforms); saltmarsh; machair; sand dunes. Two areas of the site are machair, which is one of the rarest habitats in Europe.</p>
Orkney	SPA	Copinsay	<p>Article 4.2 qualification of Directive (79/409/EEC) Assemblage qualification: A seabird assemblage of international importance.</p> <ul style="list-style-type: none"> <li>During the breeding season, the area regularly supports 70,000 individual seabirds including: Guillemot (<i>Uria aalge</i>), Kittiwake (<i>Rissa tridactyla</i>), Great Black-backed Gull (<i>Larus marinus</i>), Fulmar (<i>Fulmarus glacialis</i>).</li> </ul>

	Designation	Site Name	Designating features and comments
Orkney	SSSI	Copinsay	Qualifying features: Breeding seabird colony including Guillemot ( <i>Uria aalge</i> ), Kittiwake ( <i>Rissa tridactyla</i> ), Great Black-backed Gull ( <i>Larus marinus</i> ), Fulmar ( <i>Fulmarus glacialis</i> ), shag ( <i>Phalacrocorax aristotelis</i> ), lesser black-backed gull ( <i>Larus fuscus</i> ), herring gull ( <i>Larus argentatus</i> ), common gull ( <i>Larus canus</i> ), razorbill ( <i>Alca torda</i> ), black guillemot ( <i>Cepphus grille</i> ) and puffin ( <i>Fratercula arctica</i> ).
Orkney	SSSI	Doomy and Whitemaw Hill	Breeding Arctic skua; breeding whimbrel ( <i>Numenius phaeopus</i> ) and Arctic skua ( <i>Stercorarius parasiticus</i> ).
Orkney	SPA	East Sanday Coast	Article 4.1 qualification of Directive (79/409/EEC) supporting populations of European importance which are listed as Annex I species <ul style="list-style-type: none"> <li>Bar-tailed Godwit (<i>Limosa lapponica</i>), 600 individuals representing at least 1.1% of the wintering population in Great Britain</li> </ul> Article 4.2 qualification of Directive (79/409/EEC) supporting populations of migrating species with European importance <ul style="list-style-type: none"> <li>Purple Sandpiper (<i>Calidris maritima</i>), 840 individuals representing at least 1.7% of the wintering Eastern Atlantic - wintering population</li> <li>Turnstone (<i>Arenaria interpres</i>), 1,400 individuals representing at least 2.0% of the wintering Western Palearctic - wintering population</li> </ul>
Orkney	Ramsar	East Sanday Coast	Ramsar criterion 6 – species/populations occurring at levels of international importance Species with peak counts in winter: Purple sandpiper ( <i>Calidris maritima</i> ), E Atlantic –wintering 840 individuals, representing an average of 1.1% of the population Turnstone, ( <i>Arenaria interpres</i> ), NE Canada, Greenland/W Europe and NW Africa 1400 individuals, representing an average of 1.4% of the population
Orkney	SSSI	East Sanday Coast	Internationally important site for its wintering assemblages of wading birds such as turnstone, purple sandpiper, ringed plover ( <i>Charadrius hiaticula</i> ), sanderling ( <i>Calidris alba</i> ) and a bar-tailed godwit ( <i>Limosa lapponica</i> ). The site is of international importance as it supports the largest harbour seal ( <i>Phoca vitulina</i> ) colony on Orkney.
Orkney	SSSI	Eynhallow	Breeding and haul out site for common (or harbour) seal ( <i>Phoca vitulina</i> ).

	Designation	Site Name	Designating features and comments
Orkney	SAC	Faray and Holm of Faray	<p>Annex II species that are a primary reason for designation</p> <ul style="list-style-type: none"> <li>▪ Grey seal (<i>Halichoerus grypus</i>)</li> </ul> <p>These two uninhabited islands support the second largest breeding colony of grey seals in the UK, contributing to approximately 9% of the annual UK pup production.</p>
Orkney	SSSI	Faray and Holm of Faray	Important site as a breeding and haul out site for the grey seal ( <i>Halichoerus grypus</i> ).
Orkney	SSSI	Glims Moss and Durka Dale (part of Orkney Mainland Moors SPA)	Raised bog; Hydro morphological mire range; valley fen. Site with nesting moorland bird species including the hen harrier ( <i>Circus cyaneus</i> ), merlin ( <i>Falco columbarius</i> ) and short-eared owl ( <i>Asio flammeus</i> ).
Orkney	SSSI	Holm of Papa Westray (part of Papa Westray SPA)	<p>Site with the UK's largest breeding colony of black guillemot.</p> <p>Hosts up to 600 non breeding birds such as Arctic tern (<i>Sterna paradisaea</i>), storm petrel (<i>Hydrobates pelagicus</i>), fulmar (<i>Fulmarus glacialis</i>), shag (<i>Phalacrocorax aristotelis</i>), eider duck (<i>Somateria mollissima</i>), lesser black-backed gull (<i>Larus fuscus</i>), herring gull (<i>Larus argentatus</i>) and great black-backed gull (<i>Larus marinus</i>).</p>
Orkney	SAC	Hoy	<p>Annex I Habitats that are a primary reason for the designation</p> <ul style="list-style-type: none"> <li>▪ Vegetated sea cliffs of the Atlantic and Baltic Coasts</li> <li>▪ Natural dystrophic lakes and ponds</li> <li>▪ Northern Atlantic wet heaths with <i>Erica tetralix</i></li> <li>▪ Alpine and Boreal heaths</li> <li>▪ Blanket bogs *Priority feature (if active bog)</li> </ul> <p>Annex I habitats present as qualifying feature but not primary feature</p> <ul style="list-style-type: none"> <li>▪ European dry heaths</li> <li>▪ Petrifying springs with tufa formation (<i>Cratoneurion</i>) * Priority feature</li> <li>▪ Alkaline fens</li> </ul>

	Designation	Site Name	Designating features and comments
			<ul style="list-style-type: none"> <li>Calcareous rocky slopes with chasmophytic vegetation</li> </ul>
Orkney	SPA	Hoy	<p>Article 4.1 qualification of Directive (79/409/EEC) supporting populations of European importance Annex I species during the breeding season</p> <ul style="list-style-type: none"> <li>Peregrine (<i>Falco peregrinus</i>), 6 pairs representing at least 0.5% of the breeding population in Great Britain (Mid-1990s)</li> <li>Red-throated Diver (<i>Gavia stellate</i>), 56 pairs representing at least 6% of the breeding population in Great Britain</li> </ul> <p>Article 4.2 qualification of Directive (79/409/EEC) supporting populations of European importance migratory species during the breeding season</p> <ul style="list-style-type: none"> <li>Great Skua (<i>Catharacta skua</i>), 1,900 pairs representing at least 14.0% of the breeding World population</li> </ul> <p>Article 4.2 qualification of Directive (79/409/EEC) Assemblage qualification: A seabird assemblage of international importance</p> <p>During the breeding season the area regularly supports 120,000 individual seabirds including: Puffin, Guillemot, Kittiwake, Great Black-backed Gull, Arctic Skua, Fulmar, Great Skua <i>Catharacta skua</i>.</p>
Orkney	SSSI	Hoy	<p>Breeding seabird colony of Arctic skua, fulmar, great skua, guillemot, peregrine, red-throated diver and great black-backed gull.</p> <p>The upland habitat of blanket bog, Montane heath, petrifying tufa springs, woodland and upland heaths.</p>
Orkney	SSSI	Keelylang Hill and Swartaback Burn (Part of Orkney Mainland Moors SPA)	<p>Nationally important site for upland breeding birds including the hen harrier merlin and short-eared owl. Also designated for breeding bird assemblage; upland assemblage (mosaic).</p>
Orkney	SSSI	Loch of Banks	Designated for non-breeding hen harrier; breeding bird assemblage and basin fen.
Orkney	SSSI	Lochs of Harray and Stenness	<p>Qualifying features:</p> <p>Non-breeding goldeneye (<i>Bucephala clangula</i>), non-breeding pochard (<i>Aythya farina</i>), non-breeding scaup (<i>Aythya marila</i>), non-breeding tufted duck (<i>Aythya fuligula</i>); saline lagoon; freshwater nerite snail (<i>Theodoxus fluviatilis</i>); a caddis fly; eutrophic loch.</p>

	Designation	Site Name	Designating features and comments
Orkney	SAC	Loch of Isbister	<p>Annex I Habitats that are a primary reason for designation</p> <ul style="list-style-type: none"> <li>Natural eutrophic lakes with <i>Magnopotamion</i> or <i>Hydrocharition</i>-type vegetation</li> </ul> <p>Annex I habitats present as qualifying feature but not primary feature</p> <ul style="list-style-type: none"> <li>Transition mires and quaking bogs</li> </ul> <p>Annex II species that are a primary reason for designation</p> <ul style="list-style-type: none"> <li>Otter <i>Lutra lutra</i></li> </ul>
Orkney	SSSI	Loch of Isbister and the Loons	<p>Qualifying features:</p> <p>Breeding pintail (<i>Anas acuta</i>); breeding wildfowl bird assemblage; basin fen.</p>
Orkney	SAC	Loch of Stenness	<p>Annex I Habitats are the primary reason for designation</p> <ul style="list-style-type: none"> <li>Coastal lagoons *Priority feature</li> </ul>
Orkney	SPA	Marwick Head	<p>Article 4.2 qualification of Directive (79/409/EEC) supporting populations of European importance migratory species during the breeding season</p> <p>Guillemot(, 24,388 pairs representing up to 1.1% of the breeding East Atlantic population</p> <p>Article 4.2 qualification of Directive (79/409/EEC) Assemblage qualification: A seabird assemblage of international importance</p> <p>The area regularly supports 75,000 individual seabirds including: Kittiwakes and guillemots .</p>
Orkney	SSSI	Marwick Head	Breeding seabird colony; breeding populations of guillemots and kittiwakes.
Orkney	SSSI	Mill Loch	Breeding populations of red-throated diver with up to 10 breeding pairs.
Orkney	SSSI	Muckle and Little Green Holm	Designated for breeding populations of grey seals.
Orkney	SSSI	North Hill (part of Papa Westray SPA)	<p>Designated for an international important colony of breeding Arctic tern and nationally important breeding colony of Arctic skua.</p> <p>Also designated for maritime cliffs.</p>
Orkney	pSPA	North Orkney	Proposed qualifying interests:

	Designation	Site Name	Designating features and comments
			<ul style="list-style-type: none"> <li>Red-throated diver (breeding);</li> <li>Common eider (non-breeding);</li> <li>European shag (non-breeding);</li> <li>Great northern diver (non-breeding);</li> <li>Long-tailed duck (non-breeding);</li> <li>Red-breasted merganser (non-breeding);</li> <li>Slavonian grebe (non-breeding); and</li> <li>Velvet scoter (non-breeding).</li> </ul>
Orkney	SSSI	Northwall	Qualifying features are: Machair loch and machair.
Orkney	SPA	Orkney Mainland Moors	<p>Article 4.1 qualification of Directive (79/409/EEC) supporting populations of European importance Annex I species</p> <p>During the breeding season:</p> <ul style="list-style-type: none"> <li>Hen Harrier, 30 pairs representing at least 6.0% of the breeding population in Great Britain</li> <li>Red-throated Diver, 15 pairs representing at least 1.6% of the breeding population in Great Britain</li> </ul> <p>Over wintering:</p> <ul style="list-style-type: none"> <li>Hen Harrier, 13 individuals representing at least 1.7% of the wintering population in Great Britain</li> </ul>
Orkney	SSSI	Orphir and Stenness Hills (also forms part of the Orkney Mainland Moors SPA)	Qualifying features: Breeding hen harrier; breeding bird assemblage; Upland assemblage (mosaic).
Orkney	SPA	Papa Westray (North Hill and Holm)	<p>Article 4.1 qualification of Directive (79/409/EEC) supporting populations of European importance Annex I species during the breeding season</p> <ul style="list-style-type: none"> <li>Arctic Tern, 1,950 pairs representing at least 4.4% of the breeding population in Great Britain</li> </ul>

	Designation	Site Name	Designating features and comments
			<p>Article 4.2 qualification of Directive (79/409/EEC) supporting populations of European importance migratory species during the breeding season</p> <ul style="list-style-type: none"> <li>Arctic Skua, 135 pairs representing at least 0.4% of the breeding North Atlantic population</li> </ul> <p>The terns feed outside the SPA in the waters surrounding the islands.</p>
Orkney	SPA	Rousay	<p>Article 4.1 qualification of Directive (79/409/EEC) supporting populations of European importance Annex I species during the breeding season</p> <ul style="list-style-type: none"> <li>Arctic Tern, 1,000 pairs representing at least 2.3% of the breeding population in Great Britain (Seabird Census Register)</li> </ul> <p>Article 4.2 qualification of Directive (79/409/EEC) Assemblage qualification: A seabird assemblage of international importance</p> <p>During the breeding season, the area regularly supports 30,000 individual seabirds including: Guillemot, Kittiwake, Arctic Skua, Fulmar and Arctic Tern.</p>
Orkney	SSSI	Rousay	<p>Qualifying features:</p> <p>Assemblage of breeding seabird colonies of Arctic tern, guillemot, kittiwake; and Arctic skua;</p> <p>Blanket bog; subalpine wet heath; mesotrophic loch and maritime cliff.</p>
Orkney	SAC	Sanday	<p>Annex I Habitats that are a primary reason for designation</p> <ul style="list-style-type: none"> <li>Reefs (kelp and sponges)</li> </ul> <p>Annex I habitats present as qualifying feature but not primary feature</p> <ul style="list-style-type: none"> <li>Sandbanks which are slightly covered by sea water all the time</li> <li>Mudflats and sandflats not covered by seawater at low tide</li> </ul> <p>Annex II species that are a primary reason for designation</p> <ul style="list-style-type: none"> <li>Harbour seal</li> </ul>
Orkney	pSPA	Scapa Flow	<p>Proposed qualifying interests:</p> <ul style="list-style-type: none"> <li>Great northern diver (non-breeding);</li> <li>Red-throated diver (breeding);</li> </ul>

	Designation	Site Name	Designating features and comments
			<ul style="list-style-type: none"> <li>▪ Black-throated diver (non-breeding);</li> <li>▪ Slavonian grebe (non-breeding);</li> <li>▪ Common eider (non-breeding);</li> <li>▪ Long-tailed duck (non-breeding); and</li> <li>▪ Common goldeneye (non-breeding).</li> </ul>
Orkney	SAC	Stromness Heaths and Coast	<p>Annex I Habitats that are a primary reason for designation</p> <ul style="list-style-type: none"> <li>▪ Vegetated sea cliffs of the Atlantic and Baltic Coasts</li> <li>▪ European dry heaths</li> </ul> <p>Annex I habitats present as qualifying feature but not primary feature</p> <ul style="list-style-type: none"> <li>▪ Alkaline fens</li> </ul>
Orkney	SSSI	Stromness Heaths and Coast	<p>Qualifying features:</p> <p>Subalpine dry heath; coastal geomorphology; non-marine Devonian stratigraphy; maritime cliff.</p>
Orkney	SPA	Switha	<p>Article 4.1 qualification of Directive (79/409/EEC) supporting populations of European importance Annex I species over winter</p> <ul style="list-style-type: none"> <li>▪ Barnacle Goose <i>Branta leucopsis</i>, 1,000 individuals representing at least 3.7% of the wintering population in Great Britain</li> </ul>
Orkney	SSSI	Switha	<p>Qualifying features:</p> <p>Non-breeding Greenland barnacle goose (<i>Branta leucopsis</i>).</p>
Orkney	SSSI	Waulkmill	<p>Qualifying features:</p> <p>Saltmarsh; golden-rod case-bearer moth; maritime cliff.</p>
Orkney	SSSI	Ward Hill Cliffs	<p>Qualifying feature:</p> <p>Maritime cliff.</p>

	Designation	Site Name	Designating features and comments
Orkney	SPA	West Westray	<p>Article 4.1 qualification of Directive (79/409/EEC) supporting populations of European importance Annex I species during the breeding season</p> <ul style="list-style-type: none"> <li>Arctic Tern, 1,200 pairs representing at least 2.7% of the breeding population in Great Britain</li> </ul> <p>Article 4.2 qualification of Directive (79/409/EEC) supporting populations of European importance migratory species during the breeding season</p> <ul style="list-style-type: none"> <li>Guillemot, 28,274 pairs representing at least 1.3% of the breeding East Atlantic population</li> </ul> <p>Article 4.2 qualification of Directive (79/409/EEC) Assemblage qualification: A seabird assemblage of international importance</p> <p>During the breeding season, the area regularly supports 120,000 individual seabirds including: Razorbill, Kittiwake, Arctic Skua, Fulmar, Guillemot and Arctic Tern.</p>
Orkney	SSSI	West Westray	<p>Qualifying features:</p> <p>Breeding seabird colonies of guillemot; Arctic skua; Arctic tern; kittiwake and razorbill; and Maritime cliff.</p>
Orkney	SSSI	West Mainland Moorlands (Part of Orkney Mainland Moors SPA)	<p>Qualifying features:</p> <p>Breeding bird assemblages of hen harrier, short-eared owl and red-throated diver; and Upland assemblage (mosaic) and blanket bog.</p>
Northern North Sea	SCI	Braemar Pockmarks	<p>Annex I Habitats that are a primary reason for designation</p> <ul style="list-style-type: none"> <li>Submarine structures made by leaking gases</li> </ul> <p>The Braemar pockmarks are a series of crater-like depressions on the sea floor, two of which contain the above named Annex I habitat. The methane derived authigenic carbonate structures here provide a habitat for marine fauna usually associated with rocky reef, and very specific chemosynthetic organisms which feed off both methane and its by-product hydrogen sulphide. Fish present include wolf-fish and cod.</p>
Northern North Sea	SCI	Scanner Pockmarks	<p>Annex I Habitats that are a primary reason for designation</p> <ul style="list-style-type: none"> <li>Submarine structures made by leaking gases</li> </ul> <p>Scanner pockmark is a large seabed depression which contains large blocks of the Annex I habitat Submarine structures made by leaking gases. The blocks support fauna typically associated with rocky reef. These</p>

	Designation	Site Name	Designating features and comments
			carbonate structures are notably colonised by large numbers of anemones ( <i>Urticina felina</i> and <i>Metridium senile</i> ) and squat lobsters. They also support chemosynthesisers which utilise methane and its by-product hydrogen sulphide. Fish present include hash, haddock, wolf-fish and small red fish
Fair Isle	SPA	Fair Isle	<p>Article 4.1 qualification of Directive (79/409/EEC) supporting populations of European importance Annex I species during the breeding season</p> <ul style="list-style-type: none"> <li>Arctic Tern, 1,120 pairs representing at least 2.5% of the breeding population in Great Britain</li> </ul> <p>Fair Isle Wren <i>Troglodytes troglodytes fridariensis</i>, 37 individuals representing 100.0% of the breeding population in Great Britain</p> <p>Article 4.2 qualification of Directive (79/409/EEC) supporting populations of European importance migratory species during the breeding season</p> <ul style="list-style-type: none"> <li>Guillemot, 25,165 pairs representing at least 1.1% of the breeding East Atlantic population</li> </ul> <p>Article 4.2 qualification of Directive (79/409/EEC) Assemblage qualification: A seabird assemblage of international importance</p> <p>During the breeding season, the area regularly supports 180,000 individual seabirds including: Puffin, Razorbill, Kittiwake, Great Skua, Arctic Skua, Shag, Gannet (<i>Morus bassanus</i>), Fulmar, Guillemot, and Arctic Tern.</p>
Pentland Firth	pSPA	Pentland Firth	<p>Proposed qualifying features of interest:</p> <ul style="list-style-type: none"> <li>Arctic skua (breeding);</li> <li>Arctic tern (breeding);</li> <li>Common guillemot (breeding);</li> <li>Breeding seabird assemblage.</li> </ul>
Pentland Firth	SPA	Pentland Firth Islands	<p>Article 4.1 qualification of Directive (79/409/EEC) supporting populations of European importance Annex I species during the breeding season</p> <ul style="list-style-type: none"> <li>Arctic Tern, 1,200 pairs representing at least 2.7% of the breeding population in Great Britain</li> </ul>
Pentland Firth	SSSI	Pentland Firth Islands	<p>Qualifying features:</p> <p>Breeding Arctic tern; Vascular plant assemblage.</p>

	Designation	Site Name	Designating features and comments
West of Orkney	SPA	Sule Skerry and Sule Stack	<p>Article 4.1 qualification of Directive (79/409/EEC) supporting populations of European importance Annex I species during the breeding season</p> <ul style="list-style-type: none"> <li>Leach's Storm-petrel (<i>Oceanodroma leucorhoa</i>), 5 pairs representing at least 0.0% of the breeding population in Great Britain</li> <li>Storm Petrel, 1,000 pairs representing at least 1.2% of the breeding population in Great Britain</li> </ul> <p>Article 4.2 qualification of Directive (79/409/EEC) supporting populations of European importance migratory species during the breeding season</p> <ul style="list-style-type: none"> <li>Gannet, 4,890 pairs representing at least 1.9% of the breeding North Atlantic population</li> <li>Puffin, 43,380 pairs representing at least 4.8% of the breeding population</li> </ul> <p>Article 4.2 qualification of Directive (79/409/EEC) Assemblage qualification: A seabird assemblage of international importance</p> <p>During the breeding season, the area regularly supports 100,000 individual seabirds including: Leach's Storm-petrel, Guillemot, Shag, Puffin, Gannet, and Storm Petrel.</p>
North Scotland	SAC	Caithness and Sutherland Peatlands	<p>Annex I Habitats that are a primary reason for designation</p> <ul style="list-style-type: none"> <li>Oligotrophic to mesotrophic standing waters with vegetation of the <i>Littorelletea uniflorae</i> and/or of the <i>Isoëto-Nanojuncetea</i></li> <li>Natural dystrophic lakes and ponds</li> <li>Blanket bogs * Priority feature (if active bog)</li> </ul> <p>Annex I habitats present as qualifying feature but not primary feature</p> <ul style="list-style-type: none"> <li>Northern Atlantic wet heaths with <i>Erica tetralix</i></li> <li>Transition mires and quaking bogs</li> <li>Depressions on peat substrates of the <i>Rhynchosporion</i></li> </ul> <p>Annex II species that are a primary reason for designation</p> <ul style="list-style-type: none"> <li>Otter</li> </ul>

	Designation	Site Name	Designating features and comments
			<ul style="list-style-type: none"> <li>Marsh saxifrage (<i>Saxifraga hirculus</i>)</li> </ul>
North Scotland	SPA	Caithness and Sutherland Peatlands	<p>Article 4.1 qualification of Directive (79/409/EEC) supporting populations of European importance Annex I species during the breeding season</p> <ul style="list-style-type: none"> <li>Black-throated Diver (<i>Gavia arctica</i>), 26 pairs representing 16.3% of the breeding population in Great Britain, Golden Eagle (<i>Aquila chrysaetos</i>), 5 pairs representing 1.3% of the breeding population in Great Britain, Golden Plover (<i>Pluvialis apricaria</i>, 1,064 pairs representing 4.7% of the breeding population in Great Britain, Hen Harrier, 14 pairs representing 2.8% of the breeding population in Great Britain, Merlin, 54 pairs representing 4.2% of the breeding population in Great Britain, Red-throated Diver, 89 pairs representing 9.5% of the breeding population in Great Britain, Short-eared Owl, 30 pairs representing 3% of the breeding population in Great Britain, Wood Sandpiper (<i>Tringa glareola</i>), 5 pairs representing 50% of the breeding population in Great Britain.</li> </ul> <p>Article 4.2 qualification of Directive (79/409/EEC) supporting populations of European importance migratory species during the breeding season</p> <ul style="list-style-type: none"> <li>Common Scoter (<i>Melanitta nigra</i>), 27 pairs</li> <li>Dunlin (<i>Calidris alpina schinzii</i>), 1,860 pairs representing at least 16.9% of the breeding Baltic/UK/Ireland population</li> <li>Greenshank (<i>Tringa nebularia</i>), 256 pairs</li> <li>Wigeon (<i>Anas penelope</i>), 43 pairs</li> </ul>
North Scotland	Ramsar	Caithness and Sutherland Peatlands	<p>Ramsar criterion 1,2,6 –</p> <p>1 – Site supports one of the largest and most intact areas of blanket bog in the world.</p> <p>2 – Site supports a number of rare species of wetland plants and animals.</p> <p>6 - Species/populations occurring at levels of international importance</p> <ul style="list-style-type: none"> <li>Dunlin 1860 pairs, representing an average of 7.4% of the breeding population for Baltic/UK/Ireland</li> </ul>
North Scotland	SPA	Caithness Lochs	<p>Article 4.1 qualification of Directive (79/409/EEC) supporting populations of European importance Annex I species over winter</p>

	Designation	Site Name	Designating features and comments
			<ul style="list-style-type: none"> <li>Greenland White-fronted Goose (<i>Anser albifrons flavirostris</i>), 183 individuals representing at least 1.3% of the wintering population in Great Britain</li> <li>Whooper Swan (<i>Cygnus cygnus</i>), 250 individuals representing at least 4.5% of the wintering population in Great Britain</li> </ul> <p>Article 4.2 qualification of Directive (79/409/EEC) supporting populations of European importance migratory species over winter</p> <ul style="list-style-type: none"> <li>Greylag Goose (<i>Anser anser</i>), 6,872 individuals representing at least 6.9% of the wintering Iceland/UK/Ireland population</li> </ul>
North Scotland	Ramsar	Caithness Lochs	<p>Ramsar criterion 6 – species/populations occurring at levels of international importance</p> <p>Species with peak counts in winter:</p> <ul style="list-style-type: none"> <li>Whooper swan, Iceland/UK/Ireland 192 individuals, representing an average of 3.3% of the GB population</li> <li>Greenland white-fronted goose, Greenland 252 individuals, representing an average of 1.2% of the GB population</li> <li>Greylag goose, Iceland/UK, Ireland 8730 individuals, representing an average of 9.7% of the population</li> </ul>
North Scotland	SPA	North Caithness Cliffs	<p>Article 4.1 qualification of Directive (79/409/EEC) supporting populations of European importance Annex I species during the breeding season</p> <ul style="list-style-type: none"> <li>Peregrine, 6 pairs representing at least 0.5% of the breeding population in Great Britain</li> </ul> <p>Article 4.2 qualification of Directive (79/409/EEC) supporting populations of European importance migratory species during the breeding season</p> <ul style="list-style-type: none"> <li>Guillemot, 26,994 pairs representing at least 1.2% of the breeding East Atlantic population</li> </ul> <p>Article 4.2 qualification of Directive (79/409/EEC) Assemblage qualification: A seabird assemblage of international importance</p> <p>During the breeding season, the area regularly supports 110,000 individual seabirds including: Puffin, Razorbill, Kittiwake, Fulmar and Guillemot.</p>
North Scotland	SPA	North Sutherland Coastal Islands	<p>Article 4.1 qualification of Directive (79/409/EEC) supporting populations of European importance Annex I species over winter</p>

	Designation	Site Name	Designating features and comments
			<ul style="list-style-type: none"> <li>Barnacle Goose, 631 individuals representing at least 2.3% of the wintering population in Great Britain</li> </ul>
North Scotland	SAC	River Borgie	<p>Annex II species that are a primary reason for designation</p> <ul style="list-style-type: none"> <li>Freshwater pearl mussel (<i>Margaritifera margaritifera</i>)</li> </ul> <p>Annex II species present as a qualifying feature but not a primary feature</p> <ul style="list-style-type: none"> <li>Atlantic salmon (<i>Salmo salar</i>)</li> <li>Otter (<i>Lutra lutra</i>)</li> </ul>
North Scotland	SAC	River Naver	<p>Annex II species that are a primary reason for designation</p> <ul style="list-style-type: none"> <li>Freshwater pearl mussel</li> <li>Atlantic salmon</li> </ul>
North Scotland	SAC	River Thurso	<p>Annex II species that are a primary reason for designation</p> <ul style="list-style-type: none"> <li>Atlantic salmon</li> </ul>
Stroma	SSSI	Stroma	<p>Qualifying features:</p> <p>Breeding seabird colonies of Arctic tern; Guillemot and sandwich tern (<i>Sterna sandvicensis</i>); and Maritime cliff</p>
North Scotland	SSSI	Dunnet Head	<p>Qualifying features:</p> <p>Breeding seabird colony; breeding guillemot and maritime cliff</p>
North Scotland	SSSI	Duncansby Head	<p>Qualifying features:</p> <p>Breeding seabird colonies of fulmar; guillemot and kittiwake; and Coastal geomorphology of Scotland and maritime cliff</p>
North Scotland	SSSI	Loch of Mey	<p>Qualifying features:</p> <p>Breeding bird assemblage; non-breeding Greenland white-fronted goose and transition grassland</p>
North-east Scotland	SAC	Berriedale and Langwell Waters	<p>Annex II species that are a primary reason for designation</p> <ul style="list-style-type: none"> <li>Atlantic salmon</li> </ul>

	Designation	Site Name	Designating features and comments
North-east Scotland	SPA	Cromarty Firth	<p>Article 4.1 qualification of Directive (79/409/EEC) supporting populations of European importance Annex I species during the breeding season</p> <ul style="list-style-type: none"> <li>Common Tern <i>Sterna hirundo</i>, 294 pairs representing at least 2.4% of the breeding population in Great Britain</li> <li>Osprey (<i>Pandion haliaetus</i>), 1 pairs representing at least 1% of the breeding population in Great Britain</li> </ul> <p>Over winter;</p> <ul style="list-style-type: none"> <li>Bar-tailed Godwit, 1,420 individuals representing at least 2.7% of the wintering population in Great Britain (winter peak mean)</li> <li>Whooper Swan, 55 individuals representing at least 1.0% of the wintering population in Great Britain</li> </ul> <p>Article 4.2 qualification of Directive (79/409/EEC) supporting populations of European importance migratory species over winter</p> <ul style="list-style-type: none"> <li>Greylag Goose, 1,777 individuals representing at least 1.8% of the wintering Iceland/UK/Ireland population</li> </ul> <p>Article 4.2 qualification of Directive (79/409/EEC) Assemblage qualification: A seabird assemblage of international importance</p> <p>Over winter, the area regularly supports 34,847 individual waterfowl including: Redshank (<i>Tringa totanus</i>), Curlew (<i>Numenius arquata</i>), Dunlin, Knot (<i>Calidris canutus</i>), Oystercatcher (<i>Haematopus ostralegus</i>), Red-breasted Merganser (<i>Mergus serrator</i>), Scaup (<i>Aythya marila</i>), Pintail, Wigeon, Greylag Goose, Bar-tailed Godwit, and Whooper Swan.</p>
North-east Scotland	Ramsar	Cromarty Firth	<p>Ramsar criterion</p> <p>1 – site contains extensive, undisturbed intertidal flats with eelgrass <i>Zostera</i> spp. beds</p> <p>5 – assemblages of internationally important waterfowl</p> <p>6 – species/populations occurring at levels of international importance</p> <p>Species with peak counts in winter:</p> <ul style="list-style-type: none"> <li>Greylag goose,</li> <li>Bar-tailed godwit</li> </ul>

	Designation	Site Name	Designating features and comments
North-east Scotland	SAC	Culbin Bar	<p>Annex I Habitats that are a primary reason for designation</p> <ul style="list-style-type: none"> <li>Perennial vegetation of stony banks</li> </ul> <p>Annex I habitats present as qualifying feature but not primary feature</p> <ul style="list-style-type: none"> <li>Atlantic salt meadows (<i>Glauco-Puccinellietalia maritimae</i>)</li> <li>Embryonic shifting dunes</li> </ul>
North-east Scotland	SPA	Dornoch Firth and Loch Fleet	<p>Article 4.1 qualification of Directive (79/409/EEC) supporting populations of European importance Annex I species</p> <p>During the breeding season</p> <ul style="list-style-type: none"> <li>Osprey, 10 pairs representing at least 10% of the breeding population in Great Britain</li> </ul> <p>Over winter</p> <ul style="list-style-type: none"> <li>Bar-tailed Godwit, 1,300 individuals representing at least 2.5% of the wintering population in Great Britain</li> </ul> <p>Article 4.2 qualification of Directive (79/409/EEC) supporting populations of European importance Migratory species over winter:</p> <ul style="list-style-type: none"> <li>Greylag Goose, 2,079 individuals representing at least 2.1% of the wintering Iceland/UK/Ireland population</li> <li>Wigeon, 15,304 individuals representing at least 1.2% of the wintering Western Siberia/Northwestern/Northeastern Europe population</li> </ul> <p>A seabird assemblage of international importance:</p> <p>Over winter, the area regularly supports 34,837 individual waterfowl including: Curlew, Dunlin, Oystercatcher, Teal (<i>Anas crecca</i>), Wigeon, Greylag Goose, and Bar-tailed Godwit.</p>
North-east Scotland	Ramsar	Dornoch Firth and Loch Fleet	<p>Ramsar criterion</p> <p>1 – site supports a variety of wetland features</p> <p>2 - site supports nationally-scarce aquatic plants and British Red Data Book invertebrates</p> <p>5 – assemblages of internationally importance waterfowl</p> <p>6 – species/populations occurring at levels of international importance</p> <p>Species with peak counts in spring/autumn:</p>

	Designation	Site Name	Designating features and comments
			<ul style="list-style-type: none"> <li>Wigeon</li> </ul> <p>Species with peak counts in winter:</p> <ul style="list-style-type: none"> <li>Greylag goose</li> <li>Bar-tailed godwit,</li> </ul>
North-east Scotland	SAC	Dornoch Firth and Morrich More	<p>Annex I Habitats that are a primary reason for designation</p> <ul style="list-style-type: none"> <li>Estuaries</li> <li>Mudflats and sandflats not covered by seawater at low tide</li> <li><i>Salicornia</i> and other annuals colonising mud and sand</li> <li>Atlantic salt meadows (<i>Glauco-Puccinellietalia maritimae</i>)</li> <li>Embryonic shifting dunes</li> <li>Shifting dunes along the shoreline with <i>Ammophila arenaria</i> ('white dunes')</li> <li>Fixed dunes with herbaceous vegetation ('grey dunes') * Priority feature</li> <li>Decalcified fixed dunes with <i>Empetrum nigrum</i> * Priority feature</li> <li>Atlantic decalcified fixed dunes (<i>Calluno-Ulicetea</i>)</li> <li>Humid dune slacks</li> <li>Coastal dunes with <i>Juniperus spp.</i> * Priority feature</li> </ul> <p>Annex I habitats present as qualifying feature but not a primary feature</p> <ul style="list-style-type: none"> <li>Sandbanks which are slightly covered by sea water all the time</li> <li>Reefs</li> </ul> <p>Annex II species that are a primary reason for designation</p> <ul style="list-style-type: none"> <li>Otter</li> <li>Harbour seal</li> </ul>

	Designation	Site Name	Designating features and comments
North-east Scotland	SPA	East Caithness Cliffs	<p>Article 4.1 qualification of Directive (79/409/EEC) supporting populations of European importance Annex I species</p> <p>During the breeding season</p> <ul style="list-style-type: none"> <li>▪ Peregrine, 6 pairs representing at least 0.5% of the breeding population in Great Britain</li> </ul> <p>Article 4.2 qualification of Directive (79/409/EEC) supporting populations of European importance migratory species during the breeding season</p> <ul style="list-style-type: none"> <li>▪ Guillemot, 71,509 pairs representing at least 3.2% of the breeding East Atlantic population</li> <li>▪ Herring Gull, 9,370 pairs representing at least 1.0% of the breeding North western Europe (breeding) and Iceland/Western Europe - breeding population</li> <li>▪ Kittiwake, 31,930 pairs representing at least 1.0% of the breeding Eastern Atlantic - Breeding population</li> <li>▪ Razorbill, 9,259 pairs representing at least 1.6% of the breeding population</li> <li>▪ Shag, 2,345 pairs representing at least 1.9% of the breeding Northern Europe population</li> </ul> <p>Article 4.2 qualification of Directive (79/409/EEC) Assemblage qualification: A seabird assemblage of international importance</p> <p>During the breeding season, the area regularly supports 300,000 individual seabirds including: Puffin, Great Black-backed Gull, Cormorant, Fulmar, Razorbill, Guillemot, Kittiwake, Herring Gull and Shag.</p>
North-east Scotland	SPA	Inner Moray Firth	<p>Article 4.1 qualification of Directive (79/409/EEC) supporting populations of European importance Annex I species</p> <p>During the breeding season:</p> <ul style="list-style-type: none"> <li>▪ Common Tern, 310 pairs representing at least 2.5% of the breeding population in Great Britain</li> <li>▪ Osprey, 4 pairs representing at least 4.0% of the breeding population in Great Britain</li> </ul> <p>Over winter:</p> <ul style="list-style-type: none"> <li>▪ Bar-tailed Godwit, 1,155 individuals representing at least 2.2% of the wintering population in Great Britain</li> </ul> <p>Article 4.2 qualification of Directive (79/409/EEC) supporting populations of European importance migratory species over winter:</p>

	Designation	Site Name	Designating features and comments
			<ul style="list-style-type: none"> <li>▪ Greylag Goose, 1,731 individuals representing at least 1.7% of the wintering Iceland/UK/Ireland population</li> <li>▪ Red-breasted Merganser, 1,731 individuals representing at least 1.4% of the wintering Northwestern/Central Europe population</li> <li>▪ Redshank, 1,811 individuals representing at least 1.2% of the wintering Eastern Atlantic - wintering population</li> <li>▪ Scaup (<i>Aythya marila</i>), 97 individuals representing &lt;0.1% of the wintering Northern/Western Europe population</li> </ul> <p>Article 4.2 qualification of Directive (79/409/EEC) Assemblage qualification: A seabird assemblage of international importance</p> <p>Over winter, the area regularly supports 33,148 individual waterfowl including: Scaup, Curlew, Oystercatcher, Goosander (<i>Mergus merganser</i>), Goldeneye, Teal, Wigeon, Cormorant, Redshank, Red-breasted Merganser, Greylag Goose and Bar-tailed Godwit.</p>
North-east Scotland	Ramsar	Inner Moray Firth	<p>Ramsar criterion:</p> <p>1 – site supports a variety of important wetland habitats including intertidal flats with eelgrass <i>Zostera</i> beds, saltmarsh, and a sand and shingle spit</p> <p>5 – assemblages of internationally important waterfowl</p> <p>6 – species/populations occurring at levels of international importance</p> <p>Species with peak counts in winter:</p> <ul style="list-style-type: none"> <li>▪ Greylag goose,</li> <li>▪ Red-breasted merganser,</li> <li>▪ Bar-tailed godwit,</li> <li>▪ Common redshank,</li> </ul>
North-east Scotland	SPA	Loch of Strathberg	<p>Article 4.1 qualification of Directive (79/409/EEC) supporting populations of European importance Annex I species</p> <p>During the breeding season:</p>

	Designation	Site Name	Designating features and comments
			<ul style="list-style-type: none"> <li>Sandwich Tern, 530 pairs representing up to 3.8% of the breeding population in Great Britain</li> </ul> <p>Over winter:</p> <ul style="list-style-type: none"> <li>Barnacle Goose, 226 individuals representing up to 1.9% of the wintering population in Great Britain</li> <li>Whooper Swan, 183 individuals representing up to 3.3% of the wintering population in Great Britain</li> </ul> <p>Article 4.2 qualification of Directive (79/409/EEC) supporting populations of European importance migratory species over winter:</p> <ul style="list-style-type: none"> <li>Greylag Goose, 3,325 individuals representing up to 3.3% of the wintering Iceland/UK/Ireland population</li> <li>Pink-footed Goose (<i>Anser brachyrhynchus</i>), 39,924 individuals representing up to 17.7% of the wintering Eastern Greenland/Iceland/UK population</li> </ul> <p>Article 4.2 qualification of Directive (79/409/EEC) Assemblage qualification: A seabird assemblage of international importance</p> <p>Over winter, the area regularly supports 49,452 individual waterfowl (5 year peak mean 1991/2 - 1995/6) including: Teal, Greylag Goose, Pink-footed Goose, Barnacle Goose and Whooper Swan..</p>
North-east Scotland	Ramsar	Loch of Strathberg	<p>Ramsar criterion</p> <p>1 – site constitutes the largest dune slack pool in Britain and the largest water body in the north-east Scottish lowlands and is one of very few naturally eutrophic lochs of the size in the region</p> <p>5 - assemblages of internationally important waterfowl</p> <p>6 – species/populations occurring at levels of international importance</p> <p>Species with peak counts in spring/autumn:</p> <ul style="list-style-type: none"> <li>Pink-footed goose</li> <li>Species with peak counts in winter:</li> <li>Whooper swan</li> <li>Greylag goose</li> </ul> <p>Ramsar criterion 6 – species/populations identified subsequent to designation for possible future consideration.</p> <p>Species with peak counts in winter:</p>

	Designation	Site Name	Designating features and comments
			<ul style="list-style-type: none"> <li>Barnacle goose</li> </ul>
North-east Scotland	SPA	Moray and Nairn Coast	<p>Article 4.1 qualification of Directive (79/409/EEC) supporting populations of European importance Annex I species</p> <p>During the breeding season:</p> <ul style="list-style-type: none"> <li>Osprey, 7 pairs representing at least 7.0% of the breeding population in Great Britain</li> </ul> <p>Over winter:</p> <ul style="list-style-type: none"> <li>Bar-tailed Godwit, 1,156 individuals representing at least 2.2% of the wintering population in Great Britain</li> </ul> <p>Article 4.2 qualification of Directive (79/409/EEC) supporting populations of European importance migratory species over winter:</p> <ul style="list-style-type: none"> <li>Greylag Goose, 2,679 individuals representing at least 2.7% of the wintering Iceland/UK/Ireland population</li> <li>Pink-footed Goose, 139 individuals representing &lt;0.1% of the wintering Eastern Greenland/Iceland/UK population</li> <li>Redshank, 1,690 individuals representing at least 1.1% of the wintering Eastern Atlantic - wintering population</li> </ul> <p>Article 4.2 qualification of Directive (79/409/EEC) Assemblage qualification: A seabird assemblage of international importance</p> <p>Over winter, the area regularly supports 20,250 individual waterfowl including: Pink-footed Goose, Dunlin, Oystercatcher, Red-breasted Merganser, Velvet Scoter (<i>Melanitta fusca</i>), Common Scoter, Long-tailed duck (<i>Clangula hyemalis</i>), Wigeon, Redshank, Greylag Goose and Bar-tailed Godwit.</p>
North-east Scotland	SAC	Moray Firth	<p>Annex I habitats present as qualifying feature but not primary feature</p> <ul style="list-style-type: none"> <li>Sandbanks which are slightly covered by sea water all the time</li> </ul> <p>Annex II species that are a primary reason for designation</p> <ul style="list-style-type: none"> <li>Bottlenose dolphin (<i>Tursiops truncatus</i>)</li> </ul>
North-east Scotland	SAC	River Evelix	<p>Annex II species that are a primary reason for designation</p> <ul style="list-style-type: none"> <li>Freshwater pearl mussel</li> </ul>

	Designation	Site Name	Designating features and comments
North-east Scotland	SAC	River Oykel	<p>Annex II species that are a primary reason for designation</p> <ul style="list-style-type: none"> <li>Freshwater pearl mussel</li> </ul> <p>Annex II species present as a qualifying feature but not a primary feature</p> <ul style="list-style-type: none"> <li>Atlantic salmon</li> </ul>
North-east Scotland	SAC	River Spey	<p>Annex II species that are a primary reason for designation</p> <ul style="list-style-type: none"> <li>Freshwater pearl mussel</li> <li>Sea lamprey (<i>Petromyzon marinus</i>)</li> <li>Atlantic salmon</li> <li>Otter</li> </ul>
North-east Scotland	SPA	Troup, Pennan and Lion's Heads	<p>Article 4.2 qualification of Directive (79/409/EEC) supporting populations of European importance migratory species during the breeding season</p> <ul style="list-style-type: none"> <li>Guillemot, 29,902 pairs representing at least 1.3% of the breeding East Atlantic population</li> </ul> <p>Article 4.2 qualification of Directive (79/409/EEC) Assemblage qualification: A seabird assemblage of international importance</p> <p>During the breeding season, the area regularly supports 150,000 individual seabirds including: Razorbill, Kittiwake, Herring Gull, Fulmar and Guillemot.</p>

### **Annex I Habitats**

In addition to these protected areas, Annex I of the EC Habitats Directive (92/43/EEC) lists habitats whose conservation requires the designation of SACs. Four of these habitat types are known to occur in UK offshore waters:

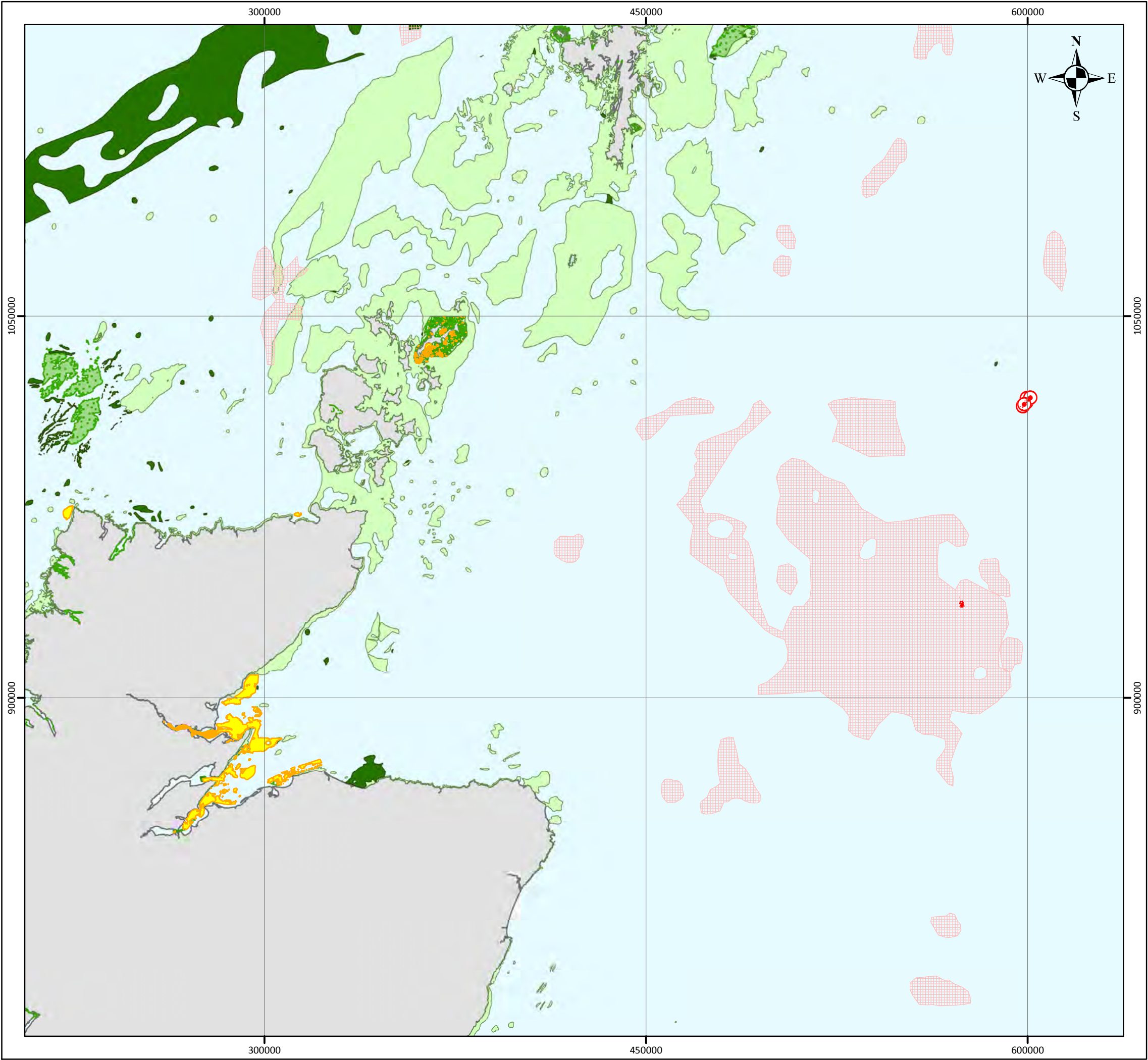
- 13. Sandbanks that are slightly covered by seawater all the time
- 14. Reefs (stony, bedrock or biogenic)
- 15. Submarine structures made by leaking gases

The JNCC differentiated areas with known Annex I habitats to those where Annex I habitats are potentially present. These are generally sites where the potential for an Annex I habitat to exist has been identified, but where no specific data are currently available to confirm the absence or presence of the habitat. Through offshore survey JNCC are working to confirm the presence of Annex I Habitats in these areas.

There are Annex I sandbanks habitats present within the study area, shown in Figure B-4. These are present within the Moray Firth and south of Sanday.

There are also three potential habitats in the study area:

- Sandbanks that are slightly covered by seawater all the time – sandy sediments in less than 60 m of water, occur around the coasts of the Orkneys Islands and the North and North-east Scottish coastline.
- Potential rocky and stony reef is widespread around the Orkney Islands and between Orkney and Shetland and the North Scottish coast (see Figure B-4). Annex I reef habitats are present on the east and west coast of Shetland, however this is outside the study area.
- A large area of the potential submarine structures made by leaking gases known as fluid seep areas is located within the northern North Sea (see Figure B-4) which contains the Scanner and Braemar pockmark SACs.



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Figure B-4: Annex I Habitats

Legend

Protected Submarine Structure Made by Leaking Gases

- Submarine Structure within Pockmark
- Submarine Structure within Pockmark
- Potential Range - Submarine Structures within Pockmark

Protected Submarine Structure

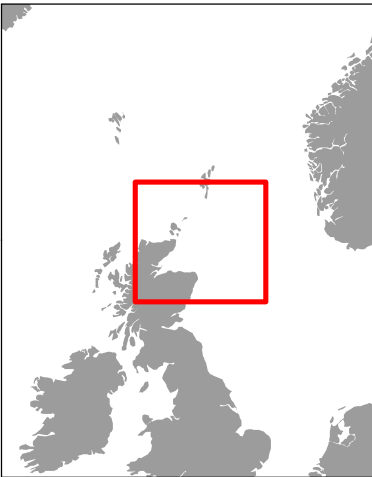
- Submarine Structure within Pockmark

Protected Sandbank Slightly Covered by Seawater All of the Time

- Sandbank Area (High Confidence)

Potential Reef

- Bedrock
- Stony
- Biogenic
- Bedrock and Stony
- Bedrock and/or Stony



NOTE: Not to be used for Navigation

Date	Wednesday, February 20, 2019 07:52:38
Projection	British_National_Grid
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Datum	D_OSGB_1936
Data Source	JNCC; OSOD; ESRI
File Reference	J:\P2214\Mxd\Report\Environmental_Report\AppB\B-4_Annex_II_Habitats.mxd
Created By	Chris Goode
Reviewed By	Emma Langley
Approved By	Beth Monkman



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0 10 20 30 40 km

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### Nature Conservation Marine Protected Areas (MPAs)

The Marine (Scotland) Act 2010 and the UK Marine and Coastal Access Act 2009 (MCCA) include new powers and duties to designate new MPAs to protect features of importance to Scotland. MPAs for biodiversity and geodiversity (under both pieces of legislation) are collectively referred to as Nature Conservation MPAs (Marine Scotland 2011; JNCC 2015).

NCMPAs are being identified for features (habitats and species) that the Scottish Government believes require more protection than that offered by existing protected sites (Marine Scotland, 2013).

Sites designated in Scotland will contribute to Scottish, UK and international networks of MPAs. These networks will form a system of sites working together, within a range of protection levels, in order to meet their role more effectively than individual sites could alone. The sites which will make up the Scottish MPA network are:

- NCMPAs, which protect nationally important biodiversity (species and habitats) and geodiversity (geology and undersea landforms) interests in Scotland's seas (SNH, 2012).
- European Marine Sites or Natura 2000 Sites: SACs and SPAs (Defra, 2012a).
- Marine components of SSSIs, which protect nationally important habitats, species and geological features and generally fall above the mean low water mark.
- Ramsar Sites which protect wetland habitats used by important migratory bird species (SNH, 2012).

To help target nature conservation action in Scotland, SNH and JNCC have generated a list of Priority Marine Features (PMFs) for the most important habitats and species in Scottish seas (SNH, 2014).

NCMPAs can help conserve marine biodiversity and geodiversity where it is possible to spatially define where habitats and species are found. MPAs are not appropriate for all habitats and species (e.g. if a species is highly mobile and does not aggregate during specific life stages). The selection of MPAs will be based on a subset of the PMF list referred to as MPA search features which are features where spatial protection measures are thought to be appropriate (Marine Scotland, 2011, SNH, 2012). A total of four NCMPAs have been designated in Orkney.

Table B-3 summarises the types of features involved in the development of MPAs and MPA networks (Marine Scotland, 2011).

**Table B-3 Features to be included in Scottish NCMPA network development (Marine Scotland, 2011)**

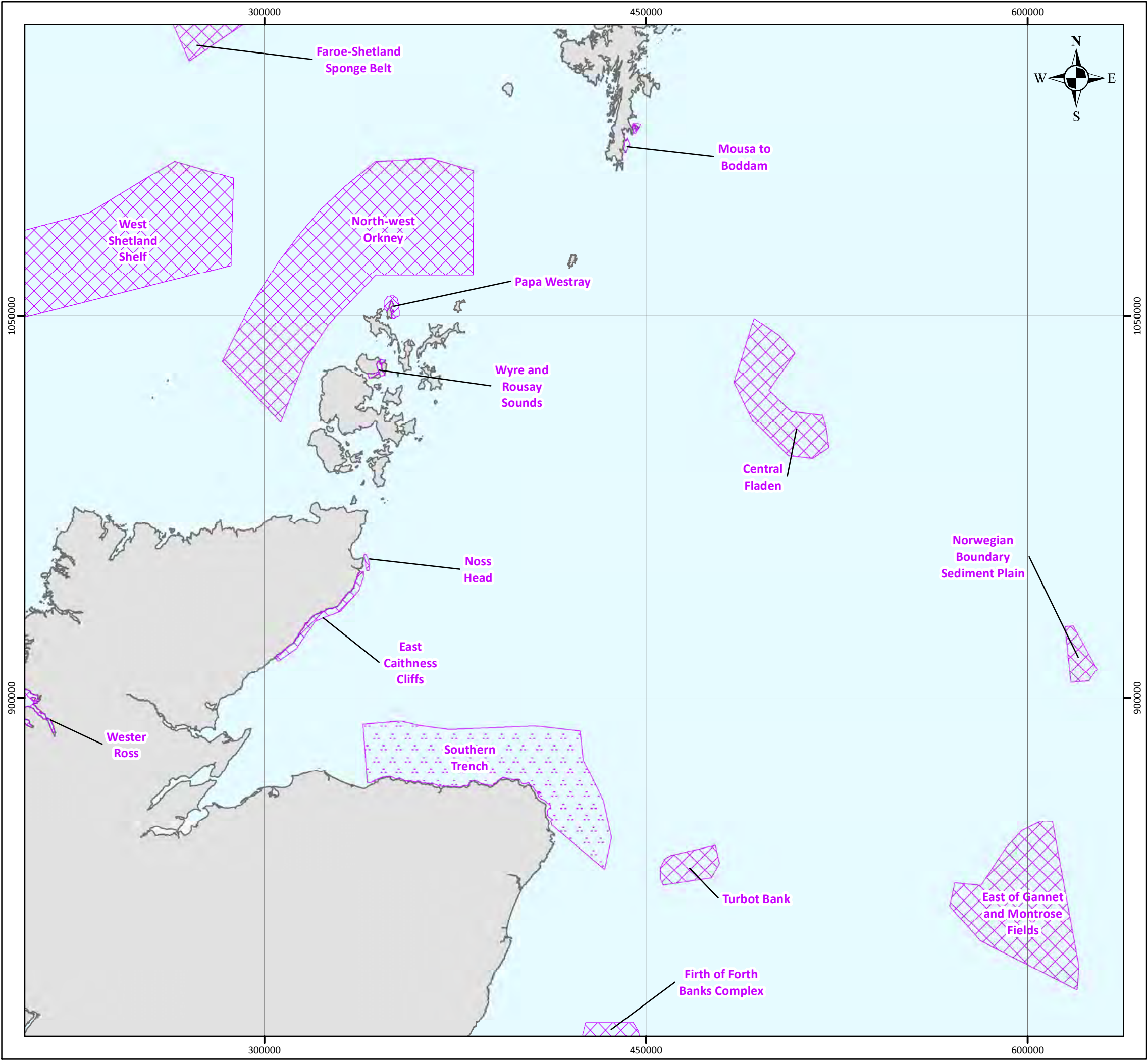
Feature / Search Location	Description
Priority Marine Feature (PMF)	A PMF is a habitat or species which has been prioritised by SNH or JNCC, on behalf of the Scottish Government, as being of conservation importance in Scotland's seas. It is intended that the list of PMFs will be used as the basis for focusing future marine conservation action via a three-pillar approach i.e. species measures, site-based measures and wider seas policies and measures.
MPA search feature	MPA search features mainly comprise those PMFs for which spatial protection measures are thought to be appropriate and for which MPAs are considered to be an appropriate conservation measure. Specific other features such as seamounts, banks and mounds are also included.
MPA protected feature	At the point of designation of a Nature Conservation MPA the term MPA protected feature will be used to describe all the features afforded protection within that MPA. MPA protected features will be defined in the designation order for a site. In addition to MPA search features, other

Feature / Search Location	Description
	habitats, species, geology and landforms may be recognised as protected features where this contributes to the ecological coherence of the network.
Network features	A list of network features will be developed which will include MPA protected features as well as qualifying features of SACs, SPAs, Ramsar, SSSIs and other forms of area-based protection recognised as part of the network. The list of network features will be used for reporting on coverage of the network, monitoring and for wider management.

During the first stage of NCMPA identification, NCMPA search locations were identified based on key MPA search features. SNH and JNCC assessed all the MPA search locations against the Scottish MPA Selection Guidelines. Successful assessment determined that MPA search locations should be recommended as MPA proposals. Presently, a total of 33 Nature Conservation MPA proposals have been developed and a further four MPA search locations remain to be fully assessed (SNH and JNCC, 2012). Of these, ten Nature Conservation MPA proposals and one MPA search location are within the study area and three Nature Conservation MPA proposals are in Orkney territorial waters. Table B-4 summarises the key designating features of the Nature Conservation proposals and search locations in the study area. The MPA proposals and MPA search location are shown in Figure B-5.

The Marine Strategy Framework Directive 2008/56/EC (MSFD) was adopted by the EU in July 2008 to try to address widespread concern about the state of Europe's marine environment with threats such as loss or damage to habitats and species, and pollutions impacts (SNH, 2013e). The MSFD aims to achieve Good Environmental Status (GES) in marine waters by 2020. GES will be defined at the scale of a Marine Region or sub-region (such as the North Sea) and will be based on a series of qualitative descriptors which are listed on annex 1 of the Directive. Member states are required to prepare national marine strategies to protect the marine environment, prevent deterioration and where possible, restore damaged marine ecosystems. (SNH, 2013e). The Directive was transposed into UK law in 2010 and the initial assessment of the marine environmental status is well underway. The UK Marine Policy Statement sets out high level aims of the Directive, but these will need to be translated in more detail in marine plans at the national and regional level (SNH, 2013e).

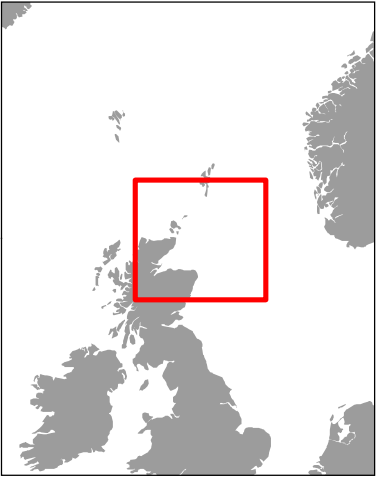
Although there is already a significant amount of legislation in the UK to protect specific marine species and habitats (e.g. the Habitats and Wild Birds Directives) and the new Scottish MPAs will help to fill in gaps in this protection in Scotland, the MSFD is unique in its breadth of coverage. GES must be achieved across all aspects of the UK's marine ecosystem, is not confined to specific protected sites and species and covers all the key pressures and impacts on it, including cumulative impacts (Defra, 2012b). Under Descriptor 1 Biodiversity, GES characteristics and targets will cover all components of the marine ecosystem (birds, marine mammals, fish, pelagic habitats and benthic habitats) and all the main pressures on them. It is expected that existing policy measures, such as the implementation of the Habitats and Wild Bird Directives and the designation of marine protected areas will play a major role in achieving GES. However, some additional management measures may be needed to further improve the state of the marine environment in order to achieve GES (Defra, 2012b).



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Figure B-5: Marine Protected Areas

- Legend
- NCMPA
- NCMPA
  - MPA Proposal



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Created By	Chris Goode
Reviewed By	Emma Langley
Approved By	Beth Monkman



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0 10 20 30 40 km

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**Table B-4 NCMPA search locations within the SEA study area (Orkney, North-west Orkney, Pentland Firth, North-east Scotland and northern North Sea) and their biodiversity protected features (Marine Scotland, 2013).**

	Designation	Site Name	Designating biodiversity features and comments
Orkney	NCMPA	Papa Westray (PWY)	<p>The Papa Westray NCMPA search location represents a 2 km extension into the marine environment from the two discrete SPAs comprising the Papa Westray SPA as black guillemots forage within 2km for their nests. The Papa Westray NCMPA lies within the Orkney carbonate production area which is an internationally important example of a shelf carbonate system.</p> <p><b>Protected features</b></p> <ul style="list-style-type: none"> <li>▪ Black guillemot</li> <li>▪ Marine geomorphology of the Scottish shelf seabed – sand wave field</li> </ul> <p><b>NCMPA search feature priorities that this location could help address:</b></p> <p>Black guillemot</p>
Orkney	NCMPA	Wyre and Rousay Sounds (WYR)	<p>The Wyre and Rousay Sounds NCMPA proposal comprises the sounds between the islands of Rousay, Wyre and Egilsay in Orkney. Tide-swept channels in this location support beds of maerl (a coralline seaweed) and kelp communities on sublittoral sediments. The maerl beds in this NCMPA proposal represent excellent examples of this habitat from amongst the largest known discontinuous area of maerl in UK waters. The beds have an exceptionally high proportion of live maerl and support diverse associated communities.</p> <p><b>Protected features</b></p> <ul style="list-style-type: none"> <li>▪ Kelp and seaweed communities on sublittoral sediment</li> <li>▪ Maerl beds</li> <li>▪ Marine geomorphology of the Scottish shelf seabed</li> </ul>
North West Orkney	NCMPA	North-west Orkney (NWO)	<p><b>The North-west Orkney NCMPA is an important area for sandeels, which are a key source of food for a large variety of marine species, particularly seabirds and larger fish.</b></p> <p><b>Protected features:</b></p> <ul style="list-style-type: none"> <li>▪ Sandeels</li> <li>▪ Sand banks, sand wave fields and sediment wave fields representative of the Fair Isle Strait Marine Process Bedforms Key Geodiversity Area.</li> </ul>

	Designation	Site Name	Designating biodiversity features and comments
			<b>NCMPA search feature priorities that this location could help address</b> <ul style="list-style-type: none"> <li>Sandeels</li> </ul>
North West Orkney	NCMPA	West Shetland Shelf (formerly Windsack) (WSS)	<p>The West Shetland Shelf NCMPA is designated for a wide range of sand and gravel habitats, providing a suitable habitat for a diverse variety of marine animals.</p> <p><b>Protected features</b></p> <p><b>Seabed Habitats:</b></p> <ul style="list-style-type: none"> <li>Offshore subtidal sands and gravels</li> </ul> <p><b>NCMPA Search Feature Priorities that this location could help address</b></p> <p>Offshore subtidal sands and gravels (shelf), shelf deeps</p>
Northern North Sea	NCMPA	Central Fladen (CFL)	<p>The Central Fladen NCMPA lies within the Fladen Grounds which is a large area of mud in the North Sea. This is characterised by sea pens and burrows created by shrimp and the Norway lobster (<i>Nephrops norvegicus</i>).</p> <p><b>Protected features</b></p> <ul style="list-style-type: none"> <li>Burrowed mud (seapens and burrowing megafauna and tall seapen components )</li> </ul> <p>Sub-glacial tunnel valley representative of the Fladen Deep Key Geodiversity Area</p> <p><b>NCMPA Search Feature Priorities that this location could help address</b></p> <p>Burrowed mud and shelf deeps</p>
Northern North Sea	NCMPA	Norwegian boundary sediment plain (NSP)	<p>The Norwegian boundary sediment plain NCMPA is a sandy plain in shallow waters and is home to a range of marine animals which live in sand and gravel habitats including the ocean quahog (<i>Arctica islandica</i>).</p> <p><b>Protected features</b></p> <ul style="list-style-type: none"> <li>Ocean quahog aggregations (including sands and gravels as their supporting habitat)</li> </ul> <p><b>NCMPA Search Feature Priorities that this location could help address</b></p> <p>Offshore subtidal sands and gravels (shelf), ocean quahog and burrowed mud (<i>Maera loveni</i>)</p>

	Designation	Site Name	Designating biodiversity features and comments
Northern North Sea	MPA proposal	South-east Fladen (SEF)	<p>The south-east Fladen MPA proposal is recommended for the protection of the seapens and burrowing megafauna (see below) component of burrowed mud habitat, and geodiversity features representing the Scotia Scanner Challenger Pockmark Complex key geodiversity area.</p> <p><b>MPA Search Feature Priorities that this location could help address</b></p> <ul style="list-style-type: none"> <li>Burrowed mud</li> </ul>
Northern North Sea	MPA proposal	Western Fladen (WFL)	<p>The Western Fladen MPA proposal is recommended for the protection of the seapens and burrowing megafauna component of burrowed mud habitat (e.g. Slender sea pen - <i>Virgularia mirabilis</i> and Phosphorescent sea pen – <i>Pennatula phosphorea</i>).</p> <p><b>Protected features</b></p> <p><b>Seabed habitats</b></p> <ul style="list-style-type: none"> <li>Burrowed mud</li> </ul>
North East Scotland	NCMPA	East Caithness Cliffs (ECC)	<p>East Caithness Cliffs NCMPA is designated as it contains approximately 2.5% of the GB population of black guillemots. The NCMPA boundary mirrors the East Caithness Cliffs SPA and extends 2km out to sea.</p> <p><b>Protected features</b></p> <ul style="list-style-type: none"> <li>Black guillemots</li> </ul>
North East Scotland	NCMPA	Noss Head (NOH)	<p>The Noss Head NCMPA is designated as it supports the largest known horse mussel bed (<i>Modiolus modiolus</i>) in Scottish waters between 35-45m. This NCMPA is located off Noss Head in Caithness, northern Scotland. Horse mussels stabilise mobile seabed sediments and provide a critical ecosystem for other species. The Noss Head bed supports an extremely diverse associated biological community and is the largest known horse mussel bed in Scottish waters, covering an estimated 3.85 km<sup>2</sup>.</p> <p><b>Protected features</b></p> <ul style="list-style-type: none"> <li>Horse mussel beds</li> </ul>
North East Scotland	MPA proposal	Southern Trench (STR)	<p>The Southern Trench MPA is shaped around the Southern Trench, a large undersea valley. It is an exceptional example of an enclosed glacial seabed basin. Shelf deeps in the MPA search location are enclosed topographic depressions on the seabed which are significantly deeper than the surrounding seabed. Large numbers of juvenile fish have been recorded within the shelf deep which may represent an important nursery area for certain species. The waters off Fraserburgh produce frontal zones with strong horizontal gradients in surface and or bottom</p>

	Designation	Site Name	Designating biodiversity features and comments
			<p>temperatures. Fronts can concentrate nutrients and plankton and are often associated with biodiversity hot spots as they attract prey assemblages and higher trophic level foragers such as cetacean.</p> <p><b>Protected features</b></p> <p><b>Seabed habitats</b></p> <ul style="list-style-type: none"> <li>▪ Burrowed Mud</li> </ul> <p><b>Mobile species</b></p> <ul style="list-style-type: none"> <li>▪ Minke whale</li> </ul> <p><b>Large scale features</b></p> <ul style="list-style-type: none"> <li>▪ Fronts</li> <li>▪ Shelf deeps</li> </ul> <p><b>Geodiversity</b></p> <ul style="list-style-type: none"> <li>▪ Quaternary of Scotland - sub-glacial tunnel valleys and moraines</li> <li>▪ Submarine Mass Movement - slide scars</li> </ul>

## B.1.2 Protected Species

### European Protected Species

European Protected Species (EPS) are those species listed on Annex IV of the Council Directive 92/43/EEC on the Conservation of natural habitats and of wild fauna and flora (Habitats Directive). They require “a system of strict protection”. In Scotland the Habitats Directive is transposed through a combination of the Conservation of Species and Habitats Regulations 2010 (in relation to reserved matters) and The Conservation (Natural Habitats, &c.) Regulations 1994. For UK offshore waters the Habitats Directive is transposed into UK law by the Offshore Marine Conservation (Natural Habitats & c.) Regulations 2007 (as amended).

The regulations make it an offence to deliberately capture, injure, kill or disturb any listed animal. Disturbance of animals includes activities that are likely to -

- a. Impair their ability -
  - (i) to survive, to breed or reproduce, or to rear or nurture their young; or
  - (ii) in the case of animals of a hibernating or migratory species, to hibernate or migrate; or
- b. Affect significantly the local distribution or abundance of the species to which they belong.

Marine EPS include:

- All cetaceans (dolphins, porpoises and whales);
- Otters
- Sturgeon fish (*Acipenser sturio*)

Cetaceans and otters are found within the study area, further details of which are provided in individual sections below.

In addition to these European protected species, Annex II of the Habitats Directive, lists animal and plant species of community interest whose conservation requires the designation of SACs. Annex II species for which SACs have been designated in the study area include:

- Otter
- Grey seal
- Harbour (or common) seal
- Freshwater pearl mussel
- Sea lamprey
- Atlantic salmon
- Bottlenose dolphin
- Harbour porpoise (*Phocoena phocoena*)
- Marine turtles (*Dermochelys coriacea*)

A summary of the SACs in the SEA study area which list an Annex IV (EPS) or Annex II species as an interest or qualifying feature are summarised in Table B-5.

**Table B-5 SACs in the SEA study area which list an Annex IV (EPS) or Annex II species as an interest or qualifying feature**

Location	Site Name	Annex IV species	Annex II species
Orkney	Faray and Holm of Faray	-	Grey seal
	Loch of Isbister	Otter	Otter
	Sanday	-	Harbour seal
North Scotland	Caithness and Sunderland Peatlands	Otter	Otter
	River Borgie	Otter	Atlantic salmon, otter
	River Naver	-	Freshwater pearl mussel, Atlantic salmon
	River Thurso	-	Atlantic salmon
North-east Scotland	Berriedale and Langwell Waters	-	Atlantic salmon
	Dornoch Firth and Morrich More	Otter	Otter, common seal
	Moray Firth	Bottlenose dolphin	Bottlenose dolphin
	River Evelix	-	Freshwater pearl mussel
	River Oykel	-	Freshwater pearl mussel, Atlantic salmon
	River Spey	Otter	Freshwater pearl mussel, sea lamprey, Atlantic salmon, otter

### Cetaceans

All cetaceans occur on Annex IV of the Habitats Directive and therefore require strict protection. A SNH commissioned report (Evans et al, 2011) covering the abundance of cetaceans in the Pentland Firth and Orkney Waters indicates that:

- The Pentland Firth and Orkney Waters is one of the richest areas in the UK for cetaceans with 19 species recorded in the area since 1980, 17 of these as live sightings. The Draft Orkney Biodiversity Action Plan (BAP) lists 18 species of cetaceans (OIC, 2012b).
- Six cetacean species occur regularly: Harbour porpoise (*Phocoena phocoena*), minke whale (*Balaenoptera acutorostrata*), white-beaked dolphin (*Lagenorhynchus albirostris*), Risso's dolphin (*Grampus griseus*), killer whale (*Orcinus orca*) and bottlenose dolphin (*Tursiops truncatus*).
- Four species are casual visitors which normally inhabit offshore waters: short-beaked common dolphin (*Delphinus delphis*), Atlantic white-sided dolphin (*Lagenorhynchus acutus*), long finned pilot whale (*Globicephala melas*) and sperm whale (*Physeter macrorhynchus*).
- Harbour porpoise and long-finned whales are recorded year round, whilst observations of the other regular species are highest in the summer months.

- Although it is difficult to obtain clear distribution patterns from the uneven distribution of sightings, areas which are clearly important for cetaceans include: Scapa Flow and adjacent areas in South Orkney, Gills Bay, Dunnet Bay, and Strathy Bay on the Scottish mainland.

Two species of cetacean: the harbour porpoise and bottlenose dolphin are listed in Annex II of the Habitats Directive as species whose conservation required designation of SACs. Sightings of these species around Orkney between 2002 and 2009 are shown in Figure B-6.

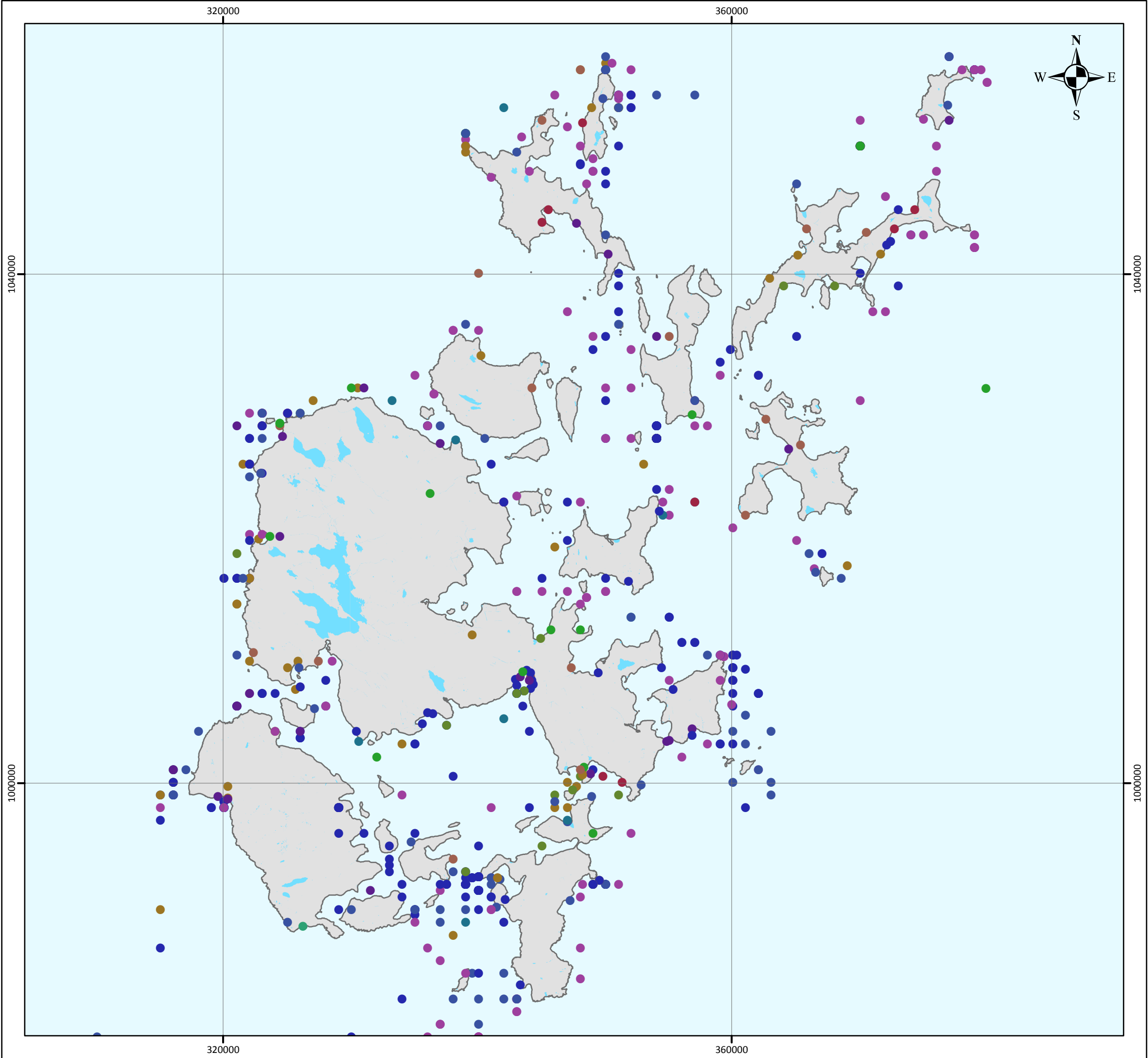
There are no SACs in Orkney designated for the harbour porpoise and bottlenose dolphin. The Moray Firth SAC located in north east Scotland is especially important for cetacean, supporting the only known resident population of bottlenose dolphin in the North Sea. The population is estimated to be around 130 individuals, present at all times of the year (JNCC, 2013a).

Cetacean sightings around the Orkney Islands between 2002 and 2009 are listed in Table D-6. During this time period the most commonly sighted cetaceans in Orkney were the harbour porpoise, followed by the killer whale and Minke whale.

Data for the period June 2018 to January 2019 were obtained from the Sea Watch foundation for Orkney and North Scotland (Sea Watch 2019). During this 6-month period, the most sighted species in Orkney was harbour porpoise. Harbour porpoise were also the most observed species during the 2002-2009 period (Table B-6 below). Other sightings during the June 2018 and January 2019 period also include Risso's dolphin, white-beaked dolphin, killer whale, common bottlenose dolphin and Atlantic white-sided dolphin (Sea Watch 2019).

**Table B-6 Cetaceans sighting around Orkney (2002-2009) (OBRC, 2012).**

Species		Sightings around Orkney Islands
Common name	Latin name	
Minke Whale	<i>Balaenoptera acutorostrata</i>	151
Blue Whale	<i>Balaenoptera musculus</i>	1
Fin Whale	<i>Balaenoptera physalus</i>	5
Beluga whale	<i>Delphinapterus leucas</i>	2
Common Dolphin	<i>Delphinus delphis</i>	20
Long-finned Pilot Whale	<i>Globicephala melas</i>	20
Risso's dolphin	<i>Grampus griseus</i>	63
Northern bottlenose whale	<i>Hyperoodon ampullatus</i>	1
Atlantic White-sided Dolphin	<i>Lagenorhynchus acutus</i>	18
White-Beaked Dolphin	<i>Lagenorhynchus albirostris</i>	39
Humpback Whale	<i>Megaptera novaeangliae</i>	9
Killer Whale	<i>Orcinus orca</i>	181
Harbour porpoise	<i>Phocoena phocoena</i>	383
Sperm Whale	<i>Physeter macrocephalus</i>	8
Striped Dolphin	<i>Stenella coeruleoalba</i>	5
Bottlenose Dolphin	<i>Tursiops truncatus</i>	3
Cuvier's Beaked Whales	<i>Ziphius cavirostris</i>	2



# ORKNEY HARBOURS PORT MASTERPLAN 2020-2040

Figure B-6: European Protected Annex II  
Cetacean Species Sighting (2002-2009)

## Legend

### Cetacean Sightings (2002-2009)

#### Species

- *Lagenorhynchus acutus* - Atlantic white-sided dolphin
- *Balaenoptera acutorostrata* - Minke whale
- *Delphinus delphis* - Short-beaked common dolphin
- *Globicephala melas* - Long-finned pilot whale
- *Grampus griseus* - Risso's dolphin
- *Lagenorhynchus acutus* - Atlantic white-sided dolphin
- *Lagenorhynchus albirostris* - White-beaked dolphin
- *Megaptera novaeangliae* - Humpback whale
- *Orcinus orca* - Killer whale
- *Phocoena phocoena* - Harbour porpoise
- *Physeter macrocephalus* - Sperm whale
- Waterbody



NOTE: Not to be used for Navigation

Date	Tuesday, February 19, 2019 15:45:16
Projection	British_National_Grid
Spheroid	Airy_1830
Datum	D_OSGB_1936
Data Source	OSOD; ESRI; OBRC
File Reference	J:\P2214\Mxd\Report\Environmental_Report\AppB\B-6_Cetacean_Species_Sighting.mxd
Created By	Chris Goode
Reviewed By	Emma Langley
Approved By	Beth Monkman



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Atlantic white-sided dolphin, bottlenose dolphin, fin whale, harbour porpoise, killer whale, long-finned pilot whale, Minke whale, Northern bottlenose whale, Risso's dolphin, short-beaked common dolphin, sperm whale and white-beaked dolphin are all listed on the recommended PMF's List and are known to be present in Orkney waters.

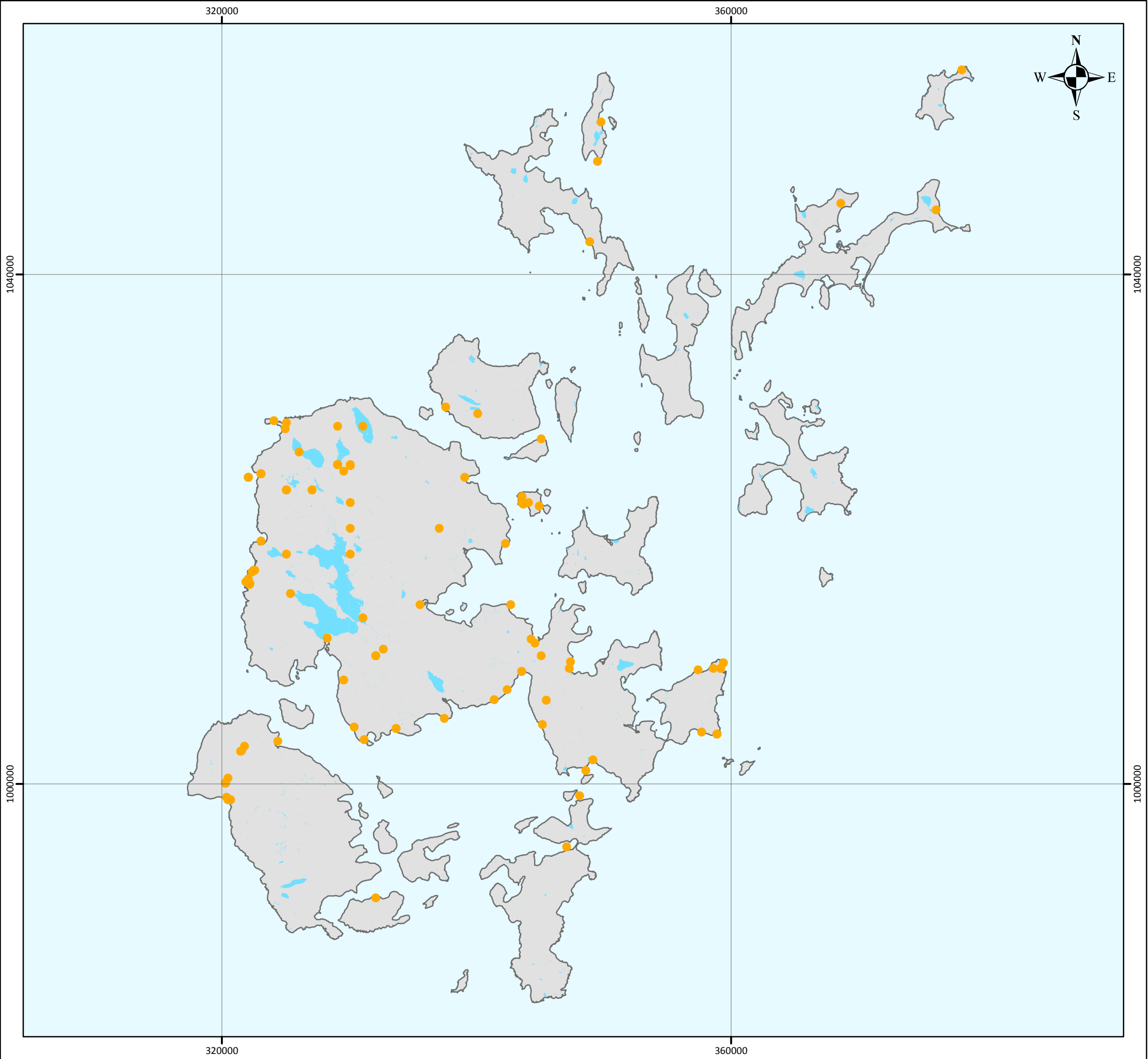
### **Otters**

The European otter (*Lutra lutra*) was once widespread in Europe, but numbers declined sharply in the 1960s and 70s due to pollution, exacerbated by habitat loss and hunting (JNCC, 2013b). In Great Britain, whilst numbers fell in England and Wales, they survived in Scotland's cleanest water bodies in the north and west, and Scotland has remained a European stronghold for otters. In 2003, the total Scottish population was estimated at around 8,000 (SNH, 2013d).

The European otter is an EPS, listed on Annex IV of the Habitats Directive. It is also listed on Annex II of the Habitats Directive requiring the designation of SACs for its conservation. Otters are semi-aquatic mammals that obtain most their food from lochs, rivers or the sea. The Scottish population is unusual in that it comprises a particularly high proportion (50% or more) of coastal-dwelling otters which feed predominantly in the sea (SNH, 2013c, d). Whilst the most important coastal areas for otters in the British Isles are the west coast of Scotland and the Shetland Islands, five SACs in the study area, including one in Orkney, list otters as an interest or a qualifying feature (see Table B-5).

Otters are also listed on the UK BAP List, Scottish Biodiversity List, Local Priority (Orkney) List and the recommended PMF List. In 2010 58 otters were sighted in Orkney, while in 2011 64 were sighted (OBRC, 2012). Figure B-7 shows the locations of otter sighting in Orkney (2010-12). The majority of sightings are on Orkney Mainland.

In a national survey during 2003/04 otters were found in all the 10km squares sampled in Orkney (SNH, 2007), therefore it should be assumed that otters occur throughout coastal areas in Orkney



# ORKNEY HARBOURS PORT MASTERPLAN 2020-2040

Figure B-7: Otter Sightings (2010-2012)

## Legend

- Otter Sighting
- Waterbody

Date	Thursday, February 21, 2019 10:09:19
Projection	British_National_Grid
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Data Source	OSOD; ESRI; OBRC
File Reference	J:\P2214\Mxd\Report\Environmental_Report\AppB\B-7_Otter_Sighting.mxd
Created By	Chris Goode
Reviewed By	Emma Langley
Approved By	Beth Monkman



## B.1.3 Other Protected Species

### Seals

Two species of seals live and breed in UK waters: grey seals (*Halichoerus grypus*) and harbour (common) seals (*Phoca vitulina*). Both species are listed under Annex II of the EC Habitats Directive which lists animal and plant species of community interest whose conservation requires the designation of SACs. In Scotland the Marine (Scotland) Act 2010 provides for improved protection of seals by making it an offence to kill or take seals at any time. The Act allows exceptions only under specific licence or for animal welfare, and introduces a new offence of harassment of seals at listed haul-out sites. Both grey seals and harbour seals are listed on the recommended PMF List.

### Harbour seal

Harbour seals are a UK BAP, Scottish Biodiversity List and Orkney BAP priority marine species and have been identified as threatened and requiring conservation action. The UK and Scotland support a large proportion of European harbour seal populations, with approximately 30% of European harbour seals found in the UK (a drop from 40% in 2002), and 79% of this population are in Scotland. Major declines have now been documented in harbour seal populations around Scotland with declines since 2000 of 66% in Orkney and 46% in the Moray Firth (SMRU, 2011b). Recent surveys of harbour seals in Orkney, during 2010, have concluded that numbers are continuing to decline, but the rate appears to be slowing (Duck and Morris, 2011). Between August 2008 and August 2010 a reduction of 6.2% was documented in Orkney, however this reduction is smaller than seen in previous surveys.

Harbour seal density has been assessed by Jones *et al.* (2015) across the North Sea and the north-eastern Atlantic. High densities have been recorded in Orkney, in particular in the northern Islands and East Orkney, where 100-500 individuals sighted per 0.36km<sup>2</sup> (Figure B-8). A smaller grid was used to record seals in Orkney (0.6 x 0.6km grid) (Jones *et al.* 2015).

There are eight SACs designated for harbour seals in Scotland, two of which are in Orkney and North-east Scotland.

- Sanday SAC is located in the north-east of Orkney and up until 2001, supported the largest group of harbour seals at any discrete site in Scotland. The breeding groups occur on intertidal haul out sites around the coast and represent over 4% of the UK population (SMRU, 2011a)
- Dornoch Firth and Morrich More (Moray Firth) SAC is located in the Dornoch Firth, the most northerly large estuary in Britain and supports a significant proportion of the inner Moray Firth population of the harbour seal. The seals, which utilise sand-bars and shores at the mouth of the estuary as haul-out and breeding sites, are the most northerly population to utilise sandbanks. Their numbers represent almost 2% of the UK population (JNCC, 2012).

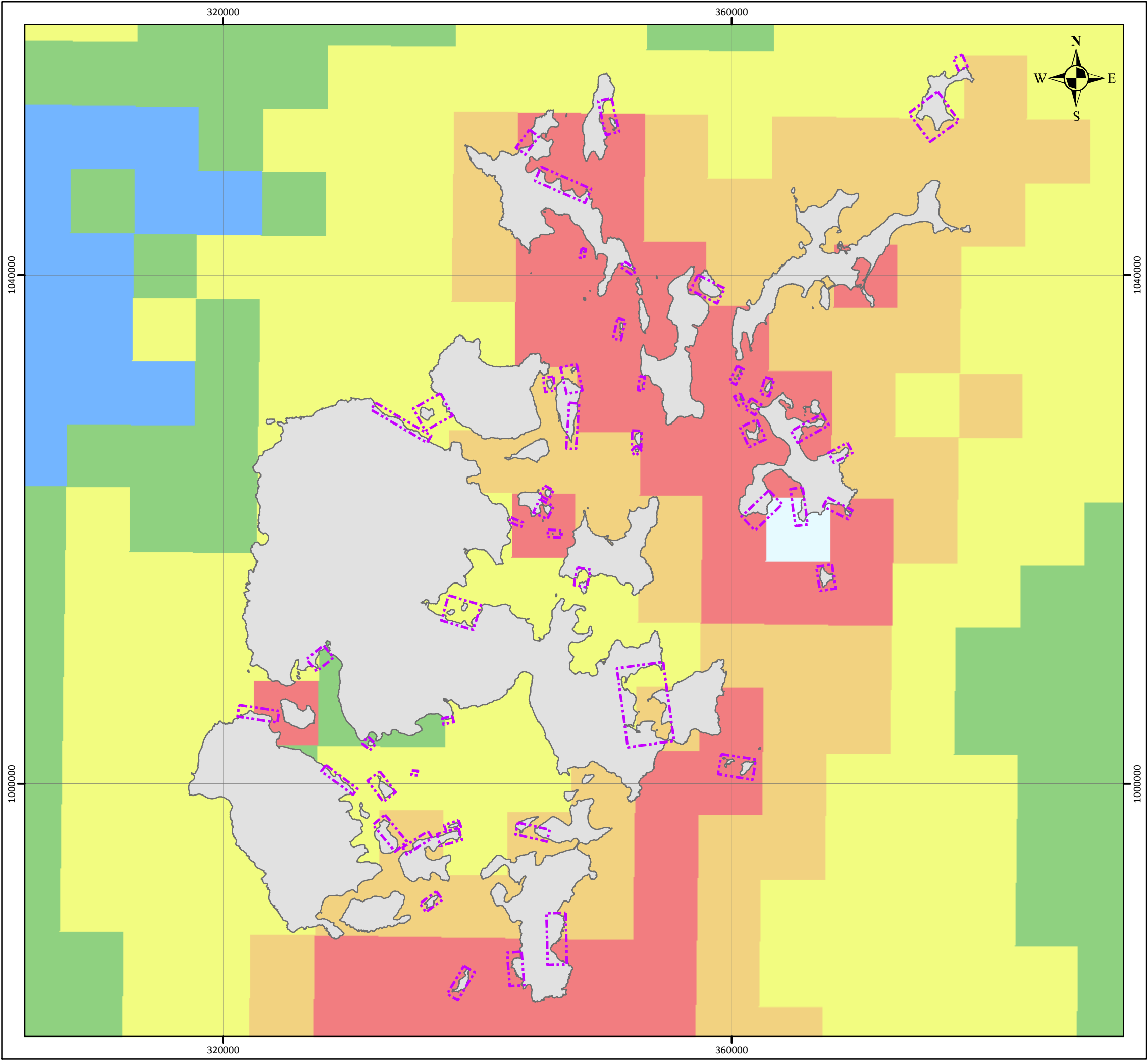
### Grey seal

Grey seals are listed on the Orkney BAP. Approximately 38% of the world's population of grey seals breed in the UK and 88% of these breed at colonies in Scotland with the main concentrations in the Outer Hebrides and Orkney (SMRU, 2011b).

Lower densities of grey seals (Figure B-9) have been recorded in Orkney, in comparison to the common (or harbour) seal. Up to 100 individuals were recorded between the Mainland and the Rousay island (in orange in Figure B-9 below). Densities decrease to 10-50 individuals over a 0.6x0.6km grid in the Scapa Flow and between the Mainland and northern islands.

One of six SACs designated for grey seals in Scotland is located in Orkney:

Faray and Holm of Faray SAC comprises two uninhabited islands in the northern part of Orkney. These islands support the third largest breeding colony in the UK (and fourth largest in the world) and, in 2008, contributed approximately 6% of annual UK pup production (SMRU, 2011a).



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Figure B-8: Orkney Islands Harbour Seals Usage

**Legend**

Designated Haul Outs Sites for Grey and Harbour Seals

**Harbour Seal (*Phoca Vitulina*) At-Sea Estimated Usage**

**Average Predicted Number of Seals**

- 0 - 0.000001
- 0.000001 - 1
- 1 - 5
- 5 - 10
- 10 - 50
- 50 - 100
- 100 - 500
- 500+

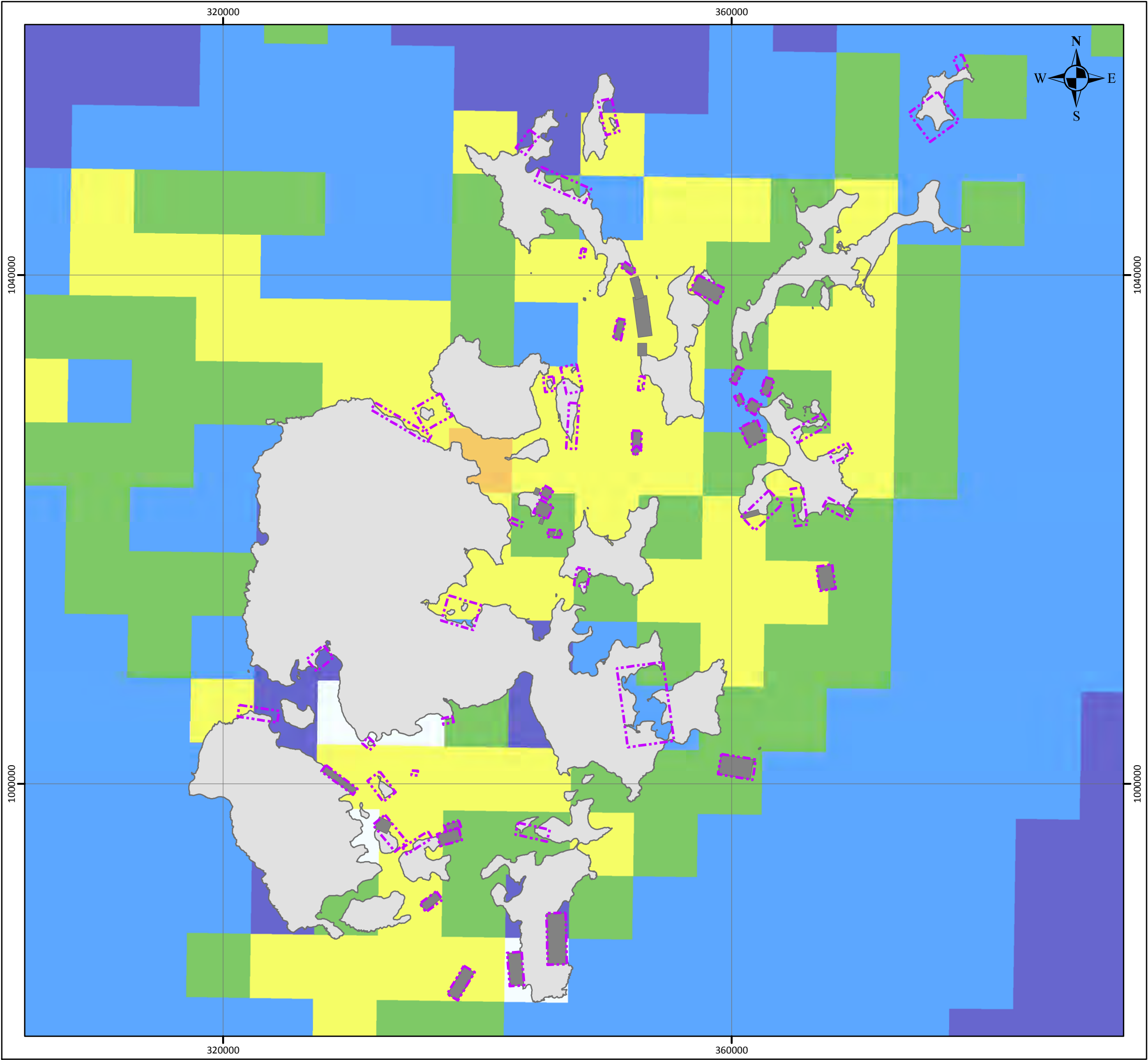


NOTE: Not to be used for Navigation

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File Reference	J:\P2214\Mxd\Report\Environmental_Report\AppB\B-8_Harbour_Seals.mxd
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Reviewed By	Emma Langley
Approved By	Beth Monkman



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Figure B-9: Orkney Islands Grey Seals Usage

**Legend**

Designated Haul Outs Sites for Grey and Harbour Seals

Grey Seal Pupping Sites

**Grey Seal (*Halichoerus grypus*) At-Sea Estimated Usage**

**Average Predicted Number of Seals**

- 0 - 0.01
- 0.01 - 1
- 1 - 5
- 5 - 10
- 10 - 50
- 50 - 100
- 100 - 500
- 500+



NOTE: Not to be used for Navigation

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Created By	Emma Langley
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## Birds

Internationally important numbers of several species of seabird breed on the North Sea coastal margin, and depend on the offshore North Sea for their food supply and, for much of the year, their habitat. The most numerous species are likely to be fulmars (*Fulmaris glacialis*), kittiwakes (*Rissa tridactyla*), and guillemots (*Uria aalge*) which are present in the northern North Sea for the majority of the year. Northern gannets (*Morus bassanus*) and Atlantic puffins (*Fratercula arctica*) are present in summer months, manx shearwaters (*Puffinus puffinus*) and European storm petrels (*Hydrobates pelagicus*) may be present between September and November, great skuas (*Stercorarius skua*), lesser black backed gulls (*Larus fuscus*) and little auks (*Alle alle*) may be present in low densities for the majority of the year, whilst herring gulls (*Larus argentatus*), glaucous gull (*Larus hyperboreus*) and great black-backed gulls (*Larus marinus*) are known to be present in the study area in winter (Stone et al., 1995).

The highest densities of all these species listed above are found during the autumn and winter months (Stone et al., 1995). The offshore distribution of these seabirds varies across the year, being largely dependent on which stage of their lifecycle they are at. For example, offshore abundance will be lower during the breeding season but will be higher outside this time. The offshore distribution of seabirds outside of the breeding season is mostly driven by the availability of food. The distance to which birds will travel for food varies greatly between species and this influences offshore distribution. Non-breeding birds may be found foraging further offshore than breeding birds.

The Orkney Islands including Scapa Flow and the surrounding area are important for a number of bird species. The Orkney BAP lists 114 individual species of birds (OIC, 2012b) and there are 13 RSPB nature reserves within Orkney (RSPB, 2012). Data was obtained from the Orkney Biological Records Office in November 2012, comprising of waterbird sightings around the Orkney Islands from 2005 to 2011. Species numbers recorded over this period are supplied in Table B-7. The Black-throated diver (*Gavia arctica*), great northern diver (*Gavia immer*), red-throated diver (*Gavia stellata*) and Slavonian grebe (*Podiceps Auritus*) are all listed on Annex I of the Birds Directive.

**Table B-7 Bird sightings 2005-2011 (OBRC, 2012)**

Species	Numbers recorded from 2005 - 2011
Black throated diver ( <i>Gavia arctica</i> )	868
Common eider ( <i>Somateria mollissima</i> )	29,346
Eurasian wigeon ( <i>Anus Penelope</i> )	223,986
Great northern diver ( <i>Gavia immer</i> )	10,236
Red-throated diver ( <i>Gavia stellata</i> )	1,949
Slovonian grebe ( <i>Podiceps auritus</i> )	4,711

Scapa Flow has been an area of search for waterbirds because of the number of inshore waterbirds that use the area. In order to ascertain its suitability as a SPA an assessment was undertaken by JNCC. For the assessment aerial surveys and land/boat based surveys were conducted over a total of seven winter seasons to estimate the total number of inshore waterbirds. Species recorded during the aerial survey were: common eider (*Somateria mollissima*), longtailed duck (*Clangula hyemalis*), common

scoter (*Melanitta nigra*), common goldeneye (*Bucephala clangula*), red-breasted merganser (*Mergus serrator*), red-throated diver (*Gavia stellata*), and great northern diver (*G. immer*). In addition land/boat-based counts documented velvet scoter (*M. fusca*), goosander (*M. merganser*), black-throated diver (*G. arctica*), little grebe (*Tachybaptus ruficollis*), rednecked grebe (*Podiceps grisena*) and Slavonian grebe (*P. Aurlitus*). The peak numbers of many of these species exceeded the criteria for SPA designation. During the winter season Scapa Flow meets UK SPA selection guidelines for consideration as a possible marine SPA for black-throated diver, great northern diver and slavonian grebe. In addition, winter populations of European shag also meet criteria for a SPA. When a complete suite of marine SPA in inshore waters is determined by the Scottish Government, it has been recommended that the inshore areas of Scapa Flow should be considered for inclusion (Dawson et al, 2009).

During the winter season Scapa Flow does not meet UK SPA selection criteria for a waterbird assemblage, as waterbird populations do not exceed more than 20,000 individuals (Dawson et al, 2009). However, the accumulated peak numbers and densities of birds in Scapa Flow relative to other inshore search areas are nevertheless important in a Scottish context.

## B.1.4 Benthic Ecology

Benthic ecology describes the assemblages of organisms living in (infauna) or on, the seabed (epifauna), their diversity, abundance and function. Benthic communities include those found on the sea floor from the intertidal zone to the deepest parts of the marine environment. The major factor influencing the geographic distribution of benthic communities is the type of sediment in which they live, and the distribution of sediments is largely governed by hydrography (Eleftheriou et al, 2004).

### Offshore Benthic Ecology:

Benthic communities in deeper offshore waters tend to be spatially distributed over large scales. In the northern North Sea the north Atlantic inflow is the major influencing factor on benthic communities. Diversity of benthic infauna here is higher than that of the southern and central areas, defined by a gradual increase in diversity northward. Much of the productivity in the northern North Sea is associated with the input of nutrient rich waters from the North Atlantic and this has an effect on the benthic communities in the northern portion of SEA5 which covers the area south and east of the Scottish mainland, Orkney and Shetland (Eleftheriou et al, 2004).

The most abundant epifaunal species in the northern North Sea are echinodermata (*Echinus acutus* and *Asterias rubens*), polychaeta (phylum annelida) (*Hyalinoecia tubicola*), cnidaria's the red sea pen (*Pennatula phosphorea*) and dead man's fingers (*Alcyonium digitatum*), crustacea the Norway lobster (*Nephrops norvegicus*) and the bryozoan (*Flustra foliacea*). In sandy areas of moderately sorted coarse sediments extending from south of the Fair Isle off to Peterhead, epifaunal communities are dominated by the Bryozoa *F. foliacea*, the anemone (*Bolocera tuediae*) and the crab (*Hyas coarctatus*). The deeper fine sediments of the Fladen Ground and its northern extensions were typified by the echinoderms (*Astropecton irregularis*) and (*Brissopsis lyrifera*).

The offshore infauna communities of this area are thought to be less abundant and more uniform than that of the inshore areas. Polychaetes dominate throughout the northern North Sea, regularly making up to 50% of the abundance, followed by molluscs and echinoderms (Eleftheriou et al, 2004).

In the Pentland Firth area strong tidal currents have resulted in heavily scoured and exposed bedrock and boulder outcrops. This lack of sediment has resulted in a community dominated by epifaunal biota. The fauna varies according to differences in current strength and scour but is predominately dominated by high numbers of the anemone (*Uticina felina*). Elevated upward facing rock located in areas of strong tidal currents is abundance and species-poor with barnacle crusts, scattered bryozoans and hydroid clumps, whereas in pockets of reduced current strength the abundance of these species increases to form localised tuffs (Moore, 2010).

### Coastal Benthic Ecology:

The Orkney coast is predominantly rocky, supporting diverse intertidal communities. The intertidal habitats in Orkney and the surrounding area range from those characterised by extreme wave action on exposed coastlines and those characterised by calm condition on sheltered coastlines to extensive sandy beaches and lagoonal habitats (Bennett and Covey, 1998). Intertidal benthic communities are largely defined by physical factors such as wave exposure, tidal stream length, temperature, salinity and climate (Moore, 2010).

Communities on exposed coastlines in the Orkney Islands and surrounding areas, exhibit those features associated with encrusting rocky shore communities dominated by the edible muscle (*Mytilus Edulis*), barnacles (*chthamalus* sp. and *Semibalanus balanoides*), the limpet (*Patella* sp.) and some lichens and brown algae such as *Fucus distichus*, *F. spiralis*, *Corallina officinalis* and a few red seaweeds i.e. *Chondus crispis* and *Mastacarpus stellatus*. In sheltered areas of the rocky coast and on mixed sediments, communities are dominated by a dense covering fucoids such as *Pelvetia canaliculata*, *F. spiralis* and *F. vesiculosus* and barnacles, as well as the gastropods *Littorina neritoides* and *Gibbula umbicalis*.

Shallow rocky sublittoral and other exposed hard substrata are dominated by red and brown algal species and on the wave surged south coast sites, dense growths of encrusting sponges; ascidians, bryozoans and hydroids were present. The communities of the deeper and exposed sublittoral areas were dominated by bryozoans, mussel beds, brittle stars and faunal and algal encrusting species along with the presence of the sea urchin *Echinus esculentus*. In areas of shallow sublittoral mixed sediments communities are dominated by the kelp *Limnaria saccharina* and filamentous red seaweeds while bivalve species and muscle beds may be present. In the open coast and on the outer areas of the sounds, maerl beds, red seaweeds, hydroids, echinoderms and bivalves are dominant (Eleftheriou et al, 2004).

In Scapa Flow, on the more sheltered areas with variable sediments, species show an uneven distribution. Sedimentary beaches were dominated by the lugworm (*Arenicola marina*) and the spinoid polychaetes *Pygospio elegans* and *Spio martinensis* and on the lower shore *Tellina tenuis* was present. Sublittoral fine sandy sediments in the central basin of the Flow supported communities dominated by bivalves such as *Thyasira flexuosa*, the polychaete *Prionospio fallax* as well as seapens, brittle stars and a number of bivalves (Murray et al., 1999) along with the burrowing anemone *Cerianthus lloydii*. In coarse sediments the outer reaches of the Flow were dominated by the sea cucumber *Neopentadactyla mixta* and the polychaete *Lanice conchylega*. Diversity was greatest on coarse sediment shores while in the finer sediments of the northeastern part of the Flow diversity and abundance were low (Eleftheriou et al, 2004). To the north of Cava mixed sediment supports a population of the horse mussel (*Modiolus modiolus*), which supports a community associated with hard substrata including brittle stars. The extent of this mussel bed is uncertain (Moore, 2010).

Benthic species and habitats of conservation importance:

- Ocean quahog (*A. Islandica*): listed as OSPAR (Oslo and Paris Convention for the Protection of the Marine Environment in the North-East Atlantic). Mostly reported in offshore areas, with high numbers recoded in the Fladen Ground.
- The cold water coral (*Lophelia*): small colonies reported in the northern North Sea, generally in deeper waters. However, none are significantly large enough for conservation interest. Listed as an OSPAR habitat and listed under the EC habitat directive along with listed on Convention on International Trade in Endangered Species of Wildlife and Flora (CITES) (Marlin, 2012) along with listed in the UK Biodiversity Action Plan (UKBAP)
- Horse Mussel (*M. modiolus*): widely distributed in the northern North Sea. Horse mussel beds have been found. This species itself does not afford any protection, however horse mussel bed habitat

are listed on OSPAR, UKBAP, recommended PMF list and could come under Annex I of the EC Habitat Directive for 'large shallow inlets and bays and reefs'.

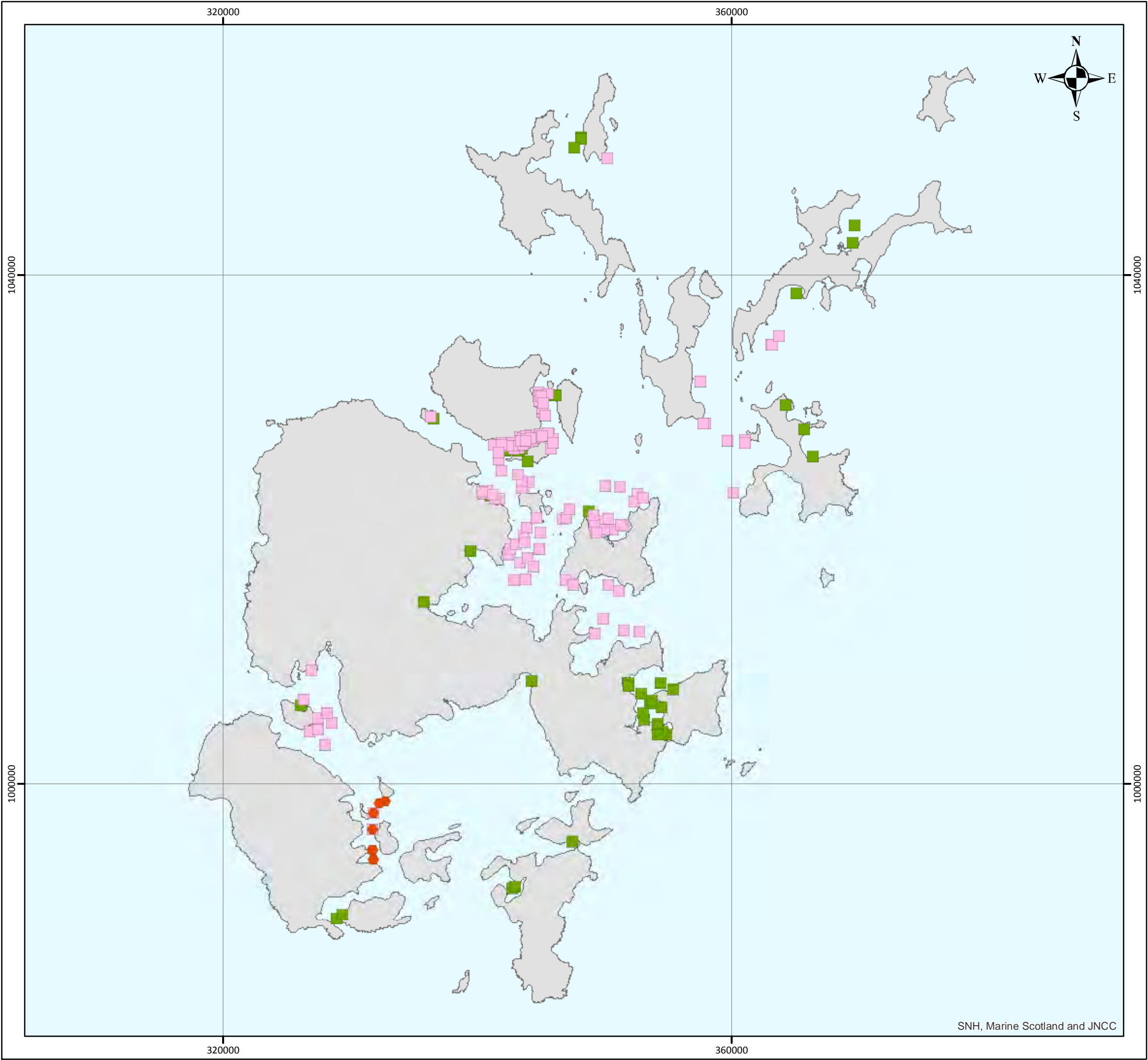
- Annex I Habitat Submarine structures made by leaking gases: the Braemar Pockmarks and Scanner Pockmarks SCIs are designated for this habitat and occur within the Fladen Grounds of the northern North Sea.
- Burrowing Mud Habitat: this is a MPA search feature which is characterised by areas of fine sediment home to a range of burrowing crustaceans, including langoustine *Nephrops norvegicus*, the mud shrimp *Calocaris macandreae*, *Callianassa subterranean*, or *Maera loveni* and the crab *Goneplax rhomboides*. In some areas, burrowed mud may support conspicuous populations of seapens including the scarce tall seapen (*Funiculina quadrangularis*) and populations of the spectacular fireworks anemone (*Pachycerianthus multiplicatus*). Scottish sea lochs and the northern North Sea support an estimated 95% of British records of burrowed mud habitat. The component biotopes and species in Scottish waters are: Seapens and burrowing megafauna in circalittoral soft mud - SS.SMu.CFiMu.SpMg; CMU.SpMg including; SS.SMu.CFiMu.SpMg.Fun and CMU.SpMg.Fun; Burrowing megafauna and *Maxmuelleria lankesteri* in circalittoral mud - SS.SMu.CFiMu.MgMax. Species: Tall seapen *Funiculina quadrangularis*; fireworks anemone *Pachycerianthus multiplicatus*; and the mud burrowing amphipod *Maera loveni*.
- Annex I Habitat, Reefs: There is one SAC in the SEA study area where the primary reason for the designation is the presence of reefs: Sandy Kelp and seaweed communities, Sanday SAC: Sanday is a large low lying island in the north east of the Orkney islands, notable for the extensive subtidal bedrock reefs that surround the island and provide a habitat for dense forests of kelp *Laminaria* spp. The kelp occurs to a depth of about 20 m and provides a habitat for species-rich, red algal turf communities. Sponges, such as *Clathrina coriacea*, and ascidians, such as *Aplidium punctum*, occur on the vertical rock faces. The north coast of Sanday is tide-swept and appears to support a richer fauna than the south coast, with a dense bryozoan/hydroid turf and dense brittlestar and horse mussel *M. modiolus* beds in mixed sediment below the kelp zone. Crabs and brittlestars are common within crevices in the rock.
- Wyre and Rousay Sounds MPA proposal: The islands are affected by the tides of the Atlantic and the North Sea with tide-swept channels supporting kelp communities on sublittoral sediments.
- Maerl beds: Wyre and Rousay Sounds NCMPA supports beds of maerl (a coralline seaweed). The maerl beds within the NCMPA represent excellent examples of this habitat from amongst the largest known discontinuous area of maerl in UK waters. The beds have an exceptionally high proportion of live maerl and support diverse associated communities. Maerl beds are listed on the recommended PMF list.

Biotopes of conservation importance (listed on the UK Biodiversity Action Plan as a Priority Habitat or on the Scottish Biodiversity list) off the west coast of Orkney and in the Pentland Firth are listed in Table B-8 below (Moore et al 2010, [www.jncc.gov.uk](http://www.jncc.gov.uk)).

A third version of the Orkney Local Biodiversity Action Plan 2018-2022 was released in August 2018, following from the original version published in 2002 and then in 2008-2011 (OIC, 2018). The Orkney Local Biodiversity Action Plan provides an overview of the biodiversity in Orkney and outlines biodiversity planning and objectives for greenspace, farmland, peatland and marine environment. Increasing levels of commercial activity in Orkney waters have been identified as having an impact on the local biodiversity. These include the physical effects of scallop dredging; damage caused by anchors and moorings; agricultural runoff; pollution from shipping; deposition of fish wastes from aquaculture and interaction with wild fish populations (OIC, 2018).

The Orkney Local Biodiversity Plan identified the following key marine species as part of the Marine Action Plans:

- Flame shell beds (*Limaria hians*) are bivalve mollusc, listed as PMF and on the UK BAP list. They are displayed in red in Figure B-10 below. They are found on mixed substrates of mud, sand, gravel, broken shells and stones at depths ranging from 5 to 100m in sheltered area. The species is difficult to record and identify; however, it is believed to be affected by physical effects on the seabed resulting from dredging, anchors and moorings. Flame shell beds are mainly located in the Scapa Flow.
- Seagrass (*Zostera spp.*) beds are found in shallow coastal areas sheltered from the action of the waves. They are classed as UK BAP species and the biotope '*Zostera marina / angustifolia* beds on lower shore or infralittoral clean or muddy sand (SS.SMp.SSgr.Zmar)' is a PMF. They can be located in water depths up to 10m and on sandy, muddy and gravelly seabed types. They have been recorded in the coastal areas of Westray, Sanday, Stronsay, Shapinsay and the inner isles (green on Figure B-10). Seagrass beds are sensitive to physical damage (resulting from dredging and bottom trawling), nutrient enrichment and siltation.
- Maerl beds form on loose subtidal accumulations of soft sediments, in shallow waters (up to 30m). However, maerl beds have also been found in large deeps beds. Maerl is composed of several species of red seaweed, with hard skeleton. Figure B-10 below (displayed in pink) shows that maerl beds are found across Orkney, in particular around Wyre, Rousay and Shapinsay islands. They are also known to occur along sandy coasts and in the Papa Westray. Maerl beds are sensitive to physical effects of dredging, and water movements resulting from storms. This can result in maerl to be come detached from their beds. Two maerl species are listed as PMF.



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Figure B-10: Orkney Islands Biodiversity Action  
Plan Species Distribution

Legend

- Flame Shell Beds - Limaria hians beds in tide-swept sublittoral muddy mixed sediment
- Seagrass Beds - Zostera marina / angustifolia beds on lower shore or infralittoral clean or muddy sand
- Maerl Beds



NOTE: Not to be used for Navigation

Date	Wednesday, February 20, 2019 08:10:28
Projection	British_National_Grid
Spheroid	Airy_1830
Datum	D_OSGB_1936
Data Source	OSOD; SNH; JNCC; MS; ESRI;
File Reference	J:\P2214\Mxd\Report\Environmental_Report\AppB\B-10_Biodiversity_Species.mxd
Created By	Chris Goode
Reviewed By	Emma Langley
Approved By	Beth Monkman



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**Table B-8 Biotopes of conservation importance in west Orkney and the Pentland Firth**

Biotape	UKBAP	Scottish Biodiversity List Habitat	Description
CR.HCR.FaT.CTub	✓	✓	<i>Tubularia indivisa</i> on tide-swept circalittoral rock. This biotope is typically found on the vertical and upper faces of strongly tide-swept, wave-exposed circalittoral bedrock and boulders. It is characterised by a dense carpet of the robust hydroid <i>Tubularia indivisa</i> .
SS.SCS.CCS	✓	✓	Tide-swept circalittoral coarse sands, gravel and shingle typically in depths greater than 15-20m. This habitat may be found in tidal channels of marine inlets, along exposed coasts and offshore. Characterised by robust infaunal polychaetes, mobile crustacea and bivalves. Certain species of sea cucumber (e.g. <i>Neopentadactyla</i> ) may also be prevalent in these areas along with the lancelet <i>Branchiostoma lanceolatum</i> .
SS.SSa.CFiSa	✓	✓	Circalittoral fine sand: Clean fine sands with less than 5% silt/clay in deeper water, either on the open coast or in tide-swept channels of marine inlets in depths of over 15-20m. The habitat may also extend offshore and is characterised by a wide range of echinoderms, polychaetes and bivalves. This habitat is generally more stable than shallower, infralittoral sands and consequently supports a more diverse community.
SS.SMx.CMx.FluHyd		✓	<i>Flustra foliacea</i> and <i>Hydrallmania falcata</i> on tide-swept circalittoral mixed sediment. <i>Flustra foliacea</i> and the hydroid <i>Hydrallmania falcata</i> characterise this biotope; lesser amounts of other hydroids such as <i>Sertularia argentea</i> , <i>Nemertesia antennina</i> and occasionally <i>Nemertesia ramose</i> , occur where suitably stable hard substrata is found. The anemone <i>Urticina feline</i> and the soft coral <i>Alcyonium digitatum</i> may also characterise this biotope.

### B.1.5 Littoral Habitats

A number of UK BAP littoral habitats are known to occur in Orkney. These include:

- Intertidal Mudflats
- Coastal Saltmarsh
- Sandy shores
- Seagrass beds
- Intertidal underboulder communities

There are three draft LNCS with special habitats of Intertidal mudflats within Orkney, Bay of Suckquoy, South Westray Coast and The Ouse, Aikerness (OIC, 2012c). LNCS are sites are designated by OIC and regarded as being worthy of protection for their ornithological, botanical or geological/geomorphological interest. Intertidal mudflats are also listed on the recommended PMF List.

Waulkmill SSSI contains the largest area of coastal saltmarsh in Orkney but there are other significant areas of the habitat on shorelines around Scapa Flow. Central Sanday SSSI also contains coastal saltmarsh. There are 14 draft Local Nature Conservation Sites (LNCS) with coastal saltmarsh as a special habitat within Orkney (OIC, 2012c).

There are a number of sandy shores located throughout the Orkney Islands, seven of which are in Scapa Flow (Atkins et al., 1985).

Eelgrass (*Zostera marina*) and slender eelgrass (*Z. Angustifolia*) occur in Orkney, with the former making up the majority of seagrass beds in Orkney. There are several significant sites of seagrass beds. These are typically in protected bays, estuaries and away from particularly strong winds (OIC, 2008). Seagrass beds are also listed on the recommended PMF List.

## B.1.6 Fish and Shellfish

The seas around Scotland support significant populations of commercially important species of fish and shellfish. Fishing targets both demersal and pelagic stocks (Scottish Government, 2011b). The distributions of these stocks and their species are mainly governed by two partially inter-related factors, depth and the physical nature of the seabed. Fisheries information has been taken from International Council for the Exploration of the Sea (ICES) Blocks 47E6, 46E6, 47E7 and 46E7, which encompasses the Orkney Islands.

The Centre for Environment, Fisheries and Aquaculture Science (Cefas) provide information on spawning grounds (the location where eggs are laid) and nursery areas (the location where juveniles are common) for fish stocks in the region in the format of fisheries sensitivity maps. The key sensitive periods for commercial species (based on the level of spawning and nursery activity) is summarised in Table B.9.

**Table B-9 Spawning and nursing periods for main commercial fish for the ICES Block 47E6, 46E6, 47E7 and 46E7 covering the Orkney Islands and surrounding area (Ellis et al., 2012 and Coull et al., 1998)**

Species	Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Oct		Nov	Dec
Anglerfish ( <i>Lophius piscatorius</i> )	N	N	N	N	N	N	N	N	N	N		N	N
Blue whiting <i>Micromesistius poutassou</i> )	N	N	N	N	N	N	N	N	N	N		N	N
Cod ( <i>Gadus morhua</i> )	N	N	N	N	N	N	N	N	N	N		N	N
Common skate ( <i>dipturus batis</i> )	N	N	N	N	N	N	N	N	N	N		N	N
Haddock ( <i>Melanogrammus aeglefinus</i> )	N	N	N	N	N	N	N	N	N	N		N	N
Hake ( <i>Merluccium merluccius</i> )	N	N	N	N	N	N	N	N					
Herring ( <i>Clupea harengus</i> )	N	N	N	N	N	N	N	SN	SN	N		N	N

Species	Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Oct		Nov	Dec
Lemon sole ( <i>Microstomus kitt</i> )	N	N	N	SN	SN	SN	SN	SN	SN	N		N	N
Ling ( <i>Molva molva</i> )	N	N	N	N	N	N	N	N	N	N		N	N
Mackerel ( <i>Scomber scombrus</i> )	N	N	N	N	N	N	N	N	N	N		N	N
Plaice ( <i>Pleuronectes platessa</i> )	N	N	N	N	N	N	N	N	N	N		N	N
Sand eel ( <i>Ammodytes</i> sp)	SN	SN	N	N	N	N	N	N	N	N		SN	SN
Saithe ( <i>Pollachius virens</i> )	N	N	N	N	N	N	N	N	N	N		N	N
Spotted Ray ( <i>Raja montagui</i> )	N	N	N	N	N	N	N	N	N	N		N	N
Sprat ( <i>Sprattus sprattus</i> )	N	N	N	N	SN	SN	SN	SN	N	N		N	N
Spurdog ( <i>Squalus acanthias</i> )	Vivi paro												
Thornback Ray ( <i>Raja clavata</i> )	N	N	N	N	N	N	N	N	N	N		N	N
Tope Shark ( <i>Galeorhinus galeus</i> )	Vivi paro												
Whiting ( <i>Merlangius merlangus</i> )	N	SN	SN	SN	SN	SN	N	N		N		N	N
Norway lobster ( <i>Nephrops norvegicus</i> )	SN	SN	SN	SN	SN	SN	SN	SN	SN	SN		SN	SN

The diverse range of habitats in the Orkney Islands and surrounding areas support a wide range of commercially viable invertebrate resources, with most shellfish fisheries based in and around Orkney. These shellfish are listed in Table B.10. These species support a large proportion of the shellfish industry in Scotland. Landings of shellfish from south and east of the Scottish mainland, Orkney and Shetland were worth around £30 million in 2000 to 2002 and are dominated by Norway lobster (Chapman, no date).

**Table B-10 Main commercial shellfish species in the Orkney Islands and surrounding area**

Crustacean species	Bivalve mollusc	Gastropod molluscs
Norway Lobster ( <i>Nephrops norvegicus</i> )	King Scallop ( <i>Pecten maximus</i> )	Whelk ( <i>Buccinum undatum</i> )
European lobster ( <i>Homarus gammarus</i> )	Queen scallop ( <i>Aequipecten opercularis</i> )	Periwinkle ( <i>Littorina littorea</i> )
Edible crab	Cockle ( <i>Cerastoderma edule</i> )	
Velvet swimming crab ( <i>Necora puber</i> )	Mussel ( <i>M. edulus</i> )	
Shore crab ( <i>Carcinus maenus</i> )		

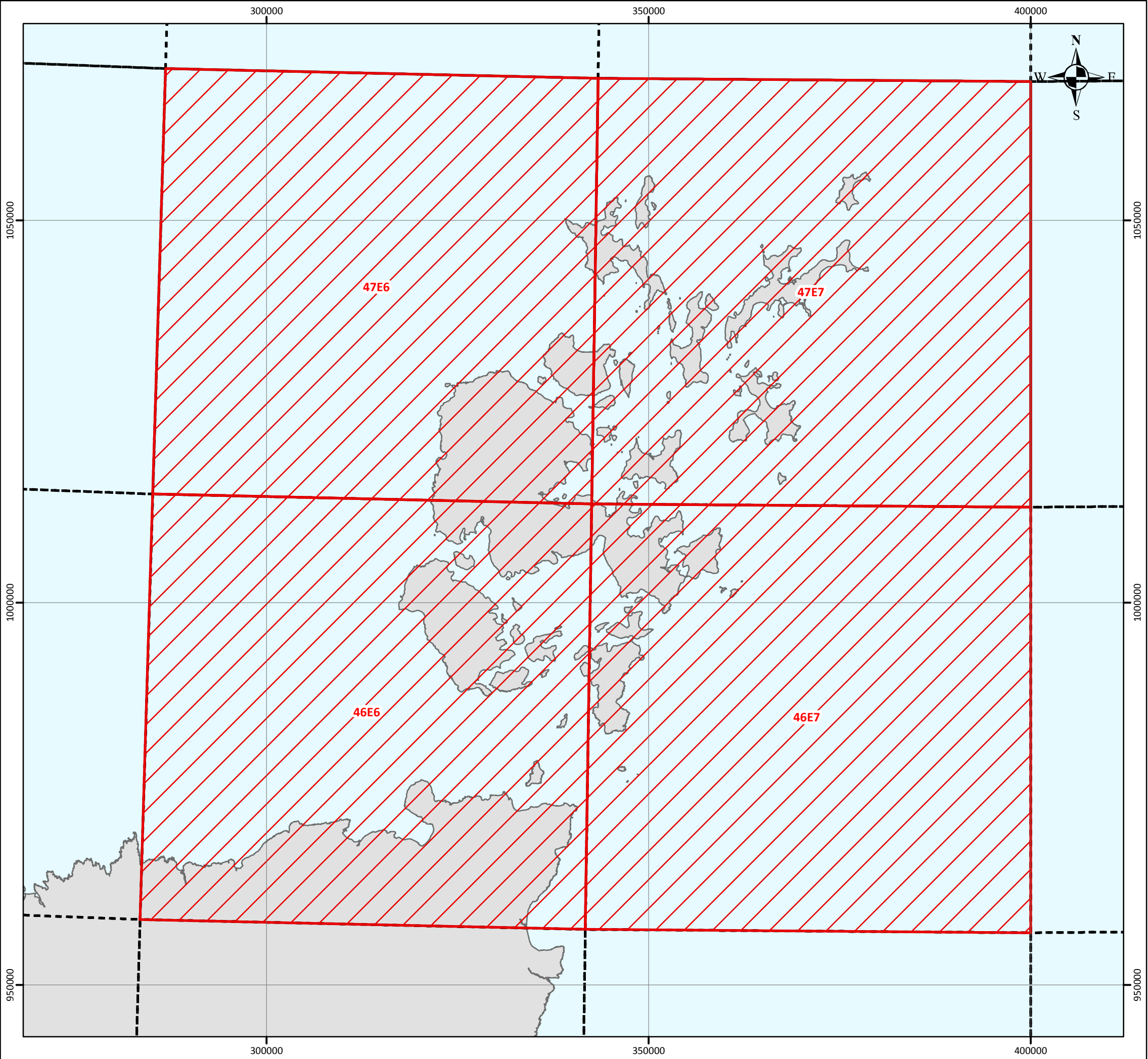
Crustacean species	Bivalve mollusc	Gastropod molluscs
Pink shrimp ( <i>Pandalus borealis</i> )		

Approximately 230 species of fish inhabit the North Sea of which thirteen are the main targets for commercial (for direct human consumption) and industrial fisheries (where the catch is converted into fish meal and oil) (OSPAR, 2000). These commercially important fish stocks are distributed widely around the north and west of Scotland. The most important of these species include mackerel and blue whiting which are taken in extensive international pelagic fisheries and four demersal species: anglerfish, mergrim, saithe and hake.

Catch statistics were obtained for ICES Block rectangles 47E6, 46E6, 47E7 and 46E7 (shown in Figure B-11) for the period of 2002-2012 (MMO, 2013). The most common species caught are given in Table B.11. Approximately 52 species are caught within these ICES rectangles.

**Table B-11 Commonly caught species in ICES 47E6, 46E6, 47E7 and 46E7 (MMO, 2013)**

Demersal (bottom living or feeding)	Pelagic (mid water)	Crustaceans and mollusc
Cod ( <i>Gadus morhua</i> ) Haddock ( <i>Melanogrammus aeglefinus</i> ) Monks and anglers Saithe ( <i>Pollachius virens</i> ) Whiting ( <i>Merlangius merlangus</i> )	Herring ( <i>Clupea harengus</i> )	Nephrops Edible Crab ( <i>Cancer pagurus</i> ) Velvet swimming crab ( <i>Necora puber</i> ) Scallops ( <i>Pectinidae</i> )





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Figure B-11: ICES Rectangles  
Encompassing the Orkney Islands

Legend

-  Orkney Islands ICES Rectangles
-  UKCS ICES Rectangles

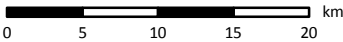


NOTE: Not to be used for Navigation

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Datum	D_OSGB_1936
Data Source	OSOD; ESRI; ICES;
File Reference	J:\P2214\Mxd\Report\Environmental_Report\AppB\B-11_ICES_Rectangles.mxd
Created By	Emma Langley
Reviewed By	Chris Goode
Approved By	Beth Monkman



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Statistics detailing fishing effort (in days fished) and species landed (live weight in tonnes and value in pounds (£)) have been obtained for the above ICES rectangles. The data considers UK vessels using both UK and foreign ports and foreign vessels landing at UK ports, but does not take into account foreign vessels landing at foreign ports. The area is predominantly targeted by Scottish fishing fleets and is considered commercially important ground for pelagic and of particular importance for demersal species.

The annual tonnage and value of the catch from ICES 47E6, 46E6, 47E7 and 46E7 for the period of 2017 is given in Table B.12. The most commonly caught demersal species is haddock (11,712 tonnes caught between 2002 and 2012), which has an average value of £875 per tonne. The most valuable species per tonne caught is Nephrops which is worth on average £2,640 per tonne.

**Table B-12 Average annual UK landings from ICES rectangles 47E6, 46E6, 47E7 and 46E7 (The Scottish Government 2018)**

Group	Species	Landings	Value	
		Tonnes	£	£/tonne
Pelagic	Herring	27	34,213	2,760
	Total	27	34,213	2,760
Demersal	Cod	86	90,354	1,049
	Haddock	103	120,943	1,179
	Lemon sole	2.2	7,488	3,346
	Monks or Anglers	1,306	131,684	101
	Saithe	28	43,363	1,572
	Whiting	0.6	1,173	2,112
	Total	320	395,0055	1,235
Shellfish	Edible crab	35	100,409	2,852
	Nephrops	9	19,406	2,216
	Scallops	6	15,320	2,425
	Velvet swimming crab	16	160,172	10,031
	Total	66	295,3075	4,458
Whole Catch	Total	90,680	985,470,579	1,087

Note: 2017 data is provisional

Under the European Community Shellfish Waters Directive the Bay of Firth on the Orkney mainland has been designated by the Scottish Environmental Protection Agency (SEPA) as a 'shellfish growing water'. This area has been designated to improve the quality of waters where shellfish grow and to contribute to the high level quality of directly edible shellfish products (SEPA, 2011a).

#### **Species and sites of conservation importance:**

- Atlantic Salmon are listed on Annex II of the Habitats Directive and the six SACs designated for the presence of Atlantic salmon in the study area are listed in Table B-5. Atlantic Salmon is also listed on the recommended PMF List.
- Sea Lamprey are listed on Annex II of the Habitats Directive, one SAC the River Spey is designated for the presence of sea lamprey. Cod is also listed on the recommended PMF List.

- Cod is listed on the OSPAR list of declining and or threatened species classified by IUCN as vulnerable and is listed under UKBAP. Cod is also listed on the recommended PMF List.
- Spurdog, listed on OSPAR as declining and or threatened species, classified by IUCN as critically endangered, listed on CITES as endangered species and is listed under UKBAP.
- Spotted rays listed on OSPAR as declining and or threatened species, listed on the IUCN red list as least concern.
- Sandeels are listed as a MPA search feature for North-West Orkney MPA Proposal. This MPA proposal has been identified to recognise an important area for sandeels based on advice from Marine Scotland Science. The area contains suitable sandeel habitat and relatively high densities of sandeel larvae. Sandeels are also listed on the recommended PMF List.
- Common skate (*Dipturus batis*) is listed on the recommended PMF List.

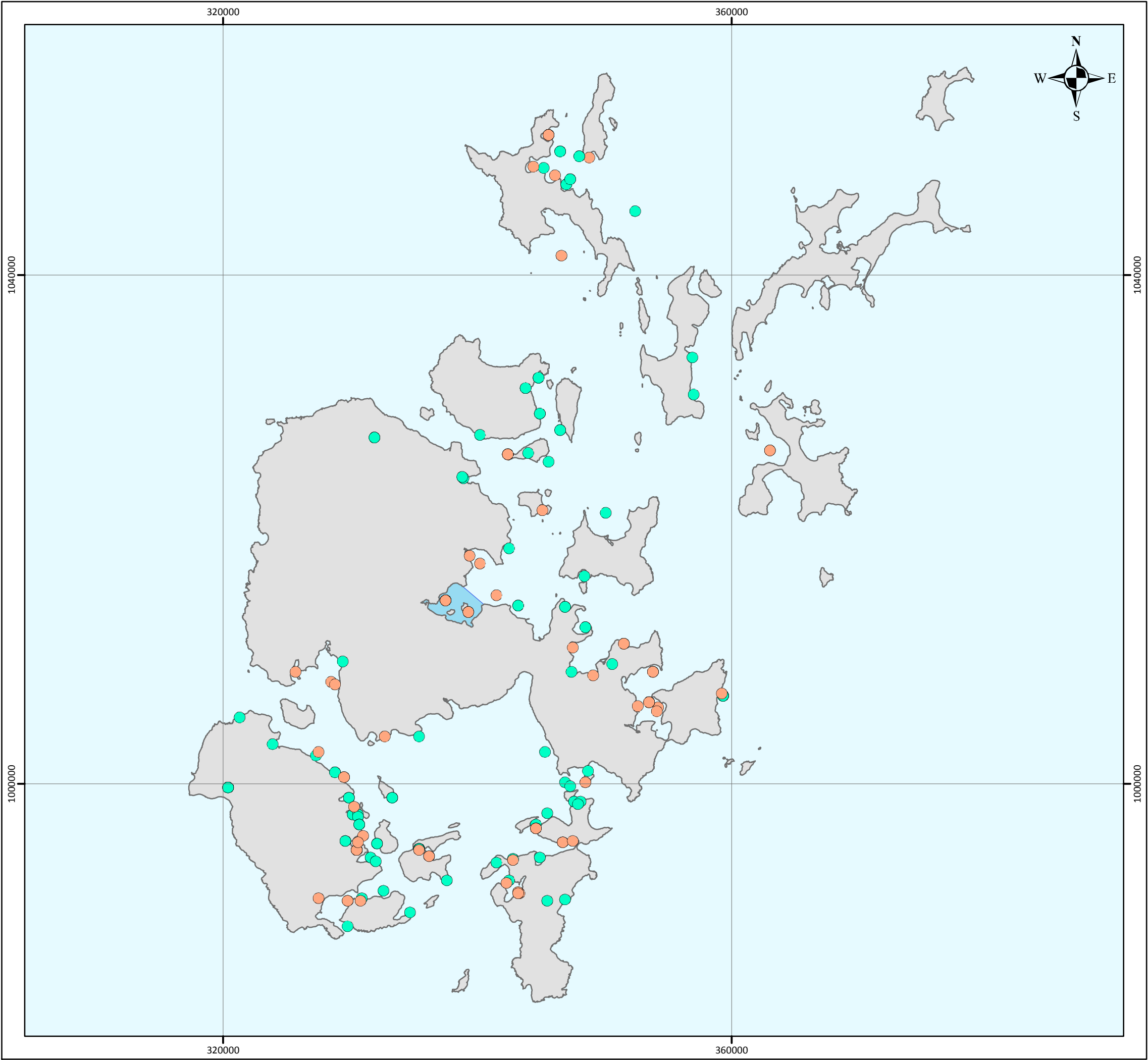
#### **Basking shark**

The basking shark (*Cetorhinus maximus*), on the UK wildlife and country act since 1998, is listed as an OSPAR threatened or declining species, is listed on Annex I and II in the CITES, listed on the UKBAP (MarLIN, 2012) and are currently listed by International Union for Convention of Nature (IUCN) as “Vulnerable” globally and “Endangered” in the northeast Atlantic and north Pacific and under the Nature Conservation (Scotland Act), no disturbance is allowed. Under European legislation, it is prohibited for basking sharks to be fished for, retained on board or landed by any community vessel (Evans *et al*, 2011). The species is also listed on the Scottish Biodiversity List, the Orkney BAP and the recommended PMF List.

Basking sharks are a wide-ranging species also occurring in warm waters and are commonly observed in British and Irish waters along the western seaboard, including the Irish Sea, the western English Channel and past the Isle of Man to the West of Scottish waters. Recent warming of European seas has resulted in this species occurring further north, with occasional records around Shetland and Orkney. There have been a total of 345 widely scattered recordings in North Scotland and Orkney, peaking between July and September. The basking shark is a filter-feeding plankton feeder and as a consequence sightings are mostly associated with productive frontal zones (Evans *et al*, 2011).

### **B.1.7 Aquaculture**

Aquaculture is Scotland’s most valuable food export. Scotland’s aquaculture industry is dominated by Atlantic salmon, rainbow trout and mussel production. In Orkney between in 2016, aquaculture produced a live weight of 14,752 tonnes of salmon with a value of £69,334,400 GDP (The Scottish Government 2017). Within Orkney there are a total of 28 known marine fin fish farms, ten of which are located within Scapa Flow, most densely situated along the east coast of Hoy. Twenty five of these finfish farms are for salmon, two are for trout and salmon and one is for salmon, trout, halibut and cod (see Figure B-12).



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Figure B-12: Orkney Islands Aquaculture

Legend

- Finfish Site
- Shellfish Site
- Shellfish Water Protected Area



NOTE: Not to be used for Navigation

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Projection	British_National_Grid
Spheroid	Airy_1830
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File Reference	J:\P2214\Mxd\Report\Environmental_Report\AppB\B-12_Aquaculture.mxd
Created By	Chris Goode
Reviewed By	Emma Langley
Approved By	Beth Monkman



The majority of the Orkney Islands shellfish production comes from the Bay of Firth shellfish growing area. Although scallops, mussels and oysters are found in the seas around Orkney, the natural spat fall is poor making it economically unviable. Instead, spat is collected from the waters and cultivated artificially in closely monitored conditions. A report commissioned by Scottish Natural Heritage (Horner and MacLennan, 2009) sets out the potential aquaculture capacity for Scapa Flow and the Wide Firth. The report highlights that these areas have the capacity to accommodate further small to medium scale aquaculture developments, taking the form of single medium scale farms within a specific location or a collection of well-sited smaller scale farms i.e. multi sites along with the possible extension of existing finfish farms (Dawson et al, 2009).

### **B.1.8 Planktonic Communities**

Plankton are small microscopic organisms which drift or float in the sea and are generally divided into phytoplankton (plants) and zooplankton (animal). A survey to provide long-term data of plankton abundance in the North Atlantic and North Sea was obtained from Continuous Plankton Recorder (CPR) surveys from 1960 to 2002 and reported in Johns (2004).

The plankton communities in the Orkney Islands and surrounding area are expected to be typical of those of the northern North Sea and a description of this broader area is expected to be representative of the Orkney Islands (Johns 2004).

#### **Phytoplankton**

The dominant phytoplankton species over the whole of the northern North Sea and north-eastern Atlantic are dinoflagellates of the genus *Ceratium*, while the predominant diatoms are species of *Thalassiosira* (Johns, 2004). Strong seasonal patterns in abundance are observed across the region, governed by light and nutrient levels. Favourable conditions lead to spring diatom blooms followed by autumnal dinoflagellate blooms and unfavourable winter conditions lead to low plankton numbers. However, stratification of the water column limits plankton growth once available nutrients have been exhausted, and therefore, 'blooms' tend not to be as intense as those observed in coastal waters.

In addition to autumn and spring blooms, there are exceptional phytoplankton blooms (transient, unsustained growth, often monospecific) and harmful algal blooms (HABs). During HABs although many of the species concerned are not thought to be toxic themselves, as a result of their large bloom-forming capabilities these species can cause anoxic conditions, leading to localised die-offs of higher trophic levels, and the spines of the *Chaetoceros* species can clog the gills of fish. HABs may be anthropogenically forced or related to more widespread changes such as global warming (Johns, 2004).

Superimposed on the annual cycle of plankton abundance in the North Sea are further changes in community structure that are occurring over longer periods of time. For example, CPR surveys have shown that phytoplankton biomass has increased over the last four decades over the majority of the North Sea (DECC 2016). Hydro-climatic events such as the North Atlantic Oscillation have also been shown to be playing an important role in altering the plankton dynamics of the North Sea (DTI, 2001a). Current research suggests that these events have a greater impact on the planktonic communities of the North Sea than anthropogenic factors.

#### **Zooplankton**

Zooplankton in the northern North Sea represents a mixture of fully planktonic species, dominated by copepods such as *Calanus finmarchicus*, and the larvae of non-planktonic species such as echinoderms and ichthyoplankton (fish larvae and eggs). Annual variations in zooplankton abundance are largely related to primary productivity, with peak populations during summer, while long term variations appear to be driven by hydroclimatic changes. Meroplankton also form part of the plankton community in the northern North Sea. This consists of benthic organisms that spend a short period of their life cycle in a pelagic stage before settling on the benthos. Of interest to the oil and gas industry,

echinoderm larvae have been known to cause problems by clogging up intake filters as a result of their spiny nature and the large concentrations which can occur rapidly.

### B.1.9 Non-Native Species

Non-native species (NNS) are species that have been transported outside their natural distribution, either deliberately or unintentionally. Not all NNS that are introduced survive, as some are unsuited to their new environment. Some introduced NNS can become invasive if they spread rapidly, establish themselves in the new environment and cause damage to native species. Invasive NNS pose one of the most significant threats to marine biodiversity. The effects of invasive NNS include the displacement of native species, competition with native species for food and space, disruption of commercial oyster beds and the fouling of ships, buoys and harbour structures (SNH, 2004).

Shipping (ballast water) and aquaculture are the most likely sources of NNS introduction in Scotland, as well as natural spread from other areas where they are already established (Baxter et al, 2011). Barton and Heard (2004) identify a number of steps to minimise the introduction of NNS including; sterilizing ship's ballast water, controlling aquaculture and changing ship's water ballast by controlled and appropriate means.

A number of marine NNS are known to already be present in Scottish territorial waters but a comprehensive list is lacking. These species are listed in Table B-13, along with whether they are considered to be invasive. While the Chinese Mitten crab (*Eriocheir sinensis*) and the Slipper Limpet (*Crepidula fornicata*) are not currently present in Scottish waters, they have been recorded in England and could reach Scotland in the near future.

**Table B-13 Marine NNS known to be present in Scottish territorial waters (Baxter et al., 2011, SNH 2017c, Marine Pathways 2018).**

Common name	Latin name	Invasive/Non-invasive	Description
Green sea fingers	<i>Codium fragile</i> <i>subsp.</i> <i>tomentosoides</i>	Invasive	A green alga which is now found throughout UK inshore waters. Identified during OIC 2013-2016 marine non-native species monitoring programme
Common cordgrass	<i>Spartina anglica</i>	Invasive	Originated from North America and, after hybridising with the native UK species, is now the most common saltmarsh grass in the UK
Red algae (siphoned Japan weed)	<i>Heterosiphonia japonica</i>	Invasive	Originating from Japan, first sighted in the Moray Firth, was reported in Loch Sunart on the west coast in 2008 and from Loch Gairloch in 2010
Harpoon weed	<i>Asparagopsis armata</i>	-	Occurs throughout western and northern Scotland as far as Shetland but absent from east coast. Identified by OIC during 2013 – 2016 survey

Common name	Latin name	Invasive/Non-invasive	Description
Wireweed	<i>Sargassum muticum</i>	Invasive	Originating from Japan, arrived in Scotland in 2004
Acorn barnacle	<i>Elminius modestus</i>	Invasive	A native of Australia and New Zealand it is well established in Scottish waters, where they can outcompete the native barnacle species
Japanese skeleton shrimp	<i>Caprella mutica</i>	Invasive	A predator on several native species, and is now widespread in western Scotland.  Identified during OIC 2013-2016 marine non-native species monitoring programme.
Leathery sea squirt	<i>Styela clava</i>	Invasive	Originating in the Far East it is a fouling organism that smothers native species and may affect aquaculture equipment if present in high density
Carpet sea squirt	<i>Didemnum vexillum</i>	Invasive	Found in the Clyde in late 2009
Colonial sea squirt	<i>Botrylloides violaceus</i>	-	Native of Japan, first recorded in south-west England in 2004 and recorded in Troon yacht haven in 2009 and Wemyss Bay in 2010
Orange-tipped sea squirt	<i>Corella eumyota</i>	-	Widespread through much of the southern hemisphere was first report from various locations around Oban in 2009.  Identified during OIC 2013-2016 marine non-native species monitoring programme.
Bryozoan	<i>Tricellaria inopinata</i>	-	Originating from the Pacific, first recorded in Troon yacht haven in 2009.  Identified during OIC 2013-2016 marine non-native species monitoring programme.
Bryozoan	<i>Bugula fulva</i>	-	Identified during OIC 2013-2016 marine non-native species monitoring programme
Bryozoan	<i>Bugulina simplex</i>	-	Identified during OIC 2013-2016 marine non-native species monitoring programme
Mussel*	<i>Mytilus trossulus</i>	-	Native to Alaska, Canada and the Baltic Sea, first identified in Loch Etive in 2008 and now known

Common name	Latin name	Invasive/Non-invasive	Description
			from various location on west coast
Mussel	<i>Mytilus galloprovincialis</i>	-	Native to the Mediterranean occurring in various west coast sea lochs and north-east coast of Scotland
Compass sea squirt	<i>Asterocarpa humilis</i>	-	New species identified during OIC 2013-2016 marine non-native species monitoring programme
Red seaweed	<i>Bonnemaisonia hamifera</i>	-	Identified during OIC 2013-2016 marine non-native species monitoring programme
Oyster thief	<i>Colpomenia peregrina</i>	-	Identified during OIC 2013-2016 marine non-native species monitoring programme
Red seaweed	<i>Dasysiphonia japonica</i>	-	Identified during OIC 2013-2016 marine non-native species monitoring programme
Red seaweed	<i>Neosiphonia harveyi</i>		New species identified during OIC 2013-2016 marine non-native species monitoring programme
Jenkins spire shell	<i>Potamopyrgus</i>	-	Identified during OIC 2013-2016 marine non-native species monitoring programme
Orange ripple bryozoan	<i>Schizoporella japonica</i>	-	Identified during OIC 2013-2016 marine non-native species monitoring programme

\*There is doubt to whether this species is a native species or not.

Until recently there was little information available on the NNS populations currently inhabiting the waters of the Orkney Islands. In 2012 a comprehensive assessment of NNS on the piers and within harbours of the Orkney Islands was undertaken. A marine non-native species monitoring programme was also undertaken between 2013 and 2016. Species encountered during this period have been listed in Table B-13.

A number of marine NNS have been recorded in the Orkney Islands and are listed in Table B.14 in 2012.

**Table B-14 Marine non-native species (recorded in Orkney Islands (OIC Marine Services, 2013a))**

Common name	Latin name	Location	Date
Green sea fingers	Codium fragile subsp. Fragile	Stromness marina, harbour and Pole star pier	07/08/2012
		Houton Pier	07/08/2012
		St. Mary's Pier	08/08/2012

Common name	Latin name	Location	Date
		Lyness Pier	10/08/2012
		Longhope Pier	10/08/2012
Japanese skeleton shrimp	Caprella mutica	Mooring line, no exact position available	2006
		Vanguard navigational buoy	11/12/2008
		Stromness marina, harbour and Pole star pier	07/08/2012
		Houton Pier	07/08/2012
		St. Mary's Pier	08/08/2012
		Lyness Pier	10/08/2012
		Longhope Pier	10/08/2012
Pacific oyster	Crassostrea gigas	Hunda	1986
		Hunda	1991
Orange-tipped sea squirt	Corella eumyota	Stromness marina, harbour and Pole star pier	07/08/2012
		St. Margaret's Hope	08/08/2012
Orange encrusting invertebrate	Schizoporella japonica	Stromness marina, harbour and Pole star Pier	07/08/2012

Non-native aquatic species which could potentially impact the environment are classified as living in rivers, lakes, transitional waters or coastal waters. A number of non-native plankton species have been recorded in the North Sea over the last century (Reid et al., 2009) and climate change has been proposed to affect NNS invasions due to warm-water species expanding their range to higher latitudes to a higher number of species moving northwards (Carlton, 2002; Stachowicz et al. 2002). The North Sea has extensive shipping traffic and over 80 non-native species identified as established populations (Gollasch, 2002). Invasive species in the North Sea are mostly invertebrates such as crustaceans, molluscs, and polychaetes followed by algae and phytoplankton. Species which are already present within the northern North Sea are likely to be able to migrate further north towards the Orkney Islands and northern Scotland through natural means.

### B.1.10 Future Trends for Biodiversity, Flora and Fauna

Scotland's Marine Atlas (Baxter *et al*, 2011) provides an assessment of the condition of Scotland's seas based on scientific evidence and analysis, supported by expert judgement. The assessment provides information on the current state and trend of habitats and species in the Orkney Islands and North Scotland coast area, and current status of species provide an indication of the potential future trends. Assessment status has been formulated by looking at current threats posed the individual receptor (i.e. species), current numbers of species, the health of the ecosystem/habitat they live in and the current legislative protection afforded to these species. This information has then been used to forecast future trends. The status and trends for assessed species are shown in Table B-15. The trends indicate that harbour seals sharks/rays and seabirds face further decline, while cetaceans, grey seals, demersal fish, plankton and non-native species are all likely to remain stable.

**Table B-15 Future trends for Species (Baxter et al, 2011)**

Species	Assessment Status	Trend
Cetaceans	Good condition	Stable
Grey seals	Few or no concern	Stable
Harbour seals	Many concerns	Deterioration
Seabirds	Many concerns	Deterioration
Water birds	Lack of evidence / robust assessment criteria	N/A
Commercial fish and finfish	Some concerns	No area assessment
Demersal fish	Some concerns	Stable
Sharks/rays	Many concerns	Deterioration
Plankton	Some concerns	Stable
Non-natives species	Some concerns	Stable

The future trends for the biodiversity, flora and fauna in the northern North Sea are likely to be driven by climatic events and anthropogenic factors. The main changes are likely to be:

- Increase in plankton blooms and plankton biomass caused by hydro-climatic events (Johns, 2004).
- Impacts resulting from ocean acidification especially those on calcareous organisms.
- Shift in warm water species northwards due to ocean warming i.e. increased numbers of basking shark and a potential decline in cold water species.
- Increase in the number of fish farms in the Orkney Islands.
- Decrease in the shellfish farming in the Orkney Islands (Horner and Maclellan, 2009)
- Reduction in seabird populations, partly as a result of a declining sand eel population (Fisheries Research Services, 2013).
- Increase in the number of designated sites and protected species (Baxter et al, 2011).

## B.2 POPULATION

### B.2.1 Population Density

Population density across Orkney was 22 persons/km<sup>2</sup> in mid-2017 (National Records of Scotland, 2018a). The most densely populated settlements are Kirkwall and Stromness with approximately 9,200 and 2,200 inhabitants respectively. Between 1961 and 2011, Orkney's smaller islands experienced a decrease in population between 2% and 36%, as people moved to the Orkney mainland. Comparison of the 2001 and 2011 census indicates a modest increase in the population of many of the Isles over the 10-year period (National Records of Scotland, 2019a).

### B.2.2 Population Demographics

The estimated population of Orkney from June 2017 is 22,000 inhabitants (National Records of Scotland, 2019b). Population change in Orkney between 2000 and 2016 is shown in Table B.16. Orkney's population has increased since 2000, with a 13% increase between 2000 and 2017. The population of the Orkney Islands accounts for 0.4 % of the total population of Scotland (National Records of Scotland, 2019b).

**Table B-16 Population change for Orkney Islands 2000-2016 (National Records of Scotland, 2019b).**

Year	Population
2000	19,290
2001	19,220
2002	19,330
2003	19,540
2004	19,830
2005	20,070
2006	20,340
2007	20,580
2008	20,740
2009	20,940
2010	21,220
2011	21,420
2012	21,530
2013	21,560
2014	21,580
2015	21,670
2016	21,850
2017	22,000

During the period 2016 - 2017 population change showed a 0.7 % increase. During this period migration to the Orkney Islands has decreased (National Records of Scotland, 2019b).

Table B.17 shows age distributions in Orkney and Scotland in 2017. The figures show that Orkney has an ageing population with 23% of the population of pensionable age.

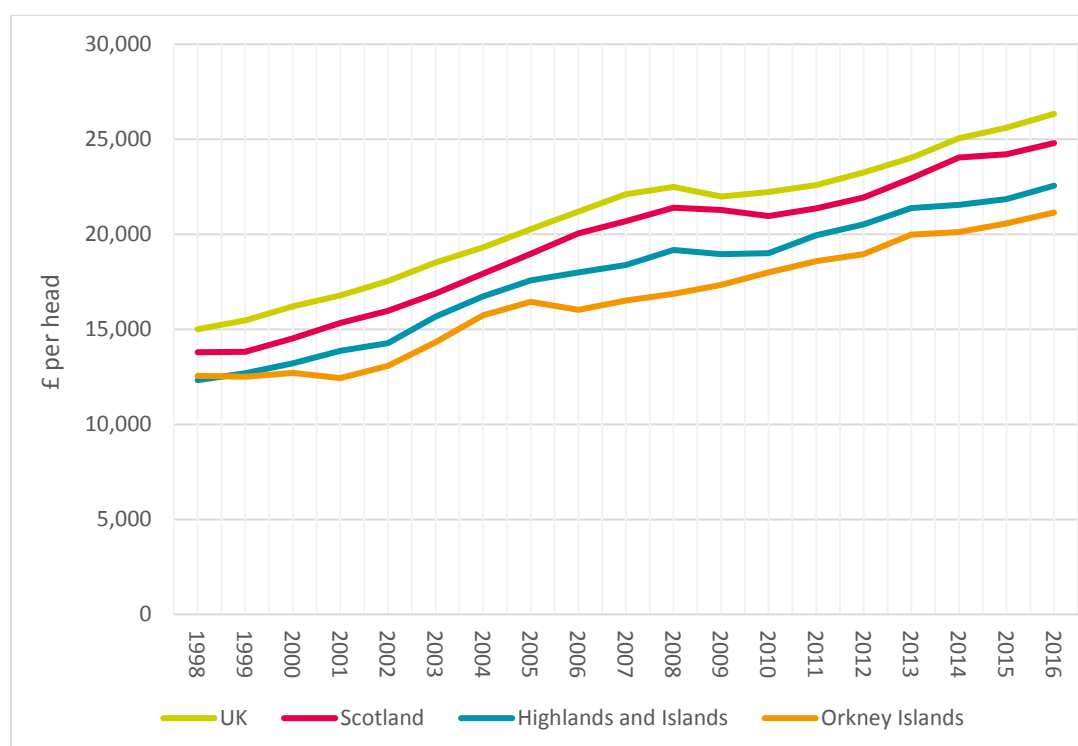
**Table B-17 Age distributions 2017 (National Records of Scotland, 2018b)**

	Orkney	Scotland
% of population under 16	16.11	19.91
% of population aged 16-65	62.11	65.53
% of population over 65	27.78	17.56

### B.2.3 Economic Output

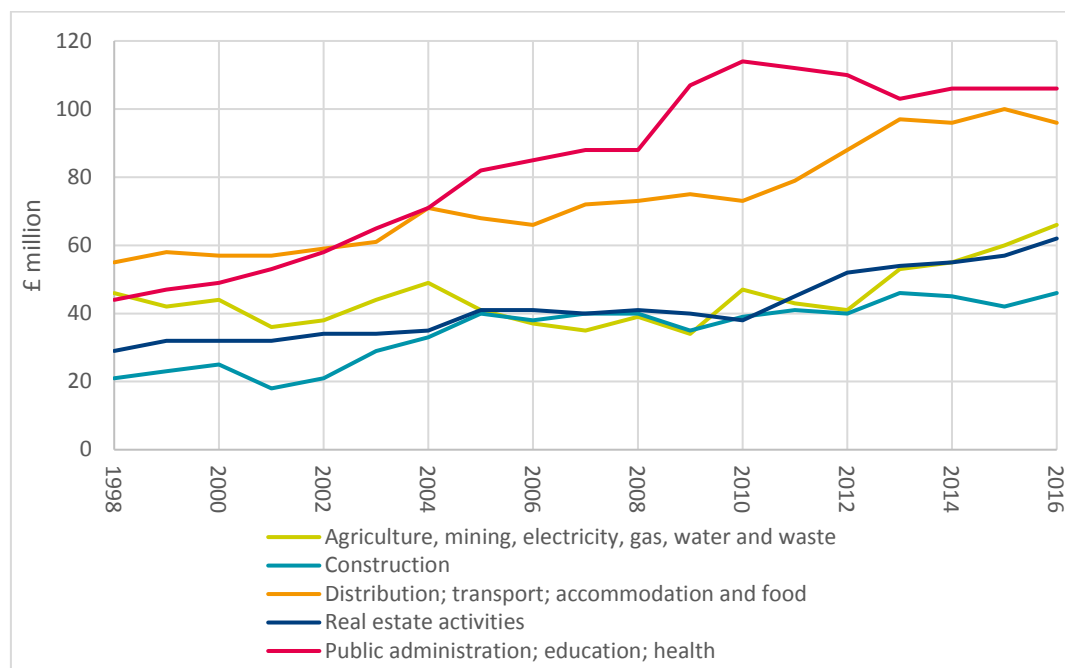
Gross Value Added (GVA) is a measure of economic performance. Figure B.13 shows GVA per head for Orkney compared to the whole of the UK, Scotland and Highlands and Islands. The results show that Orkney has a lower GVA per head than Scotland as a whole and the UK. Overtime while the GVA per head has increased for all areas, Orkney experienced a slight drop in GVA per head (from 2005 to 2006) before increasing.

**Figure B-13 Gross Value Added (GVA) per head 1997 – 2015 (Office of National Statistics, 2017)**



GVA statistics recorded for individual industries are often considered unreliable due to the types of businesses sampled. Of the ten industries GVA is calculated for by the Office of National Statistics the top five industries for Orkney are shown in Figure B.14. The main sector in Orkney is public administration. Over the period shown Orkney has seen considerable growth in the public administration and distribution sectors. The construction, agriculture (mining, electricity, gas, water and waste) and real estate sectors have also grown slightly during the period assessed.

**Figure B-14 Gross Value Added (GVA) for the main industries in Orkney (Office of National Statistics, 2017)**



## B.2.4 Employment

Orkney's traditional industries are farming and fishing. However, tourism and food processing are increasingly becoming important employers. Over 12,200 people are employed in Orkney, with the majority of people (27.3%) working in the public administration, education and health sector and 23% working in distribution, hotels and restaurants (The Scottish Government, 2018).

Unemployment levels in Orkney remain low. Unemployment rates for Orkney and Scotland from 2004 to 2017 are shown in Table B.18. The employment rate is significantly lower than the unemployment rate for Scotland and follows the same trend.

OICHA employs approximately 112 staff, many of which are directly involved in the management of the Harbour.

**Table B-18 Unemployment rate 2004-2017 (The Scottish Government, 2018) Source: Office of National Statistics)**

Year	Orkney (%)	Scotland (%)
2004	3.0	5.3
2005	3.0	5.3
2006	3.2	5.2
2007	2.6	4.7
2008	2.6	4.9
2009	2.3	6.9
2010	3.3	7.7
2011	4.3	8.2
2012	3.8	8.0
2013	3.3	7.7
2014	2.7	6.2
2015	2.4	5.8
2016	2.6	4.8
2017	2.1	4.1

The percentage of the Orkney populations who are economically active tends to be higher than the Scottish average. Table B-19 shows the percentage of the working population who are economically active in Orkney compared to Scotland. The figures demonstrate that during the period of 2004 - 2017 the percentage of Orkney's population that are economically active was continually greater than the percentage for Scotland. The proportion of the population who are economically active in Orkney has fluctuated over time, while for Scotland the figures remain reasonably stable.

**Table B-19 Percentage of population economically active in Orkney and Scotland 2006-2010 (The Scottish Government, 2018) Source: Office of National Statistics)**

Year	Orkney (%)	Scotland (%)
2004	83.4	72.6
2005	82.8	73.0
2006	81.2	73.7
2007	83.7	73.9
2008	81.9	73.6
2009	85.1	72.0
2010	79.6	71.0
2011	79.3	70.5
2012	81.3	70.5
2013	81.3	70.8
2014	89.2	72.6
2015	86.8	73.1
2016	86.0	73.0
2017	88.3	74.3

## B.2.5 Future Trends for Population

Predicted population changes from 2016 to 2026 indicate that the total population will increase by 0.5% in Orkney, whereas the total population in Scotland will increase by 3.2%. In this period Orkney is expected to see an increase of 7% of those persons of pensionable age, a decrease of 1% of those persons of working age and a decrease of 5% in children under 16 (National Records of Scotland, 2017). As a result Orkney demographic is moving towards an increasingly ageing population.

The future trends will continue towards an increasingly ageing population in Orkney, with the age group 75 and over projected to show by far the greatest increase. While the population of the younger age groups is projected to decline over the same period (2017-2026). It should be noted that these projections are largely based on past trends and although they will reflect past policy and economic impacts, they do not take into account future changes that may occur as a result of policy initiatives at a local or national level. They also do not take into account of any future effects due to the recent vote for the UK to leave the European Union (OIC, 2017a).

## B.3 HUMAN HEALTH

### B.3.1 Life Expectancy

Orkney has amongst the highest life expectancy in Scotland as shown in Table B.20 below. Life expectancy in Orkney for both males and females is higher than the Scottish average. Life expectancy has increased steadily overtime in Scotland, while life expectancy in Orkney has fluctuated. Male life expectancy is improving more rapidly than female life expectancy.

**Table B-20 Life expectancy in Orkney and Scotland at birth (National Records of Scotland, 2018c).**

Period	Orkney Islands		Scotland	
	Male	Female	Male	Female
2001-03	75.90	81.03	73.5	78.9
2002-04	76.57	80.48	73.79	79.03
2003-05	76.49	81.35	74.23	79.22
2004-06	76.37	81.01	74.61	79.53
2005-07	75.33	81.56	74.81	79.67
2006-08	74.29	81.55	75.00	79.82
2007-09	76.00	81.90	75.35	80.02
2008-10	77.83	81.71	75.80	80.28
2009-11	79.35	81.59	76.23	80.60
2010-12	79.46	81.83	76.53	80.74
2011-13	78.59	82.59	76.80	80.90
2012-14	78.65	82.87	77.08	80.99
2013-15	78.79	82.81	77.12	81.13
2014-16	80.35	82.70	77.09	81.14
2015-17	79.52	81.69	77.02	81.08

### B.3.2 Health and Safety

Table B-21 shows reported injuries to employees (fatal and non-fatal) between 2013/14 and 2017/18. The results show that fatal injuries in Orkney are very rare. When you consider the number of the population which are working this is still low. While the number of injuries in Scotland has generally decreased over time, the injury rate for Orkney fluctuates, this is due to the smaller number of working people.

**Table B-21 Reported injuries to employers (HSE, 2019)**

Period	Orkney Islands		Scotland	
	Number of fatal injuries	Number of non-fatal injuries	Number of fatal injuries	Number of non-fatal injuries
2013/14	1	30	19	6,782
2014/15	0	22	18	6,864
2015/16	1	24	15	6,494
2016/17	0	26	18	6,348
2017/18	0	27	17	6,439

Injuries within Orkney harbours are recorded by OICHA and shown in Table B-22. The results indicate a fluctuating trend in injuries occurring between 2008 and 2018 for both staff/seamen and members of the public. The most injuries occurred in 2010/11 when there were 4 recorded.

**Table B-22 Injuries recorded in OIC Harbours (OIC Marine Services, 2019a)**

Injury Type	Staff / Seaman Injury	Public / Contractors Injury
2008	2	2
2009	0	0
2010/11	4	0
2011/12	0	0
2012/13	0	2
2013/14	1	1
2014/15	0	0
2015/16	2	2
2016/17	1	1
2017	1	1
2018	2	3

The number of total accidents and incidents recorded in OIC Harbours, including near-misses, incidents within marines and other accidents, has fluctuated over time in the period assessed (2008 and 2018). Table B-23 shows the total number of accidents and incidents recorded over this time period. The most accidents and incidents occurred in 2013/14 when 38 occurred, 10 of these were from recreational craft/ diving activities and 15 of these were at harbours, piers or marinas.

**Table B-23 Recorded accidents and Injuries in OIC Harbours (OIC Marine Services, 2019a)**

Period	Total number of accidents and incidents
2008	17
2009	23
2010/11	11
2011/12	10
2012/13	23
2013/14	38
2014/15	15
2015/16	29
2016/17	12
2017/18	20
2018	20

### **B.3.3 Future Trends for Human Health**

People in the Orkney Islands have good access to greenspaces and the natural environment, which in turn help with a good quality of life. It is anticipated that the high life expectancy and good health and safety records in Orkney will continue into the future.

## B.4 WATER

### B.4.1 Water Quality

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. 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.

#### Water Framework Directive Classification

The Water Framework Directive (WFD) aims to prevent deterioration and enhance the status of aquatic ecosystems (including coastal waters). In Scotland the WFD is implemented by SEPA. On an annual basis each water body is reported as high, good, moderate, poor or bad. The water quality classification looks at both biological and chemical indicators of pollution. Waterbodies 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.

Results for the WFD classification for the coastal waters within the areas of the potential enhancement in the Orkney Harbours Masterplan are shown in Table B-24. The results show the WFD status of Scapa Flow has remained good overtime, while the status of Kirkwall, Noup Head to Start Point, Start Point to Burgh Head and Westray Firth has deteriorated overtime from High to Good and then back to High for 2013-2015) after which classification dropped back to Good. The reduction in the water quality status may be due to the pressures of the point source pollution of sewage, nutrient enrichment from diffuse source pollution and alterations in the beds and banks of burns entering the Loch of Stenness (SEPA, 2013).

Figure B-15 shows the classification of coastal waters, rivers and lochs around Orkney in 2017. It shows that the majority of coastal water bodies are classified as Good, with the coastal waters from Breck Ness to Mull Head classified as High. All Lochs are classified as Good, with the exception of Loch of Stenness, which is classified as High. While river status varies from Poor through to High, with Burn of Hourston being Poor.

Figure B-16 shows the classification of groundwater bodies in the same year. It shows all groundwater bodies in Orkney are classified as Good.

**Table B-24 Water Framework Directive Classification (SEPA, 2007-2017)**

	<b>Waterbody</b>	<b>2007</b>	<b>2008</b>	<b>2009</b>	<b>2010</b>	<b>2011</b>	<b>2012</b>	<b>2013</b>	<b>2014</b>	<b>2015</b>	<b>2016</b>	<b>2017</b>
200234	Kirkwall	High	Good	Good	Good	Good	Good	High	High	High	Good	Good
200242	Start Point to Burgh Head	High	Good	Good	Good	Good	Good	High	High	High	Good	Good
200243	Westray Firth	High	Good	Good	Good	Good	Good	High	High	High	Good	Good
200244	Noup Head to Start Point	High	Good	Good	Good	Good	Good	High	High	High	Good	Good
200474	Scapa Flow	Good	Good	Good	Good	Good	Good	Good	Good	Good	Good	Good



# ORKNEY HARBOURS PORT MASTERPLAN 2020-2040

Figure B-15: Orkney Islands WFD Waterbody Status  
(Coastal, River and Loch)

## Legend

### WFD Waterbody Status

- High Status / Potential
- Good Status / Potential
- Moderate Status / Potential
- Poor Status / Potential
- Bad Status / Potential
- High Status / Potential
- Good Status / Potential
- Moderate Status / Potential
- Poor Status / Potential
- Bad Status / Potential



NOTE: Not to be used for Navigation

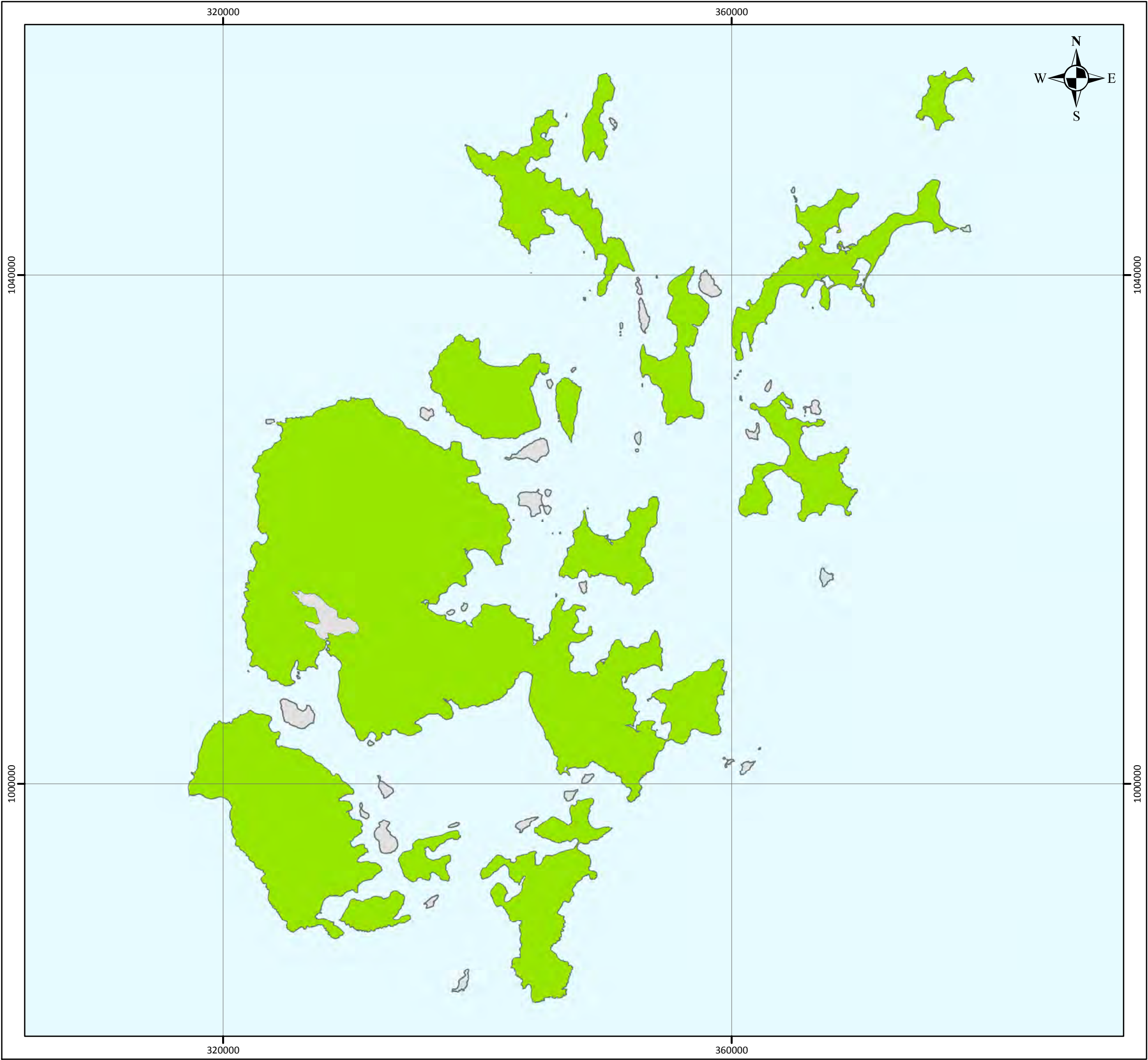
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Reviewed By	Emma Langley
Approved By	Beth Monkman



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ORKNEY HARBOURS PORT  
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Figure B-16: Orkney Islands WFD Waterbody Status  
(Groundwater)

Legend

WFD Waterbody Status

- High Status / Potential
- Good Status / Potential
- Moderate Status / Potential
- Poor Status / Potential
- Bad Status / Potential



NOTE: Not to be used for Navigation

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Created By	Chris Goode
Reviewed By	Emma Langley
Approved By	Beth Monkman



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### **Shellfish Water Quality**

Orkney currently contains one Shellfish Water Protected Area, the Bay of Firth (as shown above in (Figure B-11)). Water quality monitoring at the Bay of Firth shellfish water shows that compliance with the guideline faecal coliforms has not failed between 2000 and 2010, however they were not monitored between 2002 and 2006 (SEPA, 2011).

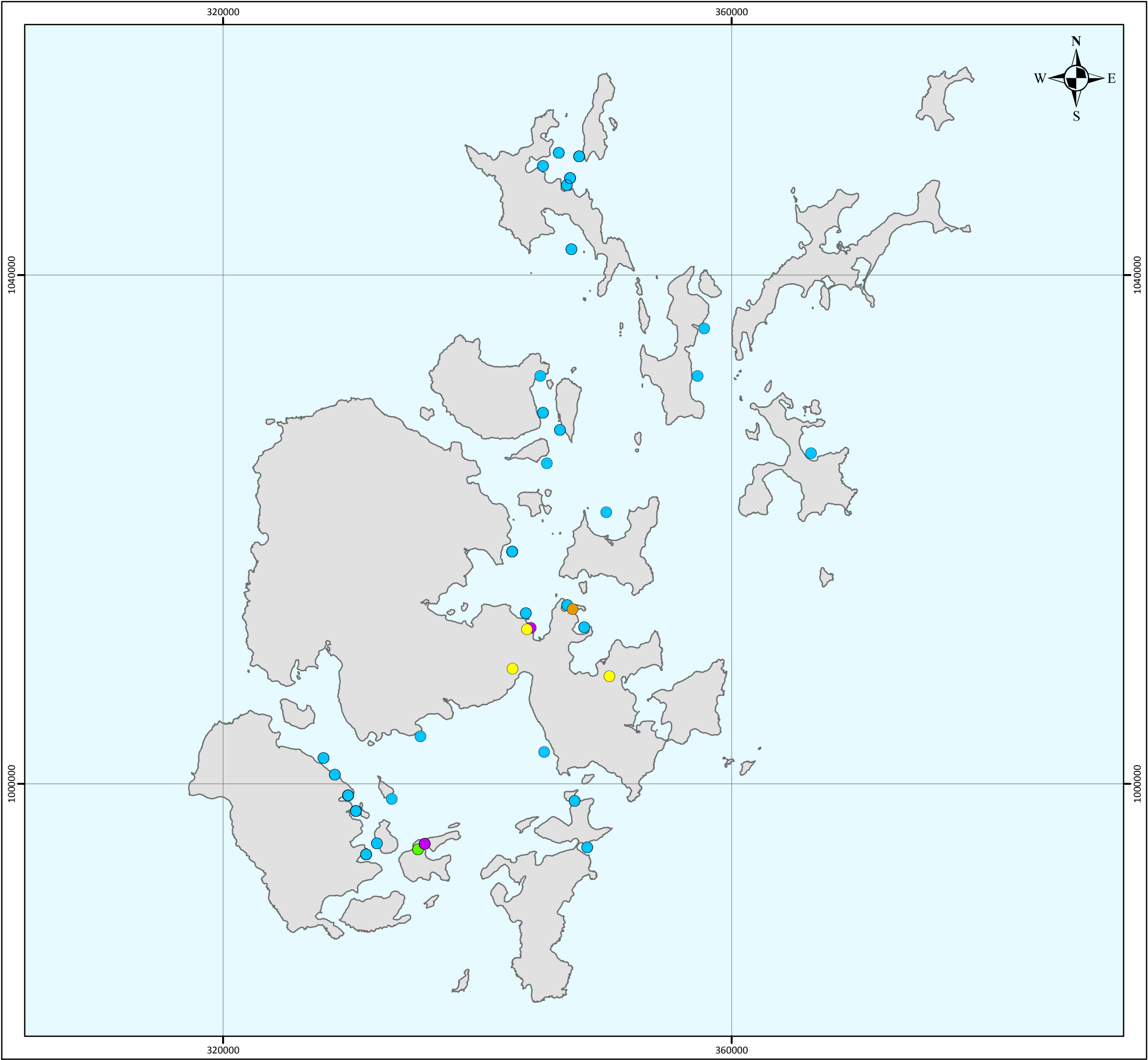
### **Other Contributors**

Ballast water discharges from Flotta Oil Terminal's discharge pipeline, LPG discharge alongside Flotta and from the five designated Ship-to-Ship (STS) transfer locations within Scapa Flow may be affecting water quality. The Flotta pipeline discharge is governed by a SEPA licence (Permit number: PPC/A/1012610) and covers emissions to the water environment and requirements for sampling, testing and reporting. The ballast water release from the STS locations is controlled by the OIC Ballast Water Management Policy, which contains limits for the volume and number of discharges per calendar year (OIC Marine Services, 2017a).

## **B.4.2 Discharges to Coastal Waters**

There are a number of permitted discharges to the coastal waters of the Orkney Islands. These are permitted by SEPA. The location of these discharges is shown in Figure B-17.

Most of the discharges are from fish farm, while there are also discharges from sewage treatment works and also from Flotta Oil Terminal.



ORKNEY HARBOURS PORT  
MASTERPLAN 2020-2040

Figure B-17 Orkney Islands Water Releases

- Legend**
- Water Releases (Type)**
- Marine Fish Farms
  - Other Multiple
  - Pollution Prevention and Control Single
  - Radioactive Substances Single
  - Sewage Treatment Works Multiple



NOTE: Not to be used for Navigation

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Created By	Chris Goode
Reviewed By	Emma Langley
Approved By	Beth Monkman



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### B.4.3 Oil and Chemical Pollution

Only one major oil spill incident has occurred in or around northern Scotland since 1993, when the Braer tanker ran aground and spilt 85,000 tonnes of crude oil off the coast of the Shetland Islands. In August 2011 the flow line leading to the Gannet Alpha platform leaked >200 tonnes of oil into the North Sea, 180 km east of Aberdeen.

A number of small incidents however do occur each year from vessels and offshore oil and gas installations. Figure B-18 shows the total number of incidents of oil and chemical spills between 2002 and 2015. The figures demonstrate that fewer oil and chemical spill incidents occur in the Orkney and Shetland area than in areas in Western and Eastern Scotland. This is most likely due to fewer oil and gas installations within the surrounding area of Orkney and Shetland. Oil spills occurring in coastal waters are usually due to accidents in the handling of oil or due to vessels running aground, while most offshore spills occur at oil and gas installations.

**Figure B-18 Number of incidents of oil and chemical spills from vessels and installations (ACOPS, 2002-2015)**

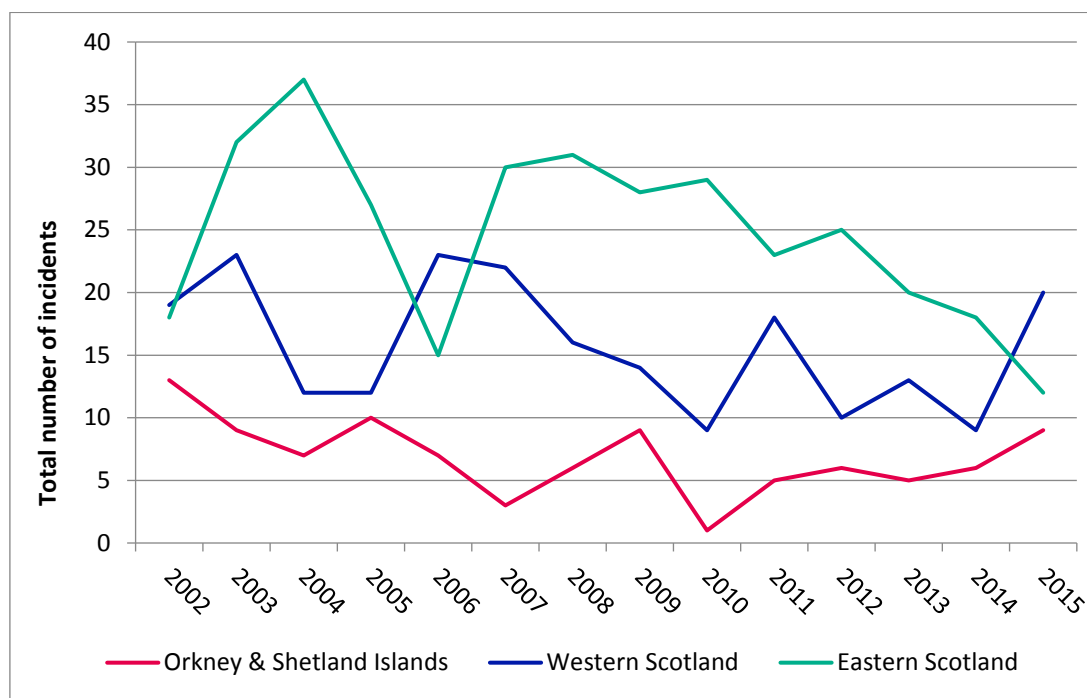


Table B-25 shows the estimated discharge volumes of oil and chemical spills recorded in the Orkney and Shetlands area between 2002 and 2015. The majority of spills are of relatively small volumes (between 1 and 455 litres).

**Table B-25 Number of instances and estimated discharge volumes of oil and chemical spills in Orkney and Shetland (ACOPS, 2003-2015)**

Estimates Volume	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
1-455 litres	9	8	3	7	6	2	4	8	1	1	5	3	4	8
456-999 litres	-	-	-	-	-	-	-	-	-	-	-	-	1	-
1-50 tonnes	1	-	1	1	-	-	-	-	-	-	-	1	-	-
>50 tonnes	-	-	-	1	-	-	-	-	-	-	-	-	-	-
Not Known	3	1	3	1	1	1	2	1	-	4	1	1	1	1

#### B.4.4 Metals and Other Pollutants

The Water Framework Directive includes testing for concentrations of priority substances (such as Lead and Nickel) and specific pollutants (such as Zinc and Copper). Assessment of Scapa Flow in 2007, 2008 and 2011 indicated that the water body passed in all these assessments with a high confidence (SEPA, 2007, 2008 and 2011).

Marine litter is a persistent and widespread problem throughout Orkney's shorelines.

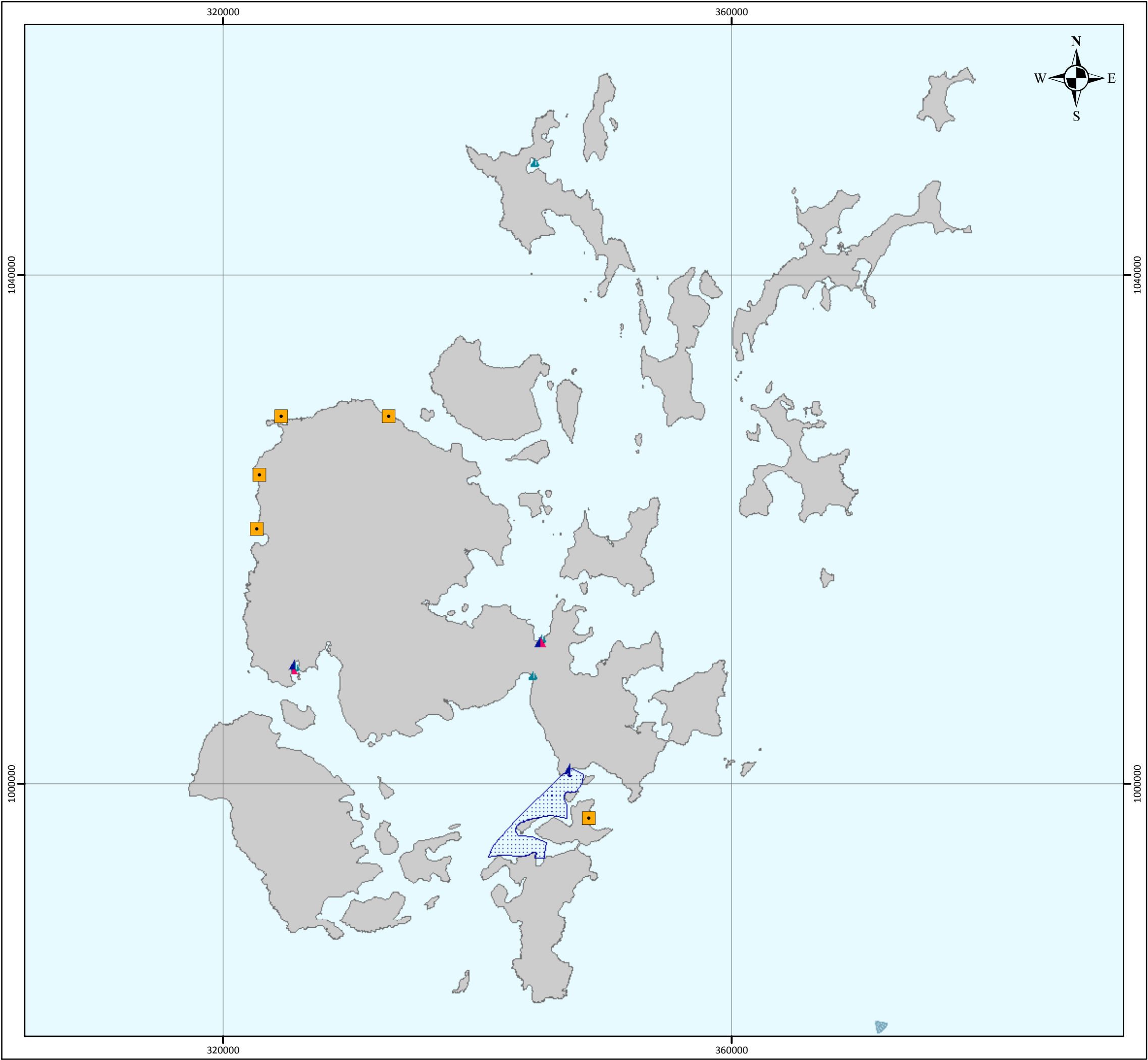
#### B.4.5 Flood Risk

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. A Strategic Flood Risk Assessment for the entire Orkney area was undertaken during 2011 in association with preparation of the Local Development Plan. There are eight Potentially Vulnerable Areas in the Orkney Local Plan District (SEPA, 2016). Areas of Kirkwall and Stromness are at significant risk of coastal, fluvial and drainage flooding. Flood Maps have been created by SEPA and are continually updated to show the likelihood of different areas being susceptible to river, coastal and surface water flooding. These will be used in the assessment.

#### B.4.6 Leisure and Recreation

Within the coastal waters of the Orkney Islands there are a number of coastal and marine recreational activities including recreational sailing and diving. The most popular area for scuba diving is Scapa Flow which is considered one of the finest wreck diving sites in Europe and has ranked among the top five wreck diving areas in the world. Recreational diving is predominantly charter based from Stromness.

Leisure activities practiced within the coastal waters include diving on underwater wrecks, swimming, sailing, surfing and canoeing. There are a number of sailing clubs and marinas located within Scapa Flow. Figure B-19 shows the locations of some of the recreational activities undertaken in the area.



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Figure B-20: Orkney Islands Recreation

## Legend

- Popular Surfing Location
- RYA UK Coastal Atlas of Recreational Boating**
  - RYA Clubs
  - RYA Training Centres
  - Marinas
  - Offshore Routes
  - General Boating Areas



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### **B.4.7 Future Trends for Water**

Future trends in the number of oil and chemical spills are difficult to predict. As these are related to the level of industrial activity and arise mainly from accidents, either from oil spills in fuelling activities, or from vessels running aground, or as discharges from oil and gas installations. If shipping and oil and gas infrastructure increases then there is the potential for an increase in the number of oil and chemical spills (Baxter et al, 2011). Reductions in the number and size of spills rely on applying the best practice and the use of fully trained staff.

As a planning authority OIC 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.

Actions are underway to improve the WFD status of the failing river water bodies. A review undertaken by Scotland's Marine Atlas (Baxter et al., 2011) for water quality and pollution in the Orkney Islands and North Scotland coast area show that shellfish water quality has few or no concerns currently, a situation which is likely to remain stable.

## B.5 CLIMATIC FACTORS

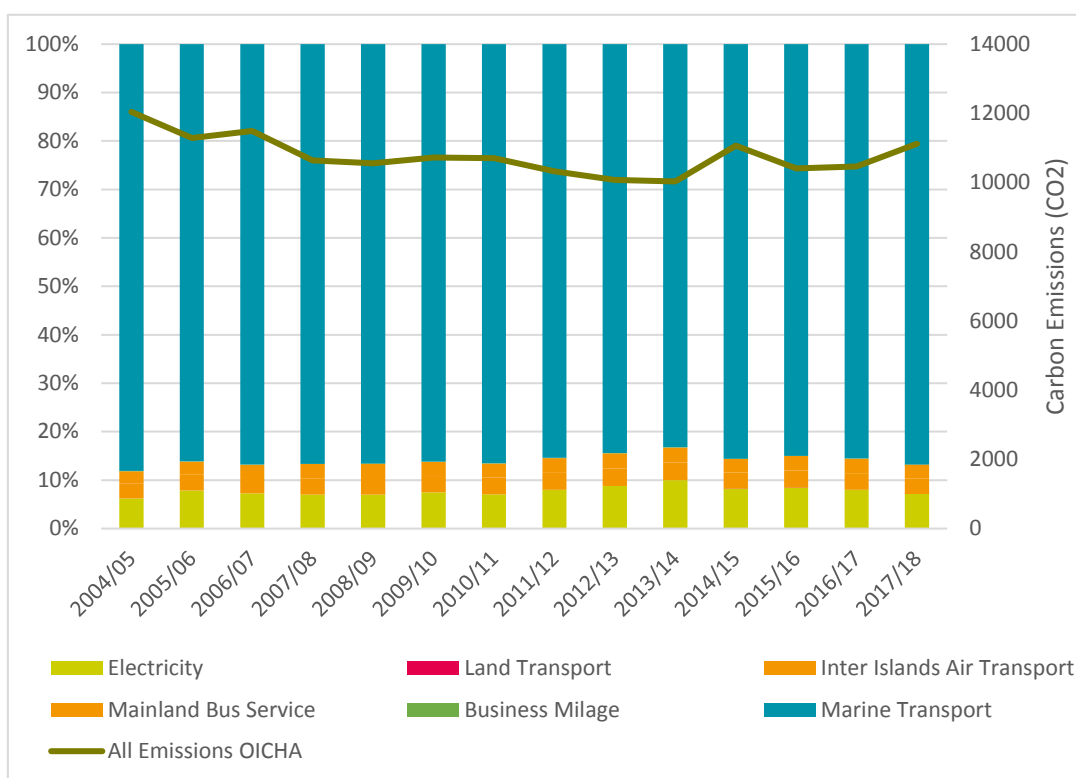
### B.5.1 Harbour Authority Emissions

OIC emissions include operational emissions (council buildings heating and electricity, street lighting, business travel and waste), ferries and harbour craft and public transport. While operational emissions for the whole of OIC have been steadily reducing over the past few years, partly as a result of the implementation of the OIC Carbon Management Programme, emissions from ferries and other harbour craft have remained steady (OIC, 2019). In general, a vast amount of the OIC emissions can be attributed to Ferries and Harbour Craft. In 2015, OIC reported that this was 35% of the total council carbon dioxide emissions (OIC, 2015).

Carbon emissions extracted from OICHA activities alone are shown in Figure B-20 for the period 2004/05 to 2017/18. This covers electricity for harbour run sites and buildings, transport fuel for land-based travel, inter Islands air travel, bus service and business mileage of OICHA staff, as well as marine transport emissions. On average, total carbon emissions have decreased over time (as shown by the green line in Figure B-20). The data shows that marine transport fuel emissions make up the vast majority of the percentage of total emissions, ranging from 83% to 88%.

Emissions resulting from the tugs and harbour craft fluctuated greatly from year to year as a result of the oil port traffic activity level (see Figure B-20 (Marine Transport)). Recently a new pilot vessel has been bought into service and is more efficient in terms of energy usage and this has led to significant fuel savings compared to older vessels (OIC, 2015).

Figure B-20 OICHA Carbon Emissions (OIC, 2019)



## **B.5.2 Future Trends for Climatic Factors**

The predicted changes to climate in Orkney 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 (OIC, 2017b).

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. The Orkney Harbours Masterplan will ensure that any developments planned should demonstrate that design and location takes into account proposed coastal erosion.

OIC Carbon Management Programme seeks to reduce the Council's Carbon Dioxide emissions. In order to achieve this, OIC have set targets for Carbon Dioxide emissions. The target for Total Carbon Dioxide emissions in the financial year 2025 is a reduction of 42% of the baseline year 2004-05 (OIC, 2015). The original target for the programme was to reduce carbon emissions by 11% from the baseline year. Recent findings concluded that reductions in emissions over this period (2006-2014) was 18% (OIC, 2015).

Reductions in emissions are dependent on the efficiency of individual craft and the size of the fleet. Ferries also contribute a large proportion of the council's overall emissions, while replacement of the fleet is part of the long term transport plan it is considered unlikely that alternative low carbon fuel sources will be commercially available in the near future (OIC, 2015).

## B.6 MATERIAL ASSETS

### B.6.1 Current Infrastructure around Scapa Flow

#### Roads

Mainland Orkney contains the majority of the island's roads and features a network of A roads connecting the populous areas (see Figure B.21). The mainland is connected to Burray and South Ronaldsay by road via the Churchill Barriers (causeways). The larger of the populated Orkney Islands contain a number of B roads.

#### Airports

The main airport (Kirkwall airport) provides services to the Scottish Mainland and Shetland. The Orkney Islands also operate inter island services to Westray, Papa Westery and Sanday, Stronsay, Eday and North Ronaldsay.

#### Ports and Harbours

Flotta Oil Terminal is located on the northern shore of Flotta island (see Figure B-21), covering approximately 400 acres (Repsol Sinopec, 2017). Flotta Oil terminal is operated by Repsol Sinopec Resources UK Limited and imports crude oil from several offshore installations through a subsea pipeline and via tankers. The imported crude oil is processed and stored in segregated storage facilities at Flotta before being exported by tankers. Liquid propane gas (LPG) separated from the oil is loaded onto gas tankers at Flotta's Jetty. Between 1977 and 2012 there were more than 4,200 crude oil tankers and more than 1,880 LPG tankers exporting oil and gas from Flotta (OIC Marine Services, 2013b). In the past crude oil has also been shipped from hydrocarbon fields and stored at Flotta Oil Terminal before being exported by tankers. After a decline in through-flow from the terminal when an average of one tankers movement occurred a week, this has increased in recent years. In 2016-2017 116 crude oil tankers exported oil from Flotta Oil Terminal (OIC Marine Services, 2017b), the following year (2017-2018) saw a rise to 130 (OIC Marine Services, 2018), an average of 2.5 tankers per week.

As a sheltered deep-water anchorage, Scapa Flow also has a long track record as a safe location for Ship-to-Ship (STS) transfers of crude oil. Since 1980 there have been more than 300 STS operations, including the world's first commercial transfer of liquid natural gas (LNG) in 2007. The world's first liquefied propane gas (LPG) ship to ship transfer was managed in Scapa Flow in 2016 with 15,464 tonnes transferred. This achievement was matched in 2017.

Details on the number of STS operations and tonnage of cargo transferred between 2001 and 2011 are shown in Table B-26. The maximum number of STS operations occurred in 2018, with 66 STS operations carried out. No STS transfers have occurred during 2012-2014 as OIC were awaiting a new Oil Transfer Licence from the Maritime and Coastguard Agency (MCA), this was granted in 2015.



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Figure B-21: Infrastructure in Orkney

Legend

- Port
- ✈ Airport
- A Road
- B Road
- Minor Road
- Water Bodies
- Urban Area



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**Table B-26 Ship-to-Ship transfers 2001-2018 (OIC Marine Services, 2018).**

	<b>Number of STS Transfers</b>	<b>Oil Tonnage Transferred</b>	<b>Number of LNG Transfers</b>	<b>LNG Tonnage Transferred</b>	<b>Number of LPG Transfers</b>	<b>LPG Tonnes Transferred</b>
2001	19	1,812,085				
2002	11	926,399				
2003	4	575,184				
2004	15	2,660,841				
2005	17	1,746,715				
2006	8	993,759				
2007	7	930,136	1	56,827		
2008	10	582,097	0	0		
2009	27	2,599,461	0	0		
2010	17	941,629	1	8,128		
2011	5	282,708	0	0		
2012	0	0	0	0		
2013	0	0	1	32,853		
2014	0	0	0	0		
2015	8	734,257	0	0		
2016	22	1,579,679	1	133,472	1	15,463.97
2017	23	1,695,230	0	0	1	15,463.97
2018	66	5,048,235	0	0	0	0

Orkney is the most popular cruise ship destination in the UK, with the three main berths Kirkwall, Hatston (located just outside Kirkwall) and Stromness receiving an average of 140 cruise ships annually (OIC Marine Services, 2019b). In 2013 the berth at Hatston was extended to 385 metres, allowing the largest cruise liners in the world to come alongside.

Ferries link Orkney Mainland to the Scottish Mainland and the Orkney Islands, with inter-island ferry services connecting all inhabited islands to Orkney Mainland. Orkney Ferries operate 9 inter-island ferries between Orkney Mainland and Orkney Islands. Orkney is home to a number of marinas and berths for pleasure boats. Orkney has three marinas; Kirkwall (95 berths), Stromness (72 berths) and Westray (17 berths), which also cater for larger cruising, sailing and powered recreational craft, along with local piers and visitor moorings throughout the islands.

#### **Fish Farms**

Salmon farming has been established for many years in Orkney and the industry provides significant employment and wider economic benefit to our island communities. There are currently 22 operational salmon farms in Orkney waters (as shown on Figure B-12 above). Salmon producers in Orkney are looking to expand their existing operations, particularly as the marine environment around Orkney enables the production of premium quality salmon products. Currently there are a number of new and extended salmon farms coming forward for planning consent in Scapa Flow.

A commercial in-shore shipping fleet also operates throughout the Orkney Islands.

### **Renewable Energy**

Orkney is at the forefront of marine renewable energy research and development and almost all technology types for wave and tidal energy conversion have been tested in Orkney waters via the European Marine Energy Centre (EMEC) (OIC Marine Services, 2019c). The area has a number of Crown Estate Scotland Agreements for Lease areas. There are currently two wave farm lease areas (both of which are operational) and six tidal farm lease areas. These lease areas are shown in Figure B-22.

The marine renewables industry has benefitted from three port developments Lyness Pier, Hatston Pier and Copland's Dock in Stromness to support wave and tidal energy development. These facilities provide additional berthing and shore side development areas (Hatston Pier) and assembly, storage and servicing of marine renewable energy devices (Lyness Pier).

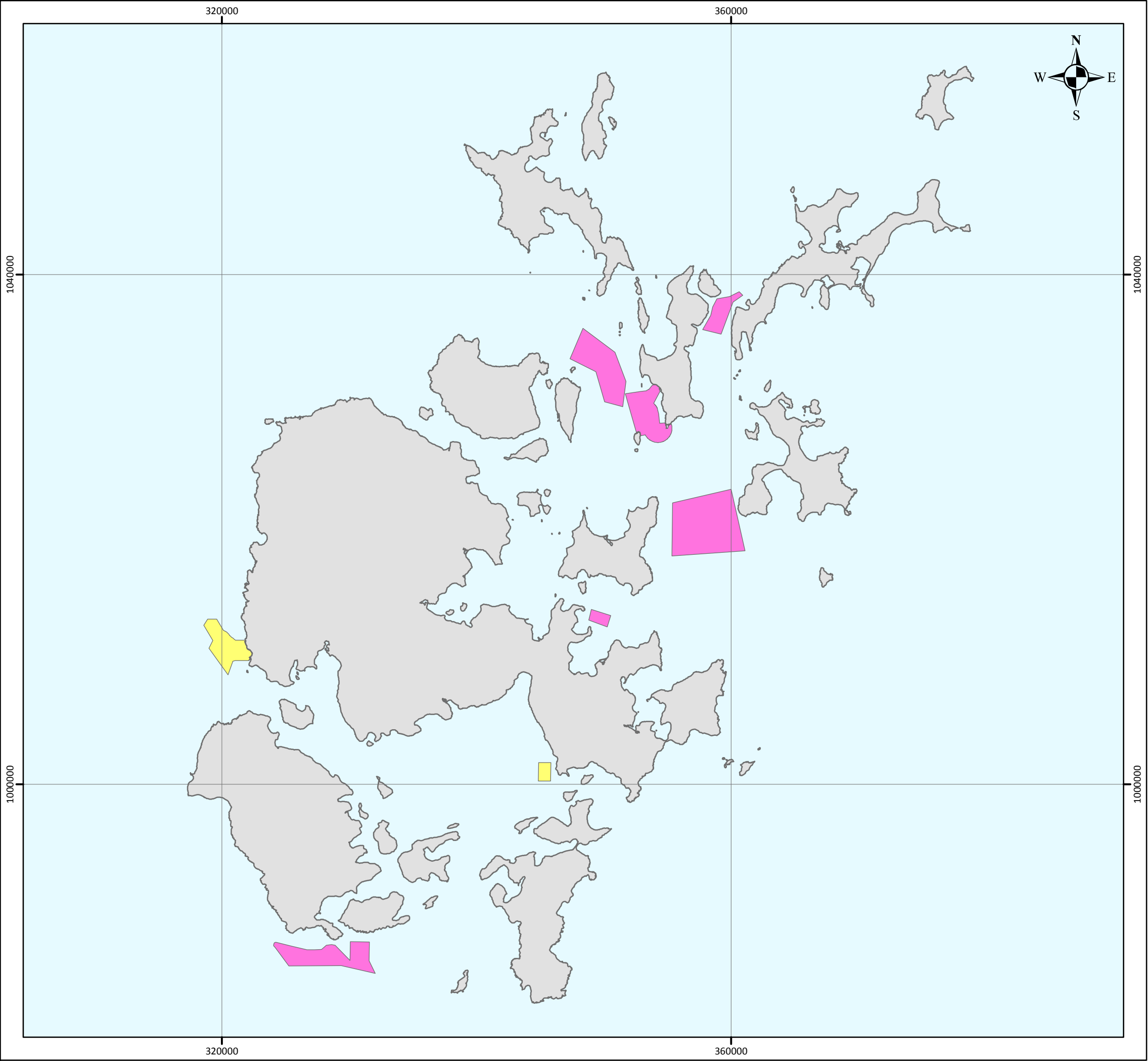
### **Waste**

OICHA operates a Port Waste Management Plan. This ensures that all ship generated waste and cargo residue is controlled at all authority piers and harbours. Waste collection facilities are available at 23 of the OICs Piers and harbours. The location of these is provided within the Port Waste Management Plan (OIC Marine Services, 2015). Each location is clearly marked for the use of garbage, combustible and non-combustible wastes and waste oil reception. Waste from shipping vessels must be recorded, required information includes; type and amount of waste.

## **B.6.2 Future Trends for Material Assets**

There are a number of tidal farm lease areas available for lease from Crown Estate Scotland, these may be operational in the near future (see Figure B-22). There are also a number of new fish farms which have been licenced within Scapa Flow and will soon be operational.

There are a number of future developments which will be considered, these are within the Orkney Local Development Plan.



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Figure B-22: Orkney Islands Marine Renewables

- Legend
- Crown Estate Scotland Agreements
- Tidal Farm
  - Wave Farm



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## B.7 CULTURAL HERITAGE

### B.7.1 World Heritage Sites

In 1999 part of Orkney was designated a UNESCO World Heritage Site for its unique group of Neolithic monuments. The site known as Heart of Neolithic Orkney 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 (UNESCO, 2019). The site is cared for by Historic Environment Scotland.

The Heart of Neolithic Orkney Site Management Plan 2014-2019 Sensitive area covers the western side of Mainland Orkney incorporating Loch of Stenness and Loch of Harray, Graemsay and northern Hoy (see Figure B.23).

### B.7.2 Wrecks

Scapa Flow contains a number of shipwrecks. Within Scapa Flow there are seven historic wrecks protected as Scheduled Monuments under the Ancient Monuments and Archaeological Areas Act 1979. These wrecks are shown in Figure B.23. These wrecks are the remains of the German High Seas Fleet scuttled in Scapa Flow in 1919 following World War I.

There are three shipwrecks in the vicinity of the Orkney Islands designated as Controlled Sites by the MOD under the Protection of Military Remains Act 1986 (see Figure B-23). Two of these wrecks; HMS Royal Oak and HMS Vanguard are located within Scapa Flow, while the wreck of HMS Hampshire lies off the North West coast of Orkney Mainland.

The wreck of HMS Royal Oak is known to leak oil, but oil is monitored and recovered by Briggs Marine (Baxter et al., 2011). However, no oil has been recovered in recent years.

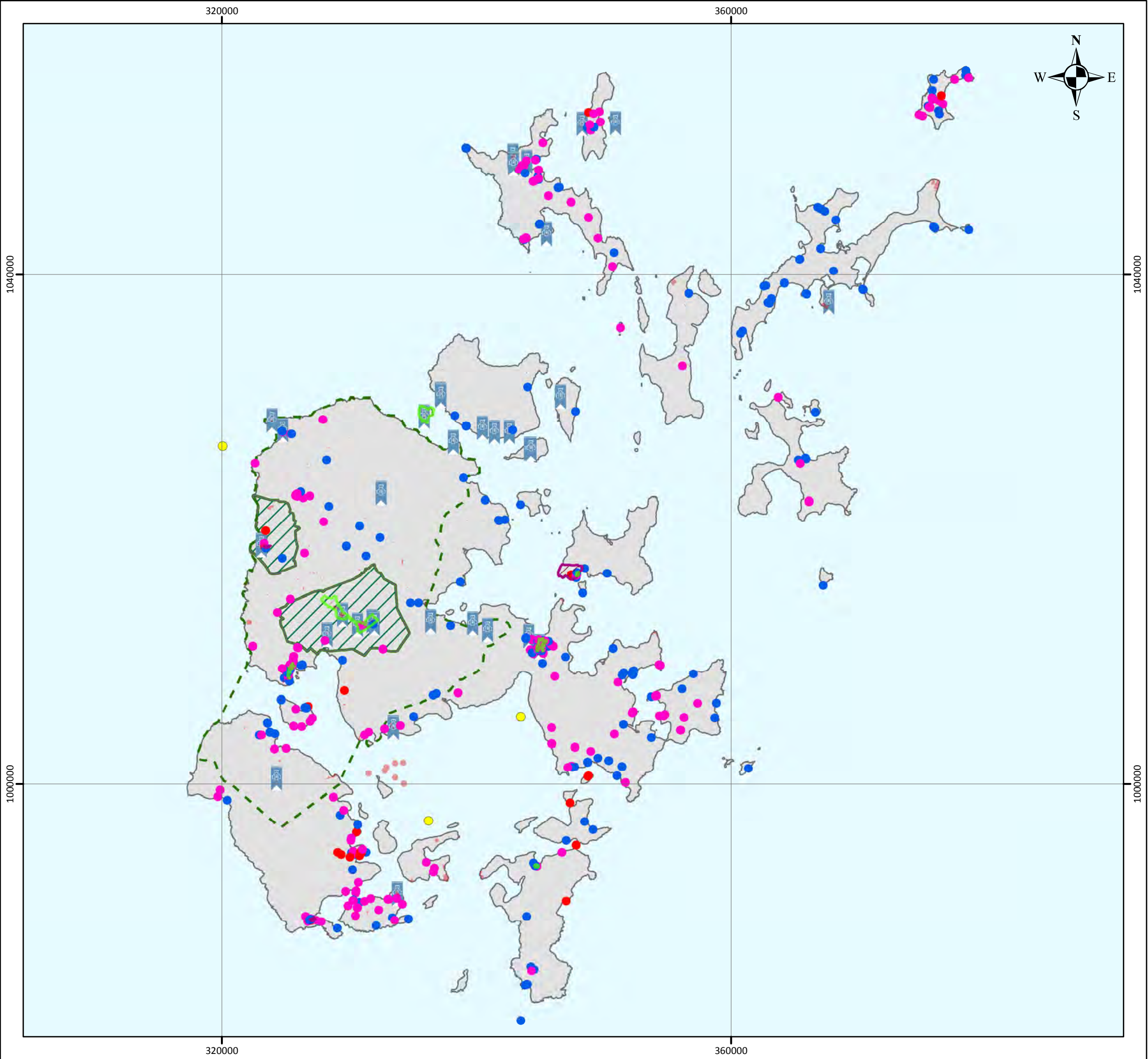
### B.7.3 Other Designated Historical Areas

Listed Buildings, Properties in Care, Conservation Areas and Gardens and Designated Landscapes within the Orkney Islands are also shown on Figure B-23. Of particular interest to the Orkney Harbours Masterplan are the following:

- On the Island of Shapinsay the gardens and woodland of Balfour Castle are designated under Inventory Garden & Designed Landscapes.
- A number of Properties in Care and Listed Buildings are located within the locality of locations identified for potential enhancement.
- Central Kirkwall, Balfour and Stromness shorefront are designated as Conservation Areas.

### B.7.4 Future Trends for Cultural Heritage

There are no relevant future trends for Cultural Heritage



ORKNEY HARBOURS PORT  
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Figure B-23: Orkney Islands Cultural Heritage

- Legend**
- Controlled Sites under the Protection of Military Remains Act 1986
  - Listed Buildings by Category**
    - A
    - B
    - C
  - Conservation Areas
  - Gardens and Designed Landscapes
  - Scheduled Monuments
  - Heart of Neolithic Orkney World Heritage Site**
    - Site Boundary
    - Site Buffer Zone
    - Site Sensitive Area



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## B.8 SOIL

### 6.2 Geological and Soil Features

The geology across Orkney is relatively unvaried. The Orkney Islands consist almost entirely of sedimentary rocks and subordinate lavas and tuffs of Middle and Upper Old Red Sandstone age. A Basement Complex composed of metamorphic rocks of Moinian type and Caledonian granites forms a number of small inliers near Yesnaby and Stromness in West Mainland and on the island of Graemsay (Mykura, 1976).

The Middle Old Red Sandstone falls naturally into two major groups. The lower group, comprising the Stromness Flags and the Rousay Flags, consists largely of 'flagstones' and is made up of rhythmic sequences of thinly bedded and, in part, laminated grey and black carbonate-rich siltstones and silty mudstones alternating with generally thin beds of fine-grained sandstone or sandy siltstone. The flags have yielded well-preserved fossil fish and the Stromness Flags contain the Sandwich Fish Bed, which is considered to be the equivalent of the Achanarras Limestone of Caithness.

The upper group, the Eday Beds, comprises the Lower, Middle and Upper Eday Sandstone, three thick sequences of yellow and red sandstone with pebbly lenses, which are separated respectively by the Eday Flags and the Eday Marls. The Eday Flags locally contain a few thin flows of basic lava and some thin beds of tuff.

Beds ascribed to the Upper Old Red Sandstone are confined to the island of Hoy, where they form up to 1000 m of red, pink and yellow sandstones with subordinate bands of marl. They are underlain by a variable thickness of basalt lava and tuff which rest on a hummocky surface floored by various members of the Middle Old Red Sandstone sequence.

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.

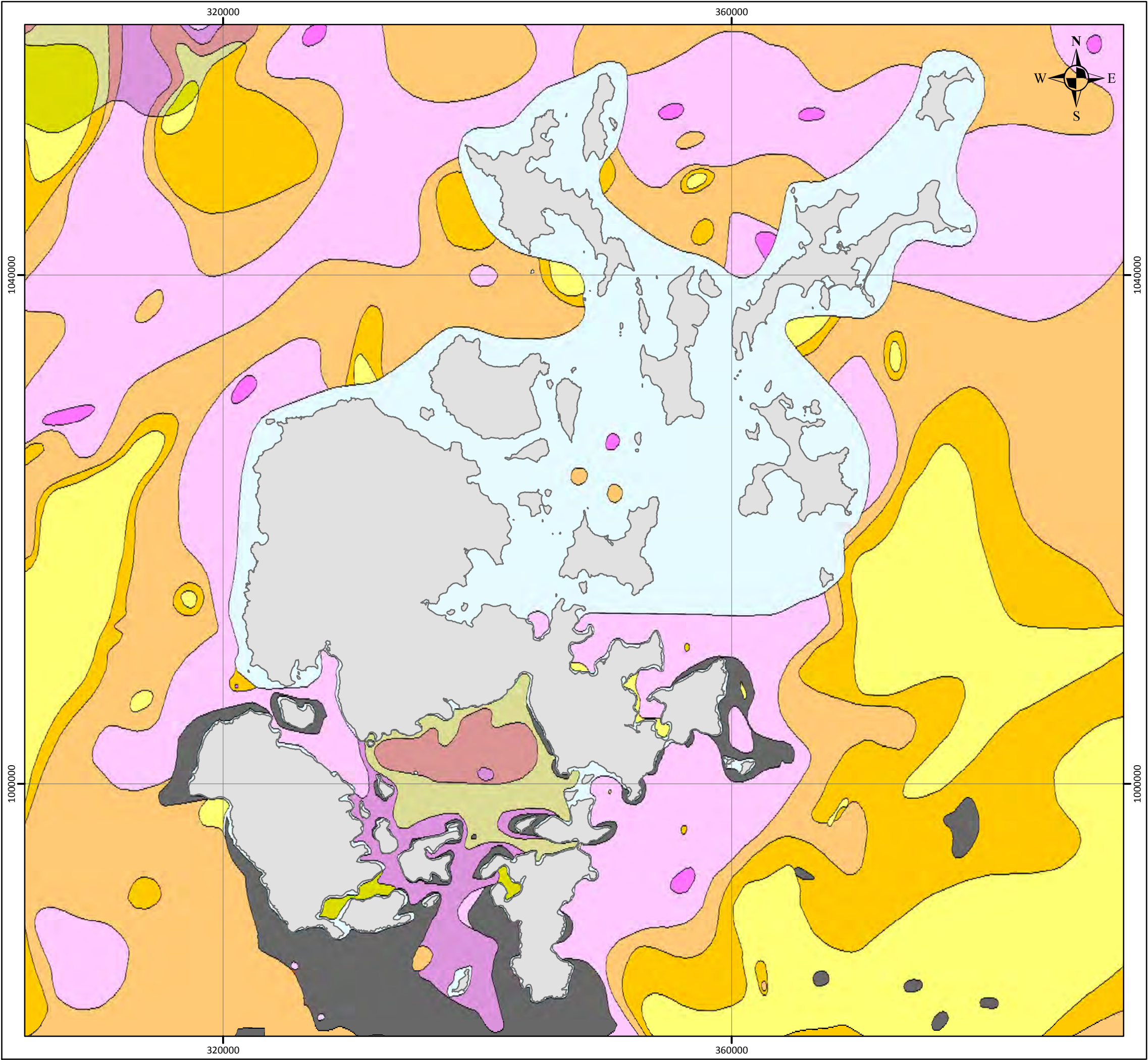
Seabed sediments for the Orkney Islands are shown in Figure B-24.

### 6.3 Soil Contamination

To ensure compliance, and to deal with contaminated land in the Orkney Islands, OIC Department of Environmental Health has produced a Contaminated Land Strategy (OIC, 2003). The information gathered on potential contaminated land sites includes 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. The Contaminated Land Register will be accessed during the EIA phased of the project.

### 6.4 Intertidal Substrate Foreshore

The intertidal substrate of the foreshore shows the beach composition classification collated under a desk-based study as part of the FutureCoast Project. The foreshore across the Orkney Islands is made up of a variety of substrates, with the majority of the foreshore being composed of Rock Platform. The intertidal substrate is shown in Figure B-25.



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Figure B-24: Orkney Islands Seabed Sediments

- Legend**
- Seabed Sediments**
- Gravel
  - Gravelly sand
  - Muddy sandy gravel
  - Muddy sand
  - Slightly gravelly muddy sand
  - Slightly gravelly sand
  - Sand
  - Gravelly muddy sand
  - Sandy gravel
  - Undifferentiated rock



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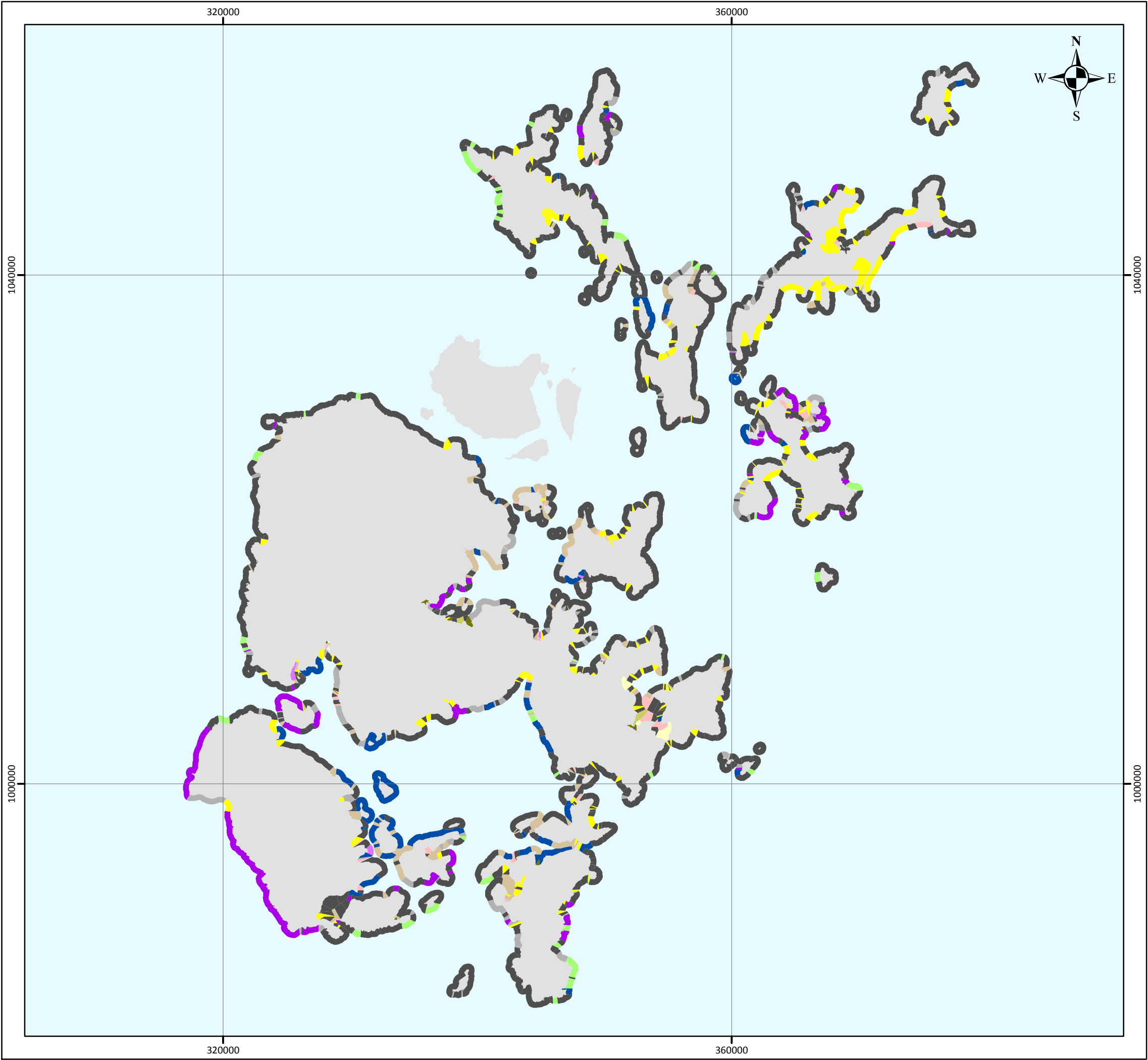
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Figure B-25: Intertidal Substrate Foreshore

- Legend**
- Intertidal Substrate Foreshore**
- Boulders / Loose Rock
  - Gravel
  - Man Made
  - Mud
  - Mud & Gravel
  - Not Present
  - Rock Platform
  - Rock Platform with Banks of Gravel
  - Rock Platform with Boulders/Loose Rock
  - Sand
  - Sand & Gravel
  - Sand & Mud
  - Unspecified



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## B.9 AIR

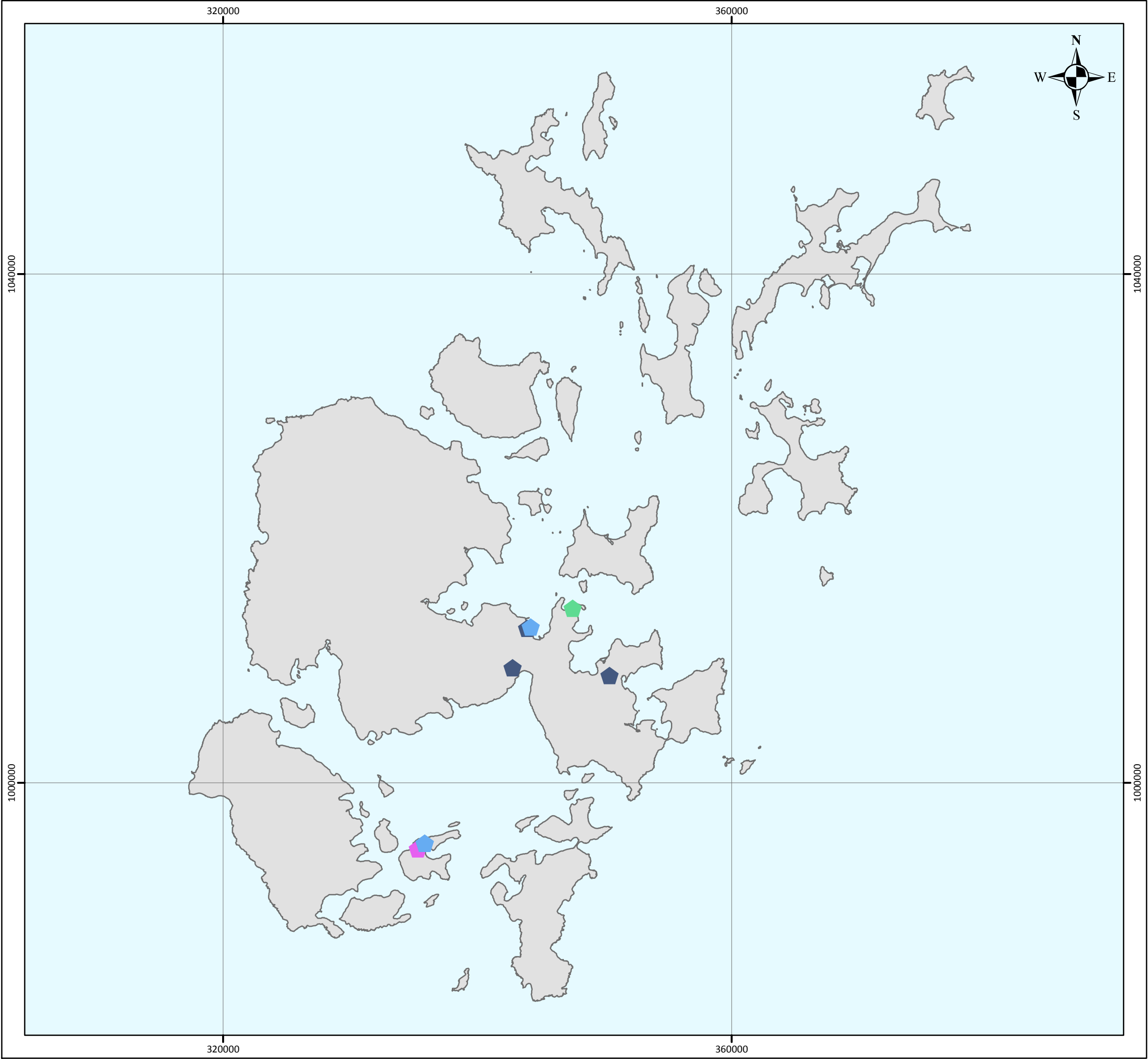
The Environment Act 1995 requires local authorities to assess that air quality in the area complies with the National Air Quality Strategy for England, Scotland, Wales and Northern Ireland 2000 (NAQS) standards and objectives (Orkney Islands Council 2008b). Orkney Island Council must also comply with regulations from the Air Quality (Scotland) Regulations 2000 and Air Quality (Scotland) Amendment Regulations 2002.

Since 1997, all local authorities in the UK are required to assess and review the air quality of the area. Orkney is not an Air Quality Management Area (AQMA) as the air quality of the area meets the national air quality objectives set out by the EU (DEFRA 2012c).

The air quality is indicated by concentrations of gases which are potentially harmful to human health (carbon monoxide, nitrogen oxides, sulphur dioxide, and volatile organic compounds (VOC)). Particulate material (PM) is not considered as the majority of PM offshore is likely to be of marine origin (Fuzzi *et al.* 2015). Concerns relating to air quality are primarily attributed to emissions from road and rail transport and land-based industries, as these are the main sources of harmful; combustion products onshore (Defra 2011).

The UK mainland air quality has been steadily improving since 1990 due to a heightened awareness of climate change and health issues associated with poor quality air; resulting in a reduction (46% and 82% respectively) of NO<sub>x</sub> and SO<sub>2</sub> emissions due to reduced emissions from road transport and power stations (Dore *et al.* 2008). Levels of primary atmospheric pollutants tend to be highest close to their sources i.e. in urban and industrial areas. The Lerwick monitoring station (on the Shetland Isles and designated as a Rural Background site) is likely to provide a reasonable indication of the current levels of airborne contaminants to be found over the adjacent North Sea. Data for this site indicates that contamination levels are low (Defra 2015). It would be expected that Orkney would also have low contamination levels.

There are seven air release sites in Orkney as seen in Figure B-26. These are made up of one radioactive substance site, two pollution prevention and control site and one sewage treatment site. The remaining sites consist of multiple sources such as recycling centres and waste transfer stations.



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Figure B-26: Orkney Islands Air Releases

Legend

Air Releases (Type)

- Pollution Prevention and Control Single
- Radioactive Substances Single
- Sewage Treatment Works Multiple
- Other Multiple



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## B.10 LANDSCAPE

### 6.5 Landscape Character Assessment

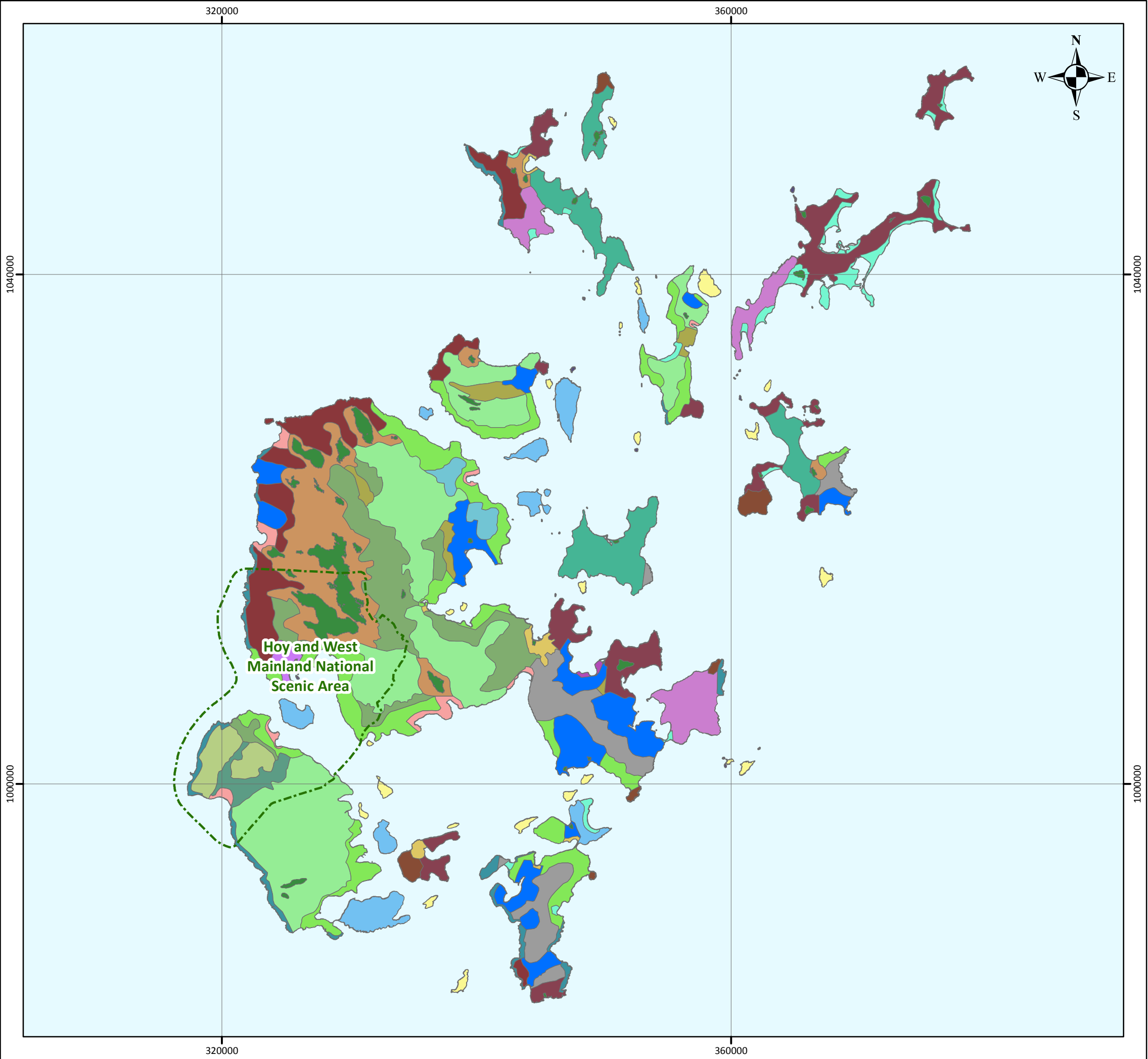
The Orkney Islands have a predominantly low and gentle relief, there is also a general lack of trees and woodland cover. The landscape supports large areas of productive pastures and some arable farming. The higher areas are characterised by their heather moorland cover which contrasts to the pastoral greens of the lower ground. On the western coastline of Orkney there are cliffs up to 300m high, while many of the lower areas contain shallow lochs and bays (Land Use Consultants, 1998).

There are 26 different landscape character types on Orkney. These are shown in Figure B-27 and listed below.

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

Part of the Orkney Islands is designated as a National Scenic Area (NSA), this is known as Hoy and West Mainland National Scenic Area and is shown on Figure B-27. 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 area covers parts of the islands of Hoy and Orkney Mainland, as well as parts of the surrounding sea. In addition there are a number of designated Gardens and Landscapes in the area, these are described in more detail in Section B.7.

In recent years more development has resulted in a number of changes to the landscape in Orkney, any new developments created through the Orkney Harbours Masterplan process should be appropriately sited and designed in relation to the surrounding landscape.



ORKNEY HARBOURS PORT  
MASTERPLAN 2020-2040

Figure B-27: Landscape

Legend

National Scenic Area

Landscape Character

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



NOTE: Not to be used for Navigation

Date	Thursday, February 21, 2019 11:32:07
Projection	British_National_Grid
Spheroid	Airy_1830
Datum	D_OSGB_1936
Data Source	OSOD; ESRI; SNH; SG;
File Reference	J:\P2214\Mxd\Report\Environmental_Report\AppB\B-27_Landscape.mxd
Created By	Chris Goode
Reviewed By	Emma Langley
Approved By	Beth Monkman



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# Appendix C

## Full Assessment Results

### Assessment Key

A high level assessment of each proposal identified in the Orkney Harbours Masterplan against each SEA objectives was made using the following scale. This provides a key for the assessment tables. It is important to note that limited information about each option is known at this stage, such as project design, construction methodology, material to be used and timing. It is anticipated that a more detailed environmental assessment will be undertaken at the project level.

**Table C-1 Significance Criteria for Assessment**

Significance of Effect	Description of Effect Significance
<b>Substantially supports SEA objective</b>	Is considered significant, e.g. beneficial impacts are substantial, substantially accelerate an improving trend, substantially decelerate a declining trend, substantially support delivery of a declared objective.
<b>Supports SEA objective</b>	but not to a significant extent, e.g. beneficial impacts are not substantial, do not substantially accelerate an improving trend, do not substantially decelerate a declining trend, do not substantially support from delivery of a declared objective
<b>Neutral contribution to SEA objective</b>	either no impacts or on balance (taking account of positive and negative impacts) a neutral contribution.
<b>Detracts from SEA objective</b>	but not to a significant extent, e.g. adverse impacts are not substantial, do not substantially decelerate an improving trend, do not substantially accelerate a declining trend, do not substantially detract from delivery of a declared objective.
<b>Substantially detracts from SEA objective</b>	is considered significant, e.g. adverse impacts are substantial, substantially decelerate an improving trend, substantially accelerate a declining trend, substantially detract from delivery of a declared objective.

Some definitions are included for reference:

- **Direct effects:** Direct impacts represent for example loss of habitat, changes in water quality, changes in biodiversity abundances or loss of resources.
- **Indirect effects:** effects on the environment, which are not a direct result of the activities of the project, often produced away from or as a result of a complex pathway.
- **Irreversible:** an effect which is likely to be permanent, effects that cannot be undone even through remediation and the resource cannot turn to its original state.
- **Reversible:** an effect which is temporary and effects that can be undone, for example through remediation or restoration.

## C.1 SCAPA PIER

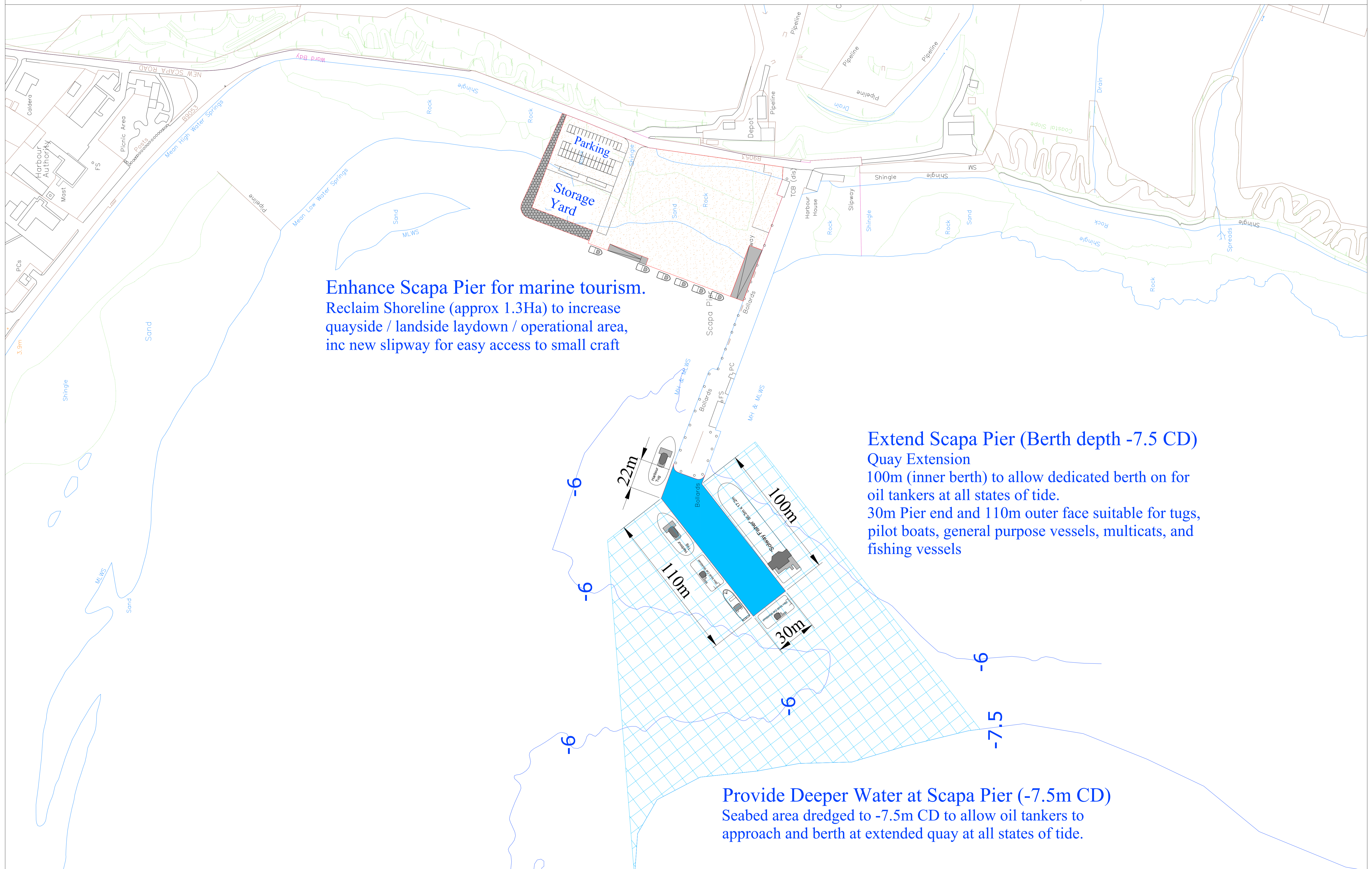
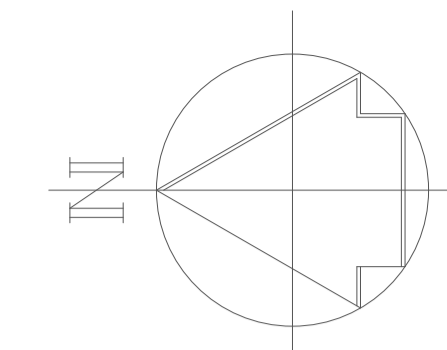
### C.1.1 Project Description

Scapa Pier is a key component of Orkney's critical infrastructure. As well as supporting Flotta Oil Terminal activities, STS and rig stacking/maintenance; it is the single point of entry for Orkney's entire supply of domestic and commercial fuels.

- The existing Scapa Pier would be lengthened by approximately 100m, and dredging would provide deeper water.
- The footprint of the dredged area of seabed is expected to be 0.041 km<sup>2</sup>.
- Through reclamation, an area adjacent to the shore would be made available for operational use, storage and/or parking. Several berths for marina use and a small slipway to service these would be incorporated - this could be a suitable location for vessels offering marine tours in Scapa Flow, for example.

The current proposed layout is shown in Figure C-1.

# SCAPA PIER



Enhance Scapa Pier for marine tourism.  
Reclaim Shoreline (approx 1.3Ha) to increase  
quayside / landside laydown / operational area,  
inc new slipway for easy access to small craft

Extend Scapa Pier (Berth depth -7.5 CD)  
Quay Extension  
100m (inner berth) to allow dedicated berth on for  
oil tankers at all states of tide.  
30m Pier end and 110m outer face suitable for tugs,  
pilot boats, general purpose vessels, multicats, and  
fishing vessels

Provide Deeper Water at Scapa Pier (-7.5m CD)  
Seabed area dredged to -7.5m CD to allow oil tankers to  
approach and berth at extended quay at all states of tide.

## C.1.2 Assessment

SEA Proposal		Proposal: Scapa Pier	
Topic	SEA Objective	Significance	Potential Impact and justification of Significance ranking
Air	1. To maintain or improve air quality and reduce emissions of key pollutants.	Detracts	Construction Phase: <ul style="list-style-type: none"> <li>Degradation of air quality impacting local communities and ecological receptors, through dust and emissions from construction traffic and plant (direct, short-term and reversible impact).</li> </ul>
			Operation Phase: <ul style="list-style-type: none"> <li>Degradation of air quality impacting local communities and ecological receptors, through additional traffic (marine and road) and increased emissions (direct, long-term and reversible).</li> </ul> <p>Low population, rural setting (less than 50 houses within 1 km radius) - resulting in limited impacts on communities. Degradation of air quality is likely to be localized and therefore unlikely to affect ecological receptors. Detract against objective, but not to significant extent.</p>
Biodiversity, Flora and Fauna	2. Avoid damage to the biodiversity, flora and fauna within the vicinity of the Orkney Islands.	Substantially detracts	Construction Phase: <ul style="list-style-type: none"> <li>Noise and visual impact resulting in disturbance to marine mammals and birds (direct, short-term and reversible).</li> <li>Impacts on designated sites (within Scapa Flow pSPA) and their conservation objectives (direct, short-term and reversible).</li> <li>Loss/disturbance of habitat (e.g. seagrass beds and benthic communities) due to reclamation on shoreline and pier extension (direct, long-term and irreversible).</li> <li>Reduction in prey available for seabirds from dredging activities (indirect, short-term and reversible).</li> <li>Degradation of water quality through small accidental release of fuel and associated impacts on flora and fauna (indirect, medium- term and reversible).</li> </ul>
			Operation Phase: <ul style="list-style-type: none"> <li>Potential for future maintenance dredging for vessel access, leading to reduction in prey available for seabirds (indirect, short-term and reversible).</li> <li>Increased marine traffic leading to an increased risk of collision with marine mammals (direct, short-term (population level) and reversible (population level)).</li> <li>Noise and visual impact resulting in disturbance to marine mammals and birds (direct, long-term and irreversible).</li> <li>Degradation of water quality and associated impacts on flora and fauna, through small accidental release from tanker (worse case - loss of full containment) (direct, long-term and reversible).</li> </ul> <p>Due to presence of cetaceans and other European Protected Species (EPS) and seagrass bed habitats within the vicinity of the development, this substantially detracts from SEA objective.</p>

SEA Proposal		Proposal: Scapa Pier	
Topic	SEA Objective	Significance	Potential Impact and justification of Significance ranking
Climatic Factors	3. Prevent introduction of new invasive species into the Orkney Islands.	<b>Detracts</b>	Construction Phase: <ul style="list-style-type: none"> <li>Potential introduction of invasive species through ballast water release and hull fouling (construction vessels) impacting local species and habitats (direct, long-term and irreversible).</li> </ul>
			Operation Phase: <ul style="list-style-type: none"> <li>Potential introduction of invasive species through hull fouling (import tankers) impacting local species and habitats (direct, long-term and irreversible). It is assumed that ballast water will not be operationally released.</li> </ul> Detracts from SEA objective, but not to a significant extent because construction vessels and import tankers likely to be from UK.
	4. Minimise greenhouse gases emissions and the Port's carbon footprint.	<b>Detracts</b>	Construction and operational activities leading to increased greenhouse gas emissions, adding to existing carbon footprint (direct, long-term, reversible). Therefore, detracts from SEA objective.
Cultural Heritage	5. Prevent damage to or loss of heritage features including maritime heritage.	<b>Neutral</b>	There is no known maritime heritage within the proposed development or close proximity. Limited change to cultural setting due to extension of existing facilities, therefore no impacts on SEA objective.
Landscape	6. Protect the landscape/seascape character and visual amenity in the vicinity of the area.	<b>Detracts</b>	Minimal impact on visual amenities to local populations and recreational users (direct, long-term and reversible). Landscape classes as Plateau Heaths and Pasture. Limited alteration to seascape as extension of existing facilities. Detracts from SEA objective, but adverse impacts are not likely to be substantial.
Material Assets	7. Promote the sustainable use and management of material assets.	<b>Substantially supports</b>	Proposal will protect and enhance existing assets, ensuring sustainable use. Therefore, substantially supports SEA objective.
	8. To meet the objectives of the Zero Waste Plan.	<b>Detracts</b>	Construction Phase: <ul style="list-style-type: none"> <li>Additional waste created during construction and requirement to provide additional facilities for waste disposal for vessels and personnel (direct, long-term and irreversible).</li> <li>Potential to meet objectives of the Zero Waste Plan, if waste materials are recyclable or re-usable. Possible exception if contaminated seabed sediments encountered during dredging operations (Direct, short-term and reversible).</li> </ul>

SEA Proposal		Proposal: Scapa Pier	
Topic	SEA Objective	Significance	Potential Impact and justification of Significance ranking
Human Health Population and		Detracts	<p>Operation Phase:</p> <ul style="list-style-type: none"> <li>Contaminated seabed sediments from maintenance dredging operations (if encountered), may require treatment as special waste (direct, short-term and reversible).</li> </ul> <p>Detracts from SEA objective, but adverse impacts are not likely to be substantial.</p>
	9. Improve the safety record of the harbours and improve safety for the sea users.		<p>Increased construction and operational vessels leading to higher risk of collision (direct, long-term and reversible).</p> <p>Extension of the pier creates increased physical barrier, which could impact navigation and lead to increase accidents (direct, long-term and reversible).</p> <p>Increased vessels leading to potential for increased accidents and incidents.</p> <p>Detracts from SEA objective but adverse impacts are not likely to be substantial due to extension of existing facility.</p>
	10. Protect and improve human health and wellbeing through improved environmental quality.	Neutral	<p>Degradation of air quality on local communities, through dust and emissions during construction (direct, short-term and reversible) and through additional traffic (marine and road) and increased emissions (direct, long-term and reversible).</p> <p>Potential for local job opportunities during construction and operation (direct, long-term and reversible).</p> <p>Increased recreation in line with objective to use facility as base for marine tours (direct, long-term and reversible).</p> <p>Potential visual and noise impacts on local communities during construction and operations (direct, long-term and reversible).</p> <p>On balance a neutral contribution to SEA objective.</p>
Soils	11. Maintain or improve soil quality and prevent any further degradation of soils.	Detracts	<p>Potential impacts on coastal processes, leading to changes in wave climate and leading to coastal erosion (direct, long-term and irreversible).</p> <p>Reclamation of the shoreline would lead to land use change (minor footprint) (direct, long-term and irreversible).</p> <p>Introduction of additional pollution sources (primarily vessels) could lead to contamination of the seabed (direct, medium-term and reversible).</p> <p>Detracts from SEA objective, but adverse impacts are not likely to be substantial.</p>
Water	12. Protect and enhance the state of the water environment.	Detracts	<p>Construction Phase:</p> <ul style="list-style-type: none"> <li>Potential degradation of water quality through dredging activities (direct, short-term and reversible).</li> <li>Potential degradation of water quality through small accidental release of fuel (direct, medium-term and reversible).</li> <li>Potential re-suspension of contaminated seabed sediments from dredging operations impacting water quality (direct, medium-term and reversible).</li> <li>Presence of extended pier leading localised changes in hydrodynamics and morphological changes to the water body (direct, long-term and irreversible).</li> </ul>

SEA Proposal		Proposal: Scapa Pier	
Topic	SEA Objective	Significance	Potential Impact and justification of Significance ranking
			<p>Operation Phase:</p> <ul style="list-style-type: none"> <li>▪ Potential for future maintenance dredging for vessel access, impacting water quality (indirect, short-term and reversible).</li> <li>▪ Degradation of water quality through small accidental release from tanker (worse case -loss of full containment) (direct, long-term and reversible).</li> <li>▪ Contaminated seabed sediments from maintenance dredging operations (if encountered), may require treatment as special waste (direct, short-term and reversible).</li> </ul> <p>Detracts from SEA objective, but adverse impacts are not likely to be substantial.</p>

## C.2 KIRKWALL

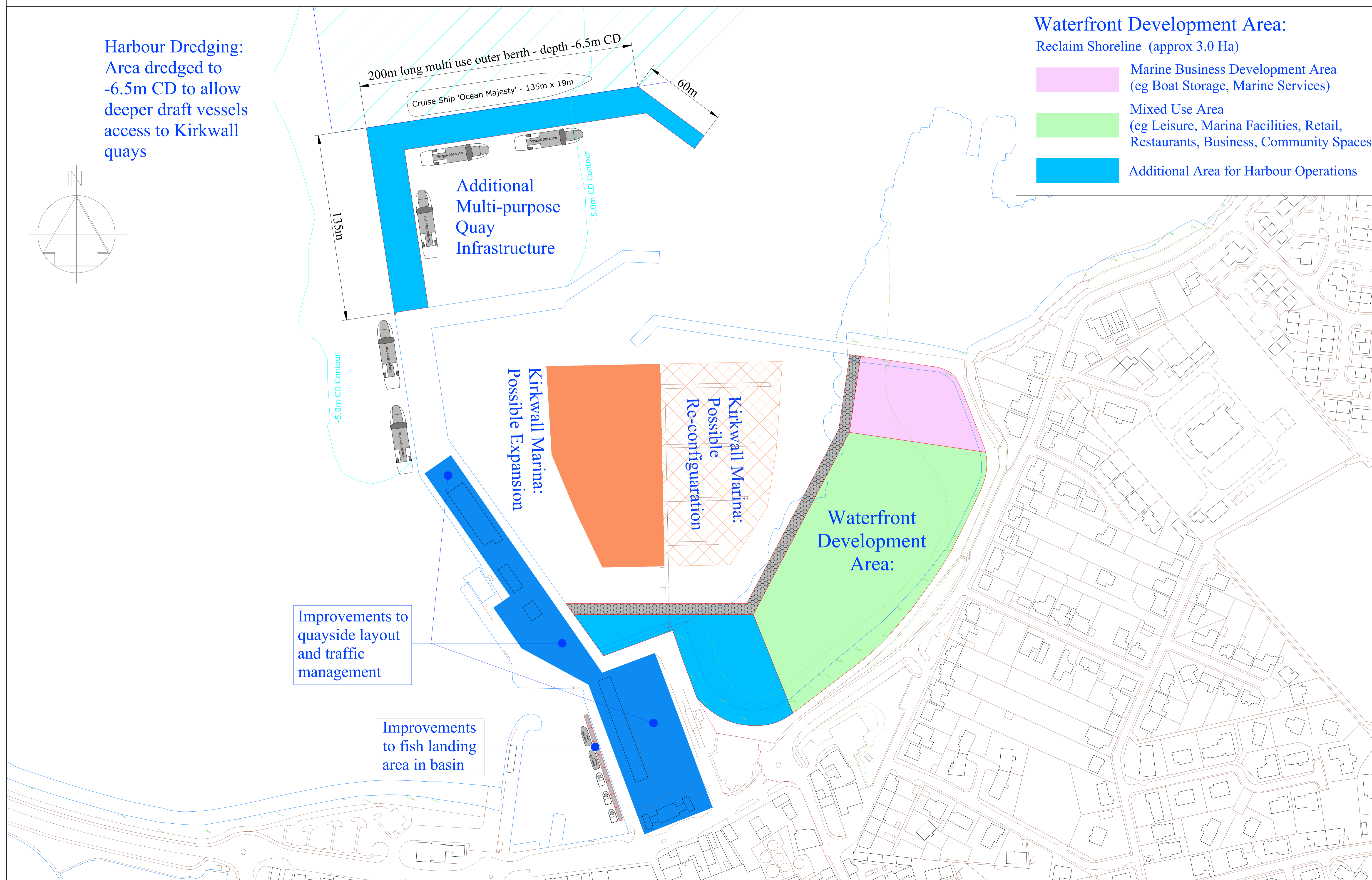
### C.2.1 Project Description

The plan for Kirkwall Pier is focussed on improving usability and efficiency of berths and quayside infrastructure, improving visual amenity, improving safety and better management of traffic and pedestrian movements.

Core proposals comprise new quayside infrastructure, a waterfront development area and marina expansion, as well as improvements to traffic management and facilities on the quayside.

- 200m of new multi-purpose quayside will be constructed to the north of the existing pier, with water depth of -6.5m CD.
- A waterfront development area (approximately 27,500 square metres) will be created through reclamation shoreside of the marina, for a range of uses/facilities. In addition the marina will be expanded significantly, potentially doubling the current number of berths.
- The entire layout of Kirkwall Pier, in terms of buildings, facilities and traffic management will be reviewed and remodelled. It is anticipated that some buildings will be demolished or moved, or that there may be new buildings or facilities constructed.
- Working with key stakeholders in the fishing industry, improvements are planned for the fish landing area at Kirkwall.
- The footprint of the dredged area of seabed at Kirkwall is expected to be approximately 0.155 km<sup>2</sup>

The current proposed layout is shown in Figure C-2.



## C.2.2 Assessment

SEA Proposal		Proposal: Kirkwall	
Topic	SEA Objective	Significance	Potential Impact and Justification of Significance Ranking
Air	1. To maintain or improve air quality and reduce emissions of key pollutants.	Detracts	<p>Construction Phase:</p> <ul style="list-style-type: none"> <li>Degradation of air quality impacting local communities and ecological receptors, through dust and emissions from construction traffic and plant (direct, short-term and reversible impact).</li> </ul>
			<p>Operation Phase:</p> <ul style="list-style-type: none"> <li>Degradation of air quality impacting local communities and ecological receptors, through additional traffic (marine and road) and increased emissions (direct, long-term and reversible).</li> </ul> <p>High population, urban setting - resulting in moderate impacts on communities. Degradation of air quality is likely to be localized and therefore unlikely to affect ecological receptors. Detract against objective, but not to significant extent.</p>
Biodiversity, Flora and Fauna	2. Avoid damage to the biodiversity, flora and fauna within the vicinity of the Orkney Islands.	Substantially detracts	<p>Construction Phase:</p> <ul style="list-style-type: none"> <li>Noise and visual impact resulting in disturbance to marine mammals and birds (direct, short-term and reversible).</li> <li>Impacts on designated sites (within North Orkney pSPA) and their conservation objectives (direct, short-term and reversible).</li> <li>Loss/disturbance of habitat due to reclamation on shoreline and pier extension (e.g. benthic communities) – (direct, long-term and irreversible).</li> <li>Reduction in prey available for seabirds from dredging activities (indirect, short-term and reversible).</li> <li>Degradation of water quality through small accidental release of fuel and associated impacts on flora and fauna (indirect, medium- term and reversible).</li> </ul>
			<p>Operation Phase:</p> <ul style="list-style-type: none"> <li>Potential for future maintenance dredging for vessel access, leading to reduction in prey available for seabirds (indirect, short-term and reversible).</li> <li>Increased marine traffic leading to an increased risk of collision with marine mammals (direct, short-term (population level) and reversible (population level)).</li> <li>Noise and visual impact resulting in disturbance to marine mammals and birds (direct, long-term and irreversible).</li> <li>Degradation of water quality through small accidental release from vessel (worse case - loss of full inventory) and associated impacts on flora and fauna (direct, long-term and reversible).</li> </ul> <p>Detracts from SEA objective, but not to a significant extent.</p>

SEA Proposal		Proposal: Kirkwall	
Topic	SEA Objective	Significance	Potential Impact and Justification of Significance Ranking
Factors	3. Prevent introduction of new invasive species into the Orkney Islands.	Detracts	Construction Phase: <ul style="list-style-type: none"> <li>Potential introduction of invasive species through ballast water release and hull fouling (construction vessels) impacting local species and habitats (direct, long-term and irreversible).</li> </ul>
			Operation Phase: <ul style="list-style-type: none"> <li>Potential introduction of invasive species through hull fouling and ballast water release impacting local species and habitats (direct, long-term and irreversible).</li> </ul> Detracts from SEA objective, but not significantly because construction vessels and vessels likely to be from UK.
	4. Minimise greenhouse gases emissions and the Port's carbon footprint.	Detracts	Construction and operational activities leading to increased greenhouse gas emissions, adding to existing carbon footprint (direct, long-term, reversible). Therefore, detracts from SEA objective.
	5. Prevent damage to or loss of heritage features including maritime heritage.	Detracts	There is no known maritime heritage within the proposed development. Development will be located in the vicinity of the Kirkwall Conservation Area. Core proposals include improving visual amenity. Sympathetic development of the area will ensure impacts on the conservation area are kept to a minimum (direct, long-term and irreversible). Limited change to cultural setting due to extension of existing facilities. Detracts from SEA objective, but adverse impacts are not likely to be substantial.
	6. Protect the landscape/seascape character and visual amenity in the vicinity of the area.	Detracts	Alteration to seascape due to extension of quayside and new waterfront development. Minimal impact on visual amenities to local populations and recreational users as the project is within an Urban Development landscape area. However, shore views for residents will be affected (Direct, long-term and irreversible). Therefore, detract from SEA objective but not substantially.
Material Assets	7. Promote the sustainable use and management of material assets.	Substantially supports	Proposal will be protecting and enhancing existing assets, ensuring and improving sustainable use, therefore substantially supports SEA objective.

SEA Proposal		Proposal: Kirkwall	
Topic	SEA Objective	Significance	Potential Impact and Justification of Significance Ranking
	8. To meet the objectives of the Zero Waste Plan.	<b>Detracts</b>	<p>Development will lead to additional waste being created due to construction and requirement to provide additional facilities for waste disposal for vessels and personnel (direct, long-term and irreversible).</p> <p>Potential to meet objectives of the Zero Waste Plan, if waste materials are recyclable or re-usable. Possible exception if contaminated seabed sediments encountered during dredging operations (Direct, short-term and reversible).</p> <p>Demolition of buildings during construction will create waste, that will require specialist facilities (direct, short-term and reversible).</p> <p>Increased users of the development area (e.g. restaurant, retail and businesses) would create more waste (direct, long-term and irreversible). If recycling and re-use is promoted this will lead to the potential to meet the objectives of the Zero Waste Plan.</p> <p>Detracts from SEA objective, but adverse impacts are not likely to be substantial.</p>
Population and Human Health	9. Improve the safety record of the harbours and improve safety for the sea users.	<b>Neutral</b>	<p>Increased vessels during construction and operational, leading to higher risk of collision (direct, long-term and reversible).</p> <p>Increased vessels leading to potential for increased accidents and incidents.</p> <p>Core proposal focuses on improving safety of the Kirkwall Pier. This supports the SEA objective.</p> <p>Extension of the quayside creates increased physical barrier, which could impact navigation and lead to increase accidents (direct, long-term and irreversible). However, due to the enclosed nature of the Kirkwall harbour, this is unlikely to result in adverse impacts that would detract from SEA objective, therefore on balance a neutral contribution to SEA objective.</p>
	10. Protect and improve human health and wellbeing through improved environmental quality.	<b>Neutral</b>	<p>Methods to improve pedestrian and traffic movement will lead to improvement in safety and wellbeing of residents and visitors (direct, long-term and irreversible).</p> <p>Proposal designed to protect key industries, such as fishing. This will lead to positive impact on human wellbeing (direct, long-term and irreversible).</p> <p>Marina improvement and waterfront development area will lead positive impacts on the SEA objective due to increased tourism and recreation (direct, long-term and irreversible).</p> <p>Degradation of air quality on local communities, through dust and emissions during construction (direct, short-term and reversible) and through additional traffic (marine and road) and increased emissions (direct, long-term and reversible).</p> <p>Potential for local job opportunities during construction and operation, in mixed industries (direct, long-term and reversible).</p> <p>High population, urban setting - resulting in moderate impacts on communities however on balance a neutral contribution to SEA objective.</p>

SEA Proposal		Proposal: Kirkwall	
Topic	SEA Objective	Significance	Potential Impact and Justification of Significance Ranking
Soils	11. Maintain or improve soil quality and prevent any further degradation of soils.	<b>Detracts</b>	<p>Potential impacts on coastal processes, leading to changes in wave climate (direct, long-term and irreversible). This is not considered likely to lead to coastal erosion in the area, as mostly rocky foreshore.</p> <p>Reclamation of the shoreline would lead to land use change (minor footprint) (direct, long-term and irreversible).</p> <p>Introduction of additional pollution sources (primarily vessels) could lead to contamination of the seabed (direct, medium-term and reversible).</p> <p>Detracts from SEA objective, but adverse impacts are not likely to be substantial.</p>
Water	12. Protect and enhance the state of the water environment.	<b>Detracts</b>	<p>Construction Phase:</p> <ul style="list-style-type: none"> <li>▪ Potential degradation of water quality through dredging activities (direct, short-term and reversible).</li> <li>▪ Potential degradation of water quality through small accidental release of fuel from plant e.g. generator (direct, medium-term and reversible).</li> <li>▪ Potential re-suspension of contaminated seabed sediments from dredging operations impacting water quality (direct, medium-term and reversible).</li> <li>▪ Pier extension will lead to localised changes in hydrodynamics (direct, long-term and irreversible).</li> </ul> <p>Operation Phase:</p> <ul style="list-style-type: none"> <li>▪ Potential for future maintenance dredging for vessel access, impacting water quality (indirect, short-term and reversible).</li> <li>▪ Degradation of water quality through small accidental release from vessels (worse case - loss of full inventory) (direct, long-term and reversible).</li> <li>▪ Contaminated seabed sediments from maintenance dredging operations (if encountered), may require treatment as special waste (direct, short-term and reversible).</li> <li>▪ New quayside and waterfront development could lead to increased risk of coastal flooding (indirect, long-term and irreversible).</li> </ul> <p>Detracts from SEA objective, but adverse impacts are not likely to be substantial.</p>

## C.3 SCAPA DEEP WATER PIER

### C.3.1 Project Description

There is no deep water pier infrastructure in Scapa Flow located on the Orkney mainland coast. As part of the option development, consideration has been given to possible locations for deep water quayside infrastructure in proximity to the existing Scapa Pier, with a suitable site identified south of Scapa Pier.

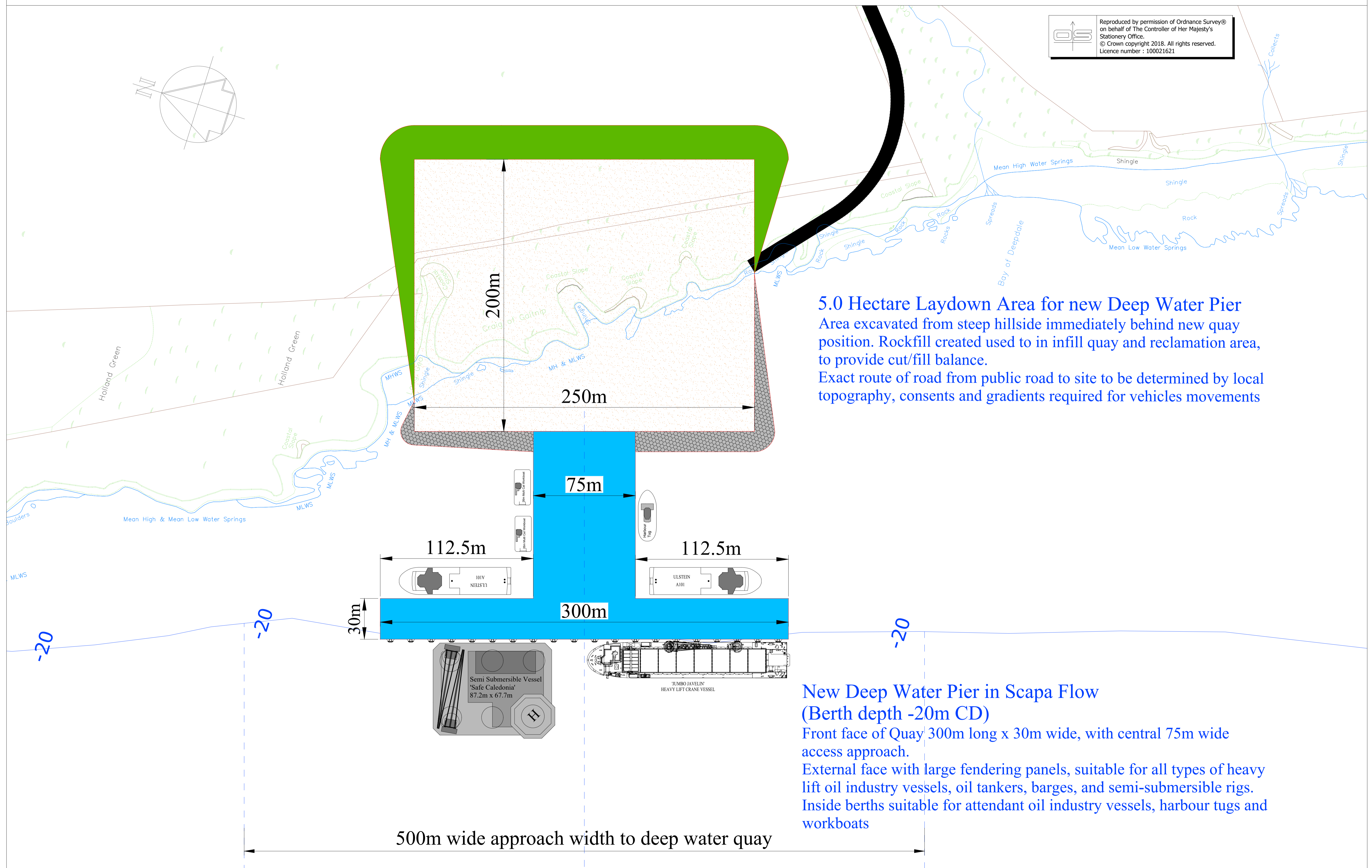
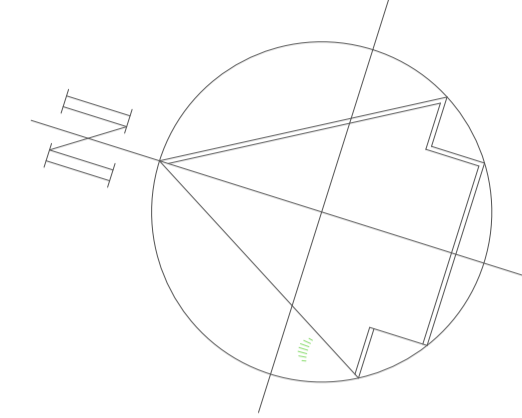
- This comprises 250m quayside with water depth of approximately -20m CD, 75m wide approach quay with 50,000 square metres of landside area serviced by 1070m length access road from east above site location.
- The main purpose of this facility would be to undertake any/multiple industry activity that requires both deep-water berthing and large laydown area adjacent. There are specific market opportunities in the offshore wind and oil and gas sectors.

The current proposed layout is shown in Figure C-3.

# SCAPA DEEP WATER QUAY



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**5.0 Hectare Laydown Area for new Deep Water Pier**  
Area excavated from steep hillside immediately behind new quay position. Rockfill created used to in fill quay and reclamation area, to provide cut/fill balance.  
Exact route of road from public road to site to be determined by local topography, consents and gradients required for vehicles movements

**New Deep Water Pier in Scapa Flow**  
(Berth depth -20m CD)  
Front face of Quay 300m long x 30m wide, with central 75m wide access approach.  
External face with large fendering panels, suitable for all types of heavy lift oil industry vessels, oil tankers, barges, and semi-submersible rigs.  
Inside berths suitable for attendant oil industry vessels, harbour tugs and workboats

### C.3.2 Assessment

SEA Proposal		Proposal: Scapa Deep Water Pier	
Topic	SEA Objective	Significance	Potential Impact and Justification of Significance Ranking
Air	1. To maintain or improve air quality and reduce emissions of key pollutants.	Detracts	Construction Phase: <ul style="list-style-type: none"> <li>Degradation of air quality impacting local communities and ecological receptors, through dust and emissions from construction traffic and plant (direct, short-term and reversible impact).</li> </ul>
			Operation Phase: <ul style="list-style-type: none"> <li>Degradation of air quality impacting local communities and ecological receptors, through new traffic (marine and road) and increased emissions (direct, long-term and reversible).</li> </ul> <p>Low population, rural setting (less than 50 houses within 2 km radius) - resulting in limited impacts on communities. Degradation of air quality is likely to be localized and therefore unlikely to affect ecological receptors. Detract against objective, but not to significant extent.</p>
Biodiversity, Flora and Fauna	2. Avoid damage to the biodiversity, flora and fauna within the vicinity of the Orkney Islands.	Substantially detracts	Construction Phase: <ul style="list-style-type: none"> <li>Noise and visual impact resulting in disturbance to marine mammals and birds (direct, short-term and reversible).</li> <li>Impacts on designated sites (within Scapa Flow pSPA) and their conservation objectives (direct, short-term and reversible).</li> <li>The proposed development is located within the Gaitnip Hill Local Nature Conservation (LNC) Area, the development will also include a road crossing the LNC. The site supports nationally important habitats and species (including maritime cliff and slope, upland heath, hen harrier and short-eared owl. Habitats would be lost, and species disturbed (direct, long-term and irreversible).</li> <li>Loss/disturbance of habitat due to reclamation on shoreline, quay side development and service road (direct, long-term and irreversible).</li> <li>Degradation of water quality through small accidental release of fuel and associated impacts on flora and fauna (indirect, medium-term and reversible).</li> </ul>
			Operation Phase: <ul style="list-style-type: none"> <li>Increased marine traffic leading to an increased risk of collision with marine mammals (direct, short-term (population level) and reversible (population level)).</li> <li>Noise and visual impact resulting in disturbance to marine mammals and birds (direct, long-term and irreversible).</li> <li>Degradation of water quality through small accidental release vessel (worst case - loss of full inventory) and associated impacts on flora and fauna (direct, long-term and reversible).</li> </ul>

SEA Proposal		Proposal: Scapa Deep Water Pier	
Topic	SEA Objective	Significance	Potential Impact and Justification of Significance Ranking
Factors			Substantially detracts from SEA objective due to irreversible loss of habitats and impacts on species supported by these habitats and presence of EPS.
	3. Prevent introduction of new invasive species into the Orkney Islands.	Detracts	<p>Construction Phase:</p> <ul style="list-style-type: none"> <li>Potential introduction of invasive species through ballast water release and hull fouling (construction vessels) impacting local species and habitats (direct, long-term and irreversible).</li> </ul> <p>Operation Phase:</p> <ul style="list-style-type: none"> <li>Potential introduction of invasive species through hull fouling and ballast water impacting local species and habitats (direct, long-term and irreversible).</li> </ul> <p>Detracts from SEA objective, but not significantly because construction vessels and vessels likely to be from UK.</p>
	4. Minimise greenhouse gases emissions and the Port's carbon footprint.	Detracts	Construction and operational activities leading to increased greenhouse gas emissions where previously no emissions occurred, adding to existing carbon footprint (direct, long-term, reversible). Therefore, detracts from SEA objective.
	5. Prevent damage to or loss of heritage features including maritime heritage.	Detracts	<p>HMS Royal Oak protected war grave wreck is within the vicinity of the proposed development. This has an exclusion zone of 200m and the development will be a minimum of 1 km away. Therefore no impact perceived.</p> <p>Introduction of infrastructure leading to change in the cultural setting. Detracts from SEA objective, but adverse impacts are not likely to be substantial.</p>
	6. Protect the landscape/seascape character and visual amenity in the vicinity of the area.	Substantially detracts	<p>Landscape classed as Inclined Coastal Pastures. Major alteration to landscape/seascape due to creation of new facility in previously rural setting (direct, long-term and irreversible).</p> <p>Major impact on visual amenity of the area during construction (direct, short-term and reversible) and during operation of new facility (direct, long-term and irreversible).</p> <p>Substantially detracts from SEA objective as adverse impacts are likely to be substantial.</p>
	7. Promote the sustainable use and management of material assets.	Neutral	Creation of new facility does not support SEA objective; however it does not detract, therefore leading to a neutral contribution on the SEA objective.
	8. To meet the objectives of the Zero Waste Plan.	Detracts	<p>Development of a new facility will lead to additional waste being created during construction and will require provision of additional facilities for waste disposal for vessels and personnel during operation (direct, long-term and irreversible).</p> <p>Detracts from SEA objective but adverse impacts are not likely to be substantial.</p>

SEA Proposal		Proposal: Scapa Deep Water Pier	
Topic	SEA Objective	Significance	Potential Impact and Justification of Significance Ranking
Human Health and Population	9. Improve the safety record of the harbours and improve safety for the sea users.	<b>Detracts</b>	<p>Increased construction and operational vessels leading to higher risk of collision (direct, long-term and reversible).</p> <p>Creation of quay creates physical barrier, which could impact navigation and lead to increase accidents (direct, long-term and reversible).</p> <p>Increased vessels leading to potential for increased accidents and incidents.</p> <p>Addition of new facility which will facility number of different industries and may cause increased health and safety issues to regulate.</p> <p>Detracts from SEA objective, but adverse impacts are not likely to be substantial.</p>
	10. Protect and improve human health and wellbeing through improved environmental quality.	<b>Detracts</b>	<p>Degradation of air quality on local communities, through dust and emissions during construction (direct, short-term and reversible) and through additional traffic (marine and road) and increased emissions (direct, long-term and reversible).</p> <p>Potential for local job opportunities during construction and operation (direct, long-term and reversible).</p> <p>Potential visual and noise impacts on local communities during construction and operations (direct, long-term and reversible).</p> <p>Detracts from SEA objective but adverse impacts are not likely to be substantial.</p>
Soils	11. Maintain or improve soil quality and prevent any further degradation of soils.	<b>Substantially detracts</b>	<p>Potential impacts on coastal processes, leading to changes in wave climate and leading to coastal erosion and landslips (direct, long-term and irreversible). The shoreline contains steep clay banks and the area often experiences landslips, therefore the area is at risk of damage from storm waves.</p> <p>Reclamation of the shoreline and loss of pastures habitat would lead to land use change (minor footprint) (direct, long-term and irreversible). Foreshore here is rocky.</p> <p>Disturbance to and loss of peat lands (direct, long-term and irreversible)..</p> <p>Introduction of new pollution sources (primarily vessels) could lead to contamination of the seabed (direct, medium-term and reversible).</p> <p>Substantially detracts from SEA objective because of changes to soil and land use.</p>
Water	12. Protect and enhance the state of the water environment.	<b>Detracts</b>	<p>Construction Phase:</p> <ul style="list-style-type: none"> <li>Potential degradation of water quality through small accidental release of fuel from plant e.g. generator (direct, medium-term and reversible).</li> <li>Presence of new pier may cause localised changes in hydrodynamics and morphological changes to the water body (direct, long-term and irreversible).</li> </ul>

SEA Proposal		Proposal: Scapa Deep Water Pier	
Topic	SEA Objective	Significance	Potential Impact and Justification of Significance Ranking
			<p>Operation Phase:</p> <ul style="list-style-type: none"><li>▪ Degradation of water quality through small accidental release from vessels (worse case - loss of inventory) (direct, long-term and reversible).</li></ul> <p>Detracts from SEA objective but adverse impacts are not likely to be substantial.</p>

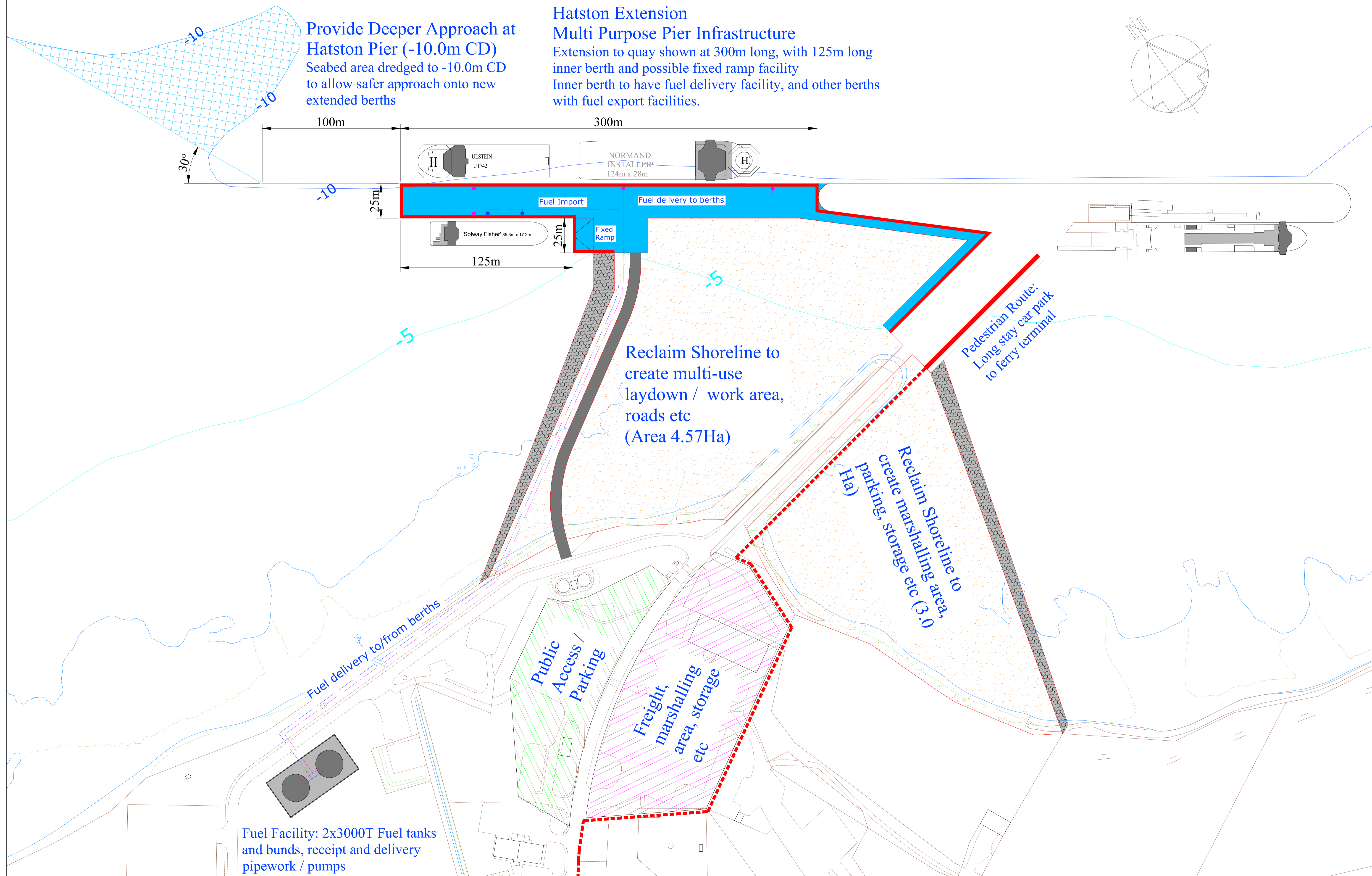
## C.4 HATSTON

### C.4.1 Project Description

The plan for Hatston is focussed on reducing conflicts between users and operational activity and enabling growth across a range of economic sectors. It also considers how freight and traffic can be handled more efficiently and effectively.

- Core proposals comprise new deep-water multi-purpose quayside infrastructure (250m of multi-purpose quayside with -10m CD) along with reclamation to futureproof availability of sufficient land for harbour operations.
- Areas for car and freight marshalling will be reconfigured and there will be better defined pedestrian routes to and from the quayside: there is also potential for the reconfigured pedestrian access within the harbour area to connect to the proposed coastal path identified within the Kirkwall Urban Design Framework (KUDD).
- In the future there may be a need to refurbish and/or extend the existing facility that caters for both ferry and cruise passengers on the quayside.

The current proposed layout is shown in Figure C-4.



## C.4.2 Assessment

SEA Proposal		Proposal: Hatston	
Topic	SEA Objective	Significance	Potential Impact and Justification of Significance Ranking
Air	1. To maintain or improve air quality and reduce emissions of key pollutants.	Detracts	<p>Construction Phase:</p> <ul style="list-style-type: none"> <li>Degradation of air quality impacting local communities and ecological receptors, through dust and emissions from construction traffic and plant (direct, short-term and reversible impact).</li> </ul> <p>Operation Phase:</p> <ul style="list-style-type: none"> <li>Degradation of air quality impacting local communities and ecological receptors, through additional traffic (marine and road) and increased emissions (direct, long-term and reversible).</li> </ul> <p>Low population, rural setting in the immediate vicinity of the development, Kirkwall is 2 km away - resulting in limited impacts on communities. Degradation of air quality is likely to be localized and therefore unlikely to affect ecological receptors. Detract against objective, but not to significant extent.</p>
	2. Avoid damage to the biodiversity, flora and fauna within the vicinity of the Orkney Islands.		<p>Construction Phase:</p> <ul style="list-style-type: none"> <li>Noise and visual impact resulting in disturbance to marine mammals and birds (direct, short-term and reversible).</li> <li>Impacts on designated sites (within North Orkney pSPA) and their conservation objectives (direct, short-term and reversible).</li> <li>Loss/disturbance of habitat due to reclamation on shoreline and new deep-water pier – (direct, long-term and irreversible).</li> <li>Degradation of water quality through small accidental release of fuel and associated impacts on flora and fauna (indirect, medium-term and reversible).</li> </ul> <p>Operation Phase:</p> <ul style="list-style-type: none"> <li>Increased marine traffic leading to an increased risk of collision with marine mammals (direct, short-term (population level) and reversible (population level)).</li> <li>Noise and visual impact resulting in disturbance to marine mammals and birds (direct, long-term and irreversible).</li> <li>Degradation of water quality through small accidental release from tanker (worse case - loss of inventory) and associated impacts on flora and fauna (direct, long-term and reversible).</li> </ul> <p>Detracts from SEA objective, but not to a significant extent.</p>
Biodiversity, Flora and Fauna	3. Prevent introduction of new invasive species into the Orkney Islands.	Detracts	<p>Construction Phase:</p> <ul style="list-style-type: none"> <li>Potential introduction of invasive species through ballast water release and hull fouling (construction vessels) impacting local species and habitats (direct, long-term and irreversible).</li> </ul>

SEA Proposal		Proposal: Hatston	
Topic	SEA Objective	Significance	Potential Impact and Justification of Significance Ranking
Factors	Climatic	Detracts	<p>Operation Phase:</p> <ul style="list-style-type: none"> <li>Potential introduction of invasive species through hull fouling, impacting local species and habitats (direct, long-term and irreversible). It is assumed that ballast water will not be operationally released.</li> </ul> <p>Detracts from SEA objective, but not significantly because construction vessels and operational vessels likely to be from UK.</p>
			Construction and operational activities leading to increased greenhouse gas emissions, adding to existing carbon footprint (direct, long-term, reversible). Therefore, detracts from SEA objective.
Heritage	Cultural	Neutral	<p>There is no known maritime heritage within the proposed development or in close proximity.</p> <p>Limited change to cultural setting due to extension of existing facilities, therefore no impacts on SEA objective.</p>
	Landscape	Detracts	<p>Landscape classed as Rolling Hill Fringe. Limited alteration to seascape due to extension of existing facilities.</p> <p>Minimal impact on visual amenities to local populations and recreational users (direct, long-term and reversible).</p> <p>Detracts from SEA objective but adverse impacts are not likely to be substantial.</p>
	Material Assets	Substantially supports	Proposal will be protecting and enhancing existing assets, ensuring sustainable use, therefore substantially supports SEA objective.
		Neutral	Development will lead to additional waste being created due to construction and requirement to provide additional facilities for waste disposal for vessels and personnel (direct, long-term and irreversible), but there is potential to meet objectives of the Zero Waste Plan, if waste materials are recyclable or re-usable. Therefore on balance neutral contribution to SEA objective.
Human Health	Population and	Detracts	<p>Increased vessels during construction and operational, leading to higher risk of collision (direct, long-term and reversible).</p> <p>Creation of new deep-water pier creates increased physical barrier, which could impact navigation and lead to increase accidents (direct, long-term and reversible).</p> <p>Increased vessels leading to potential for increased accidents and incidents.</p> <p>Detracts from SEA objective but adverse impacts are not likely to be substantial.</p>
		Neutral	<p>Degradation of air quality on local communities, through dust and emissions during construction (direct, short-term and reversible) and through additional traffic (marine and road) and increased emissions (direct, long-term and reversible).</p> <p>Potential for local job opportunities during construction and operation (direct, long-term and reversible).</p>

SEA Proposal		Proposal: Hatston	
Topic	SEA Objective	Significance	Potential Impact and Justification of Significance Ranking
	improved environmental quality.		Potential visual and noise impacts on local communities during construction and operations (direct, long-term and reversible). On balance, a neutral contribution to SEA objective.
Soils	11. Maintain or improve soil quality and prevent any further degradation of soils.	<b>Detracts</b>	Potential impacts on coastal processes, leading to changes in wave climate and leading to coastal erosion (direct, long-term and irreversible). This is not likely to occur due to the foreshore substrate in the area being mainly rock platform. Reclamation of the shoreline would lead to land use change (minor footprint) (direct, long-term and irreversible). Introduction of additional pollution sources (primarily vessels) could lead to contamination of the seabed (direct, medium-term and reversible). Detracts from SEA objective but adverse impacts are not likely to be substantial.
Water	12. Protect and enhance the state of the water environment.	<b>Detracts</b>	<p>Construction Phase:</p> <ul style="list-style-type: none"> <li>Potential degradation of water quality through small accidental release of fuel from plant e.g. generator (direct, medium-term and reversible).</li> <li>Presence of new pier may cause localised changes in hydrodynamics and morphological changes to the water body (direct, long-term and irreversible).</li> <li>Multiple fish farms are located within ~150 meters of the new quay which may be impacted by the project. The potential impacts on these fish farms and consultation with fish farm owner will be important should this project proceed.</li> </ul> <p>Operation Phase:</p> <ul style="list-style-type: none"> <li>Degradation of water quality through small accidental release from vessel (worse case -loss of inventory) (direct, long-term and reversible).</li> </ul> <p>Detracts from SEA objective but adverse impacts are not likely to be substantial.</p>

## C.5 STROMNESS

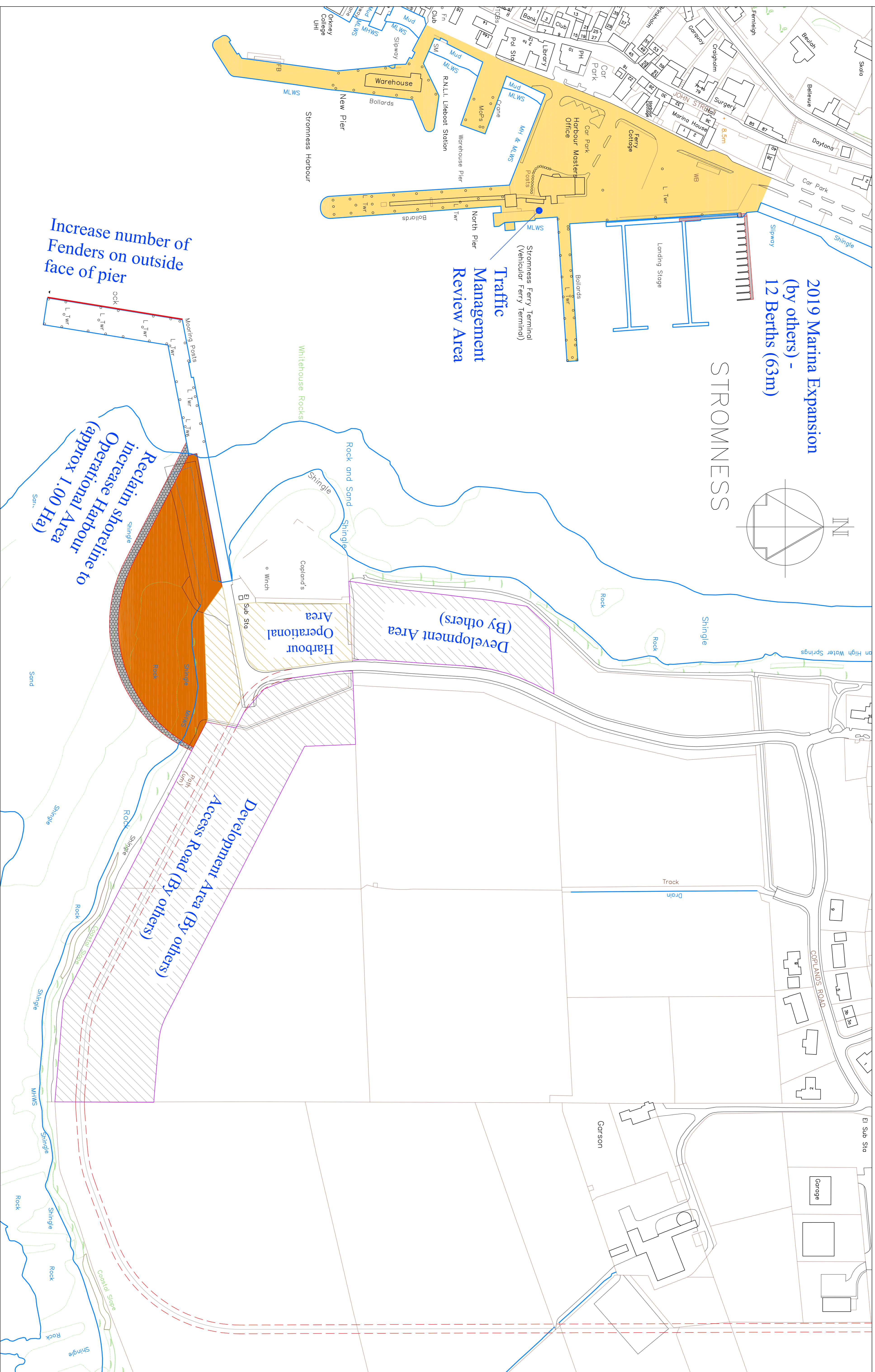
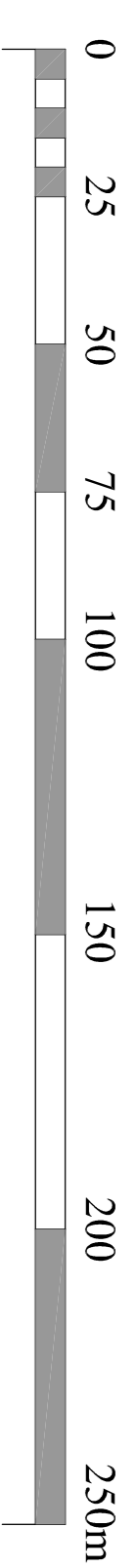
### C.5.1 Project Description

The plan for Stromness is focussed on improving the flexibility and usability of existing infrastructure, as well as creating capacity and facilities to enable growth in all sectors for the future.

- With regard to quayside infrastructure the proposal comprises filling in gaps between the fenders on Copland's Dock, which will enable smaller boats to use this infrastructure more easily.
- An additional area is proposed for reclamation, which will create a development opportunity for shore-based business.
- The marina in Stromness will be expanded with an additional 12 berths which could be earmarked for residential, visitor or commercial use.
- A review of current parking, pedestrian routes and traffic management and controls, as well as an evaluation of the location, condition and purpose of buildings and facilities on or close to the quayside in Stromness, which will determine what kind of improvements could be made.

The current proposed layout is shown in Figure C-5.

# STROMNES



## C.5.2 Assessment

SEA Proposal		Proposal: Stromness	
Topic	SEA Objective	Significance	Potential Impact and Justification of Significance Ranking
Air	1. To maintain or improve air quality and reduce emissions of key pollutants.	Detracts	Construction Phase: <ul style="list-style-type: none"> <li>Degradation of air quality impacting local communities and ecological receptors, through dust and emissions from construction traffic and plant (direct, short-term and reversible impact).</li> </ul>
			Operation Phase: <ul style="list-style-type: none"> <li>Degradation of air quality impacting local communities and ecological receptors, through additional traffic (marine and road) and increased emissions (direct, long-term and reversible).</li> </ul> <p>Moderate population, urban setting - resulting in moderate impacts on communities. Degradation of air quality is likely to be localized and therefore unlikely to affect ecological receptors. Detract against objective, but not to significant extent.</p>
Biodiversity, Flora and Fauna	2. Avoid damage to the biodiversity, flora and fauna within the vicinity of the Orkney Islands.	Substantially Detracts	Construction Phase: <ul style="list-style-type: none"> <li>Noise and visual impact resulting in disturbance to marine mammals and birds (direct, short-term and reversible). Otters and harbour seals are known to use the area. A designated seal haul out site is present in the vicinity of the development (1.3km east).</li> <li>Impacts on designated sites (within Scapa Flow pSPA) and their conservation objectives (direct, short-term and reversible).</li> <li>Loss/disturbance of habitat due to reclamation on shoreline (e.g. benthic communities) and creation of new access road – (direct, long-term and irreversible).</li> <li>Degradation of water quality through small accidental release of fuel and associated impacts on flora and fauna (indirect, medium-term and reversible).</li> </ul>
			Operation Phase: <ul style="list-style-type: none"> <li>Increased marine traffic leading to an increased risk of collision with marine mammals (direct, short-term (population level) and reversible (population level)).</li> <li>Noise and visual impact resulting in disturbance to marine mammals and birds (direct, long-term and irreversible).</li> <li>Degradation of water quality through small accidental release from vessel (worst case - loss of full inventory) and associated impacts on flora and fauna (direct, long-term and reversible).</li> </ul> <p>Due to presence of cetaceans and other European Protected Species (EPS) (harbour seals) within the vicinity of the development, this substantially detracts from SEA objective.</p>
			Construction Phase:

SEA Proposal		Proposal: Stromness	
Topic	SEA Objective	Significance	Potential Impact and Justification of Significance Ranking
Climatic Factors	3. Prevent introduction of new invasive species into the Orkney Islands.	Detracts	<ul style="list-style-type: none"> <li>Potential introduction of invasive species through ballast water release and hull fouling (construction vessels) impacting local species and habitats (direct, long-term and irreversible).</li> </ul> <p>Operation Phase:</p> <ul style="list-style-type: none"> <li>Potential introduction of invasive species through hull fouling impacting local species and habitats (direct, long-term and irreversible). It is assumed that ballast water will not be operationally released.</li> </ul> <p>Detracts from SEA objective, but not significantly because construction vessels and operational vessels likely to be from UK.</p>
	4. Minimise greenhouse gases emissions and the Port's carbon footprint.	Detracts	Construction and operational activities leading to increased greenhouse gas emissions, adding to existing carbon footprint (direct, long-term, reversible). Therefore detracts from SEA objective.
Cultural Heritage	5. Prevent damage to or loss of heritage features including maritime heritage.	Neutral	<p>There is no known maritime heritage within the proposed development. Development will be located across the water from the Stromness Conservation Area (~200 meters away) and within the Heart of Neolithic Orkney Sensitive Area.</p> <p>Limited change to cultural setting due to extension of existing facilities. Therefore, on balance a neutral contribution to SEA objective.</p>
Landscape	6. Protect the landscape/seascape character and visual amenity in the vicinity of the area.	Detracts	<p>Development is located within the Hoy and West Mainland National Scenic Area. Landscape is classed as Granite Pastures. Limited alteration to seascape due to extension of existing facilities.</p> <p>Minimal impact on visual amenities to local populations and recreational users (Direct, long-term and reversible).</p> <p>Road access will cross land classed as Inclined Coastal Pastures. Construction in this area will alter the landscape (direct, long-term and irreversible).</p> <p>Detracts from SEA objective but adverse impacts are not likely to be substantial.</p>
Material Assets	7. Promote the sustainable use and management of material assets.	Substantially supports	Proposal will be protecting and enhancing existing assets, ensuring and improving sustainable use, therefore substantially supports SEA objective.
	8. To meet the objectives of the Zero Waste Plan.	Neutral	Development will lead to additional waste being created due to construction and requirement to provide additional facilities for waste disposal for vessels and personnel (direct, long-term and irreversible), but there is potential to meet objectives of the Zero Waste Plan, if waste materials are recyclable or re-usable. Therefore neutral contribution to SEA objective.
Population and Community	9. Improve the safety record of the harbours and improve safety for the sea users.	Detracts	<p>Increased construction and operational vessels leading to higher risk of collision (direct, long-term and reversible).</p> <p>Increased vessels leading to potential for increased accidents and incidents.</p> <p>Detracts from SEA objective but adverse impacts are not likely to be substantial.</p>

SEA Proposal		Proposal: Stromness	
Topic	SEA Objective	Significance	Potential Impact and Justification of Significance Ranking
	10. Protect and improve human health and wellbeing through improved environmental quality.	Neutral	<p>Methods to improve pedestrian and traffic movement will lead to improvement in wellbeing (direct, long-term and irreversible).</p> <p>Working to protect key industries will lead on positive on human wellbeing (direct, long-term and irreversible).</p> <p>Marina improvement and waterfront development area lead to increased tourism and recreation (direct, long-term and irreversible).</p> <p>Degradation of air quality on local communities, through dust and emissions during construction (direct, short-term and reversible) and through additional traffic (marine and road) and increased emissions (direct, long-term and reversible).</p> <p>Potential for local job opportunities during construction and operation in mixed industries (direct, long-term and reversible).</p> <p>Potential visual and noise impacts on local communities during construction and operations (direct, long-term and reversible).</p> <p>High population, urban setting - resulting in moderate impacts on communities, however on balance a neutral contribution to SEA objective.</p>
Soils	11. Maintain or improve soil quality and prevent any further degradation of soils.	Substantially detracts	<p>Reclamation of the shoreline and loss of pastures habitat would lead to land use change (minor footprint) (direct, long-term and irreversible). Foreshore here is sandy.</p> <p>Potential impacts on coastal processes, leading to changes in wave climate and leading to coastal erosion (direct, long-term and irreversible).</p> <p>Introduction of additional pollution sources (primarily vessels) could lead to contamination of the seabed (direct, medium-term and reversible).</p> <p>Substantially detracts from SEA objective because of changes to soil and land use.</p>
Water	12. Protect and enhance the state of the water environment.	Detracts	<p>Construction Phase:</p> <ul style="list-style-type: none"> <li>Potential degradation of water quality through small accidental release of fuel from plant e.g. generator (direct, medium-term and reversible).</li> <li>Reclamation of shoreline could lead to localised changes in hydrodynamics and lead to increased risk of coastal flooding (direct, long-term and irreversible).</li> <li>Shellfish site is located within the vicinity of the development (~200 m away), this may be impacted due pollution incidents during construction and operation (direct, medium-term and irreversible).</li> </ul> <p>Operation Phase:</p> <ul style="list-style-type: none"> <li>Degradation of water quality through small accidental release from vessels (worst case - loss of full inventory) (direct, long-term and reversible).</li> </ul> <p>Detracts from SEA objective but adverse impacts are not likely to be substantial.</p>

# Appendix D

## Consultation Responses

**Table D-1 Summary of scoping comments received from the consultation and how the comments were taken into account in the production of the Environmental Report.**

Consultation Authority	Summary of Response	Action Taken
SNH	Habitats Regulation Appraisal (HRA) - We note your intention to undertake an HRA 'screening' on the Masterplan to be published alongside the Environmental Report. Current Scottish Government SEA guidance recommends that the HRA is undertaken alongside the Environmental Assessment and although the guidance does not recommend full integration of SEA and HRA, there may be efficiencies and value gained from linking the two processes.	N.A
SNH	Table 3-2 identifies potential environmental effects on a number of sites designated under the Birds or Habitats Directive Regulations (SPAs and SACs, collectively the "Natura" sites). It is important to note that if there are likely to be significant effects arising from the Masterplan on any Natura sites, that the responsible authority cannot approve the Masterplan unless an appropriate assessment has been carried out which demonstrates there will be no adverse effects on the integrity of these sites. A recent judgement in the EU Court of Justice (C-323/17 People over Wind) means that it is not appropriate at screening stage to take account of mitigation measures in order to conclude no likely significant effect and so avoid proceeding to an appropriate assessment. Such mitigation measures must instead be considered at the 'appropriate assessment' stage. Accordingly, it is recommended that HRAs are begun early to ensure that should any likely significant effects be identified at the 'screening' stage that this is followed through to the appropriate assessment stage to avoid delays in the progress of the Masterplan. Advice and guidance on this process, including the People over Wind case, is available on our website.	The recent judgement of C-323/17 People over Wind has been taken into consideration in the preparation of the HRA.
SNH	Table 2-2 – Masterplan Outline Requirements – We appreciate that the requirements of the Masterplan are not within the remit of the assessment process, but it is hoped that through the environmental assessment process, consideration can be given to the inclusion of opportunities for environmental enhancement as well as economic and social benefits.	N.A
SNH	Table 3-3 – Potential Inter-Relationships between SEA Topics – There is the potential for an inter-relationship between climatic factors and cultural heritage, given coastal flooding, climate change adaptation etc...	The table has been updated accordingly - Table 3-4 of this report.

Consultation Authority	Summary of Response	Action Taken
SNH	Table 5-1 – Draft SEA Environmental Objectives – The SEA should only focus on likely environmental effects and care should be taken to ensure that any adverse environmental impacts are not seen to be offset by positive socio-economic effects.	The SEA objectives have been reviewed and updating to reflect comments received (Table 3-5 of this report).
SNH	5.2 – Analysis of Alternatives – It would be useful to clarify if the assessment of alternatives will only be carried out on those options that pass the Plan requirements and objectives. Whilst we would not want abortive work to be carried out on proposals that are clearly not feasible on economic grounds, it is unlikely that any project will comply with all of the objectives. The assessment should consider the environmental effects of all reasonable alternatives and the justification provided for which option is chosen.	The Qualitative Assessment of Long List Potential Options for the Orkney Harbours Masterplan is presented in Section 4.1. Many of the options rejected initially were either technically not viable or did not deliver against the Orkney Harbours Masterplans outline requirements and/or objectives.
SNH	5.4.1 – Mitigation – It is noted that most of the environmental effects will be more easily identified once the proposals have been firmed up. However, this SEA provides an opportunity to signpost future environmental work that might be required at the project level. We recommend that mitigation measures are pulled into a table of mitigation in the Environmental Report with clear direction on what needs to be done, by whom and by when and what the likely residual effects are likely to be. This is particularly pertinent if mitigation measures are found to be necessary to avoid adverse effects on the integrity of any Natura sites.	Table 5-1 presents mitigation measures identified for the prevention, reduction and offsetting of any significant adverse effects.  This includes SEA Topic, Issue / Impact Identified, Mitigation Measure, Lead Authority and Proposed Timescale.
SEPA	Relationship with other Plans, Policies and Strategies (PPS): Some of the PPS included in Section 2.3 have themselves been subject to SEA. Where this is the case you may find it useful to prepare a summary of the key SEA findings that may be relevant to the Draft Masterplan. This may assist you with data sources and environmental baseline information and also ensure the current SEA picks up environmental issues or mitigation actions which may have been identified elsewhere.	SEA data sources and environmental baseline was reviewed and included from Orkney Local Biodiversity Action Plan (2018-2022), Orkney Local Development Plan, OICHA Ballast Water Management Policy and Orkney Supplementary Guidance: Aquaculture 2017.
SEPA	Baseline information: As identified in Section 4, SEPA holds significant amounts of environmental data which may be of interest to you in preparing the environmental baseline, identifying environmental problems, and summarising the likely changes to the environment in the absence of the Draft Masterplan, all of which are required for the assessment. Much of these data are now readily available on SEPA's website.	Noted. Data was obtained from SEPAs website to provide environmental baseline including, water quality, coastal discharges, metals and other pollutants, flood risk and air releases.
SEPA	Additional local information may also be available from our Access to Information unit at our Corporate Office	N.A

Consultation Authority	Summary of Response	Action Taken
SEPA	Other sources of data for issues that fall within SEPA's remit are referenced in our SEA topic guidance notes for air, soil, water, material assets and human health.	Noted. Data was obtained from SEPAs website to provide environmental baseline including, water and air.  SEPA guidance notes for air, water and soil were reviewed and considered in the preparation of the SEA.
SEPA	Environmental problems: No specific list of environmental problems has been identified in the Scoping Report but we welcome the proposal to gather baseline information and include a description of the state of the environment as present including a discussion of the key problems/issues currently being faced. Our SEA Guidance referenced above can assist in assessing the existing problems in relation to our interests.	Environmental problems relevant to the Orkney Harbours Masterplan are presented in Table 3-3.
SEPA	Alternatives: We welcome the proposed analysis of alternatives outlined in Section 5 to inform the choice of the preferred options. We will expect this analysis to be documented in the Environmental Report.	The Qualitative Assessment of Long List Potential Options for the Orkney Harbours Masterplan is presented in Section 4.1.
SEPA	Scoping in / out of environmental topics: We agree that in this instance all environmental topics should be scoped into the assessment.	N.A
SEPA	We note the overall appraisal 'scoring' proposed in Section 5.4. When compiling the scoring matrices including a commentary section within the them which states, where necessary, the reasons for the effects cited and the 'score' given helps to fully explain the rationale behind the assessment results. This allows the Responsible Authority to be transparent and also allows the reader to understand the rationale behind the scores given.	Appendix C presents the full assessment results, this includes a significance criteria for each objective and description of the potential impacts and justification of significance ranking.
SEPA	Where it is expected that other plans, programmes or strategies are better placed to undertake more detailed assessment of environmental effects this should be clearly set out in the Environmental Report.	N.A
SEPA	We support the use of SEA objectives as assessment tools as they allow a systematic, rigorous and consistent framework with which to assess environmental effects.	N.A

Consultation Authority	Summary of Response	Action Taken
SEPA	When it comes to setting out the results of the assessment in the Environmental Report please provide enough information to clearly justify the reasons for each of the assessments presented. It would also be helpful to set out assumptions that are made during the assessment and difficulties and limitations encountered.	Appendix C presents the full assessment results, this includes a significance criteria for each objective and description of the potential impacts and justification of significance ranking.  Limitations of the data and how this assessment addressed these shortcomings is summarised in Section 3.3.
SEPA	It is helpful if the assessment matrix directly links the assessment result with proposed mitigation measures such as in the example below and would welcome the link between effects and mitigation / enhancement measures in the proposed assessment framework and the consideration of mitigation of impacts.	Table 5-1 presents mitigation measures identified for the prevention, reduction and offsetting of any significant adverse effects.  This includes SEA Topic, Issue / Impact Identified, Mitigation Measure, Lead Authority and Proposed Timescale.
SEPA	Comments on wording of proposed SEA objectives: We would recommend that the wording of the following SEA objective(s) be revised as follows. <ul style="list-style-type: none"> <li>Air: To maintain or improve air quality and reduce emissions of key pollutants</li> <li>Material Assets: To promote the sustainable use and management of material assets; or To meet the objectives of the Zero Waste Plan.</li> <li>Human health: To protect and improve human health and wellbeing through improved environmental quality.</li> <li>Soils: To maintain or improve soil quality and prevent any further degradation of soils.</li> <li>Water: To protect and enhance the state of the water environment.</li> </ul>	The SEA objectives have been reviewed and updating to reflect comments received (Table 3-5 of this report).
SEPA	Mitigation and enhancement: We would encourage you to use the assessment as a way to improve the environmental performance of individual aspects of the final option; hence we support proposals for enhancement of positive effects as well as mitigation of negative effects.	N.A
SEPA	It is useful to show the link between potential effects and proposed mitigation / enhancement measures in the assessment framework.	Mitigation measures are provided in Section 5.1.1.

Consultation Authority	Summary of Response	Action Taken
SEPA	We would encourage you to be very clear in the Environmental Report about mitigation measures which are proposed as a result of the assessment. These should follow the mitigation hierarchy (avoid, reduce, remedy or compensate).	Mitigation measures are provided in Section 5.1.1.
SEPA	One of the most important ways to mitigate significant environmental effects identified through the assessment is to make changes to the plan itself so that significant effects are avoided. The Environmental Report should therefore identify any changes made to the plan as a result of the SEA.	Following consultation the Masterplan will be revised and changes made summarised in the Post Adoption Statement.
SEPA	Where the mitigation proposed does not relate to modification to the plan itself then it would be extremely helpful to set out the proposed mitigation measures in a way that clearly identifies: (1) the measures required, (2) when they would be required and (3) who will be required to implement them. The inclusion of a summary table in the Environmental Report such as that presented below will help to track progress on mitigation through the monitoring process.	Table 5-1 presents mitigation measures identified for the prevention, reduction and offsetting of any significant adverse effects.  This includes SEA Topic, Issue / Impact Identified, Mitigation Measure, Lead Authority and Proposed Timescale.
SEPA	Monitoring: With regards to monitoring early consideration should be given to a monitoring approach particularly in the choice of indicators. It would be helpful if the Environmental Report included a description of the measures envisaged to monitor the significant environmental effects of the plan.	Monitoring is presented in Table 5.2 and includes SEA Topic, What is being monitored, Data source, Summary of monitoring and proposed remedial actions, Responsibility and Timescales.
SEPA	Consultation period: We are satisfied with the proposal for a 6 week consultation period for the Environmental Report.	N.A