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DOCUMENT TITLE:
Offshore Phase 1 Habitats Regulations Appraisal (HRA) Screening Report

PROJECT NAME:
Round 3 Zone 2
Firth of Forth
Offshore Wind Farm Development

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Abbreviations

ACRONYM / ABBREVIATION	FULL TEXT
AA	Appropriate Assessment
AEWA	African-Eurasian Waterbirds Agreement
Bern	The Convention on the Conservation of European Wildlife and Natural Habitats
BoCC	Birds of Conservation Concern
Bonn	The Convention on the Conservation of Migratory Species of Wild Animals also known as the Convention on Migratory Species (CMS)
CIA	Cumulative Impact Assessment
EC	European Council
EU	European Union
EIA	Environmental Impact Assessment
EPS	European Protected Species
European Site	Qualifying sites include: Special Areas of Conservation (SACs) either full, candidate or proposed; Special Protection Areas (SPAs) either full or proposed and Ramsar sites.
EU	European Union
FCS	Favourable Conservation Status
FTOWDG	Forth and Tay Offshore Wind Developers Group
HRA	Habitats Regulations Appraisal
IROPI	Imperative Reasons of Overriding Public Interest
JNCC	Joint Nature Conservation Committee
LSE	Likely Significant Effect
MFWDG	Moray Firth Wind Development Group
MHWM	Mean High Water Mark

ACRONYM / ABBREVIATION	FULL TEXT
MS	Marine Scotland
Ramsar	The Ramsar Convention (The Convention on Wetlands of International Importance, especially as Waterfowl Habitat) is an international treaty for the conservation and sustainable utilisation of wetlands,
RSPB	Royal Society for the Protection of Birds
SAC	Special Area of Conservation
Seagreen	Seagreen Wind Energy Limited (SWEL)
SCOS	Special Committee On Seals
SMRU	Sea Mammal Research Unit
SNH	Scottish Natural Heritage
SPA	Special Protection Area
SSSI	Site of Special Scientific Interest
STW	Scottish Territorial Waters
TCE	The Crown Estate
WBD	Wild Birds Directive (EC 2009/147/EC)
WDCS	Whale and Dolphin Conservation Society
ZDA	Zone Development Agreement

1 Introduction

1.1 The Project

Seagreen Wind Energy Limited (hereafter referred to as 'Seagreen') has been awarded the rights to develop a number of offshore wind farms in the Firth of Forth Round 3 Zone by The Crown Estate (hereafter referred to as 'TCE'), under the Third Round of the offshore wind licensing arrangements. This Habitats Regulation Appraisal (HRA) Screening Report is for Phase 1 of 3.

Seagreen is bringing forward these wind farms for consent in three phases. Seagreen submitted a detailed scoping report for Phase 1 for Environmental Impact Assessment (EIA) purposes to Scottish Ministers on the 23 July 2010 (Seagreen, 2010).

The EIA scoping report contains substantial information concerning Phase 1 of the development of the Zone. In particular, it explains that Phase 1 (hereafter referred to as the Project) will comprise two wind farms, to be known as Seagreen Alpha (Alpha) and Seagreen Bravo (Bravo), and an Export Cable Route (ECR) to the shore. This Project boundary within the scoping report has been refined since its preparation and the refined version is included as Figure 1. This also illustrates a refined corridor for the ECR, with two alternative routes to shore in the final stretch. The total combined target capacity for Alpha and Bravo is 1,075 megawatts (MW). Figure 1 also shows the currently intended boundaries for the development of the remainder of the Zone.

The EIA scoping report explained (at paragraph 4.3.2) that consents for Alpha and Bravo will be sought applying the Rochdale Envelope Principle. It also acknowledged the need to take account of the potential impact on European sites, and the possible need for Appropriate Assessment (AA) under the EU Habitats Directive (EC Directive 92/43/CEE) regime (paragraph 4.4) in relation to consent applications for Alpha, Bravo and the ECR.

It should also be noted that Seagreen have subsequently submitted a detailed scoping report for Phase 2 and Phase 3 for EIA purposes to Scottish Ministers on the 11 June 2011 (Seagreen, 2011).

This present report is the first stage of a comprehensive HRA that will be undertaken for Phase 1 in order to identify the need for and refine the scope of the necessary AAs. The scope of the HRA is Alpha, Bravo and the ECR, collectively referred to throughout this report as the project, or Phase 1. These will be the subject of a suite of applications for consents under the Electricity Act 1989, the Marine (Scotland) Act 2010 and the Marine and Coastal Access Act 2009. These applications will be submitted simultaneously. It is currently intended that there will be a single Environmental Statement (ES) supporting all of the consent applications. This ES will consider the impacts of Alpha, Bravo and the ECR separately as well as collectively. It will contain, or be accompanied by, the necessary information to enable the Scottish Ministers to discharge their obligations under the Habitats Directive.

1.2 Purpose of this report

The purpose of this report is to begin the process of HRA following the relevant guidance and good practice in assessing the potential impacts which may arise from the Project and the significance of these effects, either singly or in combination with other developments upon potentially vulnerable European (Natura) Sites.

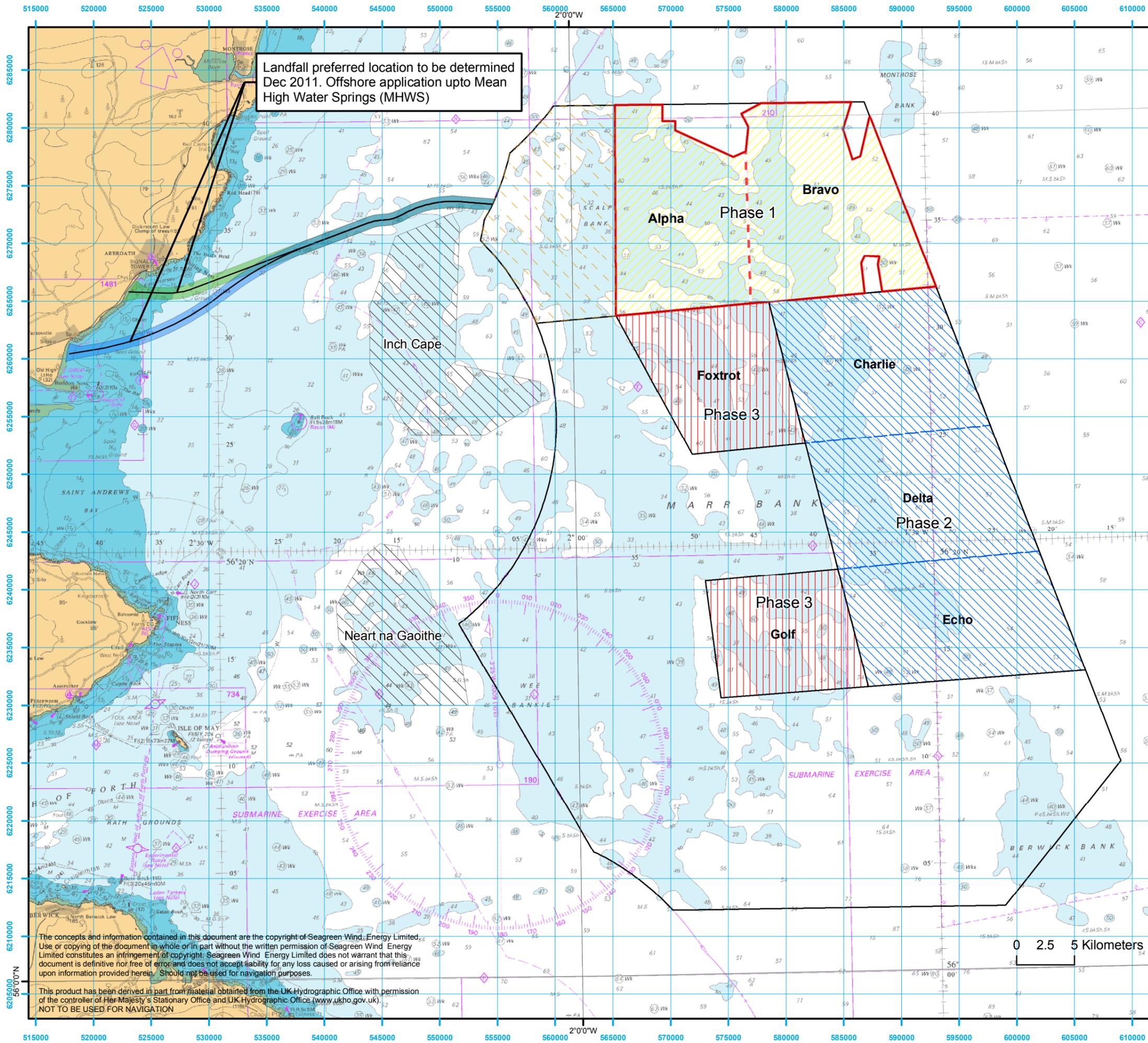
The purpose of this screening stage report is:

- (a) to identify those relevant European Sites which may include features (listed habitats or species) which **may be sensitive and vulnerable** to potential impacts arising from the construction, operation or decommissioning of the Project;
- (b) to consider the features of the relevant European sites and to identify those features which it is considered **are not at risk** of a significant effect arising from the Project, (either alone or in combination with other plans or projects), so that they can be eliminated from further consideration within the HRA process; and
- (c) to consider the features of the relevant European sites and to identify those features which it is considered **likely to be at risk** of a significant effect arising from the Project, (either alone or in combination with other plans or projects), so that they can be considered further within the HRA process.

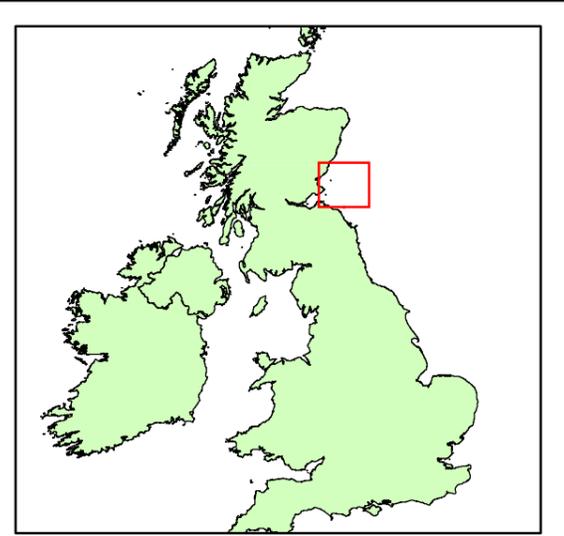
The aim of this report is to give a clearly identified scope of aspects to be considered when preparing the information and analysis to inform an AA that will be carried out by Scottish Ministers as the competent authority.

This report is based upon the available baseline data gathered as part of the wider scoping exercise and upon the new survey data gathered over the last 18 months. Many of the surveys are ongoing and this report is based on the best available preliminary data in line with the requirements for undertaking an AA. As a result a precautionary approach is taken to uncertainty with regard to environmental data within this HRA screening report.

For ease of reading, this report has been separated into the main report and its appendices. This report should be read in conjunction with the separate Offshore Phase 1 HRA Screening Report Appendices.



Landfall preferred location to be determined Dec 2011. Offshore application upto Mean High Water Springs (MHWS)



- Legend:
- R3 Zone Boundary
 - Export Cable Centreline
 - Camoustie Refined Export Cable Route with 1km Buffer
 - South Abroath Refined Export Cable Route with 1km Buffer
 - Potential Export Cable Route to Phase 1. Route TBC Nov 2011
 - Phase 1 - Alpha & Bravo (Indicative)
 - Phase 2 - Charlie, Delta & Echo (Indicative)
 - Phase 3 - Foxtro & Golf (Indicative)
 - Scottish Territorial Water Sites
 - Indicative Alpha/Bravo Separation (TBC at a later date)

Coordinate System
 UTM Zone 30 North (WGS84)
 Projection: Transverse Mercator
 Central Meridian: -3° East
 Scale Factor: 0.9996
 Latitude of Origin: 0° North
 False Easting: 500000.0
 False Northing: 0.0
 Reference Spheroid: WGS84
 Semi-major Axis: 6378137.0
 Inverse Flattening: 298.2572236



Title:
Firth of Forth Round 3 Offshore Wind Farm Zone



Figure / Drawing Title:
PROJECT AREAS IDENTIFICATION FOR PHASE 1 OFFSHORE CONSENT

Figure/Drawing Number: **FIGURE 1**

UNLESS THE REVISION IS B OR HIGHER THE DRAWING IS NOT TO BE USED FOR DESIGN OR CONSTRUCTION

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0 2.5 5 Kilometers

1.3 Project Description

The engineering design of the project continues to develop towards a design freeze in early 2012. It is intended that this design freeze will be used within the EIA and the more detailed AA phase of the HRA.

The Project includes the wind turbine generators (WTGs), offshore substations, permanent met masts and inter-array cabling, accommodation platforms and converter platforms for both Alpha and Bravo. The project also includes the ECR and landfall to the MHWM on the Angus shoreline at either Carnoustie or to the south of Arbroath (Figure 1).

The development of the Project description follows the Rochdale Principle where flexibility of some key items of the Project will be retained within the final EIA project description. This is considered essential to allow effective procurement decisions to be made and is an approach which has been successfully adopted on many other UK offshore wind farm projects.

This HRA screening assessment is based upon a working project description which is summarised below. The outline engineering design that will be subject to EIA continues to develop and refine. At present, following the Rochdale principle, several options for some key aspects of the project (e.g. turbine size or foundation choice) are under consideration. For the purposes of this HRA screening a cautious worst case approach has therefore been adopted, considering the worst likely case from the design options under consideration.

Table 1.1: The project (Seagreen Alpha, Bravo and ECR) Combined Working Rochdale Envelope.

Design parameter	Variation or 'Rochdale Envelope'
Wind Turbine Generators (WTGs)	
Turbine Specification	3.6MW, 5MW, 6MW, 7MW
Number of WTGs	154 – 299
Hub height	87 – 109 m
Water depth (LAT)	32.5 – 60 m
Tower	
Diameter of tower	Gravity Base Structure (GBS) 3.12 – 7.04 m
Tower foundation interface	18.0 m
Foundation	
Foundation type	GBS, jacket, suction caisson

Design parameter	Variation or 'Rochdale Envelope'
Foundation diameter at seabed	Jacket 14.8 – 32.0 m; Octagonal GBS foundation 44 – 72 m
Foundation anchoring	
Pile diameter (for jacket)	2.1 – 3.0 m
Pile installation methods considered	Driven piles, drilled piles
Depth of slab for GBS	1.4 - 2.1 m
Suction caisson	TBC
Scour Protection	
Scour protection diameter	TBC
Scour protection material	Geosynthetic bags - rock
Scour protection area per foundation	TBC
Total scour protection footprint based on realistic worst case of 100% of WTGs requiring scour protection	TBC
Met masts	
Number of met masts	3
Met mast foundation type	GBS, Jacket
Met mast foundation diameter at seabed	Jacket 14.8 – 32 m
Offshore substation	
Number of offshore substations	1 – 3
Number of offshore converter stations	TBC
Offshore substation foundation	GBS, Jacket
Cabling	
HVDC/AC	TBC

Design parameter	Variation or 'Rochdale Envelope'
Export Cable Route (ECR)	Two options for landing: Arbroath or Carnoustie
Burial method	Options include ploughing and jetting
Inter array cabling length	TBC
Export cable length to Phase 1	25 km
Interconnecting cables between Alpha and Bravo	TBC
Width of cable installation footprint	3 m
Total footprint of cable installation	TBC
Cable protection (export cable only)	TBC
Total cable protection footprint	TBC
Construction vessels	
Anchor based cable installation vessel	Details and number TBC
Jack-up vessels	Details and number TBC
DP2 vessels	Details and number TBC
Piling vessel	Details and number TBC
Rock dumping	Details and number TBC
Operation and Maintenance	
O&M bases	Location and number of O&M bases TBC
O&M vessels	Details and number TBC
O&M activities and programme	TBC
O&M accommodation platforms	TBC

2 Habitats Regulation Appraisal (HRA)

2.1 The Habitats Directive

As touched upon in the introductory sections, the European Council (EC) Directive on the conservation of natural habitats and of wild fauna and flora (92/43/EEC), generally known as 'The Habitats Directive' requires that certain important habitats and species are given legal protection through a network of protected sites, the Natura 2000 Network of European Sites.

Under Article 6 of the Habitats Directive the competent authority (in this case Scottish Ministers) must consider whether a plan or project has the potential to have an adverse effect on the integrity of a Natura 2000 European site. This process is known as the HRA. The AA (stage two of the HRA – see below) is required for a plan or project, which either alone or in combination with other plans or projects, is likely to have a significant effect on a European site and is not directly connected with or necessary for the management of the site.

Paragraph 3, Article 6 of the Habitats Directive states that:

'Any plan or project not directly connected with or necessary to the management of the site but likely to have a significant effect thereon, either individually or in combination with other plans or projects, shall be subject to appropriate assessment of its implications for the site in view of the site's conservation objectives. In the light of the conclusions of the assessment of the implications for the site and subject to paragraph 4 (see below), the competent national authority shall agree to the plan or project only having ascertained that it will not adversely affect the integrity of the site concerned and, if appropriate, after having obtained the opinion of the general public.'

Paragraph 4, Article 6 of the Habitats Directive states that:

'If, in spite of a negative assessment of the implications for the site and in the absence of alternative solutions, a plan or project must nevertheless be carried out for imperative reasons of overriding public interest, including those of social or economic nature, the Member State shall take all compensatory measures to ensure that the overall coherence of Natura 2000 is protected. It shall inform the Commission of the compensatory measures adopted.'

Where the site concerned hosts a priority natural habitat type and/or a priority species, the only considerations which may be raised are those relating to human health or public safety, to beneficial consequences of primary importance for the environment or, further to an opinion from the Commission, to other imperative reasons of overriding public interest.'

The requirements of the Habitats Directive are transposed into law in Scotland and the Scottish part of the Renewable Energy Zone by means of several pieces of legislation. These are:

- The Conservation of Habitats and Species Regulations 2010 (Habitats Regulations 2010) in respect of reserved matters; and

- The Conservation (Natural Habitats, &c.) Regulations 1994 (as amended) (Habitats Regulations 1994).

Between 12 and 200 nautical miles, out to the edge of the UK continental shelf, the following legislation applies:

- The Offshore Marine Conservation (Natural Habitats, & c.) Regulations 2007 (as amended).

2.2 Natura 2000 Network

Natura 2000 is the European Union wide network of protected areas established under the EU Habitats Directive (Council Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora). It includes Special Areas of Conservation (SACs) designated under the Habitats Directive and Special Protection Areas (SPAs) classified under the Birds Directive (Directive 2009/147/EC of the European Parliament and of the Council). The Birds Directive requires the establishment of SPAs for certain species and assemblages of birds. The Habitats Directive similarly requires SACs to be designated for species other than birds, and for habitats.

In addition to SACs and SPAs it is the UK government's policy, and that of the devolved administration in Scotland, to provide Ramsar sites with the same level of protection as that provided for Natura 2000 sites.

Together, SPAs, SACs and Ramsar sites make up the UK's contribution to the European Union's Natura 2000 network of protected areas.

2.3 Special Areas of Conservation

SACs are sites designated under European Union (EU) Directive 92/43/EEC on the conservation of habitats and of wild flora and fauna (known as the Habitats Directive), because they make a significant contribution to conserving the 189 habitat types and 788 species identified in Annexes I and II of the Directive. Designated SACs on the east coast of Scotland that may be impacted by the Project are shown as scoped in Table 3.1.

2.4 Special Protection Areas

SPAs are statutory designated sites that are classified under EU law in accordance with Article 4 of the EC Directive on the conservation of wild birds (2009/147/EC) (known as the Birds Directive). They are classified for rare and vulnerable birds, listed in Annex I to the Birds Directive, and for regularly occurring migratory species. Designated SPAs on the east coast of Scotland that may be impacted by the Project are shown as scoped in Table 3.3.

2.5 Ramsar sites

Ramsar sites are wetlands of international importance, designated under the Ramsar Convention on Wetlands of International Importance (The Ramsar Convention) which came into force in 1975. Ramsar Sites provide and protect important areas of habitat for waterbirds.

The UK government's policy, across the devolved administration, is to afford Ramsar sites the same level of protection as Natura 2000 sites and to include them within the legislative and policy framework that guides the management of Natura Sites. In the UK, many Ramsar sites are also SPAs and most have statutory underpinning as Sites of Special Scientific Interest (SSSIs).

All Ramsar sites in Scotland and all the Ramsar sites relevant to this HRA are also European sites under SAC and SPA.

2.6 European Marine Sites

The term 'European marine sites' is a grouping or collective term for SACs, SPAs, and Ramsar sites that are wholly or intermittently covered by tidal water.

The Scottish and wider UK European marine sites form part of a network of Marine Protected Areas (MPAs). Many of the later tranches of new Natura sites and extensions to existing Natura sites have been in the marine environment.

The establishment and management of European Marine Sites is covered by specific legislation and guidance.

2.7 Habitats Regulations Appraisal

HRA is a four stage process (Defra, 2010), of which this report comprises Stage 1:

- Stage 1: Screening is the process which initially identifies the likely effects upon a European site of a project or plan, either alone or in combination with other projects or plans, and considers whether these effects may be significant. It is important to note that the burden of evidence is to show, on the basis of objective information, that there will be no significant effect. If the effect may be significant, or is not known, that would trigger the need for an AA;
- Stage 2: AA is the detailed consideration of the potential effects to establish whether there is any impact on the integrity of the European site of the project or plan, either alone or in combination with other projects or plans, with respect to the European site's conservation objectives and its structure and function. This process is intended to determine whether there is objective evidence that adverse effects on the integrity of the site can be excluded. This stage also includes the development of mitigation measures to avoid or reduce any possible effects;
- Stage 3: Assessment of alternative solutions is the process which examines alternative ways of achieving the objectives of the project or plan that would avoid adverse effects on the integrity of the European site, should avoidance or mitigation measures be unable to sufficiently reduce adverse effects; and
- Stage 4: Assessment where no alternative solutions exist and where adverse effects remain. At Stage 4 an assessment is made with regard to whether or not the development is necessary for imperative reasons of overriding public interest (IROPI)

and, if so, of the compensatory measures needed to maintain the overall coherence of the Natura 2000 network.

This report has been developed to demonstrate to Scottish Ministers as the competent authority the process which Seagreen has adhered to in order to comply with Stage 1 of the HRA process.

2.8 Screening the HRA issues

'Screening' is a term used to describe Stage 1 of the HRA. It is not a term that is used in the Directive or Regulations. The screening stage allows for thorough consideration of all SACs or SPAs and their interest features where likely significant effects can be expected to occur, where effects are very unlikely and where effects are uncertain but potentially could be significant.

The screening approach undertaken for this project builds upon the consultation undertaken with key regulators including MS, JNCC and SNH. In particular the discussion regarding relevant European sites which has been confirmed in the Joint JNCC and SNH response (dated 8th September 2010) to the Phase 1 Offshore Scoping study. This screening report considers each feature of the relevant European sites in turn. It uses the best available information and technical specialist advice to make a judgement on the likelihood of the construction, operation or decommissioning of the project resulting in a significant effect on the feature.

It is accepted that for some features further discussion with key regulators or the availability of further data or design detail may be required to take the final decision regarding whether some features can be ruled in or out of the final AA. In this way the HRA will have some elements of iteration. However, in all cases where further consideration is required this will be highlighted and the views of the regulators (MS), and advisers (SNH and JNCC), sought.

The approach to each of the screening decisions is multifactor and expertise-led. It balances the sensitivity and vulnerability of each of the features of the relevant SAC or SPA against the project description and what is known of the likely impacts which can be predicted to arise. The assessment aims to make a cautious judgement on the likelihood of a significant affect occurring. The factors taken into consideration concerning the sensitivity and vulnerability of each feature of the potentially relevant European sites are considered in more detail in section 3 and section 4.

The data quality and comprehensiveness of the data set used to make the assessment has been subject to consultation with MS, SNH and JNCC through specific consultation and the EIA scoping process undertaken in July 2010.

2.9 Source pathway receptor approach

By adopting the 'source-pathway-receptor' approach it is possible to consider the potential for a Likely Significant Effect (LSE) on the features of each relevant European site to arise during project construction, operation and decommissioning. Tabulating findings wherever possible, the screening process identifies for each relevant designated site and its features:

- The SOURCE of the effect (e.g. installation and presence of foundation structures on the seabed);
- The PATHWAY for the effect (the route the source takes to reach the receptor, e.g. physical loss of habitat, non-physical disturbance such as noise and vibration, etc); and
- The RECEPTOR (if an effect is to cause harm, it must reach a receptor, e.g. marine mammal, fish or bird species, or coastal and marine habitats).

For an LSE to occur, an effect must have a source, a clear linking pathway and an adverse effect upon the receptor.

Further discussion of the differing approaches to screening the features of SACs and SPAs are contained in paragraphs 3.1 and 4.1 respectively below.

2.10 Relevant Guidance

There is little guidance for project related HRA in Scotland; the most recent Government policy relating to HRA can be found in the following information sources:

- Scottish Natural Heritage (2010) Habitats Regulation Appraisal of Plans: Guidance for Plan-Making Bodies in Scotland;
- IPC Advice note ten: Habitat Regulations Assessment relevant to nationally significant infrastructure projects (IPC, 2011);
- Planning Circular 1/2009: Development Planning Appendix 1: The Habitats Regulations;
- DG Environment. 2000, Managing Natura 2000, The provisions of Article 6 of the 'Habitats' Directive 92/43/CEE <http://ec.europa.eu/environment/nature/natura2000/>;
- Scottish Executive, 2000. Nature Conservation: Implementation in Scotland of the EC Directives of the Conservation of Natural Habitats and of Wild Flora and Fauna and the Conservation of Wild Birds (" the Habitats and Birds Directives") June 2000, Revised Guidance, updating the Scottish Office Circular no 6/1995; and
- English Nature, 1997; The Appropriate Assessment (Regulation 48) The Conservation (Natural Habitats &c) Regulations, 1994.

2.11 Cumulative and In Combination Effects, Identifying the Relevant Projects

In undertaking the HRA, and particularly the AA element, it is required that the appraisal considers the project alone and in combination with other projects which cumulatively are likely to have significant effects upon the relevant European Sites. In the screening tables below (Table 3.3 and Table 4.3) those features where a cumulative impact may be considered likely are clearly identified. For these features the potential in combination effects will be considered in more detail within the final AA document.

In recognition of the importance of the potential cumulative effects Seagreen has been a leading partner in the work of the Forth and Tay Offshore Wind Developers Group (FTOWDG). In November 2010, the FTOWDG produced a discussion document on the approach to assessment of cumulative effects (Royal Haskoning, 2010). This document was collaboration between Seagreen, and the two STW projects being developed by Mainstream and Repsol Nuevas Energias UK Limited (hereafter referred to as Repsol), and it presented to stakeholders the assessment methodologies that FTOWDG members propose to adopt on a receptor by receptor basis within their EIAs.

Seagreen are continuing to work collaboratively with the FTOWDG members on the standardisation of methods and data sharing across the other Offshore wind farm developers in the Firth of Forth to facilitate better Cumulative Impact Assessment (CIA). Key achievements to date include the production of the *East Coast Discussion Documents – Cumulative Impacts'* (Royal Haskoning, September 2009 and 2010 revision) reports.

The other plans or projects which need to be taken into account in this report in relation to potential in-combination or cumulative effects are set out below:

- the onshore underground cables from the landfall of the project to Tealing, where a large new converter station will be constructed;
- the other offshore wind farm projects proposed for the Round 3 Firth of Forth Zone (refer to Figure 1 above). In addition to Seagreen Alpha, Seagreen Bravo and the ECR, the Phase 1 projects which are the subject of this report, Seagreen intends to bring forward Phase 2 and Phase 3 of the Round 3 Firth of Forth Zone to develop up to 5 further offshore wind farms within the Zone to a combined generation capacity target of 3,465 MW; and
- the offshore wind farms proposed for Scottish Territorial Waters (STW) by Mainstream Renewable Power (hereafter referred to as 'Mainstream') and Repsol, where the EIA scoping reports for those projects have been taken into account.

Further afield, there are a number of other offshore wind farm developments and large infrastructure projects which are considered relevant to the in combination assessment. These are summarised in Table 2.1.

Table 2.1: Summary of remote relevant projects

Project	Description	Location	Status
Beatrice	Target capacity 920 MW	Outer Moray Firth	Application for consent expected 2011 earliest
Moray Firth Round 3 Zone 1	Target capacity 1300 MW	Outer Moray Firth	Application for consent expected 2013 earliest

Project	Description	Location	Status
Beatrice Demonstrator Project	2 turbines with max. capacity 10 MW	Outer Moray Firth	Operational since 2006
Aberdeen Offshore Wind Farm	5 turbines, approx. capacity 115 MW	1.5 – 5 km east of the Aberdeen coastline	Application for consent issued 2011
Blyth Offshore Wind Farm	2 turbines with max. capacity 3.8 MW	1 km off Blyth Harbour, north-east England	Operational since 2000
Edinburgh Waterfront Development	New housing, business, commercial and leisure facilities	Leith	Ongoing
Dundee Waterfront Development	New housing, business, commercial and leisure facilities	Dundee	Ongoing
Forth Replacement Crossing	Cable-stayed bridge	West of the existing Forth Road Bridge	Scheduled to be open 2016
Methil demonstrator	2 x 6 MW turbines	Methil, Firth of Forth	Consent in 2011

2.12 Consultation on HRA

Consultation is important in gaining views on the project, taking account of those views and concerns raised and addressing them within the final application. Consultation raises awareness of the project and helps to facilitate the process of obtaining the required permissions, licences and consents. Consultation was initiated early in the scoping phase of the selection of Round 3 zones, particularly in relation to ornithological issues with the Joint Nature Conservation Committee (JNCC) and Scottish Natural Heritage (SNH). These discussions have been used to shape the Phase 1 EIA scoping report (Seagreen, 2010). In addition, extensive consultation has taken place with JNCC and SNH in relation to ornithological issues through FTOWDG, further details are provided in section 4.

3 Special Areas of Conservation

The Project may have the potential to affect a number of SACs. The purpose of this screening report is therefore to establish whether the Project will have a likely significant effect (LSE) on the European sites recorded in Table 3.3 and shown on Figure 2 and to establish which sites and species may require AA. Ultimately, this is a matter for the competent authority.

3.1 The process of relevant SAC identification

The identification of potentially relevant SACs (and SPAs) is fundamental to the HRA. This began with the formal EIA scoping process and FTOWDG CIA work. Consultation between FTOWDG, TCE, the JNCC, MS and SNH identified the need for the EIA and CIA to assess impacts on marine mammals at a regional scale and establish connectivity between animals sighted within the site-specific boat surveys and SACs.

As part of the early consultation and dialogue with JNCC and SNH the discussion and identification of relevant SACs has been undertaken. This further consideration also formed part of the offshore scoping report (Seagreen 2010) and associated consultation. In their joint scoping response dated 8th September 2010, JNCC and SNH confirmed that eight SACs should be considered as a starting point for the HRA process. These eight SACs are presented in Table 3.1

The FTOWDG CIA discussion document (Royal Haskoning, 2010) highlighted specific Natura species and regional SACs that would focus a suite of technical studies to inform EIA, CIA and the HRA process.

At a meeting with TCE and the Sea Mammal Research Unit Ltd (SMRU Ltd) on 14th January 2011, TCE highlighted that FTOWDG must work with the Moray Firth Wind Development Group (MFWDG) to ensure that impact assessment methodologies are aligned with regard to the Moray Firth bottlenose dolphin, *Tursiops truncatus*, population.

A meeting between Seagreen and the Whale and Dolphin Conservation Society (WDCCS) on 11th November 2010 focussed on the requirement for the FTOWDG to assess how bottlenose dolphin from the Moray Firth SAC use the inner Tay during the summer months.

FTOWDG have scheduled a meeting with MS, SNH and the JNCC in early October 2011 to present FTOWDG's coordinated approach to baseline site characterisation and impact assessment methodologies in relation to marine mammals. Discussions will focus around FTOWDG's proposed approach to HRA for protected seal colonies in the region and the Moray Firth SAC.

A suite of technical studies have been commissioned through the SMRU and SMRU Ltd in order to determine how Natura species of marine mammals use the regional waters of the STW sites and the Zone.

Consideration should be given to both species of seals in terms of the historic population surveys and pup production trend data which has been gathered by SMRU over several decades. In addition, the behavioural and spatial use of the project area and wider sea area are important considerations when assessing effects. The primary source of information on foraging ranges of both seal species, grey and common, has been from seal telemetry data collected from animals tagged within the SACs in question. Analysis of this data is ongoing as part of the FTOWDG technical marine mammal studies.

The Moray Firth bottlenose dolphins are known to use the coastal waters of South East Scotland. In order to obtain a suitably robust data set on which to base the EIA and eventual AA, SMRU Ltd and Aberdeen University have been commissioned to assist in the consideration of bottlenose dolphin and relevant SACs. SMRU Ltd and Aberdeen University have been commissioned to undertake analysis of photo identification and focal follow data from bottlenose dolphins in the inner Tay Estuary. All data available for use in this project are owned, either in part or full by the SMRU, University of St Andrews, Lighthouse Field Station, or by the University of Aberdeen. The objective of this work is to determine the relative abundance, distribution and behaviour of this species within the study area. An assessment of the connectivity between individuals using the Moray Firth SAC and the Tay area will also be made.

A meeting between Seagreen and MS on 1st August 2011 focussed on the requirement for AA of the riverine SACs in Scotland and North of England which are identified for their migratory fish features (primarily the Atlantic Salmon, *Salmo salar*, and River Lamprey, *Lampetra fluviatilis*).

It was concluded at the meeting that due to the unknown behaviour of these fish species when they return to the sea there was the potential for connectivity and therefore further consideration would be required. Seagreen raised the issue of cumulative impacts associated with all of the developments in the region and how MS intends to assess the impacts through the HRA process, MS were due to meet with JNCC and SNH to discuss this on the 8th August 2011 and Seagreen are awaiting the minutes of the meeting.

As part of the process of identifying relevant SACs to be included within the HRA the following information about the SAC has been taken into account:

- the species' conservation importance;
- the current conservation status of the SAC feature (including recent 'pup production' rates for seals);
- the numbers seen or recorded within the Phase 1 area and the wider Zone;
- proximity of known breeding colonies;
- temporal-spatial distribution of animals within regional waters;
- habitat association patterns within the Phase 1 area, wider Zone and adjacent waters; and

- foraging dynamics (the distribution and seasonal abundance of prey species within regional waters).

In undertaking the screening appraisal the SAC specific information will be set against the project description and construction information.

3.2 Relevant SACs and their Features

A summary of the general description of each of these relevant SACs is provided in Appendix 1 of the Offshore Phase 1 HRA Screening Report Appendices. These descriptions are drawn from the site details held on the JNCC website (<http://jncc.defra.gov.uk>). The description provided in Appendix 1 focuses on those qualifying interest features that are considered to have potential to be affected by the Project. Table 3.1 below lists the relevant SACs to be considered within this HRA screening process.

Table 3.1: SACs in the Firth of Forth region with the potential requirement for AA.

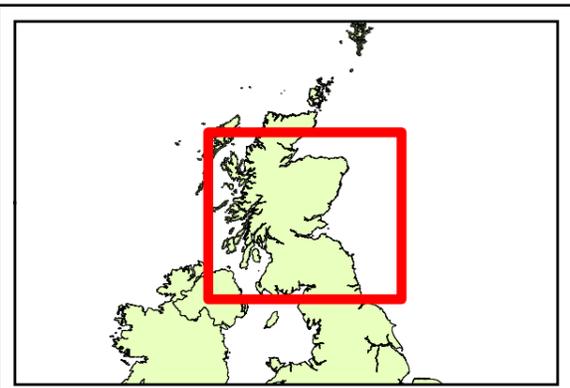
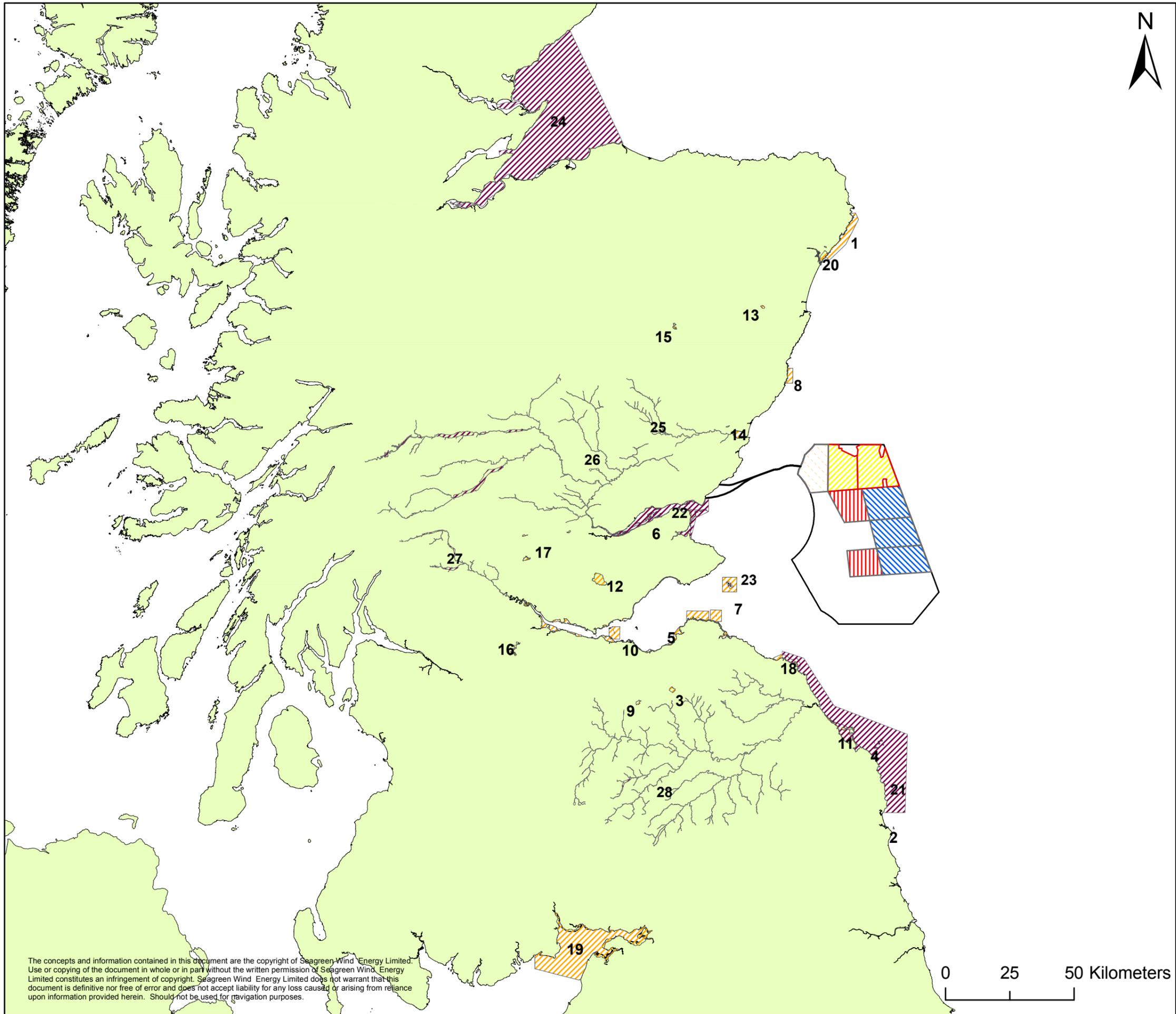
Special Areas of Conservation	
Isle of May	River South Esk
Berwickshire North Northumberland Coast	River Tay
Firth of Tay & Eden Estuary	River Teith
Moray Firth	River Tweed

In consideration of the primary and secondary features of the eight SACs, a judgement has been made of the relevant features within the European sites where there may be a possibility of an impact arising from the project's construction, operation or decommissioning. This "course filtering" process has been informed and led through the EIA scoping report and ongoing consultation and is confirmed in the joint scoping advice from JNCC and SNH as worthy of consideration within the HRA process.

A judgment of the risk of LSE is then given (summarised in Table 3.3) based on the nature of the effect, any published evidence of known effects from constructed wind farms and whether the effects may be cumulative. Where LSE is judged to be possible, the European site feature row is highlighted in Orange, where it is screened out it is highlighted green.

Table 3.2: SAC Features which require screening for AA based on qualifying habitats and species features of SACs in Table 3.1

Annex 1 Species	Annex 1 Habitat
Common Seal	Reefs
Grey Seal	Large shallow inlets and bays
Bottlenose Dolphin	Intertidal mudflats and Sandflats
Fresh Pearl Mussel	Estuaries
Atlantic salmon	Subtidal sandbanks
Sea Lamprey	Clear water lochs
River Lamprey	Floating vegetation
Brook Lamprey	Sea Caves
Otters	



Legend

- R3 Zone Boundary
- Export Cable Route Centre line
- Potential Export Cable Route to Phase 1. Route TBC Nov 2011
- Phase 1-Alpha and Bravo (Indicative)
- Phase 2-Charlie, Delta & Echo (Indicative)
- Phase 3-Foxtrot and Golf (Indicative)

- SPA**
- | | | |
|------------------------------------|--|---|
| 1. Buchan Ness to Collieston Coast | 11. Lindsfame | SAC |
| 2. Coquet Island | 12. Loch Leven | SPA |
| 3. Fala Flow | 13. Loch of Skene | |
| 4. Farn Islands | 14. Montrose Basin | |
| 5. Firth of Forth | 15. Muir of Dinnet | |
| 6. Firth of Tay & Eden Estuary | 16. Slamannan Plateau | |
| 7. Forth Islands | 17. South Tayside Goose Roosts | |
| 8. Fowlsheugh | 18. St Abb's Head to Fast Castle | |
| 9. Gladhouse Reservoir | 19. Upper Solway Flats and Marshes | |
| 10. Imperial Dock Lock, Leith | 20. Ythan Estuary, Sands of Forvie and Meikle loch | |
- SAC**
- | | |
|---|---------------------|
| 21. Berwickshire and North Northumberland Coast | 25. River South Esk |
| 22. Firth of Tay and Eden Estuary | 26. River Tay |
| 23. Isle of May | 27. River Teith |
| 24. Moray Firth | 28. River Tweed |

Coordinate System

UTM Zone 30 North (WGS84)
 Projection: Transverse Mercator
 Central Meridian: -3° East
 Scale Factor: 0.9996
 Latitude of Origin: 0° North
 False Easting: 500000.0
 False Northing: 0.0
 Reference Spheroid: WGS84
 Semi-major Axis: 6378137.0
 Inverse Flattening: 298.2572236

Title:
Firth of Forth Round 3 Offshore Wind Farm Zone



Figure / Drawing Title:
Relevant European Sites considered within HRA screening

Figure/Drawing Number: **Figure 2**

UNLESS THE REVISION IS 1 OR HIGHER THE DRAWING IS NOT TO BE USED FOR DESIGN OR CONSTRUCTION

REV	DATE	DESCRIPTION	BY	CKD	APPR
B0	20 Oct 11	ISSUED	DCT	NHC	KB
A0	30 Sept 11	DRAFT	DCT	AD	

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3.3 Results

The SAC HRA screening table has been laid out as follows:

Column 1 – European Site Name: this is the name of the SAC.

Column 2 – European Site Features: this lists the qualifying habitats and species of the SAC which are considered to be relevant for inclusion within the HRA process. For example terrestrial species which are clearly irrelevant with regard to this HRA have not been listed or considered.

Column 3 – Species or Feature of Particular Note: in addition, the condition of the species at each SAC is provided plus the year of its assessment. For Scottish SACs this information is taken from the Sitelink website.

Site condition data for SACs in England is taken from the citation for the equivalent SSSI as shown on the Nature on the Map website (Natural England); this is undated.

Column 4 – Seasonality and Key Characteristics of the Feature: this describes any seasonality and key characteristics of the species which are particularly relevant to the screening judgement taken

Column 5 – Risk of Likely Significant Effect (LSE): a judgment of risk of LSE is then given based on the nature of the effect, any published evidence of known effects from constructed offshore wind farms and whether the effects may be cumulative. This column simply summarises the risk of LSE as either Yes (Y) or No (N). In a small number of cases, where evidence is equivocal, then Y/N is applied. Where the assessment is that the risk of LSE is likely, the row is shaded orange, where it is considered unlikely, the row is shaded green.

Column 6 – Justification Notes: potential direct and indirect effects on each species are noted here with, where relevant, a brief justification of why an AA may be required. This is based on the nature of the effect, any published evidence of known effects from constructed wind farms and whether the effects may be cumulative. SACs for which cumulative assessments may be required are indicated in column 7.

Column 7 – Inclusion in CIA: this column includes a judgment of whether cumulative/in-combination effects from other projects will need to be taken into account for this species at this site.

Table 3.3: SAC HRA Screening Table (Green = screened out of the HRA; Orange = screened in for further consideration within the HRA process)

European Site Name	European Site Features	Species or features of interest	Seasonality and Key Characteristics of Feature	LSE Y/N	Justification notes	Inclusion in CIA Y/N	JNCC/SNH Agreement Y/N
Isle of May SAC							
Isle of May SAC	Inshore Sublittoral rock Annex I habitats present as a qualifying feature, but not a primary reason for selection of this site	Reefs Favourable Maintained 2009	The reef structures are permanent features on the Isle of May.	N	No further consideration required as there is limited potential connectivity between the site feature and likely significant effects of the construction and operation of the project. CIA considered unlikely as there is limited route for impact arising from the project in combination with other relevant projects. This position also reflects the advice received from JNCC & SNH in the EIA scoping response dated 8 th September 2010.	N	
Isle of May SAC	Mammals Annex II species that are a primary reason for selection of this site	Grey Seals Favourable Maintained 2007	The site is the largest east coast breeding colony of grey seals in Scotland and the fourth-largest breeding colony in the UK, contributing approximately 4.5% of annual UK pup production. Grey seals are present in low numbers throughout most of the year, with most animal present during the pupping season in October and December and the moult period in early spring. Animals are most vulnerable to disturbance during these periods.	Y	No direct physical disturbance to the SAC. The potential construction methods being considered includes piling and other noisy operations which may affect seal foraging behaviour, grey seals have a foraging range over 100 km from their haul-out sites and it is possible that individuals from the Isle of May could be found within, or in close proximity, to the Project and may be potentially vulnerable to disturbing underwater sound fields which extend well beyond the project boundary. Further impacts may arise through boat movements, cable-laying and other construction activity as there may be impacts to the grey seals' noise sensitive prey species either from the placement of infrastructure or due to noise disturbance. It is possible that other offshore wind farm or large marine infrastructure projects may be in construction or operation during the same period. This could potentially result in cumulative or in-combination noise or disturbance impacts upon seals.	Y	
Berwickshire & North Northumberland Coast SAC							
Berwickshire & North Northumberland Coast SAC	Mammals Annex II species that are a primary reason for selection of this site	Grey seals Favourable Maintained 2009	Grey seals spend most of the year at sea, and may range widely in search of prey. They come ashore in autumn to form breeding colonies on rocky shores, beaches, in caves, occasionally on sandbanks, and on small largely uninhabited islands and inaccessible area of the coastline.	Y	No direct physical disturbance to the SAC. The Rochdale envelope includes piling and other noisy operations which may impact seal foraging behaviour, grey seals have a foraging range over 100 km from their haul-out sites and it is possible that individuals from the Berwickshire & North Northumberland Coast SAC may be found within, or in close proximity, to the proposed development. Further impacts may arise through boat movements, cable-laying and other construction activity as there may be impacts to their prey species – either from the placement of infrastructure or due to noise disturbance. It is possible that other offshore wind farms or large marine infrastructure projects may be in construction or operation during the same period. This could potentially result in cumulative or in-combination noise or disturbance impacts upon seals.	Y	

European Site Name	European Site Features	Species or features of interest	Seasonality and Key Characteristics of Feature	LSE Y/N	Justification notes	Inclusion in CIA Y/N	JNCC/SNH Agreement Y/N
Berwickshire & North Northumberland Coast SAC	Littoral Sediment, rock and Sub Littoral Rock Annex I habitats that are a primary reason for selection of this site	Large shallow inlets and bays		N	No further consideration required as there is limited potential connectivity between the site feature and likely significant impacts of the construction and operation of the project. The distance between the project and the SAC makes any impact unlikely to be detectable or of any significance. This position also reflects the advice received from JNCC & SNH in the EIA scoping response dated 8 th September 2010.	N	
		Intertidal mudflats and Sandflats		N	No further consideration required as there is limited potential connectivity between the site feature and likely significant impacts of the construction and operation of the project. This position also reflects the advice received from JNCC & SNH in the EIA scoping response dated 8 th September 2010.	N	
		Reefs		N	No further consideration required as there is limited potential connectivity between the site feature and likely significant impacts of the construction and operation of the project. This position also reflects the advice received from JNCC & SNH in the EIA scoping response dated 8 th September 2010.	N	
		Sea caves Favourable maintained 2003		N	No further consideration required as there is limited potential connectivity between the site feature and likely significant impacts of the construction and operation of the project. This position also reflects the advice received from JNCC & SNH in the EIA scoping response dated 8 th September 2010.	N	
Firth of Tay & Eden Estuary SAC							
Firth of Tay & Eden Estuary SAC	Mammals Annex II species that are a primary reason for selection of this site	Common Seals Unfavourable Declining 2009	Common seals are the characteristic seal of sandflats and estuaries, but are also found on rocky shores in Scotland. As pups swim almost immediately after birth, seals can breed on sheltered tidal areas where banks allow access to deep water. Common seals may range widely in search of prey, but individuals often return to favoured haul-out sites. The breeding season is from July – August inclusive.	Y	No direct physical disturbance to the SAC. Rochdale envelope includes piling and other noisy operations which may impact seal foraging behaviour as the seals are not confined within the SAC itself, and will forage more widely in the waters of the Firths of Forth and Tay. Underwater noise from wind farm construction, vessel movements and cable-laying activities are likely to extend beyond the boundaries of the construction site. The project area includes potentially important transit and foraging areas (notably in the region of Wee Bankie, Scalp Bank and Marr Deep). Further indirect effects on prey species, either from the placement of infrastructure or disturbance from underwater noise. These direct and indirect effects could potentially affect the seals using the SAC and may also impact upon the overall pup productivity from the SAC. It is possible that other offshore wind farms or large marine infrastructure projects may be in construction or operation during the same period. This could potentially result in cumulative or in-combination noise or disturbance impacts upon seals.	Y	
Firth of Tay & Eden Estuary SAC	Littoral Sediment Annex I habitats that are a primary	Estuaries (not listed by SNH)		N	No further consideration required as there is limited potential connectivity between the site feature and likely significant impacts of the construction and operation of the project.	N	

European Site Name	European Site Features	Species or features of interest	Seasonality and Key Characteristics of Feature	LSE Y/N	Justification notes	Inclusion in CIA Y/N	JNCC/SNH Agreement Y/N
	reason for selection of this site	September 2011)			This position also reflects the advice received from JNCC & SNH in the EIA scoping response dated 8 th September 2010.		
Firth of Tay & Eden Estuary SAC	Littoral Sediment Annex I habitats present as a qualifying feature, but not a primary reason for selection of this site	Intertidal Mudflats & Sandflats Favourable Maintained 2002		N	No further consideration required as there is limited potential connectivity between the site feature and likely significant impacts of the construction and operation of the Project. This position also reflects the advice received from JNCC & SNH in the EIA scoping response dated 8 th September 2010.	N	
Firth of Tay & Eden Estuary SAC	Inshore Sublittoral Sediment Annex I habitats present as a qualifying feature, but not a primary reason for selection of this site	Subtidal sandbanks Favourable Maintained 2002		N	No further consideration required as there is limited potential connectivity between the site feature and likely significant impacts of the construction and operation of the project. This position also reflects the advice received from JNCC & SNH in the EIA scoping response dated 8 th September 2010.	N	
Moray Firth SAC							
Moray Firth SAC	Mammals Annex II species that are a primary reason for selection of this site	Bottlenose dolphins Unfavourable Recovering 2005	The Moray Firth in north-east Scotland supports the only known resident population of bottlenose dolphins in the North Sea. The population is estimated to be around 130 individuals (Wilson <i>et al.</i> 1999). Dolphins are present all year round and they range widely in the Moray Firth.	Y	It is well established that bottlenose dolphins are wide-ranging, and may be found in the waters of the Firths of Forth and Tay. The dolphins are likely to be predominantly close to the coast. Construction noise from the wind farm is likely to extend beyond the boundaries of the site and may overlap with bottlenose dolphin use of the surrounding area. Barrier effects arising from noisy construction operations or the wind farm structure may cause a project and cumulative impact. Noise and disturbance effects may occur upon certain dolphin prey species either from the placement of infrastructure or due to noise and vessel disturbance. It is possible that other offshore wind farms or large marine infrastructure projects may be in construction or operation during the same period. This could potentially result in cumulative or in-combination direct or indirect effects.	Y	
Moray Firth SAC	Inshore Sublittoral Annex I habitats present as a qualifying feature, but not a primary reason for selection of this site sandbanks which are slightly covered by sea water all the time	Subtidal sandbank habitat Favourable Maintained 2004		N	No further consideration required as there is limited potential connectivity between the site feature and likely significant impacts of the construction and operation of the project. This position also reflects the advice received from JNCC & SNH in the EIA scoping response dated 8 th September 2010.	N	
River South Esk SAC							
River South Esk SAC	Fish Annex II species that are a primary reason for selection of this site	Atlantic salmon Unfavourable Recovering 2004	Seasonal use of migratory pathways and coastal waters.	Y	There could be connectivity between Phase 1 and the Salmon passing through the waters off South East Scotland as they return to or disperse from the River South Esk SAC (Malcolm <i>et al.</i> , 2010). The effects of construction and operational noise / vibration, on these fish as well as any other types of disturbance will be assessed as far as is appropriate within the EIA and AA.	Y	

European Site Name	European Site Features	Species or features of interest	Seasonality and Key Characteristics of Feature	LSE Y/N	Justification notes	Inclusion in CIA Y/N	JNCC/SNH Agreement Y/N
					It is possible that other offshore wind farms or large marine infrastructure projects may be in construction or operation during the same period. This could potentially result in cumulative or in-combination noise and vibration impacts upon Atlantic salmon.		
River South Esk SAC	Other Invertebrate Annex II species that are a primary reason for selection of this site	Freshwater pearl mussel Unfavourable Declining 2002		Y	Atlantic salmon are host species for freshwater pearl mussel during a critical parasitic phase of the mussel's lifecycle. Therefore there could be an indirect impact upon the pearl mussels if the salmon population and behaviour are significantly affected. It is possible that other offshore wind farm or large marine infrastructure projects may be in construction or operation during the same period. This could potentially result in cumulative or in-combination noise and vibration impacts upon the Atlantic salmon, host species of the pearl mussel.	Y	
River Tay SAC							
River Tay SAC	Fish Annex II species that are a primary reason for selection of this site	Atlantic salmon Favourable Maintained 2004	Seasonal use of migratory pathways and coastal areas.	Y	There could be connectivity between Phase 1 and the River Tay SAC. The effects on these fish of construction and operational noise / vibration, as well as any other types of disturbance will be assessed as far as is appropriate to support a robust EIA and AA. It is possible that other offshore wind farms or large marine infrastructure projects may be in construction or operation during the same period. This could potentially result in cumulative or in-combination noise and vibration impacts upon Atlantic salmon	Y	
	Fish Annex II species that are present as a qualifying feature but not a primary reason for site selection	Brook lamprey Favourable Maintained 2007		N	No further consideration required as Brook lamprey are confined to the fresh water section of the river. There is therefore limited potential connectivity between the site feature and likely significant impacts of the construction and operation of the project. This position also reflects the advice received from JNCC & SNH in their joint EIA scoping advice dates 8 th September 2010.	N	
		River lamprey Favourable Maintained 2007	Seasonal use of migratory pathways and coastal waters.	Y	There could be connectivity between Phase 1 and the River Tay SAC. The effects on these fish of construction and operational noise / vibration, as well as any other types of disturbance will be assessed as far as is appropriate within the EIA and AA. It is possible that other offshore wind farms or large marine infrastructure projects may be in construction or operation during the same period. This could potentially result in cumulative or in-combination noise, or disturbance impacts upon the river lamprey.	Y	
		Sea lamprey Favourable Maintained 2007	Seasonal use of migratory pathways and coastal waters.	Y	There could be connectivity between Phase 1 . and the River Tay SAC. The effects on these fish of construction and operational noise / vibration, as well as any other types of disturbance will be assessed as far as required to support a robust EIA and AA. It is possible that other offshore wind farms or large marine infrastructure projects may be in construction or operation during the same period. This could potentially result in cumulative or in-combination direct or indirect effects on the sea lamprey.	Y	
River Tay SAC	Mammal Annex II species that are a primary reason for selection of this site	Otter Favourable Maintained 2004	Seasonal use of migratory pathways and coastal waters.	N	No Connectivity. Whilst otters use the coastal environment, they tend to remain close to shore foraging usually in water up to 10m deep. No further consideration required as there is limited potential connectivity between the site feature and likely significant impacts of the construction and operation of the project.	N	

European Site Name	European Site Features	Species or features of interest	Seasonality and Key Characteristics of Feature	LSE Y/N	Justification notes	Inclusion in CIA Y/N	JNCC/SNH Agreement Y/N
					This position also reflects the advice received from JNCC & SNH in the EIA scoping response dated 8 th September 2010.		
River Tay SAC	Standing open water and canals Annex I habitats that are a primary reason for selection of this site	Clear water lochs Favourable Maintained 2004		N	No further consideration required as there is no potential connectivity between the site feature and likely significant impacts of the construction and operation of the project. This position also reflects the advice received from JNCC & SNH in their joint EIA scoping advice dated 8 th September 2010.	N	
River Teith SAC							
River Teith SAC	Fish Annex II species that are a primary reason for selection of this site	Atlantic salmon Unfavourable Recovering 2003	Seasonal use of migratory pathways and coastal waters.	Y	There may be connectivity between Phase 1 and the River Teith SAC. The effects on these fish of construction and operational noise / vibration, as well as any other types of disturbance will be assessed as far as appropriate to inform the EIA and AA. It is possible that other offshore wind farms or large marine infrastructure projects may be in construction or operation during the same period. This could potentially result in cumulative or in-combination direct or indirect effects	Y	
	Fish Annex II species that are present as a qualifying feature but not a primary reason for site selection	Brook lamprey Favourable Maintained 2003		N	No further consideration required as Brook lamprey are confined to the fresh water of the river. There is therefore limited potential connectivity between the site feature and likely significant impacts of the construction and operation of the project. This position also reflects the advice received from JNCC & SNH in their joint EIA scoping advice dated 8 th September 2010.	N	
		River lamprey Favourable Maintained 2003	Seasonal use of coastal waters and migratory pathways potential interconnectivity.	Y	There could be connectivity between Phase 1 and the River Teith SAC. The effects on these fish of construction and operational noise / vibration, as well as any other types of disturbance will be assessed. It is possible that other offshore wind farms or large marine infrastructure projects may be in construction or operation during the same period. This could potentially result in cumulative or in-combination direct or indirect effects.	Y	
River Teith SAC		Sea lamprey Favourable Maintained 2000.	Seasonal use of coastal waters and migratory pathways potential interconnectivity.	Y	There could be connectivity between Phase 1 of the wind farm proposal and the SAC Marine Scotland. The effects on these fish of construction and operational noise / vibration, as well as any other types of disturbance will be assessed. It is possible that other offshore wind farm or large marine infrastructure projects may be in construction or operation during the same period. This could potentially result in cumulative or in-combination direct or indirect effects.	Y	
River Tweed SAC							
River Tweed SAC	Fish Annex II species that are a primary reason for selection of this site	Atlantic salmon Unfavourable Recovering 2004	Seasonal use of coastal waters and migratory pathways potential interconnectivity.	Y	There could be connectivity between Phase 1 and the River Tweed SAC. The effects on these fish of construction and operational noise / vibration, as well as any other types of disturbance will be considered and assessed as required to support a robust EIA and AA. It is possible that other offshore wind farms or large marine infrastructure projects may be in construction or operation during the same period. This could potentially result in cumulative or in-combination direct or indirect effects.	Y	
River Tweed SAC	Fish Annex II species that are present as a qualifying feature but not a	Brook lamprey Unfavourable No Change 2004		N	Brook lamprey are restricted to freshwater environments. No further consideration required as there is limited potential connectivity between the site feature and likely significant impacts of the construction and operation of the project.	N	

European Site Name	European Site Features	Species or features of interest	Seasonality and Key Characteristics of Feature	LSE Y/N	Justification notes	Inclusion in CIA Y/N	JNCC/SNH Agreement Y/N
	primary reason for site selection				This position also reflects the advice received from JNCC & SNH in their joint EIA scoping advice dated 8th September 2010.		
River Tweed SAC		River lamprey Unfavourable No Change 2004	Seasonal use of coastal waters and migratory pathways potential interconnectivity.	Y	There could be connectivity between Phase 1 of the wind farm proposal and the River Tweed SAC. The effects on these fish of construction and operational noise / vibration, as well as any other types of disturbance will be considered and assessed to support a robust EIA and AA. It is possible that other offshore wind farm or large marine infrastructure projects may be in construction or operation during the same period. This could potentially result in cumulative or in-combination direct or indirect effects	Y	
River Tweed SAC		Sea lamprey Unfavourable No Change 2004	Seasonal use of coastal waters and migratory pathways potential interconnectivity.	Y	There could be connectivity between Phase 1 and the River Tweed SAC. The effects on these fish of construction and operational noise / vibration, as well as any other types of disturbance will be considered and assessed to support a robust EIA and AA. It is possible that other offshore wind farm or large marine infrastructure projects may be in construction or operation during the same period. This could potentially result in cumulative or in-combination direct or indirect effects	Y	
River Tweed SAC	Mammals	Otter Favourable Maintained 2003		N	Whilst otters from the River Tweed SAC may use coastal waters they tend to remain restricted to comparatively shallow waters of around 10m. No further consideration required as there is limited potential connectivity between the site feature and likely significant impacts of the construction and operation of the proposed Seagreen Phase 1 wind farm developments. This position also reflects the advice received from JNCC & SNH in their joint EIA scoping advice dated 8 th September 2010.	N	
River Tweed SAC	River and Streams	Floating vegetation Unfavourable No Change 2004	No Connectivity.	N	No further consideration required as there is no potential connectivity between the site feature and likely significant impacts of the construction and operation of the project. This position also reflects the advice received from JNCC & SNH in their joint EIA scoping advice dated 8 th September 2010.	N	

3.4 Screening outcome

The outcome of the screening exercise above is summarised in Table 3.4 below, where the features of relevant SACs that will be taken forward for further consideration are identified. Seagreen now wishes to consult with JNCC, SNH and MS in order to confirm whether they concur with this screening assessment and to ascertain what further information will be required in order to provide adequate information to inform the AA.

Based on the findings of both the HRA screening and on the environmental assessments undertaken, it is considered unlikely that there would be significant effects upon any of the habitats, otters or brook lamprey within the rivers and therefore AA is unlikely to be needed. This position was supported by JNCC and SNH in their response to the scoping report (8th September 2010) in which they stated:

“The other interests of these freshwater SACs – otter, brook lamprey and habitat interests – and the habitat interests of Isle of May, Firth of Tay & Eden Estuary, Moray Firth and Berwickshire & North Northumberland Coast SACs do not need further consideration in respect of the offshore elements of this wind farm proposal i.e. there is no connectivity between them”.

A discussion and consideration of the species identified and their status on the sites is presented in Appendix 1 of the Offshore Phase 1 HRA Screening Report Appendices .

Table 3.4: Summary of SACs and the features of these SACs which are considered to require AA

SAC	Feature(s) for which AA may be required
Isle of May	Grey seal
Berwickshire North Northumberland Coast	Grey seal
Firth of Tay & Eden Estuary	Common seal
Moray Firth	Bottlenose dolphin
River South	Atlantic salmon and pearl mussel
River Tay	Atlantic salmon, river lamprey and sea lamprey
River Teith	Atlantic salmon, river lamprey and sea lamprey
River Tweed	Atlantic salmon, river lamprey and sea lamprey

4 Special Protection Areas

The Project, alone or in combination with future projects in Phases 2 and 3 of the Zone and/or other projects and plans, may have the potential to affect a number of SPAs. The purpose of this screening report is to anticipate whether or not the Project will have a likely significant effect on the integrity of the European sites recorded in Table 4.3 and to conclude which sites and species may require AA, with the aim of opening a dialogue for further discussions on this matter with JNCC, SNH and MS.

It is noted that Ramsar sites also qualify as European sites in this context. However, as all relevant Ramsar sites in the Firth of Forth region are also designated as SPAs, they are simply recorded, against the appropriate SPA, but not discussed separately.

4.1 The process of relevant SPA Identification

The SPAs to be included in this HRA screening stage have been identified as part of an iterative process undertaken with the FTOWDG, the JNCC, SNH and the Royal Society for the Protection of Birds¹ (RSPB) and are shown in Figure 2.

Initial meetings in 2010 between FTOWDG, TCE, JNCC and SNH defined the area over which cumulative impacts on birds might extend. This was defined as the region between Peterhead and the Farne Islands. It was subsequently agreed that this region was indicative only and might need to be extended (or reduced) for certain species and that the region of influence for each species would be considered on a case-by-case basis.

All qualifying and assemblage species for SPAs within this region were then collated into 'key features' tables (Prior, A. in King *et al.*, 2009) and screened to identify those species which were unlikely to require cumulative assessment. The results were published in the Cumulative Study Report Ornithology (AMEC, 2009) issued via FTOWDG to JNCC, SNH and RSPB. Comments from these organisations were incorporated into a final version of the tables which was published in a revised report (AMEC, 2010).

Subsequently, JNCC and SNH have reviewed and screened the tables again (email from Catriona Gall SNH, JNCC and MS to FTOWDG of 29/03/2011) to provide FTOWDG with Excel spreadsheets containing a list of all SPAs (Table 4.1) and features (Table 4.2) which should be scoped in to cumulative assessment (and by default, the HRA process) in relation to the Project, other wind farm projects within the Firth of Forth Zone and the two STW projects: Neart na Gaoithe and Inch Cape.

This report reviews the 20 SPAs and 55 species in Tables 4.1 and 4.2 in the light of evidence collected by Seagreen during its ornithological surveys of the Firth of Forth Round 3 Zone between December 2009 and December 2010, focussing on Phase 1, and presented in its

annual report (Seagreen, 2011), plus data from other developers e.g. Mainstream Renewable Power (undated) and other surveys of key species commissioned by FTOWDG e.g. Daunt *et al.* 2011; Hamer *et al.* 2011.

To anticipate whether an AA may be required, the following information has been taken into account:

- the species' conservation importance;
- the numbers seen within Phase 1 and the Zone as a whole;
- for breeding birds, whether they are within foraging range of Phase 1;
- for migratory species any known patterns of migration; and
- for wintering species, known patterns of distribution within the region.

Information on the species' current population trends (JNCC, 2011) has also been considered as, where a species is declining; additional wind farm mortality may have a compounding effect.

The primary source of information on foraging ranges has been Seabird-wikispaces as advised by JNCC and SNH in their response to Seagreen's annual report (email of 10th August 2010), plus Global Positioning System (GPS) tracking data collected from seabirds on the Isle of May (Forth Islands SPA) in 2010 (Daunt *et al.*, 2011).

The potential effects discussed for each species are taken from Langston 2010.

4.2 Relevant SPAs

The SPAs considered relevant to this HRA are listed in Table 4.1 and a general description of each one is provided in Appendix 2 of the Offshore Phase 1 HRA Screening Report Appendices.

Table 4.1: SPAs in the Firth of Forth region with the potential requirement for AA.

Special Protection Area	
Buchan Ness to Collieston Coast	Lindisfarne
Coquet Island	Loch Leven
Fala Flow	Loch of Skene
Farne Islands	Montrose Basin
Firth of Forth	Muir of Dinnet
Firth of Tay and Eden Estuary	St Abbs Head to Fast Castle
Forth Islands	Slamannan Plateau

¹ RSPB commented on the initial draft of the FTOWDG Cumulative Report Ornithology but have not commented on the screening tables provided subsequently by JNCC/SNH.

Special Protection Area	
Fowlsheugh	South Tayside Goose Roosts
Gladhouse Reservoir	Upper Solway Flats and Marshes
Imperial Dock Lock, Leith	Ythan Estuary, Sands of Forvie and Meikle Loch

The following 55 species are qualifying or assemblage features of the SPAs listed in Table 4.1 and identified by SNH, JNCC and MS in their email of 29/03/2011 (see above). They are listed in taxonomic order. A brief account is provided in Appendix 2 of the Offshore Phase 1 HRA Screening Report Appendices for each species retained in Table 4.3 as requiring further consideration in the HRA process.

Table 4.2: Species which require screening for AA based on qualifying and assemblage features of SPAs in Table 4.1

Whooper Swan	Slavonian Grebe
Bean Goose (Taiga)	Marsh Harrier
Pink-footed Goose	Oystercatcher
Greylag Goose	Ringed Plover
Barnacle Goose	Golden Plover
Brent Goose	Grey Plover
Shelduck	Lapwing
Wigeon	Knot
Gadwall	Sanderling
Teal	Dunlin
Mallard	Black-tailed Godwit
Shoveler	Bar-tailed Godwit
Pochard	Curlew
Tufted Duck	Redshank
Scaup	Turnstone
Eider	Kittiwake
Long tailed Duck	Black-headed Gull
Common Scoter	Lesser Black-backed Gull
Velvet Scoter	Herring Gull

Goldeneye	Little Tern
Red-breasted Merganser	Sandwich Tern
Goosander	Common Tern
Red-throated Diver	Roseate Tern
Fulmar	Arctic Tern
Gannet	Guillemot
Cormorant	Razorbill
Shag	Puffin
Great Crested Grebe	

4.3 Results

The SPA HRA screening table has been laid out as follows:

Column 1 – European Site Name: this is the name of the SPA and states whether it is also a Ramsar site.

Column 2 – European Site Features: this lists the qualifying and assemblage features as published in the site designation. SNH has specifically requested that, for Scottish SPAs, SNH's Sitelink website is used as the primary source of this information and this advice has been followed. In addition, for each SPA, a note is provided as to whether the Sitelink data is derived from the Natura Standard Data Form, the SPA Review (Stroud *et al.*, 2001) or more recent designations such as those for SPAs with marine extensions made by the Scottish Government in 2009.

Column 3 – Species or Feature of Particular Note: this column lists the species common name, Latin name, whether it is a qualifying (Q) or assemblage (A) species and the season for which it is designated i.e.

- BR: Breeding
- M: Migratory
- P: Passage
- W: Wintering

In addition, the condition of the species at each SPA is provided plus the year of its assessment. For Scottish SPAs, this information is taken from the Sitelink website and uses the following abbreviations:

- FD: Favourable declining
- FM: Favourable maintained
- FR: Favourable recovered
- UD: Unfavourable declining
- UNC: Unfavourable no change
- UR: Unfavourable recovering

Condition for species within SPAs in England is taken from the citation for the equivalent SSSI as shown on the 'Nature on the Map website' (Natural England, undated). This utilises a different terminology as shown below. Where a species' condition is unavailable, this is stated.

- ISD: Increased since designation
- DSD: Decreased since designation
- Static: Static

Column 4 – Seasonality and Key Characteristics of the Feature: this describes the seasonality and key characteristics of the species within Phase 1 based on evidence derived from boat-based and aerial surveys. In some cases, where data are available, information is provided on the species' abundance in the adjacent Scottish Territorial Waters sites. Information on flight direction, GPS tracking data (e.g. Daunt *et al.*, 2011) and foraging range have been used to briefly discuss potential linkage between birds observed within Phase 1 and the relevant SPA. There are a number of sources of foraging range data however the primary source used in this table is Seabird-wikispaces (BirdLife International, undated) - values marked as ¹ in the table, plus Langston 2010 - values marked as ². The species accounts also cite foraging ranges from Thaxter *et al.* (Unpublished data). SNH, JNCC and MS's seasonal assessment requirements based on the Excel tables provided to FTOWDG (Email of 29/03/2011) are indicated in brackets.

- BR: Breeding
- PBR: Post-breeding
- P: Passage
- W: Wintering

Column 5 – Risk of Likely Significant Effect (LSE): a judgment of risk of Likely Significant Effect (LSE) is then given based on the nature of the effect and any published evidence of known adverse effects from constructed wind farms. The column simply summarises the risk of LSE as either Yes (Y) or No (N). In a small number of cases, where evidence is equivocal, then Y/N is applied. Where the assessment concludes that there is a risk of LSE is shaded orange, where it is considered unlikely, the row is shaded green.

Column 6 – Justification Notes: Potential direct and indirect effects on each species are noted here with, where relevant, a brief justification of why an AA may be required.

Column 7 – Inclusion in CIA: this column includes a judgment of whether cumulative/in-combination effects from other projects will need to be taken into account for this species at this site.

Column 8 – This column is for the convenience of JNCC/SNH/MS who, when reviewing the report, may wish to record whether they agree or disagree with Seagreen's judgment.

Sites are listed in approximate order of increasing distance from Phase 1.

Table 4.3: SPA HRA screening table (Green = screened out; Orange = screened in for further consideration)

European site name	European site features	Species or features of interest	Seasonality and key characteristics of feature	LSE Y/N	Justification notes	Inclusion in CIA Y/N	JNCC/SNH agreement Y/N
Fowlsheugh SPA							
Fowlsheugh SPA	<p>Article 4.2 migratory, breeding: Guillemot, Kittiwake</p> <p>Breeding assemblage: Razorbill, Herring Gull, Fulmar, Guillemot, Kittiwake</p> <p>(Source: SPA Review)</p> <p>NOTE: Sitelink cites all the above species simply as Article 4.2 migratory)</p>	<p>Fulmar</p> <p><i>Fulmarus glacialis</i></p> <p>A (BR)</p> <p>Condition: FM (1999)</p>	<p>Fulmar is present in all months of the year within Phase 1 at relatively low densities. A total of 1,281 individuals were recorded in Phase 1 during the 2010 boat-based surveys, with a peak density of 2.07 individuals/km² recorded in June. Mapping of flight directions during the breeding season suggests that many birds may originate from Fowlsheugh. However, the mean maximum foraging range of the species (311.43km¹; 400km²) means that the Phase is also within range of a number of other SPAs. (JNCC/SNH have proposed that these species should be considered for the following seasons: BR/PBR/P/W)</p>	N	<p>The species is considered at low risk of effects from offshore wind farms, owing to its large foraging range which makes it unlikely to be affected by displacement or indirect effects on prey. Its low flight height means that LSE from collision is not anticipated.</p>	N	
Fowlsheugh SPA		<p>Herring Gull</p> <p><i>Larus argentatus</i></p> <p>A (BR)</p> <p>Condition: UD (1999)</p>	<p>Herring Gull has been recorded in Phase 1 in all months (except July) at low densities. A total of 363 individuals were recorded in Phase 1 during the 2010 boat-based surveys, with a peak density of 0.49 individuals/km² recorded in March. Based on the estimated mean maximum foraging range of 61.1km², Phase 1 is within foraging range of breeding birds from this SPA. However, densities in the area are low at this time and birds are thought more likely to feed inshore. Post breeding and wintering birds may use the area, however, it is thought more likely that Fowlsheugh birds remain coastal and move inland and that birds at sea are more likely to be birds of European origin, <i>L.a. argentatus</i>.</p> <p>(JNCC/SNH have proposed that these species should be considered for the following seasons: BR/PBR/P/W)</p>	Y/N	<p>Direct effect: collision from operational turbines.</p> <p>Although a low density of individuals has been recorded and therefore low levels of collision impact anticipated, the decline in population numbers may mean that an AA is required for four SPAs: Fowlsheugh, Forth Islands, St. Abb's to Fast Castle and Buchan Ness to Collieston Coast.</p>	Y/N	
Fowlsheugh SPA		<p>Kittiwake</p> <p><i>Rissa tridactyla</i></p> <p>Q (M/BR)</p> <p>A (BR)</p> <p>Condition: FM (1999)</p>	<p>Kittiwake has been recorded in all months of the year in Phase 1 with particular aggregations in the north and west during the breeding season. A total of 9,208 individuals were recorded in Phase 1 during the 2010 boat-based surveys, with a peak density of 33.94 individuals/km² occurring in November. Flight directions suggest that the area is important for breeding birds from Fowlsheugh and GPS tracking undertaken by CEH in 2011 has clearly shown that Kittiwakes from Fowlsheugh preferentially use Phase 1 compared with other areas of the Zone. Tracking data from the Isle of May (Daunt <i>et al</i> 2010) has also shown that breeding birds from the Forth Islands SPA also use the Phase. Similar patterns of occurrence within STW sites indicate cumulative risk.</p> <p>(JNCC/SNH have proposed that these species should be considered for the following seasons: BR/PBR/P/W)</p>	Y	<p>Direct effect: collision with operational turbines.</p> <p>Indirect effects on prey.</p> <p>Kittiwake is a species currently undergoing rapid decline which may make it more susceptible to the additional risks posed by wind farms. Although a large proportion of birds fly below rotor height, the numbers of birds present suggest that mortality from collisions may be a significant effect.</p> <p>Phase 1 is within the mean maximum foraging range (65.81km^{1,2}) of 3 SPAs: Forth Islands, Fowlsheugh, St. Abb's Head to Fast Castle. A further 2 SPAs, Buchan Ness to Collieston Coast and Farne Islands are within the maximum foraging range (200km¹; 120km²).</p>	Y	

European site name	European site features	Species or features of interest	Seasonality and key characteristics of feature	LSE Y/N	Justification notes	Inclusion in CIA Y/N	JNCC/SNH agreement Y/N
Fowlsheugh SPA		Guillemot <i>Uria aalge</i> Q (M/BR) A (BR) Condition: FM (1999)	Guillemot has been recorded throughout Phase 1 in all months of the year with high density aggregations in the west of the area during the breeding season. A total of 7,638 individuals were recorded in Phase 1 during the 2010 boat-based surveys, with a peak density of 24.94 individuals/km ² recorded in June. Analysis of flight direction during the breeding season suggests that birds in Phase 1 originate primarily from Fowlsheugh. Observation of flight direction and timing of foraging bouts undertaken from this SPA in 2011 may allow connectivity to be inferred. (JNCC/SNH have proposed that these species should be considered for the following seasons: BR/PBR/P/W)	Y	Direct effect: displacement. Possible indirect effect on food supply. Although displacement is assumed to be a major effect on auks, evidence from wind farm sites during and post-construction is inconsistent. Furthermore, there is no standard assessment methodology. If the effect is assumed to be significant then an AA for breeding birds is anticipated for up to 3 SPAs: Forth Islands, Fowlsheugh, St. Abb's Head to Fast Castle and for non-breeding birds for the above plus Buchan Ness to Collieston Coast.	Y	
Fowlsheugh SPA		Razorbill <i>Alca torda</i> A (BR) Condition: FM (1999)	Razorbill has been recorded in Phase 1 throughout the year with high numbers of dispersing adults and their young recorded post breeding season in the west of the area. A total of 3,142 individuals were recorded in Phase 1 during the 2010 boat-based surveys, with a peak density of 6.76 individuals/km ² in November. The Phase is within foraging range of breeding birds from Fowlsheugh (mean maximum 31km ¹ ; 57.8km ²). (JNCC/SNH have proposed that these species should be considered for the following seasons: BR/PBR/P/W)	Y	Direct effect: displacement. Possible indirect effect on food supply during construction. Although displacement is assumed to be a major effect on auks, evidence from wind farm sites during and post-construction is inconsistent. Furthermore, there is no standard assessment methodology. If the effect is assumed to be significant then an AA for breeding birds is anticipated for up to 3 SPAs: Forth Islands, Fowlsheugh, St. Abb's Head to Fast Castle.	Y	
Forth Islands SPA							
Forth Islands SPA	Article 4.1 Annex 1 breeding: Arctic Tern, Roseate Tern, Common Tern, Sandwich Tern. Article 4.2 migratory breeding: Gannet, Shag, Puffin, Lesser Black-backed Gull Breeding assemblage: Razorbill, Guillemot, Kittiwake, Herring Gull, Cormorant, Gannet, Lesser Black-backed Gull, Shag, Puffin, Fulmar, Arctic Tern, Common Tern, Roseate Tern, Sandwich Tern (Source: SPA Review / SNH Sitelink)	Fulmar <i>Fulmarus glacialis</i> A (BR) Condition: FM (2004)	Fulmar is present in all months of the year within Phase 1 at relatively low densities. A total of 1,281 individuals were recorded in Phase 1 during the 2010 boat-based surveys, with a peak density of 2.07 individuals/km ² occurring in June. Mapping of flight directions during the breeding season suggests that many birds may originate from Fowlsheugh. However, the mean maximum foraging range of the species (311.43km ¹ ; 400km ²) means that the Phase is also within range of the Forth islands SPA. (JNCC/SNH have proposed that these species should be considered for the following seasons: BR/PBR/P/W)	N	The species is considered at low risk of effects from offshore wind farms, owing to its large foraging range which makes it unlikely to be affected by displacement or indirect effect on prey. Its generally low flight height means that LSE from collision is not anticipated.	N	
Forth Islands SPA		Gannet <i>Morus bassanus</i>	Gannet has been recorded in Phase 1 in all months of the year, with numbers generally higher in the summer during the breeding season with especially high densities in the	Y	Direct effect: collision with operational turbines. Owing to the numbers of birds present in both Phase 1, other areas of the Zone and the STW sites and the	Y	

European site name	European site features	Species or features of interest	Seasonality and key characteristics of feature	LSE Y/N	Justification notes	Inclusion in CIA Y/N	JNCC/SNH agreement Y/N
		Q (M/BR) A (BR) Condition: FM (2004)	west of the area. A total of 6,256 individuals were recorded in Phase 1 during the 2010 boat-based surveys, with a peak density of 8.31 individuals/km ² occurring in June. During the breeding season, the majority of birds are likely to come from the Bass Rock breeding colony and literature review (Hamer <i>et al.</i> 2011) has shown that all parts of Zone and STW sites are within its core feeding range. (JNCC/SNH have proposed that these species should be considered for the following seasons: BR/PBR/PW)		proportion flying at rotor height (between 3.8% and 51.7%), a likely significant effect is anticipated. Provisional collision estimates suggest that impacts may be high i.e. effects may be adverse. Tracking of birds from Bempton Cliffs SPA (RSPB 2011) suggests that birds from this SPA may not forage in the Firth of Forth during the breeding season. As numbers in the Phase do not increase during the passage period and decline gradually to low levels in mid winter, with no apparent influxes, it is possible that Phase 1 is not an important passage area for birds from other gannet SPAs.		
Forth Islands SPA		Cormorant <i>Phalacrocorax carbo carbo</i> A (BR) Condition: FD (2010)	A total of 2 Cormorants have been recorded in Phase 1 in February 2011 possibly on migration. Previous to this, only a single individual has been recorded elsewhere in the Zone. (JNCC/SNH have proposed that these species should be considered for the following seasons: BR/PBR/PW)	N	Direct effect: collision/displacement. Low numbers present mean that AA is not anticipated for breeding birds. Although the species is migratory, many Cormorants from the northeast of Scotland are documented as moving across land towards the south and west (Wernham <i>et al.</i> 2002) i.e. they are unlikely to cross the Zone except in small numbers. Effects are therefore not anticipated on post-breeding, passage or wintering individuals.	N	
Forth Islands SPA		Shag <i>Phalacrocorax aristotelis</i> Q (M/BR) A (BR) Condition: UR (2001)	Shags have been recorded in very low numbers within the Zone; the 2010 boat-based surveys recorded only 2 individuals in Phase 1 in May. Tracking carried out from the Isle of May (F. Daunt Pers. comm.) suggests the birds are primarily coastal in their distribution with a maximum foraging range of 17 km (e.g. Wanless <i>et al.</i> , 1991). Their maximum dispersal distance of 100 km and the fact that they are 'virtually never seen out of site of land' (Wernham <i>et al.</i> 2002) means that effects within the Zone are likely to be negligible. (JNCC/SNH have proposed that these species should be considered for the following seasons: BR/PBR/PW)	N	Direct effect: displacement. Indirect effects on prey. No connectivity.	N	
Forth Islands SPA		Lesser Black- backed Gull <i>Larus fuscus</i> Q (M/BR) A (BR) Condition: FM (2008)	Lesser Black- backed Gull has been recorded in Phase 1 in low numbers. A total of 100 individuals were recorded during the 2010 boat-based surveys mostly between April and November. Similarly low numbers have been recorded on STW sites. (JNCC/SNH have proposed that these species should be considered for the following seasons: BR/PBR/P)	N	Direct effect: collision with operational turbines. Gulls are documented to collide with turbines (Newton and Little, 2010). However, low densities within the site suggest no LSE therefore, in spite of the fact that population levels are in decline an AA may not be required.	N	
Forth Islands SPA		Herring Gull <i>Larus argentatus</i> A (BR)	Herring Gull has been recorded in all months of the year in Phase 1 at low densities. A total of 363 individuals were recorded in Phase 1 during the 2010 boat-based surveys, with a peak density of 0.49 individuals/km ² occurring in March. Based on the estimated mean maximum foraging	Y/N	Direct effect: collision from operational turbines. Although a low density of individuals has been recorded and collision impact levels are expected to be low, the decline in population numbers may mean that, at this stage, LSE cannot be ruled out and an AA may be	Y/N	

European site name	European site features	Species or features of interest	Seasonality and key characteristics of feature	LSE Y/N	Justification notes	Inclusion in CIA Y/N	JNCC/SNH agreement Y/N
		Condition: FM (2001)	range of 61.1km ² , Phase 1 is within foraging range of breeding birds from this SPA. However, densities in the area are low at this time and birds are thought more likely to feed inshore. Post breeding and wintering birds may use the area, however, it is thought more likely that Forth Islands birds remain coastal and move inland and that birds at sea are more likely to be birds of European origin <i>L.a.argentatus</i> . (JNCC/SNH have proposed that these species should be considered for the following seasons: BR/PBR/PW)		required for four SPAs: Fowlsheugh, Forth Islands, St. Abb's to Fast Castle and Buchan Ness to Collieston Coast.		
Forth Islands SPA		Kittiwake <i>Rissa tridactyla</i> A (BR) Condition: UD (2007)	Kittiwake has been recorded in all months of the year in Phase 1 with particular aggregations in the north and west during the breeding season. A total of 9,208 individuals were recorded in Phase 1 during the 2010 boat-based surveys, with a peak density of 33.94 individuals/km ² occurring in November. Flight directions suggest that the area is important for breeding birds from Fowlsheugh and tracking from the Isle of May (Daunt <i>et al.</i> 2011) has also shown that breeding birds from the Forth Islands SPA also use the Phase, particularly its western part. Similar patterns of occurrence within STW sites indicate cumulative risk. (JNCC/SNH have proposed that these species should be considered for the following seasons: BR/PBR/PW)	Y	Direct effect: collision with operational turbines. Indirect effects on prey. Kittiwake is a species currently undergoing rapid decline which may make it more susceptible to the additional risks posed by wind farms. Although a large proportion of birds fly below rotor height, the numbers of birds present suggest that mortality from collisions may represent a significant effect. Phase 1 is within the mean maximum foraging range (65.81km ^{1,2}) of 3 SPAs: Forth Islands, Fowlsheugh, St. Abb's Head to Fast Castle. A further 2 SPAs, Buchan Ness to Collieston Coast and Farne Islands are within the maximum foraging range (200km ¹ ; 120km ²).	Y	
Forth Islands SPA		Sandwich Tern <i>Sterna sandvicensis</i> Q (B) Condition: UD (2003)	Only 2 Sandwich Terns have been recorded in Phase 1 (1 individual recorded in both June and August 2010) reflecting the fact that few or no pairs have bred in the Forth estuary since 2005 (www.forthseabirdgroup.org.uk). Effects on the breeding population are therefore not anticipated. As so few birds have been seen during the August passage period the Phase may not be an important passage route for this species. (JNCC/SNH have proposed that these species should be considered for the following seasons: BR/PBR/P)	N	Direct effect: collision with operational turbines (Everaert and Stienen, 2006). As the species no longer breeds at this SPA, LSE for breeding and post-breeding birds is not anticipated. Sandwich Terns has not been recorded on passage in Phase 1. As migration of Sandwich and other tern species has been regularly observed during offshore boat-based surveys e.g. Centrica, 2008, suggesting that much tern migration is diurnal, it seems likely that the Phase 1 area is not utilised by this species on passage and LSE is not anticipated.	N	
Forth Islands SPA		Roseate Tern <i>Sterna dougallii</i> Q (BR) A (BR) Condition: UD (2009)	Not recorded in any part the Zone. No longer extant as a breeding species in Scotland. (JNCC/SNH have proposed that these species should be considered for the following seasons: BR/PBR/P)	N	Direct effect: collision with operational turbines. No connectivity.	N	

European site name	European site features	Species or features of interest	Seasonality and key characteristics of feature	LSE Y/N	Justification notes	Inclusion in CIA Y/N	JNCC/SNH agreement Y/N
Forth Islands SPA		Common Tern <i>Sterna hirundo</i> Q (BR) A (BR) Condition: FM (2003)	A total of 47 Common Terns have been recorded on passage through Phase 1 during August – September 2010. Similar patterns of passage birds were also observed in boat-based surveys at Neart na Gaoithe. The mean-maximum foraging range of 12.24km ¹ (24.2km ²) means that western parts of Phase 1 may be accessible to breeding birds from this colony but the low densities observed mean effects on breeding birds are unlikely to be significant. (JNCC/SNH have proposed that these species should be considered for the following seasons: BR/PBR/P)	N (BR) Y (PBR/P)	Direct effect: collision with operational turbines An AA for breeding birds at Forth Islands SPA is not anticipated. However, for post breeding and passage individuals it may need to be considered.	Y	
Forth Islands SPA		Arctic Tern <i>Sterna paradisaea</i> Q (BR) A (BR) Condition: FD (2009)	A total of 223 individuals were recorded in Phase 1 during the 2010 boat-based surveys, with a peak density of 1.72 individuals/km ² occurring in August. Phase 1 is generally outside the foraging range of breeding birds from this SPA (mean maximum 12.24km ¹ ; 24.2km ²). However, low numbers of birds were recorded in Phase 1 in all months between May to October 2010 and numbers reached their highest levels during the August passage period. This pattern was reflected in high survey numbers from Neart na Gaoithe at this time and from aerial surveys undertaken in 2009 suggesting that effects will mainly affect birds on passage. (JNCC/SNH have proposed that these species should be considered for the following seasons: BR/PBR/P)	N (BR) Y (PBR/P)	Direct effect: collision with operational turbines. Collision mortality has been demonstrated for this species at constructed wind farms e.g. Zeebrugge (Everaert and Stienen, 2006). However, a relatively small proportion of passage birds were recorded at rotor height (<3%) therefore effects may not be significant where numbers of birds are relatively low as in Phase 1. AA may be required for this SPA.	Y	
Forth Islands SPA		Guillemot <i>Uria aalge</i> A (BR) Condition: FM (2007)	Guillemot has been recorded throughout Phase 1 in all months of the year with high density aggregations in the west of the area during the breeding season. A total of 7,638 individuals were recorded in Phase 1 during the 2010 boat-based surveys, with a peak density of 24.94 individuals/km ² occurring in June. Analysis of flight direction during the breeding season suggests that birds in Phase 1 originate primarily from Fowlsheugh. Tracking of guillemots from the Isle of May, Forth Islands SPA, in 2010 indicated that foraging birds did not reach Phase 1 (Daunt <i>et al.</i> 2010). (JNCC/SNH have proposed that these species should be considered for the following seasons: BR/PBR/PW)	Y	Direct effect: displacement. Possible indirect effect on food supply. Although displacement is assumed to be a major effect on auks, evidence from wind farm sites during and post-construction is inconsistent. Furthermore, there is no standard assessment methodology. If the effect is assumed to be significant then an AA for breeding birds is anticipated for up to 3 SPAs: Forth Islands, Fowlsheugh, St. Abb's Head to Fast Castle and for non-breeding birds for the above plus Buchan Ness to Collieston Coast.	Y	
Forth Islands SPA		Razorbill <i>Alca torda</i> A (BR) Condition: FM (2007)	Razorbill has been recorded in Phase 1 throughout the year with high numbers of dispersing adults and their young recorded post-breeding season in the west of the area. A total of 3,142 individuals were recorded in Phase 1 during the 2010 boat-based surveys, with a peak density of 6.76 individuals/km ² occurring in November. Tracking of razorbills from the Isle of May, Forth Islands SPA, in 2010	Y	Direct effect: displacement. Possible indirect effect on food supply during construction. Although displacement is assumed to be a major effect on auks, evidence from wind farm sites during and post-construction is inconsistent. Furthermore, there is no	Y	

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			also indicated that some foraging birds reached the western side of Phase 1 (Daunt <i>et al.</i> 2011). (JNCC/SNH have proposed that these species should be considered for the following seasons: BR/PBR/PW)		standard assessment methodology. If the effect is assumed to be significant then an AA for breeding birds is anticipated for up to 3 SPAs: Forth Islands, Fowlsheugh, St. Abb's Head to Fast Castle.		
Forth Islands SPA		Puffin <i>Fratercula arctica</i> Q (M/BR) A (BR) Condition: FM (2003)	Puffins have been recorded during boat-based surveys in Phase 1 in all months of 2010 except January/February. A total of 2,894 individuals were recorded in Phase 1 during the 2010 boat-based surveys, with a peak density of 9.33 individuals/km ² occurring in June. The highest numbers have been recorded during and immediately post breeding season in the west of the area. After this numbers decline during the autumn and the species is virtually absent during mid-winter. Analysis of flight direction suggests strong connectivity between birds in Phase 1 and the Forth Islands SPA during the breeding season. The species also occurs in good numbers in the adjacent STW sites. (JNCC/SNH have proposed that these species should be considered for the following seasons: BR/PBR/PW)	Y	Direct effect: displacement. Possible indirect effect on food supply. Although displacement is assumed to be a major effect on auks, there is no standard assessment methodology. Furthermore, there is very little evidence concerning puffins. If the effect is assumed to be significant then an AA for puffins is anticipated. Owing to the absence of the birds in winter, assessment for this period is not anticipated.	Y	
St. Abb's Head to Fast Castle* SPA							
St. Abb's Head to Fast Castle SPA	Article 4.2 breeding assemblage: Razorbill, Kittiwake, Herring Gull, Shag (Source: SPA review / SNH Sitelink)	Shag <i>Phalacrocorax aristotelis</i> A (BR) Condition: UD (2008)	Shags have been recorded in very low numbers within the Zone; the 2010 boat-based surveys recorded only 2 individuals in Phase 1 in May. Tracking carried out from the Isle of May suggests the birds are primarily coastal in their distribution with a maximum foraging range of 17 km (e.g. Wanless <i>et al.</i> 1991). Their maximum dispersal distance of 100 km and the fact that they are 'virtually never seen out of site of land' (Wernham <i>et al.</i> 2002) means that effects within the Zone are likely to be negligible. (JNCC/SNH have proposed that these species should be considered for the following seasons: PW)	N	Direct effect: displacement. Indirect effects on prey. No connectivity.	N	
St. Abb's Head to Fast Castle SPA		Herring Gull <i>Larus argentatus</i> A (BR) Condition: UD (2002)	Herring Gull was recorded in Phase 1 in all months (except July) at low densities. A total of 363 individuals were recorded in Phase 1 during the 2010 boat-based surveys, with a peak density of 0.49 individuals/km ² occurring in March. Based on the estimated mean maximum foraging range of 61.1km ² , Phase 1 may be on the fringes of the foraging range of breeding birds from this SPA. Densities in the area are low at this time and birds are thought more likely to feed inshore. Post breeding and wintering birds may use the area. However, it is thought more likely that St. Abb's birds remain coastal and move inland and that birds at sea are more likely to be birds of European origin, <i>L.a. argentatus</i> .	Y/N	Direct effect: collision from operational turbines. Although a low density of individuals has been recorded and levels of impact are anticipated to be low, the decline in population numbers may mean that an AA is required for four SPAs: Fowlsheugh, Forth Islands, St. Abb's to Fast Castle and Buchan Ness to Collieston Coast.	Y/N	

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			(JNCC/SNH have proposed that these species should be considered for the following seasons: BR/PBR/PW)				
St. Abb's Head to Fast Castle SPA		Kittiwake <i>Rissa tridactyla</i> A (BR) Condition: UD (2008)	Kittiwake has been recorded in all months of the year in Phase 1 with particular aggregations in the north and west during the breeding season. A total of 9,208 individuals were recorded in Phase 1 during the 2010 boat-based surveys, with a peak density of 33.94 individuals/km ² occurring in November. Similar patterns of occurrence within STW sites indicate cumulative risk. Although Phase 1 is within foraging range of birds from this SPA (mean max 65.81km ¹ ; 61.6km ²) GPS tracking undertaken from St. Abb's Head to Fast Castle by CEH in 2011 showed a limited use of Phase 1 and the majority of Kittiwakes only reach as far as the southern part of the Zone. (JNCC/SNH have proposed that these species should be considered for the following seasons: BR/PBR/PW)	Y	Direct effect: collision with operational turbines. Indirect effects on prey. Kittiwake is a species currently undergoing rapid decline which may make it more susceptible to the additional risks posed by wind farms. Although a large proportion of birds fly below rotor height, the numbers of birds present suggest that mortality from collisions may be a significant effect. Phase 1 is within the mean maximum foraging range (65.81km ^{1.2}) of 3 SPAs: Forth Islands, Fowlsheugh, St. Abb's Head to Fast Castle. A further 2 SPAs, Buchan Ness to Collieston Coast and Farne Islands are within the maximum foraging range (200km ¹ ; 120km ²).	Y	
St. Abb's Head to Fast Castle SPA		Guillemot <i>Uria aalge</i> A (BR) Condition: FM (1998)	Guillemot has been recorded throughout Phase 1 in all months of the year with high density aggregations in the west of the area during the breeding season. A total of 7,638 individuals were recorded in Phase 1 during the 2010 boat-based surveys, with a peak density of 24.94 individuals/km ² occurring in June. The Phase, certainly the eastern part, may be outside foraging range for breeding birds from St. Abb's (mean max 60.6km ¹ ; 71.4km ²) and observation of flight directions and timing of foraging bouts undertaken from this SPA in 2011 may determine whether there is connectivity with this part of the Zone. (JNCC/SNH have proposed that these species should be considered for the following seasons: BR/PBR/PW)	Y	Direct effect: displacement. Possible indirect effect on food supply. Although displacement is assumed to be a major effect on auks, evidence from wind farm sites during and post-construction is inconsistent. Furthermore, there is no standard assessment methodology. If the effect is assumed to be significant then an AA for breeding birds is anticipated for up to 3 SPAs: Forth Islands, Fowlsheugh and St. Abb's Head to Fast Castle, and for non-breeding birds for the above plus Buchan Ness to Collieston Coast.	Y	
St. Abb's Head to Fast Castle SPA		Razorbill <i>Alca torda</i> A (BR) Condition: FM (1998)	Razorbill has been recorded in Phase 1 throughout the year with high numbers of dispersing adults and their young recorded post breeding season in the west of the area. A total of 3,142 individuals were recorded in Phase 1 during the 2010 boat-based surveys, with a peak density of 6.76 individuals/km ² occurring in November. The Phase, certainly the eastern part, may be outside foraging range for breeding birds from St. Abb's (mean max 31km ¹ ; 57.8km ²). (JNCC/SNH have proposed that these species should be considered for the following seasons: BR/PBR/PW)	Y	Direct effect: displacement. Possible indirect effect on food supply during construction. Although displacement is assumed to be a major effect on auks, evidence from wind farm sites during and post-construction is inconsistent. Furthermore, there is no standard assessment methodology. If the effect is assumed to be significant then an AA for breeding birds is anticipated for 2 (or 3) SPAs: Forth Islands, Fowlsheugh (St. Abb's Head to Fast Castle).	Y	

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Firth of Forth SPA (and Ramsar site)							
Firth of Forth SPA (Ramsar)	<p>Article 4.1 Annex I, passage: Sandwich Tern</p> <p>Over winter: Bar-tailed Godwit, Golden Plover, Red-throated Diver, Slavonian Grebe</p> <p>Article 4.2 migratory, over winter: Knot,</p> <p>Pink-footed Goose, Redshank, Shelduck, Turnstone.</p> <p>Overwinter wetland assemblage: Scaup, Slavonian Grebe, Golden Plover, Bar-tailed Godwit, Pink-footed Goose, Shelduck, Knot, Redshank, Turnstone, Great Crested Grebe, Cormorant, Red-throated Diver, Mallard, Curlew, Eider, Long-tailed Duck, Common Scoter, Velvet Scoter, Goldeneye, Red-breasted Merganser, Oystercatcher, Ringed Plover, Grey Plover, Lapwing, Wigeon.</p> <p>(Source: SPA Review / Sitelink)</p>	<p>Pink-footed Goose <i>Anser brachyrhynchus</i></p> <p>Q (M/W)</p> <p>Condition: FM (2010)</p>	<p>A total of 27 Pink-footed Goose has been recorded on passage through Phase 1 in February 2011. Previous to this Pink-footed Goose has been recorded on passage in other parts of the Zone. As boat-based surveys may not accurately assess the scale of passage movement, it is possible that birds may pass through the area on migration as the Forth region holds a large number of SPAs for this species.</p> <p>(JNCC/SNH have proposed that these species should be considered for the following seasons: P)</p>	Y	<p>Direct effects: collision/barrier effects.</p> <p>An AA is anticipated requiring the quantification of collision and barrier effects and assessment of effects on migratory birds from a number of SPAs including: Firth of Forth; Firth of Tay and Eden Estuary, Fala Flow, Gladhouse Reservoir, Montrose Basin, South Tayside Goose Roosts, Loch Leven and Ythan Estuary, Sands of Forvie and Meikle Loch.</p>	Y	
Firth of Forth SPA (Ramsar)		<p>Shelduck <i>Tadorna tadorna</i></p> <p>Q (M) A (W)</p> <p>Condition: FD (2010)</p>	<p>Shelduck has not been in the Zone to date. Shelduck migration to the Helgoland Bight is well documented. However, there is evidence that birds in the Firth of Forth moult locally (Wernham <i>et al.</i> 2002). If this is the case and local birds do not undertake migration then impacts will be limited. In summary LSE on the Firth of Forth SPA passage and wintering population is not anticipated. (JNCC/SNH have proposed that these species should be considered for the following seasons: P)</p>	N	<p>Effects: not known.</p> <p>No connectivity; no evidence that Shelduck is affected by offshore wind farms; evidence that duck species e.g. Eider, take far field avoidance especially under adverse weather conditions.</p>	N	
Firth of Forth SPA (Ramsar)		<p>Wigeon <i>Anas penelope</i></p> <p>A (W)</p> <p>Condition: FR (2010)</p>	<p>Wigeon has not been recorded in Phase 1 and only 5 individuals have been recorded in Phase 3 during 2010. As wintering birds rarely utilise areas as far offshore as this, LSE on the Firth of Forth SPA wintering population is not anticipated.</p> <p>(JNCC/SNH have proposed that these species should be considered for the following seasons: P)</p>	N	<p>Effects: not known.</p> <p>No connectivity; no evidence that Wigeon are affected by offshore wind farms; evidence that duck species e.g. Eider, take far field avoidance especially under adverse weather conditions.</p>	N	

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Firth of Forth SPA (Ramsar)		Mallard <i>Anas platyrhynchos</i> A (W) Condition: UD (2010)	Two Mallards have been recorded to date in Phase 1. As wintering birds rarely utilise areas as far offshore as this, LSE on the Firth of Forth SPA wintering population is not anticipated. (JNCC/SNH have proposed that these species should be considered for the following seasons: P)	N	Effects: not known. No connectivity; no evidence that Mallard is affected by offshore wind farms; evidence that duck species e.g. Eider take far field avoidance especially under adverse weather conditions.	N	
Firth of Forth SPA (Ramsar)		Scaup <i>Aythya marila</i> A (W) Condition: UD (2010)	Scaup has not been recorded in Phase 1 or elsewhere in the Zone. As wintering birds rarely utilise areas as far offshore as this, LSE on the Firth of Forth SPA population is not anticipated. (JNCC/SNH have proposed that these species should be considered for the following seasons: W)	N	Effects: not known. No connectivity; no evidence that Scaup is affected by offshore wind farms; evidence that duck species e.g. Eider take far field avoidance especially under adverse weather conditions	N	
Firth of Forth SPA (Ramsar)		Eider <i>Somateria mollissima</i> A (W) Condition: FD (2010)	Eider has not been recorded in Phase 1 and only a total of 18 have been recorded in the south of the Zone, outside the development area. As wintering birds rarely utilise areas as far offshore as this, LSE on the Firth of Forth SPA population is not anticipated. Migrating Eiders are known to take far field avoidance of wind farms, particularly in conditions of poor visibility. Significant effects on migratory birds are therefore not anticipated. (JNCC/SNH have proposed that these species should be considered for the following seasons: P/W)	N	Effects: collision/displacement/ effects on prey. No connectivity; evidence that Eider take far field avoidance especially under adverse weather conditions.	N	
Firth of Forth SPA (Ramsar)		Long-tailed Duck <i>Clangula hyemalis</i> A (W) Condition: UD (2010)	Long-tailed Duck has not been recorded within Phase 1 and only 2 in the remainder of the Zone (Phase 2), representing a very small proportion of the designated population. As wintering birds rarely utilise areas as far offshore as this, LSE on the Firth of Forth SPA wintering population is not anticipated. Almost no information is available on the passage of Long-tailed Duck although clearly many cross the North sea to winter in eastern Scotland. As other duck species such as Eider, are known to take far-field avoidance of wind farms, particularly in poor weather conditions, effects are not anticipated to be significant. (JNCC/SNH have proposed that these species should be considered for the following seasons: P/W)	N	Effects: displacement/ effects on prey. No connectivity; evidence that duck species e.g. Eider take far field avoidance especially under adverse weather conditions.	N	
Firth of Forth SPA (Ramsar)		Common Scoter <i>Melanitta nigra</i> A (W) Condition: UD (2010)	Common Scoter has been recorded in Phase 1. In the rest of the Zone only 1 individual has been recorded in Phase 3 and a total of 158 in the south of the Zone, outside the development area. As wintering flocks rarely utilise areas as far offshore as this, LSE on wintering birds from the Firth of Forth is not anticipated.	N	Effects: displacement/ effects on prey. No connectivity; evidence that duck species take far field avoidance especially under adverse weather conditions.	N	

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			<p>Almost no information is available on the passage of scoters although clearly birds cross the North Sea to winter in eastern Scotland. However, other duck species such as Eider are known to take far-field avoidance of wind farms, particularly in poor weather conditions and therefore LSE on passage birds from the Firth of Forth is not anticipated.</p> <p>(JNCC/SNH have proposed that these species should be considered for the following seasons: P/W)</p>				
Firth of Forth SPA (Ramsar)		Velvet Scoter <i>Melanitta fusca</i> A (W) Condition: FM (2010)	<p>Velvet Scoter has not been recorded in Phase 1 and just one individual has been recorded in Phase 3. As wintering flocks rarely utilise areas as far offshore as this, effects on wintering birds from the Firth of Forth are not anticipated.</p> <p>Almost no information is available on the passage of Velvet Scoters although clearly some birds cross the North Sea to winter in eastern Scotland. However, other duck species such as Eider are known to take far-field avoidance of wind farms, particularly in poor weather conditions and therefore LSE is not anticipated.</p> <p>(JNCC/SNH have proposed that these species should be considered for the following seasons: P/W)</p>	N	<p>Effects: displacement/ effects on prey.</p> <p>No connectivity; evidence that duck species take far field avoidance especially under adverse weather conditions.</p>	N	
Firth of Forth SPA (Ramsar)		Goldeneye <i>Bucephala clangula</i> A (W) Condition: UD (2010)	<p>Goldeneye has not been recorded in Phase 1 and only 2 individuals recorded in Phase 3. As wintering birds rarely utilise areas as far offshore as this, LSE on the Firth of Forth SPA wintering population is not anticipated.</p> <p>(JNCC/SNH have proposed that these species should be considered for the following seasons: P)</p>	N	<p>Effects: not known.</p> <p>No connectivity; evidence that duck species take far field avoidance especially under adverse weather conditions.</p>	N	
Firth of Forth SPA (Ramsar)		Red-breasted Merganser <i>Mergus serrator</i> A (W) Condition: FD (2010)	<p>Red-Breasted Merganser has not been recorded anywhere in the Zone to date and wintering birds rarely utilise areas as far offshore as this. Limited information is available on the passage of Red-breasted Merganser. However, as effects of offshore wind farms on this species have neither been recorded nor estimated (Langston 2010), LSE on the Firth of Forth SPA population is not anticipated. (JNCC/SNH have proposed that these species should be considered for the following seasons: P/W)</p>	N	<p>Effects: not known.</p> <p>No connectivity; evidence that duck species take far field avoidance especially under adverse weather conditions.</p>	N	
Firth of Forth SPA (Ramsar)		Red-throated Diver <i>Gavia stellata</i> Q (W) A (W) Condition: FM (2010)	<p>Two Red-throated Divers have been recorded to date in Phase 1 (1 in September and 1 in December 2010), with none recorded in the rest of the Zone. Although surveys for other offshore wind farms (e.g. London Array) have identified unexpectedly large and hitherto unknown aggregations of Red-throated Divers, this does not appear to be the case within the Firth of Forth. Information on the migratory passage of divers is limited but collision impacts are expected to be low, possibly based on the flight height</p>	N	<p>Effects: displacement/collision/effects on prey.</p> <p>No connectivity; evidence that diver species on passage fly below turbine height.</p>	N	

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			of migrating birds below the rotor swept area. LSE is not anticipated. (JNCC/SNH have proposed that these species should be considered for the following seasons: P/W)				
Firth of Forth SPA (Ramsar)		Great-crested Grebe <i>Podiceps cristatus</i> A (W) Condition: UD (2010)	Great-crested Grebe has not been recorded in Phase 1 and only 1 individual has been recorded in Phase 3. As wintering birds rarely utilise areas as far offshore as this, LSE on the Firth of Forth SPA wintering population is not anticipated. (JNCC/SNH have proposed that these species should be considered for the following seasons: P)	N	Effects: not known. No connectivity.	N	
Firth of Forth SPA (Ramsar)		Slavonian Grebe <i>Podiceps auritus</i> Q (W) A (W) Condition: FD (2010)	Slavonian Grebe has not been recorded in the Zone to date. As wintering birds are not thought to utilise areas as far offshore as this, effects on the Firth of Forth SPA population are not anticipated. Limited information is available on the passage of Slavonian Grebe. However, as effects on this species have not been recorded to date, LSE on the Firth of Forth SPA passage and wintering population is not anticipated. (JNCC/SNH have proposed that these species should be considered for the following seasons: P/W)	N	Effects: not known. No connectivity.	N	
Firth of Forth SPA (Ramsar)		Cormorant <i>Phalacrocorax carbo carbo</i> A (W) Condition: FM (2010)	A total of 2 Cormorants have been recorded during migration in Phase 1 in February 2011. Previous to this, only a single individual has been recorded elsewhere in the Zone. (JNCC/SNH have proposed that these species should be considered for the following seasons: not specified)	N	Direct effect: collision/displacement. Wintering cormorants in the Firth of Forth are thought to move between this area and Loch Leven to the south west (SNH undated), i.e. they are unlikely to cross any part of the Zone except in small numbers. Effects are therefore not expected on wintering individuals.	N	
Firth of Forth SPA (Ramsar)		Bar-tailed Godwit <i>Limosa lapponica</i> Q (W) A(W) Condition: FD (2010) Dunlin <i>Calidris alpina</i> A (W) Condition: FD (2010) Knot <i>Calidris canuta</i> Q (M) A (W) Condition: UD (2010) Redshank <i>Tringa totanus</i> Q (M) A (W) Condition: FM (2010) Turnstone Q (M) A (W).	The list below summarises the maximum number of individuals of each wader species seen within Phase 1: <ul style="list-style-type: none">Bar-tailed Godwit – 0 ind.Knot – 0 ind.Dunlin – 0 ind.Redshank – 0 ind.Turnstone – 4 ind.Golden Plover – 31 ind.Curlew – 17 ind.Oystercatcher – 3 ind.Ringed Plover – 0 ind.	Y	Direct effect: possible collision during adverse weather on passage. Modelling to assess the scale of potential effects is currently being undertaken for certain key species by NIRAS Ltd. on behalf of FTOWDG (e.g. Bar-tailed Godwit). This may be adequate to confirm no LSE.	Y	

European site name	European site features	Species or features of interest	Seasonality and key characteristics of feature	LSE Y/N	Justification notes	Inclusion in CIA Y/N	JNCC/SNH agreement Y/N
		Condition: FM (2010) Golden Plover <i>Pluvialis apricaria</i> A (W) Condition: FM (2010) Curlew <i>Numenius arquata</i> A (W) Condition: FM (2010) Oystercatcher <i>Haematopus ostralegus</i> A (W) Condition: FM (2010) Ringed Plover <i>Charadrius hiaticula</i> A (W) Condition: FM (2010) Grey Plover <i>Pluvialis squatarola</i> A (W) Condition: FD (2010) Lapwing <i>Vanellus vanellus</i> A (W) Condition: FM (2010)	<ul style="list-style-type: none"> Grey Plover – 17 ind. Lapwing – 4 ind. Boat-based surveys may not accurately assess the scale of movement of passage species and it is possible that birds may pass through the area and remain undetected. Although it is usually stated that wader migration occurs at altitudes above rotor height, with birds only descending to the coast when they are within a few kilometres of the shore, it is possible that migration may occur at risk height during adverse weather conditions. (JNCC/SNH have proposed that these species should be considered for the following seasons: P)				
Firth of Forth SPA (Ramsar)		Sandwich Tern <i>Sterna sandvicensis</i> Q (P) Condition: FD (2010)	To date, only 2 Sandwich Terns have been recorded in Phase 1 (1 individual recorded in both June and August 2010) suggesting that passage is limited through the Phase 1 area. Although the Firth of Forth SPA is known to hold large passage populations including birds from elsewhere in Scotland, England, Ireland, Belgium and the Netherlands (Forrester <i>et al.</i> 2007, Bos 2008, Anon 2011), if migration occurs either inshore or further offshore than Phase 1, LSE is not anticipated. (JNCC/SNH have proposed that these species should be considered for the following seasons: PBR/P)	N?	Direct effect: collision. Sandwich Tern has not been recorded on passage in Phase 1. As migration of Sandwich and other tern species on passage has been regularly observed offshore during boat-based surveys e.g. Centrica 2008, suggesting that migration is diurnal, it seems likely that the area is not utilised by this species on passage. Owing to the proximity of the SPA to the site, AA may however, be required. It is anticipated that this will be fully screened out following further consultation with SNH/JNCC/MS.	N	
Firth of Tay and Eden Estuary SPA (and Ramsar site)							
Firth of Tay and Eden Estuary SPA (Ramsar)	Article 4.1 Annex I, breeding: Little Tern, Marsh Harrier Over winter: Bar-tailed Godwit Article 4.2 migratory, over winter: Greylag Goose, Pink-	Pink-footed Goose <i>Anser brachyrhynchus</i> Q (M) A (W) Condition: FR (Ramsar) (2011)	A total of 27 Pink-footed Goose has been recorded on passage through Phase 1 in February 2011. Previous to this Pink-footed Goose has been recorded on passage in other parts of the Zone. As boat-based surveys may not accurately assess the scale of movement, it is possible that birds may pass through the area on migration as the Forth region holds a large number of SPAs for this species.	Y	Direct effects: collision/barrier effects. An AA is anticipated requiring the quantification of collision and barrier effects and assessment of impacts on migratory birds from a number of SPAs including: Firth of Forth; Firth of Tay and Eden Estuary, Fala Flow, Gladhouse Reservoir, Montrose Basin, South Tayside Goose Roosts, Loch Leven and Ythan Estuary, Sands of	Y	

European site name	European site features	Species or features of interest	Seasonality and key characteristics of feature	LSE Y/N	Justification notes	Inclusion in CIA Y/N	JNCC/SNH agreement Y/N
	footed Goose Overwintering wetland assemblage: Velvet Scoter, Pink-footed Goose, Greylag Goose, Redshank, Cormorant, Shelduck, Eider, Bar-tailed Godwit, Common Scoter, Black-tailed Godwit, Goldeneye, Red-breasted Merganser, Goosander, Oystercatcher, Grey Plover, Sanderling, Dunlin, Long-tailed Duck (Source: SPA Review. SNH Sitelink Article 4.2 migratory includes redshank)		(JNCC/SNH have proposed that these species should be considered for the following seasons: P)		Forvie and Meikle Loch.		
Firth of Tay and Eden Estuary SPA (Ramsar)		Greylag Goose <i>Anser anser</i> Q (M) Condition: FD (2011)	Greylag Goose has not been recorded on passage either in Phase 1 or elsewhere within the Zone. (JNCC/SNH have proposed that these species should be considered for the following seasons: P)	N	Direct effects: collision/barrier effects. Passage of Icelandic Greylag Geese is generally assumed to be directly south west / north east across Scotland (Wernham <i>et al.</i> 2002) between Iceland and their east coast wintering sites. LSE from Phase 1 is therefore not anticipated.	N	
Firth of Tay and Eden Estuary SPA (Ramsar)		Shelduck <i>Tadorna tadorna</i> A (W) Condition: FR (2011)	Shelduck has not been recorded in Phase 1 and only 5 individuals have been recorded in Phase 3 during 2010. Shelduck migration to the Helgoland Bight is well documented. However, there is evidence that birds in the Firth of Forth region moult locally (Wernham <i>et al.</i> 2002). If this is the case and local birds do not undertake migration then effects will be limited. In summary, LSE on the Firth of Tay and Eden SPA passage and wintering population is not anticipated. (JNCC/SNH have proposed that these species should be considered for the following seasons: P)	N	Effects: not known. No connectivity with the offshore areas of Phase 1 and the Export Cable Route (ECR); no evidence that Shelduck is affected by offshore wind farms; evidence that duck species e.g. Eider, take far field avoidance especially under adverse weather conditions. ECR: the southern part of the proposed ECR overlaps a small area of this SPA. Should this area be selected for cable installation, works are anticipated to take place over a short time period and significant disturbance to wintering duck flocks in the SPA is not anticipated.	N	
Firth of Tay and Eden Estuary SPA (Ramsar)		Eider <i>Somateria mollissima</i> A (W) Condition: UNC (2001)	Eider has not been recorded in the development area of the Zone. As wintering birds rarely utilise areas as far offshore as this, effects on the Firth of Tay and Eden population are not anticipated. Migrating eiders are known to take far field avoidance of wind farms, particularly in conditions of poor visibility. Significant effects on migratory birds are therefore not anticipated. (JNCC/SNH have proposed that these species should be considered for the following seasons: P/W)	N	Direct effects: displacement /collision. Indirect effects on prey Wintering flocks not present in the Zone. Migrating birds at low risk of collision. ECR: the southern part of the proposed ECR overlaps a small area of this SPA. Should this area be selected for cable installation, works are anticipated to take place over a short time period and significant disturbance to wintering duck flocks in the SPA is not anticipated.	N	

European site name	European site features	Species or features of interest	Seasonality and key characteristics of feature	LSE Y/N	Justification notes	Inclusion in CIA Y/N	JNCC/SNH agreement Y/N
Firth of Tay and Eden Estuary SPA (Ramsar)		Long-tailed Duck <i>Clangula hyemalis</i> A (W) Condition: UD (2011)	Long-tailed Duck has not been recorded within Phase 1 and only 2 in the remainder of the Zone (Phase 2), representing a very small proportion of the designated population. As wintering birds rarely utilise areas as far offshore as this, LSE on the Firth of Tay and Eden SPA wintering population is not anticipated. Almost no information is available on the passage of Long-tailed Duck although clearly many cross the North sea to winter in eastern Scotland. As other duck species such as Eider are known to take far-field avoidance of wind farms, particularly in poor weather conditions, effects are not expected to be significant. (JNCC/SNH have proposed that these species should be considered for the following seasons: P/W)	N	Effects: displacement/ effects on prey. No connectivity with the offshore areas of Phase 1 and the ECR;; evidence that duck species e.g. Eider take far field avoidance especially under adverse weather conditions. ECR: the southern part of the proposed ECR overlaps a small area of this SPA. Should this area be selected for cable installation, works are anticipated to take place over a short time period and significant disturbance to wintering duck flocks in the SPA is not anticipated.	N	
Firth of Tay and Eden Estuary SPA (Ramsar)		Common Scoter <i>Melanitta nigra</i> A (W) Condition: UNC (2011)	Common Scoter has not been recorded in Phase 1. In the rest of the Zone only 1 individual has been recorded in Phase 3 and a total of 158 in the south of the Zone, outside the development area. As wintering flocks rarely utilise areas as far offshore as this, LSE on wintering birds from the Firth of Tay and Eden Estuary is not anticipated. Almost no information is available on the passage of scoters although clearly birds cross the North Sea to winter in eastern Scotland. However, other duck species such as Eider are known to take far-field avoidance of wind farms, particularly in poor weather conditions and therefore LSE on passage birds from the Firth of Forth is not anticipated. (JNCC/SNH have proposed that these species should be considered for the following seasons: P/W)	N	Effects: displacement/ effects on prey. No connectivity with the offshore areas of Phase 1 and the ECR;; evidence that duck species take far field avoidance especially under adverse weather conditions. ECR: the southern part of the proposed ECR overlaps a small area of this SPA. Should this area be selected for cable installation, works are anticipated to take place over a short time period and significant disturbance to wintering duck flocks in the SPA is not anticipated.	N	
Firth of Tay and Eden Estuary SPA (Ramsar)		Velvet Scoter <i>Melanitta fusca</i> A (W) Condition: FM (2001)	Velvet Scoter has not been recorded in Phase 1 and just one individual has been recorded in Phase 3. As wintering flocks rarely utilise areas as far offshore as this, impacts on wintering birds from the Firth of Tay and Eden Estuary are not anticipated. Almost no information is available on the passage of Velvet Scoter although clearly some birds cross the North Sea to winter in eastern Scotland. However, other duck species such as Eider are known to take far-field avoidance of wind farms, particularly in poor weather conditions and therefore LSE is not anticipated. (JNCC/SNH have proposed that these species should be considered for the following seasons: P/W)	N	Effects: displacement/ effects on prey. No connectivity with the offshore areas of Phase 1 and the ECR; evidence that duck species take far field avoidance especially under adverse weather conditions. ECR: the southern part of the proposed ECR overlaps a small area of this SPA. Should this area be selected for cable installation, works are anticipated to take place over a short time period and significant disturbance to wintering duck flocks in the SPA is not anticipated.	N	
Firth of Tay and Eden Estuary SPA		Goldeneye <i>Bucephala clangula</i>	Goldeneye has not been recorded in Phase 1 and only 2 in the remainder of the Zone (Phase 3) As wintering birds rarely utilise areas as far offshore as	N	Effects: not known. No connectivity with the offshore areas of Phase 1 and the ECR; evidence that duck species take far field avoidance	N	

European site name	European site features	Species or features of interest	Seasonality and key characteristics of feature	LSE Y/N	Justification notes	Inclusion in CIA Y/N	JNCC/SNH agreement Y/N
(Ramsar)		A (W) Condition: FM (2011)	this, LSE on the Firth of Forth SPA wintering population is not anticipated. (JNCC/SNH have proposed that these species should be considered for the following seasons: P)		especially under adverse weather conditions. ECR: the southern part of the proposed ECR overlaps a small area of this SPA. Should this area be selected for cable installation, works are anticipated to take place over a short time period and significant disturbance to wintering duck flocks in the SPA is not anticipated.		
Firth of Tay and Eden Estuary SPA (Ramsar)		Red-breasted Merganser <i>Mergus serrator</i> A (W) Condition: UNC (2001)	Red-breasted Merganser has not been recorded in the Zone to date. (JNCC/SNH have proposed that these species should be considered for the following seasons: not required)	N	No connectivity with the offshore areas of Phase 1 and the ECR SNH/JNCC/MS have deemed that HRA is not required for this species at this site (email of 29/03/2011).	N	
Firth of Tay and Eden Estuary SPA (Ramsar)		Goosander <i>Mergus merganser</i> A (W) Condition: FM (2001)	Goosander has not been recorded in Phase 1 and only a single individual in the remainder of the Zone. (JNCC/SNH have proposed that these species should be considered for the following seasons: not required)	N	No connectivity with the offshore areas of Phase 1 and the ECR. SNH/JNCC/MS have deemed that HRA is not required for this species at this site (email of 29/03/2011)..	N	
Firth of Tay and Eden Estuary SPA (Ramsar)		Cormorant <i>Phalacrocorax carbo carbo</i> A (W) Condition: FM (2001)	A total of 2 Cormorants have been recorded during migration in Phase 1 in February 2011. Previous to this, only a single individual has been recorded elsewhere in the Zone. (JNCC/SNH have proposed that these species should be considered for the following seasons: not required)	N	No connectivity with the offshore areas of Phase 1 and the ECR SNH/JNCC/MS have deemed that HRA is not required for this species at this site (email of 29/03/2011).	N	
Firth of Tay and Eden Estuary SPA (Ramsar)		Marsh Harrier <i>Circus aeruginosus</i> Q (BR) Condition: FM (2011)	N/A	N	No connectivity with the offshore areas of Phase 1 and the ECR. SNH/JNCC/MS have deemed that AA is not required for this species at this site (email of 29/03/2011).	N	
Firth of Tay and Eden Estuary SPA (Ramsar)		Bar-tailed Godwit <i>Limosa lapponica</i> Q (W) A(W) Condition: FM (2001) Black-tailed Godwit <i>Limosa lapponica</i> A (W) Condition: FM (2011) Dunlin <i>Calidris alpina</i> A (W) Condition: UNC (2001) Redshank <i>Tringa totanus</i> A (W)	The list below summarises the maximum number of individuals of each wader species seen within Phase 1: <ul style="list-style-type: none">• Bar-tailed Godwit – 0 ind.• Black-tailed Godwit – 1 ind.• Dunlin – 0 ind.• Redshank – 0 ind.• Oystercatcher – 3 ind.• Grey Plover – 17 ind.• Sanderling – 0 ind. Boat-based surveys may not accurately assess the scale	Y	Direct effect: possible collision during adverse weather on passage. Modelling to assess the scale of potential effects is currently being undertaken for certain key species by NIRAS Ltd. on behalf of FTOWDG (e.g. Bar-tailed Godwit). This may be adequate to confirm no LSE.	Y	

European site name	European site features	Species or features of interest	Seasonality and key characteristics of feature	LSE Y/N	Justification notes	Inclusion in CIA Y/N	JNCC/SNH agreement Y/N
		Condition: FM (2001) <i>Oystercatcher Haematopus ostralegus</i> A (W) Condition: FR (2011) <i>Grey Plover Pluvialis squatarola</i> A (W) Condition: FM (2011) <i>Sanderling Calidris alba</i> A (W) Condition: FR (2011)	of movement of passage species and it is possible that birds may pass through the area and remain undetected. Although it is usually stated that wader migration occurs at altitudes above rotor height, with birds only descending to the coast when they are within a few kilometres of the shore, it is possible that migration may occur at risk height during adverse weather conditions. (JNCC/SNH have proposed that these species should be considered for the following seasons: P)				
Firth of Tay and Eden Estuary SPA (Ramsar)		Little Tern <i>Sternula albifrons</i> Q (BR) Condition: UNC (2001)	Little Tern has not been recorded on surveys of the Zone to date (JNCC/SNH have proposed that these species should be considered for the following seasons: PBR/P).	N	As Little Tern is no longer a breeding species of the SPA and as Little Terns are not recorded in post-breeding aggregations within the area, LSE is not anticipated.	N	
Buchan Ness to Collieston Coast* SPA							
Buchan Ness to Collieston Coast* SPA	Article 4.2 Breeding assemblage: Guillemot, Kittiwake, Herring Gull, Shag, Fulmar. (Source: SPA Review/SNH sitelink SPA citation for site plus marine extension)	Shag <i>Phalacrocorax aristotelis</i> A (BR) Condition: UNC (2007)	Shags have been recorded in very low numbers within the Zone; the 2010 boat-based surveys recorded only 2 individuals in Phase 1 in May. Tracking carried out from the Isle of May suggests the birds are primarily coastal in their distribution with a maximum foraging range of 17 km (e.g. Wanless et al. 1991). Their maximum dispersal distance of 100 km and the fact that they are 'virtually never seen out of site of land' (Wernham et al. 2002) means that effects within the Zone are likely to be negligible. (JNCC/SNH have proposed that these species should be considered for the following seasons: P)	N	Direct effect: displacement. Indirect effects on prey. No connectivity.	N	
Buchan Ness to Collieston Coast* SPA		Fulmar <i>Fulmarus glacialis</i> A (BR) Condition: UD (2007)	Fulmar is present in all months of the year within Phase 1 at relatively low densities. A total of 1,281 individuals were recorded in Phase 1 during the 2010 boat-based surveys, with a peak density of 2.07 individuals/km ² occurring in June. Flight directions during the breeding season suggest that many birds may originate from Fowlsheugh. However, the mean maximum foraging range of the species (311.43km ¹ ; 400km ²) means that the Phase is also within range of Buchan Ness and Collieston Coast. However, it is likely during the breeding season that birds will forage more locally.	N	The species is considered at low risk of effects from offshore wind farms, owing to its large foraging range which makes it unlikely to be affected by displacement or indirect effect on prey. Its generally low flight height means that LSE from collision is not anticipated.	N	

European site name	European site features	Species or features of interest	Seasonality and key characteristics of feature	LSE Y/N	Justification notes	Inclusion in CIA Y/N	JNCC/SNH agreement Y/N
			(JNCC/SNH have proposed that these species should be considered for the following seasons: BR/PBR/P/W)				
Buchan Ness to Collieston Coast* SPA		Herring Gull <i>Larus argentatus</i> A (BR) Condition: UNC (2007)	Herring Gull was recorded in Phase 1 during the 2010 boat-based surveys in all months (except July) at low densities. A total of 363 individuals were recorded in Phase 1 during the 2010 boat-based surveys, with a peak density of 0.49 individuals/km ² recorded in March. The mean maximum foraging range for Herring Gull is given as 61.1km ² suggesting that Phase 1 is out of range of breeding birds from this SPA. Low densities within the Phase suggest that effects on the species may be limited and, as a proportion of the population of this SPA, are unlikely to be significant. (JNCC/SNH have proposed that these species should be considered for the following seasons: BR/PBR/P/W)	Y/N	Direct effect: collision from operational turbines. Although a low density of individuals has been recorded and hence low levels of effect are anticipated, the decline in population numbers may mean that an AA is required for four SPAs: Fowlsheugh, Forth Islands, St. Abb's to Fast Castle and Buchan Ness to Collieston Coast.	Y/N	
Buchan Ness to Collieston Coast* SPA		Kittiwake <i>Rissa tridactyla</i> A (BR) Condition: UNC (2007)	Kittiwake has been recorded in all months of the year in Phase 1 with particular aggregations in the north and west during the breeding season. A total of 9,208 individuals were recorded in Phase 1 during the 2010 boat-based surveys, with a peak density of 33.94 individuals/km ² occurring in November. However, it is not within the usual foraging range of breeding birds from this SPA (mean maximum 65.81 km ¹ ; 61.1km ²). Outside the breeding season birds may range more widely and the Phase could be utilised. Similar patterns of occurrence within STW sites indicate cumulative risk. (JNCC/SNH have proposed that these species should be considered for the following seasons: BR/PBR/P/W)	N (BR) Y (PB R/P/W)	Direct effect: collision with operational turbines. Indirect effects on prey. Kittiwake is a species currently undergoing rapid decline which may make it more susceptible to the additional risks posed by wind farms. Although a large proportion of birds fly below rotor height, the numbers of birds present suggest that mortality from collisions may be a significant effect. Phase 1 is within the mean maximum foraging range (65.81km ^{1.2}) of 3 SPAs: Forth Islands, Fowlsheugh, St. Abb's Head to Fast Castle. A further 2 SPAs, Buchan Ness to Collieston Coast and Farne Islands are within the maximum foraging range (200km ¹ ; 120km ²).	Y	
Buchan Ness to Collieston Coast* SPA		Guillemot <i>Uria aalge</i> A (BR) Condition: FD (2007)	Guillemot has been recorded throughout Phase 1 in all months of the year with high density aggregations in the west of the area during the breeding season. A total of 7,638 individuals were recorded in Phase 1 during the 2010 boat-based surveys, with a peak density of 24.94 individuals/km ² occurring in June. Mean max foraging distance of 60.61 km ¹ (71.4km ²) suggests that Phase 1 is out of range of breeding birds from this SPA. However, it is possible that it is utilised by dispersing and wintering individuals. (JNCC/SNH have proposed that these species should be considered for the following seasons: BR/PBR/P/W)	N (BR) Y (PB R/P/W)	Direct effect: displacement. Possible indirect effect on food supply. Although displacement is assumed to be a major effect on auks, evidence from wind farm sites during and post-construction is inconsistent. Furthermore, there is no standard assessment methodology. If the effect is assumed to be significant then an AA for breeding birds is anticipated for up to 3 SPAs: Forth Islands, Fowlsheugh, St. Abb's Head to Fast Castle and for non-breeding birds for the above plus Buchan Ness to Collieston Coast.	Y	

European site name	European site features	Species or features of interest	Seasonality and key characteristics of feature	LSE Y/N	Justification notes	Inclusion in CIA Y/N	JNCC/SNH agreement Y/N
Fala Flow SPA (and Ramsar site)							
Fala Flow (Ramsar)	Article 4.2 migratory wintering Pink-footed Goose (Source: SPA Review/SNH Sitelink)	Pink-footed Goose <i>Anser brachyrhynchus</i> Q (M/W) Condition: FM (2009)	A total of 27 Pink-footed Goose has been recorded on passage through Phase 1 in February 2011. Previous to this Pink-footed Goose has been recorded on passage in other parts of the Zone. As boat-based surveys may not accurately assess the scale of movement, it is possible that birds may pass through the area on migration as the Forth region holds a large number of SPAs for this species. (JNCC/SNH have proposed that these species should be considered for the following seasons: P)	Y	Direct effect: collision/barrier effects. An AA is anticipated requiring the quantification of collision and barrier effects and assessment of effects on migratory birds from a number of east coast SPAs including: Firth of Forth; Firth of Tay and Eden Estuary, Fala Flow, Gladhouse Reservoir, Montrose Basin, South Tayside Goose Roosts, Loch Leven and Ythan Estuary, Sands of Forvie and Meikle Loch.	Y	
Imperial Dock Lock, Leith SPA							
Imperial Dock Lock, Leith SPA	Article 4.1 Annex 1, breeding: Common Tern (Source: Natura 2000 Standard data/SNH Sitelink)	Common Tern <i>Sterna hirundo</i> Q (BR) Condition: FM (2009)	Tracking of breeding Common Terns from this SPA showed that foraging was well inshore of Phase 1 and the Zone in general (JNCC, 2010). A total of 47 Common Terns have been recorded in Phase 1 during August to September 2010. (JNCC/SNH have proposed that these species should be considered for the following seasons: BR/PBR/P)	N (BR) Y (PB R/P)	Direct effect: collision/barrier effects. An AA for breeding birds is not anticipated. However, for post breeding and passage individuals an AA may be required for 2 SPAs: Imperial Dock Lock and Forth Islands SPA.	Y	
Gladhouse Reservoir SPA (and Ramsar site)							
Gladhouse Reservoir SPA (Ramsar)	Article 4.2 Migratory, overwinter: Pink-footed Goose (SNH Sitelink)	Pink-footed Goose <i>Anser brachyrhynchus</i> Q (M/W) Condition: UD (2009)	A total of 27 Pink-footed Goose has been recorded on passage through Phase 1 in February 2011. Previous to this Pink-footed Goose has been recorded on passage in other parts of the Zone. As boat-based surveys may not accurately assess the scale of movement, it is possible that birds may pass through the area on migration as the Forth region holds a large number of SPAs for this species. (JNCC/SNH have proposed that these species should be considered for the following seasons: P)	Y	Impacts: collision/barrier effects An AA is anticipated requiring the quantification of collision and barrier effects and assessment of effects on migratory birds at SPAs including: Firth of Forth; Firth of Tay and Eden Estuary, Fala Flow, Gladhouse Reservoir, Montrose Basin, South Tayside Goose Roosts, Loch Leven and Ythan Estuary, Sands of Forvie and Meikle Loch.	Y	
Montrose Basin SPA (and Ramsar site)							
Montrose Basin SPA (Ramsar)	Article 4.2 migratory, over winter: Pink-footed Goose, Greylag Goose, Knot, Over winter wetland assemblage: Dunlin, Oystercatcher, Eider, Wigeon, Shelduck, Redshank, Knot, Greylag Goose, Pink-footed	Pink-footed Goose <i>Anser brachyrhynchus</i> Q (M) A (W) Condition: FM (2008)	A total of 27 Pink-footed Goose has been recorded on passage through Phase 1 in February 2011. Previous to this Pink-footed Goose has been recorded on passage in other parts of the Zone. As boat-based surveys may not accurately assess the scale of movement, it is possible that birds may pass through the area on migration as the Forth region holds a large number of SPAs for this species. (JNCC/SNH have proposed that these species should be considered for the following seasons: P)	Y	Direct effects: collision/barrier effects. An AA is anticipated requiring the quantification of collision and barrier effects and assessment of effects on migratory birds from a number of SPAs including: Firth of Forth; Firth of Tay and Eden Estuary, Fala Flow, Gladhouse Reservoir, Montrose Basin, South Tayside Goose Roosts, Loch Leven and Ythan Estuary, Sands of Forvie and Meikle Loch.	Y	

European site name	European site features	Species or features of interest	Seasonality and key characteristics of feature	LSE Y/N	Justification notes	Inclusion in CIA Y/N	JNCC/SNH agreement Y/N
	Goose. (Source: SPA Review – not in SNH Sitelink)						
Montrose Basin SPA (Ramsar)		Greylag Goose <i>Anser anser</i> Q (M) A (W) Condition: UNC (2008)	Greylag Goose has not been recorded on passage within Phase 1 or elsewhere in the Zone. (JNCC/SNH have proposed that these species should be considered for the following seasons: P)	N	Direct effects: collision/barrier effects. Passage of Icelandic Greylag Geese is generally assumed to be directly south west / north east across Scotland (Wernham <i>et al.</i> 2002) to and from their east coast wintering sites. LSE from Phase 1 is therefore not anticipated.	N	
Montrose Basin SPA (Ramsar)		Shelduck <i>Tadorna tadorna</i> A (W) Condition: Unavailable	Shelduck has not been recorded in the Zone to date. Shelduck migration to the Helgoland Bight is well documented. However, there is evidence that birds in the Forth region moult locally (Wernham <i>et al.</i> 2002). If this is the case and local birds do not undertake migration then effects will be limited. In summary LSE on the Montrose basin SPA passage and wintering population is not anticipated. (JNCC/SNH have proposed that these species should be considered for the following seasons: P)	N	Effects: not known. No connectivity; no evidence that Shelduck is affected by offshore wind farms; evidence that duck species e.g. Eider take far field avoidance especially under adverse weather conditions.	N	
Montrose Basin SPA (Ramsar)		Wigeon <i>Anas penelope</i> A (W) Condition: FM (2008)	Wigeon has not been recorded in Phase 1 and only 5 individuals have been recorded in Phase 3 during 2010. As wintering birds rarely utilise areas as far offshore as this, LSE on the Montrose Basin SPA wintering population is not anticipated. (JNCC/SNH have proposed that these species should be considered for the following seasons: P)	N	Effects: not known. No connectivity; no evidence that Wigeon are affected by offshore wind farms; evidence that duck species e.g. Eider take far field avoidance especially under adverse weather conditions.	N	
Montrose Basin SPA (Ramsar)		Eider <i>Somateria mollissima</i> Condition: FM (2008) A (W)	N/A	N	No connectivity with the offshore areas of Phase 1 and the ECR SNH/JNCC/MS have deemed that AA is not required for this species at this site (email of 29/03/2011).	N	
Montrose Basin SPA (Ramsar)		Dunlin <i>Calidris alpina</i> A (W) Condition: Unavailable Knot <i>Calidris canutus</i> A (W)	The list below summarises the maximum number of individuals of each wader species seen within Phase 1: <ul style="list-style-type: none">• Knot – 0 ind.• Dunlin – 0 ind.• Redshank – 0 ind.• Oystercatcher – 3 ind. Boat-based surveys may not accurately assess the scale of movement of passage species and it is possible that	Y	Direct effect: possible collision during adverse weather on passage. Modelling to assess the scale of potential effects is currently being undertaken for certain key species by NIRAS Ltd. on behalf of FTOWDG (e.g. Bar-tailed Godwit). This may be adequate to confirm no LSE.	Y	

European site name	European site features	Species or features of interest	Seasonality and key characteristics of feature	LSE Y/N	Justification notes	Inclusion in CIA Y/N	JNCC/SNH agreement Y/N
		Condition: FM (2008) Oystercatcher <i>Haematopus ostralegus</i> A (W) Condition: FM (2008) Redshank <i>Tringa totanus</i> A (W) Condition: FM (2008)	birds may pass through the area and remain undetected. Although it is usually stated that wader migration occurs at altitudes above rotor height, with birds only descending to the coast when they are within a few kilometres of the shore, it is possible that migration may occur at risk height during adverse weather conditions. (JNCC/SNH have proposed that these species should be considered for the following seasons: P)				
Muir of Dinnet SPA (and Ramsar site)							
Muir of Dinnet SPA (Ramsar)	Article 4.2 migratory, over winter: Greylag Goose	Greylag Goose <i>Anser anser</i> Q (M/W) Condition: UD (2010)	Greylag Goose has not been recorded on passage either in Phase 1 or elsewhere within the Zone. (JNCC/SNH have proposed that these species should be considered for the following seasons: P)	N	Passage of Icelandic Greylag Geese is generally assumed to be directly south west / north east across Scotland (Wernham <i>et al.</i> 2002) to and from their east coast wintering sites. LSE from Phase 1 is therefore not anticipated.	N	
Slamannan Plateau SPA							
Slamannan Plateau SPA	Article 4.2 migratory species over winter: Bean Goose (Source: SNH Sitelink)	Bean Goose (Taiga) <i>Anser fabalis</i> Q (W) Condition: FM (2011)	Bean Goose has not been recorded in the Zone to date. Connectivity is not expected but impacts from collision may require collision risk modelling to confirm no LSE. (JNCC/SNH have proposed that these species should be considered for the following seasons: P)	Y	Direct effects: collision/barrier effects. An AA is anticipated requiring the quantification of collision and barrier effects on migratory birds from this SPA.	Y	
South Tayside Goose Roost SPA (and Ramsar site)							
South Tayside Goose Roost SPA (Ramsar)	Article 4.2 migratory species over winter: Greylag Goose, Pink-footed Goose Winter wetland assemblage Greylag Goose, Pink-footed Goose (Source: SNH Sitelink** SPA Review)	Pink-footed Goose <i>Anser brachyrhynchus</i> Q (M/W) A (W) Condition: FM (2002)	A total of 27 Pink-footed Goose has not been recorded on passage through Phase 1 in February 2011, previous to this Pink-footed Goose has been recorded on passage in other parts of the Zone. As boat-based surveys may not accurately assess the scale of movement, it is possible that birds may pass through the area on migration as the Forth region holds a large number of SPAs for this species. (JNCC/SNH have proposed that these species should be considered for the following seasons: P)	Y	Effects: collision/barrier effects. An AA is anticipated requiring the quantification of collision and barrier effects on migratory birds from a number of SPAs including: Firth of Forth; Firth of Tay and Eden Estuary, Fala Flow, Gladhouse Reservoir, Montrose Basin, South Tayside Goose Roosts, Loch Leven and Ythan Estuary, Sands of Forvie and Meikle Loch.	Y	
South Tayside Goose Roost SPA (Ramsar)		Greylag Goose <i>Anser anser</i>	Greylag Goose has not been recorded on passage either in Phase 1 or elsewhere within the Zone. (JNCC/SNH have proposed that these species should be	N	Direct effects: collision/barrier effects. Passage of Icelandic Greylag Geese is generally assumed to be directly south west / north east across Scotland (Wernham <i>et al.</i> 2002) to and from their east coast	N	

European site name	European site features	Species or features of interest	Seasonality and key characteristics of feature	LSE Y/N	Justification notes	Inclusion in CIA Y/N	JNCC/SNH agreement Y/N
		Q (M/W) A (W) Condition: UD (2002)	considered for the following seasons: P)		wintering sites. LSE from Phase 1 is therefore not anticipated.		
Loch Leven SPA (and Ramsar site)							
Loch Leven SPA (Ramsar)	<p>Article 4.1 Annex I, over winter: Whooper Swan</p> <p>Article 4.2 migratory, over winter:</p> <p>Pink-footed Goose, Shoveler</p> <p>Over winter wetland assemblage: Cormorant, Gadwall, Teal, Pochard, Shoveler, Tufted Duck, Goldeneye, Pink-footed Goose, Whooper Swan.</p> <p>(Source: SPA Review/SNH Sitelink)</p>	Whooper Swan <i>Cygnus cygnus</i> Q (W) A (W) Condition: FM (2007)	Whooper Swans has not been recorded on passage within Phase 1 or elsewhere in the Zone. (JNCC/SNH have proposed that these species should be considered for the following seasons: P)	N	Direct effects: collision/barrier effects. Tracking of whooper swans suggests that birds normally commence their migration in a more or less northerly direction (Griffin <i>et al.</i> 2010). The location of Loch Leven well to the north and west of Phase 1 suggests that Whooper Swans on passage from this SPA are unlikely to pass through the Zone and LSE is not anticipated.	N	
Loch Leven SPA (Ramsar)		Pink-footed Goose <i>Anser brachyrhynchus</i> Q (M) A (W) Condition: FM (2007)	A total of 27 Pink-footed Goose has been recorded on passage through Phase 1 in February 2011. Previous to this Pink-footed Goose has been recorded on passage in other parts of the Zone. As boat-based surveys may not accurately assess the scale of movement, it is possible that birds may pass through the area on migration as the Forth region holds a large number of SPAs for this species. (JNCC/SNH have proposed that these species should be considered for the following seasons: P)	Y	Direct effects: collision/barrier effects. An AA is anticipated requiring the quantification of collision and barrier effects on migratory birds from a number of SPAs including: Firth of Forth; Firth of Tay and Eden Estuary, Fala Flow, Gladhouse Reservoir, Montrose Basin, South Tayside Goose Roosts, Loch Leven and Ythan Estuary, Sands of Forvie and Meikle Loch.	Y	
Loch Leven SPA (Ramsar)		Gadwall <i>Anas strepera</i> A (W) Condition: FM (2007)	Gadwall has not been recorded within Phase 1 or elsewhere in the Zone. (JNCC/SNH have proposed that these species should be considered for the following seasons: P)	N	Effects: not known. No recorded sensitivity to offshore wind farms and low numbers present within the wind farm area mean that LSE is not anticipated.	N	
Loch Leven SPA (Ramsar)		Teal <i>Anas crecca</i> A (W) Condition: FM (2007)	Small numbers of Teal have been recorded in Phase 1 (32 individuals) with 9 individuals elsewhere in the Zone (JNCC/SNH have proposed that these species should be considered for the following seasons: P)	N	Effects: not known. No recorded sensitivity to offshore wind farms and low numbers present within the wind farm area mean that LSE is not anticipated.		

European site name	European site features	Species or features of interest	Seasonality and key characteristics of feature	LSE Y/N	Justification notes	Inclusion in CIA Y/N	JNCC/SNH agreement Y/N
Loch Leven SPA (Ramsar)		Shoveler <i>Anas clypeata</i> Q (M) A (W) Condition: FM (2007)	Shoveler has not been recorded within Phase 1 or elsewhere in the Zone. (JNCC/SNH have proposed that these species should be considered for the following seasons: P)	N	Effects: not known. No recorded sensitivity to offshore wind farms and low numbers present within the wind farm area mean that LSE is not anticipated.	N	
Loch Leven SPA (Ramsar)		Pochard <i>Aythya farina</i> A (W) Condition: FM (2007)	Pochard has not been recorded within Phase 1 or elsewhere in the Zone. (JNCC/SNH have proposed that these species should be considered for the following seasons: P)	N	Effects: not known. No recorded sensitivity to offshore wind farms and low numbers present within the wind farm area mean that LSE is not anticipated.	N	
Loch Leven SPA (Ramsar)		Tufted Duck <i>Aythya fuligula</i> A (W) Condition: FM (2007)	Tufted Duck has not been recorded within Phase 1 and only 2 individuals have been recorded in Phase 2. (JNCC/SNH have proposed that these species should be considered for the following seasons: P)	N	Effects: not known. No recorded sensitivity to offshore wind farms and low numbers present within the wind farm area mean that LSE is not anticipated.	N	
Loch Leven SPA (Ramsar)		Cormorant <i>Phalacrocorax carbo</i> A (W) Condition: FM (2007)	A total of 2 Cormorants have been recorded during migration in Phase 1 in February 2011. Previous to this, only a single individual has been recorded elsewhere in the Zone. The population of wintering Cormorants at this site is not expected to be affected by wind farms in the Round 3 Zone owing to the direction from which the birds approach Loch Leven i.e. generally flying inland from the coast in a southerly/westerly direction (Wernham <i>et al.</i> 2002). Although some birds may utilise Phase 1 in small numbers, LSE is not anticipated. (JNCC/SNH have proposed that these species should be considered for the following seasons: W)	N	Direct effects: collision/displacement. No recorded sensitivity to offshore wind farms and low numbers present within the wind farm area plus direction of approach to Loch Leven mean that LSE is not anticipated.	N	
Loch of Skene SPA (and Ramsar site)							
Loch of Skene SPA (Ramsar)	Article 4.1 Annex I Over winter: Whooper Swan Article 4.2 migratory, over winter: Greylag Goose (Source: SPA review)	Whooper Swan <i>Cygnus cygnus</i> Q (W) Condition: Unavailable	Whooper Swan has not been recorded on passage within Phase 1 or elsewhere in the Zone. (JNCC/SNH have proposed that these species should be considered for the following seasons: P)	N	Direct effects: collision/barrier effects. Tracking of whooper swans suggests that birds normally commence their migration in a more or less northerly direction (Griffin <i>et al.</i> 2010). The location of Loch of Skene well to the North of Phase 1 suggests that whooper swans on passage from this SPA are very unlikely to pass through the Zone and LSE is not anticipated.	N	
Loch of Skene SPA (Ramsar)		Greylag Goose <i>Anser anser</i> Q (M/W)	Greylag Goose has not been recorded on passage within Phase 1 or elsewhere in the Zone. (JNCC/SNH have proposed that these species should be	N	Direct effects: collision/barrier effects. Passage of Icelandic Greylag Geese is generally assumed to be directly south west / north east across Scotland (Wernham <i>et al.</i> 2002) to and from their east coast	N	

European site name	European site features	Species or features of interest	Seasonality and key characteristics of feature	LSE Y/N	Justification notes	Inclusion in CIA Y/N	JNCC/SNH agreement Y/N
		Condition: UD (2008)	considered for the following seasons: P)		wintering sites. The location of Loch of Skene in relation to Phase 1 means that LSE is therefore not anticipated.		
Ythan Estuary, Sands of Forvie and Meikle Loch SPA (and Ramsar site – Ythan Estuary and Meikle loch)							
Ythan Estuary SPA (Ramsar)	<p>Article 4.1 Annex I, breeding: Common Tern, Little Tern, Sandwich Tern</p> <p>Article 4.2 migratory, over winter: Pink-footed Goose</p> <p>Over winter wetland assemblage: Redshank, Lapwing, Eider, Pink-footed Goose (Source: SPA Review**)</p>	Pink-footed Goose <i>Anser brachyrhynchus</i> Q (W) A (W) Condition: FM (2002)	A total of 27 Pink-footed Goose has been recorded on passage through Phase 1 in February 2011. Previous to this Pink-footed Goose has been recorded on passage in other parts of the Zone. As boat-based surveys may not accurately assess the scale of movement, it is possible that birds may pass through the area on migration as the Forth region holds a large number of SPAs for this species. (JNCC/SNH have proposed that these species should be considered for the following seasons: P)	Y	Direct effects: collision/barrier effects. An AA is anticipated requiring the quantification of collision and barrier effects and assessment of effects on migratory birds from a number of SPAs including: Firth of Forth; Firth of Tay and Eden Estuary, Fala Flow, Gladhouse Reservoir, Montrose Basin, South Tayside Goose Roosts, Loch Leven and Ythan Estuary, Sands of Forvie and Meikle Loch.	Y	
Ythan Estuary SPA (Ramsar)		Eider <i>Somateria mollissima</i> A (W) Condition: FM (2002)	N/A	N	No connectivity with the offshore areas of Phase 1 and the ECR. SNH/JNCC/MS have deemed that AA will not be required for this species at this site (email of 29/03/2011).	N	
Ythan Estuary SPA (Ramsar)		Lapwing <i>Vanellus vanellus</i> A (W) Condition: FM (2007)	N/A	N	No connectivity with the offshore areas of Phase 1 and the ECR. SNH/JNCC/MS have deemed that AA will not be required for this species at this site (email of 29/03/2011).	N	
Ythan Estuary SPA (Ramsar)		Redshank <i>Tringa totanus</i> A (W) Condition: FM (2002)	N/A	N	No connectivity with the offshore areas of Phase 1 and the ECR. SNH/JNCC/MS have deemed that AA will not be required for this species at this site (email of 29/03/2011).	N	
Ythan Estuary SPA (Ramsar)		Sandwich Tern <i>Sterna sandvicensis</i> Q (BR) Condition: FM (2008)	The SPA is outside the foraging range for breeding birds from this SPA (mean maximum 42.3km ¹ ; 31.7km ²) therefore effects are not anticipated. Although the Firth of Forth SPA is designated for birds on passage, to date, only 2 Sandwich Terns have been recorded in Phase 1 (1 individual recorded in both June and August 2010) suggesting that passage is very limited through the Phase 1 area. Effects are therefore not anticipated.	N	Direct effect: collision with operational turbines (Everaert and Stienen, 2006). Virtually no birds seen during the August passage period suggesting that Phase 1 is not an important passage route for this species. LSE not anticipated.	N	

European site name	European site features	Species or features of interest	Seasonality and key characteristics of feature	LSE Y/N	Justification notes	Inclusion in CIA Y/N	JNCC/SNH agreement Y/N
			(JNCC/SNH have proposed that these species should be considered for the following seasons: PBR/P)				
Ythan Estuary SPA (Ramsar)		Common Tern <i>Sterna hirundo</i> Q (BR) Condition: UD (2002)	The entire Zone is outside the foraging range for breeding birds from this SPA (mean maximum 33.81 km ¹ ; 15.2 km ²) and effects are not anticipated. Although terns have complex post-breeding dispersal patterns, often moving north before they commence their southerly migration, only a total of 47 Common Terns have been recorded on passage through Phase 1 during August – September 2010. (JNCC/SNH have proposed that these species should be considered for the following seasons: P)	N	Direct effect: collision with operational turbines. LSE not anticipated owing to the small proportion of birds from this SPA which may be represented within the numbers seen within Phase 1.	N	
Ythan Estuary SPA (Ramsar)		Little Tern <i>Sternula albifrons</i> Q (BR) Condition: FM (2008)	Little Tern has not been recorded on surveys of the Zone to date. As it is outside the foraging range of birds from this SPA and Little Terns are not recorded in post-breeding aggregations within the area, effects are not anticipated. (JNCC/SNH have proposed that these species should be considered for the following seasons: PBR/P)	N	As Little Terns are not recorded on passage or in post-breeding aggregations within the area and none have been recorded within the Phase, LSE is not anticipated.	N	
Lindisfarne SPA (and Ramsar site)							
Lindisfarne SPA (Ramsar)	Article 4.1 Annex 1 breeding: Little Tern Over winter: Bar-tailed Godwit, Golden Plover, Whooper Swan Article 4.2 migratory, passage: Ringed Plover Over winter: Grey Plover, Greylag Goose, Knot, Light-bellied Brent Goose, Wigeon Overwinter wetland assemblage: Pink-footed Goose, Golden Plover, Bar-tailed Godwit, Greylag Goose, Light-bellied Brent Goose, Wigeon, Whooper Swan, Knot, Redshank, Shelduck, Eider, Common Scoter, Ringed Plover, Lapwing, Dunlin, Grey Plover (Source: SPA Review)	Whooper Swan <i>Cygnus cygnus</i> Q (W) A (W) Condition: ISD	Whooper Swan has not been recorded on passage within Phase 1 or elsewhere in the Zone. (JNCC/SNH have proposed that these species should be considered for the following seasons: P)	N	Direct effects: collision/barrier effects. Tracking of Whooper Swans from Welney, in south eastern England (Griffin <i>et al.</i> 2010) suggests that birds migrating up the east coast and through the Firth of Forth remain close to the sea (9m) before rising to a mean height of 32m once they begin their ocean crossing. This study also suggests that the width of the migration front remains narrow (c. 60km) when birds are still within 100km of their wintering site. Applying this information to Phase 1, suggests that birds from Lindisfarne will pass predominantly inshore of the Zone and those that pass through the Phase will be below rotor height. Therefore, based on the small number of birds which may be affected, LSE is not anticipated.	N	
Lindisfarne SPA (Ramsar)		Pink-footed Goose <i>Anser brachyrhynchus</i>	A total of 27 Pink-footed Goose has been recorded on passage through Phase 1 in February 2011. Previous to this Pink-footed Goose has been recorded on passage in	N	No connectivity with the offshore areas of Phase 1 and the ECR. SNH/JNCC/MS have deemed that AA is not	N	

European site name	European site features	Species or features of interest	Seasonality and key characteristics of feature	LSE Y/N	Justification notes	Inclusion in CIA Y/N	JNCC/SNH agreement Y/N
		A (W) Condition: Unavailable	other parts of the Zone. (JNCC/SNH have proposed that these species should be considered for the following seasons: not required)		required for this species at this site (email of 29/03/2011).		
Lindisfarne SPA (Ramsar)		Greylag Goose <i>Anser anser</i> Q (M) A (W) Condition: DSD	Greylag Goose has not been recorded on passage within Phase 1 or elsewhere in the Zone. (JNCC/SNH have proposed that these species should be considered for the following seasons: P)	N	Direct effects: collision/barrier effects. Passage of Icelandic Greylag Geese is generally assumed to be directly south west / north east across land (Wernham <i>et al.</i> 2002) to and from Lindisfarne. LSE from Phase 1 is therefore not anticipated.	N	
Lindisfarne SPA (Ramsar)		Brent Goose <i>Branta bernicla</i> Q (M) A (W) Condition: ISD	Brent Goose has not been recorded on passage within Phase 1 or elsewhere in the Zone. (JNCC/SNH have proposed that these species should be considered for the following seasons: P)	N	Direct effects: collision/barrier effects. Wernham <i>et al.</i> (2002) suggest that Brent geese from Lindisfarne migrate on two paths basically more or less east south east to join birds passing through the Baltic or north direct to Svalbard. Assuming that half the individuals from this SPA move northwards there is limited potential for some birds to cross the Zone. If migration is continuous from Lindisfarne, it seems more likely that the southern and eastern parts of the Zone would be traversed rather than Phase 1. For this reason, LSE is not anticipated.	N	
Lindisfarne SPA (Ramsar)		Shelduck <i>Tadorna tadorna</i> A (BR) Condition: ISD	N/A	N	No connectivity with the offshore areas of Phase 1 and the ECR. SNH/JNCC/MS have deemed that AA is not required for this species at this site (email of 29/03/2011).	N	
Lindisfarne SPA (Ramsar)		Wigeon <i>Anas penelope</i> Q (M) A (W) Condition: DSD	Wigeon has not been recorded in Phase 1 and only 5 individuals have been recorded in Phase 3 during 2010. As wintering birds rarely utilise areas as far offshore as this, LSE on the Firth of Forth SPA wintering population is not anticipated. (JNCC/SNH have proposed that these species should be considered for the following seasons: P)	N	Effects: not known. No connectivity; no evidence that Wigeon are affected by offshore wind farms; evidence that duck species e.g. Eider take far field avoidance especially under adverse weather conditions.	N	
Lindisfarne SPA (Ramsar)		Eider <i>Somateria mollissima</i> A (W) Condition: DSD	Eider has not been recorded in Phase 1 and a total of 18 in the south of the Zone, outside the development area. (JNCC/SNH have proposed that these species should be considered for the following seasons: not required)	N	No connectivity with the offshore areas of Phase 1 and the ECR. SNH/JNCC/MS have deemed that AA is not required for this species at this site (email of 29/03/2011).	N	
Lindisfarne SPA		Common Scoter	Common Scoter has not been recorded in Phase 1. In the rest of the Zone only 1 individual has been recorded in Phase 3 and a total of 158 in the south of the Zone, outside	N	Almost no information is available on the passage of scoters although clearly birds cross the North Sea to winter in eastern England. It seems likely that birds	N	

European site name	European site features	Species or features of interest	Seasonality and key characteristics of feature	LSE Y/N	Justification notes	Inclusion in CIA Y/N	JNCC/SNH agreement Y/N
(Ramsar)		<i>Melanitta nigra</i> A (W) Condition: Unavailable	the development area. This SPA is outside the range of wintering birds and no passage of any duck species has been recorded within the Zone. LSE is not anticipated. (JNCC/SNH have proposed that these species should be considered for the following seasons: P)		staging in the Baltic or Waddensee would fly directly south west to the Northumberland coast without passing through the Round 3 Zone. For this reason LSE for birds on passage birds is not anticipated.		
Lindisfarne SPA (Ramsar)		Bar-tailed Godwit <i>Limosa lapponica</i> Q (W) A(W) Condition: DSD Dunlin A (W) <i>Calidris alpina</i> Condition: DSD Redshank A (W) <i>Tringa totanus</i> Condition: DSD Golden plover Q (W) A (W) <i>Pluvialis apricaria</i> Condition: ISD Grey plover Q (W) A (W) <i>Pluvialis squatarola</i> Condition: ISD Ringed plover Q (P) A(W) <i>Charadrius hiaticula</i> Condition: Static Sanderling A (W) <i>Calidris alba</i> Condition: ISD Knot Q (W) A (W) <i>Calidris canuta</i> Condition: Unavailable Lapwing A (W) <i>Vanellus vanellus</i> Condition: Unavailable	The list below summarises the maximum number of individuals of each wader species seen within Phase 1: <ul style="list-style-type: none"> Bar-tailed Godwit - 0 ind. Dunlin – 0 ind. Redshank – 0 ind. Golden plover – 31 ind. Grey Plover – 17 ind. Ringed plover 0 ind. Sanderling- 0 ind. Knot - 0 ind. Lapwing - 4 ind. Boat-based surveys may not accurately assess the scale of movement of passage species and it is possible that birds may pass through the area and remain undetected. Although it is usually stated that wader migration occurs at altitudes above rotor height, with birds only descending to the coast when they are within a few kilometres of the shore, it is possible that migration may occur at risk height during adverse weather conditions. (JNCC/SNH have proposed that these species should be considered for the following seasons: P)	N	Direct effect: possible collision during adverse weather on passage. Modelling to assess the scale of potential cumulative effects is currently being undertaken for certain key species by NIRAS Ltd. on behalf of FTOWDG (e.g. Bar-tailed Godwit). This may be adequate to confirm no LSE. Assuming that this there is no LSE for relevant Firth of Forth wintering populations, none is expected for Lindisfarne.	N	

European site name	European site features	Species or features of interest	Seasonality and key characteristics of feature	LSE Y/N	Justification notes	Inclusion in CIA Y/N	JNCC/SNH agreement Y/N
Lindisfarne SPA (Ramsar)		Little Tern Q (BR) Condition: Unavailable	Little Tern has not been recorded on surveys of the Zone to date. (JNCC/SNH have proposed that these species should be considered for the following seasons: PBR/P)	N	As Phase 1 is outside the foraging range of birds from this SPA and as Little Terns are not recorded in post-breeding aggregations within the Firth of Forth LSE is not anticipated.	N	
Farne Islands SPA							
Farne Islands SPA	<p>Article 4.1 Annex I, breeding: Arctic Tern, Common Tern, Roseate Tern, Sandwich Tern,</p> <p>Article 4.2 migratory, breeding: Guillemot, Puffin</p> <p>Breeding assemblage: Kittiwake, Shag, Cormorant, Puffin, Guillemot, Arctic Tern, Common Tern, Roseate Tern, Sandwich Tern</p> <p>(Source: SPA Review. Natura SDF: Annex 1- Tern species only minus Roseate Tern)</p>	Cormorant A (BR) Condition: Unavailable	<p>The Zone is outside the breeding range of birds from this SPA (mean maximum 31.67km¹; 25km²). A total of 2 Cormorants have been recorded during migration in Phase 1 in February 2011. Previous to this, only a single individual has been recorded elsewhere in the Zone. Although the species is migratory, Cormorants from Northumberland are thought to winter either west or south of the area (Wernham <i>et al.</i> 2002). They are therefore unlikely to utilise the Zone.</p> <p>(JNCC/SNH have proposed that these species should be considered for the following seasons: BR/P?)</p>	N	<p>Direct effect: collision/ displacement.</p> <p>No connectivity</p>	N	
Farne Islands SPA		Shag <i>Phalacrocorax aristotelis</i> A (BR) Condition: Unavailable	<p>Shags have been recorded in very low numbers within the Zone; the 2010 boat-based surveys recorded only 2 individuals in Phase 1 in May. Tracking carried out from the Isle of May suggests the birds are primarily coastal in their distribution with a maximum foraging range of 17 km (e.g. Wanless <i>et al.</i> 1991). Their maximum dispersal distance of 100 km and the fact that they are 'virtually never seen out of site of land' (Wernham <i>et al.</i> 2002) means that effects are not anticipated.</p> <p>(JNCC/SNH have proposed that these species should be considered for the following seasons: P)</p>	N	<p>Direct effect: displacement.</p> <p>Indirect effects on prey.</p> <p>No connectivity.</p>	N	
Farne Islands SPA		Kittiwake A (BR) Condition: Unavailable	<p>A total of 9,208 individuals were recorded in Phase 1 during the 2010 boat-based surveys, with a peak density of 33.94 individuals/km² occurring in November. However, the mean maximum foraging range of 65.81km¹ (61.6km²) means that Phase 1 is out of range of breeding birds from this SPA and effects are not anticipated. Although, theoretically, the Zone is within reach of Kittiwakes from this SPA, it is more likely that postbreeding, migrating and wintering birds, if present in the area utilise more southern areas of the Zone. This theory is supported by GPS tracking undertaken from St. Abb's Head to Fast Castle by CEH in 2011 which showed a very limited use of Phase 1 with the majority of Kittiwakes only reaching as far as the</p>	N	<p>Direct effect: collision with operational turbines.</p> <p>LSE not anticipated owing to the distance of the Phase from this SPA.</p>	N	

European site name	European site features	Species or features of interest	Seasonality and key characteristics of feature	LSE Y/N	Justification notes	Inclusion in CIA Y/N	JNCC/SNH agreement Y/N
			southern part of the Zone. (JNCC/SNH have proposed that these species should be considered for the following seasons: BR/PBR/PW)				
Farne Islands SPA		Sandwich Tern <i>Sterna sandvicensis</i> Q (BR) A (BR) Condition: DSD	The SPA is outside the foraging range for breeding birds (mean maximum 42.3km ¹ ; 31.7km ²) therefore effects are not anticipated. However, Sandwich Terns have complex post-breeding dispersal patterns, and may move northwards before they commence their southerly migration. The Firth of Forth SPA is designated for birds on passage. However, to date, only 2 individuals have been recorded in Phase 1 (1 individual recorded in both June and August 2010) suggesting that passage is very limited through the area. Effects are therefore not anticipated. (JNCC/SNH have proposed that these species should be considered for the following seasons: PBR/P)	N	Direct effect: collision with operational turbines (Everaert and Stienen, 2006). Sandwich terns have been observed on offshore passage during the hours of daylight. However, virtually no birds were seen within the Zone seen during the August passage period suggesting that Phase 1 is not an important route for this species.	N	
Farne Islands SPA		Roseate Tern <i>Sterna dougallii</i> Q (BR) A (BR) Condition: Unavailable	Phase 1 is outside the foraging range of birds from this SPA during the breeding season (mean maximum 18.28km ¹ ; 16.6km ²). As Roseate Tern has not been recorded in Phase 1 or elsewhere within the Zone, effects are not anticipated. (JNCC/SNH have proposed that these species should be considered for the following seasons: BR/PBR/PW)	N	Direct effect: collision with operational turbines. No connectivity.	N	
Farne Islands SPA		Common Tern <i>Sterna hirundo</i> Q (BR) A (BR) Condition: ISD	The Zone is outside the foraging range for breeding birds from this SPA (mean maximum 33.81 km ¹ ; 15.2 km ²) and effects are not anticipated. Although terns have complex post-breeding dispersal patterns, often moving north before they commence their southerly migration, only a total of 47 Common Terns have been recorded on passage through Phase 1 during August – September 2010. Owing to the proportion of birds from this SPA which may be represented within this number, effects are not expected to affect post-breeding or passage birds from this SPA. (JNCC/SNH have proposed that these species should be considered for the following seasons: PBR/P)	N	Direct effect: collision with operational turbines. LSE not anticipated owing to the small proportion of birds from this SPA which may be represented within the numbers seen within Phase 1.	N	
Farne Islands SPA		Arctic Tern <i>Sterna paradisaea</i> Q (BR) A (BR) Condition: ISD	A total of 223 individuals were recorded in Phase 1 during the 2010 boat-based surveys, with a peak density of 1.72 individuals/km ² occurring in August. However, the Phase is outside the foraging range for breeding birds from this SPA (maximum 20.6km ¹ , 24.2 km ²) and effects are not anticipated. Terns have complex post-breeding dispersal patterns, often moving north before they commence their southerly migration and passage of Arctic Terns within this Phase has generated population estimates of up to 1,030 individuals during August 2010. At this time flight heights	N	Direct effect: collision with operational turbines. LSE not anticipated owing to the small proportion of birds from this SPA which may be represented within the numbers seen within Phase 1 and low flight height suggesting minimal collision risk.	N	

European site name	European site features	Species or features of interest	Seasonality and key characteristics of feature	LSE Y/N	Justification notes	Inclusion in CIA Y/N	JNCC/SNH agreement Y/N
			were almost exclusively below rotor height with only 2.5% within the rotor swept area. Effects are therefore not anticipated on post-breeding or passage birds. (JNCC/SNH have proposed that these species should be considered for the following seasons: PBR/P)				
Farne Islands SPA		Guillemot <i>Uria aalge</i> Q (M) A (BR) Condition: ISD	A total of 7,638 individuals were recorded in Phase 1 during the 2010 boat-based surveys, with a peak density of 24.94 individuals/km ² occurring in June. However, the mean maximum foraging range of 60.61km ¹ (71.4km ²) means that Phase 1 is out of range of breeding birds from this SPA and effects are not anticipated. Although, theoretically, the Zone is within reach of Guillemots from the Farne Islands, patterns of distribution in Phase 1 suggest that the June peak reflects dispersal from local colonies. As numbers decline thereafter it seems unlikely that significant numbers of birds from this SPA reach Phase 1. For this reason, LSE on post-breeding, migrating and wintering birds is not anticipated. (JNCC/SNH have proposed that these species should be considered for the following seasons: BR/PBR/P/W)	N	Direct effect: displacement. Possible indirect effect on food supply. Outside range of breeding birds. Patterns of occurrence in Phase do not suggest influxes of guillemots from other SPAs.	N	
Farne Islands SPA		Puffin <i>Fratercula arctica</i> Q (M) A (BR) Condition: ISD	A total of 2,894 Puffins were recorded in Phase 1 during the 2010 boat-based surveys, with a peak density of 9.33 individuals/km ² occurring in June. However, Phase 1 is outside the mean maximum foraging range (62.2km ¹ ; 86.6km ²) of breeding birds from this SPA and effects are not anticipated. Although, theoretically, birds could reach the Phase outside the breeding season, distribution and estimated densities during the post breeding and passage period (peaking in June) suggest that birds within the region come from more local SPAs, and, as numbers fall to zero over mid-winter, LSE is not anticipated. (JNCC/SNH have proposed that these species should be considered for the following seasons: BR/PBR/P/W)	N	Direct effect: displacement. Possible indirect effect on food supply. LSE not anticipated as outside the range of breeding birds. For migratory birds, because numbers in Phase 1 reduce, rather than increase during late summer and autumn influxes from SPAs further south are unlikely.	N	
Coquet Island SPA							
Coquet Island SPA	Article 4.1 Annex I, breeding: Arctic Tern, Common Tern, Roseate Tern, Sandwich Tern, Article 4.2 migratory, breeding: Puffin	Black-headed Gull <i>Chroicocephalus ridibundus</i> A (BR) Condition: ISD	N/A	N	No connectivity with the offshore areas of Phase 1 and the ECR. SNH/JNCC/MS have deemed that AA is not required for this species at this SPA (email of 29/03/2011).	N	

European site name	European site features	Species or features of interest	Seasonality and key characteristics of feature	LSE Y/N	Justification notes	Inclusion in CIA Y/N	JNCC/SNH agreement Y/N
	<p>Breeding assemblage: Black-headed Gull, Puffin, Arctic Tern, Common Tern, Roseate Tern, Sandwich Tern</p> <p>(Source: SPA Review. NOTE: Natura SDF: includes Annex 1 species only)</p>						
Coquet Island SPA		Sandwich Tern <i>Sterna sandvicensis</i> Q (BR) A (BR) Condition: ISD	<p>The SPA is outside the foraging range for breeding birds (mean maximum 42.3km¹; 31.7km²) therefore effects are not anticipated. Although the Firth of Forth SPA is designated for birds on passage, to date, only 2 individuals have been recorded in Phase 1 (1 individual recorded in both June and August 2010) suggesting that the Phase may not be an important passage route for this species. Effects are therefore not anticipated.</p> <p>(JNCC/SNH have proposed that these species should be considered for the following seasons: PBR/P)</p>	N	<p>Direct effect: collision with operational turbines (Everaert and Stienen, 2006).</p> <p>Virtually no birds seen during the August passage period suggesting that Phase 1 is not an important passage route for this species.</p>	N	
Coquet Island SPA		Roseate Tern <i>Sterna dougallii</i> Q (BR) A (BR) Condition: ISD	<p>Phase 1 is outside the foraging range of birds from this SPA during the breeding season (mean maximum 18.28km¹; 16.6km²). As Roseate tern has not been recorded in Phase 1 or elsewhere within the Zone, effects are not anticipated.</p> <p>(JNCC/SNH have proposed that these species should be considered for the following seasons: PBR/P)</p>	N	<p>Direct effect: collision with operational turbines.</p> <p>No connectivity.</p>	N	
Coquet Island SPA		Common Tern <i>Sterna hirundo</i> Q (BR) A (BR) Condition: ISD	<p>The Zone is outside the foraging range for breeding birds from this SPA (mean maximum 33.81 km¹; 15.2 km²) and effects are not expected. Although terns have complex post-breeding dispersal patterns, often moving north before they commence their southerly migration, only a total of 47 Common Terns have been recorded on passage through Phase 1 during August – September 2010. (JNCC/SNH have proposed that these species should be considered for the following seasons: PBR/P)</p>	N	<p>Direct effect: collision with operational turbines.</p> <p>LSE not anticipated owing to the small proportion of birds from this SPA which may be represented within the numbers seen within Phase 1.</p>	N	
Coquet Island SPA		Arctic Tern <i>Sterna paradisaea</i> Q (BR) A (BR) Condition: ISD	<p>A total of 223 individuals were recorded in Phase 1 during the 2010 boat-based surveys, with a peak density of 1.72 individuals/km² occurring in August. However, the Phase is outside the foraging range for breeding birds from this SPA (maximum 20.6km¹, 24.2 km²) and effects are not anticipated. Terns have complex post-breeding dispersal patterns, often moving north before they commence their southerly migration and passage of Arctic Terns within Phase 1 has generated population estimates of up to 1,030 individuals during August 2010. At this time however, flight heights were almost exclusively below rotor height with</p>	N	<p>Direct effect: collision with operational turbines.</p> <p>LSE not anticipated owing to the small proportion of birds from this SPA which may be represented within the numbers seen within Phase 1 and low flight height suggesting minimal collision risk.</p>	N	

European site name	European site features	Species or features of interest	Seasonality and key characteristics of feature	LSE Y/N	Justification notes	Inclusion in CIA Y/N	JNCC/SNH agreement Y/N
			only 2.5% within the rotor swept area. Effects are therefore not anticipated on post-breeding or passage birds from this SPA. (JNCC/SNH have proposed that these species should be considered for the following seasons: PBR/P)				
Coquet Island SPA		Puffin <i>Fratercula arctica</i> Q (M) A (BR) Condition: ISD	A total of 2,894 individuals were recorded in Phase 1 during the 2010 boat-based surveys, with a peak density of 9.33 individuals/km ² occurring in June. However, Phase 1 is outside the mean maximum foraging range (62.2km ¹ ; 86.6km ²) of birds from this SPA during the breeding season. Although, theoretically, birds could reach the Phase outside the breeding season, estimated densities during post-breeding and passage period suggest that birds within the region come from more local SPAs, and, as numbers fall to zero over mid-winter are unlikely to include individuals from SPAs further afield. (JNCC/SNH have proposed that these species should be considered for the following seasons: BR/PBR/PW)	N	Direct effect: displacement. Possible indirect effect on food supply. LSE not anticipated as outside the range of breeding birds. For migratory birds, because numbers in Phase 1 reduce, rather than increase during late summer and autumn influxes from SPAs further south are unlikely.	N	
Upper Solway Flats and Marshes SPA (and Ramsar site)							
Upper Solway Flats and Marshes SPA (Ramsar)	<p>Article 4.1 Annex I, over winter: Bar-tailed Godwit, Barnacle Goose, Golden Plover, Whooper Swan</p> <p>Article 4.2 migratory species on passage: Ringed Plover</p> <p>Over winter: Curlew, Dunlin, Knot, Oystercatcher, Pink-footed Goose, Pintail, Redshank</p> <p>Over winter wetland assemblage: Redshank, Barnacle Goose, Golden Plover, Bar-tailed Godwit, Pink-footed Goose, Pintail, Oystercatcher, Knot, Whooper Swan, Curlew, Lapwing, Great Crested Grebe, Cormorant, Shelduck, Mallard, Scaup, Goldeneye, Ringed Plover, Grey Plover, Dunlin</p> <p>(Source: SPA review**)</p>	Barnacle Goose Q (W) A (W) Condition: FM (2007)	Barnacle Goose has not been recorded in Phase 1 to date. Very low numbers have been recorded in Phases 2 and 3 where a total of 35 individuals were recorded during boat-based surveys in October 2010. (JNCC/SNH have proposed that these species should be considered for the following seasons: P)	N	Direct effects: collision/barrier effect. SNH/JNCC have carried out collision risk modelling which demonstrates that Phase 1 may generate 8.65 collisions per year and that cumulative collision effects including the Zone and STW sites result in a total of 36.82 individuals per annum. LSE is therefore not anticipated.	N	

4.4 Screening Outcomes

From the above analysis (Table 4.3) it is Seagreen's preliminary judgment that an AA may be required for 14 SPAs and 23 species within the Firth of Forth region (Table 4.4). A brief account is provided for each bird species which is deemed to be at risk of LSE in Appendix 2 of the Offshore Phase 1 HRA Screening Report Appendices.

Six SPAs and 22 species have been screened out based on the evidence currently available.

Seagreen now wishes to consult with JNCC, SNH and MS in order to confirm whether they concur with this screening assessment and to ascertain what further information will be required in order to provide adequate information to inform the AA.

Table 4.4: Summary of SPAs and species which may require AA

Special Protection Area	Feature for which AA may be required
Buchan Ness to Collieston Coast	Herring Gull, Kittiwake, Guillemot
Coquet Island	None required
Fala Flow	Pink-footed Goose
Farne Islands	None required
Firth of Forth	Pink-footed Goose, waders
Firth of Tay and Eden Estuary	Pink-footed Goose, waders
Forth Islands	Gannet, Kittiwake, Herring Gull Common Tern, Arctic Tern, Guillemot, Razorbill, Puffin
Fowlsheugh	Kittiwake, Herring Gull, Guillemot, Razorbill
Gladhouse Reservoir	Pink-footed Goose
Imperial Dock Lock, Leith	Common Tern
Lindisfarne	None required
Loch Leven	Pink-footed Goose
Loch of Skene	None required
Montrose Basin	Pink-footed Goose, waders
Muir of Dinnet	None required
St. Abb's to Fast Castle	Herring Gull, Kittiwake, Guillemot, Razorbill

Special Protection Area	Feature for which AA may be required
South Tayside Goose Roosts	Pink-footed Goose
Slamannan Plateau	Bean Goose
Upper Solway Flats and Marshes	None required
Ythan Estuary, Sands of Forvie and Meikle Loch	Pink-footed Goose

5 Conclusions

This HRA screening report has identified a number of features of European sites (habitats and species) where evidence suggests there is no likely significant effect from the Phase 1 developments and these therefore require no further assessment under the Habitats Regulations.

The report also identifies interest features on a limited number of European sites (SACs and SPAs) which it is proposed should be taken forward for more detailed consideration in the HRA process. Specifically, the screening exercise identifies fifteen features on eight SACs which will be taken forward for further consideration (Table 3.3). The features identified are all annexe II species and include both species of seals, bottlenose dolphin, Atlantic salmon, river lamprey and sea lamprey. Considering SPAs, the screening exercise suggests fourteen SPAs and twenty three species within the Firth of Forth region should be taken forward for further consideration (Table 4.4).

Seagreen is now seeking to consult with Scottish Ministers through MS, JNCC and SNH to gain approval on the process undertaken in this report and confirmation that the European sites, species and habitats have been categorised correctly as to whether further consideration is required.

It is appreciated that the process is iterative and that further species may be screened out or in to HRA as more information becomes available. To this end, Seagreen will continue to gather relevant new survey data, in order to develop and improve the baseline information used to undertake the HRA. In addition the engineering design will continue to be refined to allow more targeted assessment to be made in the full HRA.

Looking forward, once the results of our screening assessment can be confirmed, the Seagreen team will continue with the HRA process, in particular to develop and undertake a draft AA. The detailed preparation and presentation of information and analysis to inform the AA will be the subject of continuing discussions with Marine Scotland, JNCC and SNH.

Seagreen will continue to gather the relevant new survey data, and to continue to develop and improve the baseline of information used to undertake the HRA. In addition the engineering design will continue to develop and refine to allow more targeted assessment to be made in the full HRA. It is possible that with further information and analysis that some of the European site, species and habitats classified for further consideration can, in fact, be screened out. If so, a supplementary screening report will be submitted at a future date.

Data sharing and a common approach to cumulative impact assessment will continue to develop through the FTOWDG process. Once Seagreen have sufficient baseline information and refined Rochdale envelope information, Seagreen will undertake a draft Appropriate Assessment (draft AA). This draft AA will include the consideration of the Project alone and in combination with other relevant projects identified in this report. Importantly the draft AA will also include a consideration of appropriate mitigation measures which may be used to avoid, minimise or offset

potentially negative effects. It is anticipated that the draft AA will be consulted with Scottish Ministers through MS, JNCC and SNH in 2012.

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 Appraisal (HRA) Screening Report
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PROJECT NAME:
**Round 3 Zone 2
 Firth of Forth
 Offshore Wind Farm Development**

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Abbreviations

ACRONYM / ABBREVIATION	FULL TEXT
AA	Appropriate Assessment
AEWA	African-Eurasian Waterbirds Agreement
Bern	The Convention on the Conservation of European Wildlife and Natural Habitats
BoCC	Birds of Conservation Concern
Bonn	The Convention on the Conservation of Migratory Species of Wild Animals also known as the Convention on Migratory Species (CMS)
CIA	Cumulative Impact Assessment
EC	European Council
EU	European Union
EIA	Environmental Impact Assessment
EPS	European Protected Species
European Site	Qualifying sites include: Special Areas of Conservation (SACs) either full, candidate or proposed; Special Protection Areas (SPAs) either full or proposed and Ramsar sites.
EU	European Union
FCS	Favourable Conservation Status
FTOWDG	Forth and Tay Offshore Wind Developers Group
HRA	Habitats Regulations Appraisal
IROPI	Imperative Reasons of Overriding Public Interest
JNCC	Joint Nature Conservation Committee
LSE	Likely Significant Effect
MFWDG	Moray Firth Wind Development Group
MHWM	Mean High Water Mark

ACRONYM / ABBREVIATION	FULL TEXT
MS	Marine Scotland
Ramsar	The Ramsar Convention (The Convention on Wetlands of International Importance, especially as Waterfowl Habitat) is an international treaty for the conservation and sustainable utilisation of wetlands,
RSPB	Royal Society for the Protection of Birds
SAC	Special Area of Conservation
Seagreen	Seagreen Wind Energy Limited (SWEL)
SCOS	Special Committee On Seals
SMRU	Sea Mammal Research Unit
SNH	Scottish Natural Heritage
SPA	Special Protection Area
SSSI	Site of Special Scientific Interest
STW	Scottish Territorial Waters
TCE	The Crown Estate
WBD	Wild Birds Directive (EC 2009/147/EC)
WDCS	Whale and Dolphin Conservation Society
ZDA	Zone Development Agreement

1 Appendix 1: Descriptions of Relevant SACs and Screened in SAC Features

1.1 Introduction

This appendices should be read in conjunction with the separate Offshore Phase 1 HRA Screening Report.

This appendix presents a discussion of the SACs which are considers relevant to this HRA screening. It is recognised that most sites include multiple features (Annex I habitats and Annex II species). Some are primary reason for site selection and others are features which occur on the site (sometimes referred to as hosted features). This appendix aims to identify the features of the European sites which may be vulnerable to significant effect.

This appendix also considers the status of the species features of the SACs which will be screened in to the ongoing HRA process

1.2 Description of Relevant SAC

1.2.1 Isle of May SAC

The Isle of May SAC is designated for Annex II species grey seals which are the primary reason for selection of this European marine site. The Isle of May is situated at the entrance to the Firth of Forth on the east coast of Scotland and it supports a breeding colony of grey seals. The site is the largest east coast breeding colony of grey seals in Scotland and the fourth-largest breeding colony in the United Kingdom (UK), contributing approximately 4.5% of annual UK pup production. The SAC also comprises of Annex I habitats – reefs which are present as a qualifying feature, but not a primary reason for the SAC designation

1.2.2 Berwickshire and North Northumberland Coast SAC

The Berwickshire and North Northumberland Coast SAC is designated for Annex II species grey seals which are a primary reason for selection of this site. The SAC is situated on an extensive and diverse stretch of coastline in north-east England and south-east Scotland. There is variation in the distribution of features of interest along the coast. The north-east England coastal section is representative of grey seal breeding colonies in the south-east of its breeding range in the UK. The Berwickshire and North Northumberland Coast SAC supports around 2.5% of annual UK pup production.

1.2.3 Firth of Tay & Eden Estuary SAC

The Firth of Tay & Eden Estuary SAC is designated for Annex II species - common seals which are a primary reason for selection of this site. The Firth of Tay & the Eden Estuary are two high-quality estuarine areas. The Tay is the least-modified of

the large east coast estuaries in Scotland, while the Eden estuary represents a smaller 'pocket' estuary. The inner parts of the estuaries are largely sheltered from wave action, while outer areas, particularly of the Tay, are exposed to strong tidal streams giving rise to a complex pattern of erosion and deposition of the sandbank feature at the firths' mouth. The sediments within the site support biotopes that reflect the gradients of exposure and salinity, and are typical of estuaries on the east coast of the UK. The abundance, distribution and composition of the associated plant and animal communities are ecologically representative of northern North Sea estuaries.

The Firth of Tay & Eden Estuary supports a nationally important breeding colony of common seal part of the east coast population of common seals that typically utilise sandbanks. Around 600 adults haul-out at the site to rest, pup and moult, representing around 2% of the UK population of this species.

1.2.4 The Moray Firth SAC

The Moray Firth SAC is designated for Annex II species – bottlenose dolphins which are a primary reason for selection of this site. The SAC is situated in the north-east of Scotland and it supports the only known resident population of bottlenose dolphin in the North Sea. The population is estimated to be around 130 individuals. Bottlenose dolphins are present all year round, and, while they range widely in the Moray Firth, they appear to favour particular areas within the inner firth.

1.2.5 The River South Esk SAC

The River South Esk SAC is designated for Annex II species – Atlantic salmon and Fresh water pearl mussel which are the primary reasons for selection of this site. The SAC supports a large, high-quality population of salmon in a river draining a moderate-sized catchment on the east coast of Scotland. The high proportion of the river which is accessible to salmon and the range of ecological conditions in the river allows it to support the full range of life-history types found in Scotland, with sub-populations of spring and summer salmon and grilse all being present. Freshwater pearl mussels are most abundant in the middle reaches of the river where they attain densities > 20 square metres (m²), representing the south-eastern range of the species in Scotland. The conservation importance of the site is further increased by the abundance of juveniles pearl mussels which comprise approximately 20% of the population. The presence of juvenile pearl mussels less than 20 millimetres (mm) long indicates that there has been successful recruitment in the last 25 years.

1.2.6 River Tay SAC

The River Tay SAC is designated for Annex II species – Atlantic salmon which is a primary reason for selection of this site. The SAC supports a high-quality population, with rod catch returns showing that the Tay is consistently one of the top three salmon rivers in Scotland. The Tay drains a very large catchment, and has the greatest flow of all UK rivers. There is considerable ecological variety in the Tay

catchment, resulting in the Tay supporting the full range of salmon life-history types found in Scotland, with adult salmon entering the River Tay throughout the year to spawn in different parts of the catchment.

The SAC also comprises of Annex II species – river lamprey, brook lamprey and sea lamprey that are present as a qualifying feature but not as primary reasons for site selection.

1.2.7 River Teith SAC

The River Teith SAC is designated for Annex II species – Atlantic salmon which is a primary reason for selection of this site. The SAC is situated in eastern Scotland and it flows through central Scotland. The SAC also comprises of Annex II species – river lamprey, brook lamprey and sea lamprey, that are present as a qualifying feature but not a primary reason for site selection. The river is the most significant tributary of the Forth estuary and young sea lampreys have been recorded throughout the lower reaches of the main river. The conservation importance is increased by the fact that, unlike many UK rivers, it supports populations of all three lamprey species and Atlantic salmon. The river lacks any significant artificial barriers to migration, has good water quality and the necessary habitat types (extensive gravel beds and marginal silt beds) to support the salmon and lamprey.

1.2.8 River Tweed SAC

The River Tweed SAC is designated for Annex II species – Atlantic salmon which is a primary reason for selection of this site. The SAC supports a very large, high-quality population of salmon in a river which drains a large catchment on the east coast of the UK, with sub-catchments in both Scotland and England. A high proportion of the River Tweed is accessible to salmon, and the variety of habitat conditions in the river has resulted in the Scottish section of the river supporting the full range of salmon life-history types, with sub-populations of spring, summer salmon and grilse all being present. The extensive system supports a significant proportion of the Scottish salmon resource.

The SAC also hosts Annex II species – river lamprey, brook lamprey and sea lamprey, that are present as a qualifying feature but not a primary reason for site selection.

1.3 Species Description

Following the screening process the following Annex II (of the Habitats Directive) species have been identified for further consideration within the ongoing HRA process. The source of much of the data is the JNCC Annex II Species Accounts (<http://jncc.defra.gov.uk>)

1.3.1 Marine Mammals

Marine mammals occurring in UK waters include pinnipeds (seals) and cetaceans (whales and dolphins). Seal species breeding in UK waters include the common or harbour seal and grey seal. The most common group of cetaceans is the toothed whales (Odontocetes) and include dolphins and porpoises which tend to inhabit the shallow coastal shelf waters around the UK. The larger baleen whales (Mysticetes) tend to be more oceanic in their distribution.

All cetaceans are protected under conservation legislation including Annex IV of the Habitats Directive which prohibits their deliberate disturbance and Annex II of the Habitats Directive which lists otter, harbour porpoise, bottlenose dolphin, grey seal and harbour seal as marine mammal species for which the establishment of SACs should be considered. The definition of deliberate disturbance was amended in August 2007 to enhance the level of protection given to European Protected Species (EPS). All cetaceans are categorised as EPS and a licence would be required from Marine Scotland for works which may affect EPS or their shelter / breeding grounds.

In UK waters, all cetacean species and basking sharks are protected as Schedule 5 species through Section 9 of the Wildlife and Countryside Act, 1981, and the Nature Conservation (Scotland) Act, 2004. For seals, protection is granted through the Conservation of Seals Act, 1970. The Marine (Scotland) Act also introduced new seal protection measures.

Over ten species of whales, dolphins and porpoises can be seen around the Scottish coastline, with seven species of cetacean known to regularly occur in west coast waters. These are: the harbour porpoise, minke whale, bottlenose dolphin, white beaked dolphin, Atlantic white sided dolphin, killer whale and the Risso's dolphin.

Bottlenose dolphins are listed as EPS and in Annex II of the EC Habitats Directive and as such require the designation of SACs for their protection. There is one SAC with bottlenose dolphins as a qualifying interest, relevant to an assessment of the likely impacts of wind farm developments in the region; this is the Moray Firth SAC. The bottlenose dolphins found in the Tay area are individuals from the same population as found in the Moray Firth SAC (Thompson *et al.*, 2004). In any one year a proportion of individuals are sighted both within the SAC and also within the Tay area.

For common seals, tagging studies (Sharples *et al.* 2005) showed that foraging usually takes place 10-20 km from haul-outs, however longer journeys to new locations in March and September can be up to 125 km. Grey seals generally forage within 40-50 km of haul-outs, with the potential for much longer journeys between haul-outs (up to 365 km). Therefore, for seals in particular, any individuals seen within the site boundary may be from more distant SACs. For harbour porpoise, it has been shown that although the species can forage over a wide range, individuals tend to stay within certain habitats close to shore, preferring high energy tidal areas

around headlands, islands and areas of up-welling caused by varying underwater topography.

1.3.2 Atlantic salmon

Atlantic salmon is an anadromous species (i.e. adults migrate from the sea to breed in freshwater). Spawning takes place in shallow excavations found in shallow gravelly areas in clean rivers and streams where the water flows swiftly. The young that emerge spread out into other parts of the river. After a period of 1-6 years the young salmon migrate downstream to the sea as 'smolts'. Salmon have a 'homing instinct' that draws them back to spawn in the river of their birth after 1-3 years in the sea. This behaviour has resulted in genetically distinct stock between rivers and even within individual rivers, with some evidence of further genetic distinctiveness in the tributaries of large rivers.

Salmon rivers vary considerably in their ecological and hydrological characteristics and in the life-cycle strategies adopted by the salmon within them. There are particularly strong contrasts between southern and northern rivers, and the UK's varied climate, geology and terrain means that high diversity can be found within some of the large rivers. The cool and wet climate in the north, often with harder, more resistant rocks and steeper slopes, results in salmon rivers that are sparsely vegetated, nutrient-poor and prone to sudden increases in flow ('spates') in response to heavy downfalls or sudden snow-melt. As a result, salmon may take several years to reach the smolt stage and migrate to sea. In the south, rivers flow across gentler terrain and softer rocks, in a warmer, drier climate. Here, salmon often grow sufficiently quickly to smolt as yearlings.

1.3.3 Pearl Mussels

The freshwater pearl mussel grows to 140 mm in length, and burrows into sandy substrates, often between boulders and pebbles, in fast-flowing rivers and streams. It requires cool, well-oxygenated soft water free of pollution or turbidity. The mussel spends its larval, or glochidial, stage attached to the gills of salmonid fishes. The larvae attach themselves during mid to late summer and drop off the following spring to settle in the riverbed gravel where they grow to adulthood.

Population declines have been caused by many different factors such as pearl-fishing and pollution but declining salmonid stocks is the most worrying factor. It is now a rare species whose conservation is giving rise to concern, and its increasing rarity in mainland Europe gives extra significance to UK populations.

As this species does not reach reproductive maturity until at least 12 years old and may live for over 120 years, population age-structure is vitally important when assessing viability. The presence of juveniles (a feature essential to the long-term sustainability of mussel populations) is a clear indicator of the structural and

functional features of the habitat required for the survival and reproduction of the species.

1.3.4 Sea Lamprey

The sea lamprey is a primitive, jawless fish resembling an eel. It is the largest of the lampreys found in the UK. It occurs in estuaries and easily accessible rivers, and is an anadromous species. After spending 18 – 24 months at sea adult lamprey migrate to rivers during spring and early summer. Like the other species of lamprey, sea lampreys need clean gravel for spawning, and marginal silt or sand for the burrowing juvenile ammocoetes. Sea lampreys have a preference for warm waters in which to spawn. Features such as weirs and dams, as well as polluted sections of river, may impede migration to spawning grounds

Sea Lamprey is reasonably widespread in UK rivers but it has declined in parts of its range and has become extinct in a number of rivers. It appears to reach its northern limit of distribution in Scotland and does not occur north of the Great Glen.

Distribution data for sea lamprey is limited and particularly sparse in the marine environment.

1.3.5 River Lamprey

The river lamprey is found in coastal waters, estuaries and accessible rivers. The species is normally anadromous and pollution or artificial obstacles such as weirs or dams impede migration. There are a few land-locked populations, including one in Scotland which is seen as having special European importance.

The UK populations are considered important for the conservation of the species at an EU level. It is widespread in the UK, occurring in many rivers from the Great Glen in Scotland southwards, and populations are strong

2 Appendix 2: Descriptions of Relevant SPAs and Screened in SPA Species

2.1 Introduction

This appendix includes a description of each SPA considered relevant to this HRA screening. Site accounts are reproduced with permission from the JNCC - Defra SPA review website at <http://jncc.defra.gov.uk/page-2534>.

2.2 Description of Relevant SPAs

2.2.1 Buchan Ness to Collieston Coast SPA

Buchan Ness to Collieston Coast SPA is located on the coast of Aberdeenshire in north-east Scotland. It is a 15 km stretch of south-east facing cliff formed of granite, quartzite and other rocks running to the south of Peterhead, interrupted only by the sandy beach of Cruden Bay. The low, broken cliffs (generally less than 50 m high) show many erosion features such as stacks, arches, caves and blowholes. The varied coastal vegetation on the ledges and cliff tops includes maritime heath, grassland and brackish flushes. The site is of importance as a nesting area for a number of seabird species (gulls and auks). As these birds feed outside the SPA in the nearby waters, as well as more distantly the SPA has recently been reclassified with a 2 km marine extension to protect the adjacent marine habitat.

2.2.2 Coquet Island SPA

Coquet Island is located 1 km off the coast of Northumberland in north-east England. It is a small, flat-topped island with a plateau extent of c. 7 hectares (ha). The island is surrounded by low sandstone cliffs and a broad rock platform at low tide, partly the result of former stone quarrying. The peaty soil of the plateau supports short turf grassland, although where nutrient input from seabird colonies is greatest, there are dense stands of taller species, including nettles *Urtica* spp. These provide cover for some of the nesting terns. The island is of importance for a range of breeding seabirds, including four species of terns, auks and gulls. The seabirds feed outside the SPA in the nearby waters, as well as more distantly in the North Sea.

2.2.3 Fala Flow SPA

Fala Flow is located in the Lammermuir Hills of the Scottish Southern Uplands, south-east of Edinburgh. It is blanket mire, with some pools, developed at a lower altitude than most blanket mires in Midlothian. The vegetation comprises Heather *Calluna vulgaris* and Hare's-tail Cottongrass *Eriophorum vaginatum* with other characteristic species including Crowberry *Empetrum nigrum* and *Sphagnum* mosses. Such mires are scarce and declining in Midlothian and this example is relatively undisturbed. The mire and pools support an internationally important roost

of the Iceland/Greenland population of Pink-footed Goose *Anser brachyrhynchus*. The geese feed in surrounding areas of agricultural land outside the SPA.

2.2.4 Farne Islands SPA

The Farne Islands are a group of low-lying islands between 2-6 km off the coast of Northumberland in north-east England. They form the easternmost outcroppings of the Great Whin Sill of quartz dolerite, and although some islands retain cappings of boulder clay or peaty deposits, vegetation is limited to pioneer communities. Vegetation is further affected by the maritime conditions and large numbers of seabirds. The islands are important as nesting areas for these birds, especially terns, gulls and auks. The seabirds feed outside the SPA in the nearby waters, as well as more distantly in the North Sea.

2.2.5 Firth of Forth SPA

The Firth of Forth is located on the east coast of central Scotland. It is a complex estuarine site, stretching for over 100 km from the River Forth at Stirling eastwards past Edinburgh and along the coasts of Fife and East Lothian to a wide estuary mouth. A wide range of coastal and intertidal habitats is found within the site, including saltmarshes, dune systems, maritime grasslands, heath and fen, cliff slopes, shingle and brackish lagoons. Extensive mud-flats occur particularly in the Inner Firth, notably at Kinneil Kerse and Skinflats on the south shore and Torry Bay on the north shore. Typically, the flats support a rich invertebrate fauna, with Eelgrass *Zostera* spp. growing on the main mud-flats, both features providing important food sources for the large numbers of migrating and wintering waterbirds that depend on the estuary. In the Outer Firth, the shoreline diversifies, with sandy shores, some rocky outcrops, mussel beds and some artificial sea walls. The North Berwick coast includes cliffs and dune grassland, with extensive dune systems at Aberlady. The Firth is of major importance for a rich assemblage of waterbirds in the migration periods and through the winter, including divers, sea-ducks, geese, other ducks, waders and terns. Some of these species, notably the sea-ducks and divers, also feed, loaf and roost outside the SPA in the open waters of the estuary.

2.2.6 Firth of Tay and Eden Estuary SPA

The Firth of Tay and Eden Estuary is located on the east coast of central Scotland. The Firth stretches for some 35 km along the estuary from near Newburgh to the estuary mouth. For much of its length the main channel of the estuary lies close to the southern shore and the most extensive intertidal flats are on the north side, west of Dundee. In Monifieth Bay, to the east of Dundee, the substrate becomes sandier and there are also Mussel *Mytilus edulis* beds. The south shore consists of fairly steeply shelving mud and shingle. The Inner Tay Estuary is particularly noted for the continuous dense stands of Common Reed *Phragmites australis* along its northern shore. These reedbeds, inundated during high tides, are amongst the largest in Britain. Eastwards, as conditions become more saline, there are areas of saltmarsh,

a relatively scarce habitat in eastern Scotland. The site is of importance in summer for breeding terns and Marsh Harrier *Circus aeruginosus*, whilst in the migration periods and in winter the estuary holds major concentrations of waterbirds, especially waders, sea-ducks and geese. Sea-ducks also feed, loaf and roost outside the SPA in the open waters of the Firth.

2.2.7 Forth Islands SPA

The Firth of Forth Islands are located in or near to the Firth of Forth on the east coast of central Scotland. The SPA comprises a number of separate islands or island groups, principally Inchmickery (together with the nearby Cow and Calves) off Edinburgh, Fidra, Lamb and Craigleith together with the Bass Rock off North Berwick, and the much larger Isle of May in the outer part of the Firth. The site also includes additional other small islands. The inner islands are very low lying whilst those in the outer Firth are higher, steeper and rockier. This applies especially to the Bass Rock which is a volcanic plug rising to over 100 m, and to the Isle of May, which is surrounded by cliffs up to 50 m. The islands support important numbers of a range of breeding seabirds, in particular terns, auks and gulls. The colony of Gannets *Morus bassanus* is the largest on the east coast of the UK. As these seabirds feed outside the SPA in nearby waters, as well as more distantly in the North Sea the SPA has recently been reclassified with a 2 km marine extension to protect the adjacent marine habitat.

2.2.8 Fowlsheugh SPA

Fowlsheugh is located on the east coast of Aberdeenshire in north-east Scotland, overlooking the North Sea. The sheer cliffs, between 30-60 m high, are cut mostly in basalt and conglomerate of Old Red Sandstone age. They form a rock face with diverse structure providing ideal nesting sites for seabirds. The cliffs support major numbers of breeding seabirds, especially gulls and auks. As these seabirds feed outside the SPA in nearby waters, as well as more distantly in the North Sea the SPA has recently been reclassified with a 2 km marine extension to protect the adjacent marine habitat.

2.2.9 Gladhouse Reservoir SPA

Gladhouse Reservoir SPA lies in the Moorfoot Hills of the Southern Uplands of Scotland, about 20 km south of Edinburgh. It is a public water-supply reservoir, with limited aquatic and emergent vegetation, although small areas of marginal fen have developed in places. The reservoir is the largest freshwater body in the Lothians and is surrounded by both coniferous and mixed woodland and grassland. It has a number of small islands. The site is an important winter roosting area for Pink-footed Goose *Anser brachyrhynchus*. The geese feed in surrounding areas of agricultural land outside the SPA.

2.2.10 Imperial Dock Lock Leith SPA

The Imperial Dock Lock is a man-made structure at the mouth of the Imperial Dock in the heart of the Port of Leith, and lies within the City of Edinburgh Local Authority area. The boundary of the SPA is coincidental with that of the Imperial Dock Lock. The SPA is an important breeding site for common tern.

2.2.11 Lindisfarne SPA

Lindisfarne is situated in north-east England off the Northumberland coast near Berwick-upon-Tweed. As well as the island of Lindisfarne (Holy Island), the site includes extensive mud-flats south of Holy Island and at Budle Bay. The area comprises a range of coastal habitats, including rocky shore, sand dunes, saltmarsh and intertidal sand- and mud-flats with extensive beds of Eelgrass *Zostera* spp., an important food source for wintering birds. The site supports internationally important numbers of wintering waterbirds on the flats and saltmarsh. In particular, it is of major international importance in autumn and early winter in holding a high proportion of the Svalbard population of Light-bellied Brent Goose *Branta bernicla hrota*. In summer, the site supports important numbers of several breeding tern species that feed in the shallow waters around the site.

2.2.12 Loch Leven SPA

Loch Leven lies midway between the Forth and Tay estuaries in east-central Scotland. It is about 3x5 km in extent and is the largest naturally eutrophic loch in Britain and Ireland. It is relatively shallow and is surrounded by farmland, with a diverse aquatic flora and shoreline vegetation. The loch contains several islands, the largest of which, St Serf's Island, has an area of about 46 ha. The site supports internationally important wintering populations of waterbirds (including swans, geese and ducks).

2.2.13 Loch of Skene SPA

Loch of Skene is located about 15 km west of Aberdeen in Scotland. It is a shallow (<2 m deep) eutrophic lowland loch surrounded by fringing reedbeds and birch-willow carr. The loch supports an internationally important roost of Icelandic Greylag Goose *Anser anser*, as well as Icelandic Whooper Swan *Cygnus cygnus*. Both swans and geese feed away from the SPA on surrounding agricultural land during the day.

2.2.14 Montrose Basin SPA

The Montrose Basin is located on the east coast of Scotland in Angus. It is an enclosed tidal basin fed by the River South Esk and contains areas of mud-flat, marsh and agricultural land, and Dun's Dish, a small eutrophic loch. It is a good natural example of an estuary, relatively unaffected by development, with high species diversity in the intertidal zone and supporting a large population of wintering waterbirds. The site is important for wintering populations of Iceland/Greenland Pink-footed Goose *Anser brachyrhynchus* and Icelandic Greylag Goose *Anser anser*,

along with ducks and waders. The geese feed away from the SPA on surrounding agricultural land during the day.

2.2.15 Muir of Dinnet SPA

The Muir of Dinnet is located in the central Dee Valley about 8 km east of Ballater in the central Highlands of Scotland. It is a large mosaic of heath woodland and mire, with open water in two sizeable lochs, and vegetation succession and transitions developing between the major habitat types. Around the open water areas, a mosaic of vegetation communities has established on soils derived from glacial material overlying granite. At Loch Kinord, there is classic succession from open water to fens comprising Bottle Sedge *Carex rostrata*, Slender Sedge *Carex lasiocarpa* and stands of Bog-myrtle *Myrica gale*. Other habitats include wet heath at Black Moss, which is dominated by Cross-leaved Heath *Erica tetralix*, Purple Moor-grass *Molinia caerulea*, Heather *Calluna vulgaris* and *Sphagnum* moss. Swamps, such as those at Ordie Moss, are dominated by Bottle Sedge or Common Reed *Phragmites australis*. There is also carr woodland of Willow *Salix* sp. and Birch *Betula pendula* around Loch Kinord and Loch Davan, together with other wetland vegetation. The lochs support important numbers of roosting passage and wintering Icelandic Greylag Goose *Anser anser*. These feed in surrounding areas of agricultural land outside the SPA.

2.2.16 St Abb's Head to Fast Castle SPA

St Abb's Head to Fast Castle lies on the coast of Berwickshire in south-east Scotland. It is a 10 km stretch of cliffs comprised of Old Red Sandstone and Silurian rocks, in places reaching over 150 m in height. The cliffs are backed by areas of grassland, open water, flushes and splash zone communities. The site is important for large numbers of breeding seabirds, especially auks and gulls, which feed outside the SPA in surrounding marine areas, as well as further away in the North Sea. As a result, the SPA has recently been reclassified with a 1 km marine extension to protect the adjacent marine habitat.

2.2.17 Slamannan Plateau SPA

The boundary of the Slamannan Plateau SPA includes most of the RSPB Fannyside Reserve (59.18 ha), which is managed mainly for bean geese. The SPA is subject to steady development pressure. Recent proposals have included housing, wind turbines, and sewage sludge deposition. Several areas of forestry were planted in the past directly reducing the area available for feeding geese and influencing remaining feeding areas through enclosure and increased risk of predation. Fortunately, in more recent years applications to plant new forests have decreased. Some of the goose resting and roosting areas have been subject to peat milling operations, although these have now stopped. If the production of peat from these areas becomes commercially viable the operations may recommence. An extant planning permission for peat extraction at the main roost site is currently being reviewed by the competent authority, North Lanarkshire Council. The removal of

peat is unlikely to be compatible with the Conservation Objectives of the SPA. Recreational use is not high, nevertheless walking, cycling, horse riding and bird watching take place. If the level of use by these activities was to increase in an unplanned manner, then it may result in disturbance to the geese. To reduce the instances of bird watchers causing disturbance, a website has been developed which gives details of suitable places from which to view the geese.

While damaging changes in land management can be controlled in part through the provisions of The Nature Conservation (Scotland) Act 2004, applying to the Slamannan Plateau and West Fannyside Moss Sites of Special Scientific Interest (SSSI), they are also addressed through the 'Slamannan Plateau Bean Goose Management Scheme'. This scheme was developed by SNH to support land managers to maintain suitable habitat conditions for bean geese within the SPA. The scheme is now closed to new entrants, having run between March 2006 and April 2008, but it is hoped that the prescriptions of the scheme will be incorporated in the Scotland Rural Development Programme.

2.2.18 South Tayside Goose Roost SPA (and Ramsar site)

The South Tayside Goose Roosts SPA is located in Perthshire in eastern Scotland. The site is a composite SPA which comprises seven lochs (including Carsebreck and Rhynd Lochs, Drummond Lochs, Dupplin Loch and Pitcarrie Loch), a number of smaller water bodies and other wetland habitats. Some of the lochs are eutrophic and support rich emergent vegetation at the loch edges. Individually and collectively, these areas are important roosts for both Greylag Goose *Anser anser* and Pink-footed Goose *Anser brachyrhynchus*. The geese feed in surrounding areas of agricultural land outside the SPA.

2.2.19 Upper Solway Flats and Marshes SPA (and Ramsar site)

The Upper Solway Flats and Marshes SPA lies on the west coast on the border between England and Scotland. The flats and marshes of the Upper Solway form one of the largest continuous areas of intertidal habitat in Britain. The geomorphology and vegetation of the estuarine saltmarshes or meres are of international importance, with broad transitions to mature 'upper-marsh' being particularly well represented. The whole estuarine complex is of importance for wintering wildfowl (ducks, geese and swans) and waders, and is a vital link in a chain of west coast UK estuaries used by migrating waterbirds. The SPA supports virtually all of the Svalbard population of Barnacle Goose *Branta leucopsis* over the winter.

2.2.20 Ythan Estuary, Sands of Forvie and Meikle Loch SPA (and Ramsar site: Ythan Estuary and Meikle Loch)

Ythan Estuary, Sands of Forvie and Meikle Loch are located north of Aberdeen on the east coast of Scotland. The site comprises the long, narrow estuary of the River Ythan and Meikle Loch. At its mouth, the river splits an extensive area of sand dunes with the Forveran Links on the west bank and the Sands of Forvie dune system on

the east bank. Extensive mud-flats in the upper reaches of the estuary are replaced by coarser gravels with Mussel *Mytilus edulis* beds closer to the sea. The margins of the estuary are varied, with areas of saltmarsh, reedbed and poor fen. Meikle Loch is an important roost site for geese, which feed away from the SPA on surrounding farmland in winter. It is a eutrophic loch supporting limited aquatic vegetation. In summer the coastal habitats of the dunes and estuary provide an important breeding site for three species of tern, whilst in winter the estuary holds large numbers of waders, ducks and geese.

2.3 Seagreen HRA Species Accounts

A brief account is provided for each bird species which is deemed to be at risk of 'LSE' (Table 4.3) and which may therefore require further screening for AA. Information is provided under three headings including: 'Conservation status', 'Relevant SPA sites' and 'Population ecology'. The population numbers included for each qualifying SPA were derived from two sources: for all seabirds including Gannet, Herring Gull, Kittiwake, Common Tern, Arctic Tern, Guillemot, Razorbill and Puffin, population numbers were derived from the Seabird Monitoring Programme (SMP) Online Database (JNCC 2011a); for wildfowl and waders, population numbers were taken from Natura 2000 standard data sheets (JNCC 2011b). Accounts are listed in taxonomic order.

2.4 Pink-footed Goose

2.4.1 Conservation status

WCA (II), WBD (II*), Bonn (II), AEW, BoCC (Amber).

2.4.2 Relevant SPA sites

Pink-footed Goose is a qualifying feature of eight SPAs within the vicinity of Phase 1: Firth of Forth (10,852 individuals), Firth of Tay and Eden Estuary (2,800 individuals), Fala Flow (6,719 individuals), Gladhouse Reservoir (3,068 individuals), Montrose Basin (31,622 individuals), South Tayside Goose Roost (43,300 individuals), Loch Leven (17,163 individuals) and Ythan Estuary (17,213 individuals).

2.4.3 Population ecology

Pink-footed Goose does not breed in the UK, but large numbers spend the winter months on wide open estuaries such as those on the east coast of Scotland. They arrive in October from their breeding grounds in Spitsbergen, Iceland and Greenland and leave again in April. The diet of the Pink-footed Goose is varied including grain, winter cereals, potatoes and grass. Numbers in the UK are generally increasing, potentially due to better roosts.

2.5 Bean Goose (Taiga)

2.5.1 Conservation status

WBD (II), Bern (III), Bonn (II), AEWA, BoCC (Amber), Scottish Biodiversity List.

2.5.2 Relevant SPA sites:

Taiga Bean Goose is a qualifying feature of one SPA within the vicinity of Phase 1: Slamannan Plateau (221 individuals).

2.5.3 Population ecology

Taiga Bean Goose is a scarce winter migrant to the UK, being present between October and February. Wintering birds on the Slamannan Plateau come from breeding grounds in Russia and northern Scandinavia where there has been a decline in the breeding population over the last twenty years. The diet of Bean Goose includes grass, cereals, potatoes and other crops.

2.6 Gannet

2.6.1 Conservation status

Bern (III), BoCC (Amber). Most of the global Gannet population breeds in the UK, highlighting the responsibility of the UK for the conservation of this species.

2.6.2 Relevant SPA sites

Gannet is a qualifying feature of one SPA within the vicinity of Phase 1: Forth Islands (96,130 individuals). This colony, on Bass Rock, is the largest in the North Sea and the second largest in the east Atlantic after St Kilda. The status of breeding gannets at Forth Islands SPA is given as favourable, maintained as at July 2004 (SNH 2011b).

2.6.3 Population ecology

Gannet is a regularly occurring migratory species which breeds on steep cliff slopes or on the tops of islands in the UK. Gannets migrate most strongly in their first year, reaching wintering grounds off West Africa as far south as Senegal, with some entering the Mediterranean (Wernham *et al.* 2002). Gannets feed opportunistically, primarily on surface dwelling fish which they catch by plunge diving from heights of up to 140 feet. Feeding hotspots have been identified by Kober *et al.* (2009) in the areas of the outer Firth of Forth including Wee Bankie and Marr Bank as well as the Inner Firth of Forth, these areas are easily within the mean maximum foraging range of Gannets (282.1km Thaxter *et al.* unpubl. data) from the Bass Rock. Gannets can travel long distances on foraging trips (maximum range of 590km (Thaxter *et al.* unpubl. data)). Camphuysen (2011) recorded a particularly high density of Gannets with a large proportion of foraging individuals in the area near Buchan Deep and Halibut Bank to the northeast of the Zone, which would involve large numbers of

Gannets passing through the Zone at Phase 1 as they transit to this area. Gannets have shown a long-term increase and range expansion, recent estimates put the population size at 418,000 pairs (Wanless *et al.* 2005). In line with this, the Bass Rock colony has increased steadily through the 20th century, and since 1995 the population has increased at 4% per annum to 48,065 pairs when last surveyed in 2004 (Forrester *et al.* 2007).

2.7 Oystercatcher

2.7.1 Conservation status

WBD (II*), Bern (III), Bonn (II), AEWA, BoCC (Amber).

2.7.2 Relevant SPA sites

Oystercatcher is a qualifying feature of two SPAs within the vicinity of Phase 1: Firth of Forth (7,846 individuals) and Montrose Basin (2,368 individuals).

2.7.3 Population ecology

Oystercatcher is a regularly occurring resident species in the UK. The species breeds on open flat coastland, although over the last 50 years more birds have started breeding inland. Most Oystercatchers spend the winter on the coast and on the east side of the UK they are joined by wintering birds from Norway. The diet of Oystercatcher includes mussels and cockles. When inland, their diet is mainly worms.

2.8 Ringed Plover

2.8.1 Conservation status

Bern (III), Bonn (II), AEWA, BoCC (Amber).

2.8.2 Relevant SPA sites

Ringed Plover is a qualifying feature of one SPA within the vicinity of Phase 1: Firth of Forth (328 individuals).

2.8.3 Population ecology

Ringed Plover is a regularly occurring migratory species which breeds in the UK and can be present all year round. The species breeds on coasts where suitable beach habitats can be found, although it has now started breeding inland in sand and gravel pits left over from former industrial sites (RSPB website). Ringed plover from Europe winter in the UK and birds from Greenland and Canada pass through on migration. The diet of Ringed plover includes flies, spiders, marine worms, crustaceans and molluscs.

2.9 Golden Plover

2.9.1 Conservation status

WCA (II, III), WBD (I, II* & III*), Bern (III), Bonn (II), AEWA, BoCC (Amber), Scottish Biodiversity List.

2.9.2 Relevant SPA sites

Golden Plover is a qualifying feature of one SPA within the vicinity of the Phase 1: Firth of Forth (2,949 individuals).

2.9.3 Population ecology

Golden Plover is a regularly occurring migratory species which breeds in the UK. The species breeds on upland moorlands across Scotland and England, moving to lowland fields and coasts during the winter. They occupy their breeding grounds from May to September, with winter flocks building up after the breeding season and peaking between November and February. The diet of Golden Plover includes worms, beetles and other invertebrates.

2.10 Grey Plover

2.10.1 Conservation status

WBD (II*), Bern (III), Bonn (II), AEWA, BoCC (Amber).

2.10.2 Relevant SPA sites

Grey Plover is a qualifying feature of one SPA within the vicinity of Phase 1: Firth of Forth (724 individuals).

2.10.3 Population ecology

Grey Plover is regular summer passage and winter species in the UK, but breeds on the tundra in the high Arctic. The species spends the winter exclusively along coasts, with its preferred habitat being large, muddy and sandy estuaries. Although some birds may stay through the summer in the UK, peak numbers are recorded between November and March, with most birds leaving in April and May. The diet of Grey Plover includes shellfish and worms.

2.11 Lapwing

2.11.1 Conservation status

WBD (II*), Bern (III), Bonn (II), AEWA, BoCC (Red), Scottish Biodiversity List.

2.11.2 Relevant SPA sites

Lapwing is a qualifying feature of one SPA within the vicinity of Phase 1: Firth of Forth (4,148 individuals).

2.11.3 Population ecology

Lapwing is a regularly occurring breeding wader resident in the UK. The species breeds on a variety of inland and coastal open country, usually on arable fields, pastureland or seashore meadows (Svensson *et al.* 2001). In winter, Lapwing can form large flocks on farmland and marshes. The diet of Lapwing includes worms, insects and other invertebrates.

2.12 Knot

2.12.1 Conservation status

WBD (II*), Bern (III), Bonn (II), AEWA, BoCC (Amber).

2.12.2 Relevant SPA sites

Knot is a qualifying feature of two SPAs within the vicinity of Phase 1: Firth of Forth (9,258 individuals) and Montrose Basin (4,500 individuals).

2.12.3 Population ecology

Knot is a regular summer passage and winter species in the UK which breeds in the Arctic. They feed at UK estuaries between August and May, with greatest numbers visiting during winter between December and March. The diet of Knot includes shellfish and worms.

2.13 Sanderling

2.13.1 Conservation status

Bern (III), Bonn (II), AEWA, BoCC (Green).

2.13.2 Relevant SPA sites

Sanderling is a qualifying feature of one SPA within the vicinity of Phase 1: Firth of Tay and Eden Estuary.

2.13.3 Population ecology

Sanderling is a regular winter visitor and passage migrant in spring and autumn in the UK and it breeds in the high Arctic. The species winters along sandy beaches around most of the UK coast other than where there are large rocky cliff areas. The diet of Sanderling includes small marine worms, crustaceans and molluscs.

2.14 Dunlin

2.14.1 Conservation status

WBD (I*), Bern (III), Bonn (II), AEWA, BoCC (Red), Scottish Biodiversity List.

2.14.2 Relevant SPA sites

Dunlin is a qualifying feature of two SPAs within the vicinity of Phase 1: Firth of Forth (9,514 individuals) and Montrose Basin.

2.14.3 Population ecology

Dunlin is a common, overwintering and breeding small wader species in the UK (Svensson *et al.* 2001). The species breeds between April and July in upland areas of Scotland. In winter it can form large flocks on estuaries, salt marshes and the shore when the tide is high. The diet of Dunlin includes insects, snails, worms and other invertebrates.

2.15 Black-tailed Godwit

2.15.1 Conservation status

WCA (I), WBD (II*), Bern (III), Bonn (II), AEWA, BoCC (Red), Scottish Biodiversity List.

2.15.2 Relevant SPA sites

Black-tailed Godwit is a qualifying feature of two SPAs within the vicinity of Phase 1: Firth of Tay and Eden Estuary (2,400 individuals) and Firth of Forth (1,974 individuals).

2.15.3 Population ecology

Black-tailed Godwit is a large wading bird which is mainly a passage or wintering species in the UK, although some are present all year round. Birds from northern Europe spend the winter on UK coasts. Some populations do breed in the UK and overwinter in Africa, but the UK has suffered a large breeding population decline in the past and it is now a rare breeder (Svensson *et al.* 2001). Black-tailed Godwit breeds on wet meadows, grassy marshes and boggy moorland. On passage and in winter it frequents mainly estuaries, coastal mudflats and also inland marshes. The diet of Black-tailed Godwit includes insects, worms, snails and other invertebrates.

2.16 Bar-tailed Godwit

2.16.1 Conservation status

WBD (I, II*), Bern (III), Bonn (II), AEWA, BoCC (Amber), Scottish Biodiversity List.

2.16.2 Relevant SPA sites

Bar-tailed Godwit is a qualifying feature of two SPAs within the vicinity of Phase 1: Firth of Forth (1,974 individuals) and Firth of Tay and Eden Estuary (2,400 individuals).

2.16.3 Population ecology

Bar-tailed Godwit is a wintering large wader species in the UK, present in its highest numbers between November and February, with numbers starting to increase in July and August, and reducing in March and April. The species breeds in the Arctic of Scandinavia and Siberia, a large number overwinter in the Forth estuary as well as other estuaries around the UK. Small numbers of non-breeding birds can be seen throughout the summer. Similar to the Black-tailed Godwit, the diet of the Bar-tailed Godwit includes insects, worms, snails and other invertebrates.

2.17 Curlew

2.17.1 Conservation status

WBD (II*), Bern (III), Bonn (II), AEWA, BoCC (Amber), Scottish Biodiversity List.

2.17.2 Relevant SPA sites

Curlew is a qualifying feature of one SPA within the vicinity of Phase 1: Firth of Forth (1,928 individuals).

2.17.3 Population ecology

Curlew is the largest European wading bird which breeds in the UK and many are present here all year round. The species breeds on extensive wet meadows, grassy marshes and boggy moorland between April and July. From July onwards, they move to their wintering grounds mainly in estuaries and coastal mudflats reaching peak numbers in January and February. The diet of Curlew includes worms, shellfish and shrimps.

2.18 Redshank

2.18.1 Conservation status

WBD (II*), Bern (III), Bonn (II), AEWA, BoCC (Amber).

2.18.2 Relevant SPA sites

Redshank is a qualifying feature of three SPAs within the vicinity of Phase 1: Firth of Forth (4,341 individuals), Montrose Basin (2,259 individuals) and Firth of Tay and Eden Estuary (1,800 individuals).

2.18.3 Population ecology

Redshank is a regularly occurring resident and overwintering species in the UK. The greatest concentrations of breeding birds are in parts of Scotland and north-west England breeding on inland and coastal marshes, wet meadows, farmland and moorland. In winter, half of the birds in Britain may be from Iceland. The diet of Redshank includes a wide variety of insects, earthworms, molluscs and crustaceans.

2.19 Turnstone

2.19.1 Conservation status

Bern (III), Bonn (II), AEWA, BoCC (Amber).

2.19.2 Relevant SPA sites

Turnstone is a qualifying feature of one SPA within the vicinity of Phase 1: Firth of Forth (860 individuals).

2.19.3 Population ecology

Turnstone is a regular winter visitor and passage species, present in the UK for most of the year. Turnstone from northern Europe pass through the UK in July and August and then travel back again in the spring. Canadian and Greenland birds arrive in August and September, and remain until April and May. Non-breeding birds may remain in the UK throughout the summer. The diet of Turnstone includes insects, crustaceans and molluscs.

2.20 Herring Gull

2.20.1 Conservation status

WBD (II*), BoCC (Red), Scottish Biodiversity List. In the UK, the breeding population of the race *argenteus* (estimated at 139,200 pairs – some 18% of the European breeding population and 12.1% of the world population) has declined by more than 50% since 1969, and more recently by 43% between 1999 and 2009 (JNCC 2010). It is also listed for the decline in the non-breeding population, which has decreased in the UK by more than 50% in the last 25 years (Eaton *et al.* 2009).

2.20.2 Relevant SPA sites

Herring Gull is a qualifying feature of three SPAs within the vicinity of Phase 1: Forth Islands (7,984 individuals), St Abb's Head to Fast Castle (516 individuals) and Fowlsheugh (428 individuals).

2.20.3 Population ecology

Herring Gull is a largely resident species with only small movements within the UK and neighbouring coastal countries. In winter, the Herring Gull population is inflated by the arrival of birds of the nominate race *argentatus* which breeds in northern Europe. Most arrive along the east coast and are present in greatest numbers from September to February (Wernham *et al.* 2002). Baker *et al.* (2006) estimated the UK wintering population of Herring Gulls as 378,748 individuals. Herring Gulls are opportunistic feeders, their diet varies regionally but can include: fish, birds, eggs, carrion and offal.

2.21 Kittiwake

2.21.1 Conservation status

Bern (III), Bonn(II), AEWA (II), OSPAR, BoCC (Amber). The status of Kittiwake populations in the UK is in rapid decline, falling 30% during the period 2000-2010 (JNCC 2011).

2.21.2 Relevant SPA sites

Kittiwake is a qualifying feature of three SPA colonies within the vicinity of Phase 1: Fowlsheugh (18,908 individuals), St Abb's Head to Fast Castle (10,596 individuals) and Forth Islands (8,180 individuals). The largest breeding colony is outside the immediate area at Buchan Ness to Collieston Coast (28,266 individuals). Their status at the Forth Islands SPA was described to be in unfavourable decline in June 2007 (SNH 2011b) and there have been recent declines of over 50% at Fowlsheugh (Mitchell *et al.* 2004; SMP Online Database 2011).

2.21.3 Population ecology

Kittiwake is a regularly occurring migratory species which breeds on near vertical rocky sea cliffs in the UK. The main wintering area for Kittiwake is the North Atlantic Ocean where their distribution and movements are influenced by weather conditions and food supplies (Wernham *et al.* 2002). As a surface feeder, Kittiwakes are particularly dependent on sandeels in the Firth of Forth and Camphuysen *et al.* (2006) describes a close association between Kittiwakes and diving Guillemots, the former taking advantage of concentrations of prey near the surface by the latter in the area of the Wee Bankie. A hotspot qualifying as a possible marine SPA has been identified by Kober *et al.* (2009) in the area of the outer Firth of Forth including Wee Bankie and Marr Bank. This area occurs within the mean maximum foraging range of 61.6 km for Kittiwakes (Thaxter *et al.* unpubl. data) and could be caused by foraging breeding birds (Kober *et al.* 2009). The Wee Bankie off the Firth of Forth has also been noted as a significant area for Kittiwakes breeding at the Isle of May (Wanless *et al.* 1998).

2.22 Common Tern

2.22.1 Conservation status

WBD (I), Bern (II), Bonn(II), AEWA (II), BoCC (Amber), Scottish Biodiversity List, Wildlife and Countryside Act 1981 (Schedule 1, Part 1). The population of Common Tern in the UK and Ireland rose 3% during the period 2000-2010 (JNCC 2011).

2.22.2 Relevant SPA sites

Common Tern is a qualifying feature of two SPAs within the vicinity of Phase 1: Forth Islands (270 individuals) and Imperial Dock Lock, Leith (1,578 individuals). The

status of breeding Common Tern at Inchmickery, SSSI (Forth Islands SPA) is given as favourable, maintained as at June 2003 (SNH 2011b).

2.22.3 Population ecology

Common Tern is a migratory species which breeds on coasts and inland wetlands in the UK. The main wintering area for both adults and juveniles is the west coast of Africa, although a few move further south (Wernham *et al.* 2002). The diet of Common Terns is varied, but is principally composed of small fish (including herring, sprat and sandeels) which they catch by diving down, sometimes barely touching the surface but at other times partially or completely submerging, though they do not swim under water (Cramp *et al.* 1974).

2.23 Arctic Tern

2.23.1 Conservation status

WBD (I), Bern (II), Bonn (II), AEWA (II), BoCC (Amber), Scottish Biodiversity List. Arctic Tern is the commonest breeding tern in the UK, although the population has fluctuated markedly since 1970. Following a peak in the mid-1980s of 78,764 pairs, the population had fallen to 53,380 pairs by the time of Seabird 2000 (Mitchell *et al.* 2004). The population fell further to a low in 2004, but has since risen with the ten-year trend between 1999 and 2009 indicating a 14% increase (JNCC 2010).

2.23.2 Relevant SPA sites

Arctic tern is a qualifying species of one SPA within the vicinity of Phase 1: Forth Islands (730 individuals). The status of breeding Arctic Terns at Inchmickery SSSI (Forth Islands SPA) is given as favourable, declining as at June 2009 (SNH 2011b).

2.23.3 Population ecology

Arctic Terns travel between the polar regions and perform the most extensive migratory journey of any bird, individuals breeding in Britain are at the southern edge of the breeding range. In the non-breeding season, Arctic Terns head south to the Antarctic seas. In the UK, Arctic Terns nest colonially on low rocky skerries, sand banks and on open ground near the shore. Similar to the Common Tern, the diet of the Arctic Tern is varied but is principally composed of sandeels, small herrings and sprats which they catch by diving.

2.24 Guillemot

2.24.1 Conservation status

WBD (I), Bonn (II), AEWA (II), BoCC (Amber). The population of Guillemot in Scotland has declined since 2001 and this is reflected in the colonies within the region which show a decline since Seabird 2000, ranging between 18% (Fowlsheugh SPA) and 37% (Firth of Forth Islands SPA).

2.24.2 Relevant SPA sites

Guillemot is a qualifying feature of four SPA colonies within the vicinity of Phase 1: Fowlsheugh (50,556 individuals), St Abb's Head to Fast Castle (33,181 individuals), Forth Islands (24,016 individuals) and Buchan Ness to Collieston Coast (20,858 individuals). The status of breeding guillemots at Forth Islands SPA is given as favourable, maintained, as at June 2007 (SNH 2011b).

2.24.3 Population ecology

Guillemot is a regularly occurring dispersive species which breeds on ledges on vertical cliff faces in the UK. They dive from the surface of the sea to feed predominantly on sandeels. In the winter, Guillemots disperse into the North Sea and can congregate in southwest Scandinavia, the Netherlands, France and northern Spain although others remain on the British continental shelf (Wernham *et al.* 2002). During breeding and chick-rearing (May – June), Stone *et al.* (1995) and Skov *et al.* (1995) describe highest densities of Guillemots in the Firth of Forth which is within their mean maximum foraging range of 71.4 km (Thaxter *et al.* unpubl. data). Camphuysen *et al.* (2006) also recorded that Guillemots from the Isle of May dominated the feeding grounds at Wee Bankie, whereas individuals from the Farne Island and St. Abb foraged at Marr Bank. Hotspots in the Firth of Forth qualifying as a possible marine SPA for breeding and wintering Guillemots have been identified by Kober *et al.* (2009). These hotspots are in range of the colonies between Crawton and Fowlsheugh, the Isle of May, St. Abb's Head and the Farne Islands. The larger of these areas includes Wee Bankie and Marr Bank. Both sandbanks are known to have a high presence of sandeels and they are important feeding areas for guillemots and other seabirds breeding in the area (Wanless *et al.* 1998).

2.25 Razorbill

2.25.1 Conservation status

Bonn (II), BoCC (Amber). The Razorbill population in the UK peaked in 2005. Since then there has been a steady decline, with an overall decrease of 11% in the period 1999-2009 (JNCC 2010). Breeding failures in 2004, 2007 and 2008 were linked to a decrease in the sandeel population which may have influenced the poor productivity of Razorbills on the Isle of May (Forrester *et al.* 2007).

2.25.2 Relevant SPA sites

Razorbill is a qualifying feature of three SPA colonies within the vicinity of Phase 1: Fowlsheugh (4,632 individuals), Forth Islands (3,570 individuals) and St Abb's Head to Fast Castle (1,687 individuals). The status of breeding razorbills at Forth Islands SPA is given as favourable, maintained as at June 2007 (SNH 2011b).

2.25.3 Population ecology

Far less abundant than Guillemot, Razorbill is a migratory species which breeds in the UK on a range of rocky coasts including cliffs, boulder fields at the base of cliffs and scree slopes. Razorbills generally overwinter further south of their breeding colonies reaching Iberia and Morocco and also the western Mediterranean (Wernham *et al.* 2002). Razorbill dive from the surface of the sea to feed on sandeels and sprat (Skov *et al.* 1995). It is a relatively short-ranging species, with a mean maximum foraging range of 57.8km (Thaxter *et al.* unpubl. data).

2.26 Puffin

2.26.1 Conservation status

Bonn (II), BoCC (Amber). Despite a recent increase in Puffins in the UK, numbers are still below the pre-1970 level, and the population of 5,700,000 - 7,300,000 pairs is classified as Depleted (BirdLife International 2004). The largest colony in the Firth of Forth is on the Isle of May, numbers here peaked at 69,300 pairs in 2003, but then suffered a dramatic decline to 42,000 pairs in 2008, followed by a significant rise to 56,867 pairs in 2009 (SMP Online Database 2011).

2.26.2 Relevant SPA sites

Puffin is a qualifying feature of one SPA within the vicinity of the Phase 1: Forth Islands (125,842 individuals) where the status of breeding birds is given as favourable, maintained as at June 2007 (SNH 2011b).

2.26.3 Population ecology

Puffin is a regularly occurring migratory species which usually nests in burrows excavated in soft ground on cliff slopes and islands. After the breeding season, Puffins disperse widely into the North Sea with individuals showing a great variability in travel distances and directions (Guilford *et al.* 2011). Puffins dive from the surface of the sea to feed predominantly on sandeels although they may also consume small herring and sprat when available. Compared with Guillemots and Razorbills, Puffins have a longer mean maximum foraging range of 86.6km (Thaxter *et al.* unpubl. data) which puts them in reach of the Zone, although studies from the Isle of May found that a large proportion of tagged Puffins foraged less than 10 km from the colony (Wanless *et al.* 1998). Hotspots in the Firth of Forth qualifying as a possible marine SPA for breeding Puffin have been identified by Kober *et al.* (2009). These hotspots include the areas of Wee Bankie and Marr Bank.