Inch Cape Wind Farm

New Energy for Scotland

Offshore Scoping Report
2017

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Abbreviations and Acronyms

AA	Appropriate Assessment
AC	Alternating Current
ADR	Air Defence Radar
AfL	Agreement for Lease
AIS	Automatic Identification System
ALARP	as low as reasonably practicable
ARPA	Automatic Radar Plotting Aid
amsl	above means sea level
ASA	Archaeological Study Area
ATC	Air Traffic Control
BEIS	Department for Business, Energy and Industrial Strategy
BOWL	Beatrice Offshore Wind Limited
BWM	Control and Management of Ships' Ballast Water and Sediments
CAA	Civil Aviation Authority
CAP	Civil Aviation Publication
CfD	Contract for Difference
CIA	Cumulative Impact Assessment
CEH	Centre for Ecology and Hydrology
CFWG	Commercial Fisheries Working Group
CGOC	Coastguard Operations Centre
CIEEM	Chartered Institute of Ecology and Environmental Management
CMFS	Commercial Fisheries Mitigation Strategy
CMS	Construction Method Statement
COLREGS	International Regulations for Preventing Collisions at Sea 1972
CRM	Collision Risk Model
DC	Direct Current

EcIA	Ecological Impact Assessment
EIA	Environmental Impact Assessment
EMF	Electro Magnetic Field
EPS	European Protected Species
ERCoP	Emergency Response Co-operation Plans
ES	Environmental Statement
FF	Far Field
FLO	Fisheries Liaison Officer
FTOWDG	Forth and Tay Offshore Wind Developers Group
GBS	Gravity Based Structure
HAT	Highest Astronomical Tide
HDD	Horizontal Directional Drilling
HES	Historic Environment Scotland
HLV	Heavy Lift Vessel
HRA	Habitats Regulations Assessment
HVAC	High Voltage Alternating Current
HVDC	High Voltage Direct Current
ICES	Chartered Institution of Civil Engineering Surveyors
ICOL	Inch Cape Offshore Limited
IROPI	Imperative Reasons of Overriding Public Interest
JR	Judicial Review
JUV	Jack-Up Vessel
LAT	Lowest Astronomical Tide
LSE	Likely Significant Effect
MCA	Maritime and Coastguard Agency
MGN	Marine Guidance Note

MHWS	Mean High Water Springs
MMO	Marine Mammal Observer
MoD	Ministry of Defence
MORL	Moray Offshore Renewables Limited
MPA	Marine Protected Area
MS-LOT	Marine Scotland Licensing and Operations Team
MW	Megawatts
NATS	National Air Traffic Services
NERL	NATS (En Route) plc
NF	Near Field
NLB	Northern Lighthouse Board
NnGOWL	Neart na Gaoithe Offshore Wind Limited
NRA	Navigational Risk Assessment
Ofcom	Office of Communications
Ofgem	The Office for Gas and Electricity Markets
OfTO	Offshore Transmission Owner
OfTW	Offshore Transmission Works
OnTW	Onshore Transmission Works
OSP	Offshore Substation Platform
O&M	Operations and Maintenance
PEMP	Project Environmental Monitoring Programme
PEXA	Practice and Exercise Areas (UK Military)
PSD	Particle Size Distribution
PTS	Permanent Threshold Shift
RAF	Royal Air Force
RCAHMS	Royal Commission for Ancient and Historical Monuments of Scotland

ROV	Remotely Operated Vehicle
RRH	Remote Radar Head
RRPL	Red Rock Power Limited
RYA	Royal Yachting Association
SAC	Special Area of Conservation
SAR	Search and Rescue
SLVIA	Seascape, Landscape and Visual Impact Assessment
SNH	Scottish Natural Heritage
SPA	Special Protection Area
SSS	Side Scan Sonar
STW	Scottish Territorial Waters
TCE	The Crown Estate
UK	United Kingdom
UKHO	United Kingdom Hydrographic Office
UXO	Unexploded Ordnance
WA	Wessex Archaeology
WSI	Written Scheme of Investigation
WTG	Wind Turbine Generator
ZTV	Zones of Theoretical Visibility (also known as ZTI Zone of Visual Influence)

Defined Terms

Term	Meaning
Development Area	The area which includes proposed Wind Turbine Generators (WTGs), inter-array cables, Offshore Substation Platforms (OSPs), the initial part of the Offshore Export Cable (part of the Revised OfTW component) and any other associated works. This area is the same for the Original Development and the Revised Development.
Export Cable Corridor	The area defined in the Original Development as the area within which the Offshore Export Cables will be installed.
Offshore Export Cable	The subsea, buried or protected electricity cables running from the offshore wind farm substation to the landfall and transmitting the electricity generated to the onshore cables for transmission onwards to the onshore substation and the electrical grid connection.
Original Application	The application to the Scottish Ministers for Section 36 Consent and Marine Licences for the Original Development. The application was made in 2013 by ICOL and was supported by an Environmental Statement (ES).
Original Development	The Inch Cape Offshore Wind Farm and Offshore Transmission Works (OfTW), as consented by the Scottish Ministers in 2014.
Original Development EIA	The Environmental Impact Assessment (EIA) that was prepared in support of the Original Application for the Original Development and reported in the Original Development ES.
Original Development ES	The ES that was submitted to support the Original Application for the Original Development.
Original Project	The Original Project included the Inch Cape Offshore Wind Farm, Offshore Transmission Works (OfTW) and Onshore Transmission Works (OnTW).
Revised Development Application	The application to the Scottish Ministers for Section 36 Consent and Marine Licences for the Revised Development. The application is being made by ICOL and will be supported by the Revised Development Environmental Statement (ES).
Revised Development	The proposed Revised Inch Cape Wind Farm and Revised Inch Cape Offshore Transmission Works (OfTW).
Revised Development EIA	The Environmental Impact Assessment (EIA) that will be prepared to support the consent application for the Revised Development and will be reported in the Revised Development ES.
Revised Development ES	The ES that will be prepared to support the consent application for the Revised Development.

Term	Meaning
Revised Offshore Export Cable Corridor	The area for the Revised Development within which the Offshore Export Cables will be installed.
Revised Inch Cape Offshore Transmission Works (OfTW)	A component of the Revised Development, comprising OSPs and their foundations and substructures, interconnector cables and Offshore Export Cables.
Revised Inch Cape Wind Farm	A component of the Revised Development, comprising wind turbines and their foundations and substructures, and inter-array cables.
Revised Project	The Revised Project includes the proposed: Revised Inch Cape Wind Farm; Revised Offshore Transmission Works (OfTW); and Onshore Transmission Works (OnTW).
Safety Zone	A marine zone demarcated for the purposes of safety around a possibly hazardous installation or works/ construction area. It may exclude other vessels.
Scoping Opinion	The Scoping Opinion that will be provided by Marine Scotland Licensing Operations Team ("MS-LOT") under Regulation 7 of the Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2000 (as amended) and Regulation 13 and Schedule 4 of the Marine Works (Environmental Impact Assessment) Regulations 2007 (as amended) setting out the Scottish Ministers opinion on the content of the Revised Development ES including those issues that will or will not need to be addressed in the Revised Development EIA.
Scoping Report	This Scoping Report sets out the proposed contents of the Revised Development ES and provided to MS-LOT to support the request for a Scoping Opinion.

1 Introduction

1.1 Background

1. Inch Cape Offshore Limited (ICOL) is promoting the development of the Revised Inch Cape Wind Farm and associated Revised Inch Cape Offshore Transmission Works (OfTW) (referred to throughout as 'the Revised Development'). The Revised Development is located in the North Sea off the east coast of Angus in Scotland. It will be comprised of an offshore array of Wind Turbine Generators (WTGs), connected to one another by subsea inter-array cables, which will in turn connect the WTGs to one or two Offshore Substation Platform(s) (OSPs), where power generated by the WTGs is transformed and subsequently carried to an onshore landfall location via Offshore Export Cables. It should be noted that the application for consent for the Revised Development is being pursued in parallel with the ongoing Judicial Review (JR) process for the Original Development.

2. The Revised Development will comprise of an offshore generating station with a capacity of greater than one megawatt (MW) and therefore requires Scottish Ministers' consent under Section 36 of the Electricity Act (Section 36 Consent) to allow its construction and operation. Under the Marine (Scotland) Act 2010, the Revised Development will also require Marine Licences granted by the Scottish Ministers to allow for the construction and deposition of substances and structures in the sea and on the seabed.

3. In line with the requirements of the Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2000 and the Marine Works (Environmental Impact Assessment) Regulations 2007 (as amended), the application for Section 36 Consent and Marine Licences for the Revised Development will be accompanied by an Environmental Statement (ES), which will detail the outcomes of an Environmental Impact Assessment (EIA) for the Revised Development.

4. This document represents the Revised Development EIA Scoping Report (referred to throughout as 'the Scoping Report') and has been prepared in support of a request for an opinion from Marine Scotland Licensing and Operations Team (MS-LOT) (acting on behalf of the Scottish Ministers) as to the scope of the information to be provided within the Revised Development ES (the 'Scoping Opinion'). This document has been prepared and submitted in accordance with the aforementioned 2000 and 2007 EIA Regulations.

5. The Revised Development ES, which will detail the outcome of the Revised Development EIA, will be informed by responses made by statutory and non-statutory consultees to this Scoping Report as may be set out in the Scoping Opinion provided by the Scottish Ministers. The Revised Development ES, which will accompany the application for the Section 36 Consent and Marine Licences, is currently expected to be submitted to the MS-LOT (acting on behalf of the Scottish Ministers) later in 2017.

1.2 The Developer

6. ICOL is a company formed to develop, finance, construct, operate, maintain and decommission the Revised Inch Cape Wind Farm.

7. Following the sale from Repsol in May 2016, ICOL is now a wholly owned subsidiary of Red Rock Power Limited (RRPL), a UK company based in Edinburgh established to develop, own and operate clean energy projects and owned by SDIC Power Holdings Co Ltd. of China. RRPL is already supporting the development of new and clean energy in Scotland through their investment in the Beatrice offshore wind project, led by Scottish and Southern Energy (SSE). The project is currently under construction and represents one of the largest ever private investments in Scottish infrastructure.

8. ICOL is separately applying for onshore planning permission in relation to onshore transmission works (OnTW), which will transport the electricity brought to shore from the Revised Inch Cape Wind Farm to the National Grid Network. The transmission assets will be transferred to an Offshore Transmission Owner (OFTO) for operation and decommissioning under the requirements of the OFTO regime established by the Office of Gas and Electricity Markets (OFGEM) and the UK Government.

1.3 Development Overview

1.3.1 Original Development Application and Consent

9. In 2014 ICOL gained offshore consents (Section 36 and Marine Licence) for the construction and operation of the Inch Cape Offshore Wind Farm and associated OfTW, situated in the Outer Firth of Tay off the east coast of Scotland. At that time, the consent allowed delivery of an offshore wind farm project with a potential generating capacity of up to 784 MW.

10. The determination of the offshore consents by the Scottish Ministers followed almost five years of project development, including environmental surveys, engineering design studies and wide-ranging stakeholder engagement.

11. In line with the applicable EIA regulations and legislation (as defined in Section 3 below), ICOL submitted a complete and competent ES. The outcomes of the Original Development EIA, presented in the Original Development ES (ICOL, 2013), that supported the Original Application, were accepted as the basis for the determination of the offshore consents by the Scottish Ministers.

12. The consents are the currently the subject of a Judicial Review.

1.3.2 Application for Consent for the Revised Development

13. In parallel with the JR, ICOL intends to pursue a new consent application for the Revised Development. The Revised Development is being developed to take advantage of advancements in offshore wind technology to achieve ICOL's twin objectives of improving project economics while reducing associated environmental effects (when compared to the Original Development). A detailed description of the infrastructure and associated construction methods for the Revised Development is provided in Section 4 below, where direct comparison is also made between the design of the Original Development and Revised Development; in summary, the Revised Development will be an application for an offshore wind farm comprised of the following key components:

- WTGs
- OSPs, used to collect the generated electricity and convert it for transmission to shore;
- Foundations and substructures for the WTGs and OSP(s);
- A network of inter-array subsea cables to connect strings of WTGs together and to connect the WTGs to the OSPs;
- Subsea inter-connector cables that link the WTGs to each other and the OSP(s) to one another;
- Minor ancillary infrastructure such as met buoys and aids to navigation; and
- Subsea export cables, to transmit electricity from the OSP(s) to the landfall point, up to mean high water level.

14. In terms of location, the Revised Development is directly comparable to the Original Development. The differences in design between the two schemes (as detailed in Section 4) are primarily the result of different construction timelines. It is anticipated that the Revised Development would have a later construction start date than that anticipated for the Original Development and as such, the design of the Revised Development aims to incorporate the latest and predicted future offshore wind farm technology.

15. It should be noted that it is ICOL's intention to construct either the Original Development or the Revised Development, but not both.

1.4 Purpose of the Scoping Document

16. This Scoping Report supports a request for a formal Scoping Opinion from the Scottish Ministers. The Scoping Opinion will contain a compilation of responses to this Scoping Report from key statutory and non-statutory consultees, which will help guide ICOL in progressing the Revised Development EIA.

17. At the end of each topic section, a series of questions have been asked, which the applicant would be grateful for a response on.

18. If ICOL does not receive a response to these questions, or through any other representation, it is assumed the approach adopted/proposed is acceptable.

19. The purpose of the Scoping Report is to engage with the Scottish Ministers, statutory and non-statutory consultees in the EIA process, inviting them to provide relevant information and to comment on the proposed approach to the Revised Development EIA, to ensure that a robust ES is submitted in support of the applications for consents. The Scoping Report therefore identifies:

- The main aspects of the offshore physical, biological and human environments likely to be significantly affected by the construction, operation and decommissioning of the Revised Development; and
- The extent of relevant environmental studies to be undertaken as part of the Revised Development EIA.

20. The identification and subsequent assessment of potentially significant effects will be based upon an understanding of the environmental conditions likely to be encountered within the Development Area and Revised Export Cable Corridor. This understanding has been developed utilising the extensive information gathered and presented within the Original Development EIA, undertaken in 2013, together with any more recent, relevant publicly available desktop data sources.

21. A number of potential environmental effects are considered in this Scoping Report. For some identified potential effects, further data collection and/or assessment may be required to determine the significance of the effect. ICOL is proposing to include the assessment on such effects within the Revised Development EIA.

22. Those effects that are unlikely to have a significant effect, based on an understanding of the nature of the Revised Development (including mitigation and a commitment to the relevant Original Development consent conditions), will be scoped out of the Revised Development EIA (i.e. no further data collection or assessment is proposed and they will not be considered further in the EIA process) (see Section 2 for further detail on the approach to the scoping process).

1.5 Document Structure

23. The Scoping Report is structured as follows:

Section 1: Introduction	Introduces the Revised Development and developer and states the purpose of the Scoping report.
Section 2: Approach to Scoping	States ICOL's approach to scoping the Revised Development EIA. Explains the intention to draw upon the content of the Original Development EIA undertaken for the previously consented Inch Cape Offshore Wind Farm and Offshore Transmission Works (OfTW).
Section 3: Policy and Legislative Context	Sets out the need for the Revised Development and provides an overview of policy and legislation most relevant to the Revised Development.
Section 4: Description of Development	Confirms the boundaries and provides a description of each of the key components of the Revised Development and outlines approaches to construction, operation and maintenance and decommissioning. Compares the Revised Development design parameters to those of the previously consented Original Development.
Section 5: EIA Methodology	Describes the assessment methodology to be adhered to in undertaking the Revised Development EIA.
Section 6: Habitat Regulations Appraisal (HRA) Methodology	Describes the approach to the provision of information to inform HRA for the Revised Development.
Section 7: Offshore Physical Environment	Presents the results of EIA scoping for physical environment EIA topics, clearly proposing which potential impacts require further, detailed consideration in the Revised Development EIA. Identifies potential impacts to be scoped out of the Revised Development EIA.
Section 8: Offshore Biological Environment	Presents the results of EIA scoping for biological environment EIA topics, clearly proposing which potential impacts require further, detailed consideration in the Revised Development EIA (and HRA where relevant). Identifies potential impacts to be scoped out of the Revised Development EIA.
Section 9: Offshore Human Environment	Presents the results of EIA scoping for human environment EIA topics, clearly proposing which potential impacts require further, detailed consideration in the Revised Development EIA. Identifies potential impacts to be scoped out of the Revised Development EIA.
Section 10: Summary of EIA Scoping	Summarises the findings presented across Sections 7 to 9, presenting the intended scope of the Revised Development EIA and CIA.
Section 11: Proposed ES Contents	Sets out the proposed contents of the Revised Development ES, which will be prepared in support of applications for offshore consents.

2 Approach to Scoping

2.1 Introduction

24. The following sections set out the approach taken to the scoping of the ES for the Revised Development as set out in this Scoping Report and specifically in relation to:

- The approach to scoping;
- The approach to scoping the cumulative impacts assessment (CIA);
- Proposed scoping consultation; and
- Proposed approach to the scoping of the HRA.

2.2 Approach to the Scoping of the EIA for the Revised Development

2.2.1 Reference to Original Development EIA

25. The Revised Development proposed by ICOL is broadly analogous in terms of location and most aspects of its design to the previously consented Original Development. It should, however, be noted that the Original Development EIA was undertaken on a scheme design comprising of up to 213 WTGs and the conclusions set out in that EIA and referred to in this Scoping Report are made on that basis (although the consent was subsequently granted for a scheme comprising of up to 110 WTGs).

26. Significant existing data and knowledge regarding the environmental characteristics of the Revised Development location are therefore already available, acquired through site specific surveys, technical studies and data gathering to inform the Original Development EIA. In addition, the potential impacts of the Original Development on the environment have been thoroughly assessed, and the outcomes of that assessment considered by the Scottish Ministers in their determination of the consent applications. On this basis, it is ICOL's intention to maximise, where appropriate, the use of the existing data and the previous impact assessments to:

- Characterise the baseline environment to inform the Revised Development EIA where data is sufficient and it is appropriate to do so;
- Scope out impacts where there is clear evidence for doing so; and
- Where impacts are scoped in, to draw upon the pre-existing evidence base and previous impact assessment work where appropriate in preparing the Revised Development EIA.

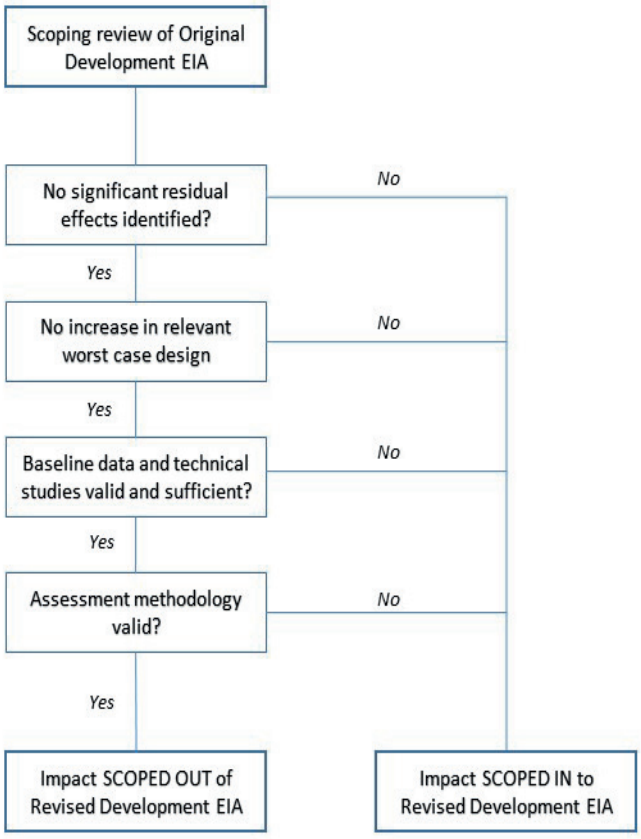
27. This approach, as summarised in Figure 2-1, is intended to focus the Revised Development EIA on those potential impacts that are most likely to give rise to significant effects (or where uncertainty exists in relation to the validity of the previous assessments) and thereby avoid

revisiting assessments where the conclusions reached previously in the Original Development ES can be shown to be applicable to the Revised Development through the scoping process.

28. The topic sections of this Scoping Report (Sections 7 to 9), therefore, identify where the existing evidence base (i.e. the Original Development ES) is being used to confirm baseline conditions, identify potential impacts and consider their likely significant effects. Each topic section:

- Identifies and summarises the baseline data that was gathered to inform the Original Development EIA, and considers the validity of the data in terms of describing current baseline conditions for the purposes of the Revised Development EIA. Where more recent publicly available desktop data sources have become available, these are also identified. Where it is deemed necessary, a description of additional data that will be collected to inform the Revised Development EIA is provided;
- Each topic section also defines a worst case design scenario for the Revised Development and compares this to the equivalent for the Original Development. Where the Revised Development design parameters are expected to be unaltered or present a reduction in a worst case value when compared to the Original Development, and where it is reasonable to conclude that additional significant effects would not occur (as a result of mitigation and a commitment to the Original Development consent conditions), a presumption in favour of not repeating the assessment is made and the previous conclusions reached on residual effects can be considered as adequate justification to scope out the effect from the Revised Development EIA. Conversely, where design parameters differ in a way that could give rise to previously undescribed impacts or a level of significant effect that might be greater than previously described, it is proposed that these are considered in the Revised Development EIA process and reported in the Revised Development ES; and
- Finally, each topic section considers whether the impact assessment methodology applied in the Original Development EIA remains valid and identifies any more recent updates in approach or best practice. Where new policy or guidance on assessment is relevant and available, the topic section describes how this will be applied in the Revised Development EIA.

Figure 2-1: Scoping of the Revised Development EIA based on the Original Development EIA



2.2.2 Application of Embedded Mitigation

29. In conducting the scoping exercise, ICOL has applied a range of 'embedded mitigation'[1] measures in determining the residual significance and therefore the justification for scoping issues in or out of the assessment process for the Revised Development.

30. The embedded mitigation is drawn from:

- Mitigation and management measures that formed 'embedded mitigation' applied during the EIA for the Original Development; and
- Additional mitigation and management measures that were identified as a result of the EIA for the Original Development.

[1] Embedded mitigation is the term applied to mitigation measures that are 'built in' to the scheme - i.e. they are assumed to be in place as up-front commitments rather than mitigation resulting in response to the EIA process and being necessary to specifically mitigate a significant effect.

31. The embedded mitigation will be listed in full in the ES prepared for the Revised Development. ICOL would also expect to see this mitigation included as conditions or requirements attached to any consents subsequently granted.

2.2.3 Commitment to Consent Conditions

32. As well as the embedded mitigation as described in Section 2.2.2, and presented within each section, ICOL proposes to commit to the relevant consent conditions granted for the Original Development, as they relate to the Revised Development Application. The most relevant conditions and requirements from the consents granted for the Original Development (those that relate to mitigation or management) are provided within each topic chapter. The consent conditions in full can be viewed in Appendix A.

33. These consent conditions have considered any relevant consultation responses to the Original Development EIA from key stakeholders in determining the acceptability of the Original Development.

34. ICOL recognises that the Licensing Authority may wish to apply different or amended conditions to any consents that may ultimately be granted for the Revised Development, but would expect the main requirements demonstrated by these conditions to remain a requirement in some form.

2.3 Approach to Scoping of Cumulative Impacts

35. Assessment of cumulative impacts forms part of the EIA process. This Scoping Report aims to confirm the scope of the Cumulative Impact Assessment (CIA) to be considered in the Revised Development EIA.

36. Fundamental to scoping of the CIA is agreement of the list of plans, projects and activities to be considered alongside the Revised Development. Section 5.7 of this document sets out the list of projects that have been considered during this scoping exercise. In advance of completing the CIA, this list may need to be updated and further agreed with the Licensing Authority to ensure that the CIA takes account of all relevant existing and reasonably foreseeable plans, projects and activities.

2.4 Proposed Scoping Consultation

37. Although the Scoping Opinion will form an important step in developing the Revised Development EIA, ICOL also recognises that the final scope of the assessments will require further development and discussion with relevant statutory and non-statutory consultees. ICOL would expect to engage with consultees through the scoping process and throughout the pre-application period in ensuring that the Revised Development EIA is completed appropriately and taking account of all relevant issues (see also Section 3.3 for further detail on proposed consultation).

2.5 Scoping of Habitats Regulations Appraisal

38. The Conservation (Natural Habitats &c.) Regulations 1994, as amended in Scotland and the Offshore Marine Conservation (Natural Habitats &c) Regulations 2007 (as amended) require that a Habitats Regulations Appraisal (HRA) is conducted by the 'competent authority' before a plan or project that is likely to have a significant effect on a Natura 2000 site (i.e. Special Protection Areas (SPAs) or Special Areas of Conservation (SACs)[2] can be given consent, permission or other authorisation (see also Section 3.3.7).

39. ICOL proposes to present a separate HRA Report alongside the Revised Development ES. This HRA Report will be designed to provide sufficient supporting information to inform any 'Appropriate Assessment' (AA) that will be required to be undertaken by the competent authority. This HRA Report will therefore contain an assessment of any identified likely significant effects (LSE) in accordance with the requirements of the regulations, identifying any Natura 2000 sites where there is a LSE and then, for these sites, provide further information in support of an AA of the adverse effects upon the integrity of any relevant Natura 2000 sites.

40. In support of this process, this Scoping Report presents the results of the separate HRA Screening exercise (Appendix B), which seeks to identify which Natura 2000 sites should be included within any AA and HRA Report (i.e. identify those sites where a LSE, resulting from the Revised Development alone or in-combination with other plans or projects, cannot be ruled out) and the methodology to be used to assess LSE and/or adverse effects on Natura 2000 sites. This has been included in this scoping report in the interests of administrative efficiency. At the end of each relevant topic chapter in this Scoping Report, any Natura 2000 sites, along with their qualifying features, that ICOL proposes to include in the HRA Report, are identified. Each section will clearly identify those parts of data and assessment contained in the ES which will also be relied on in the HRA Report.

[2] A Natura 2000 site, under Scottish Government policy, becomes a relevant consideration in preparing a Habitats Regulations Appraisal when a site becomes a proposed SAC or SPA – that is at the stage when the proposed designation has been approved for consultation by Scottish Government but has not been submitted to the European Commission (in the case of a pSAC) or classified (in the case of a pSPA).

3 Policy and Legislative Context

3.1 Need for the Development

41. The key drivers underpinning the need for renewable energy, and therefore for the Revised Development are as follows:

- The need to reduce greenhouse gas emissions, including increasing energy generation from low carbon sources to replace high carbon energy sources such as burning coal and oil;
- The need for energy security, including:
    - The need to secure safe, affordable, reliable and preferably local energy generation for the UK market;
    - The need to replace existing old energy generation infrastructure;
    - The need to support expected electricity demand whilst meeting climate change commitments; and
- The need to maximise economic opportunities from energy infrastructure.

3.2 Relevant Legislation and Policy – the Application and Consenting Process

3.2.1 Introduction

42. The Revised Development is located in Scottish Territorial Water (STW) and therefore the Scottish Ministers are the relevant decision makers in respect of the necessary consents and licences required for the construction and operation of the Revised Development. To allow the Scottish Ministers to properly consider the development proposals, applicants are required to provide information which demonstrates compliance with the relevant regulations and allows adequate understanding of the material considerations.

43. In the following sections, the key consents required to allow the Revised Development to proceed are identified and the consenting process is described.

3.2.2 Electricity Act 1989 (Section 36 Consent)

44. The Revised Development is subject to an application to the Scottish Ministers under Section 36 of the Electricity Act 1989 (Section 36) for consent for the construction and operation of an electricity generating station. The scope of this consent will include the installation, operation and maintenance of WTGs and inter-array cables.

45. In addition, the Scottish Ministers may make a declaration under Section 36A of the Electricity Act 1989 extinguishing the public rights of navigation for the locations of the proposed wind turbine structures.

3.2.3 Marine (Scotland) Act 2010 (Marine Licenses)

46. The Marine (Scotland) Act 2010 was introduced to provide a framework to balance competing demands on Scotland's seas. It introduced a duty to protect and enhance the marine environment and included measures to help boost economic investment and growth in areas such as marine renewables. The Act included measures relating to marine planning, licensing, conservation and enforcement.

47. Under the 2010 Act, a Marine Licence will be required for marine licensable activities associated with the Revised Development including the deposition of cables and substructures on the seabed seaward of the mean high water springs (MHWS) mark.

3.2.4 Consenting Process

48. Where an offshore energy project, such as an offshore wind farm, requires Section 36 Consent, a Marine Licence will also be required, and MS-LOT, on behalf of the Scottish Ministers, process both consent applications jointly.

49. The consenting process can be summarised as follows:

- Pre-application: Developer undertakes preparatory work and discusses proposal with statutory body. Developer undertakes EIA, commences with screening and/or scoping exercises to confirm the requirement for EIA and scope of EIA respectively. Developer consults on the proposal as part of consenting and EIA process with variety of statutory consultees and stakeholders. An ES is prepared;
- Application: Developer submits consent applications, including ES and fees, to MS-LOT, who will 'gate check' the application to ensure adequate information has been supplied to enable consent determination. Once the application is accepted by MS-LOT, the Developer circulates application information to consultees identified by MS-LOT, and also places copies of the same information in public viewing places. Developer advertises the applications in national and local press;
- Consideration of the application: Consultees make representations on, the consent applications;
- Proposal evaluation: Consultee responses are assessed by MS-LOT;
- Application determination and announcement: The Scottish Ministers proceed to determine the applications and the decision is announced and published; and
- Post-decision: Where consents are granted, the Developer must comply with any conditions attached to the consents.

3.2.5 Requirement for EIA

50. Certain types of developments are classed as 'EIA Development' under the requirements of the EIA Directive.[3] The purpose of the EIA Directive is to ensure that, in considering whether to grant consents for developments that are likely to have significant environmental effects, the consenting authorities have all the necessary environmental information on which to base their decision. It is considered that due to the nature, scale and size of the Revised Development that there is the potential for significant environmental effects and accordingly an EIA will be required.

51. The requirements of the EIA Directive are enacted into the relevant UK legislation for electricity generation projects requiring consent under Section 36 of the Electricity Act 1989 by the Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2000 and in relation to marine licensing by The Marine Works (Environmental Impact Assessment) Regulations 2007 (as amended in 2011). Both sets of Regulations set out the statutory process and minimum requirements for EIA, to which ICOL will adhere.

52. The EIA Directive has been recently updated with the amendments due to come into force on 16 May 2017. However, projects which enter the planning system (i.e. submit a request for an EIA Scoping Opinion) prior to that date are not required to follow the requirements set out in the amended Directive as transposed into UK legislation.

53. The main stages in the EIA process[4], which ICOL will follow, are:

- Scoping to determine the content of the ES and the matters to be addressed by the EIA (as presented in this Scoping Report);
- Data review involving compiling and reviewing available data and/or undertaking of baseline surveys to generate site-specific data;
- Assessment and design iteration whereby the likely significant effects of the Revised Development during the construction, operation and maintenance and decommissioning stages of its life are assessed and feedback is provided to the design and engineering team(s) to modify the development to avoid, prevent, reduce and, where possible, offset any significant adverse effects on the environment;
- Assessment of the construction methodology and the final design of the Revised Development;
- Identifying any residual effects and any further mitigation or compensation requirements; and

[3] The EIA Directive (85/337/EEC) came into force in 1985 and applies to a wide range of defined public and private projects, which are defined in Annexes I and II to the Directive.
[4] Screening is omitted as ICOL have chosen not to seek a screening opinion as ICOL accept an EIA is required.

- Preparing the ES, reporting on the EIA.

3.2.6 Requirement for HRA

54. The Habitats Directive provides for the conservation of natural habitats and of wild flora and fauna including in offshore areas. The Wild Birds Directive applies to the conservation of all species of naturally occurring wild birds including in offshore areas. In the UK, sites designated as SACs and SPAs form part of the Natura 2000 network, delivering the requirements of the Directives.

55. Both Directives have been transposed into Scottish Law by the Conservation (Natural Habitats &c.) Regulations 1994, as amended (the Habitats Regulations) and in the offshore marine area by the Offshore Marine Conservation (Natural Habitats &c) Regulations 2007 (as amended) (Offshore Marine Regulations).

56. The Habitats Regulations require that wherever a project, that is not directly connected to, or necessary to the management of a Natura 2000 site, has the potential to have a LSE on the conservation objectives of the site (directly, indirectly, alone or in-combination with other plans or projects) then an AA must be undertaken by the competent authority. The AA must be carried out before consent or authorisation can be given for the project.

57. An HRA is a step by step process which determines LSE and (where appropriate) assesses adverse effects on the integrity of a European site, examines alternative solutions, and provides justification of Imperative Reasons of Overriding Public Interest (IROPI). This constitutes a four stage process as summarised below:

- HRA Stage 1 - Screening: Screening for LSE (alone or in-combination with other projects or plans);
- HRA Stage 2 - Appropriate Assessment: Assessment of implications of identified LSEs on the conservation objectives of a European site to ascertain if the proposal will adversely affect the integrity of a European site.
- HRA Stage 3 – Assessment of Alternatives (where it cannot be ascertained that the proposal will not adversely affect the integrity of a European site alternative solutions must be considered); and
- HRA Stage 4 – Assessment of IROPI (where no alternatives are identified).

58. All four stages of the process are referred to as the HRA process. This clearly distinguishes the whole HRA process from the one step within it that is referred to as the AA.

59. As set out in section 2.5, this scoping report presents information in support of HRA Stage 1 – the screening of relevant European designated sites and features to determine whether there may be a LSE or not (see Appendix B).

3.2.7 Other Consents and Licenses

Energy Act 2004: Safety Zones

60. Under Section 95 of the Energy Act 2004 where a renewable energy installation is proposed to be constructed, and the Department for Business, Energy & Industrial Strategy (BEIS) (in consultation with the Scottish Ministers [5]) consider it appropriate for safety reasons, designated areas may be declared as safety zones.

1. Safety zones are intended to ensure the safety of the renewable energy installation or other installations in the vicinity during construction, operation, extension or decommissioning. Safety zones may exclude non-wind farm vessels from navigating through a designated area for a designated period.
2. Rolling safety/exclusion zones of 500 m are considered to be in place around major construction vessels. It is possible that installed infrastructure will have safety/exclusion zones of 50 m (or an appropriate size to incorporate infrastructure).

Energy Act 2004: Decommissioning

61. Sections 105 to 114 of the Energy Act 2004 require a decommissioning scheme for an offshore renewable energy installation to be approved by BEIS.[6]

The Crown Estate Act 1961: Seabed Lease

62. The Crown Estate Commissioners are the owner of much of the foreshore and the seabed below the territorial seas of the UK under the provisions of the Crown Estate Act 1961 and are the party entitled to exercise the right to exploit designated areas for the production of energy from water or winds. The Commissioners require a lease of the seabed and foreshore to be entered into for developments on the marine estate, including cable laying and construction of offshore wind turbines.

63. Under the provisions of the Scotland Act 2016, The Crown Estates' duties in Scotland were transferred to the Scottish Government (The Crown Estate Scotland) in April 2017.

[5] The powers under the Energy Act 2004 relating to safety zones are due to be devolved to Scottish Ministers shortly; thereafter the Scottish Ministers will determine on any applications for safety zones with Scottish waters.

[6] The powers under the Energy Act 2004 relating to decommissioning are due to be devolved to Scottish Ministers shortly; thereafter the Scottish Ministers will administer and approve decommissioning proposals for offshore wind farms in Scottish waters.

The Conservation (Natural Habitats, &c.) Regulations 1994 (European Protected Species Licensing)

64. Under Regulation 44 of the Habitats Regulations certain activities which would normally constitute an offence against European protected species (EPS), which are species requiring strict protection, can be carried out legally under a licence. An example of such an activity is the piling of offshore wind turbine foundations, which may generate underwater noise at levels that could disturb cetaceans, which are EPS. The licences are granted by Scottish National Heritage (SNH) or the Scottish Ministers depending on the reason for the licence application. ICOL will apply for licences as appropriate and prior to the start of construction or activity that is likely to cause disturbance is undertaken.

Town and Country Planning (Scotland) Act 1997

65. OnTW (described briefly in Section 4.5 below) associated with the Revised Development is not considered in detail within this Scoping Report as planning permission is being separately sought by ICOL for the OnTW under the Town and Country Planning (Scotland) Act 1997.

66. The Revised Development EIA will consider the OnTW to the extent that details of the OnTW are available at the time of assessment, and where there is potential for the offshore and onshore elements of the Revised Project to interact to result in an effect on an environmental receptor (for example, where the visual presence of the offshore infrastructure has the potential to impact the setting of onshore features of archaeological importance).

3.3 Consultation

67. The following legislation sets out the relevant, statutory consultation requirements that will apply to the Revised Development, such as the need for pre-application consultation and advertising of consent applications:

- Marine (Scotland) Act 2010, the Marine and Coastal Access Act 2009, and the Marine Licensing (Pre-application Consultation) (Scotland) Regulations 2013 set out the requirements for pre-application consultation;
- The Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2000; and
- The Marine Works (Environmental Impact Assessment) Regulations 2007 (as amended in 2011).

68. ICOL will adhere to all statutory consultation requirements, and in doing so, will build on existing relationships forged with stakeholders during the consenting of the Original Development.

69. As part of the EIA process, extensive consultation with those stakeholders with an interest in the proposed Revised Development is anticipated. Engagement with stakeholders is expected to be focused around the following key stages:

- Formal submission and publication of this Scoping Report and request for a Scoping Opinion;
- Follow-up to scoping, to confirm the approach to EIA (and HRA) with key stakeholders;
- Provision of key technical reports and data, used to inform the assessments, to relevant stakeholders for information and feedback;
- Formal submission and publication of consent applications and the accompanying ES to seek views on the proposal; and
- Additional public / stakeholder-specific engagement events that will take place at intervals during the consenting process, together with the issue of newsletters and updates to the ICOL website.

70. ICOL will also ensure that consultation is carried out in compliance with the specific requirements set out under the Marine Licensing (Pre-application Consultation) (Scotland) Regulations 2013. Pre-application consultation is intended to allow local communities, environmental groups and other interested parties to comment upon proposed developments at an early stage - before a consent application is submitted. A pre-application consultation report will be prepared and submitted with the Marine Licence applications for the Revised Development.

4 Description of the Development

4.1 Introduction

71. This section of the Scoping Report provides an outline description of the design of the Revised Development and describes activities associated with the construction, operation and maintenance, and decommissioning of the Revised Development.

72. The Revised Development description is indicative and the application of a 'design envelope' (which captures the full range of potential design scenarios) is intended to provide sufficient flexibility to accommodate further expected refinement in design as the Revised Development moves through consenting and towards construction. The sub-sections below therefore set out a series of design options and parameters, for which maximum values are typically provided. The maximum values constitute a realistic worst case scenario in relation to Revised Development.

73. In the case of the Revised Development, the design parameters presented below are broadly consistent with those of the previously consented Original Development, as set out in the Inch Cape Offshore Wind Farm ES, Chapter 7 (ICOL, 2013). This is of relevance to the scoping process, since the Original Development EIA, prepared by ICOL in 2013, considered the potential effects of the Original Development. Comparisons are provided below, which clearly identify where the maximum values associated with the Revised Development align with or vary from those presented for the Original Development.

74. Differences in design between the Original Development and Revised Development are primarily the result of an anticipated later construction date for the Revised Development, by which time it is expected that WTG design (and design of other offshore wind infrastructure and construction methods) will have evolved. ICOL will seek to utilise the latest technology available to them. Differences in design also reflect the intent of ICOL to further consider how design can be applied to minimise potential effects on sensitive environmental receptors.

4.2 Site Selection

75. The rationale behind the siting of the proposed Revised Development is as per that set out by ICOL in the Original Development ES (ICOL, 2013). Extensive studies and investigations informed the identification of the development location; key steps in site selection are summarised below.

76. In 2008, at the request of the Scottish Government, The Crown Estate invited potential developers to submit proposals for offshore wind farm sites within STWs.

77. A desk study of wind resource, water depth and environmental data was undertaken which identified a range of areas along the east coast of Scotland as having the most suitable characteristics for the development of an offshore wind farm.

78. In June 2011, The Crown Estate awarded an exclusivity agreement to ICOL to develop the Inch Cape Development Area.

79. The Development Area was included in Blue Seas – Green Energy: A Sectoral Marine Plan for Offshore Wind Energy in Scottish Territorial Waters: Part A – The Plan (Marine Scotland, 2011). This plan identified Inch Cape as one of six sites, within STW, for potential offshore wind farm development. A Strategic Environmental Assessment (SEA) of the Sectoral Marine Plan was undertaken by Marine Scotland (2010) which concluded that the Inch Cape site could be progressed for offshore wind development.

80. ICOL currently has the following agreements in place which are relevant to the Revised Development:

- An Agreement for Lease (AfL) with The Crown Estate Scotland, which gives an exclusive right to ICOL to develop a wind farm and the opportunity to secure a lease giving rights to the seabed; and
- Grid connection agreements with National Grid Electricity Transmission. The agreements are required to transmit generated electricity, for distribution to the UK energy markets.

4.3 Development Boundary

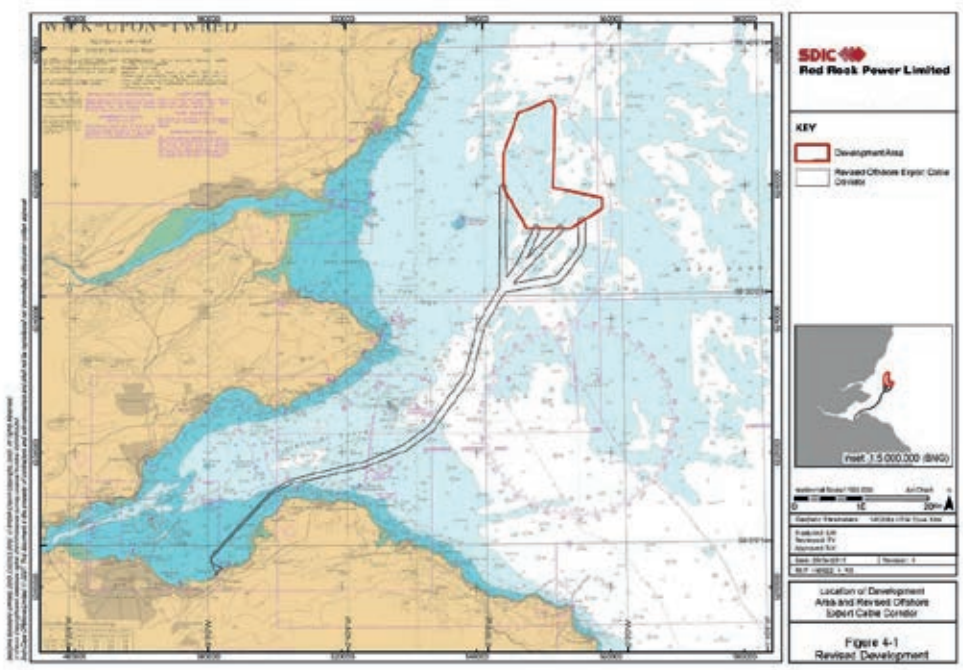
81. The Development Area and the Revised Offshore Export Cable Corridor are shown in Figure 4-1. These areas encompass the:

- Development Area: This is where the offshore wind farm will be located, which will include the WTGs, OSPs, turbine and OSP foundations, inter-array cables and inter-connector cables; and
- Revised Offshore Export Cable Corridor, within which the Offshore Export Cables will be located.

82. The Development Area for the Revised Development is the same as for the Original Development.

83. The Revised Offshore Export Cable Corridor is the same as the Original Offshore Export Cable Corridor aside from the removal of the potential landfall at Seton Sands.

Figure 4-1: Revised Development



4.4 Offshore Wind Farm Infrastructure

4.4.1 Wind Turbines

84. The Revised Development EIA will be undertaken in accordance with the concept of a Design Envelope. A Design Envelope sets out a range of minimum and maximum design parameters that may be applied to the final development design and, for each environmental topic, a worst case scenario is identified and assessed within the ES. This ensures a robust and realistic impact assessment is applied, whilst retaining enough flexibility to allow for design evolution and technology advancement during the consenting process and post-consent period. The application of this approach ensures that the EIA and consent applications are 'future-proofed'. Anticipated turbine parameters are provided in Table 4-1 below (see Figure 4-2 for parameter definitions) and compared to those presented in the application for the Original Development.

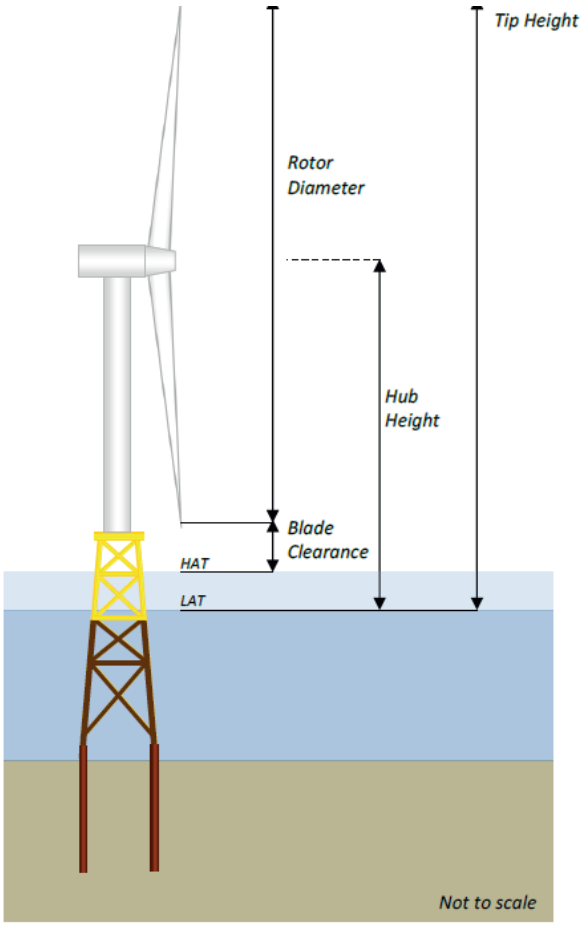
85. The turbines are likely to all follow the traditional offshore WTG design and will incorporate tubular towers and three blades attached to nacelle housing mechanical and electrical generating equipment. ICOL proposes to install no more than 72 WTGs. This number is based on current technology where the largest rotor diameter of any turbine available now is 180m. It should be noted that the use of turbines with rotor diameters larger than this would result in fewer turbines and greater separation distances. Therefore, the maximum number of WTGs combined with the maximum WTG dimensions is not a realistic scenario.

86. Turbine colouring, lighting, marking and foghorn requirements will be as per current relevant standards and guidance.

Table 4-1: Design Envelope Parameters (Wind Turbines)

Design Parameter	Design Envelope (Revised Development Application)	Design Envelope (Original Development Application, ICOL, 2013)
Number of turbines	Up to 72	Up to 213
Minimum Blade clearance above Highest Astronomical Tide	22m	22m
Hub height (above Lowest Astronomical Tide)	Up to 176m	92-129m
Blade tip height (above Lowest Astronomical Tide)	Up to 301m	152 – 215m
Rotor diameter	Up to 250m	120 – 172m
Indicative minimum separation between turbines	1,278m	820m

Figure 4-2: Wind Turbine Design Parameters



Approach to Installation

87. There are various methods of installing WTGs. The following provides an overview of the possible methods to be applied by ICOL:

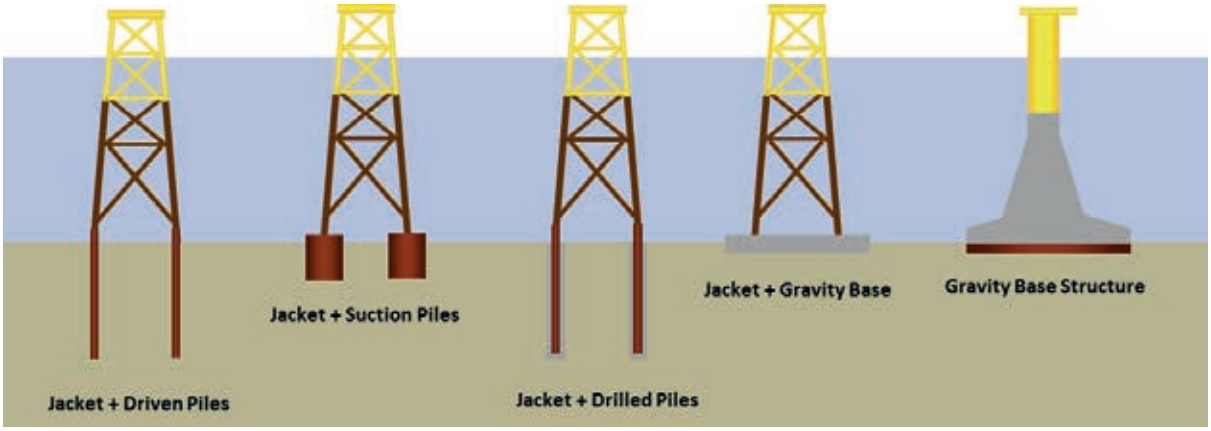
- **Individual component installation**: in this case the individual component parts of the WTG (two or three blades, nacelle with hub and a number of tower sections) are delivered from the factory to an onshore facility or directly to the offshore site. Wind turbines are then erected piece by piece offshore using a jack-up vessel (JUV) or floating vessel with heavy lift capability.
- **Onshore sub-assembly**: this is similar to individual component installation; however, some of the components are pre-assembled at the onshore location.
- **Single-lift installation**: the wind turbine is fully assembled onshore and installed in one piece offshore by either a floating or JUV.
- **One-piece installation**: for some foundation and substructure types, it is possible to install the wind turbine onto the substructure at a suitable location and then tow to site, installing both the turbine and substructure in one piece.

4.4.2 Wind Turbine Foundations and Substructures

88. Two categories of foundation and substructure suited to local ground conditions and water depths are being considered (see Figure 4-3). These are:

- **Steel frame structures**: Also known as 'jackets', these structures are constructed mainly from steel tubular members similar to a lattice tower, typically with 3 or 4 legs; and
- **Gravity base structures (GBS)**: A mainly concrete and steel reinforced structure which uses the weight of the structure and internal ballast to maintain position.

Figure 4-3: Foundation and Substructure Types



Steel Framed Jacket Substructures

89. Various steel framed jacket substructures may be utilised. Figure 4-4 provides an example of a typical four-legged jacket substructure. Steel framed substructures can be fixed to the seabed using different types of foundations, as follows:

- **Drilled Piles**: 'sockets' are drilled into the seabed and then the piles are inserted and grouted in place.
- **Driven Piles**: piles are driven into the seabed by striking them with a hydraulic hammer. Drilling may be used in the event of a pile becoming stuck due to hard soil conditions and then the pile would be driven again until final penetration is reached.
- **Suction Piles**: pumps are attached to large 'can'-like piles and the water is pumped out of them. This reduces internal pressure and the combination of external water pressure and self-weight pushes the pile into the seabed.
- **Hybrid Gravity Base**: a steel framed structure could be supported by a gravity base foundation which would fix the structure to the seabed by weight alone or also using a similar effect to a suction pile in combination.

Figure 4-4: Illustrative Steel Framed Substructure with Pile Foundation

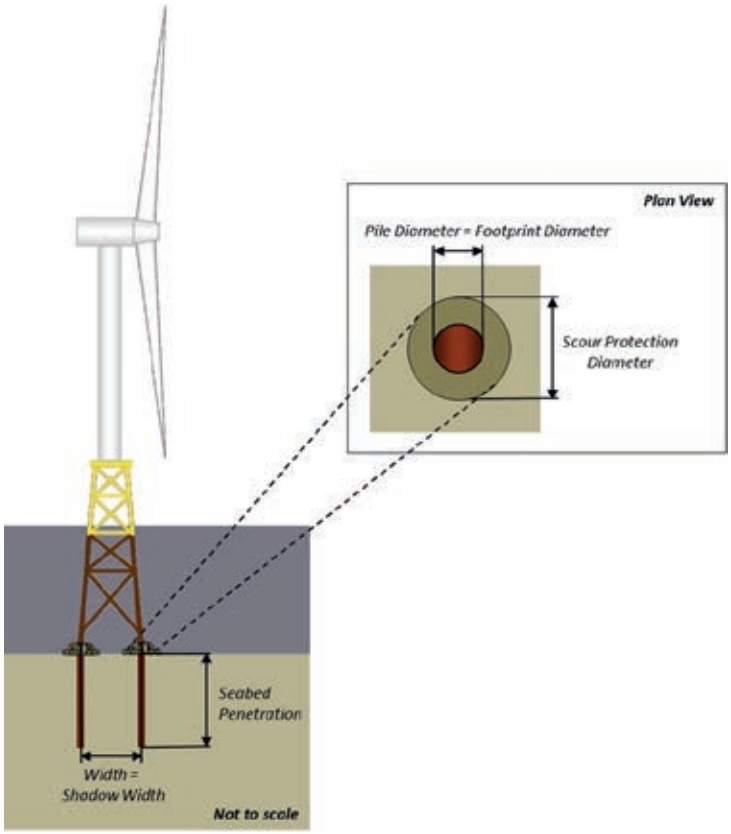


Table 4-2: Design Envelope Parameters (WTG Jacket Substructure and Pile Foundations)

Design Parameter	Design Envelope (Revised Development Application, up to 72 WTGs)	Design Envelope (Original Development Application, ICOL, 2013, up to 213 WTGs)
Drilling/Piling Events (WTGs)	288*	852*
Number of Sides	4	4
Jacket Top Width (m)	30**	30**
Jacket Base Width (m)	60	60
Maximum Seabed Penetration (m)	70	60
Maximum energy capacity of hammer	2400kJ	1200kJ
Scour Protection Diameter (m)/pile	16	16
Shadow (m^2) - Total seabed area under each substructure including those exposed	3,600	3,600
Footprint (m^2)- Total seabed area under each substructure which is not exposed	28***	28***
Footprint Including Scour Protection (m^2)	804	804
Drilled Volume at each Substructure (m^3)	1,680	1,680

* Based on four piles for each of the WTGs.

** includes allowance for boat landings and laydown area.

*** Area under each of four piles with diameter of three metres.

Gravity Base Structures

90. Alternatively, various configurations of GBS may be utilised. Figure 4-5 provides an example of a typical conical based substructure.

91. Seabed preparation such as excavation, placement of gravel and backfill using a dredging vessel is often required prior to GBS deployment. Depending on soil conditions, this

requirement may be reduced or eliminated by the use of a perimeter 'skirts' which penetrate the seabed and provide greater stability.

92. Where excavation is undertaken prior to deployment of GBS, consideration will be given on potential re-use of excavated materials. Excavated material may be used to backfill following substructure installation or deposited as a ballast material.

Figure 4-5: Illustrative GBS

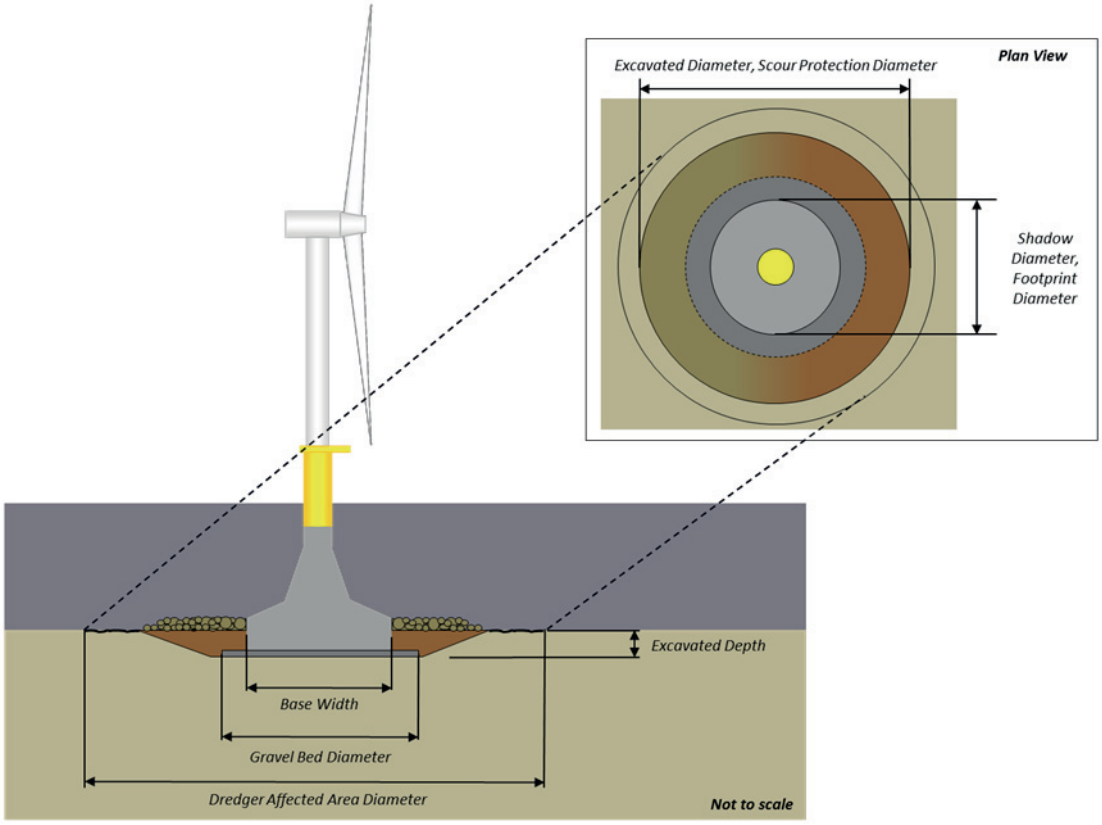


Table 4-3: Design Envelope Parameters (WTG Gravity Base Structures)

Design Parameter (for each structure)	Design Envelope (Revised Development Application – up to 72 WTGs)	Design Envelope (Original Development Application, ICOL, 2013 – up to 213 WTGs)
Top Width (m)	30*	20*
Base Diameter (m)	90	65
Excavated Diameter (m)	125	95
Scour Protection Diameter (m)	125	95

Design Parameter (for each structure)	Design Envelope (Revised Development Application – up to 72 WTGs)	Design Envelope (Original Development Application, ICOL, 2013 – up to 213 WTGs)
Dredger Affected Diameter (m)	140	125
Excavated Depth (m)	0 - 5**	0 - 5**
Shadow (m^2) - Total seabed area under each substructure including those exposed	6,361	3,318
Footprint (m^2)- Total seabed area under each substructure which is not exposed	6,361	3,318
Footprint including Scour Protection (m^2)	12,272	7,088
Dredger Affected Area Footprint (m^2) (includes scour protection and footprint)	15,400	12,272
Maximum Excavated Volume per unit (m^3)	60,000***	28,503***
Gravel Bed/Grout Diameter (m)	100	75
Gravel Bed/Grout Depth (m)	2.5	2.5

* Includes allowance for boat landings and laydown area.

** Depths of excavation may be greater than five metres if the sediment conditions dictate.

*** It is expected that the majority of foundation locations will not require this level of excavation and the extrapolated figure for the entire site will not equate to the maximum volume times the number of WTGs.

Approach to Installation

93. The foundations and substructures will be fabricated at an onshore location and then transported directly to the Development Area either by being towed, using a 'feeder' vessel or using the installation vessel itself.

94. The foundations and substructures can then be installed in various different sequences:

- Foundation and then substructure e.g. driven piles using a template and then jacket, or seabed preparation and then concrete gravity base;
- Substructure and then foundation e.g. jacket and then driven piles.; or
- Foundation and substructure combined: e.g. jacket + gravity base, jacket + suction piles or gravity base.

95. Following installation of the main structures additional items such as scour protection can be installed if required.

96. Where substructures have piled foundations, ICOL assumes there would be a maximum of two concurrent piling activities ongoing at any one time in the Development Area.

97. Some seabed preparation (e.g. boulder clearance and clearance of unexploded ordnance, in addition to preparation specific to the installation of GBS as described above) may be required prior to the installation of substructures and foundations.

Scour Protection

98. A level of structure exposure due to scour erosion can be allowed for in design, however, there are instances where this is not sufficient and preventative measures against scour are required. Scour protection is generally material which cannot be moved by the momentum of increased flow around the structure e.g. specifically selected gravel and rock. Concrete mattresses or similar techniques can also be used.

99. The indicative extent of scour protection required for each type of structure has been estimated with the currently available information and is presented in Tables 4-2 and Table 4-3 above.

4.4.3 Inter-Array Cables

100. A network of subsea cabling will be used to connect WTGs together and carry the power generated to the OSP(s) at a voltage of less than 132 kV. The cables will include three-core copper or aluminium electrical conductors, fibre optic communications cables, insulation and armouring.

101. The final layout and configuration of cabling will depend on a number of factors including WTG type, number and physical layout, but will be optimised to minimise costs and electrical losses. The cables will be configured in loops or branches and it is anticipated that there will be up to 190 km total length of inter-array cabling.

102. It is anticipated that inter-array cables will be buried to a typical depth of circa one m below the original seabed level. Where cables cannot be buried due to seabed conditions or other constraints, they will be mechanically protected using one of, or a combination of, rock placement, concrete mattresses, rock or grout bag placement, plastic ducting or metal shells. Anticipated inter-array parameters are provided in Table 4-4 below (and compared to those presented for the Original Development.

Table 4-4: Design Envelope Parameters (Inter-Array Cables as described below)

Design Parameter	Design Envelope (Revised Development Application)	Design Envelope (Original Development Application, ICOL, 2013)
Voltage (kV)	<132	66
Cable length (km)	190	353
Cable burial (% of cables buried)	90 - 100	90 - 100
Trench Width per cable (m)	1-3	1
Trench Affected Width per cable (m)	12-15*	6*
Trench Depth (m)	0 - 3	0 - 3
Typical Trench Depth (m)	1.2	1

* The area of the seabed that may experience some level of compaction or disturbance due to the footprint of the cable laying equipment. Exceptionally, where trench depth is much deeper (e.g. 3 m) to minimise snagging risk, the affected width may be up to 40 m.

Approach to Installation

103. Any of the following approaches may be applied when installing the subsea cables:

- **Lay then burial**: The cable is laid on the seabed or in a pre-cut trench and then buried in separate installation activities, sometimes using different vessels; or
- **Simultaneous lay and burial**: The cable is laid and buried simultaneously.

104. Cables may be ploughed or jetted into the seabed or laid into a pre-cut trench which is then backfilled. The following are typical tools:

- **Boulder clearance plough**: clears boulders from the cable route to enable other excavation and burial tools to be used;
- **Trenching plough**: cuts a V-shaped trench to allow subsequent cable lay;
- **Cable burial ploughs**: buries the cable by lifting a wedge of soil, placing the cable at the base of the trench and allowing the soil to naturally backfill behind the plough. Subsequent passes may be required with a backfill skid to move trenched material on top of the cable for full protection. Ploughs are generally towed or tracked vehicles; and
- **Jetting Trenchers**: buries the laid cable by directing water jets towards the seabed and cutting and/or liquidising the soil beneath the cable. Displaced material is suspended in the water and then resettles over the cable which settles into the soil slurry created by the water jets through self-weight. This process is controlled to ensure that sediment is not displaced too far from the cable. Jetting trenchers are commonly self-propelled or mounted as skids onto Remotely Operated Vehicles (ROV).

105. Some seabed preparation (e.g. boulder clearance and clearance of unexploded ordnance (UXO) and other seabed obstructions) may be required prior to the installation of subsea cabling.

4.5 Offshore Transmission Works

106. Offshore electrical transmission infrastructure is required to transfer the energy generated by the WTGs onshore to the wider electrical transmission system.

4.5.1 Offshore Substation Platforms (OSP)

107. The final design and number of OSP(s) required will be dependent on a number of factors, particularly the WTG power rating, number and layout. Initial design work suggests that up to two OSPs may be needed.

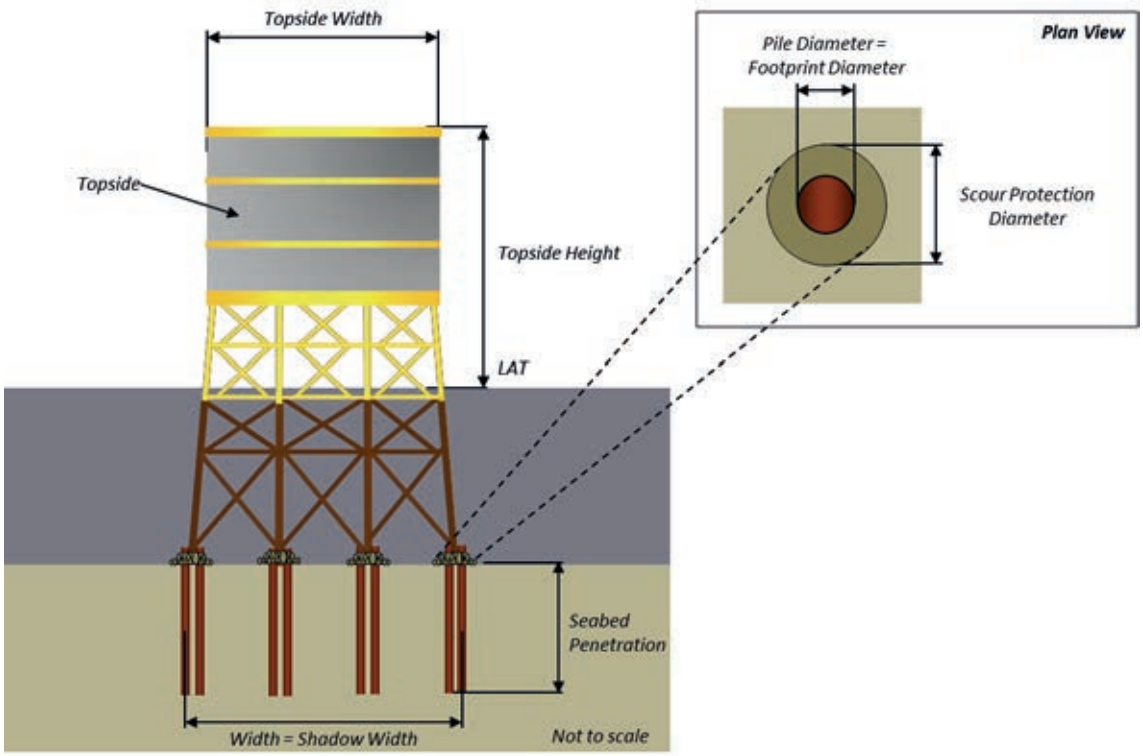
108. An OSP is a 'box-like' structure, often referred to as a 'topside', which is set above the sea level on a substructure fixed to the seabed by a foundation. The foundation and substructure options for OSPs are the same as the options outlined in Section 4.4.2 although they may be larger than those considered for the wind turbines.

109. The OSPs form the interface between the inter-array cabling and the offshore export cabling. They typically incorporate step-up transformers and associated equipment for the purpose of increasing the system voltage for transportation of power down the offshore export cable and to shore. An example of a typical OSP configuration is shown in Figure 4-6. OSPs will contain electrical and control systems including switch gear and transformers.

110. OSP colouring, lighting, marking and foghorn requirements will be as per current relevant standards and guidance.

111. Anticipated OSP parameters are provided in Tables 4-5 and 4-6 below and compared to those presented in the application for the Original Development.

Figure 4-6: Illustrative OSP Design



112. The Alternating Current (AC) OSPs collect the power generated by the WTGs and transform it to a higher voltage level to allow it to be transmitted to shore via Offshore Export Cables.

113. Up to two OSPs may be required and will be located within the Development Area. The optimal layout of OSPs will be determined by the WTGs and associated electrical distribution layout and transmission cable routing.

Table 4-5: Design Envelope Parameters (OSP on Jacket Substructure with Piled Foundations)

Design Parameter	Design Envelope (Revised Development Application)	Design Envelope (Original Development Application, ICOL, 2013)
Number of OSPs	**Up to 2**	**Up to 5**
Topside Height above LAT (m)	70	70
Topside Width and Length (m)	100*	100*
Drilling/Piling Events	16**	80
Pile Diameter (m)	3	3
Jacket Top Width and Length (m)	100	100
Jacket Base Width and Length (m)	100	100
Seabed penetration (m)	60	60
Scour Protection Diameter (m)/pile	16	16
Shadow (m^2) - Total seabed area under each substructure including those exposed	10,000	10,000
Footprint (m^2) - Maximum seabed area under each substructure which is not exposed.	500 ***	500 ***
Footprint including Scour protection at each substructure (m^2)	3,200	3,200
Drilled Volume at each Substructure (m^3)	6,785	6,785

* Includes allowance for boat landings and laydown area.

** Based on 8 piles per each of the two OSPs.

*** This is based on four 10 m x 12 m mud-mats to support the steel framed jacket structure before piling.

Table 4-6: Design Envelope Parameters (OSP on GBS Substructure)

Design Parameter*	Design Envelope (Revised Development Application)	Design Envelope (Original Development Application, ICOL, 2013)
Top Width (m)	100	100
Base Diameter (m)	130	130
Excavated Diameter (m)	260	260
Scour Protection Diameter (m)	180	180
Dredger Affected Diameter (m)	300	300
Excavated Depth (m)	0 – 5**	0 – 5**
Shadow (m2) - Total seabed area under each substructure including those exposed	13,273	13,273
Footprint (m2)- Total seabed area under each substructure which is not exposed	13,273	13,273
Footprint including Scour Protection Footprint (m2)	25,447	25,447
Dredger Affected Area Footprint (m2) (includes scour protection and footprint)	70,686	70,686
Maximum Excavated Volume per unit (m3)	114,012***	114,012***

* All stated quantities are per each GBS

** In isolated occasions depths of excavation may be greater than five metres if the sediment conditions dictate. For assessment these should be considered in a qualitative sense only due to the low frequency of their occurrence.

*** It is expected that they majority of foundations locations will not require this level of excavation and the extrapolated figure for the entire Development Area will not equate to the maximum volume times the number of OSPs.

Approach to Installation

114. The OSP topsides will be fabricated at an onshore location and then transported to the Development Area for installation on top of the substructure. The topsides would either be transported to site via barge and then installed with a Heavy Lift Vessel (HLV) or taken directly to their location and installed using a HLV. For larger OSP topsides a 'float over' concept may be used where the topside is lowered onto the substructure rather than lifted on. There is also the possibility of using self-installing OSPs to avoid the requirement for a HLV. Self-installing platforms use a similar principal to JUV to elevate the topsides above the water and would use foundation and substructure types described above.

4.5.2 OSP Interconnector Cables

115. If more than one OSP is installed, they may be interconnected by cabling. The maximum voltage for inter-platform cabling will not exceed the maximum AC export cabling voltage of 275 kV. As per the inter-array cabling, interconnector burial depths would be determined on the basis of a risk-based cable protection study, typically this is about one metre. Where it's is not reasonably practicable to bury deep enough to provide adequate protection the cables will be mechanically protected.

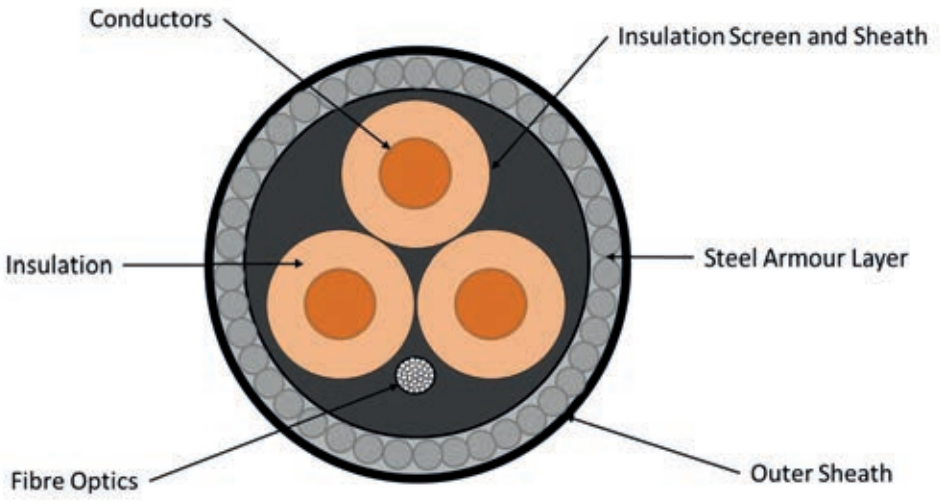
Approach to Installation

116. The approach to installation is as per that described above in Section 4.4.3 above.

4.5.3 Offshore Export Cables

117. Export cables will consist of up to two AC cables which will run from the OSPs to landfall. The type of cables used will depend on the final engineering design, technical specification and supplier. A typical cable cross sectional cable configuration is shown in Figure 4-7 below.

Figure 4-7: Illustrative Cable Cross Section



118. A typical high voltage alternating current (HVAC) cable will be around 250 mm in diameter and will comprise of three copper or aluminium conductor cores with polymer insulation and a fibre optic cable bundle. The cable will be insulated, sheathed and armoured. High voltage direct current (HVDC) cables will have a different electrical configuration but will be of a similar size and share similar design properties.

119. Where possible ICOL intends to bury the export cables, in separate trenches, typically to circa one metre below the seabed. Where cables cannot be buried due to seabed conditions or other constraints, they will be mechanically protected as per the inter-array and interconnector cables. Due to technical and practical constraints around access to cables and local conditions cable separation is generally four times the water depth with a minimum separation of 50 m.

120. Anticipated cable parameters are provided in Table 4-7 below and compared to those presented in the application for the Original Development.

Table 4-7: Design Envelope Parameters (Export Cables and Interconnector Cables)

Design Parameter	Design Envelope (Revised Development Application)	Design Envelope (Original Development Application, ICOL, 2013)
Voltage (kV)	Up to 275 (AC option)	320 (DC option) 275 (AC option)
Cable length (km)	83.3	83.3
Cable burial (% of cables buried)	80 - 100	80 - 100
Cable Lay rates (m/hr)	300 - 500	300 - 500
Number of Cables/Trenches	2	4 – 6
Trench width per cable (m)	1-3	1
Trench Affected Width per cable (m)	12-15*	6
Trench Depth (m)	0 - 3	0 - 3
Typical Trench Depth (m)	1.2	1

* The area of the seabed that may experience some level of compaction or disturbance due to the footprint of the cable laying equipment. Exceptionally, where trench depth is much deeper (e.g. three metres) to minimise snagging risk, the affected width may be up to 40 m.

Approach to Installation

121. The approach to installation is as per that described above in Section 4.5.3. However, in addition to the installation options previously described for the inter-array cables, the following additional installation methods may be used to install the Offshore Export Cables where ground conditions require and where the cables approach landfall:

- **Mechanical Rock Wheel Cutters**: Fitted to cable burial vehicles and used to cut narrow trenches into areas of hard or rocky seabed.
- **Horizontal Direction Drilling (HDD) techniques**: Used to install the cable beneath the shoreline. Involves drilling a duct from the landward side of the landfall to a point below low tide where marine equipment can operate. Cables are pulled through the duct during cable installation.
- **Open-cut trenching**: Consists of excavating a trench across the shoreline at the landfall location and below low tide level to a point where marine equipment can operate. On the shore and in shallow water a backhoe dredger may be used to create a trench; in deeper water, specialist dredging/trenching equipment may be used.

4.5.4 Landfall Infrastructure

122. The landfall is the point at which the subsea cables are physically brought ashore. The export cables will reach landfall in the vicinity of Cockenzie in East Lothian and connect to the National Grid at the Cockenzie substation.

4.5.5 Onshore Transmission Works

123. The OnTW will be permitted through an onshore planning permission. For the purposes of describing the Revised Project as a whole, a summary description of the OnTW is provided here.

124. Underground cables will transmit the energy generated by the WTGs from the landfall location to an onshore substation. The onshore substation will collect the power transmitted from the offshore and onshore export cables and adapt it to the required conditions for export to the National Grid Network.

125. The existing ICOL grid connection offer is to connect at Cockenzie.

4.6 Construction

126. Construction of the Revised Development is anticipated to commence between 2020 and 2021. An indicative programme is provided below under Section 4.6.

127. The design of the Revised Development is yet to be finalised. Once decisions have been made about the nature of the foundations and substructures to be installed, and the ports and vessels to be used in construction, a more detailed description of construction methods will be prepared. However, for the purpose of this Scoping Report, it can be assumed that the principal stages of manufacturing and transporting the various components to the Development Area and Revised Offshore Export Cable Corridor are likely to be as follows:

- Manufacture of components (including foundations, substructures and WTGs);
- Transport of components to the area;
- Storage and assembly of components as required at port location(s);
- Marine transportation of components to site for installation; and
- Moving construction vessels to the installation site.

128. It can be assumed that the key stages associated with the installation of the Revised Development are likely to be as follows:

- Pre-construction site investigation surveys;
- Unexploded ordnance survey and clearance;
- Foundation and substructure installation and associated site preparation (and spoil disposal where necessary);
- Inter-array cabling installation and associated site preparation; and
- Installation of WTGs.

129. Works associated with the OfTW are likely to include:

- Installation of OSP(s); and
- Offshore Export Cable installation and associated site preparation.

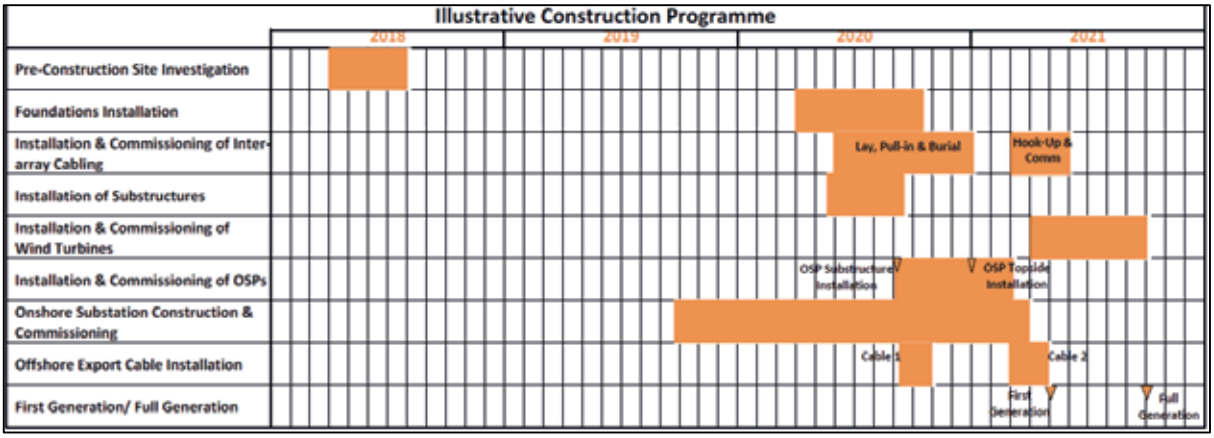
4.7 Anticipated Programme

130. A detailed construction programme will be developed as design and procurement activities progress. The construction activities are expected to commence between 2020 and 2021 and work will occur over approximately two years. Activities may not be continuous and the sequence of activities may change. Engineering and procurement activities will precede the construction phase. The main construction activities and their anticipated durations are outlined in Table 4-8 below. An illustrative activity bar chart is shown in Figure 4-8 below.

Table 4-8: Main Construction Activities and Anticipated Durations

Main Construction Activity	Anticipated Duration
Pre-construction surveys	6 months
Foundation installation and associated site preparation	6 months
Inter-array cable installation	1 year
Installation of substructures	6 months
Installation and commissioning of wind turbines	6 months
Installation and commissioning of OSPs	6 months
Export cable installation (excluding intertidal)	9 months
Intertidal cable installation	6 months

Figure 4-8: Illustrative Construction Programme



131. The nature of offshore work requires operations to be planned on a 24 hour, seven days a week basis; however work will not be continuous over the whole construction programme. All of the above durations are subject to change which may arise, for example, from weather, site conditions, equipment lead times and supply programmes, sequential work requirements, and logistical issues.

4.8 Operation & Maintenance and Decommissioning

132. It is likely that the Revised Inch Cape Wind Farm will be managed, operated and maintained from an onshore facility for the duration of its anticipated lifetime. Onshore activities may be combined in one or more locations and will include the following:

- Control room for remote operation of the Wind Farm;
- Port facilities where vessels, maintenance equipment, spares and consumables are stored;
- Onshore operations base for management of work and personnel; and
- Helicopter hangar and base (if required).

133. Operation and maintenance (O&M) activities may be required at any time, 24 hours per day and 365 days per year.

134. The majority of control activities will be undertaken remotely from shore using a control centre, however offshore access and intervention will be required to maintain and potentially repair or refit plant and equipment. Maintenance can be generally separated into three categories:

- **Planned maintenance**: This includes general inspection and testing, recertification and cleaning of equipment, investigation of faults and minor fault rectification, as well as replacement of consumables. It is anticipated that these events will be undertaken out-with winter months as the weather is likely to be more favourable, offering an increased maintenance window. Scheduled maintenance and inspection of each wind turbine is likely to occur every six to twelve months depending on individual turbine operations. Inspections of support structures and subsea cables will be performed on a periodic basis.
- **Unplanned maintenance**: This applies to defects occurring that require rectification out-with the planned maintenance periods. The scope of such maintenance would range from small defects on non-critical systems to failure or breakdown of main components potentially requiring them to be repaired or replaced.
- **Periodic overhauls**: These will be carried out in accordance with equipment manufacturer's warranty and specifications. These are likely to be planned for execution in periods of the year with the best access conditions.

135. In time, a Decommissioning Programme will be prepared for the Revised Development, and will be subject to approval from the Scottish Ministers following the requirements of the Energy Act 2004 (see Section 3.2.7).

136. For the purpose of this Scoping Report the following has been assumed for decommissioning:

- It is assumed that the duration of the works associated with the removal of the major components are similar to those outlined for installation.
- It is assumed that the vessel types, number of vessels, and number of vessel movements required for the removal of the major components are similar to those outlined for construction.

5 EIA Methodology

5.1 Introduction

137. This section presents an outline of the methodology to be employed for the Revised Development EIA. It outlines the methodology for the identification and evaluation of potential likely significant environmental effects and, also presents the methodology for the identification and evaluation of potential cumulative and inter-related impacts.

5.2 Regulations and Guidance

138. The impact assessment methodology draws upon a number of EIA principles, regulations and guidance documents, including:

- Relevant EIA regulations (see Section 3.2.5);
- Assessment of the environmental impact of offshore wind-farms (OSPAR Commission, 2008);
- Relevant guidance issued by other government and non-governmental organisations (e.g. licensing and EIA guidance published by MS-LOT and SNH); and
- Receptor specific guidance documents (e.g. Ecological Impact Assessment [EcIA] guidance issued by the Chartered Institute of Ecology and Environmental Management [CIEEM]).

139. It will also give due regard to the requirements of The Conservation (Natural Habitats &c.) Regulations 1994 (the Habitats Regulations) and the Marine (Scotland) Act 2010.

5.3 Application of the Design Envelope

140. The Revised Development EIA will utilise the Design Envelope approach, also known as the 'Rochdale Envelope' approach. This approach, described in Section 4: Description of Development, allows for a project to be assessed on the basis of project design parameters that are not specific at the time of writing, but are indicated with a range of potential values.

141. It is not possible to provide precise final details of the Revised Development, or the way it will be built, a number of years ahead of the time it will be constructed. In the offshore wind sector, improvements in technology and construction methodologies occur frequently and information provided as part of the consent application could become rapidly outdated, resulting in an uneconomical and potentially unbuildable project.

142. Under the Design Envelope approach, for each impact assessment the worst case scenario from within the range of potential options for each development parameter will be identified, and the assessment will be undertaken on this basis. This approach is consistent with that taken in the Original Development EIA.

143. Section 4 sets out the Revised Development Design Envelope parameters and identifies the range of potential project design values for all relevant components of the Revised Development. Each of the impacts for the Revised Development EIA will be assessed against the Design Envelope which would give rise to the greatest potential impact. For example, if several turbine types remain possible, then the assessment will be based on the turbine type known to have the greatest impact. This may be the turbine type with the largest footprint, the greatest tip height or the largest area of seabed required during construction, depending upon the topic under consideration. If, after undertaking the impact assessment it is shown that no significant effect is anticipated, it can be assumed that any project parameters equal to or less than those assessed in this Design Envelope will have environmental effects of the same level or less and will therefore also have no significant effect upon the receptors for the topic under consideration.

144. By employing the Design Envelope approach, ICOL seeks to retain a reasonable level of flexibility in design of the Revised Development within certain maximum extents and ranges, all of which will be fully assessed in the Revised Development ES.

145. It is ICOL's intention to refine the Design Envelope throughout the EIA process as further technical, environmental and design information becomes available.

5.4 Reference to the Original Development EIA

146. Reflecting the approach set out in Section 2, it is intended that the Revised Development EIA will be a standalone document which may reproduce information presented in the Original Development ES where appropriate. Such an approach recognises the wealth of environmental data previously gathered by ICOL and a well-developed understanding of environmental conditions within and around the project location. The baseline data gathered and technical studies undertaken to inform the Original Development EIA, unless otherwise set out in this Scoping Report, will form the basis for conducting the Revised Development EIA.

5.5 Characterisation of the Existing Environment

147. The characterisation (description) of the existing environment will be undertaken in order to determine the baseline conditions. This will involve the following steps:

- Study areas defined for each receptor based on the relevant characteristics of the receptor (e.g. mobility/range);
- Review available information;
- Review likely or potential impacts that might be expected to arise from the Revised Development;

- Determine if there is sufficient data to make the EIA judgements with sufficient confidence;
- If further data is required, ensure data gathered is targeted and directed at answering the key question and filling key data gaps; and
- Review information gathered to ensure the environment can be sufficiently characterised in sufficient detail.

148. ICOL has collated a significant amount of existing data from a number of sources to inform the EIA and HRA for the Original Development. The specific approach to establishing a robust baseline (upon which impacts can be assessed) is set out under each topic within this Scoping Report (Sections 7 to 9).

5.6 Assessment of Potential Effects

149. The approach the EIA team will take to making balanced assessments will be guided by both EIA specialists and technical specialists using available data, new data (where required), experience and expert judgement. In order to provide a consistent framework and system of common tools and terms, where appropriate, a matrix approach will be used to frame and present the judgements made. However, it should be noted that for each topic of the EIA the latest guidance or best practice will be used and therefore definitions of sensitivity and magnitude of impact will be tailored to each receptor. The impact assessment will consider the potential for impacts during the construction, operation and decommissioning of the Revised Development.

5.6.1 Identification of Potential Effects

150. This Scoping Report sets out the potential environmental effects and identifies, by reference to the Original Development EIA, those that are proposed to be scoped in or scoped out of the EIA process (see also Section 2 of this report); the final list of issues to be considered in the EIA process for the Revised Development will be confirmed following receipt of the Scoping Opinion and through further discussions with relevant stakeholders and MS-LOT.

5.6.2 Defining Magnitude and Sensitivity

151. The EIA for those potential effects scoped in will describe the level of significance of the adverse and positive effects arising from the Revised Development using a standard EIA methodology, consistent with that applied during the Original Development EIA. The assessment process will consider the potential magnitude of the change to the baseline conditions arising from the Revised Development and the sensitivity of the particular receptor under consideration.[7]

152. Categorisation of magnitude of impact will vary for specific receptors/technical assessments but will broadly follow the principles set out in Table 5-1 below in so far as it is relevant.

Table 5-1: Magnitude of Impact

High	Total loss or major alteration to key elements/features of the baseline conditions
Moderate	Partial loss or alteration to one or more key elements/features of the baseline conditions
Low	Minor shift away from the baseline conditions
Negligible	Very slight change from baseline conditions

153. In the case of assessing sensitivity, the specific scale of sensitivity is dependent on the discipline but in general it may be defined in terms of quality, value, rarity or importance of the receptor being assessed. The ability of a receptor to adapt to change, tolerate, and/or recover from potential impacts will be key in assessing its sensitivity to the impact under consideration.

154. The scale of sensitivity will be classed as 'Low', 'Moderate' or 'High'. In carrying out individual assessments, a more specific scale of increasing sensitivity will be defined where this is appropriate. Guidance will also be taken from the value attributed to elements through designation or protection under law.

155. Expert judgement is particularly important when determining the sensitivity of receptors. For instance, an Annex II species (under the Habitats Directive) would have a high value, but if it was highly tolerant of an impact or had high recoverability it would follow that the sensitivity in this instance should reflect the ecology rather than default to protected status taking precedence.

[7] Note that for certain topics an alternative approach to assessment may be applied where this is consistent with relevant guidance or best practice; where this is the case the approach will be described in the Revised Development ES.

5.6.3 Evaluation of Significance

156. The consideration of magnitude of potential impact and sensitivity of the receptor will determine an expression, which may be quantitative or qualitative and often informed by expert judgement, for the significance of the residual positive and negative effects. Table 5-2 sets out how the interaction between magnitude (which is related to the extent of the physical change, its spatial extent, duration and frequency) and the value of the resource or the number and sensitivity of the receptor are combined to provide a judgment of significance.

Table 5-2: Significance of Effect

Magnitude of Impact	Sensitivity of Resource/Receptor		
	Low	Moderate	High
Negligible	Negligible/Minor	Minor	Minor/Moderate
Low	Minor	Minor/Moderate	Moderate
Moderate	Minor/Moderate	Moderate	Moderate/Major
High	Moderate	Moderate/Major	Major

157. For the purposes of this assessment those residual positive and adverse effects indicated as Major and Moderate/Major are considered significant.

158. A description of the approach to impact assessment and the interpretation of significance levels will be provided within each section of the ES. This approach will ensure that the definition of impacts is transparent and relevant to each topic under consideration.

5.6.4 Mitigation

159. Where impact assessment identifies that an aspect of the Revised Development is likely to give rise to significant environmental effects, mitigation measures, above and beyond any embedded mitigation incorporated into the assessment process, will be considered to avoid effects or reduce them to acceptable levels where possible.

160. For the purposes of the EIA, two types of mitigation have been defined and these will be identified in the ES:

- Embedded mitigation, consisting of mitigation measures that are identified and adopted as part of the evolution of the project design or measures otherwise incorporated as controls on the construction or operation of the project (see also

Section 2.2.2), will be included as considerations in assessing significance during the EIA process; and

- Additional mitigation, consisting of mitigation measures that are identified as a result of the EIA process to reduce or eliminate any effects that are predicted to be significant, which are subsequently adopted as project commitments.

5.6.5 Assessing Residual Effects

161. Following the identification of any necessary additional mitigation measures, impacts will be re-assessed and all residual significance will be described. Where significant impacts remain and no mitigation measure is proposed, a discussion will explain why the significance cannot be reduced.

5.7 Cumulative Impact Assessment

162. As well as the Revised Development EIA, a separate consideration of the Revised Development with other relevant projects is also required under EIA law. Therefore, each technical chapter of the EIA will include a cumulative assessment which will consider the impacts arising from the Revised Development alone and cumulatively with other relevant plans, projects and activities.

163. European Commission (EC) Guidelines for the Assessment of Indirect and Cumulative Impacts as well as Impact Interactions (1999) provide a definition of cumulative and in combination effects which has been used in this document.

"Cumulative impacts are impacts that result from incremental changes caused by other past, present or reasonably foreseeable actions together with the project".

164. A list of plans, projects and activities that may act cumulatively with the Revised Development has been developed for the purposes of this scoping exercise. This list will be re-affirmed during consultation with MS-LOT and key stakeholders prior to EIA commencing. Unless otherwise requested by stakeholders, this the approach will provide for the consideration of cumulative effects arising from the various proposed offshore wind farms in the Forth and Tay region, and as applied in the Original Development EIA.

165. The list of plans, projects and activities considered in this Scoping Report (and specifically in topic Sections 7 to 9) has been updated from that presented in the Original Development ES, and is set out below. Each topic section within this Scoping Report will confirm which of the following plans, projects and activities have been considered in the scoping of cumulative effects.

166. Note that, in relation to other proposed or consented offshore wind farm projects, the most up to date publicly available information will be applied in relation to the relevant project parameters to be applied in completing the CIA (e.g. turbine numbers, turbine tip heights

etc.). However, developers will also be contacted to enquire as to whether any more recent information on project parameters is available and can be used in this CIA.

5.7.1 ICOL Firth of Forth and Tay Offshore Wind Farms

Neart na Gaoithe (as described in the decision notice of Scottish Ministers dated 10th October 2014, and Section 36 consent variation notice dated 21st March 2016, and plans referred to therein)

167. A project consisting of up to 75 wind turbines, with a total capacity of up to 450 MW. The project, being developed by Neart na Gaoithe Offshore Wind Limited (NnGOWL) and previously consented, is currently on hold pending the outcome of the ongoing JR process. Latest project details can be accessed at: http://www.gov.scot/Topics/marine/Licensing/marine/scoping/Mainstream-NeartnaGaoithe.

Seagreen Alpha and Bravo (as described in the decision notices of Scottish Ministers dated 10th October 2014 and plans referred to therein)

168. Two offshore wind farms, being developed by Seagreen Wind Energy Limited (SWEL), each consisting of up to 75 wind turbines and generating up to 525 MW. Previously consented, but the project currently on hold pending the outcome of the ongoing JR process. Project details can be accessed at: http://www.seagreenwindenergy.com/.

5.7.2 Other Offshore Wind Farms

Aberdeen Offshore Wind Farm (as-built parameters to be considered)

169. The consented project will consist of up to 11 wind turbines, generating up to 8.4 MW each, located immediately off Aberdeen. It is being developed by Aberdeen Offshore Wind Farm Limited (AOWFL) and construction will take place and be complete during 2018. Project details can be found at: https://corporate.vattenfall.co.uk/projects/wind-energy-projects/european-offshore-wind-deployment-centre/.

Hywind Demo (as-built parameters to be considered)

170. Statoil plan to build the first floating (moored floating spar type structure) wind farm off the Scottish coast. The consented project will be located near Buchan Deep, approx. 25-30 km off the coast of Peterhead in Aberdeenshire. It will consist of five wind turbines and is intended to be a 30 MW pilot project. Latest project details can be found at: http://www.statoil.com/en/TechnologyInnovation/NewEnergy/RenewablePowerProduction/Offshore/HywindScotland/Pages/default.aspx?redirectShortUrl=http%3a%2f%2fwww.statoil.com%2fHywindScotland.

Blyth Offshore (as-consented parameters to be considered)

171. Located off the coast of Northumberland, the consented project will consist of up to 15 turbines. Construction of outer array of five turbines will commence in 2017 and project details can be found at: http://www.edf-er.com/OurProjects/Proposed/BlythOffshore/ProjectOverview.aspx.

Beatrice Offshore Wind Farm (consent plan parameters to be considered)

172. The Beatrice Offshore Wind Farm, to be developed by Beatrice Offshore Wind Limited (BOWL), will consist of up to 84 wind turbines, two OSPs and generate no less than 588 MW. The project, in the Moray Firth, will enter construction in 2017 and will be fully commissioned and operational in early 2019. Latest project details can be found at: http://www.gov.scot/Topics/marine/Licensing/marine/scoping/Beatrice.

Telford, Stevenson and MacColl Offshore Wind Farms (as-consented parameters to be considered)

173. Three adjacent consented projects, developed by Moray Offshore Renewables Limited (MORL), in the Moray Firth. The projects will have a total capacity of up to 1,116 MW and will consist of up to 186 turbines. The projects are yet to enter construction and accurate project timelines are not currently known. Project details can be accessed at: http://www.morayoffshorerenewables.com/Home.aspx.

MORL Western Development Area

174. Proposed by MORL, and at the scoping stage, the project will consist of up to 90 wind turbines with a total capacity of up to 750 MW located in the Moray Firth. Project details are available at: http://www.gov.scot/Topics/marine/Licensing/marine/scoping/MORLWest.

Kincardine Floating Offshore Windfarm (parameters as-consented parameters to be considered)

175. A pilot-scale offshore wind farm project utilizing floating foundation technology. Proposed by Kincardine Offshore Wind Limited (KOWL), the project is located south-east of Aberdeen approximately 15 km from the coastline. The project is yet to enter construction. Project details can be found at: http://www.gov.scot/Topics/marine/Licensing/marine/scoping/Kincardine.

Beatrice Wind Farm Demonstrator Project

176. Two 5 MW wind turbines in the Moray Firth, operational since 2007.

Forthwind Wind Farm Demonstrator Project - Phase 1

177. Consented in December 2016, a two turbine project located 1.5 km offshore of Methil in the Firth of Forth with a capacity of up to 18 MW. Project details can be found at: http://www.gov.scot/Topics/marine/Licensing/marine/scoping/FW-Methil/s36consent.

Forthwind Wind Farm Demonstrator Project – Phase 2

178. Proposed by Forthwind, and at the scoping stage, the project will consist of up to nine wind turbines with a total capacity of up to 65 MW located in the Firth of Forth. Project details are available at: www.gov.scot/Topics/marine/Licensing/marine/scoping/fowda.

Dogger Bank Creyke Beck A & B

179. Consented in February 2015 by the Secretary of State, the Dogger Bank Creyke Beck projects are located in the central North Sea (131 km from the nearest coastline) and with a consented project capacity of up to 2.4 GW. Further details on the consents are available from: https://infrastructure.planninginspectorate.gov.uk/projects/yorkshire-and-the-humber/dogger-bank-creyke-beck/.

Dogger Bank Teesside A & B

180. Located adjacent to the Creyke Beck projects, the Teesside A and B projects were consented by the Secretary of State in August 2015 with a capacity of up to 2.4 GW. Further details on the consents are available from: https://infrastructure.planninginspectorate.gov.uk/projects/yorkshire-and-the-humber/dogger-bank-teesside-ab/.

Rampion Round 3 Offshore Wind Farm

181. E.ON Climate and Renewables UK Ltd. are currently constructing this offshore wind farm, under joint ownership with Enbridge and the UK Green Investment Bank. The project is located in South East England, off the coast of in the English Channel and comprises 116 WTGs with a capacity of 400 MW. The first turbine was installed in March 2017.

5.7.3 Onshore Wind Farms

182. Table 5-3 sets out the list of onshore wind farm projects that will be considered in the CIA.

Table 5-3: Onshore Wind Farm Projects

Wind Farm Name	Status	Wind Farm Name	Status
Ark Hill	Operational	Lingo Farm	Application
Bonerbo	Operational	Meikle Carewe	Operational
Brownieleys	Consented	Michelin Tyre Co Ltd	Operational
Clochnahill	Operational	Mid Hill I	Operational
Droop Hill	Operational	Mid Hill II	Operational
Dundee Port	Scoping	Muir of Pert	Scoping
Dusty Drum	Application	Nether Kelly	Scoping
East Memus	Operational	Paul Mathew Hill	Consented
East Skichen	Application	Scotston Hill	Operational
Easter Tulloch	Operational	South Cassingray	Application
Fasque and Glendye	Scoping	St John's Hill	Operational
Finavon Hill Estate	Consented	St Mary's Well	Scoping
Frawney	Application	Tealing	Operational
Govals	Consented	Troywood	Application
Greenhillock Farm	Operational	Tullo	Operational
Henderston Farm	Consented	Tullo North Extension	Operational
Herscha Extension	Consented	Tullo South Extension	Operational
Herscha Hill	Application	Whitefield of Dun	Consented
Hill of Auquhirie	Operational	White Top	Operational
Kenly	Consented		

5.7.4 Other Coastal Projects

183. Details of other coastal development projects, to be considered where relevant in the assessment of cumulative effects, are listed in Table 5-4:

Table 5-4: Other Coastal Development Projects

Project	Project Details
Forth Replacement Crossing	New bridge spanning the Firth of Forth, due for completion May 2017. Details at: http://www.transport.gov.scot/project/forth-replacement-crossing
Rosyth International Container Terminal Project	Proposed new container terminal in the Firth of Forth. Consenting ongoing. Details at: http://www.gov.scot/Topics/marine/Licensing/marine/scoping/RosythICT
Port of Dundee Expansion	Planned development of new quayside in the Firth of Tay. Details at: http://www.gov.scot/Topics/marine/Licensing/marine/scoping/portofdundee
Edinburgh Harbour Master Plan	Ongoing development of Edinburgh's waterfront, including development of berthing and marina facilities. Details of latest plans at: https://www.edinburgh.gov.uk/directory_record/416115/granton_waterfront_development
Aberdeen Harbour re Development (Nigg Bay Development)	Development of a new extension to Aberdeen Harbour into Nigg Bay. Details at: http://www.aberdeen-harbour.co.uk/future/nigg-bay-development/project-progress/

5.7.5 Other Onshore Projects

184. No other onshore projects have been identified as requiring consideration during the Scoping exercise, however this position will be reviewed during the Revised Development ES.

5.8 Inter-related Effects

185. The Revised Development EIA will consider the inter-relationships between the aspects of the environment that are likely to be affected by the construction, operation and decommissioning of the Revised Development. To serve as an example, the separate impacts of noise and habitat loss may in combination have an effect upon a single receptor, such as marine mammals. Such consideration of inter-related effects will also include cumulative impacts.

Transboundary effects relate to impacts that may arise from an activity within one country that have effects upon the environment of another country. Given the location of the Revised Development and the likely key receptors, potential transboundary effects are considered unlikely and it is the intention not to consider them within the Revised Development EIA.

6 HRA Methodology

6.1 Approach to Undertaking the HRA

186. The HRA process is outlined in Section 3.2.6 above. This Scoping Report presents the outcomes of a screening process, whereby Natura 2000 sites to be considered in HRA have been identified and appropriate methods for assessing effects on sites are proposed (see Appendix B). On the basis of the information presented within this document, ICOL is seeking to agree with the Scottish Government and their statutory advisors the scope of the report that ICOL will provide alongside their ES to inform any Appropriate Assessment undertaken by the competent authority (an 'HRA Report').

187. ICOL's approach to both the HRA screening exercise and preparation of a HRA Report is described below.

6.2 HRA Screening

188. In support of HRA screening, this Scoping Report provides the following:

- a description of the Revised Development, timings and methods of work;
- details of the methodology used to determine which European sites should be included within the assessment;
- descriptions of the Natura 2000 site(s) potentially affected, including a description of all qualifying features; and
- an appraisal of the potential effects resulting from the construction and operation of the Revised Development (e.g. noise) and the likely significant effect on the Natura 2000 site(s) and qualifying features (e.g. disturbance to bird species).

189. The screening exercise has sought to determine the potential for Likely Significant Effect (LSE) on Natura 2000 sites with respect to the Revised Development alone and in-combination, taking account of any site design modification proposed. The screening report has considered proposed but not yet designated Natura 2000 sites.

190. The screening exercise has taken the following into account:

- Natura 2000 citations and current status;
- Site specific information obtained from project ecological surveys;
- Advice from MS-LOT, Marine Scotland Science (MSS) and SNH in relation to the HRA for the Original Development; and
- Experience and lessons learnt from other UK offshore wind farm development projects.

6.3 HRA Report

191. Where it is not possible to exclude the potential for LSE, those Natura 2000 sites and features will require to be subject to further assessment in the form of an HRA Report, which will be submitted to MS-LOT alongside the Revised Development consent application and ES.

192. The undertaking of an HRA Report entails the consideration of the impacts of a project, alone and in-combination with other plans and projects, on the integrity of a European site, with regard to the site's structure and function and its conservation objectives.

193. The integrity of a site is defined as the coherence of the site's ecological structure and function, across the whole of its area, which enables it to sustain the habitat, complex of habitats and/or populations of species for which the site has been designated (EC, 2001). An adverse effect on integrity is likely to be one which prevents the site from making the same contribution to favourable conservation status as it did at the time of designation.

194. The HRA Report will document the assessment process undertaken for the Revised Development for the purposes of the Habitats Regulations, and will provide the information necessary to allow MS-LOT to determine whether there will be an adverse effect on the integrity of Natura 2000 sites, as a result of the Revised Development.

195. The HRA Report will be based on the realistic worst case scenario for each topic area (e.g. ornithological features of SPAs, Annex I habitat features, etc.).

196. The assessment of effects on the screened in sites and features will draw on the data and assessments set out in the EIA, including the consideration of in-combination effects.

197. It proposed that the HRA Report includes the following:

- Project overview describing key components of the Revised Development;
- Summary of screening exercise (Stage 1 of the HRA process; as described above and presented in this Scoping Report); and
- Information to inform the Appropriate Assessment (Stage 2 of the HRA process), including:
    - Summary of potential impacts of the Revised Development on relevant features and worst case scenarios used for assessment;
    - Description of the approach taken for in-combination assessment;
    - Review of baseline information on the distribution and ecology of relevant features and Natura 2000 sites requiring assessment;
    - Assessment of effect on the integrity of European sites for the Revised Development alone and in-combination.

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198. A systematic assessment will be undertaken for all sites and their features for which a LSE has been identified to determine whether there is any evidence of an Adverse Effect on the Integrity of those sites. Where such an effect cannot be discounted, suitable modification to site design will be identified to reduce impacts to acceptable levels.

199. The HRA Report will take into account all phases of the development – construction, operation and maintenance and decommissioning.

7 Physical Environment

7.1 Metocean and Coastal Processes

7.1.1 Introduction

200. As described in Section 5, the purpose of this section is to provide sufficient detail on the potential effects on metocean and coastal processes resulting from the construction, operation and maintenance and decommissioning of the Revised Development.

201. The detail provided will allow MS-LOT and their consultees to be clear about what they consider the significant effects of the proposal are likely to be and, therefore, whether they need to be subject to an EIA and be included within the ES.

202. In order to provide sufficient information to consultees reference is made to the baseline data gathered to inform the Original Development EIA, and to the outcomes of the impact assessment presented in the Original Development ES. Design, construction and operational changes between the Original Development and the Revised Development that are likely to have further impacts to metocean and coastal processes are also considered to inform any subsequent impact assessments.

203. For a full description of the design envelope parameters and changes please refer to Section 4. The Development Area for both the Original and Revised remains unchanged and can be seen in Figure 4-1.

204. This section concludes that the likely impacts on Metocean and Coastal Process from the Revised Development will be less than those assessed for the Original Development and therefore, in line with the EIA regulations are not required to be included with the Revised Development ES. This is due to the following;

- Changes in the Revised Design Envelope (see Section 4);
- Baseline data remaining valid;
- No material changes to data collection;
- No material changes to assessment best practise; and
- Not significant effects concluded within the Original Development EIA.

Full details and justification are provided within this section.

7.1.2 Data Sources and Baseline Environment

205. This section identifies the baseline data sources that can be used to characterize the metocean and coastal processes within and around the Revised Development, drawing predominantly on the data sources used to inform the Original Development EIA. Commentary is provided on the sufficiency of this data as a basis for scoping the Revised Development EIA.

Baseline Data

206. A variety of datasets describing the physical environment were collated and analysed to inform the Original Development EIA. Data was drawn from Development-specific surveys and studies commissioned by ICOL. Those datasets considered to be relevant to the Revised Development are listed in Table 7-1 below. The data sources are more fully described in the Inch Cape Offshore Wind Farm ES Chapter 10 (ICOL, 2013) and supporting technical studies.

Table 7-1: Baseline Data Sources from the Original Development EIA

Dataset	Coverage	Data use	Date
ICOL-commissioned site specific surveys and studies			
Metocean survey	Inchcape / Neart Na Gaoithe wind farm array areas	Four Acoustic Doppler Current Profiler moorings situated across the FTOWDG area (with one in the Development Area) measuring current velocity and elevations. Four moored wave buoys situated across the FTOWDG area (with one in the Development Area) recording; wave heights, periods and directions. One meteorological buoy moored at Neart na Gaoithe to measure near-bed currents turbulence and Total Suspended Solids. Limited suspended sediment concentration data at Neart na Gaoithe (six samples at each of three depths in the water column); and Particle Size Distribution (PSD) data obtained from a sediment trap deployed at Neart na Gaoithe.	2008 - 2010
Geophysical surveys	Inchcape Wind Farm Array and Offshore Export Cable Corridor	Providing information on seabed bathymetry, seabed features, and sediment distribution from Multi Beam Echo Sounder (provided two metres resolution bathymetry data); Single Beam Echo Sounder; Side Scan Sonar; and Sub-Bottom Profiler	2011 - 2012
Geotechnical survey	Inchcape Wind Farm Array	Providing details of the vertical sediment profile: Three boreholes near the proposed met mast location; and nine additional boreholes drilled to give wider spatial coverage of the Development Area.	2011 - 2012
Benthic surveys	Inchcape Wind Farm Array and Export Cable Route Corridor	119 grab samples of surface sediment analysed to obtain PSD information; and limited Suspended Sediment Concentration data (14 samples at various locations and depths in the water column).	2012
Hydrodynamic surveys / modelling	Inchcape Wind Farm Array and Export Cable Route Corridor	Studying changes to: Hydrodynamics (water levels and current flows) looking at both Near-Field (NF) and Far-Field (FF) – modelling changes in water level, current speeds and direction	2012 - 2013

Dataset	Coverage	Data use	Date
		around structures (NF); changes to wave climate, looking at wave height, direction and period across the development area; Sediment regime, looking at site specific sediment grain size data, and determining the locations and frequency of occurrence of sediment mobilisation (based on bed shear stress and sediment data); potential development of scour pits around structures and the subsequent fate of scoured material released to the water column. Modelled changes in equilibrium scour depth, scour pit dimensions, temporal evolution, volume of sediment displaced, and deposited sediment thickness and extent as a result of acceleration flow around jacket leg structures; The fate of dredged material from GBS preparations, looking at the dispersion and settling of discharged material due to dredging and modelling SSC and deposited sediment thickness and extent; and The dispersion and settling of disturbed sediment due to cable burial. An estimate of disturbed material volumes, the thickness of the deposited sediment and its extent was modelled.	

Data Validity

207. The data previously collected as part of the Original Development EIA is considered sufficient to meet the requirements needed to effectively characterise the current baseline conditions for the Revised Development. The following sections consider the sufficiency of the available data in relation to spatial coverage and age.

Data Coverage

208. As identified in Table 7-1, ICOL-commissioned site specific surveys were collected within and surrounding the Revised Development. The location and extent of the Original Development EIA covers the seabed area required for the Revised Development. Therefore it is considered that the spatial coverage remains valid and sufficient for the Revised Development.

Age of the Data

209. As described above and detailed within Table 7-1, site specific survey data for the Original Development EIA were collected predominantly between the years 2010 to 2012 (with some metocean data collected during the period 2008-2010) but was also used by comparison to broader scale, contextual data from a variety of sources.

210. It is considered unlikely that any significant alteration to the metocean and coastal processes in the survey area would have taken place since the time of surveying other than potentially minor changes to the location and extent of seabed features such as sandwaves or ripples. This is due to the relative stable physical environment, with little bedform transport in this short space of time. Therefore, it is concluded that the data remains adequate to provide a basis for the assessment of potential impacts on the physical environment and in respect of this scoping process.

Review of Baseline Characteristics

211. Chapter 10 of the Original Development ES presents the baseline characteristics of metocean and coastal processes across the area of interest, which includes known water levels and currents, the wave regime and the sedimentary regime.

7.1.3 Design Envelope

212. Table 7-2 and Table 7-3 set out the worst case scenario defined by the Original Development EIA for metocean and coastal processes (ICOL, 2013) compared to the proposed worst case scenario for the Revised Development at a level of detail sufficient to draw conclusions in relation to the scoping process. The table also identifies the differences between the two design envelopes.

Table 7-2: Worst Case Scenario Definition – Development Area

Potential Impact	Original Development Design Envelope (worst case scenario) (ICOL, 2013)	Revised Development Design Envelope (worst case scenario)	Difference between the Original and Revised Design Envelopes
Construction (and Decommissioning) Phase			
Modification to water levels due to the presence of construction vessels.	Specific parameters were not explicitly included in the Design Envelope scenario as the impacts are unlikely to lead significant effects. -	Specific parameters are not considered due to the unlikely significant effects.	Overall reduction in construction vessels movements from around 3500 to around 1500.
Modification to currents due to the presence of installation vessels.	Specific parameters were not explicitly included in the Design Envelope scenario as the impacts are unlikely to lead significant effects.	Specific parameters are not considered due to the unlikely significant effects.	Overall reduction in construction vessels movements from around 3500 to around 1500.

Potential Impact	Original Development Design Envelope (worst case scenario) (ICOL, 2013)	Revised Development Design Envelope (worst case scenario)	Difference between the Original and Revised Design Envelopes
Modification to waves due to the presence of installation vessels.	Specific parameters were not explicitly included in the Design Envelope scenario as the impacts are unlikely to lead significant effects.	Specific parameters are not considered due to the unlikely significant effects.	Overall reduction in construction vessels movements from around 3500 to around 1500.
Increase in SSC due to dredging prior to GBS installation.	Maximum volume of dredged material per WTG = 28,503 m^3 for 65m diameter GBS. Maximum volume of dredge material per OSP = 114,012m^3 Total number of structures assessed = up to 213 WTGs, five OSPs and three met masts (using both the minimum spacing of structures (to investigate overlap of impacts) and the maximum coverage of the Development Area (to investigate the greatest area of impact)).	Maximum volume of dredged material per WTG = 60,000m^3, for 90m diameter GBS Maximum volume of dredge material per OSP = 114,012m^3. Total number of structures = up to 72 WTGs, and two OSPs. Maximum total dredged volume = 4,548,024m^3	Overall a reduction of 36% in dredged volume, resulting from a 66% reduction in WTGs numbers, 60% reduction in OSPs and the Revised Development requires no further met masts.
Increase in SSC due to scour pit formation around jacket foundation structures.	Release of sediment due to scour around jacket structures: WTG/OSP/met mast jacket leg diameter = three metres. Jacket leg spacing for WTG/OSP/met mast = 20m, 30m, 40m, and 60m (a range was tested for sensitivity). Number of structures assessed = up to 213 WTGs, five OSPs, three met masts. (scenarios based on both the minimum spacing of structures (to investigate overlap of impacts) and the maximum coverage of the Development Area (to investigate the greatest area of impact)).	Release of sediment due to scour around jacket structures: WTG/OSP jacket leg diameter = three metres. Jacket leg spacing for WTG/OSP = 20m, 30m, 40m, and 60m. Number of structures = up to 72 WTGs and five OSPs.	66% reduction in WTGs numbers and 60% reduction in OSPs, resulting in the proportional reduction associated with scour pit formation.

Potential Impact	Original Development Design Envelope (worst case scenario) (ICOL, 2013)	Revised Development Design Envelope (worst case scenario)	Difference between the Original and Revised Design Envelopes
Increase in SSC due to inter-array cable burial.	As per the modelled scenario for the Offshore Export Cable Corridor. The modelling location closest to the Development Area was considered as representative of the Development Area due to the homogeneity in sediment at this location and across the Development Area. The installation methodology was by energetic means. Inter-array cable length of 353km.	Inter-array cable length 190km. 15m corridor cable burial plan	46 % reduction in inter-array cable length from 353km to 190km.
Modification to seabed features due to deposition of sediment from GBS dredging.	Deposition of suspended sediment as per "Increase in SSC due to dredging prior to GBS installation". Total number of structures assessed = up to 213 WTGs, five OSPs and three met masts.	Number of structures = up to 72 WTGs, and two OSPs.	Overall a reduction of 36% in dredged volume, resulting from a 66% reduction in WTGs numbers, 60% reduction in OSPs and the Revised Development requires no further met masts.
Modification seabed features due to deposition of sediment from jacket scour.	Deposition of suspended sediment as per "Increase in SSC due to scour pit formation around jacket foundation structures". Total number of structures assessed = up to 213 WTGs, five OSPs and three met masts.	Number of structures = up to 72 WTGs, and two OSPs.	66% reduction in WTGs numbers and 60% reduction in OSPs, resulting in the proportional reduction associated with scour pit formation.

Potential Impact	Original Development Design Envelope (worst case scenario) (ICOL, 2013)	Revised Development Design Envelope (worst case scenario)	Difference between the Original and Revised Design Envelopes
Modification to seabed features due to deposition of sediment from inter-array cable burial.	Deposition of suspended sediment as per "Increase in SSC due to inter-array cable burial". Inter-array cable length of 353km.	Inter-array cable length 190km.	46 % reduction in inter-array cable length from 353km to 190km.
Modification to seabed features due to impacts from jack-up vessels.	Specific parameters were not explicitly included in the Design Envelope scenario as the impacts are unlikely to lead significant effects.	Specific parameters were not explicitly included in the Design Envelope scenario as the impacts are unlikely to lead significant effects.	66% reduction in WTGs numbers, 60% OSPs and the Revised Development requires no further met masts, resulting in the proportional reduction associated with jack-up vessels.
Operation & Maintenance Phase			
Modification to water levels due to the presence of maintenance vessels.	Impacts resulting from maintenance vessels are taken from the existing evidence base.	Impacts resulting from maintenance vessels are taken from the existing evidence base.	66% reduction in WTGs numbers, 60% OSPs and the Revised Development requires no further met masts, resulting in the proportional reduction of vessels during operation.

Potential Impact	Original Development Design Envelope (worst case scenario) (ICOL, 2013)	Revised Development Design Envelope (worst case scenario)	Difference between the Original and Revised Design Envelopes
Modification to currents due to the presence of maintenance vessels.	As per the modification to water levels due to the presence of maintenance vessels.	As per the modification to water levels due to the presence of maintenance vessels.	66% reduction in WTGs numbers, 60% OSPs and the Revised Development requires no further met masts, resulting in the proportional reduction of vessels during operation.
Modification to waves due to the presence of maintenance vessels.	As per the modification to water levels due to the presence of maintenance vessels.	As per the modification to water levels due to the presence of maintenance vessels	66% reduction in WTGs numbers, 60% OSPs and the Revised Development requires no further met masts, resulting in the proportional reduction of vessels during operation.
Modification to water levels due to the presence (blocking effect) of substance structures.	Both local impacts and macro-impacts. The modification of hydrodynamics due to the presence of GBS was represented by: Number of WTGs modelled = 328 (deliberately conservative number of WTGs to represent the complete maximum coverage of the Development Area at the minimum proposed spacing of WTGs and therefore allowed assessment across the entire Development Area). GBS diameter of 50m used (to ensure conclusions are not unrealistically conservative).	Number of structures = up to 72 WTGs, and two OSPs.	66% reduction in WTGs numbers, 60% OSPs and the Revised Development requires no further met masts, resulting in the proportional reduction in overall blocking and local effects.

Potential Impact	Original Development Design Envelope (worst case scenario) (ICOL, 2013)	Revised Development Design Envelope (worst case scenario)	Difference between the Original and Revised Design Envelopes
Modification to currents due to the presence (blocking effect) of subsurface structures.	As per the modification to water levels due to the presence of subsurface structures.	Number of structures = up to 72 WTGs, and two OSPs.	66% reduction in WTGs numbers, 60% OSPs and the Revised Development requires no further met masts, resulting in the proportional reduction in overall blocking and local effects
Modification to waves due to the presence (blocking effect) of subsurface structures.	As per the modification to water levels due to the presence of subsurface structures.	Number of structures = up to 72 WTGs, and two OSPs.	66% reduction in WTGs numbers, 60% OSPs and the Revised Development requires no further met masts, resulting in the proportional reduction in overall blocking and local effects.
Modification to seabed features and the far-field sediment transport regime due to the presence of subsurface structures and the effects of these on the hydrodynamic and wave regimes.	As per the modification to water levels due to the presence of subsurface structures.	Number of structures = up to 72 WTGs, and two OSPs.	66% reduction in WTGs numbers, 60% OSPs and the Revised Development requires no further met masts, resulting in the proportional reduction in overall blocking and local effects and corresponding effects on sediment transport.

Potential Impact	Original Development Design Envelope (worst case scenario) (ICOL, 2013)	Revised Development Design Envelope (worst case scenario)	Difference between the Original and Revised Design Envelopes
Increase in SSC due to inter-array cable re-burial.	As per the equivalent scenario for the construction phase. Inter-array cable length of 353km.	Inter-array cable length 190km.	46 % reduction in inter-array cable length from 353km to 190km.
Modification to seabed features due to deposition of sediment from inter-array cable re-burial.	As per the equivalent scenario for the construction phase. Inter-array cable length of 353km.	Inter-array cable length 190km.	46 % reduction in inter-array cable length from 353km to 190km.

Table 7-3: Worst Case Scenario Definition – Offshore Export Cable Corridor

Potential Impact	Original Development Design Envelope (worst case scenario) (ICOL, 2013)	Revised Development Design Envelope (worst case scenario)	Difference
Construction (and Decommissioning) Phase			
Modification to water levels due to the presence of construction vessels.	Specific parameters were not explicitly included in the Design Envelope scenario as the impacts are unlikely to lead significant effects.	Specific parameters are not considered due to the unlikely significant effects.	Cable corridor length remains the same (83.3 km), there is a reduction in number of export cables from six to two, resulting in the proportional reduction in overall vessel movements.
Modification to currents due to the presence of installation vessels.	Specific parameters were not explicitly included in the Design Envelope scenario as the impacts are unlikely to lead significant effects.	Specific parameters are not considered due to the unlikely significant effects.	Cable corridor length remains the same (83.3 km), there is a reduction in number of export cables from six to two, resulting in the proportional reduction in overall vessel movements.

Potential Impact	Original Development Design Envelope (worst case scenario) (ICOL, 2013)	Revised Development Design Envelope (worst case scenario)	Difference
Modification to waves due to the presence of installation vessels.	Specific parameters were not explicitly included in the Design Envelope scenario as the impacts are unlikely to lead significant effects.	Specific parameters are not considered due to the unlikely significant effects.	Cable corridor length remains the same (83.3 km), there is a reduction in number of export cables from six to two, resulting in the proportional reduction in overall vessel movements.
Increase in SSC due to Offshore Export Cable burial.	Assumed trench depth = two metres (range zero to three metres, with protection where burial is not feasible; the target depth is one metre). Trench width = one metre. Installation of the Offshore Export Cable was by energetic means. Assumed average burial rate of 400m/hr was used.	Two offshore export cables Trench width = three metres Trench depth= 1.2 m Installation by cable burial plough	There is a reduction in overall footprint of 17.5 % with the export cable, resulting from the cable corridor length remaining the same (83.3 km), reduction in number of export cables from six to two, with an increase in disturbed footprint per cable during construction from 6 m to 15 m.
Modification to seabed features due to deposition of sediment from Offshore Export Cable burial.	Deposition of suspended sediment as per "Increase in SSC due to Offshore Export Cable burial".	Two offshore export cables. Trench width = 3m Trench depth= 1.2 Installation by cable burial plough	There is a reduction in overall footprint of 17.5 % with the export cable, resulting from the cable corridor length remaining the same (83.3 km), reduction in number of export cables from six to two, with an increase in disturbed footprint per cable during construction from 6 m to 15 m.
Operation & Maintenance Phase			
Modification to water levels due to the presence of maintenance vessels.	Specific parameters were not explicitly included in the Design Envelope scenario as the impacts are unlikely to lead significant effects.	Specific parameters are not considered due to the unlikely significant effects.	Reduction in number of export cables from six to two, resulting in the proportional reduction of vessels during operation.

Potential Impact	Original Development Design Envelope (worst case scenario) (ICOL, 2013)	Revised Development Design Envelope (worst case scenario)	Difference
Modification to currents due to the presence of maintenance vessels.	Specific parameters were not explicitly included in the Design Envelope scenario as the impacts are unlikely to lead significant effects.	Specific parameters are not considered due to the unlikely significant effects.	Reduction in number of export cables from six to two, resulting in the proportional reduction of vessels during operation.
Modification to waves due to the presence of maintenance vessels.	Specific parameters were not explicitly included in the Design Envelope scenario as the impacts are unlikely to lead significant effects.	Specific parameters are not considered due to the unlikely significant effects.	Reduction in number of export cables from six to two, resulting in the proportional reduction of vessels during operation.
Modification to water levels due to the presence (blocking effect) of substance structures.	No effect assessed: the Offshore Export Cable will offer either no, or minimal blocking, of currents and waves.	No effect assessed: the Offshore Export Cable will offer either no, or minimal blocking, of currents and waves.	Reduction in number of export cables.
Increase in SSC due to Offshore Export Cable re-burial.	As per the equivalent scenario for the construction phase.	As per the equivalent scenario for the construction phase.	There is a reduction cables from six to two, and therefore a proportional reduction in reburial requirements during the operation.
Modification to seabed features due to deposition of sediment from Offshore Export Cable re-burial.	As per the equivalent scenario for the construction phase.	As per the equivalent scenario for the construction phase.	There is a reduction cables from six to two, and therefore a proportional reduction in reburial requirements during the operation.

7.1.4 Revised Development Embedded Mitigation

213. Embedded Mitigation for the Revised Development will comprise of mitigation measures to minimise environmental effects which were captured within the Design Envelope for the Original Development, as follows:

- A study will be carried out to predict the effects of secondary from cable protection and to inform design with the intention of reducing secondary scour. Scour protection will be built into any GBS concepts (if these are employed);
- If the GBS foundation option is chosen, sediment dredged during preparation work for installation will be reused within the works where practicable. This will manage the deposition of sediment across the Development Area;
- Cables will be suitably buried or will be protected by other means when burial is not practicable.
- During the construction of the wind farm, best practice construction methods will be adopted to minimise impacts on metocean and coastal processes.
- No additional mitigation was proposed in the Original Development ES due to the low magnitude of the predicted changes to metocean and coastal processes (and when considering a conservative worst case scenario).

7.1.5 Commitment to Consent Conditions

214. As noted in Section 2.2.3, ICOL propose to commit to the Consent conditions granted for the Original Development for the application of the Revised Development.

215. These consent conditions have taken into account any relevant consultation responses to the Original Development EIA from key stakeholders in relation to Metocean and Coastal Processes in determining the acceptability of the Original Development; the most relevant consent conditions are summarised in Table 7-4. Conditions in full are provided in Appendix A.

Table 7-4: Summary of Most Relevant Consent Conditions Related to Metocean and Coastal Processes

Condition Requirement	Description
Construction method Statement	Requires the final construction methods to be set out for approval to ensure that they remain consistent with the methods assessed in the ES and to ensure appropriate construction management taking into account mitigation measures to protect the environment and other users of the marine area.
Environmental Management Plan	Setting out, for approval relevant environmental management and mitigation measures to be applied during the construction and operation of the Development.
Cable Plan	Setting out, for approval, the installation methods for the cables (including burial) to ensure it remains consistent with the installation process assessed in the ES as relevant to Metocean and Coastal Processes.
Project Environmental Monitoring Plan	Setting out, for approval, the proposed environmental monitoring programme, to include as relevant and necessary the monitoring Metocean and Coastal Processes.

7.1.6 Scoping of the Revised Development EIA

216. The Embedded Mitigation (Section 7.1.4) and the commitment to Consent conditions considered alongside the changes in the design envelope will ensure the conclusions reached in the Original Development remain valid for the Revised Development.

217. Table 7-5 summarises the residual effect for the Original Development and details whether the potential impact will be scoped out of the Revised Development EIA, with a relevant justification provided where relevant.

Table 7-5: Summary of Potential Impacts – Revised Development

Potential Impact	Residual Effect (ICOL, 2013)		Scoped in or out of the Revised Development EIA	Justification
Construction (& Decommissioning) Phase				
Modification to the seabed through deposition of dredged material for GBSs	Near Field Seabed features	Minor/ Moderate	Scoped out	There is a total reduction of 36% dredged materials due to the design changes associated with the reduced number of turbines, OSPs and inter- array cables. The impacts from the Original Development were assessed as not significant and, as a result of the design changes described above, the Revised Development is anticipated to have less of an impact. Further assessment of this potential impact is therefore scoped out of the Revised Development EIA.
	Far Field Seabed Features	Negligible/ Minor		
Modification to the seabed though scour pit formation around jacket foundations	Near Field Seabed features	Negligible/ Minor	Scoped out	The impacts from the Original Development were assessed as not significant and, as a result of the design changes described above, the Revised Development is anticipated to have less of an impact. Further assessment of this potential impact is therefore scoped out of the Revised Development EIA.
	Far Field Seabed Features	Negligible/ Minor		
Modification to the seabed though deposition of scoured material for jacket foundations.	Near Field Seabed features	Minor	Scoped out	The impacts from the Original Development were assessed as not significant and, as a result of the design changes described above, the Revised Development is anticipated to have less of an impact. Further assessment of this potential impact is therefore scoped out of the Revised Development EIA.
	Far Field Seabed Features	Negligible/ Minor		
Modification to the seabed through deposition of material disturbed during cable burial	Near Field Seabed features	Minor	Scoped out	The impacts from the Original Development were assessed as not significant and, as a result of the design changes described above, the Revised Development is anticipated to have less of an impact. Further assessment of this potential impact is therefore scoped out of the Revised Development EIA.
	Far Field Seabed Features	Negligible/ Minor		

Potential Impact	Residual Effect (ICOL, 2013)		Scoped in or out of the Revised Development EIA	Justification
Modification to the seabed through disturbance by installation vessels	Near Field Seabed features	Negligible/ Minor	Scoped out	The impacts from the Original Development were assessed as not significant and, as a result of the design changes described above, the Revised Development is anticipated to have less of an impact. Further assessment of this potential impact is therefore scoped out of the Revised Development EIA.
	Far Field Seabed Features	Negligible/ Minor		
Modification to the hydrodynamic regime, sediment regime and seabed	Near field Designated sites (geological) – both Low and high tolerance	N/A	Scoped out	The impacts from the Original Development were assessed as not significant and, as a result of the design changes described above, the Revised Development is anticipated to have less of an impact. Further assessment of this potential impact is therefore scoped out of the Revised Development EIA.
	Far field Designated sites (geological) – both Low and high tolerance	Minor/ Moderate		
Modification to the hydrodynamic regime, sediment regime and seabed	Near field designated sites (non-geological)	N/A	Scoped out	The impacts from the Original Development were assessed as not significant and, as a result of the design changes described above, the Revised Development is anticipated to have less of an impact. Further assessment of this potential impact is therefore scoped out of the Revised Development EIA.
	Far field designated sites (non-geological)	Negligible		
Operation & Maintenance Phase				

Potential Impact	Residual Effect (ICOL, 2013)		Scoped in or out of the Revised Development EIA	Justification
Modification to the seabed due to changes in the metocean and sediment regimes	Near Field Seabed features	Minor	Scoped out	The impacts from the Original Development were assessed as not significant and, as a result of the design changes described above, the Revised Development is anticipated to have less of an impact. Further assessment of this potential impact is therefore scoped out of the Revised Development EIA.
	Far Field Seabed Features	Negligible/ Minor		
Modification to the seabed through deposition of material disturbed during cable re-burial	Near Field Seabed features	Minor	Scoped out	The impacts from the Original Development were assessed as not significant and, as a result of the design changes described above, the Revised Development is anticipated to have less of an impact. Further assessment of this potential impact is therefore scoped out of the Revised Development EIA.
	Far Field Seabed Features	Negligible/ Minor		
Modification to the hydrodynamic regime, sediment regime and seabed	Near Field designated sites (geological) both low and high tolerance	N/A	Scoped out	The impacts from the Original Development were assessed as not significant and, as a result of the design changes described above, the Revised Development is anticipated to have less of an impact. Further assessment of this potential impact is therefore scoped out of the Revised Development EIA.
	Far Field designated sites (geological) both low and high tolerance	Minor/ Moderate		
Modification to the hydrodynamic regime, sediment regime and seabed	Near Field designated sites (non-geological)	N/A	Scoped out	The impacts from the Original Development were assessed as not significant and, as a result of the design changes described above, the Revised Development is anticipated to have less of an impact. Further assessment of this potential impact is therefore scoped out of the Revised Development EIA.
	Far Field designated sites (non-geological)	Negligible		
Decommissioning				

Potential Impact	Residual Effect (ICOL, 2013)		Scoped in or out of the Revised Development EIA	Justification
Modification to the seabed through removal of infrastructure	Near Field Seabed features	Minor/ Moderate	Scoped out	The impacts from the Original Development were assessed as not significant and, as a result of the design changes described above, the Revised Development is anticipated to have less of an impact. Further assessment of this potential impact is therefore scoped out of the Revised Development EIA.
	Far Field Seabed Features	Negligible/ Minor		
Modification to the hydrodynamic regime, sediment regime and seabed	Near Field Designated sites (geological) both low and high tolerance	N/A	Scoped out	The impacts from the Original Development were assessed as not significant and, as a result of the design changes described above, the Revised Development is anticipated to have less of an impact. Further assessment of this potential impact is therefore scoped out of the Revised Development EIA.
	Far Field Designated sites (geological) both low and high tolerance	Minor/ Moderate		
Modification to the hydrodynamic regime sediment regime and seabed	Near Field designated sites (non-geological)	N/A	Scoped out	The impacts from the Original Development were assessed as not significant and, as a result of the design changes described above, the Revised Development is anticipated to have less of an impact. Further assessment of this potential impact is therefore scoped out of the Revised Development EIA.
	Far Field designated sites (non-geological)	Negligible		

Scoping of Cumulative Impact Assessment

218. The CIA for metocean and coastal processes set out in the Original Development EIA considered the potential cumulative impact from the Firth of Forth offshore wind projects and in line with the approach agreed through the FTOWFDG and associated agreements related to the specific scope of the CIA for metocean and coastal processes. The agreed approach focused on the assessment of impacts on the physical environment arising from the interaction of the offshore wind farm projects only, with all other identified developments and activities scoped out on the basis of distance from the Original Development and the predicted changes in metocean conditions due to the Original Development being negligible at these sites.

219. The same basis is proposed for the purposes of the scoping of the metocean and coastal processes CIA with the following list confirming the other plans, projects and activities (selected from the list in Section 5.7) considered in the scoping of the CIA:

- Neart Na-Gaoithe Offshore Windfarm
- Seagreen Alpha and Bravo Offshore Windfarms

220. Table 7-6 presents the Original Development residual effect from the for all cumulative impacts considered and details whether the potential cumulative impact has been scoped out of the Revised Development EIA, with a relevant justification.

Table 7-6: Summary of Potential Impacts – Revised Development with Other Plans, Projects and Activities (NF = nearfield; FF = far field)

Potential Impact	Residual Effect (ICOL, 2013)		Scoped in or out of the CIA for Revised Development Application	Justification
Construction (& Decommissioning) Phase				
Modification to the seabed through deposition of dredged material for GBSs	Seabed features	NF – Minor/Moderate FF – Negligible/Minor	Scoped out	The cumulative impacts from the projects under consideration are identical to those considered in the CIA for the Original Development, but with a substantial reduction in the scale
Modification to the seabed through scour pit formation around jacket foundations	Seabed features	NF – Negligible/Minor FF – Negligible/Minor	Scoped out	

Potential Impact	Residual Effect (ICOL, 2013)		Scoped in or out of the CIA for Revised Development Application	Justification
Modification to the seabed through deposition of scoured material for jacket foundations	Seabed features	NF – Minor FF – Negligible/Minor	Scoped out	of the Revised Development. Cumulative impacts would therefore be no greater than, and possibly less than, those previously described for the Original Development all of which were considered not to be significant.
Modification to the seabed through deposition of material disturbed during cable burial	Seabed features	NF – Minor FF – Negligible/Minor	Scoped out	
Modification to the seabed through disturbance by installation vessels	Seabed features	NF – Negligible/Minor FF – Negligible/Minor	Scoped out	
Modification to the hydrodynamic regime, sediment regime and seabed	Designated sites (geological) – both low and high tolerance	NF – N/A FF – Minor	Scoped out	
Modification to the hydrodynamic regime, sediment regime and seabed	Designated sites (non-geological)	NF – N/A FF – Negligible	Scoped out	
Operation & Maintenance Phase				
Modification to the seabed due to changes in the metocean and sediment regimes	Seabed features	NF – Minor FF – Negligible/Minor	Scoped out	The cumulative impacts from the projects under consideration are identical to those considered in the CIA for the Original Development, but with a substantial reduction in the scale of the Revised Development.
Modification to the seabed through deposition of material disturbed during cable re-burial	Seabed features	NF – Minor FF – Negligible/Minor	Scoped out	

Potential Impact	Residual Effect (ICOL, 2013)		Scoped in or out of the CIA for Revised Development Application	Justification
Modification to the hydrodynamic regime, sediment regime and seabed	Designated sites (geological) – both low and high tolerance	NF – N/A FF – Minor/Moderate	Scoped out	Cumulative impacts would therefore be no greater than, and possibly less than, those previously described for the Original Development all of which were considered not to be significant.
Modification to the hydrodynamic regime, sediment regime and seabed	Designated sites (non-geological)	NF – N/A FF – Negligible	Scoped out	
Decommissioning				
Modification to the seabed through removal of infrastructure	Seabed features	NF – Minor/Moderate FF – Negligible/Minor	Scoped out	The cumulative impacts from the projects under consideration are identical to those considered in the CIA for the Original Development, but with a substantial reduction in the scale of the Revised Development. Cumulative impacts would therefore be no greater than, and possibly less than, those previously described for the Original Development all of which were considered not to be significant.
Modification to the hydrodynamic regime, sediment regime and seabed	Designated sites (geological) – both low and high tolerance	NF – N/A FF – Minor/Moderate	Scoped out	
Modification to the hydrodynamic regime, sediment regime and seabed	Designated sites (non-geological)	NF – N/A FF – Negligible	Scoped out	

7.1.7 Implications for EIA

221. Based on the evidence summarised from the Original Development EIA and considering the Design Envelope of the Revised Development by comparison to the Original Development, it is concluded that all of the potential impacts on metocean and coastal processes should be scoped out of the EIA for the Revised Development, due to the fact that it is unlikely to cause significant effects.

7.1.8 Scoping Questions – Metocean and Coastal Processes

- Do you agree that the existing data available to describe the metocean and coastal process baseline remains sufficient to describe the physical environment in relation to the Revised Development?
- Do you agree that the modelling of the potential impacts on the physical environment (and applying the worst case scenario for the Original Development) provides an appropriate and precautionary basis for assessing the potential impacts of the Revised Development?
- Do you agree that, in all cases, the assessment scenario previously applied in conducting the Original Development EIA represents the worst case when compared to the Revised Development?
- Do you agree, with the embedded mitigation in place, that the assessment of Metocean and Coastal Processes should be scoped out of the EIA for the Revised Development?
- Do you agree that cumulative impacts on metocean and coastal processes should be scoped out of EIA for the Revised Development based on the assumptions set out and the conclusions reached in the CIA for the Original Development?

8 Natural Environment

8.1 Benthic Ecology

8.1.1 Introduction

222. As described in Section 5, the purpose of this section is to provide sufficient detail on the potential effects on Benthic Ecology resulting from the construction, operation and maintenance and decommissioning of the Revised Development.

223. The detail provided will allow MS-LOT and their consultees to be clear about what they consider the significant effects of the proposal are likely to be and, therefore, whether they need to be subject to an EIA and be included within the ES.

224. In order to provide sufficient information to consultees reference is made to the baseline data gathered to inform the Original Development EIA, and to the outcomes of the impact assessment presented in the Original Development ES. Design, construction and operational changes between the Original Development and the Revised Development that are likely to have further impacts on benthic ecology are also considered to inform any subsequent impact assessments.

225. For a full description of the design envelope parameters and changes please refer to Section 4. The Development Area for both the Original and Revised Development remains unchanged and can be seen in Figure 4-1.

226. This section concludes that the likely impacts on Benthic Ecology from the Revised Development will be less than those assessed for the Original Development and therefore, in line with the EIA regulations are not required to be included with the Revised Development ES. This is due to the following;

- Changes in the Revised Design Envelope (see Section 4);
- Baseline data remaining valid;
- No material changes to data collection;
- No material changes to assessment best practice; and
- No significant effects concluded within the Original Development EIA.

Full details and justification are provided within this section.

8.1.2 Data Sources and Baseline Environment

227. This section identifies baseline data sources that have been used to characterise the benthic biological resources within and around the Revised Development, drawing predominantly from the data sources used to inform the Original Development EIA but updated where necessary with more recent data. Commentary is provided on the sufficiency of this data as a basis for scoping the Revised Development EIA.

Baseline Data

228. A variety of benthic datasets were collected and analysed to inform the Original Development EIA. Data was drawn from Development specific surveys and studies commissioned by ICOL, and from a desktop review of publicly available information, and those datasets considered to be relevant to the Revised Development are listed in Table 8-1 below. The data sources are more fully described in the Inch Cape Offshore Wind Farm ES Chapter 12 (ICOL, 2013) and supporting technical studies.

Table 8-1: Baseline Datasets from the Original Development EIA

Dataset	Coverage	Data use	Date
ICOL-commissioned site specific surveys and studies			
Epibenthic & benthic surveys	Within and around Wind Farm Array and Export Cable Corridor	Trawl surveys incorporate fish species; grab and drop-down video data provides benthic habitat information	2010 and 2012
Geophysical surveys	Within and around Wind Farm Array and Export Cable Corridor	Geophysical surveys incorporating mulitbeam bathymetry and sidescan data	2010
Habitat mapping	Within and around Wind Farm Array and Export Cable Corridor	Interpretation of benthic and geophysical data for biotope classification and mapping	2013
Intertidal surveys	Cable landing locations within the Offshore Export Cable Corridor	Distribution of intertidal ecology	2009
Intertidal and benthic surveys	Cable landing locations within the Offshore Export Cable Corridor	Distribution of intertidal and benthic ecology. (Note: these surveys were originally carried out for the Neat na Gaoithe project but overlapped the Offshore Export Cable Corridor and so were used for the ICOL analysis).	2009
External / pre-existing broader scale data and studies			
Neart na Gaoithe Offshore Environmental Statement (Mainstream Renewable Power)	Within and around the Neart na Gaiothe Offshore Wind Farm array and Offshore Export – located south of the proposed Inchcape site	Incorporating a geophysical survey (EMU, 2009a) and a benthic ecological survey (EMU, 2009b).	2012
Sea Green Zone Appraisal and Planning (Sea Green)	Within the Phase 1 boundary in the Sea Green Zone – located north east of the proposed Inchcape site	Benthic survey, incorporating grab sampling, drop down video and epifaunal beam trawl (IECS, 2011).	2011

Dataset	Coverage	Data use	Date
Contaminant data (Marine Scotland)	Within proximity to the Development Area	Contaminant data for Bell Rock disposal ground.	2012
The Marine Nature Conservation Review (MNCR) of East Scotland (Brazier)	Within proximity to the Development Area and Export Cable Corridor	Broader data on the benthic environments in the region	1998
Strategic Environmental Assessment (SEA) for region 5 (Eleftheriou et al.)	Within proximity to the Development Area and Export Cable Corridor	Broader data on the benthic environments in the region	2004
Clean Seas Environment Monitoring Programme (CSEMP)	Within proximity to the Development Area	Contaminant data for monitoring station at Montrose Bank and along the east coast of Scotland	2012
EUSeaMap - Mapping European Seabed Habitats (MESH, 2012)	Broader data across the Development Area and Export Cable Corridor	EU seabed predictive mapping and benthic survey data	2012

Data Validity

229. The data previously collected as part of the Original Development EIA is considered sufficient to meet the requirements needed to effectively characterise the current baseline conditions for the Revised Development. The following sections consider the sufficiency of the available data in relation to spatial coverage and age. In addition, where any new research has been published since the Original Development EIA was undertaken, which could affect the overall assessment of sensitivity of a receptor or magnitude of an impact, this research has been reviewed and considered.

Data Coverage

230. As identified in Table 8-1, ICOL-commissioned site specific surveys were collected within and surrounding the Original Development.

231. The Original Development EIA benthic survey was undertaken between the 19th March 2012 and 25th March 2012 (EMU, 2012). The benthic survey carried out in the Development Area consisted of the following elements (further detail on figures can be viewed in the Original Development ES):

- Drop Down Video (DDV) at 124 stations;
- Benthic grabs (including sub-sampling for contaminant analysis, particle size analysis (PSA) and total organic carbon (TOC) analysis) at 87 stations; and
- Epibenthic trawls at 24 stations.

232. The benthic survey of the offshore export cable corridor consisted of the following elements:

- Intertidal biotope mapping surveys at the cable landfall options at Cockenzie and Seton Sands, and sub-tidal surveys within and in proximity to the Offshore Export Cable Corridor including;
    - DDV at 22 stations;
    - DDV transects at 11 rock seabed stations; and
    - Benthic grab sampling for PSA and contaminant sampling at 13 Stations.

233. The sampling locations were specifically selected, based on a systematic analysis of the available geophysical data (multibeam bathymetry and sidescan data) collected in the Inch Cape Development Area, as well as meteorological and oceanographic (metocean) data that were analysed by Envision Mapping Ltd (Envision) in order to create broad-scale habitat maps. The habitat maps were used to ensure that the sampling locations were representative of the full range of habitats across the study area. Furthermore, desk based information on seabed sediments were collated from various sources and, together with direct interpretation of the sidescan mosaic, provided some evidence for sediment types across the study area. Control stations were also built into the survey design, which would still be representative for the Revised Development Area. The site specific trawl survey, DDV and benthic grabs methodology were agreed with Marine Scotland LOT and their advisors Marine Scotland Science prior to commencement.

234. In addition, in characterising the Export Cable Corridor, existing seabed video footage and sediment particle size distribution data from a further 37 stations were used to characterise habitats and associated communities along the sub-tidal Offshore Export Cable Corridor. This data was sourced from the 2009 Neart na Gaoithe survey (EMU, 2009).

235. The location and extent of the Original Development EIA covers the seabed area required for the Revised Development, the methodology was originally agreed with Marine Scotland and their advisors, and the methodologies still remain valid. Therefore it is considered that the spatial coverage remains valid and sufficient for the Revised Development.

Age of the Data

236. The site specific benthic survey data for the Original Development EIA were collected between 2009 to 2012 and this data was compared to broader scale, contextual information from a variety of other, publicly available, data sources as listed in Table 8-1. The age of the site specific survey data is not considered an issue due to no man-made physical interference or changes (i.e. other development activity) having taken place to the seabed / physical environment within, or immediately around, the Development Area since 2009, which would result in significant habitat (and therefore species community) alterations.

237. In reviewing baseline data and descriptions from across the region, there would appear to be no more recent data available for the Development Area since the Original Development EIA was undertaken. The habitats found to be characterising the Development Area through site specific surveys and literature review are typical of those commonly found in the wider region and do not represent particularly sensitive benthic habitats or communities that would require re-surveying. It is therefore not of any benefit to repeat benthic surveying across the Development Area and the age of the data remains valid.

238. Therefore, it is concluded that the data remains adequate to provide a basis for the assessment of potential impacts on the benthic environment and in respect of this scoping process.

Review of Baseline Characteristic

239. Chapter 12 of the Original Development ES presented the baseline characteristics for benthic ecology resources across the area of interest including the Development Area and Offshore Export Cable Corridor, further reference should be made to this chapter if required. The following information summaries the differences in the design envelopes and the potential impacts pertinent to benthic ecology.

8.1.3 Design Envelope

240. Tables 8-2 and 8-3 set out the worst case scenario defined by the Original Development EIA for benthic ecology (ICOL, 2013) compared to the proposed worst case scenario for the Revised Development at a level of detail sufficient to draw conclusions in relation to the scoping process. The table also identifies the differences between the two design envelopes.

Table 8-2: Worst Case Scenario Definition – Wind Farm

Potential Impact	Original Development Design Envelope (worst case scenario) (ICOL, 2013)	Revised Development Design Envelope (worst case scenario)	Difference between the Original and Revised Design Envelopes
Construction (& Decommissioning) Phase			
Direct temporary disturbance of seabed habitats caused by construction based activities	• Total seabed area disturbed is 5.54 km^2, equating to 3.69% of the Development Area resulting from: • Seabed preparation for 213 WTGs with GBS selected as having the largest disturbance footprint (125 m dredge effected diameter); • Seabed preparation for five OSPs with GBS selected as having the largest area disturbance footprint (300 m dredge effected diameter); • Seabed preparation for three met masts with GBS selected as having the largest area disturbance footprint (125 m dredge effected diameter); • 353 kilometres (km) Inter-array cable installation with a trench affected width of six metres as the widest possible area of disturbance; • Jack up vessel with disturbance footprint per jack up vessel of 600 m^2 and three visits per foundation installation/decommissioning required for WTGs, OSPs and met masts; and • Vessel anchorage disturbance from 5 m^2 anchor footprints deployed	Total seabed area disturbed is 4.24 km^2, equating to 2.82% of the development area, resulting from: • Seabed preparation for up to 72 WTGs with gravity base substructures (GBS) selected as having the largest disturbance footprint (140 m dredger affected diameter); • Seabed preparation for two OSPs with GBS selected as having the largest area of disturbance footprint (300 m dredger affected diameter); • No met masts; • 190 km inter-array cable installation with a cable corridor disturbed width of 15 metres as the widest possible area of disturbance; • Vessel anchorage disturbance from 5 m^2 anchor footprints deployed at 500 m intervals along the 190 km of inter-array cable; All other development aspects remain the same as those assessed in the Original Development ES.	Overall there is a 66% reduction in WTGs numbers, 60% OSPs and 46 % reduction in inter-array cable and the Revised Development requires no further met masts. Total area disturbed is 1.3km^2 less than assessed in the Original Development ES. This equates to a 23% reduction in total disturbed area.

Potential Impact	Original Development Design Envelope (worst case scenario) (ICOL, 2013)	Revised Development Design Envelope (worst case scenario)	Difference between the Original and Revised Design Envelopes
	at 500 m intervals along the 353 km of inter-array cable.		
Indirect impacts of temporary increases in suspended sediment concentrations (SSC) from construction based activities, and associated deposition	Model outputs of anticipated worst case SSC, deposition and sediment transportation from energetic means (cable) and dredging (foundations) are detailed in Chapter 12 of the ES. The assessment includes: Suspended sediments arising from seabed preparations and installations for 213 WTGs, five OSPs and three met masts with GBS foundation types; and Suspended sediments arising from inter-array cable burial using energetic means (excavated trench 353 km long, one metre wide and two metres depth) as recognised as representing the worst case.	Suspended sediments arising from seabed preparations and installations for up to 72 WTGs and two OSPs with GBS foundation types; and Suspended sediments arising from inter-array cable burial using energetic means (excavated trench 190 km long, one metre wide and two metres depth) as recognised as representing the worst case.	Overall a reduction of 36% in dredged volume, resulting from a 66% reduction in WTGs numbers, 60% reduction in OSPs and 46 % reduction in inter-array cable and the Revised Development requires no further met masts.
Release of contaminants bound in sediments	Sediment release as per 'Indirect impacts of temporary increases in suspended sediment concentrations (SSC) from construction based activities, and associated deposition' impact (above).	Sediment release as per 'Indirect impacts of temporary increases in suspended sediment concentrations (SSC) from construction based activities, and associated deposition' impact (above).	Overall a reduction of 36% in dredged volume, resulting from a 66% reduction in WTGs numbers, 60% reduction in OSPs and 46 % reduction in inter-array cable and the Revised Development requires no further met masts.

Potential Impact	Original Development Design Envelope (worst case scenario) (ICOL, 2013)	Revised Development Design Envelope (worst case scenario)	Difference between the Original and Revised Design Envelopes
Secondary impacts of decreased primary production due to increased SSC within the water column	Sediment release as per 'Indirect impacts of temporary increases in suspended sediment concentrations (SSC) from construction based activities, and associated deposition' impact (above).	Sediment release as per 'Indirect impacts of temporary increases in suspended sediment concentrations (SSC) from construction based activities, and associated deposition' impact (above).	Overall a reduction of 36% in dredged volume, resulting from a 66% reduction in WTGs numbers, 60% reduction in OSPs and 46 % reduction in inter-array cable and the Revised Development requires no further met masts.
Potential release of pollutants from construction plant	Sources from vessels and plant associated with the construction of WTGs, OSPs, inter-array cables, and associated works.	Sources from vessels and plant associated with the construction of WTGs, OSPs, inter-array cables, and associated works	66% reduction in WTGs numbers, 60% OSPs and the Revised Development requires no further met masts. There is a reduction in total inter-array cable length by 46%. There will therefore be a proportional reduction in construction plant required.
Introduction of Non-Indigenous Species (NIS)	Introduction from vessels and plant associated with the installation of WTGs, OSPs, inter-array cables, and associated works.	Introduction from vessels and plant associated with the installation of WTGs, OSPs, inter-array cables, and associated works.	66% reduction in WTGs numbers, 60% OSPs and the Revised Development requires no further met masts. There is a reduction in total inter-array cable length by 46%.

Potential Impact	Original Development Design Envelope (worst case scenario) (ICOL, 2013)	Revised Development Design Envelope (worst case scenario)	Difference between the Original and Revised Design Envelopes
			There will therefore be a proportional reduction in construction plant and vessels required.
Operation & Maintenance Phase			
Loss of original habitat	Total loss of original habitat is 1.87 km^2, equating to 1.25% of the Development Area resulting from: Seabed preparation for 213 WTGs with GBS selected as having the largest footprint (95 m diameter including scour protection); Seabed preparation for five OSPs with GBS selected as having the largest footprint (180 m diameter including scour protection); Seabed preparation for three met masts with GBS selected as having the largest footprint (95 m diameter including scour protection); and Maximum 10% protection on the 353 km inter-array cable installation with protection width of six metres as the widest possible area of disturbance.	Total loss of habitat is 1.05 $km^{2,}$ equating to 0.7 % of the Development Area resulting from (resulting from: Seabed preparation for up to 72 WTGs with GBS selected as having the largest footprint (125 m diameter including scour protection); Seabed preparation for two OSPs with GBS selected as having the largest footprint (180 m diameter including scour protection); Maximum 10% protection on the 190 km inter-array cable installation with protection width of six metres as the widest possible area of disturbance; All other development aspects remain the same as those originally assessed in the ES.	Total loss of habitat is 0.82 km^2 less than assessed in the Original Development ES equating to a 44% reduction in total loss of habitat.
Changes in tidal regime and associated sediment transport	Model outputs of predicted changes to hydrodynamics (*Chapter 10 of ES*) resulting from WTGs, met masts and OSPs. GBS foundations have been identified as being the worst case for impacts on tidal regime.	Model outputs of predicted changes to hydrodynamics (*Chapter 10 of Original Development ES*) resulting from WTGs and OSPs. GBS foundations have been identified as being the worst case for impacts on tidal regime.	66% reduction in WTGs numbers, 60% OSPs and the Revised Development requires no further met masts.

Potential Impact	Original Development Design Envelope (worst case scenario) (ICOL, 2013)	Revised Development Design Envelope (worst case scenario)	Difference between the Original and Revised Design Envelopes
Scour and associated sediment transportation leading to changes in habitats	Model outputs of predicted scour effects (*Chapter 10, of the ES*) resulting from WTGs, met masts and OSPs. Jacket foundations with no scour protection have been identified as being the worst case for impacts on scour and associated sediment transportation.	Model outputs of predicted scour effects (*Chapter 10, of the Original Development ES*) resulting from WTGs and OSPs. Jacket foundations with no scour protection have been identified as being the worst case for impacts on scour and associated sediment transportation.	66% reduction in WTGs numbers, 60% OSPs and the Revised Development requires no further met masts.
Colonisation of introduced substrata leading to a change in the benthic ecology and/or biodiversity	Introduction of new substrate available for colonisation from infrastructure as described in 'loss of original habitat' above.	Introduction of new substrate available for colonisation from infrastructure as described in 'loss of original habitat' above.	66% reduction in WTGs numbers, 60% OSPs and the Revised Development requires no further met masts.
Provision of Introduced Substrata Facilitating Spread of NIS	Introduction of new substrate available for colonisation from infrastructure as described in 'loss of original habitat' above.	Introduction of new substrate available for colonisation from infrastructure as described in 'loss of original habitat' above.	66% reduction in WTGs numbers, 60% OSPs and the Revised Development requires no further met masts.
Potential release of pollutants from operation plant	Sources from vessels and plant associated with the operation and maintenance of WTGs, OSPs, inter-array cables, and associated works.	Sources from vessels and plant associated with the operation and maintenance of WTGs, OSPs, inter-array cables, and associated works.	66% reduction in WTGs numbers, 60% OSPs, 46 % reduction in inter-array cable length and the Revised Development requires no further met masts, resulting in the proportional reduction in the presence of vessels and plant.

Potential Impact	Original Development Design Envelope (worst case scenario) (ICOL, 2013)	Revised Development Design Envelope (worst case scenario)	Difference between the Original and Revised Design Envelopes
Responses to electromagnetic fields and thermal emissions	Total inter-array cable length of 353 km suitably buried and protected where burial is not feasible. Longest length and shallowest burial, or protection, recognised as the worst case in terms of electromagnetic fields (EMF) exposure.	Total inter-array cable length of 190 km suitably buried and protected where burial is not feasible. Longest length and shallowest burial, or protection, recognised as the worst case in terms of electromagnetic fields (EMF) exposure.	Total inter-array cable length reduced by 163 km, which is a 46% reduction.
Temporary habitat disturbance from operations and maintenance (O&M) activities	Area of seabed disturbed annually is 0.14 km^2, equating to 0.09% of the Development Area resulting from: Jack up vessel with disturbance footprint per vessel of 600 m^2 and one visit per foundation (WTGs, OSPs and met masts) every five years; Vessel anchorage disturbance from 5.0 m^2 anchor footprints deployed at 500 m intervals along the 353 km of inter-array cable; and Inter-array cable reburial assuming maximum of 10% reburial during operation of the total 353 km with a trench affected area of six metres as the widest possible area of disturbance.	Area of seabed disturbed annually is 0.12km^2, equating to 0.08% of the Development Area resulting from: Jack up vessel with disturbance footprint per vessel of 600 m^2 and one visit per foundation (WTGs and OSPs) every five years; Vessel anchorage disturbance from 5.0 m^2 anchor footprints deployed at 500 m intervals along the 190 km of inter-array cable; and Inter-array cable reburial assuming maximum of 10% reburial during operation of the total 190 km with a trench affected area of six metres as the widest possible area of disturbance.	66% reduction in WTGs numbers, 60% OSPs, 46 % reduction in inter-array cable length and the Revised Development requires no further met masts, resulting in a 14% reduction in temporary habitat disturbance.

Table 8-3: Worst Case Scenario Definition – Offshore Export Cable Corridor

Potential Impact	Original Development Design Envelope (ICOL, 2013)	Revised Development Design Envelope	Difference between Envelopes
Construction (& Decommissioning) Phase			
Direct temporary disturbance of seabed habitats caused by construction based activities	Sub-tidal area of seabed disturbed across export cable corridor is 3.02 km^2 (3.0% of Offshore Export Cable Corridor) resulting from the export cable installation: AC selected as worst case as it utilises the largest possible number of cables i.e. six DC options utilises less cables than AC; maximum cable length for each of the six cables is approximately 83.3 km; and Each of the six cables are installed in a separate trench resulting in six trenches in total. Intertidal area disturbed at the Cockenzie beach landfall option is 2,216 m^2 which equates to 2.0% of total beach area (measured from the Cockenzie Power station to East Cuthill Rocks) resulting from: the cable corridor width which is disturbed by installation equipment which is six metres for each of the six trenches i.e. 36 m in total. two jointing pits estimated at 100 m^2 each within the intertidal area; and tidal range at widest point of the beach, and therefore cable length across the intertidal area of 56 m. Intertidal Area disturbed at Seton Sands beach landfall option is 14,636 m^2 which equates to 1.1% of total beach area measure from Wrecked Craigs to Fenny Ness resulting from: the cable corridor width which is disturbed by installation	Sub-tidal area of seabed disturbed across export cable corridor is 2.51km^2 (2.5 % of Offshore Export Cable Corridor) resulting from the export cable installation: AC selected as worst case as it utilises the largest possible number of cables DC options no longer considered. maximum cable length for each of the two cables is approximately 83.3 km; and each of the two cables are installed in a separate trench resulting in two trenches in total. Intertidal area disturbed at the Cockenzie beach landfall option is ~875 m^2 resulting from: the cable corridor width which is disturbed by installation equipment which is six metres for each of the two trenches i.e. 12 m in total. two jointing pits estimated at 100 m^2 each within the intertidal area; and tidal range at widest point of the beach, and therefore cable length across the intertidal area of 56 m. Seton Sands option no longer under consideration.	Cable corridor length remains the same (83.3 km), there is a reduction in number of export cables from six to two (reduction in overall footprint of 17.5 %), resulting in the proportional reduction in disturbed habitats caused by construction.

Potential Impact	Original Development Design Envelope (ICOL, 2013)	Revised Development Design Envelope	Difference between Envelopes
	equipment which is six metres for each of the six trenches; two jointing pits estimated at 100 m^2 each; and tidal range at widest point of the beach, and therefore cable length across the intertidal area of 401 m.		
Indirect impacts of temporary increases in SSC from construction based activities and associated deposition	Model outputs of anticipated SSC, deposition and sediment transportation from installation of the cable by energetic means (*Chapter 10, of the ES*).	Model outputs of anticipated SSC, deposition and sediment transportation from installation of the cable by energetic means (*Chapter 10, of the Original Development ES*).	Cable corridor length remains the same (83.3 km), there is a reduction in number of export cables from six to two (reduction in overall footprint of 17.5 %), resulting in the proportional reduction in temporary increases in SSC.
Release of contaminants bound in sediments	Sediment release as per 'Indirect impacts of temporary increases in SSC from construction based activities and associated deposition' impact (above). Contaminant levels as per baseline characterisation in Section 12.5.3.	Sediment release as per 'Indirect impacts of temporary increases in SSC from construction based activities and associated deposition' impact (above). Contaminant levels as per baseline characterisation in Section 12.5.3 for the Original Development ES.	Cable corridor length remains the same (83.3 km), there is a reduction in number of export cables from six to two (reduction in overall footprint of 17.5 %), resulting in the proportional reduction in

Potential Impact	Original Development Design Envelope (ICOL, 2013)	Revised Development Design Envelope	Difference between Envelopes
			disturbed habitats caused by construction.
Secondary impacts of decreased primary production due to increased SSC within the water column	Sediment release as per 'Indirect impacts of temporary increases in SSC from construction based activities and associated deposition' impact (above).	Sediment release as per 'Indirect impacts of temporary increases in SSC from construction based activities and associated deposition' impact (above).	Cable corridor length remains the same (83.3 km), there is a reduction in number of export cables from six to two (reduction in overall footprint of 17.5 %), resulting in the proportional reduction in disturbed habitats caused by construction.
Potential release of pollutants from construction plant	Sources from vessels and plant associated with the construction of Export Cable and associated works.	Sources from vessels and plant associated with the construction of Export Cable and associated works.	Cable corridor length remains the same (83.3 km), there is a reduction in number of export cables from six to two (reduction in overall footprint of 17.5 %), resulting in the proportional reduction in use of vessels and plant.

Potential Impact	Original Development Design Envelope (ICOL, 2013)	Revised Development Design Envelope	Difference between Envelopes
Introduction of NIS	Introduction from vessels and plant associated with the construction of Export Cable and associated works.	Introduction from vessels and plant associated with the construction of Export Cable and associated works.	Cable corridor length remains the same (83.3 km), there is a reduction in number of export cables from six to two (reduction in overall footprint of 17.5 %), resulting in the proportional reduction in use of vessels and plant.
Operation & Maintenance Phase			
Loss original of habitat	Total area of original habitat loss = 0.6 km^2 resulting from: Protection of 20% of each of the 83.3 km long Export Cables. Protection material 6.0 m wide.	Total area of original habitat loss = 0.4 km^2 resulting from: Protection of 20% of each of the 83.3 km long Export Cables. Protection material 6.0 m wide.	Cable corridor length remains the same (83.3 km), there is a reduction in number of export cables from six to two, resulting in the proportional reduction in loss of habitat.
Colonisation of introduced substrata leading to a change in the benthic ecology and/or biodiversity	Introduction of new substrate available for colonisation from Export Cable protection which is predicted to be installed on a maximum of 20% of the total cable length for each cable.	Introduction of new substrate available for colonisation from Export Cable protection which is predicted to be installed on a maximum of 20% of the total cable length for each cable.	Cable corridor length remains the same (83.3 km), there is a reduction in number of export cables from six to two, resulting in the

Potential Impact	Original Development Design Envelope (ICOL, 2013)	Revised Development Design Envelope	Difference between Envelopes
			proportional reduction in introduced substrata.
Provision of Introduced Substrata Facilitating Spread of NIS	Introduction of new substrate available for colonisation from Export Cable protection which is predicted to be installed on a maximum of 20% of the total cable length for each Export Cable.	Introduction of new substrate available for colonisation from Export Cable protection which is predicted to be installed on a maximum of 20% of the total cable length for each Export Cable.	Cable corridor length remains the same (83.3 km), there is a reduction in number of export cables from six to two, resulting in the proportional reduction in introduced substrata.
Potential release of pollutants from construction plant e.g. from accidental spillage/leakage or sacrificial anodes	Source from vessels and plant associated with the O&M of Export Cables, and associated works.	Source from vessels and plant associated with the O&M of Export Cables, and associated works.	Cable corridor length remains the same (83.3 km), there is a reduction in number of export cables from six to two, with an increase in disturbed footprint per cable during construction from 6 m to 15 m, resulting in the proportional reduction of O & M vessel and plant requirements.

Potential Impact	Original Development Design Envelope (ICOL, 2013)	Revised Development Design Envelope	Difference between Envelopes
Responses to EMF and thermal emissions associated with cabling	Total Export Cable length of approximately 83.3 km for each six cables, suitably buried to a target depth of 1.0 m and protected where burial is not practicable.	Total Export Cable length of approximately 83.3 km for each two cables, suitably buried to a target depth of 1.0 m and protected where burial is not practicable.	Cable corridor length remains the same (83.3 km), there is a reduction in number of export cables from six to two, with an increase in disturbed footprint per cable during construction from 6 m to 15 m.
Temporary habitat disturbance from O&M activities	Annual disturbance from Export Cable reburial is 0.007 km^2 equating to 0.005% of the Export Cable Corridor. This results from a maximum predicted reburial of 10% of the 83.3 km Export Cable length for each of the six cables during the operational phase.	Annual disturbance from Export Cable reburial is 0.002 km^2 equating to 0.002% of the Export Cable Corridor. This results from a maximum predicted reburial of 10% of the 83.3 km Export Cable length for each of the two cables during the operational phase.	Cable corridor length remains the same (83.3 km), there is a reduction in number of export cables from six to two, resulting in the proportional reduction of O & M activities.

8.1.4 Revised Development Embedded Mitigation

241. Embedded Mitigation for the Revised Development will comprise of mitigation measures to minimise environmental effects which were captured within the Design Envelope for the Original Development, as follows:

- Vessels and plant relating to construction, operation and decommissioning activities will follow best practice and guidance for pollution at sea, detailed in the final Environmental Management Plan (EMP) to reduce and coordinate response to pollution events if they were to occur. The final EMP will follow OSPAR, IMO and MARPOL guidelines and industry best practices regarding pollution at sea, this includes provision for storage of pollutants and identifies products suitable for use in the marine environment. The EMP will be finalised prior to construction;

- The risk of invasive species introduction will be managed through prevention methods by following best practice, for example the International Convention for the Control and Management of Ships' Ballast Water and Sediments (BWM), and the Scottish Code of Practice on non-native species. Details will be confirmed in the EMP prior to construction;
- Cables will be suitably buried or will be protected by other means when burial is not practicable which will reduce the impacts of loss of original habitat; and
- For any drilling activities, reversed circulation (air), sea water, water based mud, or synthetic (biodegradable) oil will be used. These compounds have been shown to have reduced environmental impacts over traditional oil based muds. For example, studies at some offshore drilling platforms using water-based drilling mud's have found no adverse effects (Daan and Mulder, 1996).

8.1.5 Commitment to Consent Conditions

242. As noted in Section 2.2.3, ICOL propose to commit to the same Consent conditions (that will further minimise the impacts of the development on the environment) that were granted for the Original Development for the application of the Revised Development.

243. These consent conditions have taken into account any relevant consultation responses to the Original Development EIA from key stakeholders in relation to benthic ecology in determining the acceptability of the Original Development; the most relevant consent conditions are summarised in Table 8-4. Conditions in full are provided in Appendix A.

Table 8-4: Summary of the Most Relevant Consent Conditions Related to Benthic Ecology

Requirement	Description
Production of a Construction Method Statement (CMS)	Condition will ensure the appropriate construction management of the Development, taking into account mitigation measures to protect the environment (including benthic ecology) and other users of the marine area.
Production of a Project Environmental Monitoring Programme ("PEMP")	Condition will ensure that appropriate and effective monitoring of the impacts of the Development on Benthic Communities is undertaken.
Production of an Environmental Management Plan	Setting out, for approval relevant environmental management and mitigation measures to be applied during the construction and operation of the Development, including those matters identified as mitigation in the Original Development EIA as listed above.
Production of an Operations and Maintenance Plan	Setting out, for approval, the operations and maintenance procedures and the management of impacts during the operational phase so as to safeguard environmental interests.

Requirement	Description
Production of a Cable Plan	Setting out, for approval, the installation methods for the cables (including burial) to ensure it remains consistent with the installation process assessed in the ES as relevant to benthic ecology.
Appointment of an ECoW	Appointment of an approved Ecological clerk of Works (ECoW) to provide independent audit and reporting of compliance with various requirements of the consent relating to environmental management and to ensure that appropriate and effective monitoring of the impacts of the development is undertaken.

8.1.6 Scoping of the EIA for the Revised Development

244. The Embedded Mitigation (Section 8.1.4) and the commitment to relevant consent conditions considered alongside the changes in the design envelope will be taken into consideration when determining the scope of the Revised Development EIA. Due to the smaller overall footprint of development (see Section 4), the potential impacts on Benthic Ecology for the Revised Development, would be less than the worst case scenario impacts from the Original Development which were not significant. Therefore, the worst case scenario conclusions reached in the Original Development should remain valid for the Revised Development.

245. Tables 8-5 and 8-6 summarise the residual effect for the Original Development and details whether the potential impact will be scoped out of the Revised Development EIA, with a relevant justification provided where relevant.

Table 8-5: Summary of Potential Impacts – Wind Farm

Potential Impact	Residual Effect (ICOL, 2013)		Scoped in or out of the Revised Development EIA	Justification
Construction (& Decommissioning) Phase				
Direct temporary disturbance to seabed habitats caused by construction based activities	SS.SMx.CMx.MysThyMx	Minor	Scoped out	The impacts from the Original Development were assessed as not significant and, as a result of the design changes described above, the Revised Development is anticipated to have less of an impact. Further assessment of this potential impact is therefore scoped out of the Revised Development EIA.
	SS.SCS.CCS.MedLumVen, SS.SCS.OCS, *Arctica islandica*	Minor/ Moderate		

Potential Impact	Residual Effect (ICOL, 2013)		Scoped in or out of the Revised Development EIA	Justification
Indirect impacts of temporary increases in SSC from construction based activities	SS.SMx.CMx.MysThyMx	Minor	Scoped out	The impacts from the Original Development were assessed as not significant and, as a result of the design changes described above, the Revised Development is anticipated to have less of an impact. Further assessment of this potential impact is therefore scoped out of the Revised Development EIA.
	SS.SCS.CCS.MedLumVen, SS.SCS.OCS, *Arctica islandica*	Minor/ Moderate		
Deposition of resuspended sediments leading to smothering	SS.SMx.CMx.MysThyMx,	Minor	Scoped out	The impacts from the Original Development were assessed as not significant and, as a result of the design changes described above, the Revised Development is anticipated to have less of an impact. Further assessment of this potential impact is therefore scoped out of the Revised Development EIA.
	SS.SCS.CCS.MedLumVen, SS.SCS.OCS, *Arctica islandica*	Minor/ Moderate		
Release of PAH, PCB, organotins bound in sediments	SS.SMx.CMx.MysThyMx	Minor	Scoped out	The impacts from the Original Development were assessed as not significant and, as a result of the design changes described above, the Revised Development is anticipated to have less of an impact. Further assessment of this potential impact is therefore scoped out of the Revised Development EIA.
	SS.SCS.CCS.MedLumVen, SS.SCS.OCS	Minor/ Moderate		
Release of metals bound in sediments	SS.SMx.CMx.MysThyMx	Negligible/ Minor	Scoped out	The impacts from the Original Development were assessed as not significant and, as a result of the design changes described above, the Revised Development is anticipated to have less of an impact. Further assessment of this potential impact is therefore scoped out of the Revised Development EIA.
	SS.SCS.CCS.MedLumVen, SS.SCS.OCS	Minor		

Potential Impact	Residual Effect (ICOL, 2013)		Scoped in or out of the Revised Development EIA	Justification
Secondary impacts of decreased primary production due to increased SSC of the water column	SS.SMx.CMx.MysThyMx	Negligible/ Minor	Scoped out	The impacts from the Original Development were assessed as not significant and, as a result of the design changes described above, the Revised Development is anticipated to have less of an impact. Further assessment of this potential impact is therefore scoped out of the Revised Development EIA.
	SS.SCS.CCS.MedLumVen, SS.SCS.OCS	Minor		
Operation & Maintenance Phase				
Loss of original habitat	SS.SMx.CMx.MysThyMx	Minor	Scoped out	The impacts from the Original Development were assessed as not significant and, as a result of the design changes described above, the Revised Development is anticipated to have less of an impact. Further assessment of this potential impact is therefore scoped out of the Revised Development EIA.
	SS.SCS.CCS.MedLumVen, SS.SCS.OCS, *Arctica islandica*	Minor/ Moderate		
Changes in hydrodynamic regime and sediment transport	SS.SMx.CMx.MysThyMx	Negligible/ Minor	Scoped out	The impacts from the Original Development were assessed as not significant and, as a result of the design changes described above, the Revised Development is anticipated to have less of an impact. Further assessment of this potential impact is therefore scoped out of the Revised Development EIA.
	SS.SCS.CCS.MedLumVen, SS.SCS.OCS, *Arctica islandica*	Minor		
Scour and associated sediment transportation leading to changes in habitats	SS.SMx.CMx.MysThyMx	Minor	Scoped out	The impacts from the Original Development were assessed as not significant and, as a result of the design changes described above, the Revised Development is anticipated to have less of an impact. Further assessment of this potential
	SS.SCS.CCS.MedLumVen, SS.SCS.OCS, Arctica islandica	Minor/ Moderate		

Potential Impact	Residual Effect (ICOL, 2013)		Scoped in or out of the Revised Development EIA	Justification
				impact is therefore scoped out of the Revised Development EIA.
Colonisation of introduced substrata leading to a change in the benthic ecology and/or biodiversity	SS.SMx.CMx.MysThyMx	Minor	Scoped out	The impacts from the Original Development were assessed as not significant and, as a result of the design changes described above, the Revised Development is anticipated to have less of an impact. Further assessment of this potential impact is therefore scoped out of the Revised Development EIA.
	SS.SCS.OCS and SS.SCS.CCS.MedLumVen	Minor/ Moderate		
Introduced Substrata facilitating the Spread of NIS	SS.SMx.CMx.MysThyMx	Minor/ Moderate	Scoped out	The impacts from the Original Development were assessed as not significant and, as a result of the design changes described above, the Revised Development is anticipated to have less of an impact. Further assessment of this potential impact is therefore scoped out of the Revised Development EIA.
	SS.SCS.OCS and SS.SCS.CCS.MedLumVen	Moderate		
Potential release of pollutants from operation plant	SS.SMx.CMx.MysThyMx	Minor	Scoped out	The impacts from the Original Development were assessed as not significant and, as a result of the design changes described above, the Revised Development is anticipated to have less of an impact. Further assessment of this potential impact is therefore scoped out of the Revised Development EIA.
	SS.SCS.OCS and SS.SCS.CCS.MedLumVen	Minor/ Moderate		
Responses to EMF and thermal emissions	SS.SMx.CMx.MysThyMx	Negligible/ Minor	Scoped out	The impacts from the Original Development were assessed as not significant and, as a result of the design changes described above, the Revised Development is anticipated to have less of an impact. Further assessment of this potential impact is therefore scoped out of the Revised Development EIA.
	SS.SCS.OCS and SS.SCS.CCS.MedLumVen	Minor		

Potential Impact	Residual Effect (ICOL, 2013)		Scoped in or out of the Revised Development EIA	Justification
Temporary habitat disturbance from O&M activities	SS.SMx.CMx.MysThyMx	Negligible/ Minor	Scoped out	The impacts from the Original Development were assessed as not significant and, as a result of the design changes described above, the Revised Development is anticipated to have less of an impact. Further assessment of this potential impact is therefore scoped out of the Revised Development EIA.
	SS.SCS.OCS and SS.SCS.CCS.MedLumVen	Minor		

Table 8-6: Summary of Potential Impacts – Offshore Export Cable Corridor

Potential Impact	Residual Effect (ICOL, 2013)		Scoped in or out of the Revised Development EIA	Justification
Construction (& Decommissioning)				
Direct Temporary disturbance of seabed habitats caused by construction activities	SS.SMu.CFiMu.SpnMeg, SS.SCS.CCS, Stony Reef	Minor/Moderate	Scoped out	The impacts from the Original Development were assessed as not significant and, as a result of the design changes described above, the Revised Development is anticipated to have less of an impact. Further assessment of this potential impact is therefore scoped out of the Revised Development EIA.
	SS.SMx.CMx, SS.SSa.CMuSa, SS.SMx.CMx.MysThyMx SS.SMx.CMx.FluHyd	Minor		
	LR.MLR.BF.PelB, LR.HLR.MusB.Cht.Cht, LR.MLR.BF.FspiB	Minor		
	LS.LSa.MoSa.AmSco.Sco, LS.LSa.FiSa.Po, LS.LSa.FiSa.Po.Aten	Negligible/ Minor		

Potential Impact	Residual Effect (ICOL, 2013)		Scoped in or out of the Revised Development EIA	Justification
Indirect impacts of temporary increases in SSC from construction based activities	SS.SMu.CFiMu.SpnMeg, SS.SCS.CCS, Stony Reef	Minor	Scoped out	The impacts from the Original Development were assessed as not significant and, as a result of the design changes described above, the Revised Development is anticipated to have less of an impact. Further assessment of this potential impact is therefore scoped out of the Revised Development EIA.
	SS.SMx.CMx, SS.SSa.CMuSa, SS.SMx.CMx.MysThyMx SS.SMx.CMx.FluHyd	Negligible/Minor		
	LR.MLR.BF.PelB, LR.HLR.MusB.Cht.Cht, LR.MLR.BF.FspiB, IR.MIR.KR.Ldig.Ldig, LR.LLR.F.FSpi.FS	Negligible/Minor		
	LS.LSa.MoSa.AmSco.Sco, LS.LSa.FiSa.Po, LS.LSa.FiSa.Po.Aten	Negligible/Minor		
Deposition of resuspended sediments leading to smothering	SS.SMu.CFiMu.SpnMeg, SS.SCS.CCS, Stony Reef	Minor	Scoped out	The impacts from the Original Development were assessed as not significant and, as a result of the design changes described above, the Revised Development is anticipated to have less of an impact. Further assessment of this potential impact is therefore scoped out of the Revised Development EIA.
	SS.SMx.CMx, SS.SSa.CMuSa, SS.SMx.CMx.MysThyMx SS.SMx.CMx.FluHyd	Negligible/Minor		
	LR.MLR.BF.PelB, LR.HLR.MusB.Cht.Cht, LR.MLR.BF.FspiB, IR.MIR.KR.Ldig.Ldig, LR.LLR.F.FSpi.FS	Negligible/Minor		
	LS.LSa.MoSa.AmSco.Sco, LS.LSa.FiSa.Po, LS.LSa.FiSa.Po.Aten	Negligible/Minor		
Release of contaminants bound in sediments	SS.SMu.CFiMu.SpnMeg, SS.SCS.CCS, Stony Reef	Minor	Scoped out	The impacts from the Original Development were assessed as not significant and, as a result of the design changes described above, the Revised Development is anticipated to have less of an impact. Further
	SS.SMx.CMx, SS.SSa.CMuSa, SS.SMx.CMx.MysThyMx SS.SMx.CMx.FluHyd	Negligible/Minor		

Potential Impact	Residual Effect (ICOL, 2013)		Scoped in or out of the Revised Development EIA	Justification
	LR.MLR.BF.PelB, LR.HLR.MusB.Cht.Cht, LR.MLR.BF.FspiB, IR.MIR.KR.Ldig.Ldig, LR.LLR.F.FSpi.FS	Negligible/Minor		assessment of this potential impact is therefore scoped out of the Revised Development EIA.
	LS.LSa.MoSa.AmSco.Sco, LS.LSa.FiSa.Po, LS.LSa.FiSa.Po.Aten	Negligible/Minor		
Secondary impacts of decreased primary production due to increased SSC of the water column	SS.SMu.CFiMu.SpnMeg, SS.SCS.CCS, Stony Reef	Minor	Scoped out	The impacts from the Original Development were assessed as not significant and, as a result of the design changes described above, the Revised Development is anticipated to have less of an impact. Further assessment of this potential impact is therefore scoped out of the Revised Development EIA.
	SS.SMx.CMx, SS.SSa.CMuSa, SS.SMx.CMx.MysThyMx SS.SMx.CMx.FluHyd	Negligible/Minor		
	LR.MLR.BF.PelB, LR.HLR.MusB.Cht.Cht, LR.MLR.BF.FspiB, IR.MIR.KR.Ldig.Ldig, LR.LLR.F.FSpi.FS	Negligible/Minor		
	LS.LSa.MoSa.AmSco.Sco, LS.LSa.FiSa.Po, LS.LSa.FiSa.Po.Aten	Negligible/Minor		
Potential release of pollutants from construction plant	SS.SMu.CFiMu.SpnMeg, SS.SCS.CCS, Stony Reef	Minor/Moderate	Scoped out	The impacts from the Original Development were assessed as not significant and, as a result of the design changes described above, the Revised Development is anticipated to have less of an impact. Further assessment of this potential impact is therefore scoped out of the Revised Development EIA.
	SS.SMx.CMx, SS.SSa.CMuSa, SS.SMx.CMx.MysThyMx SS.SMx.CMx.FluHyd	Minor		
	LR.MLR.BF.PelB, LR.HLR.MusB.Cht.Cht, LR.MLR.BF.FspiB, IR.MIR.KR.Ldig.Ldig, LR.LLR.F.FSpi.FS	Minor		
	LS.LSa.MoSa.AmSco.Sco, LS.LSa.FiSa.Po, LS.LSa.FiSa.Po.Aten	Minor		

Potential Impact	Residual Effect (ICOL, 2013)		Scoped in or out of the Revised Development EIA	Justification
Introduction of NIS	SS.SMu.CFiMu.SpnMeg, SS.SCS.CCS, Stony Reef	Moderate	Scoped out	The impacts from the Original Development were assessed as not significant and, as a result of the design changes described above, the Revised Development is anticipated to have less of an impact. Further assessment of this potential impact is therefore scoped out of the Revised Development EIA.
	SS.SMx.CMx, SS.SSa.CMuSa, SS.SMx.CMx.MysThyMx SS.SMx.CMx.FluHyd	Minor/Moderate		
	LR.MLR.BF.PelB, LR.HLR.MusB.Cht.Cht, LR.MLR.BF.FspiB, IR.MIR.KR.Ldig.Ldig, LR.LLR.F.FSpi.FS	Minor/Moderate		
	LS.LSa.MoSa.AmSco.Sco, LS.LSa.FiSa.Po, LS.LSa.FiSa.Po.Aten	Minor/Moderate		
Operation & Maintenance Phase				
Loss of original habitat	SS.SMu.CFiMu.SpnMeg, SS.SCS.CCS, Stony Reef	Minor	Scoped out	The impacts from the Original Development were assessed as not significant and, as a result of the design changes described above, the Revised Development is anticipated to have less of an impact. Further assessment of this potential impact is therefore scoped out of the Revised Development EIA.
	SS.SMx.CMx, SS.SSa.CMuSa, SS.SMx.CMx.MysThyMx SS.SMx.CMx.FluHyd	Negligible/Minor		
	LR.MLR.BF.PelB, LR.HLR.MusB.Cht.Cht, LR.MLR.BF.FspiB, IR.MIR.KR.Ldig.Ldig, LR.LLR.F.FSpi.FS	Negligible/Minor		
	LS.LSa.MoSa.AmSco.Sco, LS.LSa.FiSa.Po, LS.LSa.FiSa.Po.Aten	Negligible/Minor		
Colonisation of cable protection leading to a change in benthic ecology and/or biodiversity	SS.SMu.CFiMu.SpnMeg, SS.SCS.CCS, Stony Reef	Minor	Scoped out	The impacts from the Original Development were assessed as not significant and, as a result of the design changes described above, the Revised Development is anticipated to have less of an impact. Further
	SS.SMx.CMx, SS.SSa.CMuSa, SS.SMx.CMx.MysThyMx SS.SMx.CMx.FluHyd	Negligible/Minor		

Potential Impact	Residual Effect (ICOL, 2013)		Scoped in or out of the Revised Development EIA	Justification
				assessment of this potential impact is therefore scoped out of the Revised Development EIA.
Provision of New Substrata Facilitating the Spread of NIS	SS.SMu.CFiMu.SpnMeg, SS.SCS.CCS	Moderate	Scoped out	The impacts from the Original Development were assessed as not significant and, as a result of the design changes described above, the Revised Development is anticipated to have less of an impact. Further assessment of this potential impact is therefore scoped out of the Revised Development EIA.
	SS.SMx.CMx, SS.SSa.CMuSa, SS.SMx.CMx.MysThyMx SS.SMx.CMx.FluHyd	Minor/Moderate		
Responses to EMF and thermal emissions	SS.SMu.CFiMu.SpnMeg, SS.SCS.CCS, Stony Reef	Minor	Scoped out	The impacts from the Original Development were assessed as not significant and, as a result of the design changes described above, the Revised Development is anticipated to have less of an impact. Further assessment of this potential impact is therefore scoped out of the Revised Development EIA.
	SS.SMx.CMx, SS.SSa.CMuSa, SS.SMx.CMx.MysThyMx SS.SMx.CMx.FluHyd	Negligible/Minor		
	LR.MLR.BF.PelB, LR.HLR.MusB.Cht.Cht, LR.MLR.BF.FspiB, IR.MIR.KR.Ldig.Ldig, LR.LLR.F.FSpi.FS	Negligible/Minor		
	LS.LSa.MoSa.AmSco.Sco, LS.LSa.FiSa.Po, LS.LSa.FiSa.Po.Aten	Negligible/Minor		
Potential release of pollutants from operation plant	SS.SMu.CFiMu.SpnMeg, SS.SCS.CCS, Stony Reef	Minor/Moderate	Scoped out	The impacts from the Original Development were assessed as not significant and, as a result of the design changes described above, the Revised Development is
	SS.SMx.CMx, SS.SSa.CMuSa, SS.SMx.CMx.MysThyMx SS.SMx.CMx.FluHyd	Minor		

Potential Impact	Residual Effect (ICOL, 2013)		Scoped in or out of the Revised Development EIA	Justification
	LR.MLR.BF.PelB, LR.HLR.MusB.Cht.Cht, LR.MLR.BF.FspiB, IR.MIR.KR.Ldig.Ldig, LR.LLR.F.FSpi.FS	Minor		anticipated to have less of an impact. Further assessment of this potential impact is therefore scoped out of the Revised Development EIA.
	LS.LSa.MoSa.AmSco.Sco, LS.LSa.FiSa.Po, LS.LSa.FiSa.Po.Aten	Minor		
Temporary habitat disturbance due to O&M activities	SS.SMu.CFiMu.SpnMeg, SS.SCS.CCS, Stony Reef	Minor	Scoped out	The impacts from the Original Development were assessed as not significant and, as a result of the design changes described above, the Revised Development is anticipated to have less of an impact. Further assessment of this potential impact is therefore scoped out of the Revised Development EIA.
	SS.SMx.CMx, SS.SSa.CMuSa, SS.SMx.CMx.MysThyMx SS.SMx.CMx.FluHyd	Negligible/Minor		
	LR.MLR.BF.PelB, LR.HLR.MusB.Cht.Cht, LR.MLR.BF.FspiB, IR.MIR.KR.Ldig.Ldig, LR.LLR.F.FSpi.FS	Negligible/Minor		
	LS.LSa.MoSa.AmSco.Sco, LS.LSa.FiSa.Po, LS.LSa.FiSa.Po.Aten	Negligible/Minor		

Scoping of Cumulative Impact Assessment

246. The following list confirms the other plans, projects and activities (selected from the list in Section 5.7) considered in the scoping of the CIA in respect of benthic ecology.

- Neart Na-Gaoithe Offshore Windfarm
- Seagreen Alpha and Bravo Offshore Windfarms

247. This is the same basis for the CIA for benthic ecology as was undertaken in the EIA for the Original Development (all other projects set out in Section 5.7 being considered to be too distant from the Revised Development for significant cumulative effects on benthic ecological receptors to occur.

248. Table 8-7 presents the Original Development residual effect from the for all cumulative impacts considered and details whether the potential cumulative impact has been scoped out of the Revised Development EIA, with a relevant justification.

Table 8-7: Summary of Potential Impacts – Revised Development with Other Plans, Projects and Activities

Potential Impact	Residual Effect (ICOL, 2013)		Scoped in or out of the Revised Development EIA	Justification
Construction (& Decommissioning) Phase				
Direct temporary disturbance to seabed habitats caused by construction based activities	SS.SMx.CMx.MysThyMx	Minor	Scoped out.	The cumulative impacts from the Original Development were assessed as not significant. As a result of the design changes described above, coupled with no change to the projects required to be considered cumulatively, it is anticipated that that there will be less of a cumulative impact associated with the Revised Development. Further assessment is therefore scoped out of the Revised Development CIA.
	SS.SCS.CCS.MedLumVen, SS.SCS.OCS, *Arctica islandica*	Minor/Moderate		
Indirect impacts of temporary increases in SSC from construction based activities	SS.SMx.CMx.MysThyMx	Minor	Scoped out.	
	SS.SCS.CCS.MedLumVen, SS.SCS.OCS, *Arctica islandica*	Minor/Moderate		
Deposition of resuspended sediments leading to smothering	SS.SMx.CMx.MysThyMx,	Minor	Scoped out.	
	SS.SCS.CCS.MedLumVen, SS.SCS.OCS, *Arctica islandica*	Minor/Moderate		
Release of PAH, PCB, organotins bound in sediments	SS.SMx.CMx.MysThyMx	Minor	Scoped out.	
	SS.SCS.CCS.MedLumVen, SS.SCS.OCS	Minor/Moderate		
Release of metals bound in sediments	SS.SMx.CMx.MysThyMx	Negligible/Minor	Scoped out.	
	SS.SCS.CCS.MedLumVen, SS.SCS.OCS	Minor		
Secondary impacts of decreased primary production due to increased SSC of the water column	SS.SMx.CMx.MysThyMx	Negligible/Minor	Scoped out.	
	SS.SCS.CCS.MedLumVen, SS.SCS.OCS	Minor		

Potential Impact	Residual Effect (ICOL, 2013)		Scoped in or out of the Revised Development EIA	Justification
Operation & Maintenance Phase				
Loss of original habitat	SS.SMx.CMx.MysThyMx	Minor	Scoped out.	The cumulative impacts from the Original Development were assessed as not significant. As a result of the design changes described above, coupled with no change to the projects required to be considered cumulatively, it is anticipated that that there will be less of a cumulative impact associated with the Revised Development. Further assessment is therefore scoped out of the Revised Development CIA.
	SS.SCS.CCS.MedLumVen, SS.SCS.OCS, *Arctica islandica*	Minor/Moderate		
Changes in hydrodynamic regime and sediment transport	SS.SMx.CMx.MysThyMx	Negligible/Minor	Scoped out.	
	SS.SCS.CCS.MedLumVen, SS.SCS.OCS, *Arctica islandica*	Minor		
Scour and associated sediment transportation leading to changes in habitats	SS.SMx.CMx.MysThyMx	Minor	Scoped out.	
	SS.SCS.CCS.MedLumVen, SS.SCS.OCS, Arctica islandica	Minor/Moderate		
Colonisation of introduced substrata leading to a change in the benthic ecology and/or biodiversity	SS.SMx.CMx.MysThyMx	Minor	Scoped out.	
	SS.SCS.OCS and SS.SCS.CCS.MedLumVen	Minor/Moderate		
Introduced Substrata facilitating the Spread of NIS	SS.SMx.CMx.MysThyMx	Minor/Moderate	Scoped out.	
	SS.SCS.OCS and SS.SCS.CCS.MedLumVen	Moderate		
Potential release of pollutants from operation plant	SS.SMx.CMx.MysThyMx	Minor	Scoped out.	
	SS.SCS.OCS and SS.SCS.CCS.MedLumVen	Minor/Moderate		
Responses to EMF and thermal emissions	SS.SMx.CMx.MysThyMx	Negligible/Minor	Scoped out.	
	SS.SCS.OCS and SS.SCS.CCS.MedLumVen	Minor		

Potential Impact	Residual Effect (ICOL, 2013)		Scoped in or out of the Revised Development EIA	Justification
Temporary habitat disturbance from O&M activities	SS.SMx.CMx.MysThyMx	Negligible/Minor	Scoped out.	
	SS.SCS.OCS and SS.SCS.CCS.MedLumVen	Minor		

8.1.7 Approach to EIA

249. As noted in Section 2, the intention of the EIA is to focus on those impacts that are likely to have significant effects (or those effects that are currently uncertain).

250. Based on the evidence summarised from the Original Development EIA and considering the Design Envelope of the Revised Development by comparison to the Original Development, it is concluded that all of the potential effects on Benthic Ecology should be scoped out of the Revised Development EIA. Therefore, it is proposed that no benthic ecology assessment would be included within the Revised Development ES.

8.1.8 Approach to HRA

251. The information below summarises the HRA process applicable to the Revised Development in relation to benthic ecology, for more details please see the HRA Screening Report, Appendix B. The HRA Screening Report is designed to provide information upon potential connectivity of the Revised Development and Natura sites, in order to determine for which designated features it is possible to conclude no 'likely significant effect' (LSE) and so screen out of further consideration at the Appropriate Assessment stage of the HRA.

252. HRA screening has been undertaken by following available and relevant guidance in assessing potential impacts which may arise during the construction, operation and decommissioning of the offshore elements of the Revised Development (the Wind Farm and OfTW) by:

a) Identifying relevant Natura 2000 sites with benthic ecology or marine habitats listed as qualifying features, for which there is potential connectivity from an impact from the construction, operation and decommissioning activities associated with the Wind Farm and OfTW;

b) Identifying likely significant effects (LSE) associated with the construction, operation and decommissioning of the Wind Farm and OfTW; and

c) Considering potential impacts in relation to qualifying features of identified Natura sites in relation to their conservation objectives.

253. The HRA screening (Appendix B) has reviewed available literature, modelling outputs and impact assessments based upon the Project Design Envelope and has drawn on the evidence base set out in the Original Development EIA and AA.

254. The following Natura 2000 sites, which include Annex 1 habitats as qualifying features, were assessed for potential connectivity with an impact from the construction, operation and decommissioning activities associated with the Wind Farm and OfTW:

- Isle of May SAC;
- Firth of Tay & Eden Estuary SAC; and
- Moray Firth SAC.

255. The HRA screening report (Appendix B) has concluded that there is no potential connectivity between these SACs and the Development Area in relation to benthic ecology or Annex I habitat interests. This is due to the distance of the habitats from the Development Area and the limited pathways for, and range of, direct or indirect effects. The closest of these sites to the Revised Development is the Isle of May SAC which runs approximately 5 km from the Revised Inch Cape Offshore Cable Corridor, but it is considered there will be no connectivity to the rocky reefs that are designated as Annex 1 habitat.

256. For SACs identified with migratory fish or marine mammal qualifying features that are linked to habitat-based conservation objectives, or have freshwater Annex 1 habitats as qualifying features (e.g. River Tay SAC), these are identified and assessed within the relevant section of this scoping report and the HRA screening report.

8.1.9 Scoping Questions – Benthic Ecology

- Do you agree that the existing data available to describe the benthic ecology baseline remains sufficient to describe the baseline environment in relation to the Revised Development?
- Do you agree that, in all cases, the assessment scenario previously applied in conducting the Original Development EIA represents the worst case when compared to the Revised Development?
- Do you agree that the embedded mitigation, and the proposed use of consent conditions, described provides a suitable means for managing and mitigating the potential effects of the Revised Development on benthic ecological receptors?
- Do you agree, with the embedded mitigation in place, that the assessment of impacts on benthic ecology receptors should be scoped out of the EIA for the Revised Development?
- Do you agree that cumulative impacts on benthic ecology should be scoped out of EIA for the Revised Development based on the assumptions set out and the conclusions reached in the CIA for the Original Development?

- Do you agree there is no potential connectivity between these SACs and the Revised Development in relation to benthic ecology or Annex I habitat interests and therefore will not be considered at the Appropriate Assessment stage?

8.2 Natural Fish and Shellfish

8.2.1 Introduction

257. As described in Section 5, the purpose of this section is to provide sufficient detail on the potential effects on Natural Fish and Shellfish Ecology resulting from the construction, operation and maintenance and decommissioning of the Revised Development.

258. The detail provided will allow MS-LOT and their consultees to be clear about what they consider the significant effects of the proposal are likely to be and, therefore, whether they need to be subject to an EIA and be included within the ES.

259. In order to provide sufficient information to consultees reference is made to the baseline data gathered to inform the Original Development EIA, and to the outcomes of the impact assessment presented in the Original Development ES. Design, construction and operational changes between the Original Development and the Revised Development that are likely to have further impacts on natural fish and shellfish are also considered to inform any subsequent impact assessments.

260. For a full description of the design envelope parameters and changes please refer to Section 4. The Development Area for both the Original and Revised Development remains unchanged and can be seen in Figure 4-1.

261. This section concludes that for all but impact from piling, the likely impacts from the Revised Development will be less than those assessed for the Original Development and therefore, in line with the EIA regulations are not required to be included with the Revised Development ES. This is due to the following;

- Changes in the Revised Design Envelope (see Section 4);
- Baseline data remaining valid;
- No material changes to data collection;
- No material changes to assessment best practice; and
- Not significant effects concluded within the Original Development EIA.

Full details and justification are provided within this section.

8.2.2 Data Sources and Baseline Environment

262. This section identifies baseline data sources that have been used to characterise the fish and shellfish resource within and around the Revised Development, drawing predominantly from the data sources used to inform the Original Development EIA but updated where necessary with more recent data. Commentary is provided on the sufficiency of this data as a basis for scoping the Revised Development EIA.

Baseline Data

263. A variety of fish and shellfish datasets were collated and analysed to inform the Original Development EIA. Data was drawn from Development-specific surveys and studies commissioned by ICOL and from a desktop review of publicly available information. Those datasets considered to be relevant to the Revised Development are listed in Table 8-8 below. The data sources are more fully described in the Original Development EIA Chapter 13 (ICOL, 2013) and supporting technical studies.

Table 8-8: Baseline Datasets from the Original Development EIA

Dataset	Coverage	Data use	Date
ICOL-commissioned site specific surveys and studies			
Epibenthic & benthic surveys	Within and around Wind Farm Array and Export Cable Corridor	Trawl surveys incorporate fish species; grab and drop-down video data provides benthic habitat information	2010 and 2012
Fish trawl surveys	Within and around Wind Farm Array	Distribution and seasonality of quarterly fish species at the development site	2012
Sandeel habitat mapping	Within and around Wind Farm Array and Export Cable Corridor	Production of distribution maps of areas of sandeel habitat suitability	2012
Electromagnetic Field (EMF) study	Subsea cabling within Wind Farm Array and Export Cable Corridor	Review of knowledge base on effects of EMF on fish and shellfish	2013
Herring spawning study	Within and around Wind Farm Array and Export Cable Corridor	Reviews of data collected as part of the ICES International Herring Larvae Surveys (IHLS) and International Bottom Trawl Surveys (IBTS) ICES commercial fishing data, and site specific benthic and fish surveys to determine the likelihood and magnitude of any potential effects on herring stocks.	2013
External / pre-existing broader scale data and studies			
Landings data (Marine Scotland Science and ICES)	Within and around Wind Farm Array and Export Cable Corridor	Broader data on commercial landings of key fish and shellfish species in the region	2007-2011
Bycatch data (Marine Scotland Science)	Within and around Wind Farm Array and Export Cable Corridor	Data on fish and shellfish species discarded from fishing vessels recorded in the broader region	2010

Dataset	Coverage	Data use	Date
International Bottom Trawl Survey (IBTS) data (ICES)	Within and around Wind Farm Array and Export Cable Corridor	Data on fish species recorded in the broader region	2009-2013
Salmon migration routes (Malcom I, 2010)	Scottish waters	Summarises available information regarding the migratory routes used by Atlantic salmon, sea trout and European eel in Scottish coastal waters.	2010
Demersal gear survey data (Marine Scotland Science)	Scottish waters	Data on fish species recorded in the North Sea.	1927 - 2010
International Herring Larvae Survey (IHLS) data (ICES)	Within and around Wind Farm Array and Export Cable Corridor	Data on herring larvae distribution in the North Sea.	1991-2011
Fish sensitivity maps (Coull *et al.,* 1998; Ellis et al., 2012)	Within and around Wind Farm Array and Export Cable Corridor	Provides information on the distribution of spawning and nursery areas for key species around the UK.	1998 and 2012

264. The Development Area straddles two ICES rectangles: 41E7 covers the northern half of the Development Area while 42E7 covers the southern half of the Development Area and the Revised Offshore Export Cable Corridor. The Revised Offshore Export Cable Corridor runs from the south of the Development Area, to its landfall on the south coast of the Firth of Forth at Cockenzie in East Lothian.

265. Following the review of available data (Table 8-8 above) and completion of the site specific surveys, a number of receptor groups were derived against which each impact could be assessed. These receptor groups are defined in Table 8-9 below.

Table 8-9: Fish and Shellfish Receptor Groups

Receptor	Key Species
Mobile fish species	Whiting, plaice, haddock, plaice, mackerel, sea trout, European eel, sparling, squid, etc. (i.e. all species of fish not included in another specific receptor group).
Hearing specialists	Herring, sprat, allis shad, twaite shad, and cod.
Prey species (specifically sandeel)	Sandeel.
Electro-sensitive elasmobranchs	Ray and skate species, dogfish, spurdog, tope.
SAC qualifying feature species	Salmon, sea lamprey, river lamprey, Fresh Water Pearl Mussels.
Shellfish	Scallop, crab, lobster, *Nephrops*.

Data Validity

266. The following sections consider the sufficiency and validity of the available data in relation to spatial coverage and age. Where additional data of relevance is available, this has been reviewed and presented in the Additional Data Sources Section. In addition, where any new research has been published since the Original Development EIA was undertaken, which could affect the overall assessment of sensitivity of a receptor or magnitude of an impact, this research has been reviewed and summarised.

Data Coverage

267. As identified in Table 8-8, ICOL-commissioned site specific surveys were collected within and surrounding the Revised Development.

268. The location and extent of the Original Development EIA covers the seabed area required for the Revised Development. Therefore it is considered that the spatial coverage of the original site specific data remains valid and sufficient for the Revised Development.

269. The Original Development EIA fish trawl surveys were undertaken quarterly in 2012 (Amec, 2012). It is worth emphasising that the sampling locations were allocated based on the fish and shellfish areas of interest, including spawning, nursery and feeding grounds, refuge areas for crustaceans and migration routes for the local area (which encompasses the Revised Development Area). The locations were informed by geophysical information, in addition to desk based information for the local area. Locations were specified to provide a representative, but not exhaustive, coverage of the different areas and ground conditions, as defined by geophysical survey data collected previously (iXSurvey, 2011). Control stations were also built into the survey design, which would still be representative for the Revised Development. The site specific trawl survey methodology was agreed with Marine Scotland and their advisors Marine Scotland Science prior to commencement. Taking the above into account, the data collected during the fish trawl surveys therefore remains sufficient for the Revised Development EIA.

270. As for the fish trawl surveys, the herring spawning and sandeel habitat suitability studies and supporting data covered the whole Development Area; therefore in terms of spatial representation, this data on herring spawning and sandeel habitat still remains sufficient for the Revised Development EIA.

Age of the Data

271. As detailed within Table 8-8, site specific survey data for the Original Development EIA were collected in 2012, and this data was compared to broader scale, contextual information from a variety of other, publicly available, data sources also listed in Table 8-8.

272. Importantly, the key fish habitats, such as spawning and nursery areas, were defined through reference to key literature such as that presented in Coull et al. (1998) and Ellis et al. (2012). Both these studies are still currently widely used by industry and are considered to be 'worst case' as a basis for considering potential impacts on these key habitats. No update to these references has occurred since the Original Development EIA was completed and as such they remain the key source of data on spawning and nursery habitats.

273. The data used to inform the Herring Spawning Study, specifically the IHLS and IBTS data, covered the survey between 1991 to 2011 (inclusive), therefore the analysis was based on a 21-year average.

Additional Data Sources

274. A number of additional, more recent, data sources have been examined in order to describe the current state of knowledge surrounding natural fish populations in the area. This information is summarised below and has been taken into account in this report. In addition information has been provided on any research that has come to light since the publication for the Original Development ES, which can assist the assessment in relation to impacts arising from construction and operation (this is provided in the research updates section below).

275. Commercial fisheries data provides an insight into the range of species found within the region of the Development Area, although landings data is not exhaustive as bycatch are not recorded and the list of species is bias towards those of commercial importance. None the less a review has been undertaken of up to date landings data (Marine Scotland Science and ICES, 2012-2015) in order to ascertain whether the baseline presented within the Original Development ES remains valid for the Revised Development EIA.

276. Post Original Development ES data agrees with that presented in the Original Development ES and highlights the dominance of shellfish over white fish in commercial landings, with Nephrops and king scallop dominating landings by weight. Table 8-10 provides details of commercial fish and shellfish which contributed to catches from ICES rectangles within the between 2007-2011 and any additional species which appear in the landings data post Original Development ES (2012-2015).

Table 8-10: Comparison of Fish and Shellfish Species Landed from ICES Squares 41E7 and 42E7 – 2007-2011 and 2012-2015

ICES Square	41E7	42E7
Species landed 2007-2011 (ES baseline)	Mackerel (*Scomber scombrus*), haddock (*Melanogrammus aeglefinus*), cod (*Gadus morhua*), plaice (*Pleuronectes platessa*), whiting (*Merlangius merlangus*), lemon sole (*Microstomus kitt*), saithe (*Pollachius virens*), halibut (*Hippoglossus hippoglossus*), monkfish (*Lophius piscatorius*), dab (*Limanda limanda*), witch (*Pleuronectes cynoglossus*), hake (*Merluccius merluccius*), pollack (*Pollachius pollachius*), skate and ray, other flatfish, sprat (*Sprattus sprattus*), ling (*Molva molva),* red gurnard (*Aspitrigla cuculus*), turbot (*Scophthalmus maximus*), grey gurnard (*Eutrigla gurnardus*), gurnard and latchet, spurdog (*Squalus acanthius*), sole (*Solea solea*), megrim (*Lepidorhombus whiffiagonis*), shark, brill (*Scophthalmus rhombus*), red mullet (*Mullus surmuletus*), unidentified dogfish, conger eels (*Conger conger*), redfish, roes, shad, wrasse (*Labridae*), mullet – other, John dory (*Zeus faber*), bass (*Dicentrarchus labrax*).	Mackerel (*Scomber scombrus*), haddock (*Melanogrammus aeglefinus*), cod (*Gadus morhua*) plaice (*Pleuronectes platessa*), whiting (*Merlangius merlangus*), lemon sole (*Microstomus kitt*), saithe (*Pollachius virens*), halibut (*Hippoglossus hippoglossus*), monkfish (*Lophius piscatorius*), dab (*Limanda limanda*), witch (*Pleuronectes cynoglossus*), hake (*Merluccius merluccius*), pollack (*Pollachius pollachius*), skate and rays, other flatfish, ling (*Molva molva*), red gurnard (*Aspitrigla cuculus*), turbot (*Scophthalmus maximus*), gurnard and latchet, sole (*Solea solea*), brill (*Scophthalmus rhombus*), red mullet (*Mullus surmuletus*), conger eel (*Conger conger*).
Species landed 2012-2015 (post ES)	All of the above, plus: Herring (*Clupea harengus*), Blonde ray (*Raja brachyura*), Thornback ray (*Raja clavata*), Cuckoo ray (*Leucoraja naevus*), Catfish (Unknown species), Mixed clams (Unknown species), Octopus (Unknown species), squat lobster (Unknown species)	All of the above, plus: Herring (*Clupea harengus*), Redfish (Unknown species), John Dory (*Zeus faber*), Clams (*Mya arenaria*)

277. While the fisheries in these ICES squares have slightly diversified, with a slightly wider range of species captured, it is apparent that the species present in the region have not altered greatly. All additional species i.e. those recorded in landings post 2011, were identified through other sources (i.e. surveys and bycatch data), and were assessed in the relevant receptor group. On this basis, it is considered that the baseline presented in the Original Development ES is suitable for the Revised Development in terms of the range of species present.

Research Updates

278. Since the submission of the Original Development ES, there have been a number of key pieces of research undertaken, which have advanced understanding and reduced uncertainties relating to the sensitivity of some fish species to the potential impacts of offshore wind farms. These have focused on migratory fish and Atlantic salmon in particular.

279. Research carried out by Harding et al. (2016), looked at the behavioural response of Atlantic salmon to piling noise, whereby Atlantic salmon were exposed to real piling noise in a dock filled with seawater. The Atlantic salmon were examined for both behavioural and physiological responses. These experiments were carried out with captive Atlantic salmon, determined to have similar hearing abilities of wild Atlantic salmon. The conclusions of the work were that no significant avoidance behaviour or physiological response during pile driving was found. Based on this research it would now seem likely that there would be no adverse or significant behavioural impacts to Atlantic Salmon arising due to the piling or operational noise from the offshore developments.

280. Marine Scotland Science has also conducted extensive research on the response and behaviour of Atlantic salmon and European eel to Electro Magnetic Fields (EMF) (Armstrong et al., 2015). The results of which were that no unusual behaviour was observed during the experiments when fish passed through magnetic fields, regardless of the extent. Based on this research it would now seem likely that there will be no adverse or significant behavioural impacts to Atlantic salmon and European eel arising due to the presence of EMF from offshore developments.

281. The research on the migratory routes of Atlantic salmon (Malcolm et al., 2010), also presented in the original ES, concluded that during migration of Atlantic salmon, fish followed the coastline to reach their migratory point. The Development Area is located at a minimum of 15 km from the coastline, and the location relative to the SACs designated for salmon makes it unlikely therefore that salmon would enter the Development Area on route to the coast during migration. Although it is difficult to conclude where smolt migrate, ongoing research and the general consensus within the scientific community is that they also migrate along coastal waters.

Summary of Data Validity

282. Table 8-8 identifies the baseline data sources that were used to characterise the fish and shellfish resource within and around the Development Area, as part of the Original Development EIA. The external and pre-existing data for the area of interest provided important contextual information to that collected as part of the ICOL-commissioned site specific surveys and studies. In line with the evidence set out above, with the exception of the herring, the baseline presented in the Original Development ES Chapter 13 is considered sufficient upon which to base an assessment of the Revised Development.

Review of Baseline Characteristics

283. Chapter 13 of the Original Development ES presented the baseline characteristics for fish and shellfish ecology across the area of interest including the Development Area and Offshore Export Cable Corridor, further reference should be made to this chapter if required. The following information summaries the differences in the design envelopes and the potential impacts pertinent to fish and shellfish ecology.

8.2.3 Design Envelope

284. Tables 8-11 and 8-12 set out the worst case scenario defined by the Original Development EIA for Natural Fish and Shellfish (ICOL, 2013) compared to the proposed worst case scenario for the Revised Development at a level of detail sufficient to draw conclusions in relation to the scoping process. The tables also identify the differences between the two design envelopes.

Table 8-11: Worst Case Scenario Definition – Wind Farm

Potential Impact	Original Development Design Envelope (worst case scenario) (ICOL, 2013)	Revised Development Design Envelope (worst case scenario)	Difference between the Original and Revised Design Envelopes
Construction (& Decommissioning) Phase			
Direct temporary habitat disturbance	Total seabed area disturbed is 5.54 km^2, equating to 3.69% of the Development Area resulting from: Seabed preparation for 213 WTGs with gravity base substructures (GBS) selected as having the largest disturbance footprint (125 m dredger affected diameter); Seabed preparation for five OSPs with GBS selected as having the largest area disturbance footprint (300 m dredger affected diameter); Seabed preparation for three met masts with GBS selected as having the largest area disturbance footprint (125 m dredge effected diameter); 353 km inter-array cable installation with a cable corridor disturbed width of six metres as	Total seabed area disturbed is 4.24 km^2, resulting from, equating to 2.82% of the development area: Seabed preparation for up to 72 WTGs with gravity base substructures (GBS) selected as having the largest disturbance footprint (140 m dredger affected diameter); Seabed preparation for two OSPs with GBS selected as having the largest area of disturbance footprint (300 m dredger affected diameter); No met masts; 190 km inter-array cable installation with a cable corridor disturbed width of 15 metres as the widest possible area of disturbance; Vessel anchorage disturbance from 5 m^2 anchor footprints	Overall there is a 66% reduction in WTGs numbers, 60% OSPs and 46 % reduction in inter-array cable and the Revised Development requires no further met masts. Total area disturbed is 1.3km^2 less than assessed in the Original Development ES.

Potential Impact	Original Development Design Envelope (worst case scenario) (ICOL, 2013)	Revised Development Design Envelope (worst case scenario)	Difference between the Original and Revised Design Envelopes
	the widest possible area of disturbance; Jack up vessel with disturbance footprint per vessel of 600 m^2 and three visits per foundation installation/ decommissioning required for WTGs, OSPs and met masts; and Vessel anchorage disturbance = 5.0 m^2 footprint, six anchors deployed per 500 m along inter-array cable.	deployed at 500 m intervals along the 190 km of inter-array cable; All other development aspects remain the same as those assessed in the Original Development ES.	This equates to a 23% reduction in total disturbed area.
Indirect disturbance as a result of sediment deposition and temporary increases in SSC	Model outputs of anticipated SSC, deposition and sediment transportation from energetic means (cable) and dredging (foundations), which includes: Suspended sediments arising from seabed preparations and installations for 213 WTGs, five OSPs and three met masts with GBS substructure/ foundation types; and Suspended sediments arising from inter-array cable burial using energetic means (excavated trench 353 km long, one-metre-wide and two metres depth) as recognised as representing the worst case. Note that the actual range of cable burial depths is zero to three metres, with protection where burial is not feasible; the target depth is one metre. Two metres was chosen as being sufficiently conservative to represent the macro impacts of SSC from burial across the Development Area.	Suspended sediments arising from seabed preparations and installations for 72 WTG and two OSPs with GBS substructure/ foundation types; and Suspended sediments arising from inter-array cable burial using energetic means (excavated trench 190 km long, one-metre-wide and two metres depth) as recognised as representing the worst case. Note that the actual range of cable burial depths is zero to three metres, with protection where burial is not feasible; the target depth is one metre.	Overall a reduction of 36% in dredged volume, resulting from a 66% reduction in WTGs numbers, 60% reduction in OSPs and 46 % reduction in inter-array cable and the Revised Development requires no further met masts.

Potential Impact	Original Development Design Envelope (worst case scenario) (ICOL, 2013)	Revised Development Design Envelope (worst case scenario)	Difference between the Original and Revised Design Envelopes
Barrier effects, disturbance or physical injury associated with construction noise	Construction noise from seabed preparations and installations for 213 WTGs (four legged Jacket structure, driven piles), five OSP (with eight driven piles per structure) and three met masts. Up to two piling vessels may operate simultaneously. Piling operations will take place over a two-year construction period. However, only 11% - 23% of this time will be spent physically piling. *Noise modelling was calculated on a pile diameter of 2438 mm; maximum blow energy of 1080 kJ. Total duration, including soft start, 4.2 hours.*	Construction noise from seabed preparations and installations for 72 WTGs (four legged Jacket structure, driven piles) and two OSPs (with eight driven piles per structure). Up to two piling vessels may operate simultaneously. Piling operations will take place over a one-year construction period. However, only approximately 14% of this time will be spent physically piling. Up to eight piles per 24 hour period. Maximum hammer capacity energy of 2400 KJ.	There is an increase in hammer energy associated with taller turbines, however due to the reduction in number of WTG's, OSP's and met masts, the number of piling events is reduced.
Operation & Maintenance Phase			
Long term loss of original habitat	Total loss of original habitat is 1.87 km^2, equating to 1.25% of the Development Area resulting from: Seabed preparation for 213 WTGs with GBS selected as having the largest footprint (95 m diameter including scour protection); Seabed preparation for five OSPs with GBS selected as having the largest footprint (180 m diameter including scour protection); Seabed preparation for three met masts with GBS selected as having the largest footprint (95 m diameter including scour protection); and Maximum 10% protection on the 353 km inter-array cable installation with protection width of six metres as the widest possible area of disturbance.	Total loss of habitat is 1.05 $km^{2,}$ equating to 0.7 % of the Development Area resulting from (resulting from: Seabed preparation for up to 72 WTGs with GBS selected as having the largest footprint (125 m diameter including scour protection); Seabed preparation for two OSPs with GBS selected as having the largest footprint (180 m diameter including scour protection); Maximum 10% protection on the 190 km inter-array cable installation with protection width of six metres as the widest possible area of disturbance; All other development aspects remain the same as those originally assessed in the ES.	Total loss of habitat is 0.82 km^2 less than assessed in the Original Development ES equating to a 44% reduction in total loss of habitat.

Potential Impact	Original Development Design Envelope (worst case scenario) (ICOL, 2013)	Revised Development Design Envelope (worst case scenario)	Difference between the Original and Revised Design Envelopes
Creation of new habitat due to presence of infrastructure.	Introduction of new substrate available for colonisation from 213 WTGs, five OSPs and three met masts (GBS as greatest area), scour protection and inter-array cable protection (10% of cable length) as per loss of original habitat above.	Introduction of new substrate available for colonisation from 72 WTGs and two OSPs (GBS as greatest area), scour protection and inter-array cable protection (10% of cable length) as per loss of original habitat above.	66% reduction in WTGs numbers, 60% OSPs, 46 % reduction in inter-array cable length and the Revised Development requires no further met masts, resulting in the proportional reduction in the creation of new habitat.
Behavioural responses to EMF associated with cabling	Total inter-array cable length (353 km). Cables will be suitably buried or will be protected by other means when burial is not practicable. The AC option is identified as having the greatest potential for EMF impacts and will be used for the inter-array cables.	Total inter-array cable length (190 km). Cables will be suitably buried or will be protected by other means when burial is not practicable. The AC option is identified as having the greatest potential for EMF impacts and will be used for the inter-array cables.	Reduction in length of inter-array cabling by 46 %.
Disturbance or physical injury associated with operational noise.	Operational noise from the works in the Development Area, taken from evidence base, resulting from WTG operation and maintenance vessels.	Operational noise from the works in the Development Area, taken from evidence base, resulting from WTG operation and maintenance vessels.	Reduction of 66% in number of WTG's.
Temporary habitat disturbance from O&M activities	Area of seabed disturbed annually is 0.14 km^2, equating to 0.09% of the Development Area resulting from: Jack up vessel with disturbance footprint per vessel of 600 m^2 and one visit per foundation (WTGs, OSPs and met masts);	Area of seabed disturbed annually is 0.12km^2, equating to 0.08% of the Development Area resulting from: Jack up vessel with disturbance footprint per vessel of 600 m^2 and one visit per foundation (WTGs and OSPs) every five years; Vessel anchorage disturbance from 5.0 m^2 anchor footprints	66% reduction in WTGs numbers, 60% OSPs, 46 % reduction in inter-array cable length and the Revised Development requires no

Potential Impact	Original Development Design Envelope (worst case scenario) (ICOL, 2013)	Revised Development Design Envelope (worst case scenario)	Difference between the Original and Revised Design Envelopes
	Vessel anchorage with 5.0 m^2 footprint, six anchors deployed per 500 m along Export Cable; and Inter-array cable reburial assuming maximum of 10% reburial during operation of total 353 km, with a disturbed footprint of 6 m as the widest possible area of disturbance.	deployed at 500 m intervals along the 190 km of inter-array cable; and Inter-array cable reburial assuming maximum of 10% reburial during operation of the total 190 km with a trench affected area of six metres as the widest possible area of disturbance.	further met masts, resulting in the proportional reduction in temporary habitat disturbance.

Table 8-12: Worst Case Scenario Definition – Offshore Export Cable Corridor

Potential Impacts	Original Development Design Envelope (ICOL, 2013)	Revised Development Design Envelope	Difference between Envelopes
Construction (& Decommissioning) Phase			
Direct temporary habitat disturbance via export cable installation	Area of seabed disturbed is 3.02 km^2 across Offshore Export Cable Corridor: AC as largest number (six) of Export Cables; Export Cable length = 83.3 km (multiplied by six); Each Export Cable in a separate trench; Offshore Export Cable trench affected width = six metres (for each of six Export Cables); and Anchoring disturbance from vessels.	Sub-tidal area of seabed disturbed across export cable corridor is 2.51km^2 (2.5 % of Offshore Export Cable Corridor) resulting from the export cable installation: Two AC cables. Maximum cable length for each of the two cables is approximately 83.3 km; and Each of the two cables are installed in a separate trench resulting in two trenches in total.	Cable corridor length remains the same (83.3 km), there is a reduction in number of export cables from six to two (reduction in overall footprint of 17.5 %), resulting in the proportional reduction in disturbed habitats caused by construction.

Potential Impacts	Original Development Design Envelope (ICOL, 2013)	Revised Development Design Envelope	Difference between Envelopes
Indirect disturbance as a result of sediment deposition and temporary increases in SSC	Model outputs of anticipated SSC, deposition and sediment transportation from installation of the cable by energetic means.	Model outputs of anticipated SSC, deposition and sediment transportation from installation of the cable by energetic means.	Cable corridor length remains the same (83.3 km), there is a reduction in number of export cables from six to two (reduction in overall footprint of 17.5 %), resulting in the proportional reduction in temporary increases in SSC.
Operation & Maintenance Phase			
Long term loss of original habitat	Total area of long term original habitat loss = 0.60 km^2 Protection of maximum 20% of each of the six, 83.3 km long Export Cables; and Protection material six meters wide.	Total area of original habitat loss = 0.4 km^2 resulting from: Protection of 20% of each of the 83.3 km long Export Cables. Protection material 6.0 m wide.	Cable corridor length remains the same (83.3 km), there is a reduction in number of export cables from six to two, resulting in 33% reduction in loss of habitat.
Creation of new habitat due to presence of infrastructure	Introduction of new substrate available for colonisation from Export Cable protection (maximum 20% of Export Cable length on an approximately 83.3 km length and 6 cables with protection width of 6 m) = 0.60 km^2.	Introduction of new substrate available for colonisation from Export Cable protection which is predicted to be installed on a maximum of 20% of the total cable length for each cable.	Cable corridor length remains the same (83.3 km), there is a reduction in number of export cables from six to two, resulting in the proportional reduction in creation of new habitat.

Potential Impacts	Original Development Design Envelope (ICOL, 2013)	Revised Development Design Envelope	Difference between Envelopes
Behavioural responses to EMF associated with cabling	Total Export Cable length of 83.3 km. Cables will be suitably buried or will be protected by other means when burial is not practicable. The AC option is identified as having the greatest potential for EMF impacts. Qualitative assessment based on interaction of fish species along total Export Cable length.	Total Export Cable length of 83.3 km. Cables will be suitably buried or will be protected by other means when burial is not practicable. The AC option is identified as having the greatest potential for EMF impacts. Qualitative assessment based on interaction of fish species along total Export Cable.	Cable corridor length remains the same (83.3 km), there is a reduction in number of export cables from six to two and as such any effects are anticipated to be reduced accordingly.
Temporary habitat disturbance from O&M activities	Annual disturbance is 0.007 km^2 assuming reburial of 10% of total length of Export Cables (six) 83.3 km during operation.	Annual disturbance is .0.002 km^2 equating to 0.002% of the export cable corridor assuming reburial of 10% of total length of Export Cables (two) 83.3 km during operation.	Cable corridor length remains the same (83.3 km), there is a reduction in number of export cables from six to two, resulting in the proportional reduction of O & M activities.

8.2.4 Revised Development Embedded Mitigation Measures

285. Embedded Mitigation for the Revised Development will comprise of mitigation measures to minimise environmental effects which were captured within the Design Envelope for the Original Development, as follows:

- Piling operations will incorporate a soft start procedure which will reduce the potential for noise-related fatality;
- Cables will be suitably buried or will be protected by other means when burial is not practicable as considered in Section 8.8 and 8.9 which will reduce the potential for impacts relating to EMF; and
- Cables will be specified to reduce EMF emissions as per industry standards and best practice such as the relevant IEC (International Electrotechnical Commission) specifications.

8.2.5 Commitment to Consent Conditions

286. As noted in Section 2.2.3, ICOL also propose to commit to those consent conditions (that will further minimise the impacts of the development on the environment) that were granted for the Original Development for the application of the Revised Development.

287. These consent conditions have taken into account any relevant consultation responses to the Original Development EIA from key stakeholders in relation to fish and shellfish ecology in determining the acceptability of the Original Development; the most relevant consent conditions are summarised in Table 8-13. Conditions in full are provided in Appendix A.

Table 8-13: Summary of the Most Relevant Consent Conditions Related to Natural Fish and Shellfish

Requirement	Description
Production of a Construction Method Statement (CMS)	Condition will ensure the appropriate construction management of the Development, taking into account mitigation measures to protect the environment (including benthic ecology) and other users of the marine area.
Development Specification and Layout Plan	Condition will set out for approval the final design and layout of the Development to ensure it remains consistent with the design assessed in the ES as relevant to fish and shellfish ecology.
Production of an Environmental Management Plan	Setting out, for approval relevant environmental management and mitigation measures to be applied during the construction and operation of the Development, including those matters identified as mitigation in the Original Development EIA as listed above.
Production of an Operations and Maintenance Plan	Setting out, for approval, the operations and maintenance procedures and the management of impacts during the operational phase so as to safeguard environmental interests.
Production of a Cable Plan	Setting out, for approval, the installation methods for the cables (including burial) to ensure it remains consistent with the installation process assessed in the ES as relevant to fish and shellfish ecology (including matters related to EMF).
Production of a Project Environmental Monitoring Programme ("PEMP")	Setting out, for approval, the proposed environmental monitoring programme, to include as relevant and necessary the monitoring of fish and shellfish.
Appointment of an ECoW	Appointment of an approved Ecological clerk of Works (ECoW) to provide independent audit and reporting of compliance with various requirements of the consent relating to environmental management and to ensure that appropriate and effective monitoring of the impacts of the development is undertaken.
Participation in any Forth and Tay Regional	Participation in any group established will ensure effective environmental monitoring and mitigation is undertaken at a regional scale

Requirement	Description
Advisory Group ("FTRAG") established	
Participation in any Scottish Strategic Marine Environment Group ("SSMEG") established	Participation in any group established will ensure effective environmental monitoring and mitigation is undertaken at a national scale.
Participation in the monitoring requirements as laid out in the 'National Research and Monitoring Strategy for Diadromous Fish.	Participation will ensure effective monitoring of the effects on migratory fish at a local level

8.2.6 Scoping of the Revised Development EIA

288. Tables 8-14 and 8-15 summarise the post-mitigation (residual) significance for all effects considered for the Original Development and detail whether the potential effect has been scoped out of the Revised Development EIA, with a relevant justification noting that where relevant the mitigation applied in the Original Development EIA (in addition to any relevant conditions as highlighted above) has been carried forward as Embedded Mitigation for the Revised Development.

289. It should be noted that the residual impact in the Original Development ES was based on EIA methodology, using matrices. The latest guidance on offshore assessment from the Chartered Institute of Ecology and Environmental Management (CIEEM, 2016) has moved away from the matrix approach to one of justified expert opinion to assign significance. Instead significance should take into account of the following criteria: positive or negative; extent; magnitude; duration; timing; frequency; and reversibility, rather than simply considering magnitude and sensitivity.

290. In the Original Development ES, 'sensitivity' was fixed for receptor groups based on a number of parameters, one of which was conservation importance. On this basis all SAC qualifying feature species (specifically Atlantic salmon and lamprey) were assigned high sensitivity due to their international conservation importance, rather than their actual sensitivity to a potential impact. As a result of the matrix approach this meant that even with a negligible magnitude of impact the significance derived was Minor/Moderate, and a low magnitude resulted in conclusion of moderate impact. While in the Original Development EIA moderate did not equate to a significant impact, it's worth noting that for this receptor group application of new CIEEM guidance (as will be applied in any new assessment on the Revised Development - see Section 8.1.5 for EIA methodology) would result in a lower residual impact. The reason being as a more expert opinion, less matrix driven assessment

result can be derived. This is particularly pertinent to this receptor group in the light of new research on migratory species and their sensitivity to piling noise and EMF.

Table 8-14: Summary of Potential Impacts – Wind Farm

Potential Impact	Residual Effect (ICOL, 2013)		Scoped in or out of Revised Development EIA	Justification
Construction (& Decommissioning) Phase				
Direct temporary habitat disturbance	Mobile fish species	Negligible/ Minor	Scoped out	The impacts from the Original Development were assessed as not significant and, as a result of the design changes described above, the Revised Development is anticipated to have less of an impact. Further assessment of this potential impact is therefore scoped out of the Revised Development EIA.
	Hearing specialists	Minor		
	Prey species	Minor/ Moderate		
	Electro-sensitive elasmobranchs	Negligible/ Minor		
	SAC qualifying feature species	Minor/ Moderate		
	Shellfish	Negligible/ Minor		
Indirect disturbance as a result of sediment deposition and temporary increases in SSC	Mobile fish species	Negligible/ Minor	Scoped out	The impacts from the Original Development were assessed as not significant and, as a result of the design changes described above, the Revised Development is anticipated to have less of an impact. Further assessment of this potential impact is therefore scoped out of the Revised Development EIA.
	Hearing specialists	Minor		
	Prey species	Minor/ Moderate		
	Electro-sensitive elasmobranchs	Negligible/ Minor		
	SAC qualifying feature species	Minor/ Moderate		
	Shellfish	Negligible/ Minor		

Potential Impact	Residual Effect (ICOL, 2013)		Scoped in or out of Revised Development EIA	Justification
Barrier effects disturbance or physical injury associated with construction noise	Mobile fish species	(Mortality and injury) = Negligible/ Minor (Behavioural responses) = Minor	Scoped out	The impacts from the Original Development were assessed as not significant for all receptor groups. Since the EIA was carried out further research has also shown the impacts from piling on Atlantic salmon are less than what was originally considered. As a result of the design changes described above, due to the increase in potential hammer energy, it is proposed that '*Barrier effects disturbance or physical injury associated with construction noise impacts*' are scoped in to the Revised Development EIA for hearing specialists only, but scoped out for mobile fish species, prey species, electrosensitive elasmobranchs, and shellfish as these species are known not to be sensitive to noise impacts and as such no potentially significant impacts are predicted.
	Hearing specialists	(Mortality and injury) = Minor (Behavioural responses) herring = Moderate Cod & sprat = Minor/ Moderate	Scoped in	
	Prey species	(Mortality and injury) = Minor (Behavioural responses) = Minor/ Moderate	Scoped out	
	Electro-sensitive elasmobranchs	(Mortality and injury) = Negligible/ Minor (Behavioural responses) = Minor	Scoped out	
	SAC qualifying feature species	Mortality and injury) = Minor/ Moderate (Behavioural responses) = Moderate	Scoped out	
	Shellfish	(Mortality and injury) = Negligible/ Minor (Behavioural responses) = Negligible/ Minor	Scoped out	

Potential Impact	Residual Effect (ICOL, 2013)		Scoped in or out of Revised Development EIA	Justification
Operation & Maintenance Phase				
Long term loss of original habitat	Mobile fish species	Negligible/ Minor	Scoped out	The impacts from the Original Development were assessed as not significant and, as a result of the design changes described above, the Revised Development is anticipated to have less of an impact. Further assessment of this potential impact is therefore scoped out of the Revised Development EIA.
	Hearing specialists	Minor		
	Prey species	Minor/ Moderate		
	Electro-sensitive elasmobranchs	Negligible/ Minor		
	SAC qualifying feature species	Minor/ Moderate		
	Shellfish	Minor		
Behavioural responses to EMF associated with cabling	Mobile fish species	Negligible/ Minor	Scoped out	The impacts from the Original Development were assessed as not significant and, as a result of the design changes described above and the increase in knowledge regarding EMF impacts on the receptor groups as presented within this Scoping Report, the Revised Development is anticipated to have less of an impact. Further assessment of this potential impact is therefore scoped out of the Revised Development EIA.
	Hearing specialists	Minor		
	Prey species	Minor		
	Electro-sensitive elasmobranchs	Negligible/ Minor		
	SAC qualifying feature species	Minor/ Moderate		
	Shellfish	Negligible/ Minor		
Disturbance or physical injury associated with operational noise	Mobile fish species	Negligible/ Minor	Scoped out	The impacts from the Original Development were assessed as not significant and, as a result of the design changes described above, the Revised Development is anticipated to have less of an impact. Further
	Hearing specialists	Minor		
	Prey species	Minor		

Potential Impact	Residual Effect (ICOL, 2013)		Scoped in or out of Revised Development EIA	Justification
	Electro-sensitive elasmobranchs	Negligible/ Minor		assessment of this potential impact is therefore scoped out of the Revised Development EIA.
	SAC qualifying feature species	Minor/ Moderate		
	Shellfish	Negligible/ Minor		
Reduced fishing activity within the Development Area	All receptor groups	Negligible/ Minor (positive)	Scoped out	The impacts from the Original Development were assessed as positive, and as a result of the design changes described above, the Revised Development is still anticipated to have a positive impact. Further assessment of this potential impact is therefore scoped out of the Revised Development EIA.
Creation of new habitat due to presence of infrastructure	Mobile fish species	Negligible/ Minor (Positive)	Scoped out	The impacts from the Original Development were assessed as non-significant or positive, and as a result of the design changes described above, the Revised Development is still anticipated to have a non-significant or positive impact. Further assessment of this potential impact is therefore scoped out of the Revised Development EIA
	Hearing specialists	Minor		
	Prey species	Minor		
	Electro-sensitive elasmobranchs	Negligible/ Minor (positive)		
	SAC qualifying feature species	No Impact		
	Shellfish	Minor/ Moderate		
Temporary habitat disturbance via O&M activities	Mobile fish species	Negligible/ Minor	Scoped out	The impacts from the Original Development were assessed as not significant and, as a result of the design changes described above,
	Hearing specialists	Minor		

Potential Impact	Residual Effect (ICOL, 2013)		Scoped in or out of Revised Development EIA	Justification
	Prey species	Minor		the Revised Development is anticipated to have less of an impact. Further assessment of this potential impact is therefore scoped out of the Revised Development EIA.
	Electro-sensitive elasmobranchs	Negligible/ Minor		
	SAC qualifying feature species	Minor/ Moderate		
	Shellfish	Negligible/ Minor		

Table 8-15: Summary of Potential Impacts – Offshore Export Cable Corridor

Potential Impact	Residual Effect (ICOL, 2013)		Scoped in or out of the Revised Development EIA	Justification
Construction (& Decommissioning) Phase				
Direct temporary habitat disturbance via Export Cable installation	Mobile fish species	Negligible/ Minor	Scoped out	The impacts from the Original Development were assessed as not significant and, as a result of the design changes described above, the Revised Development is anticipated to have less of an impact. Further assessment of this potential impact is therefore scoped out of the Revised Development EIA.
	Hearing specialists	Minor		
	Prey species	Minor		
	Electro-sensitive elasmobranchs	Negligible/ Minor		
	SAC qualifying feature species	Minor/ Moderate		
	Shellfish	Negligible/ Minor		
Indirect disturbance as a result of sediment deposition	Mobile fish species	Negligible/ Minor	Scoped out	The impacts from the Original Development were assessed as not significant and, as a result of the design changes described above, the Revised
	Hearing specialists	Minor		

Potential Impact	Residual Effect (ICOL, 2013)		Scoped in or out of the Revised Development EIA	Justification
and temporary increases in SSC via Export Cable installation	Prey species	Minor		Development is anticipated to have less of an impact. Further assessment of this potential impact is therefore scoped out of the Revised Development EIA.
	Electro-sensitive elasmobranchs	Negligible/ Minor		
	SAC qualifying feature species	Minor/ Moderate		
	Shellfish	Negligible/ Minor		
Disturbance or physical injury associated with construction noise (Export Cable installation)	Mobile fish species	Negligible/ Minor	Scoped out	The impacts from the Original Development were assessed as not significant and, as a result of the design changes described above, the Revised Development is anticipated to have less of an impact. Further assessment of this potential impact is therefore scoped out of the Revised Development EIA.
	Hearing specialists	Minor		
	Prey species	Minor		
	Electro-sensitive elasmobranchs	Negligible/ Minor		
	SAC qualifying feature species	Minor/ Moderate		
	Shellfish	Negligible/ Minor		
Operation & Maintenance Phase				
Long term loss of original habitat (Export Cable)	Mobile fish species	Negligible/ Minor	Scoped out	The impacts from the Original Development were assessed as not significant and, as a result of the design changes described above, the Revised Development is anticipated to have less of an impact. Further assessment of this potential impact is therefore scoped out of the Revised Development EIA.
	Hearing specialists	Minor		
	Prey species	Minor		
	Electro-sensitive elasmobranchs	Negligible/ Minor		
	SAC qualifying feature species	Minor/ Moderate		

Potential Impact	Residual Effect (ICOL, 2013)		Scoped in or out of the Revised Development EIA	Justification
	Shellfish	Minor		
Behavioural responses to EMF associated with cabling (Export Cable)	Mobile fish species	Negligible/ Minor	Scoped out	The impacts from the Original Development were assessed as not significant and, as a result of the design changes described above and the increase in knowledge regarding EMF impacts on the receptor groups as presented within this Scoping Report, the Revised Development is anticipated to have less of an impact. Further assessment of this potential impact is therefore scoped out of the Revised Development EIA.
	Hearing specialists	Minor		
	Prey species	Minor		
	Electro-sensitive elasmobranchs	Minor		
	SAC qualifying feature species	Moderate		
	Shellfish	Negligible/ Minor		
Creation of new habitat due to presence of Cable Protection	Mobile fish species	Negligible/ Minor (positive)	Scoped out	The impacts from the Original Development were assessed as not significant and, as a result of the design changes described above, the Revised Development is anticipated to have less of an impact. Further assessment of this potential impact is therefore scoped out of the Revised Development EIA.
	Hearing specialists	No impact		
	Prey species	No impact		
	Electro-sensitive elasmobranchs	Negligible/ Minor (positive)		
	SAC qualifying feature species	No impact		
	Shellfish	Negligible/ Minor (positive)		

Potential Impact	Residual Effect (ICOL, 2013)	Scoped in or out of the Revised Development EIA	Justification
Direct temporary habitat disturbance from O & M activities	Impacts on all receptors considered to be less than that of "Direct temporary habitat disturbance via Export Cable installation" during the construction phase (as outlined above).	Scoped out	The impacts from the Original Development were assessed as not significant and, as a result of the design changes described above, the Revised Development is anticipated to have less of an impact. Further assessment of this potential impact is therefore scoped out of the Revised Development EIA.

Scoping of Cumulative Effects Assessment

291. The CIA for Natural Fish and Shellfish set out in the Original Development EIA considered the potential cumulative effects from the Firth of Forth offshore wind projects only and with a focus on the overlap of construction periods and potential interaction from piling operations. A worst case assumption of all of the piling at all of these projects occurring simultaneously was made. No other plans or projects were considered relevant to the CIA on fish and shellfish ecology for the Original Development primarily due to the distance from the project, the timing or development status of the proposed development or the nature of the construction activities (i.e. a lack of piling activity or other activities that could act cumulatively in scale, location or timing).

292. The same basis is proposed for the purposes of the scoping of the fish and shellfish ecology CIA with the following list confirming the other plans, projects and activities (selected from the list in Section 5.7) considered in the scoping of the CIA:

- Neart Na-Gaoithe Offshore Windfarm; and
- Seagreen Alpha and Bravo Offshore Windfarms.

293. Table 8-16 presents the Original Development residual effect from the for all cumulative impacts considered and details whether the potential cumulative impact has been scoped out of the Revised Development EIA, with a relevant justification.

Table 8-16: Summary of Potential Impacts – Revised Development with Other Plans, Projects and Activities

Potential Impact	Residual Effect (ICOL, 2013)		Scoped in or out of the Revised Development CIA	Justification
Construction (& Decommissioning) Phase				
Direct temporary habitat disturbance	Mobile fish species	Negligible/ Minor	Scoped out	The cumulative impacts from the Original Development were assessed as not significant. As a result of the design changes described above, coupled with no change to the projects required to be considered cumulatively, it is anticipated that that there will be less of a cumulative impact associated with the Revised Development. Further assessment is therefore scoped out of the Revised Development CIA.
	Hearing specialists	Minor		
	Prey species	Minor/ Moderate		
	Electro-sensitive elasmobranchs	Negligible/ Minor		
	SAC qualifying feature species	Minor/ Moderate		
	Shellfish	Negligible/ Minor		
Indirect disturbance as a result of sediment deposition and temporary increases in SSC	Mobile fish species	Negligible/ Minor	Scoped out	The cumulative impacts from the Original Development were assessed as not significant. As a result of the design changes described above, coupled with no change to the projects required to be considered cumulatively, it is anticipated that that there will be less of a cumulative impact associated with the Revised Development. Further assessment is therefore scoped out of the Revised Development CIA
	Hearing specialists	Minor		
	Prey species	Minor/ Moderate		
	Electro-sensitive elasmobranchs	Negligible/ Minor		
	SAC qualifying feature species	Minor/ Moderate		
	Shellfish	Negligible/ Minor		

Potential Impact	Residual Effect (ICOL, 2013)		Scoped in or out of the Revised Development CIA	Justification
Barrier effects disturbance or physical injury associated with construction noise	Mobile fish species	(Mortality and injury) = Negligible/ Minor (Behavioural responses) = Minor	Scoped out	The cumulative impacts from the Original Development were assessed as not significant. Since the EIA was carried out further research has also shown the impacts from piling on Atlantic salmon are less than what was originally considered. There is no change to the other projects to be assessed cumulatively. As a result of the increase in potential hammer energy, it is proposed that '*Barrier effects disturbance or physical injury associated with construction noise impacts*' are scoped in to the Revised Development CIA for hearing specialists only, but scoped out for mobile fish species, prey species, electrosensitive elasmobranchs, and shellfish as these species are known not to be sensitive to noise impacts and as such no potentially significant impacts are predicted.
	Hearing specialists	(Mortality and injury) = Minor (Behavioural responses) Herring = Moderate Cod & sprat = Minor/ Moderate	Scoped in	
	Prey species	(Mortality and injury) = Minor (Behavioural responses) = Minor/ Moderate	Scoped out	
	Electro-sensitive elasmobranchs	(Mortality and injury) = Negligible/ Minor (Behavioural responses) = Minor	Scoped out	
	SAC qualifying feature species	(Mortality and injury) = Minor/ Moderate (Behavioural responses) = Moderate	Scoped out	

Potential Impact	Residual Effect (ICOL, 2013)		Scoped in or out of the Revised Development CIA	Justification
	Shellfish	(Mortality and injury) = Negligible/ Minor (Behavioural responses) = Negligible/ Minor	Scoped out	
Operation & Maintenance Phase				
Long term loss of original habitat	Mobile fish species	Negligible/ Minor	Scoped out	The cumulative impacts from the Original Development were assessed as not significant. As a result of the design changes described above, coupled with no change to the projects required to be considered cumulatively, it is anticipated that that there will be less of a cumulative impact associated with the Revised Development. Further assessment is therefore scoped out of the Revised Development CIA
	Hearing specialists	Minor		
	Prey species	Minor/ Moderate		
	Electro-sensitive elasmobranchs	Negligible/ Minor		
	SAC qualifying feature species	Minor/ Moderate		
	Shellfish	Minor		
Behavioural responses to EMF associated with cabling	Mobile fish species	Negligible/ Minor	Scoped out	The cumulative impacts from the Original Development were assessed as not significant. Since then there is also an increase in knowledge regarding EMF impacts on the receptor groups (presented within this Scoping Report). Therefore as a result of the design changes described above, coupled with no change to the projects required to be considered cumulatively, it is anticipated that that there will be less of a cumulative impact associated with the Revised Development. Further assessment is therefore scoped
	Hearing specialists	Minor		
	Prey species	Minor		
	Electro-sensitive elasmobranchs	Minor		
	SAC qualifying feature species	Moderate		
	Shellfish	Negligible/ Minor		

Potential Impact	Residual Effect (ICOL, 2013)		Scoped in or out of the Revised Development CIA	Justification
				out of the Revised Development CIA
Disturbance or physical injury associated with operational noise	Mobile fish species	Negligible/ Minor	Scoped out	The cumulative impacts from the Original Development were assessed as not significant. As a result of the design changes described above, coupled with no change to the projects required to be considered cumulatively, it is anticipated that that there will be less of a cumulative impact associated with the Revised Development. Further assessment is therefore scoped out of the Revised Development CIA.
	Hearing specialists	Minor		
	Prey species	Minor		
	Electro-sensitive elasmobranchs	Negligible/ Minor		
	SAC qualifying feature species	Minor/ Moderate		
	Shellfish	Negligible/ Minor		
Reduced fishing activity within the Development Area	All receptor groups	Negligible/ Minor (positive)	Scoped out	The cumulative impacts from the Original Development were assessed as having positive effects. As a result of the design changes described above, coupled with no change to the projects required to be considered cumulatively, it is anticipated that that there will still be a positive cumulative impact associated with the Revised Development. Further assessment is therefore scoped out of the Revised Development CIA.
Creation of new habitat due to presence of infrastructure	Mobile fish species	Negligible/ Minor (positive)	Scoped out	The cumulative impacts from the Original Development were assessed as not significant or positive effects. As a result of the design changes described above, coupled with no change to the projects required to be considered cumulatively, it is
	Hearing specialists	Minor		
	Prey species	Minor		

Potential Impact	Residual Effect (ICOL, 2013)		Scoped in or out of the Revised Development CIA	Justification
	Electro-sensitive elasmobranchs	Negligible/ Minor (positive)		anticipated that that there will still be a not significant/ positive cumulative impact associated with the Revised Development. Further assessment is therefore scoped out of the Revised Development CIA.
	SAC qualifying feature species	No Impact		
	Shellfish	Minor/ Moderate (positive)		
Temporary habitat disturbance via O&M activities	Mobile fish species	Negligible/Minor	Scoped out	The cumulative impacts from the Original Development were assessed as not significant. As a result of the design changes described above, coupled with no change to the projects required to be considered cumulatively, it is anticipated that that there will be less of a cumulative impact associated with the Revised Development. Further assessment is therefore scoped out of the Revised Development CIA
	Hearing specialists	Minor		
	Prey species	Minor/ Moderate		
	Electro-sensitive elasmobranchs	Negligible/ Minor		
	SAC qualifying feature species	Minor/ Moderate		
	Shellfish	Negligible/ Minor		

8.2.7 Approach to EIA

294. Impacts relating to underwater noise from piling operations on hearing specialists will need to be reassessed due to the revisions to the scope of proposed piling works, and improved scientific understanding of the behaviour of such species.

295. Based on the evidence summarised from the Original Development EIA and considering the scope of the Revised Development by comparison to the Original Development, it is concluded that all of the potential effects on Natural Fish receptors should be scoped out of the Revised Development EIA with the exception of:

- Barrier effects disturbance or physical injury associated with construction noise on hearing specialists.

296. ICOL intend to undertake consultation and workshops with stakeholders and Marine Scotland Licensing to establish agreement upon key parameters and the most appropriate methodologies to employ for the impact assessment.

297. For Natural Fish receptors, no further baseline surveys will be conducted but contemporary information will be used to augment the baseline where appropriate (i.e. updating the Herring Larvae Study with IHLS and IBTS data).

298. Underwater noise modelling will be carried out based on information about the Revised Development (including number of turbines, pile design information and predicted piling campaign duration) and seabed conditions. The results of the underwater noise modelling will be used to predict potential effects on key, noise sensitive fish receptors (herring, sprat, and cod) as per the Original Development EIA.

299. The assessment will take into account any additional information on fish responses to underwater noise that have become available since 2013. Best practice at the time of the assessment will be used along with previous experience gained from the Original Development EIA.

8.2.8 Approach to HRA

300. HRA screening has been undertaken by following available and relevant guidance in assessing potential impacts which may arise during the construction, operation and decommissioning of the offshore elements of the Revised Development (the Wind Farm and OfTW) by:

a) Identifying relevant Natura sites which include migratory fish and associated species as notified interest features and for which there is potential connectivity from an impact from the construction, operation and decommissioning activities associated with the Wind Farm and OfTW;

b) Identifying likely significant effects (LSE), and if appropriate adverse effects, associated with the construction, operation and decommissioning of the Wind Farm and OfTW; and

c) Considering potential impacts in relation to notified interest features of identified Natura 2000 sites in relation to their conservation objectives.

301. Available literature, modelling outputs, and initial impact assessment based upon the Revised Development Design Envelope have been reviewed, and the evidence base set out in the EIA for the Original Development, updated where possible, has been drawn upon.

302. The following Natura 2000 sites, which include migratory fish and associated species as notified interest features, and for which there is potential connectivity with an impact from the Construction, Operation and Decommissioning activities associated with the Wind Farm and OfTW, are considered relevant to HRA:

- River South Esk SAC;
- River Dee SAC;
- River Tay SAC;
- River Teith SAC; and
- River Tweed SAC.

303. Table 8-17 below presents the conservation objectives and designated features associated with each of the sites.

Table 8-17: Conservation Objectives of Natura 2000 Sites Designated for Migratory Fish

Natura 2000 Site	Specific Conservation Objectives	Designated Feature(s)
River South Esk SAC	Population of the species, including range of genetic types for salmon, as a viable component of the site. Distribution of the species within site. Distribution and extent of habitats supporting the species. Structure, function and supporting processes of habitats supporting the species. No significant disturbance of the species. Distribution and viability of freshwater pearl mussel host species. Structure, function and supporting processes of habitats supporting freshwater pearl mussel host species.	Atlantic salmon Freshwater pearl mussel
River Dee SAC	Population of the species, including range of genetic types for salmon, as a viable component of the site. Distribution of the species within site. Distribution and extent of habitats supporting the species. Structure, function and supporting processes of habitats supporting the species. No significant disturbance of the species. Distribution and viability of freshwater pearl mussel host species. Structure, function and supporting processes of habitats supporting freshwater pearl mussel host species.	Atlantic salmon Freshwater pearl mussel Otter
River Tay SAC	Population of the species, including range of genetic types for salmon, as a viable component of the site. Distribution of the species within site. Distribution and extent of habitats supporting the species.	Atlantic salmon Brook lamprey River lamprey Sea lamprey

Natura 2000 Site	Specific Conservation Objectives	Designated Feature(s)
	Structure, function and supporting processes of habitats supporting the species. No significant disturbance of the species.	Otter Oligotrophic to mesotrophic standing waters with vegetation of the *Littorelletea uniflorae* and/or of the *Isoëto-Nanojuncetea*
River Teith SAC	To avoid deterioration of the habitats of the qualifying species (listed below) or significant disturbance to the qualifying species, thus ensuring that the integrity of the site is maintained and the site makes an appropriate contribution to achieving favourable conservation status for each of the qualifying features. To ensure for the qualifying species that the following are maintained in the long term: Population of the species, including range of genetic types for salmon, as a viable component of the site. Distribution of the species within the site. Distribution and extent of habitats supporting the species. Structure, function and supporting processes of habitats supporting the species. No significant disturbance of the species.	Sea lamprey Brook lamprey River lampreyAtlantic salmon
River Tweed SAC	Population of the species, including range of genetic types for salmon, as a viable component of the site. Distribution of the species within site. Distribution and extent of habitats supporting the species. Structure, function and supporting processes of habitats supporting the species. No significant disturbance of the species.	Atlantic salmon Brook lamprey River lamprey Sea lamprey Water Courses of plain to montane levels with the *Ranunculian fluitantis* and *Callitrich-Batrachion* vegetation.

304. The key potential impacts of the Revised Development on migratory fish have been considered and the effects summarised in Tables 8-18 and 8-19 below.

Table 8-18: Potential Impact on Migratory Fish Species – Wind Farm

Potential Impact	Description of Effect
Construction (& Decommissioning) Phase	
Barrier effects, disturbance or physical injury associated with construction noise	Noise from construction activities (piling particularly) will result in increased levels of noise which may act as a barrier to migration to and from natal rivers, as a result of avoidance behaviour.
Indirect disturbance as a result of sediment deposition and temporary increases in SSC	Construction activities will mobilise and deposit sediments, therefore increasing suspended sediments in the water column which may act as a barrier to migration as a result of avoidance responses.
Direct temporary habitat disturbance	Temporary habitat loss arising from construction activities may potentially reduce area of available habitat for foraging during migration.
Operation & Maintenance Phase	
Behavioural responses to EMF associated with cabling	Migratory fish are known to use the earth's magnetic field as an aid to navigation; therefore EMF arising from the Export Cable could in theory act as a barrier to migration.
Long term loss of original habitat	Long term habitat loss arising from the Wind Farm and OfTW footprint may potentially reduce the area of available habitat for foraging during migration.
Disturbance or physical injury associated with operational noise	Increases to background noise have the potential to cause changes in behaviour and could have masking effects on navigation.

Table 8-19: Potential Impact on Migratory Fish Species – Export Cable Corridor

Potential Impact	Description of Effect
Construction (& Decommissioning) Phase	
Disturbance or physical injury associated with construction noise	Migratory fish are known to use sound as an aid to navigation. During cable laying, noise is produced by the motion of the plough or trencher through the seabed, and increased noise could in theory act as a barrier to migration.
Indirect disturbance as a result of sediment deposition and temporary increases in SSC	Construction activities will mobilise and deposit sediments, therefore increasing suspended sediments in the water column which may act as a barrier to migration as a result of avoidance responses.
Direct temporary habitat disturbance via Export Cable installation	Temporary habitat loss arising from cable laying activities may potentially reduce area of available habitat for foraging during migration.

Potential Impact	Description of Effect
Operation & Maintenance Phase	
Behavioural responses to EMF associated with cabling (Export Cable)	Migratory fish are known to use the earth's magnetic field as an aid to navigation; therefore, EMF arising from the Export Cable could in theory act as a barrier to migration.
Long term loss of original habitat (Export Cable)	Cable protection would change original habitat which may potentially reduce area of available habitat for foraging during migration.

305. The HRA Screening Report in Appendix B identifies those impacts on the noted SACs that will have no LSE and therefore will not be included in the rest of the HRA process.

306. For the Revised Development HRA, and drawing on the impact assessment outcomes of both the Original Development and the Revised Development EIAs, any LSE arising from the Revised Development either alone or in-combination with the plans, projects and activities listed in Section 5.7, will be identified. Potential effects on notified interest features of Natura 2000 sites in relation to their conservation objectives will be considered.

8.2.9 Scoping Questions – Natural Fish and Shellfish

- Are you satisfied that the existing fish and shellfish baseline and proposed updates to that baseline are appropriate to the potential level of impact from this proposed development?
- Are you satisfied that the EIA should only concentrate on those receptors which may be subject to significant effects from the proposed development?
- Are you satisfied with the receptors and potential impact proposed to be included within the impact assessment (i.e. impact of construction noise on hearing specialist)? Are you satisfied that this sufficiently covers the potential impacts on features from the proposed development?
- Are you satisfied with the proposed approach to the assessment of those effects scoped into the EIA for the Revised Development?
- Are you satisfied that the embedded mitigation (including Licence conditions) are appropriate to the potential level of impact from this proposed development?
- Do you agree that cumulative impacts on fish and shellfish should be scoped out of EIA for the Revised Development (with the exception of piling noise effects) based on the assumptions set out and the conclusions reached in the CIA for the Original Development?
- Do you agree that there will be no LSE with respect to potential impacts from EMF and indirect effects through sediment deposition and therefore will not be considered further for HRA?

- The HRA report will include potential impacts from barrier effects and disturbance or physical injury due to construction of the Revised Inch Cape Wind Farm and construction and operation of the Revised OfTW. There is also potential impacts for direct temporary habitat disturbance from the OfTW. Do you agree that these potential impacts should be included in the HRA report?

8.3 Marine Mammals

8.3.1 Introduction

307. This section of the Scoping Report confirms the marine mammal receptors of relevance to the Revised Development. As described in Section 5, the purpose of this section is to provide sufficient detail on the potential effects on marine mammals resulting from the construction, operation and maintenance and decommissioning of the Revised Development.

308. The detail provided will allow MS-LOT and their consultees to be clear about what they consider the significant effects of the proposal are likely to be and, therefore, whether they need to be subject to an EIA and be included within the ES.

309. In order to provide sufficient information to consultees reference is made to the baseline data gathered to inform the Original Development EIA, and to the outcomes of the impact assessment presented in the Original Development ES. Design, construction and operational changes between the Original Development and the Revised Development that are likely to have further impacts on marine mammals are also considered to inform any subsequent impact assessments.

310. For a full description of the design envelope parameters and changes please refer to Section 4. The Development Area for both the Original and Revised remains unchanged and can be seen in Figure 4-1.

311. This section concludes that the likely impacts (apart from piling impact during construction) from the Revised Development will be less than those assessed for the Original Development and therefore, in line with the EIA regulations are not required to be included with the Revised Development ES. This is due to the following;

- Changes in the Revised Design Envelope (see Section 4);
- Baseline data remaining valid;
- No material changes to data collection;
- No material changes to assessment best practise; and
- Not significant effects concluded within the Original Development EIA.

Full details and justification are provided within this section.

312. Table 8-20 shows the main marine mammal species which have been recorded in the Firths of Forth and Tay. The assessment will focus on the six most common species (minke whale, bottlenose dolphin, white-beaked dolphin, harbour porpoise, grey seal, harbour seal) and any resulting mitigation will be considered appropriate/relevant for the less commonly occurring species.

Table 8-20: Main Marine Mammal Species Recorded in the Firths of Forth and Tay

Common name	Latin name	Occurrence
Cetaceans		
Bottlenose dolphin	*Tursiops truncatus*	All year
Harbour porpoise	*Phocoena phocoena*	All year
Minke whale	*Balaenoptera acutorostrata*	Seasonal
White-beaked dolphin	*Lagenorhynchus albirostris*	Seasonal
Sperm whale	*Physeter macrocephalus*	Occasional
Humpback whale	*Megaptera novaeangliae*	Occasional
Long-finned pilot whale	*Globicephala melas*	Occasional
Killer whale	*Orcinus orca*	Occasional
Common dolphin	*Delphinus delphis*	Occasional
White-sided dolphin	*Lagenorhynchus acutus*	Occasional
Seals		
Grey seal	*Phoca vitulina*	All year
Harbour seal	*Halichoerus grypus*	All year

8.3.2 Data Sources and Baseline Environment

313. This section identifies baseline data sources that can be used to characterise the marine mammal resource within and around the Revised Development. It draws predominantly from the data sources used to inform the Original Development EIA, but proposes updates where necessary with more recent data. Commentary is provided on the sufficiency of these data as a basis for scoping the Revised Development EIA.

Baseline Data

314. A variety of marine mammal datasets were collated and analysed to inform the EIA for the Original Development. Data were drawn from site-specific surveys, studies commissioned by ICOL and from a desktop review of publicly available information. Those datasets considered to be relevant to the Revised Development are listed in Table 8-21 below. The data sources are more fully described in the Inch Cape Offshore Wind Farm ES Chapter 14 (ICOL, 2013) and supporting technical studies.

Table 8-21: Baseline Datasets from the Original Development EIA

Dataset	Coverage	Data use	Date
ICOL-commissioned site specific surveys and studies			
Boat-based surveys (Canning, 2012)	Within Wind Farm Array and buffer	Estimation of animal density (fed into the integrated cetacean analysis work)	2010-2012
Seal baseline report (Sparling et al., 2012)	Outer Firths of Forth and Tay and surrounding area	Usage of the Forth and Tay area by seals, connectivity with local SACs	Up to 2012
External / pre-existing broader scale data and studies			
TCE aerial surveys (Grellier and Lacey, 2012)	Outer Firths of Forth and Tay and surrounding area (covering the STW and R3 sites)	Estimation of encounter rates and animal density (fed into the integrated cetacean analysis work)	2009-2010
SMRU seal data (counts and telemetry)	East Coast Management Area/UK	Estimation of reference population size; fed into the seal usage maps (Figure 14.5 and 14.6 of Chapter 14; ICOL 2013) along with SMRU seal telemetry data	Up to 2011
FTOWDG bottlenose dolphin surveys (Quick and Cheney, 2011)	Firth of Tay and St Andrews Bay	Informed predictions of animal density	2009-2010
Reid et al. (2003)	North-west European waters	Species' distributions	2003
Integrated cetacean analysis for the three FTOWDG sites	Within and around Wind Farm Array	Estimation of animal density for harbour porpoise, white-beaked dolphin and minke whale	2012 (Mackenzie et al.)
SCANS II	European Atlantic and North Sea	Reference populations for harbour porpoise and white-beaked dolphin	Survey conducted in 2005; report used in Original Development ES produced in 2006
Bottlenose dolphin photo-ID (University of Aberdeen)	East coast of Scotland	Reference population (Cheney et al., 2013); predicting animal density (along with information from Hastie	1989-2007

Dataset	Coverage	Data use	Date
		at al. (2003) and Robinson et al. (2007))	
IWC/IUCN Red List	North Atlantic	Reference population for minke whale	2003 (Northeast Atlantic, Central North Atlantic and Canadian East Coast)/2006 (West Greenland)

Data Validity

315. To inform this Scoping Report, the data previously collected/used as part of the Original Development EIA has been updated with recently published, publicly available data, and this should be considered sufficient to meet the requirements needed to effectively characterise the current baseline conditions within the Revised Development area. The following sections consider the sufficiency of the available data in relation to spatial coverage and age.

Data Coverage

316. As identified in Table 8-21, ICOL-commissioned site specific surveys were conducted within, and surrounding, the wind farm array and cable corridor for the Original Development EIA. As marine mammals are wide-ranging, some of the baseline data used in the Original Development EIA was drawn from further afield. The location of the Revised Development will cover the same portion of seabed assessed within the Original Development EIA. Potential impacts to marine mammals are not constrained to the footprint of the wind farm. Noise, in particular from percussive piling, has the potential to propagate through the water column to disturb animals at a distance from the wind farm site itself. This was considered when ensuring that the spatial coverage of the data was sufficient for the Original Development assessments, and retains relevancy for the Revised Development.

317. It is therefore considered that the spatial coverage of the original data remains valid for the Revised Development Area.

Age of the Data

318. As described above and detailed within Table 8-21, site specific survey data for the Original Development EIA were collected up to 2012. These data were also used in conjunction with broader scale, contextual data from a variety of sources also listed in Table 8-21.

Additional Data Sources

319. Table 8-21 identifies the baseline data sources that were used to characterise the marine mammal resource within and around the development area, as part of the Original Development EIA. The externally sourced and pre-existing data for the area of interest provided important contextual information to that collected as part of the ICOL-commissioned site specific surveys and studies. As part of this scoping report, a review of each of the following data sources has been undertaken to enable an assessment of the update which needs to be made to the existing understanding of baseline conditions: -

- Grey and harbour seal density maps (Jones et al., 2013); and
- SCANS III data (SMRU).

320. The grey and harbour seal at sea density maps used within the Original Development EIA were bespoke maps provided under contract by SMRU. ICOL assumes that the underlying data for these maps and those of the Jones et al. 2013 maps are the same. However, direct comparison is not possible as the spatial resolution (size of the bins; density estimated for four or five kilometre squared area) is different. Population estimates for the East Coast Management Unit (as described above) will be used to scale the at sea density surfaces provided by Jones et al. 2013 to reflect current grey and harbour seal numbers. This will provide representative density surface estimates for the Revised Development EIA.

321. SCANS III data are not available at present (12/04/2017). Once available (later in 2017), the design-based density estimates will be used to inform the species' density surfaces (at a relatively coarse scale) and the design-based abundance estimates will be used to inform the sizes of the reference populations i.e. the abundance of animals in the appropriate Management Unit. It is possible that the IAMMWG (2015) paper may be updated in light of the new estimates. If they are available in time, the model-based estimates (due in 2018) will be used to inform the species' density surfaces (at a relatively fine scale). For the Revised Development, the new SCANS III data will be used to inform/revise the baseline for minke whale, white-beaked dolphin and harbour porpoise.

322. In addition, results of more recent studies on noise propagation modelling and the properties of the noise field as it moves through the water column (NMFS, 2016; Farcas et al., 2016), the physiological and behavioural consequences for marine mammals from exposure to noise including sensitivity to PTS onset (NMFS, 2016; Thompson et al., 2013; Hastie et al., 2015; Russell et al., 2016) and assessment methodology/tools (Harwood et al., 2014) have been reviewed to supplement, where relevant, findings presented in the Original Development EIA. It is proposed that these additional data sources be discussed with stakeholders to determine how best to utilise the information they provide to reduce the uncertainty inherent within the assessments of the Original Development ES (see Section 8.3.6 for details).

323. It is therefore considered that the age of the data, supplemented with the additional sources as identified above are valid to characterise the baseline assessment for the Revised Development Area.

Review of Baseline Characteristics

324. Chapter 14 of the Original Development ES presents the baseline characteristics for marine mammals across the Development area.

325. For some of these broader scale density estimates, no update has occurred since the Original Development EIA was completed and as such they remain the key source of data. For example, although additional data have been collected, the estimate derived by Cheney et al. (2013) remains the most recent estimate of the size of the east coast of Scotland bottlenose dolphin population.

326. More contemporary data are available for other key data sets such as, for example, the SMRU seal count data. In addition, with the publication of Hammond et al. (2013), the SCANS II density and abundance estimates have been revised from those used for the Original Development EIA. These data have been reviewed in order to assess whether any material changes have occurred that might alter the baseline conditions as previously described within the Original Development ES. Although it should be noted that the 2015 Firth of Tay and Eden Estuary harbour seal count (of 60 animals) was up on the previous year's lowest recorded count of 29 individuals (Duck and Morris, 2016), the 2015 count is still less than 10 per cent of the numbers generally counted in the 1990s and early 2000s. The East Coast Management Area (within which the Firth of Tay and Eden Estuary SAC lies) count for harbour seals (which was used to derive the harbour seal reference population for the Original Development EIA, as advised by regulators) has changed from 459 in 2007[8] (SMRU unpublished data – cited in ICOL, 2013) to the current count of 194 (Duck et al., 2015) since the Original Development EIA was produced, confirming the general continued decline in harbour seal numbers for the East Coast Management Area. The East Coast Management Area count for grey seals has also changed (from 2,347 in 2007[9]; SMRU unpublished data – cited in ICOL, 2013) to the current count of 2,134 (Duck et al., 2015)). Revision of the SCANS II density and abundance estimates (used to inform reference population sizes) produced no gross change for either harbour porpoise or white-beaked dolphin.

[8] This count was multiplied by a correction factor (1/0.72) in order to take into account the number of harbour seals which were at sea when the count was made – giving an East Coast Management Area reference population of 638 harbour seals.

[9] This count was multiplied by a correction factor (1/0.33) in order to take into account the number of grey seals which were at sea when the count was made – giving an East Coast Management Area reference population of 7,112 grey seals.

8.3.3 Design Envelope

327. Table 8-22 sets out the worst case scenarios defined by the EIA for the Original Development for marine mammals (ICOL, 2013) compared to the proposed worst case scenario for the Revised Development. These definitions are provided to a level of detail sufficient to draw conclusions in relation to the scoping process.

Table 8-22: Worst Case Scenario Definition – Wind Farm and Export Cable Corridor

Potential Impact	Original Development Design Envelope (worst case scenario) (ICOL, 2013)	Revised Development Design Envelope (worst case scenario)	Difference between the Original and Revised Design Envelopes
Construction (& Decommissioning) Phase			
Disturbance/ displacement. Barrier to movement. In both cases from WTG numbers and layout or through cable installation.	213 WTGs with a minimum cross-wind and down-wind spacing of 820 x 820 m in either a grid or diamond layout. Up to three met masts. Up to five OSPs. Area of seabed disturbed is 3.02 km^2 across Offshore Export Cable Corridor: AC as largest number (six) of Export Cables;	Up to 72 WTGs with a minimum turbine spacing of 1278 m in either a grid or an off-set grid pattern. No met masts. Up to two OSPs. Area of seabed disturbed is 2.51 km^2 across Offshore Export Cable Corridor. Maximum cable length for each of the two cables is approximately 83.3 km; and Each of the two cables are installed in a separate trench resulting in two trenches in total	Overall there is a 66% reduction in WTGs numbers, 60% OSPs and 46 % reduction in inter-array cable and the Revised Development requires no further met masts. Total area disturbed is 1.3km^2 less than assessed in the Original Development ES. This equates to a 23% reduction in total disturbed area. Increase in spacing between WTGs Cable corridor length remains the same (83.3 km), there is a reduction in number of export cables from six to two (reduction in overall footprint of 17.5 %),

Potential Impact	Original Development Design Envelope (worst case scenario) (ICOL, 2013)	Revised Development Design Envelope (worst case scenario)	Difference between the Original and Revised Design Envelopes
Reduction in prey availability (indirect effect). Barrier to movement. In both cases from foundation options with regards to habitat loss.	Total seabed area disturbed is 5.54 km^2, equating to 3.69% of the Development Area. Area of seabed disturbed is 3.02 km^2 across Offshore Export Cable Corridor	Total seabed area disturbed is 4.24 km^2, equating to 2.82% of the development area, resulting from: Seabed preparation for up to 72 WTGs with gravity base substructures (GBS) selected as having the largest disturbance footprint (140 m dredger affected diameter); Seabed preparation for two OSPs with GBS selected as having the largest area of disturbance footprint (300 m dredger affected diameter); No met masts; 190 km inter-array cable installation with a cable corridor disturbed width of 15 metres as the widest possible area of disturbance; Vessel anchorage disturbance from 5 m^2 anchor footprints deployed at 500 m intervals along the 190 km of inter-array cable; All other development aspects remain the same as those assessed in the Original Development ES. Area of seabed disturbed is 2.51 km^2 across Offshore Export Cable Corridor.	Overall there is a 66% reduction in WTGs numbers, 60% OSPs and 46 % reduction in inter-array cable and the Revised Development requires no further met masts. Total area disturbed is 1.3km^2 less than assessed in the Original Development ES. This equates to a 23% reduction in total disturbed area. Cable corridor length remains the same (83.3 km), there is a reduction in number of export cables from six to two (reduction in overall footprint of 17.5 %), resulting in the proportional reduction in disturbed habitats caused by construction.
Lethal effects and physical injury. Hearing damage. Disturbance/ displacement.	Total number of piles is 944 – based on 213 WTGs (213 x 4), five OSPs (5 x 16) and three offshore met masts (3 x 4). Pile driving will take place over a two year period, approximately 11% to 23% of time (depending	Total number of piles is 304 – based on up to 72 WTGs[10] (72 x 4) and two OSPs (2 x 8). Piling activities are predicted to extend over a one year period with piling being	Reduction in overall number of piles. Increase in maximum blow energy.

[10] A four-legged jacket has been assessed as a representative arrangement for the purpose of identifying the worst case.

Potential Impact	Original Development Design Envelope (worst case scenario) (ICOL, 2013)	Revised Development Design Envelope (worst case scenario)	Difference between the Original and Revised Design Envelopes
Reduction in prey availability (indirect impact). In all cases from piling activities.	upon the number of vessels used and hardness of substrate encountered). Up to two piling vessels may operate simultaneously. Worst Case: Noise modelling based on four piles per 24 hour period. Modelling calculated on a pile diameter of 2438 mm; maximum blow energy of 1080 kJ. Total duration, including soft start, 4.2 hours. This scenario is estimated to represent 30% of the Development Area. Most Likely Case: Noise modelling based on two piles installed per 24 hour period. Modelling calculated on a pile diameter of 2438 mm; maximum blow energy of 1080 kJ. Total duration, including soft start, 2.1 hours. This scenario is estimated to represent 70% of the Development Area.	underway for approximately 14% of this time. Up to two piling vessels may operate simultaneously. Worst Case: Eight piles per 24 hour period. Maximum blow energy capacity of 2400 KJ. 4.2 hours per pile. Most Likely Case: Four piles per 24 hour period. 2.1 hours per pile.	Increase in maximum number of piles installed per 24 hour period.
Collision risk. Disturbance/ displacement. Toxic contamination. In all cases from vessel movement.	Approximately 3,500 vessel movements (defined as a transit to and from the construction port and site centre) over total construction period (2016 - 2020).	Approximately 1,500 vessel movements may be required over the construction period.	Overall there is a 66% reduction in WTGs numbers, 60% OSPs and 46 % reduction in inter-array cable and the Revised Development requires no further met masts. There is a reduction in number of Export Cables required from 6 to 2. Therefore there will be a reduction in number of vessel movements.

Potential Impact	Original Development Design Envelope (worst case scenario) (ICOL, 2013)	Revised Development Design Envelope (worst case scenario)	Difference between the Original and Revised Design Envelopes
Potential bio-accumulation in liver, kidney, bone and fatty tissues. Potential effect upon health and reproductive success of marine mammal species. From toxic contamination in both cases.	Approximately 3,500 vessel movements (defined as a transit to and from the construction port and site centre) over total construction period (2016- 2020).	Approximately 1,500 vessel movements may be required over the construction period.	Overall there is a 66% reduction in WTGs numbers, 60% OSPs and 46 % reduction in inter-array cable, reduction in Export Cables from six to two, and the Revised Development requires no further met masts. Therefore there will be a reduction in number of vessel movements.
Operation & Maintenance Phase			
Reduction in prey availability (indirect impact). Barrier to movement. In both cases from foundation options with regards to habitat loss.	Total loss of original habitat is 1.87 km^2, equating to 1.25% of the Development Area. For the Export Cable Corridor: Total area of long term original habitat loss = 0.60 km^2 Protection of maximum 20% of each of the six, 83.3 km long Export Cables; and Protection material six meters wide.	Total loss of habitat is 1.05 km^2, equating to 0.7 % of the Development Area. For the Export Cable Corridor: Total area of original habitat loss = 0.4 km^2 resulting from: Protection of 20% of each of the 83.3 km long Export Cables. Protection material 6.0 m wide.	Total loss of habitat is 0.82 km^2 less than assessed in the Original Development ES equating to a 44% reduction in total loss of habitat. Cable corridor length remains the same (83.3 km), there is a reduction in number of export cables from six to two, resulting in 33% reduction in loss of habitat.
Disturbance from inter-array and Export Cable.	AC cables. Maximum cabling length = 353 km. Trench width one metre, buried to a target depth of one metre and protected where burial is not possible. Inter-array cable with maximum	Total inter-array cable length (190 km). Cables will be suitably buried or will be protected by other means when burial is not practicable.	Reduction in length of inter-array cabling by 46 %. Cable corridor length remains the same (83.3 km),

Potential Impact	Original Development Design Envelope (worst case scenario) (ICOL, 2013)	Revised Development Design Envelope (worst case scenario)	Difference between the Original and Revised Design Envelopes
	protection of 10% of the cable's length covering 1.87 km^2 (equivalent to 1.25% of the Development Area). Total Export Cable length of 83.3 km. Six cables in total required. Cables will be suitably buried or will be protected by other means when burial is not practicable. The AC option is identified as having the greatest potential for EMF impacts.	Total Export Cable length of 83.3 km. Two cables in total required. Cables will be suitably buried or will be protected by other means when burial is not practicable. The AC option is identified as having the greatest potential for EMF impacts.	there is a reduction in number of export cables from six to two and as such any effects are anticipated to be reduced accordingly.
Toxic contamination (direct and indirect effect on prey from corrosion and anti-fouling protection).	Cathodic protection, anti-corrosion coatings, anti-fouling paints and mechanical removal of deposits. Potential for use of corrosion inhibitor chemicals inside J-tubes.	Cathodic protection, anti-corrosion coatings, anti-fouling paints and mechanical removal of deposits. Potential for use of corrosion inhibitor chemicals inside J-tubes.	None.
Collision risk. Disturbance/displacement. Toxic contamination. In all cases from vessel movement.	A maximum average of six service trips per day.	Scheduled maintenance and inspection of each WTG is likely to occur every six to twelve months. Inspections of support structures and subsea cables will be performed on a periodic basis.	66% reduction in WTGs numbers, 60% OSPs, 46 % reduction in inter-array cable length, reduction in Export cable from six to two, and the Revised Development requires no further met masts, resulting in the proportional reduction in vessel movements during O&M

Potential Impact	Original Development Design Envelope (worst case scenario) (ICOL, 2013)	Revised Development Design Envelope (worst case scenario)	Difference between the Original and Revised Design Envelopes
Potential bio-accumulation in liver, kidney, bone and fatty tissues. Potential effect upon health and reproductive success of marine mammal species. From toxic contamination in both cases.	A maximum average of six service trips per day.	Scheduled maintenance and inspection of each WTG is likely to occur every six to twelve months. Inspections of support structures and subsea cables will be performed on a periodic basis.	66% reduction in WTGs numbers, 60% OSPs, 46 % reduction in inter-array cable length, reduction in Export cable from six to two, and the Revised Development requires no further met masts, resulting in the proportional reduction in potential for toxic contamination.

8.3.4 Revised Development Embedded Mitigation Measures

328. Embedded Mitigation for the Revised Development will comprise of mitigation measures to minimise environmental effects which were captured within the Design Envelope for the Original Development, and are as follows:

- A mitigation protocol has been developed by the Statutory Nature Conservation Bodies (SNCBs) in order to reduce risk of potential death/physical injury from noise sources to negligible levels (JNCC, 2010) which will be implemented by ICOL. The project specific protocol will be detailed in the final Environmental Management Plan (EMP) prior to construction and will reflect current guidance at the time of construction;
- Advances in technology may provide more effective means to aid, enhance or replace the Marine Mammal Observer (MMO) function. An example of the trialling of such technology will be undertaken during the construction of the Beatrice Offshore Wind Farm within the Moray Firth in 2017. The feasibility of alternative approaches will be considered in consultation with regulatory authorities;
- Vessels and plant relating to construction, operation and decommissioning activities will follow best practice and guidance for pollution at sea, detailed in the final EMP, to reduce and coordinate response to pollution events if they were to occur. The final EMP will follow OSPAR, IMO and MARPOL guidelines, and industry best practice

regarding pollution at sea. This includes provision for storage of pollutants, and identifies products suitable for use in the marine environment. The EMP will be finalised prior to construction;

- Defined navigational routes will be used by vessels. This will reduce the risk of collision with marine mammals;
- Alternative mitigation techniques will be investigated prior to the finalisation of the construction method statement. Approaches will be confirmed following consultation with regulatory organisations. Adoption of any mitigation measures will be subject to an assessment of technical and commercial feasibility;
- All materials used will be safe for use within the marine environment; and
- Cables will be suitably buried or will be protected by other means when burial is not practicable, which will reduce the potential for impacts relating to EMF.

329. No additional mitigation was proposed as a result of the EIA process.

8.3.5 Commitment to Consent Conditions

330. As noted in Section 2.2.3, ICOL also proposes to commit to those consent conditions (that will further minimise the impacts of the development on the environment) that were granted for the Original Development for the application of the Revised Development.

331. These consent conditions have taken into account any relevant consultation responses to the Original Development EIA from key stakeholders in relation to marine mammals and in determining the acceptability of the Original Development; the most relevant consent conditions are summarised in Table 8-23. Conditions in full are provided in Appendix A.

Table 8-23: Summary of the Most Relevant Consent Conditions Related to Marine Mammals

Requirement	Description
Production of a Project Environmental Monitoring Programme ("PEMP")	Condition will ensure that appropriate and effective monitoring of the impacts of the Development on marine mammals is undertaken.
Production of a Construction Method Statement (CMS)	Condition will ensure the appropriate construction management of the Development, taking into account mitigation measures to protect the environment (including marine mammals) and other users of the marine area.
Production of a Piling Strategy	Condition will mitigate the underwater noise impacts arising from piling activity.
Production of a detailed Construction programme	Provision for approval of a Construction Programme to confirm the timing and programming of the construction works (including piling operations).

Requirement	Description
Production of an Environmental Management Plan	Condition will mitigate the impacts on the environmental interests during construction and operation.
Production of a Vessel Management Plan	Describing, for approval, the types of vessels to be employed and the management and routeing of those vessels so as to mitigate disturbance to bird and marine mammal species.
Production of a Piling Strategy	Setting out for approval the details of any proposed piling and how that piling will be managed to mitigate any impacts of underwater noise on sensitive species (including monitoring provisions).
Production of a Cable Plan	Setting out, for approval, the installation methods for the cables (including burial) to ensure it remains consistent with the installation process assessed in the ES as relevant to marine mammals (including matters related to EMF).
Participate in surveys as set out in a Marine Mammal Monitoring Programme	Condition will ensure that appropriate and effective monitoring of the impacts of the Development is undertaken.
Appointment of an ECoW	Appointment of an approved Ecological clerk of Works (ECoW) to provide independent audit and reporting of compliance with various requirements of the consent relating to environmental management and to ensure that appropriate and effective monitoring of the impacts of the development is undertaken.
Marine Mammal Observer (MMO)	Requirement for the appointment of an MMO for piling activities.
Noise registry	Requirement to submit noise registry forms for piling activities and any other activities that produce loud, low to medium frequency (10Hz – 10kHz) impulsive noise
Participation in any Forth and Tay Regional Advisory Group (“FTRAG”) established	Participation in any group established will ensure effective environmental monitoring and mitigation is undertaken at a regional scale.
Participation in any Scottish Strategic Marine Environment Group ("SSMEG") established	Participation in any group established will ensure effective environmental monitoring and mitigation is undertaken at a national scale.

8.3.6 Scoping of the Revised Development EIA

332. The Embedded Mitigation (Section 8.3.4) and the commitment to consent conditions considered alongside the changes in the design envelope will be taken into consideration when determining the scope of the Revised Development EIA. Due to a reduced number of WTGs, OSPs, met masts, and the smaller overall footprint of development (see Section 4) combined with fewer vessel movements, the potential impacts on Marine Mammals for the Revised Development, would be less than the worst case scenario impacts from the Original Development which were not significant. Therefore the worst case scenario conclusions reached in the Original Development should remain valid for the Revised Development.

333. The only exception to this is in relation to piling noise associated with taller turbines; although there will be a reduction in the total number of piling events, there will be an increase in both the maximum blow energy required and the number of piles per day.

334. The Embedded Mitigation (Section 8.3.4) and the commitment to consent conditions (Section 8.3.5) considered alongside the changes in the design envelope will be taken into consideration when determining the scope of the Revised Development EIA. Due to the smaller overall footprint of development (see Section 4) and the potential impacts on Benthic Ecology for the Revised Development, would be less than the worst case scenario impacts from the Original Development which were all not significant. Therefore the worst case scenario conclusions reached in the Original Development should remain valid for the Revised Development.

335. The following tables summarise the post-mitigation (residual) significance for the Original Development and details whether the potential impact will be scoped out of the Revised Development EIA, with a relevant justification provided where relevant

336. Where the assessment of effects for the Original Development was undertaken in a qualitative manner, did not specifically reference population density surfaces and concluded a minor effect, ICOL are proposing to scope out their re-assessment for the Revised Development. This is appropriate because examination of contemporary (baseline) data now available showed no gross changes that that would materially alter the baseline conditions as previously described within the Original Development ES. Justification on each element is provided within Tables 8-24 and 8.25 below. While it is acknowledged that the baseline may require limited up-dating to reflect new data that have become available since the Original Development EIA, the magnitude of these changes is expected to be very small and would not change the outcomes of the qualitative assessments presented below. The new data that have become available (described in 'Additional Data Sources' above) will be included within the quantitative assessments scoped in within Tables 8-24 and 8-25 below.

337. The Embedded Mitigation (Section 8.3.4) was included within the assessment conclusions and therefore only the residual effects have been presented in these tables.

Table 8-24: Summary of Potential Impacts – Wind Farm

Potential Impact	Residual Effect (ICOL, 2013)		Scoped in or out of the EIA for current Application	Justification
Construction (& Decommissioning) Phase				
Disturbance from increased noise (excluding piling and noise associated with geophysical survey)	All marine mammals	Minor	Scoped out	The impacts from the Original Development were assessed as not significant and, as a result of the design changes described above, the Revised Development is anticipated to have less of an impact. Further assessment of this potential impact is therefore scoped out of the Revised Development EIA.
Disturbance from increased noise from geophysical survey systems *Please note this was not assessed in the Original Development EIA*	All marine mammals	N/A	Scoped in	Current knowledge has shown that noise from some geophysical survey systems used during the course of preparatory work for cable laying, scour protection installation and other ground intrusive works has the potential to induce the onset of PTS and/or disturb/displace animals (depending on the frequencies and source levels of the equipment used). It is therefore proposed to scope in this potential impact (disturbance from increased noise (geophysical survey systems) into the EIA for the Revised Development.
Displacement/PTS from piling	All marine mammals	Minor to major in the medium term, minor in the long term	Scoped in	There will be an increase in Maximum Hammer Capacity to 2400 kJ due to the increase WTG size. Due to an increase in Maximum Hammer Capacity it is proposed to scope further consideration of displacement/PTS from piling into the EIA for the Revised Development.

Potential Impact	Residual Effect (ICOL, 2013)		Scoped in or out of the EIA for current Application	Justification
Collision risk and barrier effect from increased vessel movement	All marine mammals	Minor	Scoped out	The impacts from the Original Development were assessed as not significant and, as a result of the design changes described above, the Revised Development is anticipated to have less of an impact. Further assessment of this potential impact is therefore scoped out of the Revised Development EIA.
Use of ducted propellers leading to risk of corkscrew injury	Seals	Moderate (harbour seals) in the medium term, minor in the long term Minor (grey seals)	Scoped out	A position statement from the SNCBs made after the EIA for the Original Development provides guidance on the risk of cork screw injury. The guidance states it is considered very likely that the use of vessels with ducted propellers do not pose any increased risk to seals over and above normal shipping activities (Interim advice on risk of seal corkscrew injuries, February 2015). Taking into account the new position statement it is therefore proposed that the potential for corkscrew injury on seals resulting from the use of ducted propellers be scoped out.
Accidental pollution events	All marine mammals	Minor	Scoped out	The impacts from the Original Development were assessed as not significant and, as a result of the design changes described above, the Revised Development is anticipated to have less of an impact. Further assessment of this potential impact is therefore scoped out of the Revised Development EIA.
Changes in availability of prey species	All marine mammals	Minor	Scoped out	The impacts from the Original Development were assessed as not significant and, as a result of the design changes described above, the Revised Development is anticipated to have less of an impact. Further assessment of this potential impact is therefore scoped out of the Revised Development EIA.

Potential Impact	Residual Effect (ICOL, 2013)		Scoped in or out of the EIA for current Application	Justification
Operation & Maintenance Phase				
Disturbance from increased anthropogenic noise (non-piling) i.e. operational noise	All marine mammals	Minor	Scoped out	Research since the Original Development EIA, carried out by Marmo et al. (2013) concluded that (1) WTG noise is unlikely to cause permanent hearing damage in seals, porpoises or bottlenose dolphins, even at close proximity to the WTGs (2) operational wind farms do not appear to affect harbour seal movement patterns and (3) while porpoise were displaced during offshore wind farm construction they return to the operational projects. Evidence now exists that marine mammals quickly habituate to the presence of (operational) turbines in the water, that there is sufficient distance between turbines to allow movement between foundations, and that usage of the wider area may increase compared to prior to wind farm development (e.g. Russell et al., 2016). Furthermore, GPS-tagged seals have been shown to exhibit striking grid-like patterns as they concentrate their (foraging) activity at individual turbines (Russell et al., 2014). Taking into account the new evidence as described above, the impacts from the Original Development were assessed as not significant and, as a result of the design changes described above, the Revised Development is anticipated to have less of an impact. Further assessment of this potential impact is therefore scoped out of the Revised Development EIA.

Potential Impact	Residual Effect (ICOL, 2013)		Scoped in or out of the EIA for current Application	Justification
Collision risk and barrier effect from increased vessel movement	All marine mammals	Minor	Scoped out	The impacts from the Original Development were assessed as not significant and, as a result of the design changes described above, the Revised Development is anticipated to have less of an impact. Further assessment of this potential impact is therefore scoped out of the Revised Development EIA.
Use of ducted propellers leading to risk of corkscrew injury	Seals	Minor for both harbour and grey seals	Scoped out	A position statement from the SNCBs made after the EIA for the Original Development provides guidance on the risk of cork screw injury. The guidance states it is considered very likely that the use of vessels with ducted propellers do not pose any increased risk to seals over and above normal shipping activities (Interim advice on risk of seal corkscrew injuries, February 2015). Taking into account the new position statement it is therefore proposed that the potential for corkscrew injury on seals resulting from the use of ducted propellers be scoped out.
Loss of habitat	All marine mammals	Minor	Scoped out	Recent studies in the North Sea and around the UK(e.g. Russell et al., 2016; Canning et al., 2013; Scheidat et al., 2011; Dähne et al., 2013) have shown that harbour seals and harbour porpoises return to preferred foraging areas post-construction of wind farms. The impacts from the Original Development were assessed as not significant. As a result of the design changes and recent research described above, the Revised Development is anticipated to have less of an impact. Further assessment of this potential impact is therefore scoped out of the Revised Development EIA.

Potential Impact	Residual Effect (ICOL, 2013)		Scoped in or out of the EIA for current Application	Justification
Creation of habitat	All marine mammals	Minor	Scoped out	Recent studies in the North Sea and around the UK (e.g. Russell et al., 2016; Canning et al., 2013; Scheidat et al., 2011; Dähne et al., 2013) have shown that animals return to preferred areas post-construction; increases in usage of areas where OWFs have been constructed appear to occur as a result of changes in usage of the wider area rather than as a result of the presence of the wind farm (Scheidat et al., 2011; Russell et al., 2016). The impacts from the Original Development were assessed as not significant. As a result of the design changes and recent research described above, the Revised Development is anticipated to have less of an impact. Further assessment of this potential impact is therefore scoped out of the Revised Development EIA.
Effects of EMF	Cetaceans	Minor	Scoped out	As per ICOL (2013), there is no evidence to date suggesting a change in marine mammal activity related to magnetic fields from cables associated with offshore wind farms. In addition, recent studies reported at the American Geophysical Union's Ocean Sciences Meeting (2016) support the conclusion that EMF is unlikely to cause significant effects upon the food chain of marine mammals (Nishimoto et al., 2016; Wyman et al., 2016; Bull and Nishimoto, 2016). The impacts from the Original Development were assessed as not significant. As a result of the design changes and research described above, the Revised Development is anticipated to have less of an impact. Further assessment of this potential impact is therefore scoped out of the Revised Development EIA.

Potential Impact	Residual Effect (ICOL, 2013)		Scoped in or out of the EIA for current Application	Justification
Toxic contamination	All marine mammals	Minor	Scoped out	The impacts from the Original Development were assessed as not significant. As a result of the design changes, the Revised Development is anticipated to have less of an impact. Further assessment of this potential impact is therefore scoped out of the Revised Development EIA.

Table 8-25: Summary of Potential Impacts – Export Cable Corridor

Potential Impact	Residual Effect (ICOL, 2013)		Scoped in or out of the EIA for current Application	Justification
Construction (& Decommissioning) Phase				
Disturbance from increased noise (non-geophysical survey)	All marine mammals	Minor	Scoped out	The impacts from the Original Development were assessed as not significant and, as a result of the design changes described above, the Revised Development is anticipated to have less of an impact. Further assessment of this potential impact is therefore scoped out of the Revised Development EIA.
Disturbance from increased noise from geophysical survey systems	All marine mammals	Minor	Scoped in	Current knowledge has shown that noise from some geophysical survey systems used during the course of preparatory work for cable laying, scour protection installation and other ground intrusive works has the potential to induce the onset of PTS and/or disturb/displace animals (depending on the frequencies and source levels of the equipment used). It is therefore proposed to scope in this potential impact (disturbance from increased noise (geophysical survey systems) into the EIA for the Revised Development.

Potential Impact	Residual Effect (ICOL, 2013)		Scoped in or out of the EIA for current Application	Justification
Collision risk from increased vessel movement	All marine mammals	Minor	Scoped out	The impacts from the Original Development were assessed as not significant and, as a result of the design changes described above, the Revised Development is anticipated to have less of an impact. Further assessment of this potential impact is therefore scoped out of the Revised Development EIA.
Use of ducted propellers leading to risk of corkscrew injury	Seals	Minor for both harbour and grey seals	Scoped out	A position statement from the SNCBs made after the EIA for the Original Development provides guidance on the risk of cork screw injury. The guidance states it is considered very likely that the use of vessels with ducted propellers do not pose any increased risk to seals over and above normal shipping activities (Interim advice on risk of seal corkscrew injuries, February 2015). Taking into account the new position statement it is therefore proposed that the potential for corkscrew injury on seals resulting from the use of ducted propellers be scoped out.
Accidental pollution events	All marine mammals	Minor	Scoped out	The impacts from the Original Development were assessed as not significant and, as a result of the design changes described above, the Revised Development is anticipated to have less of an impact. Further assessment of this potential impact is therefore scoped out of the Revised Development EIA.
Operation & Maintenance Phase				
Collision risk from increased vessel movement	All marine mammals	Minor	Scoped out	The impacts from the Original Development were assessed as not significant and, as a result of the design changes, and associated reduction in vessel requirements, the Revised Development is anticipated to have less of an impact. Further assessment of this potential impact is therefore scoped out of the Revised Development EIA.

Potential Impact	Residual Effect (ICOL, 2013)		Scoped in or out of the EIA for current Application	Justification
Use of ducted propellers leading to risk of corkscrew injury	Seals	Minor for both harbour and grey seals	Scoped out	A position statement from the SNCBs made after the EIA for the Original Development provides guidance on the risk of cork screw injury. The guidance states it is considered very likely that the use of vessels with ducted propellers do not pose any increased risk to seals over and above normal shipping activities (Interim advice on risk of seal corkscrew injuries, February 2015). Taking into account the new position statement it is therefore proposed that the potential for corkscrew injury on seals resulting from the use of ducted propellers be scoped out.
Changes in availability of prey species	All marine mammals	Minor	Scoped out	The impacts from the Original Development were assessed as not significant and, as a result of the design changes described above, the Revised Development is anticipated to have less of an impact. Further assessment of this potential impact is therefore scoped out of the Revised Development EIA.
Effects of EMF	Cetaceans	Minor	Scoped out	Recent studies reported at the American Geophysical Union's Ocean Sciences Meeting (2016) support the conclusion that EMF is unlikely to cause significant effects upon the food chain of marine mammals (Nishimoto et al., 2016; Wyman et al., 2016; Bull and Nishimoto, 2016). The impacts from the Original Development were assessed as not significant. As a result of the design changes and recent research described above, the Revised Development is anticipated to have less of an impact. Further assessment of this potential impact is therefore scoped out of the Revised Development EIA.

Scoping of Cumulative Impact Assessment

338. The geographic scope of the cumulative assessment for the Original Development primarily focused on the Firths of Forth and Tay; however, it also recognised that as mobile species, marine mammals may spend considerable periods of time outside this area and consequently there is therefore the potential for these species to be affected by other offshore developments, more remote to the Development Area. As a result, the CIA for the

Original Development considered the potential cumulative effects from a range of projects, as follows:

- Methil (Fife Energy Park) Offshore Demonstration Wind Turbine
- Neart na Gaoithe Offshore Wind Farm
- Firth of Forth Phase 1 (Project Alpha and Bravo)
- Aberdeen European Offshore Wind Deployment Centre
- Beatrice Offshore Wind Farm
- Firth of Forth Phase 1 Meteorological Mast
- Moray Firth R3 Zone 1 (Eastern Development Area)
- Hywind Demonstration Site
- Montrose Tidal Array (GlaxoSmithKline Tidal Energy Project)
- Grangemouth Renewable Energy Plant
- Rosyth Renewable Energy Plant
- Dundee Renewable Energy Plant
- Cockenzie Combined Cycle Gas Turbine Power Station
- Captain Clean Energy Project(Caledonia Clean Energy Project)
- Forth Replacement Crossing
- Coastal Improvement Works at the Mouth of the Barry Burn
- Rosyth International Container Terminal Project
- Victoria and Albert Museum at Dundee (Dundee Waterfront Development)
- Port of Dundee Expansion
- Edinburgh Harbour Master Plan (Edinburgh Waterfront Development)

339. A number of the projects listed in Section 5.7 were not previously considered by the CIA for the Original Development. These are set out in Table 8-26 with a consideration as to whether they are considered relevant to the CIA for the Revised Development.

Table 8-26: Additional Projects Not Previously Considered in Relation to the CIA for Marine Mammals

Project Name	Requiring Further Consideration as part of the CIA for the Revised Development?	Justification
Blyth Offshore	No	The small scale of piling proposed at Blyth and the distance between the Revised Development and the Blyth site being such that there is no potential for over-lapping noise contours if piling at both projects were to happen within similar time periods or concurrently.
Kincardine Floating Offshore Windfarm	No	No temporal overlap for construction of Kincardine and the Revised Development; lack of piling activity for Kincardine.
Teesside Offshore Wind Farm	No	Teesside has been operational since 2014; operational noise effects are scoped out of the assessment.
Dogger Bank (Creyke Beck A & B, Teesside A & B)	Yes	There is no firm construction programme for these projects and none of these projects has made application for CfD. At this time, due to the distance between the projects, it is considered that unless the Dogger Bank projects and the Revised Development have an overlapping construction programme, there would be no route to cumulative impact upon marine mammals. Therefore, unless new information comes forward for the construction timescales for the Dogger Bank projects that provides confidence that there will be no over-lapping activity with the Revised Development, the Dogger Bank proposals will be included within the CIA for marine mammals as a worst case scenario.
Moray Firth Offshore Wind Ltd Western Development Area	No	Although the MORL WDA consenting is in progress and the design includes piling of foundations, the distance between the projects means that it is considered unlikely that significant cumulative effects would occur even where construction timescales were aligned.
Aberdeen Harbour Expansion	No	The proposals for the consented Aberdeen Harbour Extension include for use of explosives and also potential piling for breakwater and quay construction. However, construction has already commenced and is due for completion by 2020 which, together with the distance between the two projects, means that cumulative effects are considered unlikely to occur.

340. Table 8-27 summarises the post-mitigation significance for all cumulative effects considered (and in relation to the projects considered above) and details whether the potential effect has been scoped out of the CIA for the Revised Application, with a relevant justification.

Table 8-27: Summary of Potential Impacts – Revised Development with Other Plans, Projects and Activities

Potential Impact	Residual Effect (ICOL, 2013)		Scoped in or out of the CIA for current Application	Justification
Construction (& Decommissioning) Phase				
Disturbance from increased noise (non-piling and geophysical survey) – Wind Farm and Export Cable Corridor	All marine mammals	Minor	Scoped out	The cumulative impacts from the Original Development were assessed as not significant. As a result of the design changes described above, coupled with only one change to the projects required to be considered cumulatively, it is anticipated that that there will be no more of a cumulative impact associated with the Revised Development. Further assessment is therefore scoped out of the Revised Development CIA.
Disturbance from increased noise (geophysical survey) – Wind Farm and Export Cable Corridor	All marine mammals	Minor	Scoped in	Current knowledge has shown that noise from some geophysical survey systems used during the course of preparatory work for cable laying, scour protection installation and other ground intrusive works has the potential to induce the onset of PTS and/or disturb/displace animals (depending on the frequencies and source levels of the equipment used). It is therefore proposed to scope further consideration of this potential effect (disturbance from increased noise (geophysical survey systems) into the CIA for the Revised Development.
Displacement/ PTS from piling – Wind Farm	All marine mammals	Minor to major in the medium term, minor in the long term	Scoped in	There will be an increase in Maximum Hammer Capacity to 2400 kJ due to the increase WTG size. It is proposed to scope further consideration of displacement/PTS from piling into the CIA for the Revised Development. This is because: Displacement/PTS onset as a result of piling are still considered to have the potential to affect marine mammals; Maximum blow energy has increased;

Potential Impact	Residual Effect (ICOL, 2013)		Scoped in or out of the CIA for current Application	Justification
				The maximum number of piles per 24 hour period has increased; Results of recent studies on noise propagation modelling and the properties of the noise field as it moves through the water column (NMFS, 2016; Farcas et al., 2016) may need to be taken into account; Results of recent studies on the physiological and behavioural consequences for marine mammals from exposure to noise including sensitivity to PTS onset (NMFS, 2016; Thompson et al., 2013; Hastie et al., 2015; Russell et al., 2016) may need to be taken into account; New tools for assessing the population consequences of disturbance and/or injury are available (Harwood et al., 2014) and may need to be used; and Changes in the baseline population sizes used in the Original Development ES (ICOL, 2013) have occurred for some species.
Collision risk and barrier effect from increased vessel movement	All marine mammals	Minor	Scoped out	The cumulative impacts from the Original Development were assessed as not significant. As a result of the design changes described above (and associated reduction in vessel movements), coupled with only one change to the projects required to be considered cumulatively, it is anticipated that that there will be no more of a cumulative impact associated with the Revised Development. Further assessment is therefore scoped out of the Revised Development CIA.
Use of ducted propellers leading to risk of corkscrew injury	Seals	Moderate (harbour seals) in the medium term, minor in the long term	Scoped out	A position statement from the SNCBs made after the EIA for the Original Development provides guidance on the risk of cork screw injury. The guidance states it is considered very likely that the use of vessels with ducted propellers do not pose any increased risk to seals over and above normal shipping activities (Interim advice on risk of seal corkscrew injuries, February 2015). Taking into account the new position statement it is therefore proposed that the potential for corkscrew injury on seals resulting from the use of ducted propellers be scoped out.
		Minor (grey seals)		

Potential Impact	Residual Effect (ICOL, 2013)		Scoped in or out of the CIA for current Application	Justification
Accidental pollution events	All marine mammals	Minor	Scoped out	The cumulative impacts from the Original Development were assessed as not significant. As a result of the design changes described above, coupled with only one change to the projects required to be considered cumulatively, it is anticipated that that there will be no more of a cumulative impact associated with the Revised Development. As a consequence of the embedded mitigation (including e.g. EMP, pollution control plan etc), the probability of accidental pollution events is deemed highly unlikely. Further assessment is therefore scoped out of the Revised Development CIA.
Changes in availability of prey species	All marine mammals	Minor	Scoped out	The cumulative impacts from the Original Development were assessed as not significant. As a result of the design changes described above, coupled with only one change to the projects required to be considered cumulatively, it is anticipated that that there will be no more of a cumulative impact associated with the Revised Development. Further assessment is therefore scoped out of the Revised Development CIA.
Operation & Maintenance Phase				
Disturbance from increased anthropogenic noise (non-piling) i.e. operational noise	All marine mammals	Minor	Scoped out	Research since the Original Development EIA, carried out by Marmo et al. (2013) concluded that (1) WTG noise is unlikely to cause permanent hearing damage in seals, porpoises or bottlenose dolphins, even at close proximity to the WTGs, (2) operational wind farms do not appear to affect harbour seal movement patterns and (3) while porpoise were displaced during offshore wind farm construction they return to the operational projects. Evidence now exists that marine mammals quickly habituate to the presence of (operational) turbines in the water, that there is sufficient distance between turbines to allow movement between foundations, and that usage of the wider area may increase compared to prior to wind farm development (Scheidat et al., 2011; Dähne et al., 2013; Russell et al., 2016). Furthermore, GPS-tagged seals have been shown to exhibit striking

Potential Impact	Residual Effect (ICOL, 2013)		Scoped in or out of the CIA for current Application	Justification
				grid-like patterns as they concentrate their (foraging) activity at individual turbines (Russell et al., 2014). The cumulative impacts from the Original Development were assessed as not significant. As a result of the design changes and recent research described above, coupled with only one change to the projects required to be considered cumulatively, it is anticipated that that there will be no more of a cumulative impact associated with the Revised Development. Further assessment is therefore scoped out of the Revised Development CIA.
Collision risk and barrier effect from increased vessel movement	All marine mammals	Minor	Scoped out	The cumulative impacts from the Original Development were assessed as not significant. As a result of the design changes described above (and associated reduction in vessel movements), coupled with only one change to the projects required to be considered cumulatively, it is anticipated that that there will be no more of a cumulative impact associated with the Revised Development. Further assessment is therefore scoped out of the Revised Development CIA.
Use of ducted propellers leading to risk of corkscrew injury	Seals	Minor for both harbour and grey seals	Scoped out	A position statement from the SNCBs made after the EIA for the Original Development provides guidance on the risk of cork screw injury. The guidance states it is considered very likely that the use of vessels with ducted propellers do not pose any increased risk to seals over and above normal shipping activities (Interim advice on risk of seal corkscrew injuries, February 2015). Taking into account the new position statement it is therefore proposed that the potential for corkscrew injury on seals resulting from the use of ducted propellers be scoped out.
Loss of habitat	All marine mammals	Minor	Scoped out	The cumulative impacts from the Original Development were assessed as not significant. As a result of the design changes described above, coupled with only one change to the projects required to be considered cumulatively, it is anticipated that that there will be no more of a cumulative impact associated with the Revised Development. Further assessment is therefore scoped out of the Revised Development CIA.

Potential Impact	Residual Effect (ICOL, 2013)		Scoped in or out of the CIA for current Application	Justification
Creation of habitat	All marine mammals	Minor	Scoped out	The cumulative impacts from the Original Development were assessed as not significant. As a result of the design changes described above, coupled with only one change to the projects required to be considered cumulatively, it is anticipated that that there will be no more of a cumulative impact associated with the Revised Development. Further assessment is therefore scoped out of the Revised Development CIA.
Effects of EMF	Cetaceans	Minor	Scoped out	As per ICOL (2013), there is no evidence to date suggesting a change in marine mammal activity related to magnetic fields from cables associated with offshore wind farms. In addition, recent studies reported at the American Geophysical Union's Ocean Sciences Meeting (2016) support the conclusion that EMF is unlikely to cause significant effects upon the food chain of marine mammals (Nishimoto et al., 2016; Wyman et al., 2016; Bull and Nishimoto, 2016). The cumulative impacts from the Original Development were assessed as not significant. As a result of the design changes and research described above, coupled with only one change to the projects required to be considered cumulatively, it is anticipated that that there will be no more of a cumulative impact associated with the Revised Development. Further assessment is therefore scoped out of the Revised Development CIA.
Toxic contamination	All marine mammals	Minor	Scoped out	The cumulative impacts from the Original Development were assessed as not significant. As a result of the design changes described above, coupled with only one change to the projects required to be considered cumulatively, it is anticipated that that there will be no more of a cumulative impact associated with the Revised Development. Further assessment is therefore scoped out of the Revised Development CIA.

8.3.7 Approach to EIA

341. As noted in Section 2, the intention of the EIA is to focus on those impacts that are likely to have significant effects (or those effects that are currently uncertain).

342. As identified above the only impact that may cause a significant residual effect from the construction (and decommissioning), operation and maintenance of the Revised Development is the potential increased impacts relating to underwater noise from increased piling operations and from the use of geophysical survey systems on marine mammals.

343. Based on the evidence summarized from the EIA for the Original Development EIA and considering the scope of the Revised Development by comparison to the Original Development, it is concluded that all of the potential impacts on marine mammals should be scoped out of the EIA for the Revised Development with the exception of:

- Disturbance from increased noise for geophysical survey systems); and
- Displacement/PTS from piling.

344. ICOL intend to undertake consultation and workshops with stakeholders and Marine Scotland Licensing to establish agreement upon key parameters and the most appropriate methodologies to employ for the impact assessments for the two routes to impact upon marine mammals identified above. These workshops will cover:

- Agreement upon baseline populations to inform impact assessments
- PTS onset thresholds in relation to revised sensitivity of harbour porpoise and NMFS 2016 guidelines; and
- Methodology to investigation potential population level effects from PTS and displacement

345. For 'displacement/PTS from piling', no further baseline surveys will be conducted but contemporary information will be used to augment the baseline where appropriate. Underwater noise modelling will be carried out based on information about the Revised Development (including number of turbines, pile design information and predicted piling campaign duration) and seabed conditions. The results of the underwater noise modelling will be used to predict potential effects on key marine mammal receptors (likely minke whale, bottlenose dolphin, white-beaked dolphin, harbour porpoise, grey seal and harbour seal) as per the Original Development EIA. Population modelling will be utilised to explore the consequences of predicted effects on the viability of Natura designated species.

346. The assessment will take into account any additional information on marine mammal responses to underwater noise that have become available since 2013. Best practice at the time of the assessment will be used along with previous experience gained from the Original Development EIA.

8.3.8 Approach to HRA

347. HRA screening has been undertaken by following available and relevant guidance in assessing potential impacts which may arise during the construction, operation and decommissioning of the offshore elements of the Revised Development (the Wind Farm and OfTW) by:

a) Identifying relevant Natura sites which include marine mammals as notified interest features and for which there is potential connectivity from an impact from the construction, operation and decommissioning activities associated with the Wind Farm and OfTW;

b) Identifying likely significant effects (LSE), and if appropriate adverse effects, associated with the construction, operation and decommissioning of the Wind Farm and OfTW; and

c) Considering potential impacts in relation to notified interest features of identified Natura sites in relation to their conservation objectives.

348. Available literature, modelling outputs, and initial impact assessment based upon the Revised Development Design Envelope have been reviewed, and the evidence base set out in the EIA for the Original Development, updated where possible, has been drawn upon.

349. As agreed for the Original Project, the following Natura 2000 sites which include marine mammals as notified interest features, and for which there is potential connectivity with an impact from the construction, operation and decommissioning activities associated with the Revised Development, are considered relevant to HRA:

- Berwickshire and North Northumberland Coast SAC;
- Firth of Tay and Eden Estuary SAC;
- Isle of May SAC; and
- Moray Firth SAC.

350. Table 8-28 below presents the conservation objectives and designated features associated with each of the sites.

Table 8-28: Conservation Objectives of Natura 2000 Sites Designated for Marine Mammals

Natura 2000 Site	Specific Conservation Objectives	Designated Feature(s)
Berwickshire and North Northumberland Coast SAC	To avoid deterioration of the habitats of the qualifying species or significant disturbance to the qualifying species, thus ensuring that the integrity of the site is maintained and the site makes an appropriate contribution to achieving favourable conservation status for each of the qualifying features; and To ensure for the qualifying species that the following are maintained in the long term: Population of the species as a viable component of the site; Distribution of the species within site; Distribution and extent of habitats supporting the species; Structure, function and supporting processes of habitats supporting the species; and No significant disturbance of the species.	Grey seal
Firth of Tay and Eden Estuary SAC	To avoid deterioration of the habitats of the qualifying species or significant disturbance to the qualifying species, thus ensuring that the integrity of the site is maintained and the site makes an appropriate contribution to achieving favourable conservation status for each of the qualifying features; and To ensure for the qualifying species that the following are maintained in the long term: Population of the species as a viable component of the site; Distribution of the species within site; Distribution and extent of habitats supporting the species; Structure, function and supporting processes of habitats supporting the species; and No significant disturbance of the species.	Common (also known as harbour) seal

Natura 2000 Site	Specific Conservation Objectives	Designated Feature(s)
Isle of May SAC	To avoid deterioration of the habitats of the qualifying species or significant disturbance to the qualifying species, thus ensuring that the integrity of the site is maintained and the site makes an appropriate contribution to achieving favourable conservation status for each of the qualifying features; and To ensure for the qualifying species that the following are maintained in the long term: Population of the species as a viable component of the site; Distribution of the species within site; Distribution and extent of habitats supporting the species; Structure, function and supporting processes of habitats supporting the species; and No significant disturbance of the species.	Grey seal
Moray Firth SAC	To avoid deterioration of the habitats of the qualifying species or significant disturbance to the qualifying species, thus ensuring that the integrity of the site is maintained and the site makes an appropriate contribution to achieving favourable conservation status for each of the qualifying features; and To ensure for the qualifying species that the following are established then maintained in the long term: Population of the species as a viable component of the site; Distribution of the species within site; Distribution and extent of habitats supporting the species; Structure, function and supporting processes of habitats supporting the species; and No significant disturbance of the species.	Bottlenose dolphin

351. The key potential effects of the Revised Development on marine mammals have been considered earlier in Section 8.3.6. These are summarised in Tables 8-29 and 8-30 below. The other activities assessed within the shadow Appropriate Assessment for the Original Project[11] (disturbance from noise (excluding piling noise and noise associated with the use of geophysical survey equipment) collision risk and barrier effect from increased vessel movement, use of ducted propellers leading to risk of corkscrew injury, accidental pollution events, changes in availability of prey species, disturbance from operational noise, loss/creation of habitat, effects of EMF and toxic contamination are not considered to provide a route to impact sufficient to cause a LSE and thus are screened out of future shadow AAs (which will be presented as separate HRA Reports – and have hereafter been referred to as such) for the Revised Development.

[11] Information provided to Marine Scotland to enable them to undertake the Appropriate Assessment.

Table 8-29: Key Potential Impacts on Marine Mammals – Wind Farm

Potential Impact	Description of Effect
Construction (& Decommissioning) Phase	
Disturbance from increased noise from geophysical survey systems	Current knowledge has shown that noise from some geophysical survey systems used during the course of preparatory work for cable laying, scour protection installation and other ground intrusive works has the potential to induce the onset of PTS and/or disturb/displace animals (depending on the frequencies and source levels of the equipment used). It is therefore proposed to scope in this potential impact (disturbance from increased noise (geophysical survey systems) into the HRA Report for the Revised Development. Information on this route to impact will therefore be provided as part of the HRA Report.
Displacement/PTS from piling	It is proposed to scope further consideration of displacement/PTS from piling into the HRA Report for the Revised Development. This is because: Displacement/PTS onset as a result of piling are still considered to have the potential to affect marine mammals; Maximum blow energy has more than doubled; The number of piles per 24 hour period has doubled; Results of recent studies on noise propagation modelling and the properties of the noise field as it moves through the water column (Farcas et al., 2016) may need to be taken into account; Results of recent studies on the physiological and behavioural consequences for marine mammals from exposure to noise including sensitivity to PTS onset (NMFS, 2016; Hastie et al., 2015; Russell et al., 2016) may need to be taken into account; New tools for assessing the population consequences of disturbance and/or injury are available (Harwood et al., 2014) and may need to be used; and Changes in the baseline population sizes used in the Original Development ES (ICOL, 2013) have occurred for some species. Information on this route to impact will therefore be provided as part of the HRA Report.

Table 8-30: Key Potential Impact on Marine Mammals – Revised Offshore Export Cable Corridor

Potential Impact	Description of Effect
Construction (& Decommissioning) Phase	
Disturbance from increased noise (non-piling)	Disturbance from increased noise (i.e. trenching, rock placing, cable laying, dredging and vessel noise) was previously considered to be minor (ICOL, 2013). However, recent work has shown that noise from some geophysical survey systems used during the course of preparatory work for the installation of the transmission cables have the potential to induce the onset of PTS and/or disturb/displace animals (depending on the frequencies and source levels of equipment used). It is therefore proposed to scope further consideration of this potential effect (disturbance from increased noise) into the HRA Report for the Revised Development. Information on this route to impact will therefore be provided as part of the HRA Report.

352. The HRA Screening Report in Appendix B identifies that it is not possible to conclude no LSE for the SACs identified. Therefore these will be further assessed in the HRA report.

353. Within the Revised HRA Report, and drawing on the impact assessment outcomes of both the Original Development and the Revised Development EIAs, any LSE arising from the Revised Development either alone or in-combination with the plans, projects and activities listed in Section 5, will be identified. Potential effects on notified interest features of Natura 2000 sites in relation to their conservation objectives will be considered.

8.3.9 Scoping Questions – Marine Mammals

- Are you satisfied that the EIA should only concentrate on those receptors which may be subject to significant effects from the proposed development?
- Are you satisfied that the existing marine mammal baseline survey data (including proposed updates) are appropriate for the assessment of impacts arising from the Revised Development?
- Previously, the cetacean reference populations for assessment of the Original Development were those detailed in chapter 14 of the Original Development ES. However, the IAMMWG has since agreed final Management Units for the seven most common cetacean species in UK waters (IAMMWG, 2015). Should these 2015 figures be used instead?
- Previously the seal reference population for assessment of the Original Development were those detailed in chapter 14 of the Original Development ES. However, the IAMMWG has since agreed Management Units for both seal species in UK waters (IAMMWG, 2013). Should these 2013 figures be used instead?

- Are you satisfied that the EIA for the Revised Development should focus only on those issues identified above (i.e. disturbance from increased noise (geophysical survey systems) and disturbance/PTS from piling)?
- Are you satisfied that the embedded mitigation (including that specified within the consent conditions of the Original Development) is appropriate to the potential impact from the Revised Development?
- Do you agreed on the other projects proposed to be included in the cumulative impact assessment?
- Do you agree that cumulative impacts on marine mammals should be scoped out of EIA for the Revised Development (with the exception of disturbance from increased noise (geophysical survey systems) and disturbance/PTS from piling) based on the assumptions set out and the conclusions reached in the CIA for the Original Development?
- Do you agree on the proposed projects to be included within the CIA?
- Do you agree on the Natura sites proposed, which include marine mammals as qualifying features, and for which there is potential connectivity with an impact from the Revised Development?
- Do you agree that the potential impacts to be considered in the HRA report relate to disturbance from increased noise and displacement/ PTS from piling operations? No other potential impacts will be considered in the HRA report.

8.4 Ornithology

8.4.1 Introduction

354. As described in Section 5, the purpose of this section is to provide sufficient detail on offshore, near-shore and intertidal ornithological receptors of relevance to the Revised Development and considers the potential effects on them resulting from construction, operation and maintenance and decommissioning.

355. The detail provided will allow MS-LOT and their consultees to be clear about what they consider the significant effects of the proposal are likely to be and, therefore, whether they need to be subject to an EIA and be included within the ES.

356. In order to provide sufficient information to consultees reference is made to the baseline data gathered to inform the Original Development EIA, and to the outcomes of the impact assessment, the HRA, as well as to the Marine Scotland (MS) Appropriate Assessment. Design, construction and operational changes between the Original Development and the Revised Development that are likely to have further impacts on ornithology are also considered to inform any subsequent impact assessments.

357. For a full description of the design envelope parameters and changes please refer to Section 4. The Development Area for both the Original and Revised remains unchanged and can be seen in Figure 4-1.

8.4.2 Data Sources and Baseline Environment

358. This section identifies baseline data sources that can be used to characterise the ornithological resource within and around the Revised Development, drawing predominantly from the data sources used to inform the Original Development EIA. Where it is considered necessary and appropriate these data sources will be updated with more recent data. Commentary is provided on the sufficiency of the baseline data for the Original Application as a basis for scoping the Revised Development EIA and HRA.

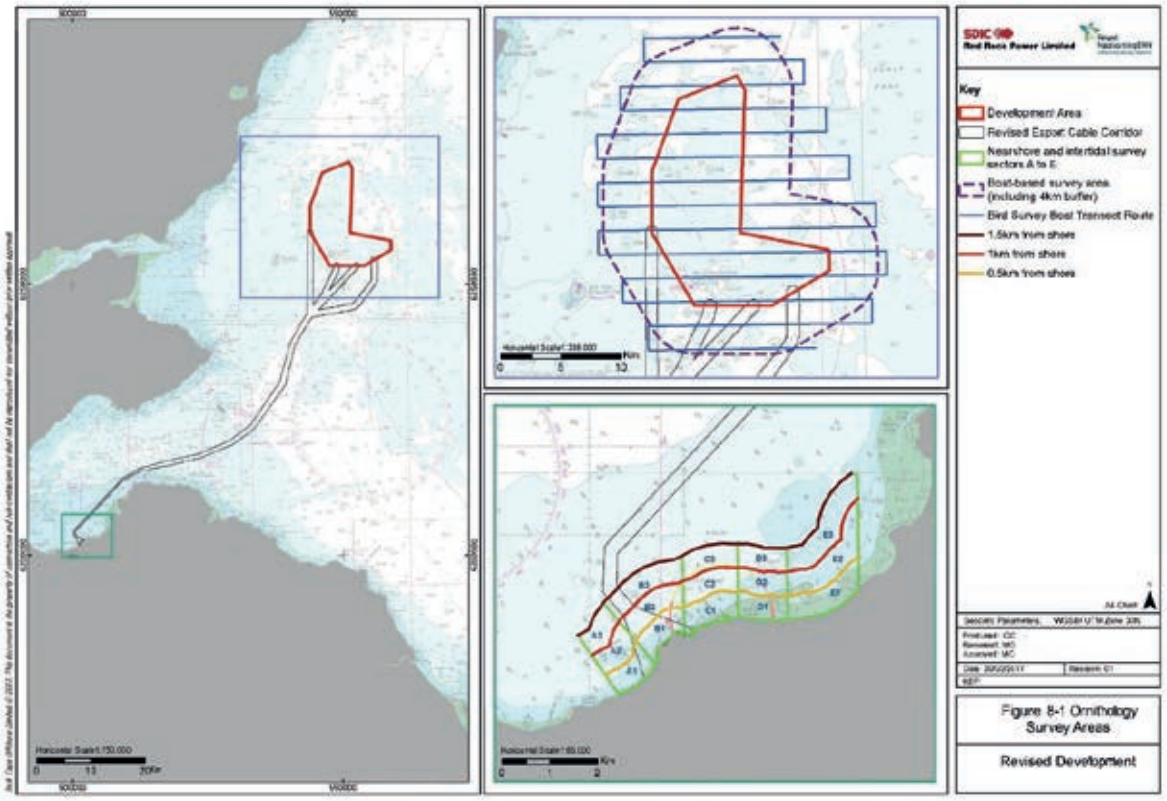
359. A summary of the baseline data collected is presented in Table 8-31, with further detail provided on each below.

Baseline Data – Offshore

360. Monthly boat-based surveys of the Boat-based Survey Area for the Original Development were carried out between September 2010 and September 2012. The Boat-based Survey Area included the Development Area and a 4 km buffer, encompassing a total area of 430 km^2 (Figure 8-1). The data, collected by European Seabirds at Sea (ESAS)-certified surveyors, were used to produce monthly population estimates of seabirds within the Boat-based Survey Area and to characterise bird behaviour within this area (e.g. in terms of bird flight heights). Survey methods were based upon the guidelines for Collaborative Offshore Wind

Research into the Environment (COWRIE) (Camphuysen et al., 2004, Maclean et al., 2009) and are detailed in Appendix 15A of the Original Development ES (ICOL, 2013c).

Figure 8-1: Revised Development and Related Survey Areas



361. The baseline survey design and extent of buffer around the Boat-based Survey Area were informed by a power analysis (RPS, 2010), to ensure robust bird population estimates for the Development Area, and to facilitate future detection of displacement of birds by post-consent monitoring programmes. It was concluded that boat transects at 2 km intervals in-combination with a 4 km buffer zone would give a design with sufficient power to permit reliable detection of displacement effects of 15% or more amongst the more abundant species, and of 30% or more amongst less abundant species (RPS, 2010). Both the survey methodology and the power analysis to define the survey parameters were based upon SNH advice from their scoping opinion provided for the Original Development (SNH, 2010a).

362. Due to the limited scale of works required for the Offshore Export Cable (i.e. a small number of vessel movements), the Original Development EIA involved no specific surveys of the area for the Offshore Export Cable Corridor between the Boat-based and the near-shore survey areas. Therefore, the assessment for the Offshore Export Cable Corridor made use of published data sources on the presence of birds as collated during a desk study (see '*Additional Data and Information Sources*', below).

Baseline Data - Near-Shore

363. A programme of monthly intertidal and near-shore bird surveys in and around the Cable Landfall Study Area was conducted over a period of thirteen months between January 2012 and January 2013 inclusive. This survey area encompassed the area from the MHWS out to 1.5 km and extended approximately six kilometres along the East Lothian Coast from Prestonpans Sea Front at Ox Rocks (NT 38288 74532) to the eastern end of Seton Sands (NT 43301 76480) (Figure 8-1). This included the two potential cable landfall sites that were being considered at the time of the Original Development ES.

364. The near-shore surveys were designed to assess the use of the intertidal and near-shore habitats associated with the cable landfall by qualifying species of the Forth Islands and Firth of Forth SPAs and Ramsar site, as well as by other bird species of conservation concern. As with the boat-based surveys, they were used to inform the ornithological assessment for the Original Development EIA as well as the HRA. Survey methods were based on the high tide (core count) methodology of the Wetland Bird Survey (WeBS) scheme (Musgrove *et al*., 2003, Holt *et al*., 2012), with the survey area treated as five distinct count sectors (sectors A – E in Figure 8-1).

365. Although the largest numbers of birds were expected to be present during the non-breeding season (approximately September to March, covering the spring and autumn migration periods as well as the winter months), data were collected for the full year in order to cover the post-breeding period for Sandwich tern (one of the Firth of Forth SPA qualifying interests) and to provide confirmation of the periods when fewer birds were present.

Table 8-31: Summary of Baseline Datasets from the Original Development EIA

Dataset	Coverage	Data use	Date
ICOL-commissioned site specific surveys and studies			
Site Specific Boat Based Survey	Boat-based Survey Area	Used for site characterisation for the purposes of EIA and HRA	September 2010 – September 2012
Site Specific Intertidal and Near-Shore survey	Near-shore and intertidal areas at and around potential cable landfall sites	Used for site characterisation for the purposes of EIA and HRA	January 2012 - January 2013
External / pre-existing data and studies contributing to the baseline			
BTO Wetland Bird Survey (WeBS) data[12]	Firth of Forth SPA WeBS count sectors	Used to supplement the Near-Shore survey data	2006/07 – 2010/11

[12] https://www.bto.org/volunteer-surveys/webs/data

Dataset	Coverage	Data use	Date
GPS tracking data for Isle of May seabirds (Daunt et al., 2011a)	Foraging ranges of guillemots, razorbills and kittiwakes nesting on the Isle of May	Used as ancillary and supporting data in assessing connectivity between the Original Development site and the Forth Islands SPA	May – June 2010
GPS tracking data for kittiwakes at Fowlsheugh and St Abb's Head (Daunt et al., 2011b)	Foraging ranges of kittiwakes nesting at Fowlsheugh and St Abb's Head	Used as ancillary and supporting data in assessing connectivity between the Original Development site and the Fowlsheugh and St Abb's Head to Fastcastle SPAs	May – June 2011
Trip durations and flight directions of guillemots at Fowlsheugh and St Abb's Head (Daunt et al., 2011b)	Fowlsheugh and St Abb's Head	Used as ancillary and supporting data in assessing connectivity between the Original Development site and the Fowlsheugh and St Abb's Head to Fastcastle SPAs	May – June 2011
Seabird 2000 data on colony sizes (Mitchell et al., 2004)	Seabird breeding colonies within foraging range of the Original Development site	Used for contributing to the determination of seabird breeding population sizes at the regional level and for specific SPAs.	1998 - 2002
Seabird Monitoring Programme (SMP) data on colony counts and kittiwake breeding success (Mavor et al., 2008)[13]	Seabird breeding colonies within foraging range of the Original Development site	Used for; (i) contributing to the determination of seabird breeding population sizes at the regional level and for specific SPAs; (ii) providing estimates of kittiwake breeding success at Fowlsheugh, St Abbs to Fastcastle and Buchan Ness to Collieston SPAs for purposes of undertaking population viability analyses	1986 - 2011
Centre for Ecology and Hydrology (CEH) Isle of May long-term study (IMLOTS) seabird annual breeding success[14]	Isle of May, Forth Islands	Used to provide estimates of breeding success of kittiwake, guillemot, razorbill and puffin at the Forth Islands SPA for purposes of undertaking population viability analyses	2007 - 2012

[13] http://jncc.defra.gov.uk/page-4460

[14] Previously at *http://www.ceh.ac.uk/sci programmes/2012-seabird-breeding-IsleofMay.html*, now at *https://catalogue.ceh.ac.uk/documents/02c98a4f-8e20-4c48-8167-1cd5044c4afe*

Data Validity

366. As described above, the site-specific surveys undertaken previously to inform the Original Development EIA followed standard, recommended, methods, and MS have advised in principle that no new site based surveys are required for the purposes of informing site characterisation for the Revised Development (email of 16 February, 2017 from MS to ICOL). Discussion on the suitability of this bassline data is presented in Appendix C. This Scoping Report seeks confirmation of agreement with this position.

367. In relation to the baseline characteristics at the cable landfall site, the most recently available WeBS data (covering the period 2010/11 – 2014/15) were used to check the continued validity of the near-shore and intertidal surveys for the Original Development EIA. Thus, the species abundance estimates from these baseline surveys within the immediate vicinity of the Cockenzie landfall site (i.e. the survey sectors A1 – A3 and B1 – B3 in Figure 8-1) were compared with those from the overlapping WeBS count sectors. These comparisons indicate no major changes in baseline characteristics at the cable landfall site (RPS 2016).

368. The data obtained from the site-specific baseline surveys formed the core of the ornithological assessment for the Original Development EIA, with the other external and pre-existing datasets detailed in Table 8-31 being used to augment these site-specific data and provide important context in characterising the baseline conditions. These external and pre-existing datasets remain relevant and will be of value in informing a Revised Development EIA. In some cases, these datasets have been updated since the time of the Original Development ES and the potential effect of this on the baseline characteristics has to be considered.

369. This is most relevant for the Seabird Monitoring Programme (SMP) data, from which the regional (and SPA) breeding seabird reference populations for the Original Development EIA were determined (based upon the count data for colonies within expected foraging range of the Development Area and four kilometre buffer – ICOL 2013c). These colony counts were derived from a wide range of years, with many from the time of the Seabird 2000 surveys (i.e. 1998 – 2002 – Mitchell *et al.,* 2004), but others from earlier or later counts (Table 8-31). To address the problem caused by many of the counts deriving from several years before the collection of the site-specific baseline surveys, counts from before 2007 were amended by applying a 'correction' based upon the UK trend for the species between 2000 and 2010 (JNCC, 2012). This approach is likely to reduce the potential for disparity between the reference populations for the Original and Revised Developments.

370. However, checks of the SMP data indicate that a reasonable proportion of the relevant colony counts have been updated since the time of the Original Development ES (often greater than 20%). These updated counts indicate that changes to the regional reference populations are likely for several of the thirteen species for which such populations were determined for the Original Development EIA. These changes may affect the baseline

characteristics for the Revised Development and this is considered further in the section on Scoping of the EIA for the Revised Development (see 8.4.5 below).

371. In addition to the datasets detailed in Table 8-31, background information on seabird distributions in the bio-geographic region was also taken from the following sources - BirdLife International (2004), Stone *et al.* (1995), Skov *et al.* (1995), Forrester *et al.* (2007) and Kober *et al.* (2010). These sources were used in conjunction with the Seabird 2000 and SMP data to determine regional breeding, passage and non-breeding or wintering numbers and distributions for each species in the Original Development ES.

372. For intertidal and near-shore birds, the National Biodiversity Network (NBN) database was also consulted to provide an overview of the bird species recorded within the survey area plus a five kilometre buffer. The desk study for the near-shore and intertidal areas also included reference to existing ES documents.

373. Boat-based survey data are often unsuitable for characterising baseline conditions for certain migratory species, particularly in cases where the main passage movement through a site occurs over a short time period. Therefore, the assessment for migratory wildfowl, waders and skuas for the Original Development followed the approach recommended by the Strategic Ornithological Support Services (SOSS) for Offshore Renewables (Wright *et al.,* 2012). This involved first estimating the proportion of the migratory population of each species that overflew the Development Area on the basis of the width of the Development Area relative to that of the migratory corridor (as identified by Wright *et al.*, 2012). Collisions were then estimated using the migration collision risk model (Band 2012) in conjunction with precautionary assumptions of the percentage of birds at collision risk height, as given by Wright *et al.* (2012). This was undertaken for both spring and autumn migration to give an annual collision estimate.

374. The conclusions from this assessment for migratory wildfowl, waders and skuas are in line with those from the Marine Scotland Science (MSS) commissioned project on the strategic assessment of collision risk of Scottish offshore wind farms to migratory birds (WWT, 2014), which was produced after submission of the Original Development ES.

375. For the Original Development ES, background information on the ecology and behaviour of the relevant bird species, as well as on their responses to offshore wind farm developments, was obtained from several main sources, including:

- Band, W. (2012). Using a Collision Risk Model to Assess Bird Collision Risks for Offshore Wind farms. Available at: http://www.bto.org/sites/default/files/u28/downloads/Projects/Final_Report_SOSS02_Band1ModelGuidance.pdf
- Cook, A. S. C. P., Johnston, A., Wright, L. J. and Burton, N. H. K. (2012). A review of flight heights and avoidance rates of birds in relation to offshore wind farms. Project SOSS-02. BTO report on behalf of The Crown Estate.

- Daunt, F., Bogdanova, M. I., Newell, M., Harris, M. P. and Wanless, S. (2011). Literature review of foraging distribution, foraging range and feeding behaviour of common guillemot, razorbill, Atlantic puffin, black-legged kittiwake and northern fulmar in the Forth/Tay region. Report to FTOWDG.
- Furness, B. and Wade, H. (2012). *Vulnerability of Scottish seabirds to offshore wind turbines.* MacArthur Green, report on behalf of Marine Scotland.
- Hamer, K. C., Holt, N. and Wakefield, E. (2011). *The distribution and behaviour of northern gannets in the Firth of Forth and Tay area: a review on behalf of the Forth and Tay Offshore Wind Developers Group.* Institute of Integrative and Comparative Biology, University of Leeds.
- King, S., Prior, A., Maclean, I. and Norman, T. (2009). *Developing guidance on ornithological cumulative impact assessment for offshore windfarm developers.* COWRIE.
- Maclean, I. M. D., Wright, L. J., Showler, D. A. and Rehfisch, M. M. (2009). *A review of assessment methodologies for offshore windfarms.* British Trust for Ornithology Report Commissioned by Cowrie Ltd.
- Snow, D. W. and Perrins, C. M. (1998). *The Birds of the Western Palearctic.* Concise edition, Oxford University Press.
- Thaxter, C. B., Lascelles, B., Sugar, K., Cook, A. S. C. P., Roos, S., Bolton, M., Langston, R. H. W. and Burton, N. H. K. (2012). Seabird foraging ranges as a tool for identifying candidate Marine Protected Areas. *Biological Conservation*, **156**, 53-61.
- WWT Consulting (2012). *Gannet Population Viability Analysis. Demographic data, population model and outputs.* WWT, RPS, MacArthurGreen Ltd. SOSS-04 report to The Crown Estate. http://www.bto.org/sites/default/files/u28/downloads/Projects/Final_Report_SOSS04_GannetPVA.pdf

Data Coverage

376. As identified in Table 8-31, the ICOL-commissioned site-specific surveys were collected within an area that encompassed the Development Area and a surrounding four kilometre buffer, as well as in the near-shore area encompassing the two potential cable landfall sites (as identified at the time of the Original Development ES). The survey coverage in both cases was systematic across the sites and covered the full annual period, whilst (in the case of the boat-based surveys) the design was informed by a power analysis to ensure adequate sampling intensity.

377. Given that the Development Area is unchanged for the Revised Development and that the Export Cable Corridor has been reduced by the confirmation that the landfall will be Cockenzie (one of the two potential sites at the time of the Original Development ES), it is considered that the level of survey coverage achieved for both the offshore and the near-

shore / intertidal areas for the Original Development EIA remains valid for the Revised Development EIA.

378. For the same reason, the other datasets detailed in Table 8-31 and other information sources listed above remain as relevant to the Revised Development as they were to the Original Development in terms of their spatial coverage.

Age of the Data

379. As described above and as detailed within Table 8-31, the site specific survey data used for the Original Development ES were collected between the years 2010 to 2012 for the Development Area (and surrounding buffer) and between 2012 and 2013 for the near-shore surveys undertaken in the area encompassing the potential cable landfall sites identified for the Original Development.

380. The external and pre-existing datasets used to contribute to the characterisation of the baseline conditions for the Original Development were contemporary to the site-specific baseline data in some, but not all, cases (Table 8-31). Where possible these datasets will be updated to ensure that the Revised Development EIA is based upon the most recently available information. This will include updating WeBS, SMP and the Centre for Ecology and Hydrology (CEH) Isle of May long-term study (IMLOTS) data.

Additional Data and Information Sources

381. As detailed above (under Age of the Data), the WeBS, SMP and IMLOTS datasets will all be updated and, as such, these will partly comprise data that are additional to those used to inform the Original Development EIA.

382. Since the submission of the Original Development ES, a number of key sources of information have been produced that are relevant to considering the potential effects of offshore wind farms on the bird species that will be scoped into the Revised Application. These information sources are largely concerned with potential impacts on the key seabird species of interest to the Revised Development, or to the methodologies that are available for conducting assessments of the impacts of offshore wind farms on birds. Some of the information sources relate specifically to the Forth and Tay region. These information sources will be used to inform the Revised Application and include:

- Cleasby, I.R., Wakefield, E.D., Bearhop, S., Bodey, T.W., Votier, S.C., and Hamer, K.C. (2015). Three-dimensional tracking of a wide-ranging marine predator: Flight heights and vulnerability to offshore wind farms. *Journal of Applied Ecology*, **52**, 1474-1482.
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Review of Baseline Characteristics

383. Chapter 15 of the Original Development ES presents the baseline characteristics for ornithological resources across the area of interest. These are summarised below.

Development Area

384. A list of bird species considered by the Original Development ES in relation to the Development Area (and surrounding buffer) is included in Table 8-32 below. This includes all seabird species which were recorded during the boat-based surveys, as well as migratory wildfowl and wader species which were recorded infrequently, or not at all, but were considered likely to be under-recorded in these surveys. Other bird species recorded infrequently in boat surveys – mainly passerines - are included in Table 8-32 as a species group. The table also notes which species were scoped in and which were scoped out of the Original Development EIA, and details the rationale for this decision.

Table 8-32: Bird Species Recorded during Boat-based Surveys and Whether Species were Scoped In or Out for the Original Development EIA

Species	Summary of Recorded Presence	Sensitivity[1]	Scoped in or out of Original Assessment	Rationale
Taiga bean goose*	Not recorded in any surveys but included in assessment on the basis that migrating birds from the single UK SPA for this species may fly through the Development Area.	High	In	Connectivity with SPAs. Any birds passing through the Boat-based Survey Area are assumed to derive from the Slamannan Plateau SPA.
Pink-footed goose*	Migrating birds recorded on three boat surveys (84 individuals; winter).	Moderate	In	Potential connectivity with SPA.
Svalbard barnacle goose*	Migrating flocks recorded in two boat surveys (74 individuals within Boat-based Survey Area; autumn and spring passage).	High	In	Connectivity with SPAs. Any birds passing through the Boat-based Survey Area are assumed to derive from the Upper Solway Flats and Marshes SPA.
Shelduck*	Recorded on a single boat survey (one individual; winter).	Moderate	In	Potential connectivity with SPAs.
Tufted duck*	Recorded on a single boat survey outwith Boat-based Survey Area (two individuals; May).	Moderate	In	Potential connectivity with SPA.
Eider	Recorded twice on boat surveys (five individuals; April, November).	High	Out	Very small numbers recorded in relation to the UK population, potential connectivity to SPAs likely to be very low.
Long-tailed duck*	Recorded on two boat surveys (three individuals; winter).	Moderate	In	Potential connectivity with SPAs.
Common scoter*	Recorded twice on boat surveys (three individuals; winter, summer).	Moderate	In	Potential connectivity with SPAs.

Species	Summary of Recorded Presence	Sensitivity[1]	Scoped in or out of Original Assessment	Rationale
Goldeneye*	Recorded on a single boat survey outwith Boat-based Survey Area (two individuals; April).	Moderate	In	Potential connectivity with SPAs.
Red-throated diver	Recorded on three out of 24 surveys (six individuals in flight, autumn, winter).	High	Out	Very small numbers recorded in relation to the UK population. Connectivity to SPAs unlikely as species prefers inshore coastal habitats.
Great northern diver	Recorded on two out of 24 surveys (two individuals, winter).	Moderate	Out	Small numbers recorded in relation to the UK population. Not a qualifying feature of any UK SPAs.
Fulmar	Recorded on 23 out of 24 boat surveys. Amongst the ten most numerous species.	High	In	Cited as an SPA qualifying interest for SPAs within foraging range.
Sooty shearwater	Recorded on seven out of 24 boat surveys between August and October (97 individuals).	Moderate	Out	Occurs in the UK on passage only. No UK SPAs. Low numbers (not exceeding nationally or regionally
Manx shearwater	Recorded on 14 out of 24 boat surveys (150 individuals; mainly between June and October.	Moderate	Out	Small numbers recorded in relation to the UK population. Connectivity to SPAs unlikely.
Storm petrel	Recorded on four out of 24 surveys (nine individuals; June-July and September- October).	Moderate	Out	Small numbers recorded in relation to the UK population. Connectivity to SPAs unlikely.
Gannet	Recorded in all 24 boat surveys. Amongst the ten most numerous species.	High	In	Cited as an SPA qualifying interest of SPAs within foraging range.

Species	Summary of Recorded Presence	Sensitivity[1]	Scoped in or out of Original Assessment	Rationale
Shag	Recorded on seven boat surveys (25 individuals in 4 km buffer zone, in winter and spring/summer).	Moderate	In	Amber listed. Potential connectivity with UK SPAs.
Grey heron	Recorded on a single boat survey (one individual; September).	Low	Out	Very small numbers recorded, not a species of conservation concern. No UK SPAs.
Peregrine	Recorded on a single boat survey (one individual; September).	Moderate	Out	Very small numbers recorded, likely to occur on passage only.
Oystercatcher*	Recorded on a single boat survey (20 individuals, August).	Moderate	In	Potential connectivity with SPAs.
Golden plover*	Recorded on a single boat survey (two individuals; November).	Moderate	In	Potential connectivity with SPAs.
Ringed plover*	Recorded on two boat surveys (two individuals; winter).	Moderate	In	Potential connectivity with SPAs.
Curlew*	Recorded on a single boat survey (three individuals; June)	Moderate	In	Potential connectivity with SPAs.
Knot*	Recorded on a single boat survey (three individuals; July).	Moderate	In	Potential connectivity with SPAs.
Dunlin*	Recorded on a single boat survey (five individuals; August).	Moderate	In	Potential connectivity with SPAs.

Species	Summary of Recorded Presence	Sensitivity[1]	Scoped in or out of Original Assessment	Rationale
Purple sandpiper*	Recorded on a single boat survey (one individual; November).	Moderate	In	Potential connectivity with SPAs.
Grey phalarope*	Recorded on four boat surveys between September to November (18 individuals).	Moderate	In	Recorded in nationally important numbers.
Pomarine skua	Recorded during four boat surveys (24 individuals; October to December).	Low	Out	UK Green listed species (not of conservation concern); small numbers recorded, Occurs in the UK on passage only. No UK SPAs.
Arctic skua	Recorded on eight boat surveys (23 individuals; July to November).	Moderate	In	UK Red listed, UK BAP priority. Potential connectivity with SPAs.
Great skua	Recorded during 11 boat surveys (39 individuals; June to December).	Moderate	In	UK Amber listed. Potential connectivity with SPAs.
Puffin	Recorded on 23 out of 24 boat surveys. Amongst the ten most numerous species.	High	In	Cited as an SPA qualifying interest of SPAs within foraging range.
Black guillemot	Recorded on a single survey (one individual, January).	Moderate	Out	Very small numbers recorded in relation to the UK population. Not an Annex 1 or migratory species. Not a qualifying feature of any SPAs.
Razorbill	Recorded in all 24 boat surveys. Amongst the ten most numerous species.	High	In	Cited as an SPA qualifying interest of SPAs within foraging range.

Species	Summary of Recorded Presence	Sensitivity[1]	Scoped in or out of Original Assessment	Rationale
Little auk	Recorded on seven out of 24 boat surveys (809 individuals between November and February).	Low	Out	Green listed species. Occurs irregularly in British waters during the winter only. No SPAs. Amongst the ten most numerous species but only present in the Boat-based Study Area between November and February. Although large numbers were recorded in the winter of 2011/2012 the population estimate represents less than 0.01% of the estimated North Sea winter population.
Guillemot	Recorded in all 24 boat surveys. Amongst the ten most numerous species.	High	In	Cited as an SPA qualifying interest of SPAs within foraging range.
Sandwich tern	Recorded on a single boat survey (one individual, May).	High	Out	Cited as an SPA qualifying interest for the Forth Islands but has not been recorded breeding within the SPA in recent years.
Common tern	Recorded during three boat surveys (13 individuals; September, June-July).	High	In	Cited as an SPA qualifying interest of SPAs within foraging range.
Arctic tern	Recorded during six boat surveys between May and September. Amongst the ten most numerous species.	High	In	Cited as an SPA qualifying interest of SPAs within foraging range.
Kittiwake	Recorded on all 24 boat surveys, highest numbers in June and July. Amongst the ten most numerous species.	High	In	Cited as an SPA qualifying interest of SPAs within foraging range.

Species	Summary of Recorded Presence	Sensitivity[1]	Scoped in or out of Original Assessment	Rationale
Little gull	Recorded on ten boat surveys, (175 individuals; mainly between July and September).	High	In	Annex 1 species present in potentially national important numbers.
Common gull	Recorded on 16 boat surveys (85 individuals; mainly in winter).	Moderate	In	Potential connectivity with SPAs.
Lesser black-backed gull	Recorded on 11 out of 24 boat surveys (51 individuals; April to September).	High	In	Cited as an SPA qualifying interest of SPAs within foraging range.
Herring gull	Recorded on 18 out of 24 boat surveys (302 individuals; highest numbers in the winter.	High	In	Cited as an SPA qualifying interest of SPAs within foraging range.
Great black-backed gull	Recorded on 20 out of 24 boat surveys (260 individuals; predominantly in winter).	Moderate	In	Potential connectivity with SPAs.
Passerines	Recorded on nine out of 24 surveys from April to November.	Low	Out	Common species occurring along broad front during migration. No SPAs in the UK for any species involved.

[1] As defined in Table 15.5 of Chapter 15 of the Original Development ES. Where a species was identified as high sensitivity based on its status as an SPA qualifying species, SPA(s) where a likely significant effect was identified during the breeding season as a result of the HRA screening process (ICOL, 2013) are listed. For herring gull one additional site, Buchan Ness to Collieston Coast SPA, was added based on SNH advice on the HRA Scoping report (SNH, 2012). These SPAs have been provided for information only at this time.

*Species which may migrate through the Boat-based Survey Area (Development Area and 4km buffer) were scoped in for potential collision risk and barrier effect only.

385. Table 8-33 lists the species recorded during near-shore surveys (including the intertidal habitats), and which were considered for the assessment of potential impacts at the landfall site in the Original Development ES. As for Table 8-32, details are provided on whether species were scoped in or out of the assessment, along with an explanation of the basis for this decision.

Table 8-33: Bird Species Recorded During Near-shore Surveys (including Intertidal) and Whether Species were Scoped In or Out for the Original Application

Bird species	Recorded Presence	Sensitivity	Scoped in or out of the Original Assessment	Rationale
Mute swan	Occasionally recorded pairs/single birds. Absent from the Nearshore Survey Area- Sector A.	Low	Out	Small numbers recorded in relation to the UK population, no UK SPAs.
Shelduck	Absent during the nearshore surveys and a peak of only four birds in the Port Seton to Craigielaw WeBS Sector (Nearshore Survey Area- Sector E) in April (0.1% of SPA pop.).	High	In	Cited as a qualifying interest of Firth of Forth SPA.
Wigeon	Present only in sector E during the nearshore surveys with a peak of 66 birds in February (2.9% of SPA pop.). Peak of 107 birds recorded in the Port Seton to Craigielaw WeBS Sector (Nearshore Survey Area- Sector E) in October (4.8% of SPA pop.).	High	In	Cited as a qualifying interest of Firth of Forth SPA.
Mallard	Absent from all nearshore surveys and only present in the Port Seton to Craigielaw WeBS Sector (Nearshore Survey Area-Sector E), with a peak count of 26 birds in December (2.2% of SPA pop.).	High	In	Cited as a qualifying interest of Firth of Forth SPA.
Eider	Found throughout year in all nearshore survey count sectors with largest counts in August in Sector E (425 birds, 7.2% of SPA pop.). Similar peak count of 452 in the wider Port Seton to Craigielaw WeBS Sector (Nearshore Survey Area-Sector E) in July (7.6% of SPA pop.).	High	In	Cited as a qualifying interest of Firth of Forth SPA.
Long-tailed duck	Peak counts generally recorded in March-April, with 17 birds recorded in Sector E (7.7% of SPA pop.). Corresponding Port Seton to Craigielaw WeBS Sector (Nearshore Survey Area- Sector E) held a peak of 29 birds (13.2% of SPA pop.).	High	In	Cited as a qualifying interest of Firth of Forth SPA.

Common scoter	Mainly found in winter, but peak count of 70 birds in survey Sector E in May (2.5% of SPA pop.). WeBS peak of 196 birds in April in the Port Seton to Craigielaw WeBS Sector (Nearshore Survey Area-Sector E) (7.0% of SPA pop.).	High	In	Cited as a qualifying interest of Firth of Forth SPA.
Velvet scoter	Present in all nearshore survey sectors with peaks in March and May. Up to 121 birds, which equals 13.0% of SPA pop. A peak of 161 birds recorded in the Port Seton to Craigielaw WeBS Sector (Nearshore Survey Area-Sector E) in September (17.3% of SPA pop.).	High	In	Cited as a qualifying interest of Firth of Forth SPA.
Goldeneye	Peak counts in January in Sector A (20 birds, 1.5% of SPA pop.). Up to 34 birds in the wider Preston Grange to Port Seton Count Sector (Nearshore Survey Area-Sectors A and B) (2.5% of SPA pop.).	High	In	Cited as a qualifying interest of Firth of Forth SPA.
Red-breasted merganser	Found throughout winter and migratory periods with peak count of 28 birds in survey Sector E in December (8.1% of SPA pop.). Peak of 101 birds recorded in the corresponding Port Seton to Craigielaw WeBS Sector (Nearshore Survey Area--Sector E) in September (29.1% of SPA pop.).	High	In	Cited as a qualifying interest of Firth of Forth SPA.
Red-throated diver	Recorded in peak numbers during autumn, with highest counts of 13 birds in the Preston Grange to Port Seton WeBS Sector (Nearshore Survey Area-Sectors A and B) in November (12.7% of SPA pop.). Peak of six birds in survey sector E in Sep (5.9% of SPA pop.).	High	In	Cited as a qualifying interest of Firth of Forth SPA.
Black-throated diver	Single record in September in Nearshore Survey Area-Sector E.	Moderate	Out	Small number recorded in relation to the UK population, no likely connectivity to SPA populations.
Fulmar	Single records in Nearshore Survey Area- Sectors B and E.	Moderate	Out	Small numbers recorded in relation to the UK population, no significant connectivity to SPA populations.

Gannet	Present during breeding season, with peak of 49 birds in Nearshore Survey Area- Sector E.	High	In	Cited as an SPA qualifying interest in the breeding season for SPAs within foraging range. SPAs: Forth Islands (Bass Rock).
Cormorant	Recorded throughout the year, with a peak of 18 birds within Nearshore Survey Area-Sector B in July (2.8% of SPA pop.). WeBS count peak of 72 in the Preston Grange to Port Seton Count Sector (Sectors A and B) in September (11.0% of SPA pop.).	High	In	Cited as a qualifying interest of Firth of Forth SPA.
Shag	Recorded throughout the year with a peak of 30 birds in October, in Nearshore Survey Area-Sector B.	Moderate	In	Potential connectivity with UK SPA populations.
Little grebe	Single birds recorded in Nearshore Survey Area- Sectors A and B.	Moderate	Out	Small numbers recorded in relation to the UK population, no significant connectivity to SPA populations.
Great crested grebe	Low numbers recorded during the nearshore surveys (peak of two birds recorded in Nearshore Survey Area- Sector B in September (1.4% of SPA pop.)). Up to 24 birds recorded in the wider Preston Grange to Port Seton Count Sector (Nearshore Survey Area-Sectors A and B) in September (17.3%	High	In	Cited as a qualifying interest of Firth of Forth SPA.
Red-necked grebe	Recorded in Nearshore Survey Area-Sector E mainly during autumn passage, with a peak of 12 birds in August.	High	In	Potentially significant peak numbers in relation to small UK wintering population (57 birds, Musgrove *et al.*, 2013).
Slavonian grebe	Recorded during autumn and winter months in the Port Seton to Craigielaw WeBS Sector only (Nearshore Survey Area-Sector E), with a peak count of 12 in February (41.0% of SPA pop.). Found in small numbers during autumn/winter with a peak of two birds in all survey sectors (6.9% of SPA pop.).	High	In	Cited as a qualifying interest of Firth of Forth SPA.

Oystercatcher	Recorded in all Nearshore Survey Area-Sectors with peak of 42 birds in Sector E in March (0.5% of SPA pop.). Much higher peak of 388 birds in the wider Port Seton to Craigielaw WeBS Sector (Nearshore Survey Area-Sector E) in December (4.7% of SPA pop.).	High	In	Cited as a qualifying interest of Firth of Forth SPA.
Golden plover	Recorded mainly during passage and winter, particularly in the Port Seton to Craigielaw WeBS Sector (Nearshore Survey Area-Sector E), with a peak count of 192 in August (5.4% of SPA pop.). Max. count of four birds in Sector E in January (0.1% of SPA pop.) but absent in others.	High	In	Cited as a qualifying interest of Firth of Forth SPA.
Grey plover	Peak of three birds in Sector E in November (0.6% of SPA pop.) and absent in other sectors. Peak WeBS count of 70 birds in the Port Seton to Craigielaw WeBS Sector (Nearshore Survey Area-Sector E) in April (14.9% of SPA pop.).	High	In	Cited as a qualifying interest of Firth of Forth SPA.
Lapwing	Absent from the nearshore surveys and only recorded in the Port Seton to Craigielaw WeBS Sector (Nearshore Survey Area-Sector E), with peak of 171 birds in September (3.1% of SPA pop.).	High	In	Cited as a qualifying interest of Firth of Forth SPA.
Ringed plover	Absent from all nearshore surveys but with a peak of 26 birds in the Port Seton to Craigielaw WeBS Sector (Nearshore Survey Area-Sector E) in January (2.4% of SPA pop.).	High	In	Cited as a qualifying interest of Firth of Forth SPA.
Curlew	Recorded in low numbers in Nearshore Survey Area Sectors (peak of seven birds in Sector E in March, 0.2% of SPA pop.). Higher numbers in the Port Seton to Craigielaw WeBS Sector (Sector E) in July (124 birds, 2.7% of SPA pop.).	High	In	Cited as a qualifying interest of Firth of Forth SPA.

Bar-tailed godwit	Recorded during winter, particularly in the Port Seton to Craigielaw WeBS Sector (Nearshore Survey Area-Sector E), with a peak count of 211 in February (14.0% of SPA pop.). Max. count of 18 birds in Sector E in February (1.2% of SPA pop.).	High	In	Cited as a qualifying interest of Firth of Forth SPA.
Turnstone	Found throughout winter with peak counts in autumn/winter. Peak of 22 birds in Sector E in December (2.4% of SPA pop.), and peak of 87 birds in the Port Seton to Craigielaw WeBS Sector (Nearshore Survey Area-Sector E) in January (9.3% of SPA pop.).	High	In	Cited as a qualifying interest of Firth of Forth SPA.
Knot	Present throughout winter but peak count in the Port Seton to Craigielaw WeBS Sector (Nearshore Survey Area-Sector E) of 135 birds in April (3.3% of SPA pop.). Absent from nearshore surveys.	High	In	Cited as a qualifying interest of Firth of Forth SPA.
Dunlin	Absent from nearshore surveys and relatively low numbers during WeBS counts. Peak of 16 birds (0.2% of SPA pop.) in August and October in the Port Seton to Craigielaw WeBS Sector (Nearshore Survey Area-Sector E).	High	In	Cited as a qualifying interest of Firth of Forth SPA.
Purple sandpiper	Three birds recorded on two occasions in Nearshore Survey Area-Sector A.	Moderate	Out	Small numbers recorded in relation to the UK population, no significant connectivity to SPA populations.
Redshank	Found in all survey sectors with a peak of 13 birds in December (0.3% of SPA pop.). WeBS count peak of 121 birds in the Port Seton to Craigielaw Count Sector (Nearshore Survey Area-Sector E) in September (2.4% of SPA pop.).	High	In	Cited as a qualifying interest of Firth of Forth SPA.
Puffin	Occasionally recorded with peak of eight birds in May, in Nearshore Survey Area-Sector B.	Moderate	Out	Small numbers recorded in relation to the UK population, no significant connectivity to SPA populations.

Razorbill	Highest numbers recorded during post-breeding period with peak of 416 birds in August within Nearshore Survey Area- Sector B.	High	In	Cited as an SPA qualifying interest in the breeding season for SPAs within foraging range and post-breeding dispersal.
Guillemot	Highest numbers recorded during post-breeding period with peak of 414 birds in August within Nearshore Survey Area- Sector B.	High	In	Cited as an SPA qualifying interest in the breeding season for SPAs within foraging range and post-breeding dispersal. SPAs: Forth Islands.
Sandwich tern	Present in summer/autumn with peak of 41 birds in the Port Seton to Craigielaw WeBS Sector (Nearshore Survey Area- Sector E) in May (4.0% of SPA pop.). Peak count of 38 birds in Sector E in same month (3.7% of SPA pop.).	High	In	Cited as a qualifying interest of Firth of Forth SPA on the basis of the passage population.
Common tern	Sporadically recorded in low numbers with peak of 10 birds in Nearshore Survey Area-Sector E in August.	High	In	Cited as an SPA qualifying interest in the breeding season for SPAs within foraging range/post-breeding dispersal.
Kittiwake	Occasionally recorded with peak of 18 birds in August in Nearshore Survey Area-Sector B. Absent from Sector E.	Moderate	Out	Small numbers recorded in relation to the UK population, no significant connectivity to SPA populations.
Black-headed gull	Present in most months during winter. Peak of 127 birds in Nearshore Survey Area-Sector E in February.	Moderate	Out	Small numbers recorded in relation to the UK population, no likely connectivity to SPA populations.
Common gull	Recorded in all Nearshore Survey Area-Sectors, with a peak of 118 birds in August in Sector B.	Moderate	Out	Small numbers recorded in relation to the UK population, no likely connectivity to SPA populations.

Lesser black-backed gull	Occasionally recorded, with peak of 12 birds in August in Nearshore Survey Area-Sector B.	Moderate	Out	Small numbers recorded in relation to the UK population, no significant connectivity to SPA populations.
Herring gull	Recorded throughout the year with peak of 430 birds in August in Nearshore Survey Area-Sector B.	High	In	Cited as an SPA qualifying interest in the breeding season for SPAs within foraging range.
Great black-backed gull	Small numbers throughout year with peak of 12 birds in Sector B in August.	Moderate	Out	Small numbers recorded in relation to the UK population, no significant connectivity to SPA populations.
All Firth of Forth SPA qualifying interests that were recorded during baseline surveys were identified as high sensitivity due to likely direct connectivity. The sensitivity of a particular species may differ between the near-shore survey area and the Boat-based Survey Area (Table 8-32) due to differences in status and importance in the different habitats and areas (e.g. via connectivity to an SPA in one area but not in the other).				

Validity of baseline characteristics

386. As detailed above, the baseline data to inform the Revised Development EIA will be based upon those used for the Original Development EIA but with updates being made to the relevant external and pre-existing datasets where possible. Additionally, a range of relevant information sources have become available since the submission of the Original Development ES and these sources will be used to help inform the EIA and HRA for the Revised Development (see Additional Data and Information Sources above).

387. These updates and additional information sources are required to ensure that the EIA and HRA for the Revised Development are based upon the best evidence that is currently available, but they also have the potential to alter the baseline characteristics. The updates that have been undertaken to the WeBS data suggest that the baseline characteristics for the cable landfall site and its surrounds remain relevant and appropriate to the Revised Development. By contrast, updates to the SMP data are likely to produce changes in some of the regional reference populations for breeding seabirds, which may in turn alter aspects of the baseline characteristics for the Revised Development.

388. Similarly, the further information sources that have become available since the time of the Original Development ES will lead to differences in the approaches and methodologies taken to the assessment for the Revised Development EIA. However, it is considered that most such differences will either; (i) have relatively minor effects on the predicted impacts (e.g. changes to the seasonal periods for seabirds used in the Original Development EIA, following Furness (2015) and replacing the seabird population viability analyses (PVAs) used in the Original Development EIA with those produced subsequently by Freeman *et al.* (2014) and MacArthur Green (2014a,b); or (ii) lead to reductions in the predicted impacts (e.g. changes to the collision risk avoidance rates for gannet and gull species, including kittiwake (Cook *et al.*, 2014, SNCBs, 2014) and to the nocturnal activity factors for gannet and gull species used in collision risk models - MacArthur Green 2015). One exception in this regard concerns the prediction of impacts on seabirds from displacement and barrier effects, and how the predictions from the modelling approach developed by Searle *et al.* (2014) would (if used for the Revised Development EIA) compare to those obtained by the more basic approaches, as used for the Original Development EIA. However, the modelling approach of Searle *et al.* (2014) has only been developed for five species, all of which are scoped in to the Revised Development EIA (see Section 8.4.5). It is unlikely that sufficient ecological knowledge and data exist to enable this approach to be readily extended to the other seabird species considered in the Original Development EIA.

389. The potential changes to baseline characteristics and to the assessment methodologies are taken into account when setting out the scoping and approach for the EIA for the Revised Development (see 8.4.5 and 8.4.6).

8.4.3 Design Envelope

390. Table 8-34 sets out the worst case scenario defined by the EIA for the Original Development for Ornithology (ICOL, 2013) compared to the proposed worst case scenario for ornithology for the Revised Development at a level of detail sufficient to draw conclusions in relation to the scoping process.

Table 8-34: Worst Case Scenario Definition – Development Area and Offshore Export Cable Corridor to Near-shore

Potential Impact	Original Development Design Envelope (ICOL, 2013)	Revised Development Design Envelope	Difference between the Original and Revised Design Envelopes
Construction (& Decommissioning) Phase			
Direct habitat loss from disturbance to seabed possibly causing indirect impacts via effects on prey.	Total seabed area disturbed is 5.54km^2, equating to 3.69% of the Development Area. This results from the seabed preparation for 213 WTGs, five OSPs, three met masts and the installation of inter-array cables, as well as from jack up vessels and vessel anchorages.	Total seabed area disturbed is 4.24 km^2, equating to 2.82% of the development area. This results from the seabed preparation for 72 WTGs, two OSPs, and the installation of inter-array cables, as well as from jack up vessels and vessel anchorages.	Overall there is a 66% reduction in WTGs numbers, 60% OSPs and 46 % reduction in inter-array cable and the Revised Development requires no further met masts. Total area disturbed is 1.3km^2 less than assessed in the Original Development ES. This equates to a 23% reduction in total disturbed area.

Potential Impact	Original Development Design Envelope (ICOL, 2013)	Revised Development Design Envelope	Difference between the Original and Revised Design Envelopes
Direct disturbance	Vessel traffic: approximately 3,500 vessel movements (movement equals return trip from port – Development Area), with maximum duration of construction programme assumed to be four years. A worst case scenario considered that up to 15 vessels could be present in the Development Area at any one time (including tugs, and construction, heavy lift, cable laying and crew vessels).	Vessel traffic: approximately 1,500 vessel movements (movement equals return trip from port – Development Area), with maximum duration of construction programme assumed to be three years. A worst case scenario considered that up to 15 vessels could be present in the Development Area at any one time (including tugs, and construction, heavy lift, cable laying and crew vessels).	Reduction of vessel movements by 2000.
Indirect impacts on birds via noise impacts on prey species	Noise impacts on prey from the installation of WTGs, cables etc, as described above. The steel jacket foundation option was identified as representing the worst case scenario for noise impacts, as pile driving is accepted as producing the largest potential source of noise. Piling noise modelled considers the following sources: 213 WTG with four piles per foundation; three met mast with four piles per foundation; and five OSPs with 16 piles per foundation Piling activities were predicted to extend over two years, with piling being underway for 11% - 23% of this time. A maximum energy	Noise impacts on prey from the installation of WTGs, cables etc, as described above. The steel jacket foundation option was identified as representing the worst case scenario for noise impacts, as pile driving is accepted as producing the largest potential source of noise. Piling noise modelled considers the following sources: 72 WTG with four piles per foundation; and two OSPs with eight piles per foundation No met masts. Piling activities are predicted to extend over a one year period with piling being underway for approximately 14% of this time. A maximum hammer capacity of 2400 kJ will be modelled for piling noise	Increase in maximum blow energy (resulting in a potentially greater footprint of effect) but with a significantly reduced number of piles and therefore much lower period of noise exposure’

Potential Impact	Original Development Design Envelope (ICOL, 2013)	Revised Development Design Envelope	Difference between the Original and Revised Design Envelopes
	of 1080kJ was modelled for piling noise		
Operation & Maintenance Phase			
Direct habitat loss possibly causing indirect impacts via effects on prey.	Gravity bases fitted to 213 WTGs as well as to five OSPs, three met masts and inter-array cables, with maximum protection of 10% of the cables length, covering 1.87km^2, equivalent to 1.25% of the Development Area.	Gravity bases fitted to 72 WTGs as well as to two OSPs, and inter-array cables, with maximum protection of 10% of the cables length. Total loss of habitat is 1.05 km^{2,} equating to 0.7 % of the Development Area.	Total loss of habitat is 0.82 km^2 less than assessed in the Original Development ES equating to a 44% reduction in total loss of habitat.
Other indirect impacts on birds via effects on prey species	In addition to direct habitat loss, possible operational impacts on fish prey populations considered were displacement, behavioural response to electromagnetic fields (EMF) associated with cabling, disturbance and injury from operational noise, changes in fishing pressures and creation of new habitat from the wind farm infrastructure.	Reduction in the number of WTGs and in length of inter-array cables to 190km.	Overall there is a 66% reduction in WTGs numbers, 60% OSPs and 46 % reduction in inter-array cable and the Revised Development requires no further met masts.
Direct disturbance	An average of four to six vessel trips to the Development Area per day was assumed for the operational phase.	An average of four to six vessel trips to the Development Area per day is assumed for the operational phase.	Assumed to be the same as in Original Development ES
Displacement	Maximum extent of Development Area (150km^2) plus a 2km buffer considered for displacement 213 WTGs within the Development Area giving an indicative minimum separation of 820 m between WTGs.	Maximum extent of the Development area is unchanged Maximum of 72 WTGs giving an indicative minimum spacing between WTGs of 1278 m.	Overall there is a 66% reduction in WTGs numbers. Greater spacing between WTGs

Potential Impact	Original Development Design Envelope (ICOL, 2013)	Revised Development Design Envelope	Difference between the Original and Revised Design Envelopes
Barrier effect	Maximum extent of Development Area at 150km^2, with 213 WTGs of: hub height 114m above LAT rotor diameter of 172m. minimum air draft 22m above HAT Average WTG density of 1.42 per km^2. WTGs will have markings, foghorns and lighting as per agreement with navigation and aviation stakeholders	Maximum extent of the Development Area is unchanged. A maximum of 72 WTGs, of: maximum hub height 176 m above LAT maximum rotor diameter 250m minimum air draft of 22m above HAT Average WTG density of 0.48 per km^2. At this stage there is no final design, but it is assumed WTGs will have markings, foghorns and lighting similar to the Original Development.	Overall there is a 66% reduction in WTGs numbers. Increase in overall turbine height and rotor diameter. WTG density reduced, with greater spacing between WTGs
Collision risk	Maximum extent of Development Area at 150km2, with 213 WTGs of: hub height 114m above LAT rotor diameter of 172m. minimum air draft 22m above HAT Average WTG density of 1.42 per km^2. Total rotor swept area below a height of 50m (relative to MSL) of 445,363m^2. WTGs will have markings, foghorns and lighting as per agreement with navigation and aviation stakeholders	Maximum extent of the Development Area is unchanged. A maximum of 72 WTGs, of: maximum hub height 176 m above LAT maximum rotor diameter 250m minimum air gap of 22m above HAT Average WTG density of 0.48 per km^2. Total rotor swept area below a height of 50m (relative to MSL) will be no more than 129,000m^2. At this stage there is no final design, but it is assumed WTGs will have markings, foghorns and lighting similar to the Original Development.	Overall there is a 66% reduction in WTGs numbers Total rotor swept area below a height of 50m (relative to MSL) will be reduced to less than a third of that for the Original Development Rotor swept area of WTGs extending to greater heights

Table 8-35: Worst Case Scenario Definition – Export Cable Corridor – Near-shore to Intertidal

Potential Impact	Original Development Design Envelope (ICOL, 2013)	Revised Development Design Envelope	Difference between the Original and Revised Design Envelopes
Construction (& Decommissioning) Phase			
Direct habitat loss including intertidal areas, and including impacts arising from indirect effects of disturbance to habitats on prey species	Specification of construction details (assumed worst case): Maximum of six cables; Cable route length of approximately 83.3 km from the edge of the Development Area to the MHWS Maximum cable corridor width of 1,400 m (the maximum distance between the outer most trenches) Sub-tidal area of seabed disturbed across Offshore Export Cable Corridor assumed as 3.02km^2 (3.0% of Offshore Export Cable Corridor) resulting from the Export Cable installation. Intertidal area disturbed at the Cockenzie landfall option is 2,216m2 which equates to 2.0% of total beach area (measured from the Cockenzie Power station to East Cuthill Rocks).	Specifications as per Original Design envelope with the exception that there is a maximum of two cables Landfall confirmed as Cockenzie. Therefore, the disturbance of intertidal habitat at Seton Sands, involving a greater area of habitat than at Cockenzie, is no longer relevant. Disturbance to inter-tidal area at Cockenzie to be as for Original Development	Smaller area of disturbance and loss of habitat along cable route Disturbance of intertidal habitat limited to Cockenzie Disturbance in inter-tidal area at Cockenzie assumed to be as for the Original Development
Direct disturbance	Specification of construction details (assumed worst case): Maximum estimated cable laying rate of 500 m per hour; Maximum of nine months for installation between Development Area and near-shore habitat Maximum of up to four weeks per cable, with a maximum installation of three cables per year (i.e. 12 weeks per year) for installation in	Specification of construction details (assumed worst case): Maximum estimated cable laying rate of 500 m per hour; At this stage there is no further final design information but is, likely to be similar to Original Development except that the duration of activities and the number of vessel movements will	Shorter duration of construction activities associated with cable laying and fewer vessel movements due to the reduction in cable numbers

Potential Impact	Original Development Design Envelope (ICOL, 2013)	Revised Development Design Envelope	Difference between the Original and Revised Design Envelopes
	intertidal habitat. This possibility that this process could be phased over three years (i.e. eight weeks per year) was also considered. Approximate number of vessel movements – 30 per cable.	be lower because a maximum of two cables would be laid.	from six to two.
Operation & Maintenance Phase			
Direct disturbance	Noise, visual disturbance through maintenance. A small number of vessel movements associated with inspections and monitoring to identify if the Offshore Export Cable becomes exposed over time and to take appropriate remedial action.	Noise, visual disturbance through maintenance. A small number of vessel movements associated with inspections and monitoring to identify if the Offshore Export Cable becomes exposed over time and to take appropriate remedial action.	Assumed to be the same as in Original Development ES

8.4.4 Proposed Embedded Mitigation Measures

391. Embedded Mitigation for the Revised Development will comprise of a range of Embedded Mitigation and Specific Mitigation measures to minimise environmental effects which were captured within the Design Envelope for the Original Development (see Section 4.4.1), as follows:

- Piling operations will incorporate a soft start procedure which will reduce the potential for noise related fatality.
- Cables will be suitably buried or will be protected by other means when burial is not practicable. This will reduce the potential for impacts relating to the electromagnetic field (EMF) on some prey species of seabirds.
- A suitably qualified Ecological Clerk of Works will be appointed to the Project during construction. This will ensure compliance with mitigation and best practice is followed relating to disturbance of priority bird species (notably qualifying species from the Firth of Forth SPA).

8.4.5 Commitment to Consent Conditions

392. As noted in Section 2.2.3, ICOL also propose to commit to those consent conditions (that will further minimise the impacts of the development on the environment) that were granted for the Original Development for the application of the Revised Development.

393. These consent conditions took into account consultation responses to the Original Development ES from key stakeholders in relation to ornithology (Marine Scotland 2014a, 2014b). A summary of the most relevant conditions in relation to Ornithology is provided in Table 3-36. Conditions in full are provided in Appendix A.

Table 8-36: Summary of the Most Relevant Consent Conditions Related to Ornithology

Requirement	Description
Production of a Project Environmental Monitoring Programme ("PEMP")	Condition will ensure that appropriate and effective monitoring of the impacts of the Development on ornithology is undertaken.
Production of a Construction Method Statement (CMS)	Condition will ensure the appropriate construction management of the Development, taking into account mitigation measures to protect the environment (including ornithology) and other users of the marine area.
Production of a detailed Construction programme	Provision for approval of a Construction Programme to confirm the timing and programming of the construction works.
Production of an Environmental Management Plan	Condition will mitigate the impacts on the environmental interests during construction and operation.
Production of a Vessel Management Plan	Describing, for approval, the types of vessels to be employed and the management and routeing of those vessels so as to mitigate disturbance to bird species.
Production of a Piling Strategy	Setting out for approval the details of any proposed piling and how that piling will be managed to mitigate any impacts of underwater noise.
Production of a Cable Plan	Setting out, for approval, the installation methods for the cables (including burial) to ensure it remains consistent with the installation process assessed in the ES as relevant to ornithology.
Production of an Operations and Maintenance Plan	Setting out, for approval, the operations and maintenance procedures and the management of impacts during the operational phase so as to safeguard environmental interests.
Development Specification and Layout Plan	Setting out for approval the final design and layout of the Development to ensure it remains consistent with the design assessed in the ES as relevant to ornithology.

8.4.6 Scoping of the EIA for the Revised Development

394. From Tables 8-34 and 8-35 above, it is clear that the design envelope for the worst-case definition for the Revised Development will have similar or lower levels of predicted ornithological impacts to that of the Original Development in all cases except possibly for the potential indirect effects arising from noise impacts on prey species during construction. This is because the key features of the design either remain the same (e.g. the size of the Development Area) or have changed in such a way as to reduce impacts (e.g. reduced number of WTGs, reduced WTG density, reduced total swept area within the height zone at which the vast majority of seabird flights occur (defined in Table 8-34 as below 50m relative to MSL) and reduced number of export cables (Tables 8-34 and 8-35)).

395. For the indirect effects arising from noise impacts on prey during construction, the revised estimates of the required piling energies have increased compared to those estimated for the Original Development. Further noise modelling will be undertaken and the indirect impacts on birds subsequently re-assessed. Therefore, it cannot be assumed that the conclusions relating to this indirect impact for the Original Development EIA will be applicable to the Revised Development. As such, this construction-phase impact will be scoped into the Revised Development EIA.

396. For all other potential impacts from the project alone the conclusions of the Original Development ES remain valid. As detailed above (see Section 8.4.2), there have been changes to some aspects of the baseline characteristics and to some assessment methodologies since the time of the Original Development ES but it is considered that these do not affect the conclusions that were reached by the Original Development EIA (as justified in Sections 8.4.2 and 8.4.5). Original Development EIA found that none of the residual impacts on bird species from Inch Cape alone were of greater significance than minor/moderate (Tables 8-37 and 8-38). Therefore, it is considered valid to scope out all impacts and species other than the indirect effects of noise impacts on prey during construction (at least when considering the project alone).

397. However, since the completion of the Original Development EIA, the MS Appropriate Assessment for the Forth and Tay Wind Farms has been undertaken. This focused on the effects of displacement and barrier effects on breeding gannet, kittiwake, guillemot, razorbill and puffin and of collisions on breeding gannet and kittiwake (Marine Scotland, 2014a). Therefore, these impacts and species have been subject to further assessment since the Original Development ES (albeit in relation to specific SPA populations) and, as such, it is considered appropriate to scope them into the Revised Development EIA.

398. Manx shearwater and black-headed gull are also scoped into the Revised Development EIA. For both species, this is on the basis that they are both qualifying features of the Outer Firth of Forth and St Andrews Bay Complex pSPA, for which information only became available after the submission of the Original Development ES (see Section 8.4.7 below). Both were scoped out of the Original Development EIA, in part, because of unlikely connectivity to SPAs.

399. Updates to the SMP data since the time of the Original Application are considered likely to produce changes in the regional reference populations for some breeding seabird species. This could cause the baseline characteristics for the Revised Development to differ from those for the Original Development, affecting the decision on which impacts and species to scope in. However, for most of the breeding seabird species that are proposed to be scoped out the evidence for changes in the regional reference populations is limited. For these species, there are either few, or no, colonies within the regional population that have more recent count data (e.g. common tern, great black-backed gull and shag) or else the more recent colony counts provide little indication of any major changes in the overall regional reference population size (e.g. fulmar and herring gull). The exception to this is lesser black-backed gull, for which the most recent counts from the major colonies within the regional reference population indicate marked declines compared to the estimates used for the Original Development EIA. However, this species was relatively scarce during the site-specific baseline surveys (Tables 8-32 and 8-33), so that such changes in the regional reference population will not affect the conclusions reached in the Original Development EIA.

400. As detailed in the Section 8.4.2, it is considered that differences in the approaches and methodologies used to inform the EIAs for the Original and Revised Developments (resulting from the additional information sources that have become available since the Original Development ES) will tend to have small effects only on the predicted impacts, or else may reduce them. A possible exception in this regard concerns the prediction of impacts from displacement and barrier effects. Consideration will be given to using the modelling approach of Searle et al. (2014) in the Revised Development EIA and it is unclear how this will alter the conclusions from the Original Development EIA. However, this uncertainty does not affect the scoping decisions because this modelling has only been developed for five species, all of which are scoped in (whilst it is unlikely that sufficient information and knowledge is available to enable the approach to be readily extended to the other breeding seabird species considered in the Original Development EIA - see Section 8.4.2).

401. Consideration of cumulative impacts could also affect the decision on the impacts and species to scope in to the EIA for the Revised Development. The Cumulative Impacts Assessment (CIA) scoping includes several projects that were not considered in the CIA for the Original Development, notably the Hywind Demo, Moray Offshore Western Development Area, Kincardine Floating Offshore Windfarm, ForthWind Offshore Wind Demonstration Project, ForthWind Extension and Dogger Bank Creyke Beck A and B (see below). The cumulative impacts from these offshore wind projects are likely to be most

relevant to the breeding seabird populations, as opposed to the passage or wintering populations. This is because access to offshore waters for breeding seabirds is constrained by colony location, but at the same time foraging ranges are extensive and may encompass these project locations.

402. Of the above projects, the Moray Offshore Western Development Area and ForthWind Extension are both at the scoping stage only, so that no assessment of their predicted impacts is yet available. For Dogger Bank Creyke Beck A and B, the considerable distance of this project from the Development Area means that the extent of connectivity between the regional seabird populations associated with the Revised Development and this project will be extremely limited, and it is likely to make little contribution to the CIA (Thaxter et al., 2012, Wakefield et al., 2013, ICOL, 2013c). Of the other offshore wind farms that are new to the CIA for the Revised Development, their predicted impacts on breeding seabird populations are assessed as minor or negligible (Statoil, 2015, ForthWind, 2015, Atkins, 2016). As such, it is considered that the CIA will not affect the decisions on the impacts and species to be scoped in for the Revised Development.

403. Therefore, for the Revised Development EIA the indirect effects on seabirds arising from noise impacts on prey during construction will be scoped in, as will impacts from collisions, displacement and barrier effects on breeding gannet, kittiwake, guillemot, razorbill and puffin. It is considered that there is little, or no, justification for scoping in other impacts and/or other breeding seabird species. There is no evidence for any changes to either the baseline conditions [15] or potential assessment methodologies relating to non-breeding seabirds, passage seabirds, other migratory species or the species and populations associated with the near-shore and intertidal habitats within the vicinity of the cable landfall site. Given that the design for the Revised Development will be associated with similar or lower predicted impacts than that for the Original Development (except in relation to piling energies and the associated indirect noise effects), these species and populations will also be scoped out.

404. The significance of the residual impacts (i.e. after accounting for the embedded mitigation – Section 8.4.4) in the Original Development ES and the justification for the impacts and species that have been scoped in and out of the Revised Application are detailed in Tables 8-37 and 8-38.

[15] Note that the implications of the marine pSPAs in Scottish waters (which have been the subject of recent public consultation) for the non-breeding or passage populations that are qualifying features of these pSPAs will be considered within the HRA report - see 8.4.7 below.

Table 8-37: Summary of Potential Effects – Development Area and Offshore Export Cable Corridor to Near-shore

Potential Impact	Residual Effect (ICOL, 2013)		Scoped in or out of the Revised Development EIA	Justification
Construction (& Decommissioning) Phase				
Direct disturbance	All species	Negligible	Manx shearwater (breeding season only) – scoped in. All other species and seasonal populations – scoped out	The impacts from the Original Development were assessed as not significant and, as a result of the design changes described above, the Revised Development is anticipated to have less of an impact. Further assessment of this potential impact is therefore scoped out of the Revised Development EIA. Manx shearwater is the only species of exception, which will be scoped in. It was scoped out of the Original Development EIA on the basis of relatively low numbers recorded during the boat-based surveys and unlikely connectivity to SPAs (Table 8-32). However, it is a qualifying feature of the Outer Firth of Forth and St Andrews Bay Complex pSPA (for which details were not available at the time of the Original Development ES) and is scoped in on this basis[16]
Indirect impacts on birds via prey species	Razorbill	Minor (breeding season)	All species - scoped In	Estimated piling energies required for the Revised Development are greater than for Original Development. Therefore, noise modelling will be revised and the indirect impacts on birds will be re-assessed.
	Common tern	Minor/moderate (breeding season)		
	Arctic tern	Minor/moderate (breeding season)		

[16] As with black-headed gull, Manx shearwater is a qualifying feature of the Outer Firth of Forth and St Andrews Bay Complex pSPA and was also scoped out of the Original Development EIA, in part because of no likely connectivity to SPA populations – Table 8-32). However, the species was not recorded during the near-shore surveys (Table 8-33) and remains scoped out for the Near-shore to Intertidal components for the Revised Development EIA.

Potential Impact	Residual Effect (ICOL, 2013)		Scoped in or out of the Revised Development EIA	Justification
	All other species	Negligible		
Operation & Maintenance Phase				
Habitat loss	All species	Negligible	Manx shearwater (breeding season only) – scoped in. All other species and seasonal populations – scoped out	The impacts from the Original Development were assessed as not significant and, as a result of the design changes described above, the Revised Development is anticipated to have less of an impact. Further assessment of this potential impact is therefore scoped out of the Revised Development EIA. Manx shearwater is the only species of exception, which will be scoped in. It was scoped out of the Original Development EIA on the basis of relatively low numbers recorded during the boat-based surveys and unlikely connectivity to SPAs (Table 8-32). However, it is a qualifying feature of the Outer Firth of Forth and St Andrews Bay Complex pSPA (for which details were not available at the time of the Original Development ES cation) and is scoped in on this basis.[16]
Indirect impacts on birds via prey species	All species	Negligible	Manx shearwater (breeding season only) – scoped in. All other species and seasonal populations – scoped out	The impacts from the Original Development were assessed as not significant and, as a result of the design changes described above, the Revised Development is anticipated to have less of an impact. Further assessment of this potential impact is therefore scoped out of the Revised Development EIA.

Potential Impact	Residual Effect (ICOL, 2013)		Scoped in or out of the Revised Development EIA	Justification
				Manx shearwater is the only species of exception, which will be scoped in. It was scoped out of the Original Development EIA on the basis of relatively low numbers recorded during the boat-based surveys and unlikely connectivity to SPAs (Table 8-32). However, it is a qualifying feature of the Outer Firth of Forth and St Andrews Bay Complex pSPA (for which details were not available at the time of the Original Development ES) and is scoped in on this basis.[16]
Direct disturbance	All species	Negligible	Manx shearwater (breeding season only) – scoped in. All other species and seasonal populations – scoped out	The impacts from the Original Development were assessed as not significant and, as a result of the design changes described above, the Revised Development is anticipated to have less of an impact. Further assessment of this potential impact is therefore scoped out of the Revised Development EIA. Manx shearwater is the only species of exception, which will be scoped in. It was scoped out of the Original Development EIA on the basis of relatively low numbers recorded during the boat-based surveys and unlikely connectivity to SPAs (Table 8-32). However, it is a qualifying feature of the Outer Firth of Forth and St Andrews Bay Complex pSPA (for which details were not available at the time of the Original Development ES) and is scoped in on this basis. [16]

Potential Impact	Residual Effect (ICOL, 2013)		Scoped in or out of the Revised Development EIA	Justification
Displacement	Puffin	Minor (breeding season)	Manx shearwater, gannet, kittiwake, guillemot, razorbill and puffin (all for breeding season only) – scoped in. All other species and seasonal populations – scoped out	The impacts from the Original Development were assessed as not significant and, as a result of the design changes described above, the Revised Development is anticipated to have less of an impact. Further assessment of this potential impact is therefore scoped out of the Revised Development EIA. On the basis that displacement impacts on breeding populations of gannet, kittiwake, guillemot, razorbill and puffin were a focus of the MS Appropriate Assessment for the Forth and Tay wind farms, these species are scoped in. Manx shearwater is also scoped in. It was scoped out of the Original Development EIA on the basis of relatively low numbers recorded during the boat-based surveys and unlikely connectivity to SPAs (Table 8-32). However, it is a qualifying feature of the Outer Firth of Forth and St Andrews Bay Complex pSPA (for which details were not available at the time of the Original Development ES) and is scoped in on this basis.[16]
	Razorbill	Minor (breeding season)		
	Guillemot	Minor (breeding season)		
	Kittiwake	Minor (breeding season)		
	All other species and seasonal populations	Negligible		
Barrier effects (in the Original Development ES the impacts from barrier effects on breeding seabirds were assumed to be incorporated	Puffin	Minor (breeding season)	Manx shearwater, gannet, kittiwake, guillemot, razorbill and puffin (all for breeding season only) – scoped in. All other species and seasonal	The impacts from the Original Development were assessed as not significant and, as a result of the design changes described above, the Revised Development is anticipated to have less of an impact. Further assessment of this potential impact is therefore scoped out of the Revised Development EIA.
	Razorbill	Minor (breeding season)		
	Guillemot	Minor (breeding season)		

Potential Impact	Residual Effect (ICOL, 2013)		Scoped in or out of the Revised Development EIA	Justification
with those of displacement)	Kittiwake	Minor (breeding season)	populations – scoped out	On the basis that barrier effect impacts on breeding populations of gannet, kittiwake, guillemot, razorbill and puffin were a focus of the MS Appropriate Assessment for the Forth and Tay wind farms, these species are scoped in. Manx shearwater is also scoped in. It was scoped out of the Original Development EIA on the basis of relatively low numbers recorded during the boat-based surveys and unlikely connectivity to SPAs (Table 8.32). However, it is a qualifying feature of the Outer Firth of Forth and St Andrews Bay Complex pSPA (for which details were not available at the time of the Original Development ES) and is scoped in on this basis.[16]
	All other species and seasonal populations	Negligible		
Collision risk impacts	Gannet	Minor (breeding season)	Manx shearwater, gannet and, kittiwake (all for breeding season only) - scoped in. All other species and seasonal populations – scoped out	The impacts from the Original Development were assessed as not significant and, as a result of the design changes described above, the Revised Development is anticipated to have less of an impact. Further assessment of this potential impact is therefore scoped out of the Revised Development EIA On the basis that collision impacts on breeding populations of gannet and kittiwake, were a focus of the MS Appropriate Assessment for the Forth and Tay wind farms, these species are scoped in. Manx shearwater is also scoped in. It was scoped out of the Original Development EIA on the basis of relatively low numbers recorded during the boat-based surveys and unlikely connectivity to SPAs (Table 8-32). However, it is a
	Kittiwake	Minor (breeding season)		
	All other species and seasonal populations	Negligible		

Potential Impact	Residual Effect (ICOL, 2013)		Scoped in or out of the Revised Development EIA	Justification
				qualifying feature of the Outer Firth of Forth and St Andrews Bay Complex pSPA (for which details were not available at the time of the Original Development ES) and is scoped in on this basis.

Table 8-38: Summary of Potential Effects – Export Cable Corridor – Near-shore to Intertidal

Potential Impact	Residual Effect (ICOL, 2013)		Scoped in or out of the Revised Development EIA	Justification
Construction (& Decommissioning) Phase				
Direct habitat loss	All species	Negligible	Black-headed gull (non-breeding season only) – scoped in. All other species and seasonal populations – scoped out	The impacts from the Original Development were assessed as not significant and, as a result of the design changes described above, the Revised Development is anticipated to have less of an impact. Further assessment of this potential impact is therefore scoped out of the Revised Development EIA.
Indirect impacts on birds via prey species.	All species	Negligible	Black-headed gull (non-breeding season only) – scoped in. All other species and seasonal populations – scoped out	Black-headed gull is scoped in. It was scoped out of the Original Development EIA on the basis of unlikely connectivity to SPAs (Table 8-33). However, it is a qualifying feature of the Outer Firth of Forth and St Andrews Bay Complex pSPA (for which details were not available at the time of

Potential Impact	Residual Effect (ICOL, 2013)		Scoped in or out of the Revised Development EIA	Justification
Direct disturbance	All species	Negligible	Black-headed gull (non-breeding season only) – scoped in. All other species and seasonal populations – scoped out	the Original Development ES) and is scoped in on this basis.[17]
Operation & Maintenance Phase				
Direct disturbance	All species	Negligible	Black-headed gull (non-breeding season only) – scoped in. All other species and seasonal populations – scoped out	The impacts from the Original Development were assessed as not significant and, as a result of the design changes described above, the Revised Development is anticipated to have less of an impact. Further assessment of this potential impact is therefore scoped out of the Revised Development EIA. Black-headed gull is scoped in. It was scoped out of the Original Development EIA on the basis of unlikely connectivity to SPAs (Table 8-33). However, it is a qualifying feature of the Outer Firth of Forth and St Andrews Bay Complex pSPA (for which details were not available at the time of the Original Development ES) and is scoped in on this basis17.

[17]As with Manx shearwater, black-headed gull is a qualifying feature of the Outer Firth of Forth and St Andrews Bay Complex pSPA and was also scoped out of the Original Development EIA, in part because of no likely connectivity to SPA populations – Table 8-33). However, the species was not recorded during the boat-based surveys (Table 8-32) and remains scoped out for the Development Area and Offshore Export Cable Corridor to Near-shore components in the Revised Development EIA.

Scoping of CIA

405. The following list confirms the other plans, projects and activities (selected from the list in *Section 5.7*) considered in the scoping of the CIA. This list is derived by considering the other coastal or offshore developments that overlap with the seabird breeding season foraging ranges from the main colonies that are also within foraging range of the Development Area (see Figures 15.4 – 15.11 in ICOL, 2013). This list will be used as a basis for developing the final CIA for the Development Area and Offshore Export Cable Corridor to Near-shore components of the Revised Application.

Other Offshore Wind Farms

- Aberdeen Offshore Windfarm;
- Blyth Offshore Demonstrator;
- Dogger Bank Creyke Beck A and B;
- Fife Energy Park Offshore Demonstration Wind Turbine;
- Forthwind Demonstration Array and extension;
- Hywind Demo;
- Kincardine Floating Offshore Windfarm;
- Neart na Gaoithe;
- Seagreen Alpha and Bravo; and
- Teesside Offshore Wind Farm.
- Beatrice Offshore Wind Farm
- Telford, Stevenson and MacColl Offshore Wind Farms
- Moray Offshore Western Development Area
- Beatrice Wind Farm Demonstrator Project

Other Coastal Projects

- Port of Dundee Expansion - Dundee Waterfront Development
- Edinburgh Harbour - Edinburgh Waterfront Development

406. The requirement for CIA for the Near-shore and Intertidal components of the Revised Development is dependent upon the outcome of the assessment of impacts on black-headed gull, since this is the only species scoped in for the project alone assessment; impacts on all other species are assumed to be negligible on the basis of the EIA for the Original Development (Table 8-38). If required for black-headed gull (i.e. impacts are assessed to be greater than negligible), the CIA for the Near-shore and Intertidal components will follow

the approach taken in the Original Development ES. Thus, relevant developments identified within five kilometres of either side of the landfall site will be included in this CIA. This was considered to be a conservative threshold distance for the Original Development ES, as the cumulative impacts are likely to be highly localised.

407. Consideration of how the CIA will affect decisions on the impacts and species to be scoped in to the Revised Development EIA has been set out above. Table 8-39 summarises the post-mitigation significance for all cumulative impacts considered for the Development Area and Offshore Export Cable Corridor to Near-shore components as set out in the Original Development EIA and details whether the potential effect has been scoped in or out of the Revised Development EIA, together with the relevant justification.

408. The post-mitigation significance of cumulative effects, as well as the impacts and species to be scoped in and out of the CIA for the near-shore and intertidal components of the Revised Development, will be as for the project alone and exactly as specified in Table 8-38 above.

Table 8-39: Summary of Potential Effects – Development Area and Offshore Export Cable Corridor to Near-shore for the Revised Development with Other Plans, Projects and Activities

Potential Impact	Residual Effect (ICOL, 2013)		Scoped in or out of the Revised Development CIA	Justification
Construction (& Decommissioning) Phase				
Direct disturbance	All species	Negligible	Manx shearwater (breeding season only) – scoped in. All other species and seasonal populations – scoped out	Given that the Revised Development is assumed to have a negligible impact on all species other than Manx shearwater it is considered that it will not contribute in any significant way to a CIA, except possibly for Manx shearwater. Also, the further projects to be considered in the CIA for the Revised Development had minor or negligible predicted impacts on breeding seabird populations, and/or are so far from the Development Area as to have little connectivity with the regional seabird populations associated with the Revised Development. As such, for the species scoped out, the inclusion of these additional projects will not affect the

Potential Impact	Residual Effect (ICOL, 2013)		Scoped in or out of the Revised Development CIA	Justification
				conclusions of the CIA for the Original Development. Manx shearwater is scoped in on the basis that it has been scoped in for impacts from the project alone.
Indirect impacts on birds via prey species	Razorbill	Minor (breeding season)	All species – scoped in	The estimated piling energies required for the Revised Development are greater than for Original Development. Therefore, noise modelling will be revised and the indirect impacts on birds will be re-assessed. Therefore, all species are scoped in for this impact for the project alone. Given this, a CIA will be undertaken for all species.
	Common tern	Moderate (breeding season)		
	Arctic tern	Minor - Moderate (breeding season)		
	All other species	Negligible		
Operation & Maintenance Phase				
Habitat loss	All species	Negligible	Manx shearwater (breeding season only) – scoped in. All other species and seasonal populations – scoped out	Given that the Revised Development is assumed to have a negligible impact on all species other than Manx shearwater it is considered that it will not contribute in any significant way to a CIA, except possibly for Manx shearwater. Also, the further projects to be considered in the CIA for the Revised Development had minor or negligible predicted impacts on breeding seabird populations, and/or are so far from the Development Area as to have little connectivity with the regional seabird populations associated with the Revised Development. As such, for the species scoped out, the inclusion of these additional projects will not affect the

Potential Impact	Residual Effect (ICOL, 2013)		Scoped in or out of the Revised Development CIA	Justification
				conclusions of the CIA for the Original Development. Manx shearwater is scoped in on the basis that it has been scoped in for impacts from the project alone.
Indirect impacts on birds via prey species	All species	Negligible	Manx shearwater (breeding season only) – scoped in. All other species and seasonal populations – scoped out	Given that the Revised Development is assumed to have a negligible impact on all species other than Manx shearwater it is considered that it will not contribute in any significant way to a CIA, except possibly for Manx shearwater. Also, the further projects to be considered in the CIA for the Revised Development had minor or negligible predicted impacts on breeding seabird populations, and/or are so far from the Development Area as to have little connectivity with the regional seabird populations associated with the Revised Development. As such, for the species scoped out, the inclusion of these additional projects will not affect the conclusions of the CIA for the Original Development. Manx shearwater is scoped in on the basis that it has been scoped in for impacts from the project alone.
Displacement	Puffin	Minor – Moderate (breeding season)	Manx shearwater, gannet, kittiwake, guillemot, razorbill and puffin (all for breeding season only) – scoped in. All other species and seasonal populations – scoped out	The impacts from the Revised Development will be assessed on Manx shearwater, gannet, kittiwake, guillemot, razorbill and puffin. Therefore, a CIA will be undertaken on these species. For all other species the impacts from the Revised Development are considered to be negligible and therefore it is considered that
	Razorbill	Minor (breeding season)		
	Guillemot	Minor – Moderate		

Potential Impact	Residual Effect (ICOL, 2013)		Scoped in or out of the Revised Development CIA	Justification
		(breeding season)		the Revised Development will not contribute in any significant way to a CIA. Also, the further projects to be considered in the CIA for the Revised Development had minor or negligible predicted impacts on breeding seabird populations, and/or are so far from the Development Area as to have little connectivity with the regional seabird populations associated with the Revised Development. As such, for the species scoped out, the inclusion of these additional projects will not affect the conclusions of the CIA for the Original Development.
	Kittiwake	Minor – Moderate (breeding season)		
	All other species and seasonal populations	Negligible		
Barrier effects	Puffin	Minor – Moderate (breeding season)	Manx shearwater, gannet, kittiwake, guillemot, razorbill and puffin (all for breeding season only) – scoped in. All other species and seasonal populations – scoped out	The impacts from the Revised Development will be assessed on Manx shearwater, gannet, kittiwake, guillemot, razorbill and puffin. Therefore, a CIA will be undertaken on these species. For all other species the impacts from the Revised Development are considered to be negligible and therefore it is considered that the Revised Development will not contribute in any significant way to a CIA. Also, the further projects to be considered in the CIA for the Revised Development had minor or negligible predicted impacts on breeding seabird populations, and/or are so far from the Development Area as to have little connectivity with the regional seabird populations associated with the Revised Development. As such, for the species scoped out, the inclusion of these additional projects will not affect the
	Razorbill	Minor (breeding season)		
	Guillemot	Minor – Moderate (breeding season)		
	Kittiwake	Minor – Moderate (breeding season)		
	All other species and seasonal populations	Negligible		

Potential Impact	Residual Effect (ICOL, 2013)		Scoped in or out of the Revised Development CIA	Justification
				conclusions of the CIA for the Original Development.
Collision risk impacts	Svalbard barnacle goose	Minor (Passage migration)	Manx shearwater, gannet and kittiwake (all for breeding season only) – scoped in. All other species and seasonal populations – scoped out	The impacts from the Revised Development will be assessed on Manx shearwater, gannet and kittiwake. Therefore, a CIA will be undertaken on these species. As for displacement and barrier effects this will be limited to the breeding season for these species because the impacts from the Revised Development during the non-breeding season(s) are considered to be negligible and therefore it is considered that the Revised Development will not contribute in any significant way to a CIA. For all other species the impacts from the Revised Development are considered to be negligible and therefore it is considered that the Revised Development will not contribute in any significant way to a CIA. Also, the further projects to be considered in the CIA for the Revised Development had minor or negligible predicted impacts on breeding seabird populations, and/or are so far from the Development Area as to have little connectivity with the regional seabird populations associated with the Revised Development. As such, for the species scoped out, the inclusion of these additional projects will not affect the conclusions of the CIA for the Original Development.
	Gannet	Minor (breeding and non-breeding season)		
	Kittiwake	Major (breeding season) Minor (non-breeding season)		
	Herring gull	Minor (non-breeding season)		
	Great black-backed gull	Minor (non-breeding season		
	All other species and seasonal populations	Negligible		

8.4.7 Approach to EIA

The Impacts and Species Scoped In

409. As detailed above (Section 8.4.5), the scope of the EIA will be based in large part upon the conclusions of the EIA for the Original Development ES; i.e. that most impacts were of negligible significance (both for the project alone and for the CIA) and at most of minor or (in two cases only) minor/moderate significance for the project alone and of minor/moderate or (in one case only) moderate significance for the CIA (Tables 8-37, 8-38 and 8-39).

410. In determining the continued validity of these conclusions, consideration has been given to the likely changes in the baseline characteristics, as well as to the updates that have emerged since the time of the Original Development ES in the approaches and methodologies for undertaking the assessment for the Revised Development. This, together with the fact that the design envelope for the worst-case definition for the Revised Development will have similar or lower levels of predicted impacts to that of the Original Development for all but one of the potential impacts, means that most impacts and species will be scoped out for the Revised Development EIA. This will allow the EIA to remain focused on the impacts and species that are of key relevance. Therefore, the impacts and species that will be scoped in for both the project alone and CIA are:

- The indirect impacts arising via noise impacts on prey species (due to need to undertake further noise modelling as a result of the higher piling energies estimated to be required for the Revised Development).
- The impacts and species that were the focus of the Marine Scotland Appropriate Assessment for the Forth and Tay wind farms (Marine Scotland 2014a).
- Species whose conservation status has changed as a consequence of being qualifying features of the Outer Firth of Forth and St Andrews Bay Complex pSPA (details of which were not available at the time of the Original Development ES), and which were scoped out of the Original Development ES (in part at least) on the basis of unlikely connectivity to SPAs.

Assessment methodologies

411. The approaches to be taken to the assessment for the Revised Development will follow available industry guidance and will be informed by the approaches used in the Original Development EIA, together with the body of work that has become available since submission of the Original Development ES (as detailed in Section 8.4.2). Specifically, the approaches and methods to be used will include:

- Determination of regional reference populations for breeding seabirds: These will be determined using similar methods to those for the Original Development EIA.

Breeding colonies within foraging range of the Development Area plus four kilometre buffer will be identified on the basis of available foraging range information, notably the estimated mean maximum foraging range (e.g. as defined by Thaxter et al., 2012) in combination with other detailed information on ranges where this is available (e.g. Wakefield et al., 2013, Wilson et al., 2014). As in the ES for the Original Development, consideration will be given to using the mean maximum foraging range plus one standard deviation where the data appear to justify this.

Having identified the colonies that contribute to the regional reference population for each species, the SMP colony count data will be used to derive population estimates. As in the ES for the Original Development, a correction will be applied to count data from before 2007 based upon recent population trends for the species in question. For each species, consideration will be given to whether the trend correction should be based upon the UK, Scottish or regional trend.

- Collision risk modelling: This will be undertaken using the SOSS offshore collision risk model (CRM) (Band 2012). CRMs will be run using the recent adaptation of the offshore model (Masden 2015), unless unforeseen issues arise in applying this adaptation of the model to the available input data (in which case CRMs will be undertaken using the original excel spreadsheet routines – Band 2012).

  Gannet and kittiwake will be the only species scoped in for collision impacts and for both of these species the basic version of the model will be used, with the avoidance rates as recommended by the SNCBs – i.e. 0.989 for both species (SNCBs, 2014).

  As in the ES for the Original Development, the site-specific flight height data are considered to be the most appropriate for use within the CRMs in this instance, although it is acknowledged that there are situations in which the generic flight height data (Johnston *et al.*, 2014a, b) are also valid. The site-specific flight height data are preferred because the baseline survey data provide large sample sizes for both gannet and kittiwake (ICOL, 2013c), whilst there is increasing recognition of the high level of between-site and between-season variation in seabird flight heights (Johnston and Cook 2016).

- Displacement/barrier effects: Consideration will be given to whether it will be more appropriate to use the modelling approaches of Searle *et al.* (2014) in predicting impacts from displacement and barrier effects, or the more basic approach of assuming a reduction in the reproductive or survival rates of the displaced 'population' (where the displaced 'population' is estimated by applying a species-specific displacement rate to the estimated breeding season population size in the Development Area plus one kilometre buffer). The assessment for the Original Development EIA was followed the latter approach.

  The more basic approach to assessing the displacement impacts has the advantage of using the species abundance estimates from the site-specific surveys, whilst a

disadvantage is that there is little, or no, biological basis to the assumed demographic costs of displacement. Although the modelling approach of Searle *et al.* (2014) has been developed for five of the species scoped in to the Revised Development EIA on the basis of being the focus of the MS Appropriate Assessment, concerns exist over the model performance and reliability for puffin (Marine Scotland, 2014a). Furthermore, the modelling was developed specifically in relation to predicting the impacts of the Forth and Tay wind farms on SPA populations and it is unclear what modifications are required to incorporate other projects to be included in the CIA for the Revised Development, or to enable estimation of impacts at the regional population scale.

Irrespective of which of the above approaches is used to predict the impacts from displacement and barrier effects, species-specific displacement rates will be required as a key input. The displacement rates used in the Original Development ES were 75% for gannet, 30% for kittiwake and 50% for each of the three auk species. These are in broad agreement with the rates recommended by the Statutory Nature Conservation Bodies (SNCBs) for the Inch Cape wind farm ahead of the finalisation of the MS Appropriate Assessment. However, the WTG density in the Revised Development is considerably lower than that for the Original Development (and for the design on which the MS Appropriate Assessment was based).

The species-specific displacement rates to be used for the Revised Development EIA will be determined from a review of the available information for each of the relevant species (e.g. Cook *et al.,* 2014, Dierschke *et al.,* 2016), together with consideration of the effects of the reduction in WTG density compared to that for the Original Development.

- Population-level impacts: These will be determined for the key seabird species by applying PVAs to compare predicted population trajectories and population sizes after 25 years of operation between the impacted and un-impacted scenarios. It is intended that the PVAs for kittiwake, guillemot and razorbill will be based upon those of Freeman *et al.* (2014), whilst for gannet and puffin they will be based upon those of MacArthur Green (2014a,b). Should PVAs be required for any other species, consideration will be given to the most suitable modelling approaches to use.

  Outputs from the PVAs will be interpreted taking note of the findings of the Cook and Robinson (2015a) study on the sensitivity of different metrics. Therefore, the metrics to be used will include the counterfactuals of both the 25-year population size and the population growth rate (i.e. comparing impacted and un-impacted populations), but consideration will also be given to applying other metrics which provide different types of information (e.g. on changes in the probability of population decline or of a particular level of population decline). Findings that may emerge from further work undertaken on the value and performance of such metrics will also be taken into account. This range of metrics applied to the PVA outputs will be reviewed to reach a

conclusion as to the significance of the impacts on the species (or populations) of interest.

412. The plans, projects and activities that will be considered in the CIA for the Development Area and Offshore Export Cable Corridor to Near-shore components for the Revised Development EIA are listed in *Section 8.4.5*. Details of the potential impacts from these projects on the species that are scoped into the Revised Development EIA will be sourced for inclusion within the CIA. For the other offshore wind farm developments included in the CIA, the most recently available estimates of collision risk and possibly of displacement/barrier impacts[18] will be used to produce the cumulative estimates. A qualitative assessment of the contribution of a project to such impacts will be made in cases where suitably comparable estimates of collision and displacement/barrier effect impacts are unavailable. Estimation of the cumulative population-level impacts will be undertaken using PVAs in conjunction with the associated metrics for interpreting the outputs, as for the project alone (and as described above).

413. As detailed above (see Scoping of CIA), the plans, projects and activities that will be considered in the event that a CIA is required for the Near-shore and Intertidal components of the Revised Development have yet to be identified. Should a CIA be required, the impacts from the relevant projects will be determined and considered with those from the Revised Development.

8.4.8 Approach to HRA

Approach and Links to the HRA for the Original Development

414. The report to inform an Appropriate Assessment (included in the HRA report) will be undertaken by following available and relevant guidance in assessing potential impacts on European designated sites (SPAs in the case of birds), and Ramsar sites, which may arise during the construction, operation and decommissioning of the offshore and near-shore / intertidal elements of the Revised Development. This will involve:

- Identifying relevant Natura (and Ramsar) sites which include Annex I or regularly occurring migratory bird species as qualifying features and for which there is potential connectivity with an impact from the construction, operation and decommissioning activities associated with the Revised Development;
- Identifying no LSE, and if appropriate no adverse effect on site integrity, associated with the construction, operation and decommissioning of the Revised Development; and

[18] The need to source estimates of displacement/barrier effect impacts for these projects will depend upon the approach taken to predicting these impacts. This will not be required where the modelling approach of Searle *et al.*, (2014) is used and where such modelling includes consideration of the project.

- Considering potential impacts in relation to notified interest features of identified Natura (and Ramsar) sites in relation to their conservation objectives.

415. The HRA screening exercise is set out in Appendix B. This identifies the designated features for which it is possible to conclude no LSE and so screen out of further consideration in the Appropriate Assessment stage of the HRA.

416. As detailed above (see 8.4.3), the design envelope for the worst-case definition for the Revised Development will have similar or lower levels of predicted impacts to that of the Original Development for all but one of the potential impacts (i.e. the indirect impacts on birds via prey species). Consequently, the potential for concluding no LSE, and subsequently no adverse effect on site integrity, as associated with the design of the Revised Development, is similar to or less than that associated with the design of the Original Development for most impacts. One notable exception in this respect is the indirect impacts on birds via prey species (Appendix B).

417. It is acknowledged that changes to either the status of relevant SPA populations or the approaches and methods for assessing impacts, or both, since the time of the Original Development ES could affect the assessment (although for the approaches and methods most such changes are likely to have relatively minor effects or reduce the predicted impacts – see 8.4.2). For those SPA qualifying features for which it is not possible to conclude no LSE in the HRA Screening, this could conceivably lead to a conclusion of being unable to conclude no adverse effect on site integrity from the Revised Development, despite the lower predicted impacts associated with the design of the Revised Development. Similarly, changes to the projects considered for the in-combination assessment will have to be taken into account (see below).

418. However, given the lower levels of predicted impacts for the Revised Development, it is considered that the Original Development HRA will provide a valuable foundation for the Revised Development HRA. Thus, the conclusions relating to the Original Development have been used as the starting point for assessing LSE (see Appendix B) and, where relevant, they will also be used for assessing adverse effects for existing SPAs, drawing upon and presenting the evidence base set out in the Original Development EIA and HRA, updated where required. The HRA report for the Revised Development will clearly identify those parts of the data and assessment that derive from Original Development EIA and HRA. The HRA for the Revised Development will take account of:

- Changes in the baseline population status of SPA features that may affect the conclusions reached in the Original Development HRA.
- Changes in the approaches and methodologies for the assessment that may affect the conclusions reached in the Original Development HRA.

- The SPAs, and associated features, that were the focus of the MS Appropriate Assessment for the Forth and Tay Wind Farms, and have therefore been subject to further assessment since the Original Development (i.e. breeding populations of gannet, kittiwake, guillemot, razorbill and puffin at the Forth Islands SPA, kittiwake and guillemot at Buchan Ness to Collieston Coast SPA, kittiwake, guillemot and razorbill at Fowlsheugh SPA, and kittiwake, guillemot and razorbill at St Abb's Head to Fastcastle SPA - Marine Scotland, 2014a).
- The inclusion of additional projects for the in-combination assessment, which could affect the conclusions reached in the Original Development HRA regarding adverse effects on qualifying features.
- The Outer Firth of Forth and St Andrew's Bay Complex proposed SPA (pSPA)[19], details of which were not available when the Original Development HRA was produced.

The HRA for the Original Development

419. The following SPAs were identified as having connectivity with the offshore and near-shore / intertidal elements of the Original Development:

- Slamannan Plateau
- Upper Solway Flats and Marshes
- Firth of Forth
- Forth Islands
- Fowlsheugh
- St Abb's Head to Fast Castle
- Buchan Ness to Collieston Coast

420. Of these SPAs, the Slamannan Plateau and Upper Solway Flats and Marshes are designated solely for their over-wintering qualifying interests (i.e. Taiga bean goose for the former and which include Svalbard barnacle goose for the latter). The Firth of Forth SPA is designated for a wide range of over-wintering waterbird species, as well as for Sandwich tern on passage. The Upper Solway Flats and Marshes and the Firth of Forth are also Ramsar Sites.

421. For both the Slammanan Plateau SPA and Upper Solway Flats and Marshes SPA, the potential connectivity is between the Development Area and the qualifying features (as identified above) when they are on migration, with the route to impact being via collision risk (see Appendix B). Based on the findings of the MSS commissioned strategic assessment of collision risk of Scottish offshore wind farms to migratory birds (WWT, 2014), produced after

[19]http://www.snh.gov.uk/protecting-scotlands-nature/protected-areas/international-designations/spa/marine-spas

submission of the Original Application, no LSE is concluded for these qualifying features. Therefore, both SPAs are screened out of further assessment (Appendix B).

422. The findings from the MSS strategic assessment of collision risk also mean that it is not possible to conclude no LSE for four other SPA qualifying features for which potential connectivity exists between the Development Area and the features when they are on migration. In each of these four cases the individual SPAs with which potential connectivity exists are not known (Appendix B). However, it is considered highly likely that further work to be undertaken for the HRA will enable no LSE to be concluded in these cases.

423. The remaining four SPAs listed above are all designated for their breeding seabird interests, and were the focus of the MS Appropriate Assessment for the Forth and Tay wind farms (Marine Scotland, 2014). The following species are qualifying features of one or more of these four SPAs (or at least named components of an assemblage feature) – fulmar, gannet, kittiwake, herring gull, lesser black-backed gull, common tern, Arctic tern, guillemot, razorbill, puffin, roseate tern, Sandwich tern, shag, and cormorant (Table 8-4-9). Several of these seabird species are listed as components of the seabird assemblage for each of these four SPAs, as opposed to being designated features in their own right. For both the Original Development HRA and the MS Appropriate Assessment, cormorant, roseate tern, Sandwich tern and shag were not considered to contribute to being unable to conclude no LSE at any of the four SPAs for which they were features (Table 8-40).

424. The conservation objectives for the five SPAs that are screened in for further consideration in the Appropriate Assessment are set out in the HRA Screening in Appendix B.

425. To avoid deterioration of the habitats of the qualifying species or significant disturbance to the qualifying species, thus ensuring that the integrity of the site is maintained; and

Table 8-40: The Designated Features of the Four Breeding Seabird SPAs Considered in the HRA for the Original Development and in the Marine Scotland Appropriate Assessment

Natura 2000 Site	Designated Feature(s)	Considered in HRA for Original Development	Considered in Marine Scotland Appropriate Assessment
Buchan Ness to Collieston Coast SPA	Fulmar*	Yes	Yes
	Guillemot*	Yes	Yes
	Herring gull*	Yes	Yes
	Kittiwake*	Yes	Yes
	Shag*	No	No
	Seabird assemblage		

Natura 2000 Site	Designated Feature(s)	Considered in HRA for Original Development	Considered in Marine Scotland Appropriate Assessment
Fowlsheugh SPA	Fulmar*	Yes	Yes
	Guillemot	Yes	Yes
	Herring gull*	Yes	Yes
	Kittiwake	Yes	Yes
	Razorbill*	Yes	Yes
	Seabird assemblage		
Forth Islands SPA	Arctic tern	Yes	Yes
	Common tern	Yes	Yes
	Cormorant*	No	No
	Fulmar*	Yes	Yes
	Gannet	Yes	Yes
	Guillemot*	Yes	Yes
	Herring gull *	Yes	Yes
	Kittiwake*	Yes	Yes
	Lesser black-backed gull	Yes	Yes
	Puffin	Yes	Yes
	Razorbill *	Yes	Yes
	Roseate tern	No	No
	Sandwich tern	No	No
	Shag	No	No
	Seabird assemblage		
St Abb's Head to Fast Castle SPA	Guillemot*	Yes	Yes
	Herring gull*	Yes	Yes
	Kittiwake*	Yes	Yes
	Razorbill*	Yes	Yes
	Shag*	No	No
	Seabird assemblage		

*indicates features that are components of the assemblage feature.

426. The effects considered on the different interest features of the above SPAs in the HRA for the Original Development were as detailed in Tables 8-34 and 8-35 for the worst case

scenarios for the Development Area and Offshore Export Cable Corridor to Near-shore and for the Near-shore to Intertidal area, respectively. The assessment undertaken in this HRA concluded no adverse effect on site integrity in relation to the construction, operation and decommissioning of the Project alone for all seven of the SPAs for which no LSE could not be concluded, and also for the in-combination effects for the three SPAs concerned largely (or solely) with over-wintering populations. For the four SPAs designated for their breeding seabird populations, no overall conclusions were presented in relation to in-combination effects because the information required to apportion the predicted kittiwake collision mortality from the other projects was not available.

427. The subsequent MS Appropriate Assessment considered only the operational effects of collision risk, displacement and barrier effects on the designated features.

Marine Proposed SPAs

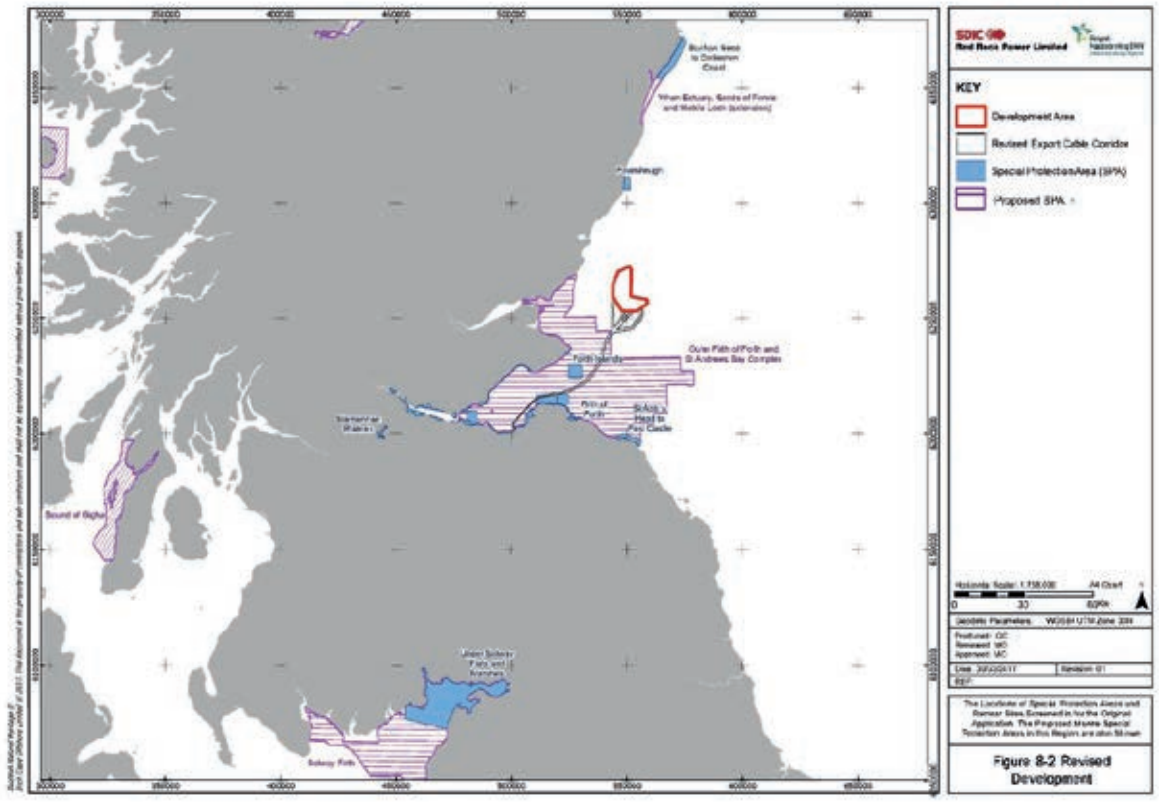
428. The suite of marine pSPAs in Scottish waters has been the subject of recent public consultation, and there is a requirement to consider the potential impacts on these sites. The Revised Development has connectivity with the Outer Firth of Forth and St Andrew's Bay Complex pSPA, which lies to the south and west of the Development Area and includes much of the route for the Revised OfTW (Figure 8-2).

429. The designated features, and named components of designated assemblage features, of this pSPA overlap substantially with those of the Firth of Forth SPA and the Forth Islands SPA, and are considered to have connectivity with the Revised Development (Appendix B). These are as follows:

- Non-breeding populations of: red-throated diver, Slavonian grebe, common eider, long-tailed duck[20], common scoter[20], velvet scoter[20], goldeneye[20], red-breasted merganser[20], guillemot[20], shag[20], kittiwake[20], razorbill[20], little gull, black-headed gull[20], common gull[20], herring gull[20]
- Breeding populations of: common tern, Arctic tern, shag, gannet, puffin[20], kittiwake[20], guillemot[20], herring gull[20].
- Additionally: Manx shearwater (as present during the breeding season)[20] and assemblages of breeding seabirds, non-breeding seabirds and non-breeding waterfowl.

[20] Included as a named component of an assemblage feature.

Figure 8-2: Location of the SPAs and Ramsar Sites Screened into the HRA for the Original Development, and of the pSPAs in this Region



430. The draft conservation objectives for this pSPA are set out in the HRA Screening (Appendix B).

The status and proposed treatment of named components of SPA assemblage features

431. As identified above, several of the SPAs identified as having connectivity to the Revised Development, as well as the pSPA with connectivity, include assemblage features with named component species. In the Original Development HRA (and the MS Appropriate Assessment) these named assemblage features were essentially treated as qualifying features in their own right, despite being only a component of the actual qualifying feature (i.e. the assemblage).

432. ICOL is unclear on the status that should be accorded to these named assemblage features in undertaking the assessment for HRA, and would seek advice on the appropriate way to treat them for the purposes of assessment. ICOL's view is that these species are not qualifying features in their own right and so should not be accorded that status and should not be assessed as if they are qualifying features in their own right.

433. As is apparent from Table 8-40, and the above details of the Outer Firth of Forth and St Andrew's Bay Complex pSPA, this issue is relevant to a large proportion of the breeding seabird SPA populations that have connectivity to the Revised Development.

Assessment methodologies – links to EIA

434. For ornithology, the HRA will, as far as is possible, rely upon the methodologies and modelling approaches adopted in the EIA for the Revised Development (and as set out in the 'Assessment methodologies' section above). The aim is to ensure commonality between the EIA and HRA in relation to key aspects of the approaches that underpin the assessment (e.g. in terms of collision risk modelling, estimation of displacement and barrier effect impacts and the determination of population-level impacts). Therefore, where it is not possible to conclude no LSE, the approaches used in the EIA will be applied to the SPA populations of relevance for the determination of no adverse effect on site integrity.

435. Additionally, apportioning of the estimated effects to SPA populations will be undertaken following the recommended draft guidance from SNH, and as used for the MS Appropriate Assessment.

436. ICOL seeks confirmation that it is considered appropriate to ensure commonality between the HRA and EIA elements of the assessment in the methodologies and modelling approaches that are applied (except, of course, where a particular methodology (e.g. the apportioning of SPA populations) is specific to either HRA or EIA).

The HRA in-combination assessment for the Revised Development

437. For the purposes of the in-combination assessment for the Revised Development, the same sites identified for the CIA will be used as a starting point for determining which SPAs may have connectivity to each site (see Section 8.4.5).

8.4.9 Questions

- Are you satisfied that the EIA should only concentrate on those receptors which may be subject to significant effects from the proposed development?
- Do you agree that the boat-based survey data for the Original Development EIA remain suitable for providing the baseline survey data for the Revised Development EIA?
- Do you agree that the near-shore and intertidal survey data remain suitable for describing the baseline characteristics in the areas around the landfall site, given the check on their validity that has been undertaken using recent WeBS data?
- Can confirmation be provided that the proposed list of developments to be considered for the cumulative EIA includes all of those that would be expected? Are there any apparent omissions from this list?

- Is it expected that the list of sites for the HRA in-combination assessment should be based upon the list for the cumulative EIA, at least in terms of providing the starting point for the in-combination assessment; can you confirm acceptability to this approach?
- What advice is available on possible approaches to accounting for potential impacts outside the breeding season to SPA (and pSPA) breeding populations? Is there a recommended approach to predicting these impacts, and is it envisaged that such approaches can be based on quantitative methods or are they likely to rely upon a qualitative assessment?
- What is the advice regarding the incorporation of non-breeding components (e.g. juveniles and immatures) into the assessment of impacts on SPA breeding populations? Should such assessments consider only the breeding component of the population? If not, can specific recommendations be provided on exactly what is required in this regard?
- For the purposes of the HRA, ICOL would seek advice on the status that should be afforded to species that are listed as named components of SPA (and pSPA) assemblage features, and how these named components should be treated? Specifically, ICOL would wish to have clarification on whether these species should be regarded as having the same status as qualifying features and, if so, why that should be (given that these named components do not meet the criteria for inclusion as qualifying features and that it is the assemblage itself that is the qualifying feature).
- The different options that are available for undertaking the prediction of displacement and barrier effect impacts are outlined in 'Assessment methodologies' in section 8.4.6. What is the preferred approach to undertaking the prediction of these impacts, and is it advised to use the modelling approach of Searle et al (2014), or subsequent developments of that approach, on the species and populations for which it has been developed?
- In relation to predicting the impacts from displacement and barrier effects, what advice is available on the appropriate displacement rates to be applied to breeding populations of the key species (i.e. kittiwake and the auks)? Specifically, for given species, these rates tended to be similar between the Original Development EIA and the MS Appropriate Assessment. However, the Revised Design involves a much reduced WTG density. Therefore, is it expected that the assumed displacement rates for these species should be reduced in line with this (but subject to the findings from recent reviews of displacement / macro-avoidance – e.g. Dierschke et al 2016).
- MSS have recently put out a tender for the development of a stochastic collision risk model. Can confirmation be provided that ICOL would be expected to use only those collision risk models that have been developed and are currently available (as

opposed to models that may become available part-way through the production of the EIA)?

- Assuming they are required, it is proposed that the population models (and resulting PVAs) to be applied to breeding populations of kittiwake, guillemot and razorbill within the EIA (and HRA) should be based upon those developed for the MS Appropriate Assessment (Freeman et al 2014). However, it is not envisaged that the development of such complex population models is realistic for other species or populations (but recognising that similar models have also been produced for herring gulls for the Forth Islands and St Abbs Head to Fastcastle SPAs). Can confirmation be provided that this is considered to be an appropriate approach?
- Can confirmation be provided that the existing matrix-based population models for Forth Islands gannet and puffin populations (as used in the MS Appropriate Assessment – MacArthur Green 2014a, b) would still be considered to be suitable for use in the EIA and HRA for the Revised Development?
- The approach proposed for selecting and using metrics to apply to PVA outputs to aid the interpretation of the population-level impact in the EIA and HRA is also described in 'Assessment methodologies' in section 8.4.6. Can confirmation be provided on the suitability of the proposed approach? If amendments to this approach are envisaged, can they be detailed?
- Can advice be provided on how the assessment of impacts should be undertaken for the seabird qualifying features of the Outer Firth of Forth and St Andrew's Bay Complex pSPA in cases where LSE is determined? In particular, can the reference populations against which such an assessment would be undertaken be specified, given that most (or all) breeding populations will relate closely to the breeding populations of nearby colony SPAs (for which assessment will also be undertaken), whilst the wider non-breeding populations may be difficult to define?

9 Offshore Human Environment

9.1 Seascape, Landscape and Visual Receptors

9.1.1 Introduction

438. As described in Section 5, the purpose of this section is to provide sufficient detail on the potential effects on Seascape, Landscape and Visual Receptors from the construction, operation and maintenance and decommissioning of the Revised Development.

439. The detail provided will allow MS-LOT and their consultees to be clear about what they consider the significant effects of the proposal are likely to be and, therefore, whether they need to be subject to an EIA and be included within the ES.

440. The assessment of the Revised Development will consider effects on seascape, landscape and visual receptors. As was the case in respect of the Original Development, seascape receptors are defined as all regional seascape character units in the SLVIA Study Area from where the proposed Wind Turbine Generators (WTGs) and Offshore Substation Platforms (OSPs) are predicted to be visible.

441. In order to provide sufficient information to consultees reference is made to the baseline data gathered to inform the Original Development EIA, and to the outcomes of the impact assessment presented in the Original Development ES, including reference to the SLVIA Viewpoints used in the Original Development Seascape, Landscape and Visual Impact Assessment (SLVIA). Differences between the Original Development and the Revised Development that are likely to have further impacts on SLVIA are also considered to inform any subsequent impact assessments.

442. For a full description of the design envelope parameters and changes please refer to Section 4. The Development Area for both the Original and Revised remains unchanged and can be seen in Figure 4-1.

443. This section includes a series of figures (Figure 9-1, 9-4 to 9-6) and wirelines (Figure 9-2 to 9-3), the figures are embedded in the document and are also presented with the wirelines at the end of the Scoping Report.

444. This section concludes that due to the increase in turbine height there will be a requirement to assess the physical presence (during operation) of the WTGs, Met Masts and OSPs against the seascape and/or landscape character, landscape designations and visual amenity (this will also be assessed cumulatively with other projects). Assessment will also be required on the impact of installation vessels and related works at the landfall location for the export cable corridor. All other potential impacts will be scoped out of the Revised Development EIA.

9.1.2 Data Sources and Baseline Environment

445. This section identifies baseline data sources that have been used to characterise the seascape, landscape and visual resource in relation to the Revised Development, drawing predominantly from the data sources used to inform the Original Development EIA and identifying where additional data will be obtained where necessary in respect of the Revised Development EIA.

Baseline Data

446. Several seascape, landscape and visual datasets were collated and analysed to inform the SLVIA for the Original Development. Data was drawn from a desktop review of publicly available information supplemented by some Development-specific surveys commissioned by ICOL. Those datasets considered to be relevant to the Revised Development are listed in Table 9-1 below. The data sources are more fully described in the Inch Cape Offshore Wind Farm ES Chapter 16 (ICOL, 2013) and supporting ES Appendices (Appendix 16A Seascape, Landscape and Visual Baseline; and Appendix 16D Regional Seascape Assessment).

Table 9-1: Baseline Datasets from the Original Development EIA

Dataset	Coverage	Data use	Date
ICOL-commissioned site specific surveys			
Seascape and Landscape Baseline	50km radius from outermost turbines of Original Development.	Verification of published seascape and landscape assessments to inform the Regional Seascape Assessment; confirm their relevance for assessment of the Original Development; and to inform boundaries of seascape and landscape character units.	2010 and 2012
External / pre-existing broader scale data and studies			
An Assessment of the Sensitivity and Capacity of the Scottish Seascape in Relation to Offshore Wind Farms (SNH)	Seaward extent of 50km radius study area.	Classification, description and assessment of seascape area.	2005
South and Central Aberdeenshire Landscape Assessment (Environmental Resources Management for SNH)	Landward extent of 50km radius study area within Aberdeenshire.	Classification and description of key characteristics of landscape character units in Aberdeenshire to define baseline.	1998

Dataset	Coverage	Data use	Date
Fife Landscape Assessment (David Tyldesley Associates for SNH)	Landward extent of 50km radius study area within Fife.	Classification and description of key characteristics of landscape character units in Fife to define baseline.	1999
Tayside Landscape Assessment (Land Use Consultants for SNH)	Landward extent of 50km radius study area within Tayside.	Classification and description of key characteristics of landscape character units in Tayside to define baseline.	1999

Data Validity

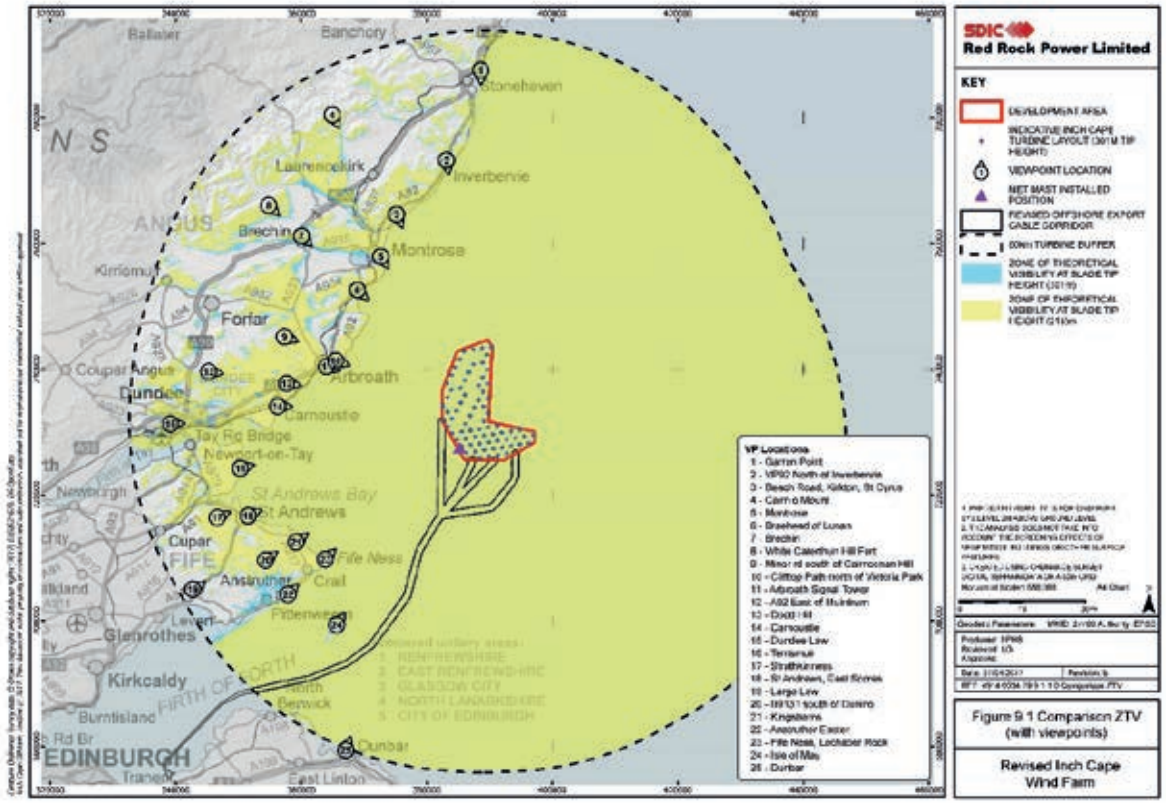
447. The data previously collected as part of the Original Development SLVIA should be considered sufficient to meet the requirements needed to effectively characterise the current baseline conditions for the Revised Development. The following sections consider the sufficiency of the available data in relation to spatial coverage and age. In addition, where any new data has been published since the Original Development EIA was undertaken, which could affect the overall assessment of sensitivity of a receptor or magnitude of an impact, this research has been reviewed and summarised.

Data Coverage

448. As identified in Table 9-1, ICOL commissioned site specific surveys were collected for a 50km radius study area. SNH guidance (SNH, December 2014) in respect of wind farm Zones of Theoretical Influence (ZTVs) advises that for WTGs of over 150m to blade tip height, ZTVs should extend to 45km from the outermost WTGs. It was agreed through consultation in respect of the Original Development that the ZTV for 215m height WTGs should extend to 50 km from the outermost WTG.

449. Given that the WTGs will be taller (up to 301m to blade tip) and therefore potentially more visible within this Study Area, the revised ZTV for the Revised Development will be taken into account in the SLVIA. A comparative ZTV (Figure 9-1) illustrates that the Revised Development marginally increases the areas of predicted visibility at the edges of the ZTV of the Original Development. It should be noted that as the Development Area of both the Revised Development and Original Development is the same, all the new areas of predicted visibility will see a maximum of 86m of the proposed Revised Development's turbines blades (being the difference between the blade tip height of the WTGs in the Original and Revised Development).

Figure 9-1: Comparison ZTV



450. Despite the increase in turbine height, the 50 km Study Area used for the Original Development is still considered valid for SLVIA of the Revised Development. This is due to visual acuity and the curvature of the earth restricting visibility beyond this distance. WTGs at this distance are unlikely to give rise to significant effects, which is the focus of the EIA.

451. Further to this, comparative wirelines (Figure 9-2 and Figure 9-3 found at the end of the Scoping Report) have been produced from Viewpoint 1 (Garron Point, 43.74km) and Viewpoint 25 (Dunbar, 50.33km) which lie at the north and south ends of the study area respectively (see Figure 9-1 for the viewpoint locations). These indicatively illustrate the differences in height between the Original and Revised Developments and it is considered that the change would not introduce significant effects at this distance. Therefore it is considered that the spatial coverage of the Original Development remains valid and sufficient for the Revised Development.

Age of the Data

452. As detailed within Table 9-1, ICOL specific survey data for the Original Development EIA were collected between the years 2010 to 2012 but was also used by comparison to broader scale, contextual data from a variety of sources also listed in Table 9-1. Although SNH intends to

publish updated Landscape Assessments covering Scotland, these are not yet available and the sources identified in Table 9-1 above are therefore valid.

Additional Data Sources

453. Table 9-1 identifies the baseline data sources that were used to characterise the seascape, landscape and visual resource within the SLVIA 50km Study Area, as part of the Original Development EIA. The external and pre-existing data for the area of interest provided important contextual information to that collected as part of the ICOL surveys. As part of this Scoping Report for the Revised Development, a review of local authority published landscape and/or seascape character assessments has been carried out, which has identified the following data sources which will enable an update to be made to the existing understanding of baseline conditions: -

- Strategic Landscape Capacity for Windfarms, Ironside Farrar for Aberdeenshire Council (March 2014).
- Aberdeenshire Local Landscape Designation Review, LUC for Aberdeenshire Council (March 2016);
- Supplementary Guidance No. 9 Special Landscape Areas, Aberdeenshire Council (due to be adopted April 2017 in context of revised Aberdeenshire Local Development Plan)
- Strategic Landscape Capacity Assessment for Wind Energy in Angus, Angus Council (March 2014); and
- Landscape Supplementary Guidance, Perth and Kinross Council (2015).

Review of Baseline Characteristics

454. Chapter 16 of the Original Development ES presents the baseline characteristics for seascape, landscape and visual resources across the Study Area.

455. A review of additional data resources (listed in the previous section) will be undertaken to enable an update to be made to the existing understanding of baseline conditions and the relevant changes will be presented in the SLVIA.

456. The comparative ZTV (Figure 9-1) (based on a preliminary layout of the proposed offshore WTGs using the worst case scenario height, and maximum number, of turbines for the Revised Development) was reviewed in relation to seascape and landscape character areas, as well as landscape designations and key visual receptor groups to check that all relevant baseline data is covered by the identified data sources. Figures 9-4, 9-5, 9-6 illustrate the comparative ZTV with the landscape character areas, landscape designations and visual receptors overlaid.

Figure 9-4: Comparison ZTV and LCA

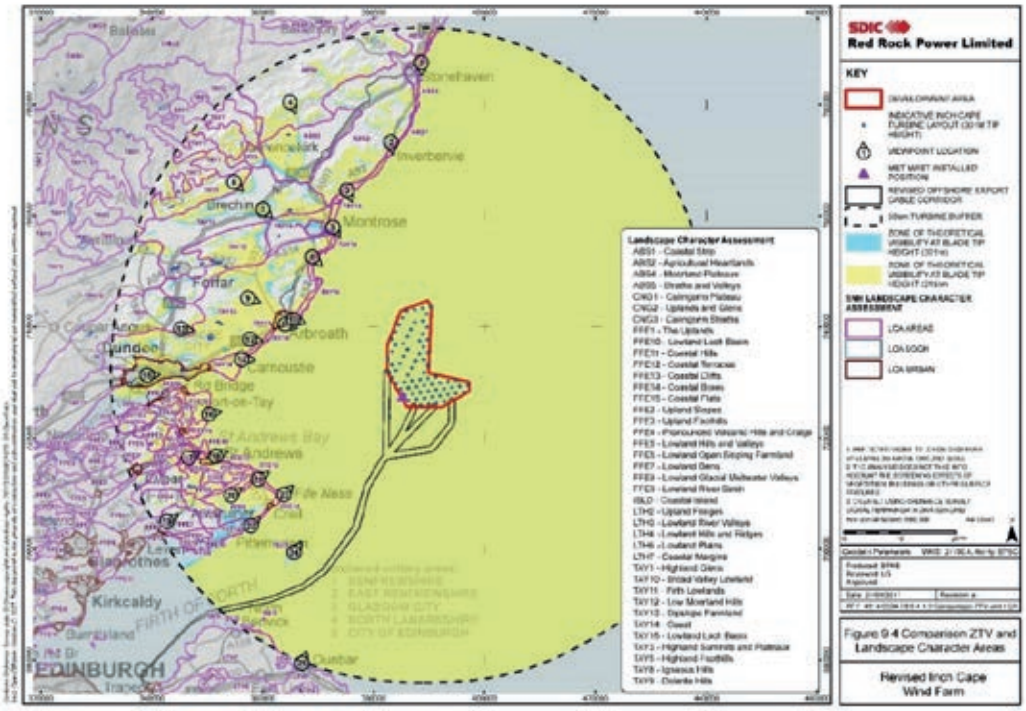
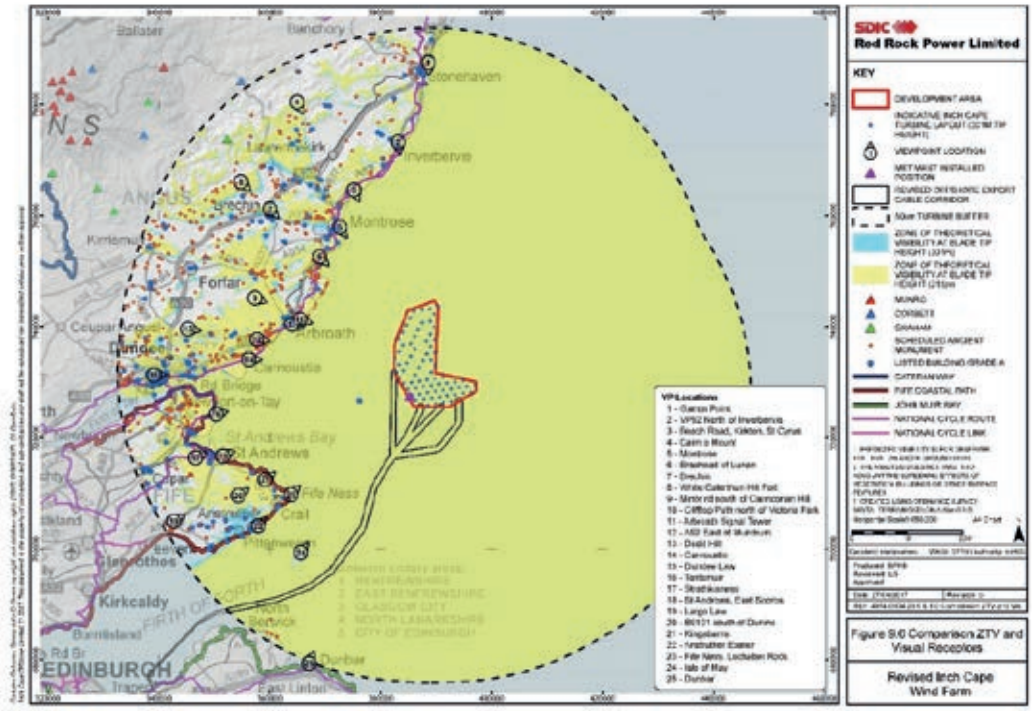


Figure 9-5: Comparison ZTV and Landscape Designations

Figure 9-6: Comparison ZTV and Visual Receptors



457. On review of these comparative ZTVs, there is only one large area of additional theoretical visibility from the Revised Development, which lies in Fife, inland between Elie and Crail, approximately 30-40km from the Revised Development. This new area lies within the LCAs FF6 Lowland Open Sloping Farmland and FF12 Coastal Terraces, as well as part of Fife Council's East Neuk Local Landscape Designation. These were all considered as part of the Original Development and will remain within the scope of the Revised Development's SLVIA. Viewpoints 20 and 22 lie in close proximity to this area and are considered to remain representative of this area. The only other areas of additional theoretical visibility from the WTGs proposed for the Revised Development are limited in extent and occur along the edge of areas predicted to have visibility of the Original Development.

Landscape and Seascape Character

458. The comparative ZTV with landscape character areas (Figure 9-4) illustrates that the extent of the Revised Development's ZTV coverage across the LCAs is only marginally different to the Original Development's ZTV and no additional character areas would need to be considered in the SLVIA. The extent of visibility of the Revised Development across the regional seascape units would be the same as the Original Development and thus there would be no change to the units included in the SLVIA.

Landscape Designations

459. The comparative ZTV with landscape designations (Figure 9-5) illustrates that the extent of the Revised Development's ZTV coverage across the landscape designations is only marginally different to the Original Development's ZTV and no additional designations would need to be considered in the SLVIA.

460. Consistent with the Original Development SLVIA, it is proposed to scope out the Lochnagar–Mount Keen Wild Land Area (WLA) and the Cairngorms National Park (CNP). The WLA lies at closest 49.5km to the north west of the Revised Development and the CNP boundary lies just beyond the 50 km radius study area in the same direction. The comparative ZTV with designations (Figure 9-5) illustrates that there is no change in geographical extent of predicted visibility within the WLA of the Revised Development from the Original Development. Figure 9-7 illustrates a wireline of the Revised Development from the WLA (Hill of Glansie) at 50km. This shows that whilst the Revised Development is visible, the distance and horizontal extent, as well as foreground features would limit any potential for significant effects. A wireline (Figure 9-8) was produced from a location within the closest part of the CNP which demonstrates, as described for the WLA, there is not any potential for significant effects and it is proposed that the CNP is continued to be scoped out of the SLVIA.

Viewpoints

461. The viewpoints assessed in the Original Development EIA were agreed through consultation with all relevant stakeholders, including representatives of the local authorities from the potentially affected landward parts of the Study Area. Drawing on the comparative ZTV (see Figures 9-1, 9-4, 9-5 and 9.6), it is considered that the viewpoints previously agreed to be representative of the key seascape, landscape and visual receptors for the Original Development EIA remain relevant to provide sufficient representation of these receptors for the Revised Development EIA also. Reference should be made to Figures 9.2, 9.3. 9-9 and 9-10 which show a wireline comparison of the Revised Development and Original Development from the furthest and closest landward extents of the study area also. Therefore no additional viewpoints are being proposed for the Revised Development EIA, and assessment will focus on those presented in table 9-7 below.

9.1.3 Design Envelope

462. Table 9-2 and 9-3 set out the worst case scenario defined by the Original Development EIA for the SLVIA (ICOL, 2013) compared to the worst case scenario for the Revised Development at a level of detail sufficient to draw conclusions in relation to the scoping process. This table also identifies the differences between the two design envelopes.

Table 9-2: Worst Case Scenario Definition – Wind Farm

Potential Impact	Original Development Design Envelope (ICOL, 2013)	Revised Development Design Envelope	Difference between the Original and Revised Design Envelopes
Construction (& Decommissioning) Phase			
Construction activities in the development area may affect key characteristics of seascape and/ or landscape character, landscape designations and visual amenity	Maximum number of vessel movements and construction activities within development area.	Maximum number of vessel movements and construction activities within development area.	Overall reduction in construction vessels movements from around 3500 to around 1500.
Operation & Maintenance Phase			
Physical presence of WTGs, Met Masts and OSPs may affect seascape and/or landscape character, landscape designations and visual amenity.	213 WTGs 215 m to blade tip and 129 m to hub height Closest averaged down-wind spacing – 820m Closest average cross-wind spacing – 820m Jacket WTG foundations with sea level dimensions of 30 m x 30 m; Three Met Masts – steel lattice structure Up to five OSPs 100 m x 100 m and up to 70m height Indicative layout is shown in Chart 16.ii	72 WTGs 301 m to blade tip and 176 m to hub height Closest averaged down-wind spacing – 1278 m Closest average cross-wind spacing – 1278 m Jacket WTG foundations with sea level dimensions of 30 m x 30 m; No Met Masts Up to two OSPs 100 m x 100 m and up to 70 m height	Overall there is a 66% reduction in WTGs numbers, 60% OSPs and the revised development requires no further met masts.
Night time lighting of development area may affect seascape and/or landscape character and visual amenity.	Maritime and navigational lighting as described in *Chapters 19 and 20* and *Section 7.14*.	Maritime and navigational lighting as described in *Chapters 19 and 20* and *Section 7.14* of the Original Development ES	No change between Original and Revised Development

Table 9-3: Worst Case Scenario Definition – Export Cable Corridor

Potential Impact	Original Development Design Envelope (ICOL, 2013)	Revised Development Design Envelope	Difference between Envelopes
Construction (& Decommissioning) Phase			
Presence of installation vessels and related works, and trenching of cable at landfall location may affect seascape and/or landscape character, landscape designations and visual amenity.	Longest installation period and trenching across landfall by burial plough, mechanical rock wheel cutter or open trenching (assuming that horizontal directional drilling may be used but would not be visible).	Longest installation period and trenching across landfall by burial plough, mechanical rock wheel cutter or open trenching (assuming that horizontal directional drilling may be used but would not be visible).	No change between Original and Revised Development at landfall
Operation & Maintenance Phase			
Presence of plant during the O & M of the wind farm that may affect seascape and/or landscape character, landscape designations and visual amenity.	All types of O&M activity are likely to be visible from within the SLVIA Study Area, particularly from coastal locations. However, they will be temporary in duration and are unlikely to give rise to any significant effects greater than those associated with the operation of the WTGs or the construction phase of the Export Cable Corridor.	All types of O&M activity are likely to be visible from within the SLVIA Study Area, particularly from coastal locations. However, they will be temporary in duration and are unlikely to give rise to any significant effects greater than those associated with the operation of the WTGs or construction phase of the Export Cable Corridor.	No change between Original and Revised Development

9.1.4 Revised Development Embedded Mitigation Measures

463. Embedded Mitigation for the Revised Development will comprise of mitigation measures to minimise environmental effects which were captured within the Design Envelope for the Original Development, and are as follows:

- WTGs will be placed in a regular grid subject to micro-siting requirements;
- WTGs will all be of similar dimensions to hub height and blade tip subject to WTG and substructure design and installation specification; and
- The WTGs will all be pale grey in colour with a semi-matt finish. This tends to reduce the distance over which the WTGs are visible, especially in dull or overcast conditions,

which often occur. As offshore WTGs are often viewed against the sky, pale grey is the most appropriate colour as it is closest to that of the lower part of the sky under the most frequent UK weather conditions.

9.1.5 Commitment to Consent Conditions

464. As noted in Section 2.2.3, ICOL propose to commit to the same consent conditions (that will further minimise the impacts of the development on the environment) granted for the Original Development for the application of the Revised Development.

465. These consent conditions have taken into account any relevant consultation responses to the Original Development EIA from key stakeholders in relation to SLVIA in determining the acceptability of the Original Development; the most relevant consent conditions in relation to SLVIA are summarised in Table 9-4. Conditions in full are provided in Appendix A.

Table 9-4: Summary of most Relevant Consent Conditions related to SLVIA

Requirement	Description
Production of a Development Specification and Layout Plan	Condition will set out for approval the final design and layout of the Development to ensure it remains consistent with the design assessed in the ES as relevant to SLVIA.
Production of a Design Statement	Condition will inform interested parties of the process and justification that has led to the final development proposals being put forward (including visualisations from key viewpoints).
Production of a Navigation Safety Plan (NSP)	Condition will mitigate the navigational risk to other legitimate users of the sea.
Lighting and Marking Plan	Detailing the agreed lighting and marking of the scheme, for approval, so as to safeguard the safety of air and surface navigation (and confirming the assumptions with regards to lighting used in the SLVIA).

9.1.6 Scoping of the Revised Development EIA

466. The following tables summarise the residual significance for all impacts considered for the Original Development and details whether the potential impact has been scoped out of the Revised Development EIA, with a relevant justification.

Table 9-5: Summary of Potential Effects – Wind Farm and Offshore Substation Platforms

Potential Impact	Residual Effect (ICOL, 2013)	Scoped in or out of the Revised Development EIA	Justification
Construction (& Decommissioning) Phase			
Construction activities in the development area may affect key characteristics of seascape and/ or landscape character, landscape designations and visual amenity	Assessed as less than "worst case scenario" for operation and maintenance phase and therefore not considered in detail.	Scoped out	The Original Development (ICOL 2013) concluded the residual construction effects are not expected to exceed those resulting from the "worst-case scenario" for the operation and maintenance phase. Further to this the residual impact of direct change to seascape as a result of the construction phase of the Revised Development is considered to be less than the effect of the Original Development due to 66% reduction in WTGs numbers, 60% OSPs, the revised development requires no further met masts as well as reduced construction period. Therefore further assessment should be scoped out of the SLVIA for the Revised Development.
Operation & Maintenance Phase			
Physical presence of WTGs and OSPs may affect seascape and/or landscape character, landscape designations and visual amenity.	Major to None	Scoped in	Due to the design changes; increase in overall turbine height, and reduction in total WTGs across the development area the impacts from the physical presence will be re-assessed in the Revised Development EIA. The assessment area, and viewpoints assessed in the Original Development EIA will be reassessed in the Revised

Potential Impact	Residual Effect (ICOL, 2013)	Scoped in or out of the Revised Development EIA	Justification
			Development EIA, with no addition proposed.
Night time lighting of development area may affect seascape and/or landscape character, landscape designations and visual amenity.	Not assessed	Scoped in	Lighting requirements will be part of the assessment.

Table 9-6: Summary of Potential Effects – Offshore Export Cable Corridor

Potential Impact	Residual Effect (ICOL, 2013)	Scoped in or out of the Revised Development EIA	Justification
Construction (& Decommissioning) Phase			
Presence of installation vessels and related works, and trenching of cable at landfall location may affect seascape character area, designated landscape and visual amenity.	Temporary significant effects	Scoped in	As there is no change between Original and Revised Development at landfall (other than the removal of land fall at Seton Sands) the impacts will be assessed in the Revised Development EIA.

Potential Impact	Residual Effect (ICOL, 2013)	Scoped in or out of the Revised Development EIA	Justification
Operation & Maintenance Phase			
Routine maintenance activities may affect seascape character area, designated landscape and visual amenity.	Temporary in duration and are unlikely to give rise to any significant effects greater than those associated with the operation of the WTG and construction phase of the Export Cable Corridor and landfall.	Scoped Out	The impacts from the Original Development were assessed as unlikely to give rise to any significant effects greater than those associated with the operation of the WTGs and construction of the export cable corridor and landfall, as a result of the design changes described above, this would be the same for the Revised Development and therefore scoped out.

Scoping of the Cumulative Impact Assessment

467. The Original Development CIA identified those existing, consented and application stage wind farm developments with which the Original Development had the potential to give rise to cumulative effects; the list of developments considered was agreed with SNH, Marine Scotland and the relevant local authorities.

468. Given the changes to the Design Envelope for the Revised Development it is recognised that an updated CIA will be required.

469. The following list confirms the other wind farms (selected from the list in Section 5) that will be considered in the scoping of the CIA for the SLVIA. ICOL would welcome comments and identification of any relevant projects known to the stakeholders which should be included or can be excluded in this list.

470. The projects proposed to be considered in the Revised Development CIA are as follows:

Offshore wind farms

- Neart na Gaoithe;
- Seagreen Alpha and Bravo; and
- Firth of Forth Phases 2 and 4.

471. For onshore wind farms Table 9-7 identifies those projects for consideration.

Table 9-7: Onshore Wind Farms for consideration in SLVIA CIA

Wind Farm Name	Status	Wind Farm Name	Status
Ark Hill	Operational	Lingo Farm	Application
Bonerbo	Operational	Meikle Carewe	Operational
Brownieleys	Consented	Michelin Tyre Co Ltd	Operational
Clochnahill	Operational	Mid Hill I	Operational
Droop Hill	Operational	Mid Hill II	Operational
Dundee Port	Scoping	Muir of Pert	Scoping
Dusty Drum	Application	Nether Kelly	Scoping
East Memus	Operational	Paul Mathew Hill	Consented
East Skichen	Application	Scotston Hill	Operational
Easter Tulloch	Operational	South Cassingray	Application
Fasque and Glendye	Scoping	St John's Hill	Operational
Finavon Hill Estate	Consented	St Mary's Well	Scoping
Frawney	Application	Tealing	Operational
Govals	Consented	Troywood	Application
Greenhillock Farm	Operational	Tullo	Operational
Henderston Farm	Consented	Tullo North Extension	Operational
Herscha Extension	Consented	Tullo South Extension	Operational
Herscha Hill	Application	Whitefield of Dun	Consented
Hill of Auquhirie	Operational	White Top	Operational
Kenly	Consented		

* Data collected from DECC Restats, SNH and SLR wind farm data bases.

472. The following table presents the Original Development Residual Effect Significance from the cumulative impacts considered and details whether the potential cumulative impact has been scoped out of the Revised Development EIA, with a relevant justification.

Table 9-8: Summary of Potential Effects – Revised Development with Other Plans, Projects and Activities

Potential Impact	Residual Effect (ICOL, 2013)	Scoped in or out of the Revised Development CIA	Justification
Construction (& Decommissioning) Phase			
Direct temporary effects to sea surface within Development Area	Assessed as less than "worst case scenario" for operation and maintenance phase and therefore not considered in detail.	Scoped out	The residual impact of direct change to seascape as a result of the construction phase of the Revised Development is considered to be less than the effect of the Original Development due to the reduced number of turbines and OSPs as well as reduced construction period. Additionally, as was assessed in the SLVIA for the Original Development (ICOL 2013), the residual cumulative construction effects are not expected to exceed those resulting from the "worst-case scenario" for the operation and maintenance phase, and therefore further assessment should be scoped out of the SLVIA for the Revised Development.
Indirect temporary effects to seascape and landscape character, landscape designations and effects on visual receptors	Assessed as less than "worst case scenario" for operation and maintenance phase and therefore not considered in detail.	Scoped out	As was assessed in the SLVIA for the Original Development (ICOL 2013), the residual cumulative construction effects are not expected to exceed those resulting from the "worst-case scenario" for the operation and maintenance phase, and therefore further assessment should be scoped out of the SLVIA for the Revised Development.
Operation & Maintenance Phase			
Direct effects on seascape character of Development Area	Major to None	Scoped in	The additional effect of the Revised Development with the list of agreed cumulative sites taking account of the smaller number of taller WTGs will be assessed in the CIA for the Revised Development.
Indirect effects on seascape and landscape character, landscape	Major to None	Scoped in	The additional effect of the Revised Development with the list of agreed cumulative sites taking account of the smaller number of

Potential Impact	Residual Effect (ICOL, 2013)	Scoped in or out of the Revised Development CIA	Justification
designations and effects on visual receptors			taller WTGs will be assessed in the CIA for the Revised Development.

9.1.7 Approach to EIA

473. Based on the SLVIA for the Original Development EIA and considering the Design Envelope for the Revised Development by comparison to the Original Development, it is concluded that despite the decrease in the total number of WTGs, the potential increase in height to 301m to blade tip, means that the appearance of the Revised Development for seascape, landscape and visual receptors will be different from that assessed in the Original Development EIA. Therefore, it is proposed that a revised SLVIA should be included within the Revised Development ES for those elements not identified as being scoped out in Tables 9-5 and 9-6.

Methodology for the SLVIA

474. The general approach to EIA for the Revised Development is outlined in Section 5. This section highlights where the SLVIA methodology differs from, or adds more detail to, the general methodological approach.

475. The SLVIA will take account of guidance provided in:

- Guidance to Best Practice in Seascape Assessment (Countryside Council for Wales, Brady Shipman Martin, University College Dublin, Maritime Ireland / Wales INTERREG, 2001);
- Landscape Character Assessment (The Countryside Agency and SNH 2002);
- An Assessment of the Sensitivity and Capacity of the Scottish Seascape in Relation to Offshore Wind Farms (SNH 2005);
- Guidance on the Assessment of the Impact of Offshore Wind Farms: Seascape and Visual Impact Report (Enviros/DTI, 2005);
- Guidance on Landscape/Seascape Capacity for Aquaculture (SNH 2008);
- Assessing the cumulative impact of onshore wind energy developments (SNH 2012);
- Offshore Renewables – guidance on assessing the impact on coastal landscape and seascape (SNH 2012);

- Guidelines for Landscape and Visual Impact Assessment (Landscape Institute and Institute of Environmental Management and Assessment, 3rd Edition 2013);
- Siting and Designing windfarms in the Landscape Version 3 (SNH February 2017); and
- Visual Representation of windfarms – Good Practice Guidance (SNH Version 2.2, February 2017)

476. Landscape receptors are defined as all landscape character areas in the SLVIA Study Area from where the WTGs and OSPs are predicted to be visible. Designated landscapes within the SLVIA Study Area from where the WTGs and OSPs may be seen will be included as landscape receptors. Visual amenity receptors are defined as individuals or groups of people within the SLVIA Study Area who are predicted to have views of the WTGs and OSPs. The main groups of visual receptors which will be considered are:

- residents;
- walkers and hill climbers;
- tourists, visitors and users of recreational facilities;
- road and rails users; and
- marine based receptors including people taking part in water-based recreational activities and people on commercial and cruise ships.

477. The SLVIA Study Area will cover a 50 km radius area from the outermost proposed WTGs as shown on the comparative ZTV Figure 9-1. The cumulative SLVIA will use the same 50 km radius areas from outermost WTG. The objective of the Cumulative Assessment will be to assess predicted cumulative effects which will occur within the Study Area arising from the Revised Development along with other existing/under construction/consented wind farms together with wind farms for which applications have been submitted, or are under appeal (or within six months of a refusal decision), including both onshore and offshore developments of similar characteristics to the Revised Development.

478. The Regional Seascape Assessment developed for the SLVIA of the Original Development will be used to inform the baseline. This was prepared as part of the collaborative approach to impact assessment by the Forth and Tay Offshore Wind Farm Developers Group (FTOWDG) and was agreed with FTOWDG, SNH and Marine Scotland as well as the local authorities for areas within the Study Areas of the three offshore wind farms (Inch Cape, Neart na Gaoithe and Seagreen Alpha Bravo).

479. As described in above, seascape, landscape and visual receptors will be included in the SLVIA. Drawing on a comparison of the original Development ZTV and Revised Development ZTV (see Figure 9-1) and comparative wirelines (Figures 9-2, 9-3, 9-9, and 9-10), it is considered that the viewpoints representative of the key seascape, landscape and visual receptors for the Original Development EIA remain relevant to provide reasonable representation of

seascape, landscape and visual receptors for the Revised Development EIA and therefore the same list of viewpoints be assessed, as identified in Table 9-9 below, and as shown on Figure 9-1.

Table 9-9: Representative Viewpoints to be Included in the Assessment

Viewpoint Number	Viewpoint Location	Reason for Inclusion
1	Garron Point	Extensive view from scenic golf course out to North Sea and south along coast past Stonehaven to Dunnottar Castle and beyond.
2	A92 North of Inverbervie	Cumulative view of the proposed Inch Cape WTGs and OSPs with cluster of existing and proposed wind farms located on Hill of Garvock.
3	Beach Road, Kirkton, St Cyrus	Extensive view over Montrose Bay from well-used car park adjacent to coastal footpath.
4	Cairn o' Mount	Recognised scenic viewpoint on B974 between the Howe of the Mearns and Deeside with expansive view over surrounding areas.
5	Montrose	Popular tourist and recreational destination on the beach front; views encompassing Montrose Bay and Scurdie Ness Lighthouse.
6	Braehead of Lunan	Extensive views across Lunan Bay to Red Head; located on NCN Route 1.
7	Brechin	Representative views of the proposed Inch Cape WTGs and OSPs which might be obtained from the outskirts of the settlement.
8	White Caterthun Hill	Important cultural heritage site in upland foothills popular with walkers having extensive views over surrounding landscape.
9	Minor Road south of Cairnconon Hill	Representative of inland views from agricultural landscape from which the sea is visible.
10	Clifftop Path North of Victoria Park, Arbroath	Popular clifftop path included to show more coastal context in a view of the proposed Inch Cape WTGs and OSPs from Arbroath.
11	Arbroath Signal Tower	Listed building with historic connection to the Bell Rock, now a museum. Public access to roof top platform not currently possible.
12	A92 East of Muirdrum	Representative of inland views from agricultural landscape from where the sea is visible and located on NCN Route 1.
13	Dodd Hill	Popular with hill-walkers having extensive view over surrounding landscape.
14	Carnoustie	Popular destination for tourists, day trippers and local residents, adjacent to golf course and beach.
15	Dundee Law	Recognised scenic viewpoint in centre of Dundee with extensive views over the surrounding landscape.

Viewpoint Number	Viewpoint Location	Reason for Inclusion
16	Tentsmuir	Well-visited beach adjacent to Tentsmuir Forest, located close to NCN Route 1.
17	Strakthkinness	Representative of inland views from agricultural landscape from where the sea is visible and on NCN Route 1.
18	East Scores, St Andrews	Representative of views from seafront of St Andrews. Popular with tourists and local residents and located on Fife Coastal Path.
19	Largo Law	Popular with hill-walkers having extensive view over surrounding landscape.
20	B9131 South of Dunino	Representative of inland views from agricultural landscape from where the sea is visible.
21	Kingsbarns	Representative of inland views from agricultural landscape from where the sea is visible.
22	Anstruther Easter	Representative of views from the coastal villages of the East Neuk of Fife and on Fife Coastal Path. Popular with tourists and day trippers.
23	Fife Ness, Lochaber Rock	Easternmost point in Fife. Located on Fife Coastal Path and popular with tourists and other visitors. Small settlement nearby.
24	Isle of May	A National Nature Reserve and tourist destination popular with day trippers, which provides a proxy for seaborne views.
25	Dunbar	Representative viewpoint on East Lothian coastline located on the John Muir Way. Visited by residents and recreational users.

480. The viewpoint photography used for the SLVIA of the Original Development will be assessed to ensure that it is still relevant for the SLVIA of the Revised Development. Thus, if there have been any changes to the baseline conditions that are evident in the views shown on the original viewpoint photography, new photography will be taken to show the current baseline conditions.

481. Analysis will be carried out of the potential impacts on seascape or landscape character and visual amenity at each of the viewpoints, arising from the Revised Development, considering both on its own and/or with other relevant cumulative projects. The analysis will involve production of computer generated wirelines, and in some instances, photomontages, to predict the views of the Revised Development from each of the agreed viewpoints. The existing and predicted views from each for these viewpoints will be analysed to identify the magnitude of change and the residual effect on seascape and landscape character and visual amenity based on field work as well as desk based assessment.

482. Finally, an assessment of the significance of the residual effects will be carried out to determine the predicted impact of the Revised Development in the Study Area in relation to seascape and landscape character as well as visual amenity. The significance of a seascape, landscape or visual effects is a function of the sensitivity of the affected seascape, landscape or visual receptor, and the magnitude of change that will occur as a result of the Revised Development.

Receptor Sensitivity

483. The sensitivity of the seascape and landscape will be defined as high, moderate or low based on combining value and susceptibility of the resource to the change envisaged from the Revised Development.

484. Firstly, the value of the seascape or landscape resource will be assessed taking account of whether or not any designation applies, and if not, based on consideration of quality or condition; scenic quality; rarity; representativeness; conservation interests; recreational value; perceptual aspects such as wildness or tranquility; and cultural associations.

485. The susceptibility of seascape to change will be judged according to a series of criteria originally identified in "An assessment of the sensitivity and capacity of the Scottish seascape in relation to offshore wind farms (SNH, 2005) and, as subsequently modified for the SLVIA of the Original Development to include aspects of seascape covered in "Guidance on Landscape/Seascape Capacity for Aquaculture" (SNH, 2008). Susceptibility will be defined as high, moderate or low based on professional interpretation of a combination of parameters including:

- Scale and openness of the seascape;
- Form, whether complex and intricate or simple;
- Degree of settlement;
- Pattern and number/character of focal points;
- Lighting, whether dark or well-lit;
- Degree and perception of movement in the seascape;
- Aspect, for example whether coastal views are aligned towards the open sea or inner firths;
- Experiential qualities of the seascape such as seclusion, busyness, strong maritime connections, etc.;
- Degree of exposure;
- Process and dynamics;
- Quality and condition; and

- What development or other pressures are present.

486. Overall sensitivity of the seascape and landscape resource will be assessed as high, moderate or low in accordance with Table 9-10 below:

Table 9-10: Seascape or Landscape Sensitivity

Sensitivity of Receptor	Seascape or Landscape Resource
High	A seascape or landscape of particularly distinctive character, which may be nationally designated for its scenic quality or where its key characteristics have limited resilience to accommodate change without being fundamentally altered.
Moderate	A seascape or landscape of notable character or where its key characteristics have some/medium resilience to accommodate change.
Low	A seascape or landscape which is of low/poor scenic quality or where its key characteristics are such that they are resilient to change.

Viewpoint Sensitivity

487. Viewpoint sensitivity will be defined as high, moderate or low based on combining value and susceptibility of the view or visual amenity to the change envisaged from the Revised Development.

488. The value of views will be assessed as high, moderate or low. The value attached to publicly accessible views is judged as high, moderate or low according to a range of criteria as set out in Table 9-11 below.

Table 9-11: Value Attached to Publicly Accessible Views

Value	Criteria
High	Views from nationally (or internationally) known viewpoints, which: • have some form of planning designation; • are associated with internationally or nationally designated landscapes or important heritage assets; • are promoted in sources such as maps and tourist literature; • are linked with important and popular visitor attractions where the view forms a recognised part of the visitor experience; or • have important cultural associations. Also may include views judged by the assessors to be of particularly high value.

Value	Criteria
Moderate	Views from viewpoints of some importance at regional or local levels, which: • have some form of local planning designation associated with locally designated landscapes or areas of equivalent landscape quality; • are promoted in local sources; • is linked with locally important and popular visitor attractions where the view forms a recognised part of the visitor experience; or • have important local cultural associations. Also may include views judged by the assessors to be of value at the local authority level.
Low	Views from viewpoints which, although they may have value to local people: • have no formal planning status; • are not associated with designated or otherwise high quality landscapes; • are not linked with popular visitor attractions; or • have no known cultural associations. Also may include views judged by the assessors to be of particular value to local communities.

489. All views from residential properties will be considered to be of high value, as the views that people obtain from their homes are generally highly valued.

490. The susceptibility of views to change arising from the Revised Development will be considered in relation to the following parameters:

- location and context of the viewpoint;
- land use or main activity at the viewpoint;
- frequency and duration of use; and
- seascape or landscape character and quality of the intervening seascape or landscape.

491. Overall visual sensitivity will be assessed as high, moderate or low as defined in Table 9-12 below.

Value	Criteria
Moderate	Views from viewpoints of some importance at regional or local levels, which: • have some form of local planning designation associated with locally designated landscapes or areas of equivalent landscape quality; • are promoted in local sources; • is linked with locally important and popular visitor attractions where the view forms a recognised part of the visitor experience; or • have important local cultural associations. Also may include views judged by the assessors to be of value at the local authority level.
Low	Views from viewpoints which, although they may have value to local people: • have no formal planning status; • are not associated with designated or otherwise high quality landscapes; • are not linked with popular visitor attractions; or • have no known cultural associations. Also may include views judged by the assessors to be of particular value to local communities.

489. All views from residential properties will be considered to be of high value, as the views that people obtain from their homes are generally highly valued.

490. The susceptibility of views to change arising from the Revised Development will be considered in relation to the following parameters:

- location and context of the viewpoint;
- land use or main activity at the viewpoint;
- frequency and duration of use; and
- seascape or landscape character and quality of the intervening seascape or landscape.

491. Overall visual sensitivity will be assessed as high, moderate or low as defined in Table 9-12 below.

Table 9-12: Visual Sensitivity in Relation to Main Activity at Viewpoint

Sensitivity of Receptor	Visual Resource of Amenity
High	Locations frequented by viewers with proprietary interest and prolonged viewing opportunities such as at residential properties or at popular recreational destinations, including views obtained by recreational cyclists on recognised national cycle routes.
Moderate	Locations frequented by viewers with a moderate interest in their environment; people travelling through the landscape in a motorised vehicle or at recreational facilities where the main focus of activity is not on the surroundings.
Low	Locations frequented by viewers with a passing interest in their surroundings and whose interest is not specifically focused on the scenery, e.g. at working premises.

Magnitude of Change

492. The magnitude change arising from the Revised Development for any particular receptor is described as high, moderate, low or negligible, based on professional interpretation of a combination of parameters, including size and scale of the predicted change; geographic extent; as well as its duration and reversibility. The size and scale of the change arising from the Revised Development will be considered in relation to the distance of the receptor from the Revised Development; the extent of the Revised Development in the view (e.g. the horizontal angle subtended by the main elements of the Revised Development); the angle of view in relation to main receptor activity; and the degree of contrast of the Revised Development compared to its surrounding context. The geographical extent of the change will be considered for each group of receptors; for example, people using a particular route or public amenity, drawing on the viewpoint assessments, plus information about the distribution of that particular group of people in the Study Area. Duration will be considered as long term where effects will occur for 25 years or longer; medium term where effects will occur for between 2 years and 25 years and relatively short term or temporary where effects will occur over a 2 year period.

493. Magnitude of change will be assessed as high, moderate, low or negligible, as defined in Table 9-13 below.

9.1.8 Scoping Questions - SLVIA

- Can you confirm that the 50km radius study area is appropriate for the purposes of the SLVIA?
- Are you happy with the proposed methodology and approach to conducting the SLVIA?
- Can you confirm that you consider the use of the same viewpoints and viewpoint photography previously agreed for the Original Development appropriate? and
- Are you satisfied with the proposed approach to the cumulative SLVIA? Are there any changes to those projects listed that you consider should be included in the cumulative SLVIA?

9.2 Archaeology and Cultural Heritage

9.2.1 Introduction

496. As described in Section 5, the purpose of this section is to provide sufficient detail on the potential effects on archaeology and cultural heritage receptors (below Mean High Water Springs (MHWS)) from the construction, operation and maintenance and decommissioning of the Revised Development.

497. The detail provided will allow MS-LOT and their consultees to be clear about what they consider the significant effects of the proposal are likely to be and, therefore, whether they need to be subject to an EIA and be included within the ES.

498. In order to provide sufficient information to consultees reference is made to the baseline data gathered to inform the Original Development EIA, and to the outcomes of the impact assessment presented in the Original Development ES, the outcomes of the impact assessment presented in the Original Development ES and subsequent pre-construction technical reports (Wessex Archaeology (WA) 2015a; 2015b; 2016a; 2016b). Differences between the Original Development and the Revised Development are also documented in order to inform any subsequent impact assessments.

499. For a full description of the design envelope parameters and changes please refer to Section 4. The Development Area for both the Original and Revised remains unchanged and can be seen in Figure 4-1.

500. This section concludes that for all but damage to or removal of heritage features resulting from direct physical impacts during the construction phase of the wind farm and Revised OfTW, and setting changes during the operation phase of the wind farm, the likely impacts from the Revised Development will be less than those assessed for the Original Development and therefore, in line with the EIA regulations are not required to be included with the Revised Development ES. This is due to the following;

- Changes in the Revised Design Envelope (see Section 4);
- Baseline data remaining valid;
- No material changes to data collection;
- No material changes to assessment best practise; and
- Not significant effects concluded within the Original Development EIA.

9.2.2 Data Sources and Baseline Environment

501. This section identifies baseline data sources that can be used to characterise the cultural heritage resource within and around the Revised Development, drawing predominantly from the data sources used to inform the Original Development EIA but updated where

possible with more recent data. Commentary is provided on the sufficiency of this data as a basis for scoping the Revised Development EIA.

Baseline Data

502. A variety of cultural heritage and archaeological datasets were collated and analysed to inform the Original Development EIA primarily from a desktop review of publicly available information. To enhance the documentary baseline datasets Development-specific surveys and studies were commissioned by ICOL, and those datasets considered to be relevant to the Revised Development for archaeological purposes, are listed in Table 9-15 below. The data sources are more fully described in the Inch Cape Offshore Wind Farm ES Chapter 17 (ICOL, 2013) and supporting technical studies.

Table 9-15: Archaeologically Assessed Baseline Datasets from the Original Development EIA

Dataset	Coverage	Data use	Date
ICOL-commissioned site specific surveys and studies			
Sidescan sonar (SSS) survey	Development Area (with 1km buffer) and Original Export Cable Corridor Area (with 1km buffer)	Identification and accurate location of potential seabed archaeological and cultural heritage receptors	2010
Magnetometer survey	Development Area (with 1km buffer) and Original Export Cable Corridor Area (with 1km buffer)	Identification and accurate location of potential metal seabed and sub-seabed archaeological and cultural heritage receptors	2010
Sub-bottom profiler survey	Development Area (with 1km buffer) and Original Export Cable Corridor Area (with 1km buffer)	Identification and accurate location of potential sub-seabed archaeological and cultural heritage receptors, particularly submerged prehistory	2010
Multibeam bathymetry	Development Area (with 1km buffer) and Original Export Cable Corridor Area (with 1km buffer)	Identification and accurate location of potential seabed archaeological and cultural heritage receptors	2010
Geotechnical sampling (stage 1 and 2 geoarchaeological assessment)	Original Development Area (with 1km buffer)	Identification and accurate location of potential sub-seabed archaeological and cultural heritage receptors, particularly submerged prehistory	2011, 2012,

Dataset	Coverage	Data use	Date
External / pre-existing broader scale data and studies			
UK Hydrographic Office (UKHO) records of charted wrecks and obstructions	Archaeological Study Area (ASA) Original Development Area and Original Export Cable Corridor Areas with a 1km buffer around both)	Identification and location of known wrecks from records held by the UKHO	2012
The Royal Commission on the Ancient and Historical Monuments of Scotland (RCAHMS) records of known cultural heritage receptors	ASA Development Area and Original Export Cable Corridor Areas with a 1km buffer around both)	Identification and location of known cultural heritage receptors held by Historic Environment Scotland (HES)	2012
Angus Historic Environment Record (AHER), records for known archaeology and cultural heritage receptors identified by SVLA report	Viewshed from Original Development Area with original maximum blade tip height	Identification of archaeology and cultural heritage receptors likely to have their setting changed due to windfarm construction/operation	2012
East Lothian Historic Environment Record (ELHER) records of known archaeology and cultural heritage receptors	Inter-tidal section of the ASA	Identification and location of known cultural heritage receptors in the inter-tidal zone held by East Lothian Council Archaeology Service (ELCAS)	2012
Other published literature, Admiralty charts and other secondary sources	N/A	Variety of marine charts and peer reviewed papers on relevant topics	Various – referenced in full in the 2013 ES

Data Validity

503. The following sections consider the sufficiency and validity of the available data in relation to spatial coverage and age. Where additional data of relevance is available, this has been reviewed and presented in the Additional Data Section. In addition, where any new research has been published since the Original Development EIA was undertaken, which could affect

the overall assessment of sensitivity of a receptor or magnitude of an impact, this research has been reviewed and summarised.

504. The data collected as part of the survey campaign in 2014 following the Original Development EIA have validated the findings in the earlier datasets, therefore it is considered that data remains valid and sufficient for the Revised Development. These should be considered sufficient to meet the requirements needed to effectively characterise the current baseline conditions within the Revised Development. The following sections consider the sufficiency of the later data in relation to spatial coverage and age.

Data Coverage

505. The ASA covered the entire Development Area for the Original Development EIA, therefore as this remains the same for the Revised Development (apart from the removal of the potential landfall at Seton Sand associated with the export cable), it is considered that the spatial coverage of the original data remains valid for the Revised Development.

Age of the Data

506. As described above and detailed within Table 9-15, site specific survey data for the Original Development EIA was collected between the years 2010 to 2012 but was also used by comparison to broader scale, contextual data from a variety of sources also listed in Table 9-15. The specific survey data has also been validated with further geophysical survey work in 2014 (see Table 9-16 below for further detail).

507. Updated data requests from the UKHO and HES have been reviewed as part of this updated scoping to ensure up to date results for the previously known archaeological and cultural heritage receptors within the ASA, as outlined in Additional Data Sources below.

508. Therefore, it is concluded that, following a check of the updated data requests, the archaeological baseline data requires updating with the details of the changes and edits made since the 2012 requests to provide a basis for the assessment of potential impacts on archaeology and cultural heritage in respect of the scoping process.

Additional Data Sources

509. A further set of geophysical datasets for SSS, Multibeam bathymetry and magnetometer were collected in 2014 by Horizon Geosciences Limited (Horizon Geosciences Limited 2014) which has been used to validate those taken prior to submission of the Original Development EIA. Details of these and other data analysis carried out since the submission of the Original Development EIA are included in Table 9-16.

Table 9-16: Archaeologically Assessed Baseline Datasets post-dating the Original Development EIA

Dataset	Coverage	Data use	Date
ICOL-commissioned site specific surveys and studies			
SSS survey	Development Area (with 1km buffer) and Original Export Cable Corridor Area (with 1km buffer)	Identification and accurate location of potential seabed archaeological and cultural heritage receptors	2014
Magnetometer survey	Development Area (with 1km buffer) and Original Export Cable Corridor Area (with 1km buffer)	Identification and accurate location of potential metal seabed and sub-seabed archaeological and cultural heritage receptors	2014
Multibeam bathymetry	Development Area (with 1km buffer) and Original Export Cable Corridor Area (with 1km buffer)	Identification and accurate location of potential seabed archaeological and cultural heritage receptors	2014
Geotechnical sampling (stage 1 and 2 geoarchaeological assessment)	Development Area (with 1km buffer)	Identification and accurate location of potential sub-seabed archaeological and cultural heritage receptors, particularly submerged prehistory	2014
Geotechnical sampling (stage 3 geoarchaeological assessment)	Development Area (with 1km buffer)	Investigation of potential submerged prehistoric sediments recovered during stages 1 and 2.	2015
External / pre-existing broader scale data and studies			
UKHO records of charted wrecks and obstructions	ASA Development Area and Original Export Cable Corridor Areas with a 1km buffer around both)	Identification and location of known wrecks from records held by the UKHO	2016/17
HES records of known cultural heritage receptors	ASA Development Area and Original Export Cable Corridor Areas with a 1km buffer around both)	Identification and location of known cultural heritage receptors held by HES	2016

Dataset	Coverage	Data use	Date
AHER records for known archaeology and cultural heritage receptors identified by SVLA report	Viewshed from Original Development Area with original maximum blade tip height	Identification of archaeology and cultural heritage receptors likely to have their setting changed due to windfarm construction/operation	2012
AHER records for known archaeology and cultural heritage receptors identified by SVLA report	Viewshed from Revised Development Area with maximum blade tip height	Identification of archaeology and cultural heritage receptors likely to have their setting changed due to windfarm construction/operation	2017
ELHER records of known archaeology and cultural heritage receptors	Inter-tidal section of the ASA	Identification and location of known cultural heritage receptors in the inter-tidal zone held by ELCAS	2016

510. As identified in Table 9-16, ICOL-commissioned site specific marine geophysics surveys within and surrounding the wind farm array and export cable corridor, following the submission of the Original Development EIA.

511. The archaeological interpretation of geophysical data aimed to identify, assess and report on the position, character and nature of known archaeological sites and unknown geophysical anomalies of archaeological potential within the ASA, which encompasses the Revised Development area (Horizon Geosciences Limited 2014).

512. The geophysical survey data comprised SSS, magnetometer and multibeam bathymetry datasets. Each of these were assessed for their quality and rated using the criteria outlined in Table 9-17.

Table 9-17: Data Quality Criteria

Data Quality	Description
Good	Data which are clear and unaffected by weather conditions or sea state. The dataset is suitable for the interpretation of standing and partially buried metal wrecks and their character and associated debris field. These data also provide the highest chance of identifying wooden wrecks and debris.
Average	Data which are affected by weather conditions and sea state to a slight or moderate degree. The dataset is suitable for the identification and partial interpretation of standing and partially buried metal wrecks, and the larger elements of their debris fields. Wooden wrecks may be visible in the data, but their identification as such is likely to be difficult.
Variable	This category contains datasets with the quality of individual lines ranging from good to average to below average. The dataset is suitable for the identification of standing and some partially buried metal wrecks. Detailed interpretation of the wrecks and debris field is likely to be problematic. Wooden wrecks are unlikely to be identified.

513. The SSS data have been rated as 'Good' using the above criteria table. The data quality and positioning was found to be of a generally high standard for archaeological assessment.

514. The magnetometer data were rated as 'Good' from an archaeological perspective using the above criteria. The data were not overly affected by noise and the geology has had little effect on the data.

515. The multibeam bathymetry data have been rated as 'Variable' using the above criteria. The data quality and resolution of 1 m was found to be of a fair standard and suitable for the archaeological assessment of seabed objects and debris, although of a lower resolution than the 2010 survey.

516. WA processed and assessed 100 percent of the 2014 SSS, magnetometer and multibeam bathymetry data.

517. The total coverage of the ASA was approximately 480 line km. The survey line plan comprised two main lines run in a primary direction (NNE-SSW) at 10 m line spacing with opposite survey headings and a cross line through the proposed borehole locations. These lines were deliberately spaced to target the proposed WTG locations and optimised to run through the borehole locations (Horizon Geosciences Limited 2014).

518. The geotechnical survey dataset analysed by WA covers the Original Offshore Development Area covering the proposed array but does not currently extend to the Original Export Cable Corridor Area or its 1km buffer as the geophysics surveys did.

519. The geodetic parameters used for the survey were WGS84 UTM30N.

520. Updated wreck and obstruction data within the Revised ASA were obtained from UKHO and a search of HES maritime datasets was carried out prior to this Scoping Report. This demonstrated that new records and updates to existing records have occurred. These would need to be integrated with previous datasets within the Revised Development ES.

521. The UKHO dataset has seen updates to five records since the 2012 data request, as detailed below in Table 9-18.

Table 9-18: Updates to UKHO Dataset

Wreck ID	Latitude	Longitude	Object Name	Last Amendment	Category
80147	56 5.878 N	2 44.171 W		20130405	foul ground
3028	56 28.993 N	2 9.096 W	GRENMAR	20140801	non-dangerous wreck
2922	56 6.631 N	2 42.069 W		20150318	non-dangerous wreck
2939	56 9.692 N	2 30.858 W	SNELAND 1	20160426	non-dangerous wreck
3007	56 25.994 N	2 16.094 W		20161213	non-dangerous wreck

522. HES and ELHER datasets similarly have updated records since the 2012 original data requests- in the case of the HES data upwards of 60 records have been edited or added.

Review of Baseline Characteristics

523. Chapter 17 of the Original Development ES presents the baseline characteristics for inter-tidal and marine archaeology and cultural heritage resources across the area of interest, which includes known wrecks and obstructions, identified geophysical receptors, the potential for further maritime and aviation archaeological receptors and potential submerged prehistory. For further detail on these please refer to Chapter 17 of the Original Development ES and associated technical appendices.

524. The additional data and amended records from the UKHO, HES and HER datasets (as noted above) that have been identified will be undertaken and assessed to enable an update to be made to the existing understanding of baseline conditions – this will be presented in the Revised Development ES.

9.2.3 Design Envelope

525. Tables 9-19 and 9-20 set out the worst case scenarios defined by the Original Development EIA for archaeology and cultural heritage (ICOL, 2013) compared to the proposed worst case scenario for the Revised Development at a level of detail sufficient to draw conclusions in relation to the scoping process.

Table 9-19: Worst Case Scenario Definition – Wind Farm

Potential Impact	Original Development Design Envelope (worst case scenario) (ICOL, 2013)	Revised Development Design Envelope (worst case scenario)	Difference between the Original and Revised Design Envelopes
Construction (& Decommissioning) Phase			
Disruption of the seabed affecting archaeological features including changes to hydrographic and sedimentary regimes	Total seabed area disturbed is 5.54 km^2, equating to 3.69% of the Development Area resulting from: • Seabed preparation for 213 WTGs with gravity base substructures (GBS) selected as having the largest disturbance footprint (125 m dredger affected diameter); • Seabed preparation for five OSPs with GBS selected as having the largest area disturbance footprint (300 m dredger affected diameter); • Seabed preparation for three met masts with GBS selected as having the largest area disturbance footprint (125 m dredge effected diameter); • 353 km inter-array cable installation with a cable corridor disturbed width of six metres as the widest possible area of disturbance; • Jack up vessel with disturbance footprint per vessel of 600 m^2 and three visits per foundation installation/decommissioning required for WTGs, OSPs and met masts; and	Total seabed area disturbed is 4.24 km^2, equating to 2.82% of the development area, resulting from:: • Seabed preparation for up to 72 WTGs with gravity base substructures (GBS) selected as having the largest disturbance footprint (125 m dredger affected diameter); • Seabed preparation for two OSPs with GBS selected as having the largest area disturbance footprint (300 m dredger affected diameter); • No met masts; • 190 km inter-array cable installation with a cable corridor disturbed width of 15 metres as the widest possible area of disturbance; • Jack up vessel with disturbance footprint per vessel of 600 m^2 and three visits per foundation	Overall there is a 66% reduction in WTGs numbers, 60% OSPs and 46 % reduction in inter-array cable and the Revised Development requires no further met masts. Total area disturbed is 1.3km^2 less than assessed in the Original Development ES. This equates to a 23% reduction in total disturbed area.

Potential Impact	Original Development Design Envelope (worst case scenario) (ICOL, 2013)	Revised Development Design Envelope (worst case scenario)	Difference between the Original and Revised Design Envelopes
	• Vessel anchorage disturbance = 5.0 m^2 footprint, six anchors deployed per 500 m along inter-array cable	installation/decommissioning required for WTGs and OSPs; and • Vessel anchorage disturbance = 5.0 m2 footprint, six anchors deployed per 500 m along inter-array cable.	
Impacts on the setting of cultural heritage assets	There will be 213 WTGs with a maximum blade tip height of 215 m. The worst case scenario is that these will be arranged in a grid on jacket foundations and that five OSPs will be required. The worst case scenario assumes the maximum correspondence between WTGs and known receptors.	Up to 72 WTGs with a maximum blade height of 301m, two OSPs and no met masts with GBS substructure/foundation types.	Reduction in number of WTG's (66%), OSPs (60%) and no met masts but increase in maximum blade tip height from 215m to 301m.
Operation & Maintenance Phase			
Damage to or removal of heritage features resulting from direct physical impacts-anchoring.	Operation and Maintenance related vessels accessing: • 213 WTGs with GBS selected as having the largest footprint (95 m diameter including scour protection); • Five OSPs with GBS selected as having the largest footprint (180 m diameter including scour protection); and • Three met masts with GBS selected as having the largest footprint (95 m diameter including scour protection).	Operation and Maintenance related vessels accessing: • Up to 72 WTGs with GBS selected as having the largest footprint (125 m diameter including scour protection); • Two OSPs with GBS selected as having the largest footprint (180 m diameter including scour protection); • No met masts.	Overall there is a 66% reduction in WTGs numbers, 60% OSPs. There will therefore be a proportional reduction in Operation and Maintenance vessels.

Table 9-20: Worst Case Scenario Definition – Export Cable Corridor

Potential Impact	Original Development Design Envelope (ICOL, 2013)	Revised Development Design Envelope	Difference between Envelopes
Construction (& Decommissioning) Phase			
Disruption of the seabed affecting archaeological features	Area of seabed disturbed is 3.02 km^2 across Offshore Export Cable Corridor: • AC as largest number (six) of Export Cables; • Export Cable length = 83.3 km (multiplied by six); • Each Export Cable in a separate trench; • Offshore Export Cable trench affected width = six metres (for each of six Export Cables); and • Anchoring disturbance from vessels.	Area of seabed disturbed is 2.51 km^2 across Offshore Export Cable Corridor: • AC as largest number (two) of Export Cables; • Export Cable length = 83.3 km (multiplied by two); • Each Export Cable in a separate trench; • Offshore Export Cable trench affected width = six metres (for each of two Export Cables); and • Anchoring disturbance from vessels.	Cable corridor length remains the same (83.3 km), there is a reduction in number of export cables from six to two, resulting in a reduction in overall footprint of 17.5 %.
Operation & Maintenance Phase			
Damage to or removal of heritage features resulting from direct physical impacts- anchoring.	Operation and Maintenance related vessels accessing: Protection of maximum 20% of each of the six, 83.3 km long Export Cables; and Protection material six meters wide.	Operation and Maintenance related vessels accessing: Protection of maximum 20% of each of the two, 83.3 km long Export Cables; and Protection material six meters wide.	Reduction in number of export cables from six to two, resulting in the proportional reduction of direct physical impacts from anchoring.

9.2.4 Revised Development Embedded Mitigation Measures

526. The primary method of mitigation when dealing with the unknown archaeological resource is the precautionary principle, based on the prevention of damage to receptors by proactively putting in place protective measures rather than attempting to repair damage after it has occurred. Therefore, the ES for the Original Development, included provision for a series of embedded mitigation measures to ensure that significant direct physical impacts will not occur during the construction, operation or decommissioning of the wind farm and associated infrastructure. No mitigation was proposed for indirect physical impacts. The mitigation set out in relation to the Original Development EIA will be incorporated as embedded mitigation for the Revised Development.

527. The following embedded mitigation is proposed for all direct physical impacts. This includes Archaeological Exclusion Zones around known marine and intertidal cultural heritage features and programmes of mitigation works where physical impacts are unavoidable.

528. Embedded Mitigation for the Revised Development will comprise of a range of measures to minimise environmental effects which were captured within the Design Envelope for the Original Development, as follows:

- A project specific Written Scheme of Investigation (WSI) will be prepared, in consultation with HES, once the final layout of the Wind Farm and export cables is established. This document will be incorporated into the final PEMP. The WSI will set out the design and implementation of a programme of detailed mitigation works. This will comply with guidance current at the time of its development (presently The Crown Estate 2010).
- Mitigation strategies for known shipwreck sites will include maintenance of appropriate buffer zones between project infrastructure including WTGs, OSPs, met masts, inter-array and Export Cables and known shipwrecks.
- Analysis of pre-construction survey data will be undertaken to refine the identified potential marine archaeology assets at infrastructure locations. Appropriate micro-siting allowance for identified assets will be agreed in consultation with HES.
- Both the micro-siting allowance and exclusion zones will be detailed in the WSI described above. This will reduce any potential impacts on marine archaeology.
- The WSI will include a Protocol for Archaeological Discoveries (PAD) which will be prepared in consultation with HES. This will mitigate the risk of damage to any previously unrecorded archaeological remains.
- Mitigation relating to effects of the Wind Farm and the export cables on the setting of cultural heritage receptors will be as per SVLIA mitigation described in Chapter 16 of the Original Development ES and summarised in Section 9.1.4 of this scoping report and will include:

- WTGs will be placed in a regular grid subject to micro siting requirements;
- WTGs will all be of similar dimensions to hub height and blade tip subject to WTG and substructure design and installation specification; and
- The WTGs will all be pale grey in colour with a semi-matt finish. This tends to reduce the distance over which the WTGs are visible, especially in dull or overcast conditions, which often occur. As offshore WTGs are often viewed against the sky, pale grey is the most appropriate colour as it is closest to that of the lower part of the sky under the most frequent UK weather conditions.

9.2.5 Commitment to Consent Conditions

529. As noted in Section 2.2.3, ICOL also propose to commit to the relevant consent conditions (that will further minimise the impacts of the development on the environment) that were granted for the Original Development for the application of the Revised Development.

530. These consent conditions have taken into account any relevant consultation responses to the Original Development EIA from key stakeholders in relation to Archaeology and Cultural Heritage in determining the acceptability of the Original Development; the most relevant consent conditions are summarised in Table 9-21. Conditions in full are provided in Appendix A.

Table 9-21: Summary of most Relevant Consent Conditions related to Archaeology and Cultural Heritage

Requirement	Description
Submit a Marine Archaeology Reporting Protocol	Condition ensures any accidental discovery of archaeological interest is properly and correctly reported.
Production of a Construction Method Statement (CMS)	Condition will ensure the appropriate construction management of the Development, taking into account mitigation measures to protect the environment and other users of the marine area.
Development Specification and Layout Plan	Setting out for approval the final design and layout of the Development to ensure it remains consistent with the design assessed in the ES as relevant to archaeology and cultural heritage.
Production of an Environmental Management Plan	Setting out, for approval relevant environmental management and mitigation measures to be applied during the construction and operation of the Development, including those matters identified as mitigation in the Original Development EIA as listed above.
Production of a Cable Plan	Setting out, for approval, the installation methods for the cables (including burial) to ensure it remains consistent with the installation process assessed in the ES as relevant to archaeology and cultural heritage.

Production of an Operations and Maintenance Plan	Setting out, for approval, the operations and maintenance procedures and the management of impacts during the operational phase so as to safeguard environmental interests.

9.2.6 Scoping of the Revised Development EIA

531. The following tables summarise the post-mitigation (residual) significance for all impacts considered for the Original Development and details whether the potential impact has been scoped out of the Revised Development EIA.

532. Where this is the case relevant justification is noted and where the mitigation applied in the Original Development EIA (in addition to any relevant conditions as highlighted above) has been carried forward as Embedded Mitigation for the Revised Development.

533. The embedded mitigation (Section 9.2.4) was included within the assessment conclusions and therefore only the residual effects have been presented in these tables.

Table 9-22: Summary of Potential Impacts – Wind Farm

Potential Impact	Residual Effect (ICOL, 2013)		Scoped in or out of the Revised Development EIA	Justification
Construction (& Decommissioning) Phase				
Damage to or removal of heritage features resulting from direct physical impacts.	Known maritime features (A1), unconfirmed locations of shipwrecks (A3) and known intertidal heritage assets.	Minor	Scoped in	The area of residual impact on archaeology or cultural heritage features is considered to be Minor following appropriate mitigation as described in the Original Development ES and results of the previous marine geophysical assessments which have provided an archaeologically assessed gazetteer of seabed features. It is noted that while the geophysical survey is fully valid, there have been some additions or changes to the UKHO, HES and HER datasets within the Revised Development. Therefore, it is considered that while no further geophysical assessment is required, the Revised Development EIA should contain a review of the UKHO, HES and HER datasets.

Potential Impact	Residual Effect (ICOL, 2013)		Scoped in or out of the Revised Development EIA	Justification
Damage to or removal of features.	Unknown maritime, aviation and intertidal heritage features.	Minor	Scoped out	The impacts from the Original Development were assessed as not significant and, as a result of the design changes described above, the Revised Development is anticipated to have less of an impact. Embedded mitigation will ensure unknown features are considered appropriately should they be encountered during the construction works. Further assessment of this potential impact is therefore scoped out of the Revised Development EIA.
Operation & Maintenance Phase				
Damage to or removal of heritage features resulting from direct physical impacts.	Known maritime features (A1), unconfirmed locations of shipwrecks (A3) and known intertidal heritage assets.	Minor	Scoped out	The impacts from the Original Development were assessed as not significant and, as a result of the design changes described above, the Revised Development is anticipated to have less of an impact. Further assessment of this potential impact is therefore scoped out of the Revised Development EIA. In practical terms, direct physical impacts during operation will have been mitigated against during the construction phase in any case.
Setting changes	Bell Rock Lighthouse Signal Tower, Bell Rock Lighthouse, Tentsmuir Coastal Defences, St Andrews Cathedral and adjacent ecclesiastical remains, St Andrews Castle and Crail Airfield pillbox.	Minor to Moderate	Scoped in	The change in maximum blade tip height from 152m to 301m, even with the reduction in the number of WTGs from 213 to 72 makes a reassessment of the setting appropriate. *Please note that a review of the Revised Development ZTV (Figure 9-7) has identified further receptors experiencing theoretical visibility associated with the increase in turbine height. These new receptors and the scope of this assessment will be agreed in*

Potential Impact	Residual Effect (ICOL, 2013)		Scoped in or out of the Revised Development EIA	Justification
				consultation with appropriate Stakeholders.

Table 9-23: Summary of Potential Impacts – Offshore Export Cable Corridor

Potential Impact	Residual Effect (ICOL, 2013)		Scoped in or out of the Revised Development EIA	Justification
Construction (& Decommissioning) Phase				
Damage to or removal of heritage features resulting from direct physical impacts.	Known maritime features (A1), unconfirmed locations of shipwrecks (A3) and known intertidal heritage assets.	Minor	Scoped in	The area of residual impact on archaeology or cultural heritage features is considered to be Minor following appropriate mitigation as described in the Original Development ES. It is noted that while the geophysical survey is fully valid, there have been some additions or changes to the UKHO, HES and HER datasets within the Revised Development. Therefore, it is considered that while no further geophysical assessment is required, the Revised Development EIA should contain a review of the UKHO, HES and HER datasets.
Damage to or removal of heritage features resulting from direct physical impacts.	Potential (currently unknown) submerged prehistory	Moderate	Scoped In	Geotechnical survey datasets have not been geoarchaeologically assessed within the Export Cable Corridor area to investigate submerged prehistory potential. Therefore, it is considered that further assessment should be scoped in to the Revised Development EIA.

Potential Impact	Residual Effect (ICOL, 2013)		Scoped in or out of the Revised Development EIA	Justification
Damage to or removal of features.	Unknown maritime, aviation and intertidal heritage features.	Minor	Scoped out	The impacts from the Original Development were assessed as not significant and, as a result of the design changes described above, the Revised Development is anticipated to have less of an impact. Embedded mitigation will ensure unknown features are considered appropriately should they be encountered during the construction works. Further assessment of this potential impact is therefore scoped out of the Revised Development EIA.
Operation & Maintenance Phase				
None	None		Scoped out	There are no known potential residual effects on archaeology or cultural heritage receptors in the operations/maintenance phase of the Development in the export cable corridor.

Scoping of Cumulative Effects Assessment (CIA)

534. The CIA for the Original Development identified those existing or consented developments that had the potential to give rise to cumulative effects when considered alongside the Original Development; for impacts on settings the list of projects considered was as for the SLVIA CIA set out under Section 9.1.5.

535. For direct and indirect effects, the cumulative effects from the adjacent offshore wind farms were considered, namely:

- Neart na Gaoithe; and
- Seagreen Alpha and Bravo;

536. Cumulative construction and operational effects for direct and indirect physical impacts on archaeological receptors were considered to be not significant.

537. For the Revised Development, the following offshore wind farm projects will be considered during the CIA for direct and indirect impacts on archaeological receptors:

- Neart Na-Gaoithe Offshore Windfarm;
- Seagreen Alpha and Bravo Offshore Windfarms;
- Forthwind Offshore Wind Demonstration Project; and
- Kincardine Offshore Windfarm.

538. Given the change in project parameters related to visual impacts, the cumulative assessment on setting will be revisited for the Revised Development and in line with the list of developments that will be agreed, and set out in respect of SLVIA.

539. Table 9-24 presents the Original Development residual effect from the for all cumulative impacts considered and details whether the potential cumulative impact has been scoped out of the Revised Development EIA, with a relevant justification

Table 9-24: Summary of Potential Impacts – Revised Development with Other Plans, Projects and Activities

Potential Impact	Residual Effect (ICOL, 2013)		Scoped in or out of the Revised Development CIA	Justification
Construction (& Decommissioning) Phase				
Direct physical impacts.	Known maritime features (A1), unconfirmed locations of shipwrecks (A3) and known intertidal heritage assets	Minor/ moderate	Scoped in	The potential cumulative impacts may have changed (due to a change in base line- the additional recorded assets) therefore this will be scoped in to the CIA and assessed according to the methodology outlined in above.

Potential Impact	Residual Effect (ICOL, 2013)		Scoped in or out of the Revised Development CIA	Justification
Damage to or removal of features.	Unknown maritime, aviation and intertidal heritage features.	Minor/ moderate	Scoped out	The cumulative impacts from the Original Development were assessed as not significant. As a result of the design changes described above, coupled with no change to the projects required to be considered cumulatively, it is anticipated that that there will be less of a cumulative impact associated with the Revised Development. Further assessment is therefore scoped out of the Revised Development CIA.
Operation & Maintenance Phase				
Operational setting impacts.	Bell Rock Lighthouse Signal Tower, Bell Rock Lighthouse, Tentsmuir Coastal Defences, St Andrews Cathedral and adjacent ecclesiastical remains, St Andrews Castle and Crail Airfield pillbox.	High/Low	Scoped in	As a result of the design changes described above (increase in maximum blade tip height from 152m to 301m, even with the reduction in the number of WTGs from 213 to 72) an impact assessment from the project will be required. Therefore further assessment is scoped in to the Revised Development CIA. Additional receptors to those previously assessed may need to be considered and will be agreed in consultation with appropriate Stakeholders.

9.2.7 Approach to EIA

540. Based on the evidence summarised from the Original Development EIA and considering the scope of the current application by comparison to the Original Development, it is concluded that a review of the UKHO, HES and HER datasets should be scoped into the Revised Development EIA for both the WTG Development Area and Export Cable Corridor. All of the remaining physical potential effects on archaeology and cultural heritage present within the WTG Development Area should be scoped out of the Revised Development EIA as seabed features identified by geophysical assessment and submerged prehistory are covered in the Original Development ES and more recent technical reports.

541. The potential for submerged prehistory within the Export Cable Corridor has not been archaeologically investigated within previous surveys and so it is suggested that this is scoped in to the Revised Development EIA for further study in agreement with the relevant Stakeholders.

542. It is suggested that due to the changes in the number and increase in size of the WTGs within the Development Area, a re-analysis of the setting of the previously identified archaeology and cultural heritage receptors within the Original Development EIA would be necessary, as will a review of the cumulative impact of the Revised Development in this regard. This settings analysis will be undertaken in conjunction with the SLVIA in agreement with the relevant curators at HES and Local Authority Archaeology Services.

543. The methodology adopted in the Original Development EIA will be used.

544. The following relevant guidance documents will be used to inform the EIA methodology:

- JNAPC Code of Practice for Seabed Development (The Crown Estate, Joint Nautical Archaeology Policy Committee (JNAPC), 2008).
- Historic Environment Guidance for the Renewable Energy Sector (Wessex Archaeology, 2007, Collaborative Offshore Wind Research into the Environment (COWRIE)).
- Guidance for Assessment of Cumulative Impact on the Historic Environment from Offshore Renewable Energy (Oxford Archaeology, 2008, COWRIE).
- Standard and Guidance for Archaeological Desk-Based Assessment (Chartered Institute for Archaeologists, revised 2014).
- Protocol for Archaeological Discoveries: Offshore Renewables Projects (The Crown Estate, 2010a (prepared by Wessex Archaeology).
- Round 3 Offshore Renewables Projects Model Clauses for Archaeological Schemes of Investigation (The Crown Estate, 2010b (prepared by Wessex Archaeology)).
- Offshore Geotechnical Investigations and Historic Environment Analysis: Guidance for the Renewable Energy Sector (Gribble, J and Leather, S, 2011, COWRIE).
- Managing Change in the Historic Environment: Setting (HS, 2010).

9.2.8 Scoping Questions - Archaeology and Cultural Heritage

- Do you agree that the existing data, supplemented with the updated UKHO, HES and HER datasets and geophysical survey work, are sufficient to describe the baseline environment in relation to the physical impacts from the Revised Development?
- Do you agree that, in all cases, the assessment scenario previously applied in conducting the Original Development EIA represents the worst case when compared to the Revised Development?;
- Do you agree that the embedded mitigation, and the proposed use of consent conditions, described provides a suitable means for managing and mitigating the potential effects of the Revised Development on archaeology and cultural heritage receptors?
- Do you agree, with the embedded mitigation in place, that the assessment of impacts in relation to the damage to or removal of heritage features resulting from direct physical impacts from the wind farm and export cable route can be scoped out of the Revised Development EIA?
- Do you agree that the EIA should only focus on the setting Impacts from the previously assessed receptors and any further archaeology and cultural heritage receptors associated with the additional visibility from the increase in turbine height?
- Do you agree that cumulative impacts on archaeology and cultural heritage receptors should be scoped out of EIA for the Revised Development, for all elements other than setting impacts?
- The impacts on Setting will be assessed using Managing Change in Historic Environment: Setting (HES 2016) as guidance and following the same approach as the previous assessment for the Original Development EIA. Do you agree that this is the appropriate approach to take?

9.3 Commercial Fisheries

9.3.1 Introduction

545. This section of the Scoping Report confirms the Commercial Fisheries receptors of relevance to the Revised Development.

546. As described in Section 5, the purpose of this section is to provide sufficient detail on the potential effects on Commercial Fisheries receptors resulting from the construction, operation and maintenance and decommissioning of the Revised Development.

547. The detail provided will allow MS-LOT and their consultees to be clear about what they consider the significant effects of the proposal are likely to be and, therefore, whether they need to be subject to an EIA and be included within the ES.

548. In order to provide sufficient information to consultees reference is made to the baseline data gathered to inform the Original Development EIA, and to the outcomes of the impact assessment presented in the Original Development ES. Design, construction and operational changes between the Original Development and the Revised Development that are likely to have further impacts on Commercial Fisheries are also considered to inform any subsequent impact assessments.

549. For a full description of the design envelope parameters and changes please refer to Section 4. The Development Area for the Revised Development remains unchanged from the Original Development and can be seen in Figure 4-1.

550. This section concludes that the likely impacts on Commercial Fisheries for the majority of impacts from the Revised Development will be less than those assessed for the Original Development and therefore, in line with the EIA regulations are not required to be included with the Revised Development ES. This is due to the following;

- Changes in the Revised Design Envelope (see Section 4);
- Baseline data remaining valid;
- No material changes to data collection;
- No material changes to assessment best practise; and
- Not significant effects concluded within the Original Development EIA.

551. Due to the requirement to review the most recent, available landings data (MSS and ICES, from 2012-2015) impacts on both the Development Area and Revised Export Cable Corridor during Construction and Operation will be considered in the Revised Development EIA for):

i. Temporary loss or restricted access to fishing grounds (construction and operation);

ii. Increased steaming times to fishing grounds (construction and operation);

iii. Displacement of fishing vessels into other areas (construction and operation); and

iv. Complete Loss or Restricted access to fishing grounds (operation only);

Full details and justification provided within this section.

9.3.2 Data Sources and Baseline Environment

552. This section identifies baseline data sources that can be used to characterise the commercial fisheries resource within and around the Revised Development, drawing predominantly from the data sources used to inform the Original Development EIA but updated where necessary with more recent data. Commentary is provided on the sufficiency of this data as a basis for scoping the Revised Development EIA.

Baseline Data

553. A variety of commercial fisheries datasets were collated and analysed to inform the Original Development EIA. Data was drawn from national, regional and local databases. The data sources are fully described in the Original Development ES Chapter 18 (ICOL, 2013) and supporting technical studies and are summarised in Table 9-25 below.

Table 9-25: Baseline Datasets from the Original Development EIA

Dataset	Coverage	Data use	Date
Commercial Fisheries			
External/ pre-existing data sources			
Landings data (MSS and International Council for the Exploration of the Sea (ICES))	Within and around the Development Area and Export Cable Corridor	Broader data on commercial landings of key fish species in the region	2007-2011
ICES	Within and around Wind Farm Array and Export Cable Corridor; ICES rectangles 41E7 and 42E7. used for Scottish waters.	Demarcation of ICES rectangles	2010

Dataset	Coverage	Data use	Date
MMO Fisheries Statistics	Data for whole of UK including Wind Farm Array and Export Cable Corridor	Landings values and fishing effort data. Includes data on vessels < 10 m	2001 - 2010
MMO Surveillance sightings	Data covers all fishing vessels in the UK	Data used to give indication of the distribution of fishing activity by method and nationality	2001-2010
MMO UK Satellite Tracking Vessel Monitoring System (VMS) data	Satellite tracking data for all UK fishing vessels > 15m in length	Data used to give indication of the distribution of fishing activity	2009 & 2007 - 2010
Marine Scotland Satellite tracking	All UK fishing vessels > 15m	Data used to give indication of the distribution of fishing activity	2007-2010
MSS salmon and sea trout catch data by salmon fishery region	Rivers Tay; Esk (Bervie, North Esk, South Esk) and Forth	Salmon and sea trout catch data	1952-2010
MSS salmon and sea trout catch data by salmon fishery district	Rivers Tay; Esk (Bervie, North Esk, South Esk) and Forth	Salmon and sea trout catch data	2001-2010
MSS salmon and sea trout netting effort data	Rivers Tay; Esk (Bervie, North Esk, South Esk) and Forth	Salmon and sea trout catch data	2001-2010
Site specific studies			
Consultation with fishing stakeholders, as follows; District Fisheries Officers (DFOs); Scottish Fishermen's Federation (SFF); and Pittenween fishermen; Dunbar fishermen; Port Seton and Cockenzie Fishermen's association; Eyemouth Fishery Office;	Within and around Wind Farm Array and Export Cable Corridor; ICES rectangles used for Scottish waters.	Consultation exercise undertaken to provide indication of the distribution of fishing activity for various fishing sectors (particularly relevant to under 15m and non-quota/permit fleet)	2010-2012

Dataset	Coverage	Data use	Date
Fisheries Industry Representative (FIR); and Arbroath and District Fishermen's Association			

Data Validity

554. The following sections consider the sufficiency of the available data in relation to spatial coverage and age.

555. The baseline information presented in the Original Development EIA has been reviewed in light of more recent data (sources provided below) in order to assess the validity of the Original Development EIA baseline for the Revised Development EIA. This review of new data is presented in the Additional Data section below, with a summary of the validity of the data provided at the end of this section.

Data Coverage

556. With the exception of the removal of the export cable landfall location at Seton Sands, the Revised Development will cover the same location assessed as the Original Development and therefore it is considered that the spatial coverage of the data from the Original Development EIA remains valid for the Revised Development EIA.

557. There is no one single data source or recognised model for establishing commercial fisheries baselines; therefore, the data used to describe the baseline for the Original Development EIA was collated from the primary sources listed in Table 9-25. This comprises existing data sources combined with extensive stakeholder consultation. Stakeholder consultation is an essential part of establishing an accurate fisheries baseline, beyond the data sources listed in Table 9-25. For example, information on the distribution of fishing is scarce for the under 15 m fleet as there is no requirement for them to be fitted with a VMS. In addition, there is no requirement for non-quota or permit fisheries to have logbooks and record fishing activity and landings (if under 15 m).

558. Therefore it is considered that the spatial coverage remains valid and sufficient for the Revised Development, although the landings baseline datasets will need to be updated and reviewed for the Revised Development EIA in order to consider most recent 5 years' worth of data and in line with standard practice (Cefas, 2012).

559. It should be noted that while the Commercial Fisheries chapter for the Original Development EIA included assessing ecological impacts on target species (as impact on target species affect fisheries), no baseline was presented for these species. Instead the Commercial

Fisheries chapter relied on the baseline and EIA findings in the Natural Fish and Shellfish chapter. The Original Development natural fish and shellfish baseline has been reviewed for this scoping exercise to establish its validity for the Revised Development in the Section 8.2 of this scoping report.

Age of the Data

560. The datasets analysed in the Original Development EIA for commercial fisheries covered years 2000 to 2010.

561. Salmon and sea trout fishery data utilised in the Original Development EIA baseline were taken from MSS and from stakeholder and resource user consultation (i.e. the District Salmon Fishery Boards (DSFBs)), and ranged from 1952 to 2010.

562. For the purposes of this scoping study the existing data is considered sufficient to identify the relevant pressures which will require consideration within the Revised Development EIA.

563. For the Revised Development EIA, it is considered that the baseline will need to be updated and reviewed in order to consider the most recent 5 years' worth of data and in line with standard practice (Cefas, 2012). Therefore the data sources used for the Original Development EIA will be updated to ensure that the latest trends in fishing activity are taken into account and in order to consider any spatial or temporal distribution changes to fishing activity.

Additional Data Sources

564. Table 9-25 identifies the baseline data sources that were used to characterise the commercial fisheries present within and around the Development Area, as part of the Original Development EIA. The external and pre-existing data for the area of interest provided important contextual information to that collected as part of the ICOL-commissioned site specific surveys and studies.

565. A review of the most recent, available landings data (MSS and ICES, from 2012-2015) has been undertaken in order to compare against the baseline data from the Original Development EIA and to assess its validity in terms of data coverage and age of the data (Figures 9-11 to 9-14). This data review was undertaken in order to provide an indication of whether the fisheries baseline has changed over the last 5 years. Figures 9-11 to 9-14 indicate that landings have not, in some cases, remained constant over the past 4 years since the EIA for the Original Development was completed, which may be taken as an indication that there may have been changes in the patterns of other fisheries too.

Figure 9-11: Fish landings from ICES rectangle 41E7 (2007 – 2015)

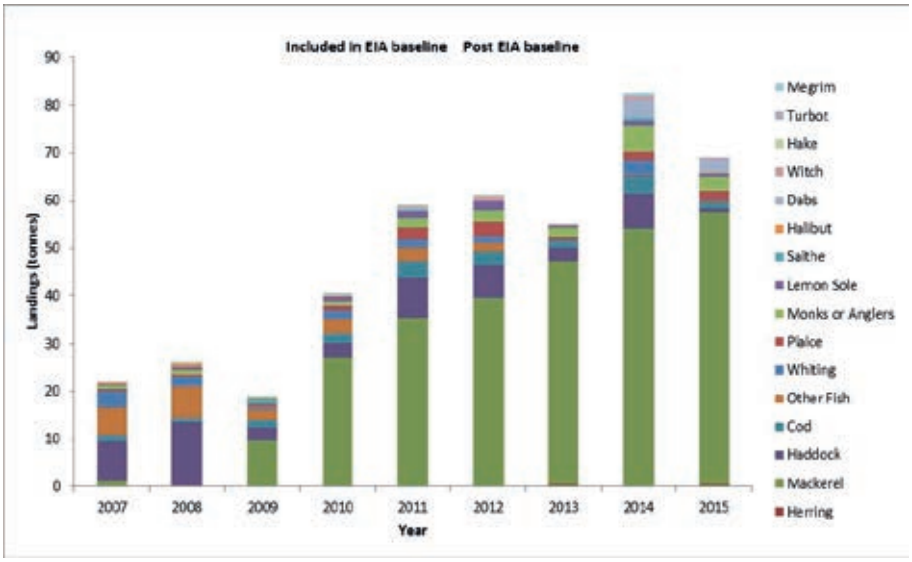


Figure 9-12: Invertebrate landings from ICES rectangle 41E7 (2007 – 2015)

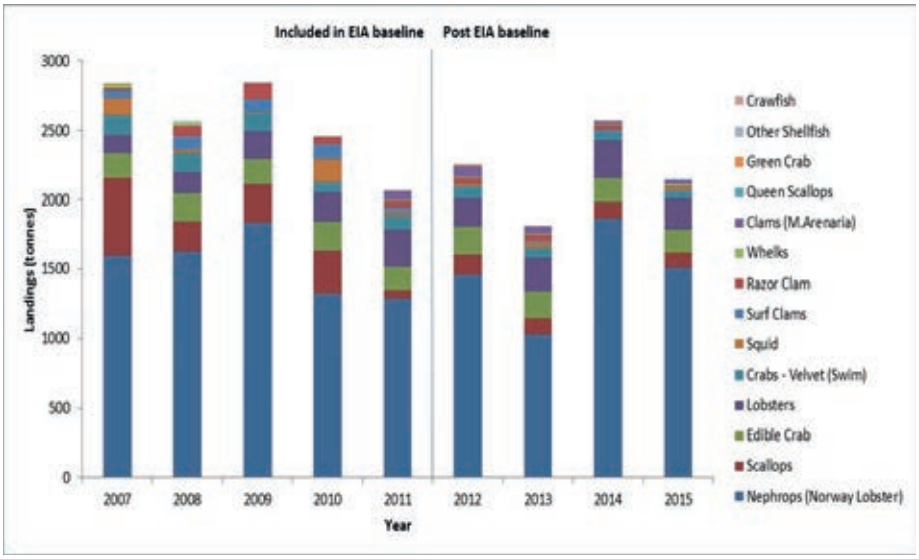


Figure 9-13: Fish landings from ICES rectangle 42E7 (2007 – 2015)

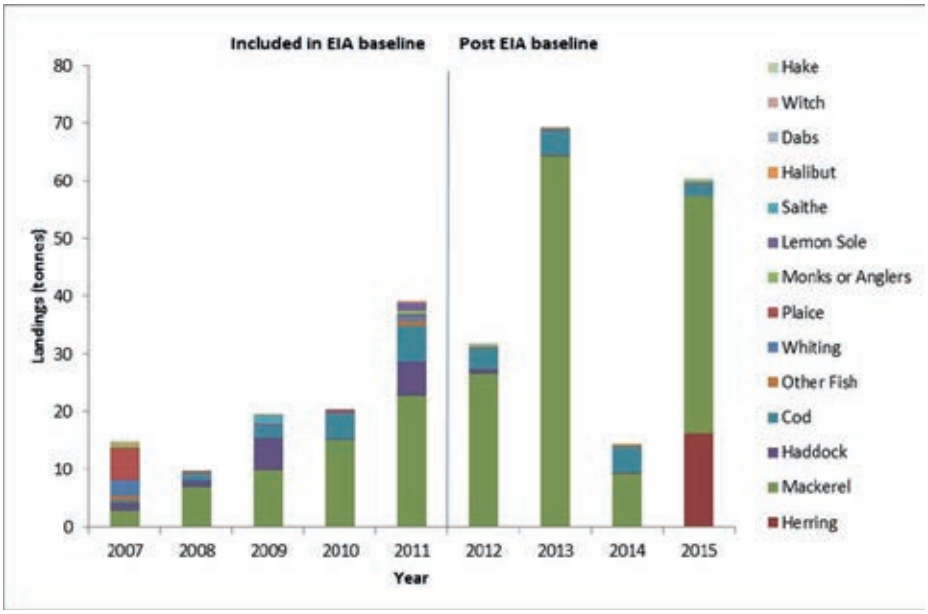
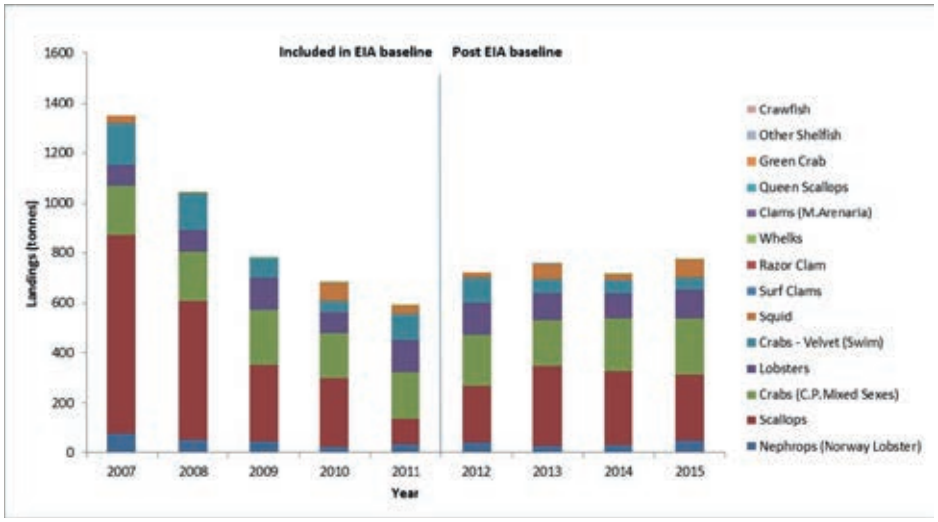


Figure 9-14: Invertebrate landings from ICES rectangle 42E7 (2007 – 2015)



Summary of Validity of Data

566. The fisheries data presented in the Original Development EIA are considered appropriate for this scoping study to identify the relevant pressures and receptors that will need to be considered in the Revised Development EIA. However the fisheries baseline will be updated for the Revised Development EIA to reflect the most recent available data and as a check on trends in fisheries patterns.

567. Regarding ecological impacts on target species, the Original Development Natural fish and shellfish baseline has been reviewed for this scoping exercise (in Section 8.2) and found to be still valid, therefore does not need updated.

Review of Baseline Characteristics

568. Chapter 18 of the Original Development ES presents the baseline characteristics for commercial fisheries resources across the Revised Development.

9.3.3 Design Envelope

569. Tables 9-26 and 9.27 set out the worst case scenarios defined by the Original Development EIA for Commercial Fisheries (ICOL, 2013) compared to the proposed worst case scenario for the Revised Development at a level of detail sufficient to draw conclusions in relation to the scoping process.

Table 9-26: Worst Case Scenario Definition – Wind Farm

Potential Impact	Original Development Design Envelope (worst case scenario) (ICOL, 2013)	Revised Development Design Envelope (worst case scenario)	Difference between the Original and Revised Design Envelopes
Construction (& Decommissioning) Phase			
Temporary loss or restricted access to fishing grounds	Infrastructure and procedures resulting in the maximum loss of fishing grounds: • Four-year construction period; • Total Development Area: 150 km²; • Progressive installation of 213 WTGs and five OSPs and three meteorological masts (met masts); • Dimensions of infrastructure: WTG - gravity foundations of 65 m diameter per foundation; OSPs - gravity foundations of 130 m diameter per foundation; • Minimum spacing between WTGs: 820 m; • Maximum inter-array cable length: 353 km; • 500 m safety/ exclusion zones around construction works; • Consideration of 50 m safety/ exclusion zones around fully and partially installed infrastructure;	Infrastructure and procedures resulting in the maximum loss of fishing grounds: • Three-year construction period; • Total Development Area: 150 km² (with 4.24km^2 in total disturbed during construction); • Progressive installation of up to 72 WTGs and up to two OSPs and up to 2 floating LIDAR; • Dimensions of infrastructure: WTG - gravity foundations of 65 m diameter per foundation with 95m scour protection. Total area per foundation 12,272 m^2. OSPs - foundations of up to 130 m diameter per foundation with 180m scour protection. Total area per OSP 70,650 m^2. Total area affected (two OSPs) – 0.14 km^2. • Minimum spacing between WTGs: 820 m;	Overall there is a 66% reduction in WTGs numbers, 60% OSPs and 46 % reduction in inter-array cable and the Revised Development requires no further met masts. Total area disturbed is 1.3km^2 less than assessed in the Original Development ES. This equates to a 23% reduction in

Potential Impact	Original Development Design Envelope (worst case scenario) (ICOL, 2013)	Revised Development Design Envelope (worst case scenario)	Difference between the Original and Revised Design Envelopes
	• Progressive installation of inter-array cables across the Development Area for the duration of construction (i.e. fishing activities cannot be undertaken in the area of inter-array cable installation); • Ongoing cable burial and protection works throughout the construction phase (maximum cable burial depth between zero metres and three metres); and • Maximum length of unburied inter-array cables, protected by other means (i.e. rock placement).	• Maximum inter-array cable length: 190 km (90-100% buried); • 500 m safety/ exclusion zones around construction works; • Consideration of 50 m safety/ exclusion zones around fully and partially installed infrastructure; • Progressive installation of inter-array cables across the Development Area for the duration of construction (i.e. fishing activities cannot be undertaken in the area of inter-array cable installation); • Ongoing cable burial and protection works throughout the construction phase (maximum cable burial depth between zero metres and three metres); and • Unburied inter-array cables, protected by other means (i.e. rock placement).	total disturbed area.
Safety issues for fishing vessels	Fishing activities cannot be safely undertaken or resumed. In addition, the assessment considers inter-array cables based upon: • Maximum inter-array cable length: 353 km; • Maximum unburied sections of inter-array cables protected by other means; and • Cable burial depth of between zero metres and three metres.	Fishing activities cannot be safely undertaken or resumed. In addition, the assessment considers inter-array cables based upon: • Maximum inter-array cable length: 190 km (90-100% buried); • Maximum unburied sections of inter-array cables protected by other means; and • Cable burial depth of between zero metres and three metres.	46 % reduction in inter-array cable associated with the Revised Development.

Potential Impact	Original Development Design Envelope (worst case scenario) (ICOL, 2013)	Revised Development Design Envelope (worst case scenario)	Difference between the Original and Revised Design Envelopes
Increased steaming times	Maximum number of construction safety/ exclusion zones and infrastructure in the Development Area resulting in the maximum disruption to established steaming routes and potential increases in operating costs.	Maximum number of construction safety/ exclusion zones and infrastructure in the Development Area resulting in the maximum disruption to established steaming routes and potential increases in operating costs. Construction period two years.	Reduced construction period from four years to two years, equating to a 50 % reduction.
Interference with fishing vessels	Will result in the highest number of works vessels transiting identified fishing grounds. Impact is associated with navigational conflict and as a result the following parameters apply: • Location of construction port; and • Approximate number of vessel movements during construction period (c.3500).	Will result in the highest number of works vessels transiting identified fishing grounds. Impact is associated with navigational conflict and as a result the following parameters apply: • Location of construction port; and • Approximate number of vessel movements during construction period (c.1500). Construction period two years.	Overall there is a 66% reduction in WTGs numbers, 60% OSPs and 46 % reduction in inter-array cable and the Revised Development requires no further met masts. Reduced construction period from four years to two years, equating to a 50 % reduction. Resulting in a reduction in number of vessel movements by an approximate 57%.

Potential Impact	Original Development Design Envelope (worst case scenario) (ICOL, 2013)	Revised Development Design Envelope (worst case scenario)	Difference between the Original and Revised Design Envelopes
Displacement of fishing activity	See 'Temporary loss or restricted access to fishing grounds'. Infrastructure resulting in the maximum loss of fishing grounds.	See 'Temporary loss or restricted access to fishing grounds'. Infrastructure resulting in the maximum loss of fishing grounds.	Overall there is a 66% reduction in WTGs numbers, 60% OSPs and 46 % reduction in inter-array cable and the Revised Development requires no further met masts. Reduction in construction period by 50 %
Operation & Maintenance Phase			
Complete loss or restricted access to fishing grounds	Infrastructure resulting in the maximum loss of fishing ground. • Installation of 213 WTGs and five OSPs; • WTG gravity base foundations of 65 m diameter; • OSP gravity base foundations of 130 m diameter; • Minimum spacing between WTGs: 820 m; • Maximum inter-array cable length: 353 km; • Maximum unburied sections of inter-array cables protected by other means; and • Cable burial depth of between zero metres and three metres.	Infrastructure resulting in the maximum loss of fishing ground. • Installation of 72 WTGs and up to two OSPs; • Dimensions of infrastructure: WTG - gravity foundations of 125 m diameter including scour protection. Total area per foundation 12,272 m^2. Total area affected 0.88 km^2; OSPs - foundations of up to 130 m diameter per foundation with 180m scour protection. Total area per OSP 25,447 m^2. Total area affected (two OSPs) – 0.05km^2. • Minimum spacing between WTGs: 1,278 m; • Maximum inter-array cable length: 190 km (90-100% buried);	Overall there is a 66% reduction in WTGs numbers, 60% OSPs and 46 % reduction in inter-array cable and the Revised Development requires no further met masts, which results in a total loss or restricted access is 0.82 km^2 less than assessed in the Original Development ES equating to

Potential Impact	Original Development Design Envelope (worst case scenario) (ICOL, 2013)	Revised Development Design Envelope (worst case scenario)	Difference between the Original and Revised Design Envelopes
		• Consideration of 50 m safety/ exclusion zones around fully and partially installed infrastructure; • Cable burial depth between zero metres and three metres; and • Unburied inter-array cables, protected by other means (i.e. rock placement).	a 44% reduction.
Safety issues for fishing vessels	Fishing activities cannot be safely undertaken or resumed (see *Chapter 19*). In addition, the assessment considers inter-array cables based upon: • Maximum inter-array cable length: 353 km; • Maximum unburied sections of inter-array cables protected by other means; and • Cable burial depth of between zero metres and three metres.	Fishing activities cannot be safely undertaken or resumed (see Chapter 19). In addition, the assessment considers inter-array cables based upon: • Maximum inter-array cable length: 190 km (90-100% buried); • Maximum unburied sections of inter-array cables protected by other means; and • Cable burial depth of between zero metres and three metres.	Reduction in length of inter-array cabling by 46 %.
Increased steaming times	Maximum number of infrastructure and associated safety/exclusion zones in the Development Area resulting in the maximum disruption to established steaming routes.	Maximum number of infrastructure and associated safety/exclusion zones in the Development Area resulting in the maximum disruption to established steaming routes.	Overall there is a 66% reduction in WTGs numbers, 60% OSPs and 46 % reduction in inter-array cable and the Revised Development requires no further met masts.

Potential Impact	Original Development Design Envelope (worst case scenario) (ICOL, 2013)	Revised Development Design Envelope (worst case scenario)	Difference between the Original and Revised Design Envelopes
Interference with fishing vessels	Location of operation and maintenance port and maximum number of operation and maintenance vessel trips to the Development Area (six per day) will result in the highest number of works vessels transiting identified fishing grounds.	Location of operation and maintenance port and maximum number of operation and maintenance vessel trips to the Development Area (six per day) will result in the highest number of works vessels transiting identified fishing grounds.	Overall there is a 66% reduction in WTGs numbers, 60% OSPs and 46 % reduction in inter-array cable and the Revised Development requires no further met masts.
Objects on the seabed post-construction	Any construction related obstacles and changes to seabed conditions. Unacceptable safety risks to fishing vessels assume that fishing activities cannot be safely undertaken or resume.	Any construction related obstacles and changes to seabed conditions. Unacceptable safety risks to fishing vessels assume that fishing activities cannot be safely undertaken or resume.	No difference in design envelopes.
Displacement of Fishing Activity	See 'Complete loss or restricted access to fishing grounds'. Infrastructure resulting in the maximum loss of fishing grounds.	See 'Complete loss or restricted access to fishing grounds'. Infrastructure resulting in the maximum loss of fishing grounds.	See 'Complete loss or restricted access to fishing grounds'.

Table 9-27: Worst Case Scenario Definition – Offshore Export Cable Corridor

Potential Impact	Original Development Design Envelope (worst case scenario) (ICOL, 2013)	Revised Development Design Envelope (worst case scenario)	Difference between the Original and Revised Design Envelopes
Construction (& Decommissioning) Phase			
Complete loss or restricted access to fishing grounds	Infrastructure and procedures resulting in the maximum loss of fishing grounds: • Approximately 225 days' duration of installation over a three-year period; • Total export cable length: 83.3 km; • Maximum number of export cable trenches: 6; • Cable burial to approximately 1 m where feasible; • Maximum length of unburied cable length, protected by other means (i.e. rock placement), where burial is not feasible; • Safety/ exclusion zones around installation works; and • Progressive installation of cable for the duration of construction (i.e. fishing activities cannot be undertaken in the area of export cable installation).	Infrastructure and procedures resulting in the maximum loss of fishing grounds: • Approximately 9 month duration of installation over a two year period; • Total export cable length: 83.3 km; • Maximum number of export cable trenches: 2; • Cable burial to approximately 1 m where feasible (range 0-3m), 80-100% buried; • Maximum length of unburied cable length, protected by other means (i.e. rock placement), where burial is not feasible; • Safety/ exclusion zones around installation works; and • Progressive installation of cable for the duration of construction (i.e. fishing activities cannot be undertaken in the area of export cable installation).	33.3% decrease in installation period Maximum number of export cables: reduced from six to two (66.6% reduction). There is a reduction in overall footprint of 17.5 % with the Revised Development export cable.
Safety issues for fishing vessels	Fishing activities cannot be safely undertaken or resumed. In addition, the assessment considers export cables based upon: • Maximum export cable length: 83.3 km; • Cable burial to approximately 1 m where feasible; and	Fishing activities cannot be safely undertaken or resumed. In addition, the assessment considers export cables based upon: • Maximum export cable length: 83.3 km; • 80-100% of cable buried to approximately 1 m where feasible (0-3m range); and	There is a reduction in overall footprint of 17.5 % with the export cable, 33.3% decrease in installation period

Potential Impact	Original Development Design Envelope (worst case scenario) (ICOL, 2013)	Revised Development Design Envelope (worst case scenario)	Difference between the Original and Revised Design Envelopes
	• Maximum unburied sections of export cables protected by other means.	• Maximum unburied sections of export cables protected by other means.	
Increased Steaming Times	Maximum number of construction safety/ exclusion zones resulting in the maximum disruption to established steaming routes and potential increases in operating costs.	Maximum number of construction safety/ exclusion zones resulting in the maximum disruption to established steaming routes and potential increases in operating costs.	Maximum number of export cable trenches: reduced from six to two. 33.3% decrease in installation period.
Interference with fishing vessels	Will result in the highest number of works vessels transiting identified fishing grounds. Impact is associated with navigational conflict and as a result the following parameters apply: • Location of construction port; and • Approximate number of vessel movements during construction period (c.3500).	Will result in the highest number of works vessels transiting identified fishing grounds. Impact is associated with navigational conflict and as a result the following parameters apply: • Location of construction port; and • Approximate number of vessel movements during construction period (c.1500 overall for all work including WTG installation).	Maximum number of export cable trenches: reduced from six to two (66.6% reduction). 33.3% decrease in installation period Reduction in number of vessel movements by an estimated 57% (for all construction work- eg including wind farm construction and the export cable.

Potential Impact	Original Development Design Envelope (worst case scenario) (ICOL, 2013)	Revised Development Design Envelope (worst case scenario)	Difference between the Original and Revised Design Envelopes
Displacement of fishing activity	See 'Temporary loss or restricted access to fishing grounds'. Infrastructure resulting in the maximum loss of fishing grounds.	See 'Temporary loss or restricted access to fishing grounds'. Infrastructure resulting in the maximum loss of fishing grounds.	See 'Temporary loss or restricted access to fishing grounds'
Operation & Maintenance Phase			
Complete loss or restricted access to fishing grounds	Infrastructure resulting in the maximum loss of fishing ground. • Maximum length of export cable: 83.3 km; • Operational cable burial to approximately 1 m where feasible; and • Maximum unburied sections of export cable protected by other means.	Infrastructure resulting in the maximum loss of fishing ground. • Maximum length of export cable: 83.3 km; • 80-100% of operational cable buried to approximately 1 m (0-3m range) where feasible; and • Maximum unburied sections of export cable protected by other means.	Maximum number of export cables: reduced from six to two (66.6% reduction).
Safety issues for fishing vessels	Fishing activities cannot be safely undertaken or resumed. In addition, the assessment considers export cables based upon: • Maximum export cable length: 83.3 km; • Maximum unburied sections of export cables protected by other means; • Cable burial to approximately 1 m where feasible; and • Post-installation status of the export cable.	Fishing activities cannot be safely undertaken or resumed. In addition, the assessment considers export cables based upon: • Maximum length of export cable: 83.3 km; • Maximum unburied sections of export cable protected by other means; • 80-100% of operational cable buried to approximately 1 m (0-3m range) where feasible; and • Post-installation status of the export cable.	Maximum number of export cables: reduced from six to two (66.6% reduction).
Increased steaming times	None	None	No difference in design envelopes.

Potential Impact	Original Development Design Envelope (worst case scenario) (ICOL, 2013)	Revised Development Design Envelope (worst case scenario)	Difference between the Original and Revised Design Envelopes
Interference with fishing vessels	Location of operation and maintenance port and maximum number of operation and maintenance vessel trips to the Development Area (six per day) will result in the highest number of works vessels transiting identified fishing grounds.	Location of operation and maintenance port and maximum number of operation and maintenance vessel trips to the Development Area will result in the highest number of works vessels transiting identified fishing grounds.	Maximum number of export cables: reduced from six to two (66.6% reduction).
Objects on the seabed post-construction	Any construction related obstacles and changes to seabed conditions. Unacceptable safety risks to fishing vessels assume that fishing activities cannot be safely undertaken or resume.	Any construction related obstacles and changes to seabed conditions. Unacceptable safety risks to fishing vessels assume that fishing activities cannot be safely undertaken or resume.	No difference in design envelopes.
Displacement of Fishing Activity	See 'Complete loss or restricted access to fishing grounds'. Infrastructure resulting in the maximum loss of fishing grounds.	See 'Complete loss or restricted access to fishing grounds'. Infrastructure resulting in the maximum loss of fishing grounds.	See 'Complete loss or restricted access to fishing grounds'.

9.3.4 Revised Development Embedded Mitigation Measures

570. Embedded Mitigation for the Revised Development will comprise, as far as possible, of mitigation measures to minimise environmental effects which were captured within the Design Envelope for the Original Development, as follows:

- A Construction Management Plan will be developed in consultation with fishing industry representatives which establishes a protocol for engagement between ICOL and the fishing industry. This will include details on:
    - Communication channels between the fishing community and ICOL through all phases;
    - Protocol for the navigation of construction and operation / maintenance vessels to and from the site (e.g. use of transit lanes that will reduce interaction with fishing activities); and
    - Procedures in the event of interactions between wind farm construction and operation and fishing activities.
- 500 m 'rolling' safety zones around working areas during construction, decommissioning and major maintenance activities to exclude vessels not associated with the works. Consultation will be undertaken with relevant stakeholders to ensure effective implementation and management of safety/exclusion zones.
- Structures within the Development Area will be marked and lit in accordance with International Association of Lighthouse Authorities (IALA) Recommendation O-139 on the Marking of Man-Made Offshore Structures (IALA, 2008). The final lighting and marking scheme will be agreed with the relevant stakeholders prior to construction.
- Cables will be suitably buried or will be protected by other means when burial is not practicable which will reduce the risk to fishing vessels from snagging.
- Promulgation of information and appropriate liaison will be carried out to ensure information on the works are circulated through agreed procedure e.g. Notices to Mariners, Kingfisher and other appropriate media to allow vessels to effectively and safely navigate around the proposed sites.

571. In addition, the EIA for the Original Development identified the requirement for additional mitigation in relation to commercial fisheries which would equally be applied as embedded mitigation for the Revised Development, as follows:

- Suitable and sufficient assessment will be undertaken to ensure that all safety risks are reduced as far as reasonably practicable.
- Modifications to bottom towed fishing gear are being investigated in consultation by the offshore renewables industry and the fishing industry which may better enable fishing activities within and around operational wind farms.

- Defined navigational routes will be used by vessels. This will reduce the risk of disturbance to static gear.
- A regional Commercial Fisheries Working Group (CFWG) had been established to provide a forum for collaborative discussion and action in relation to offshore wind farm developments in the Forth and Tay area and their interactions with commercial fishing activities. Please note that the CFWG no longer exists, should this group not be re-established, ICOL will ensure the principle of the commitments (as identified below) are met:
    - Provide regular contact for representatives of commercial fishermen and the FTOWDG developers to promote communication and understanding;
    - Provide a forum to manage engagement through a project(s) lifecycle with particular focus on consenting, pre-construction planning and construction activities;
    - Provide input to general approaches, procedures and protocols with respect to construction management plans and potential mitigation options, promoting standardisation where possible;
    - Agree specific offshore working practices relating to Marine Licence conditions where required;
    - Agree and maintain a current regional assessment of commercial fishing activities;
    - Identify and develop opportunities between the fishing/renewables industries in the Forth and Tay area, and
    - Establish a protocol for the removal of temporary works post-construction including appropriate verification.

9.3.5 Commitment to Consent Conditions

572. As noted in Section 2.2.3, ICOL propose to commit to the relevant consent conditions granted for the Original Development for the application of the Revised Development. Many of these conditions reinforce the embedded mitigation as identified above.

573. These consent conditions have taken into account any relevant consultation responses to the Original Development EIA from key stakeholders in relation to Commercial Fisheries and in determining the acceptability of the Original Development; the most relevant consent conditions are summarised in Table 9-28, and may include means to which the embedded mitigation identified above will be secured. Conditions in full are provided in Appendix A.

Table 9-28: Summary of Most Relevant Consent Conditions related to Commercial Fisheries

Condition Requirement	Description
Submit a Construction method Statement	Condition will ensure the appropriate construction methods to be set out for approval to ensure that they remain consistent with the methods assessed in the ES and to ensure appropriate construction management taking into account mitigation measures to protect the environment and other users of the marine area.
Submit a Piling Strategy	Condition will set out for approval the details of any proposed piling and how that piling will be managed to mitigate any impacts of underwater noise on sensitive species including fish species (including monitoring provisions) (and therefore of indirect interest to commercial fisheries).
Submit a Development Specification and Layout Plan	This condition will set out for approval the final design and layout of the Development to ensure it remains consistent with the design assessed in the ES as relevant to commercial fisheries.
Production of an Environmental Management Plan	Condition will set out, for approval relevant environmental management and mitigation measures to be applied during the construction and operation of the Development, including those matters identified as mitigation in the Original Development EIA as listed above.
Production of a Vessel Management Plan	Condition will describe, for approval, the types of vessels to be employed and the management and routing of those vessels.
Production of a Navigational Safety Plan	Condition will set out, for approval, the navigational safety measures to be applied so as to mitigate the navigational risk to other legitimate users of the sea.
Production of an Operations and Maintenance Plan	Plan will Set out, for approval, the operations and maintenance procedures and the management of impacts during the operational phase so as to safeguard environmental interests and the interests of other sea users, including fishery interests.
Production of a Cable Plan	Plan will set out, for approval, the installation methods for the cables (including burial) to ensure it remains consistent with the installation process assessed in the ES as relevant to commercial fisheries (including matters related to EMF and cable burial or protection).
Production of a Lighting and Marking Plan	Plan will detail the agreed lighting and marking of the scheme, for approval, so as to safeguard the safety of air and surface navigation.
Submit a Project Environmental Monitoring Plan	This condition will set out, for approval, the proposed environmental monitoring programme, to include as relevant and necessary the monitoring of fish and shellfish (and therefore of indirect interest in relation to commercial fisheries).

Condition Requirement	Description
Appointment of an ECoW	Appointment of an approved Ecological clerk of Works (ECoW) to provide independent audit and reporting of compliance with various requirements of the consent relating to environmental management and to ensure that appropriate and effective monitoring of the impacts of the development is undertaken.
Submit a Commercial Fisheries Mitigation Strategy (CMFS)	This condition will ensure that once approved a mitigation scheme will minimise the impact on commercial fishermen.
Appointment of a Fisheries Liaison Officer (FLO)	Appointment of an approved FLO to ensure effective communication with the local fishing industry and to mitigate the impact on commercial fishermen.
Environmental Protection	Including removal of waste and debris from site, no deposit of toxic materials, management of invasive non-native species risk, use of non-oil based drilling muds.
Relating to Navigational and aviation safety and charting	This condition will ensure the issuing of notice to mariners and details promulgated via Kingfisher Bulletins and requirement for lighting and marking.
Dropped objects	Procedures for the recording of materials used in the works and for recording any lost items and subsequently recording and recovering any such items.
Relating to navigational safety	This condition will ensure that in addition to notifications, requirement for cable laying vessels to be equipped with AIS for depths from cabling works not to be reduced by more than 5% without prior approval; restriction on use of radar or radio beacon use without prior approval by OFCOM.
Marking and Lighting	Requirements for marking and lighting of the site as directed by Northern Lighthouse Board (NLB), Civil Aviation Authority (CAA), Ministry of Defence (MOD) and Maritime and Coastguard Agency (MCA) (including requirement for marking of the area with buoys). Requirement for all vessels to be lit/marked in accordance with the COLREGS.
Participation in any Forth and Tay Regional Advisory Group ("FTRAG") established	Participation in any group established will ensure effective environmental monitoring and mitigation is undertaken at a regional scale.
Participation in any Scottish Strategic Marine Environment Group ("SSMEG") established	Participation in any group established will ensure effective environmental monitoring and mitigation is undertaken at a national scale.

Condition Requirement	Description
Participation in the monitoring requirements as laid out in the 'National Research and Monitoring Strategy for Diadromous Fish.	Participation will ensure effective monitoring of the effects on migratory fish at a local level

9.3.6 Scoping of the Revised Development EIA

574. The Embedded Mitigation (Section 9.3.4) and the commitment to relevant consent conditions (Section 9.3.5) considered alongside the changes in the design envelope will be taken into consideration when determining the scope of the Revised Development EIA. Due to the smaller overall footprint of development, combined with fewer turbines and reduced construction programme, the potential impacts on Commercial Fisheries for the Revised Development would be less than worst case scenario impacts from the Original Development, which were not significant for the majority of impacts. Therefore, the worst case scenario conclusions reached in the Original Development should remain valid for the Revised Development conclusions reached in the Original Development

575. The following Tables (9-29 and 9-30) summarise the post-mitigation (residual) significance for the Original Development and details whether the potential impact will be scoped out of the Revised Development EIA. Where this is the case relevant justification is noted and where the mitigation applied in the Original Development EIA has been carried forward as Embedded Mitigation for the Revised Development.

Table 9-29: Summary of Potential Impacts – Wind Farm

Potential Impact	Receptor	Residual Effect (worst case scenario) (ICOL, 2013)	Scoped in or out of the Revised Development EIA	Justification
Construction (& Decommissioning) Phase				
Direct temporary habitat disturbance	Scallop, Nephrops, crab & lobster	Negligible/ Minor	Scoped out	The impacts from the Original Development were assessed as not significant and, as a result of the design changes described above, the Revised Development is anticipated to have less of an impact. Further assessment of this potential impact is therefore scoped out of the Revised Development EIA.
	Squid	Negligible/ Minor		
	Sea trout	Negligible/ Minor		
	Salmon	Minor/ Moderate		
Indirect disturbance as a result of sediment deposition and temporary increases in suspended sediment concentrations (SSC)	Scallop, Nephrops, crab & lobster	Negligible/ Minor	Scoped out	The impacts from the Original Development were assessed as not significant and, as a result of the design changes described above, the Revised Development is anticipated to have less of an impact. Further assessment of this potential impact is therefore scoped out of the Revised Development EIA.
	Squid	Negligible/ Minor		
	Sea trout	Negligible/ Minor		
	Salmon	Minor/ Moderate		
Barrier effects disturbance or physical injury associated with construction noise	Scallop, Nephrops, Crab & lobster	Mortality, injury and Behaviour = Negligible/ Minor	Scoped out (please note impacts on hearing specialists will be assessed in the Natural Fish and	The impacts from the Original Development were assessed as not significant for all receptor groups. Since the EIA was carried out further research has also shown the impacts from piling on Atlantic salmon are less than what was originally considered.

Potential Impact	Receptor	Residual Effect (worst case scenario) (ICOL, 2013)	Scoped in or out of the Revised Development EIA	Justification
	Squid	Mortality, injury = Negligible/ Minor; Behaviour = Minor	Shellfish Chapter) *	As a result of the design changes described above, due to the increase in potential hammer energy, it is proposed that 'Barrier effects disturbance or physical injury associated with construction noise impacts' will be scoped in to the Revised Development EIA for hearing specialists and assessed under the Natural Fish and Shellfish Chapter. As impacts on a single species which is not considered to be a major focus of the commercial fishery fleets in the area are unlikely to significantly impact commercial fishery receptors, it is recommended that 'Barrier effects disturbance or physical injury associated with construction noise be scoped out of the commercial fishery assessment.
	Sea trout	Mortality, injury = Negligible/ Minor; Behaviour = Minor		
	Salmon	Mortality, injury = Minor/ Moderate; Behaviour = Moderate		
Temporary loss or restricted access to fishing grounds	Scallop fishery	Moderate	Scoped in	Scoped in due to the need to update the commercial fisheries baseline in order to properly assess magnitude of the effect on the fisheries.
	Squid fishery	Minor/ Moderate		
	Creel fishery	Minor/ Moderate		
Safety issues for fishing vessels	All fisheries	No safety risks	Scoped out	The impacts from the Original Development were assessed as no safety risk. Taking into account the design changes and the embedded mitigation (LMP, NSP, VMP, CMS) the Revised Development is considered to have less of an impact than those assessed within the Original Development. Further assessment of this potential impact is therefore scoped out of the Revised Development EIA.

Potential Impact	Receptor	Residual Effect (worst case scenario) (ICOL, 2013)	Scoped in or out of the Revised Development EIA	Justification
Obstacles on the seabed	All fisheries	No safety risks	Scoped out	The impacts from the Original Development were assessed as no risk. Taking into account the design changes and the embedded mitigation (PEMP, EMP, CMS) the Revised Development is considered to have less of an impact than those assessed within the Original Development. Further assessment of this potential impact is therefore scoped out of the Revised Development EIA.
Increased steaming times to fishing grounds	Scallop fishery	Minor	Scoped in	Scoped in due to the need to update the commercial fisheries baseline in order to properly assess magnitude of the impact on the fisheries.
	Squid fishery	Minor		
	Creel fishery	Minor		
Displacement of fishing vessels into other areas	Scallop fishery	Moderate	Scoped in	Scoped in due to the need to update the commercial fisheries baseline in order to properly assess magnitude of the impact on the fisheries.
	Squid fishery	Minor/ Moderate		
	Creel fishery	Minor/ Moderate		
Interference to fishing activities arising from navigational conflict	Scallop fishery	Minor	Scoped out	The impacts from the Original Development were assessed as not significant. Taking into account the design changes and the embedded mitigation (NSP, VMP) the Revised Development is considered to have less of an impact than those assessed within the Original Development. Further assessment of this potential impact is therefore scoped out of the Revised Development EIA.
	Squid fishery	Minor		
	Nephrops Fisheries	Minor		
	Creel fishery	Minor		

Potential Impact	Receptor	Residual Effect (worst case scenario) (ICOL, 2013)	Scoped in or out of the Revised Development EIA	Justification
Operation & Maintenance Phase				
Long term loss of original habitat	Scallop, *Nephrops,* crab & lobster	Minor	Scoped out	The impacts from the Original Development were assessed as not significant and, as a result of the design changes described above, the Revised Development is anticipated to have less of an impact. Further assessment of this potential impact is therefore scoped out of the Revised Development EIA.
	Squid	Negligible/ Minor		
	Sea trout	Negligible/ Minor		
	Salmon	Minor/ Moderate		
Behavioural responses to EMF associated with cabling	Scallop, Nephrops, crab & lobster	Negligible/ Minor	Scoped out	The impacts from the Original Development were assessed as not significant and, as a result of the design changes described above and the increase in knowledge regarding EMF impacts on the receptor groups as presented within this Scoping Report, the Revised Development is anticipated to have less of an impact. Further assessment of this potential impact is therefore scoped out of the Revised Development EIA.
	Squid	Negligible/ Minor		
	Sea trout	Negligible/ Minor		
	Salmon	Minor/ Moderate		
Disturbance or physical injury associated with operational noise	Scallop, Nephrops, crab & lobster	Negligible/ Minor	Scoped out	The impacts from the Original Development were assessed as not significant and, as a result of the design changes described above, the Revised Development is anticipated to have less of an impact. Further assessment of this potential impact is therefore scoped out of the Revised Development EIA.
	Squid	Negligible/ Minor		
	Sea trout	Negligible/ Minor		

Potential Impact	Receptor	Residual Effect (worst case scenario) (ICOL, 2013)	Scoped in or out of the Revised Development EIA	Justification
	Salmon	Minor/ Moderate		
Effect on fish and shellfish resources due to reduced fishing effort within Development Area	Blanket assessment across receptors	Not assigned but considered to be Negligible/ Minor (positive)	Scoped out	The impacts from the Original Development were not assessed but considered to be positive, and as a result of the design changes described above, the Revised Development is still anticipated to have a positive impact. Further assessment of this potential impact is therefore scoped out of the Revised Development EIA.
Creation of new habitat due to presence of project specific infrastructure	Scallop, Nephrops, crab & lobster	Minor/ Moderate (positive)	Scoped out	The impacts from the Original Development were assessed as non-significant or positive, and as a result of the design changes described above, the Revised Development is still anticipated to have a non-significant or positive impact. Further assessment of this potential impact is therefore scoped out of the Revised Development EIA
	Squid	Negligible/ Minor (positive)		
	Sea trout	Negligible/ Minor (positive)		
	Salmon	No Impact		
Temporary habitat disturbance via O&M activities	Scallop, Nephrops, crab & lobster	Negligible/ Minor	Scoped out	The impacts from the Original Development were assessed as not significant and, as a result of the design changes described above, the Revised Development is anticipated to have less of an impact. Further assessment of this potential impact is therefore scoped out of the Revised Development EIA.
	Squid	Negligible/ Minor		
	Sea trout	Negligible/ Minor		

Potential Impact	Receptor	Residual Effect (worst case scenario) (ICOL, 2013)	Scoped in or out of the Revised Development EIA	Justification
	Salmon	Minor/ Moderate		
Complete Loss or Restricted access to fishing grounds	Scallop fishery	Moderate	Scoped in	Scoped in due to the need to update the baseline in order to properly assess magnitude of the effect on the fisheries
	Squid fishery	Minor/ Moderate		
	Creel fishery	Minor/ Moderate		
Safety issues for fishing vessels	All fisheries	No safety risks	Scoped out	The impacts from the Original Development were assessed as no safety risk. Taking into account the design changes and the embedded mitigation (LMP, NSP, VMP, CMS) the Revised Development is considered to have less of an impact than those assessed within the Original Development. Further assessment of this potential impact is therefore scoped out of the Revised Development EIA.
Obstacles on the seabed	All fisheries	No safety risks	Scoped out	The impacts from the Original Development were assessed as no safety risk. Taking into account the design changes and the embedded mitigation (LMP, NSP, VMP, CMS) the Revised Development is considered to have less of an impact than those assessed within the Original Development. Further assessment of this potential impact is therefore scoped out of the Revised Development EIA.
Increased steaming times to fisheries grounds	All fisheries	Minor	Scoped in	Scoped in due to the need to update the baseline in order to properly assess magnitude of the effect on the fisheries.

Potential Impact	Receptor	Residual Effect (worst case scenario) (ICOL, 2013)	Scoped in or out of the Revised Development EIA	Justification
Displacement of fishing vessels into other areas	Scallop Fishery	Moderate	Scoped in	Scoped in due to the need to update the baseline in order to properly assess magnitude of the effect on the fisheries.
	Squid Fishery	Minor/ Moderate		
	Creel Fishery	Minor/ Moderate		
Interference with fishing activities arising from navigational conflict	All fisheries	Minor	Scoped out	The impacts from the Original Development were assessed as not significant. Taking into account the design changes and the embedded mitigation (NSP, VMP) the Revised Development is considered to have less of an impact than those assessed within the Original Development. Further assessment of this potential impact is therefore scoped out of the Revised Development EIA.

Table 9-30: Summary of Potential Impacts – Offshore Export Cable Corridor

Potential Impact	Receptor	Residual Effect (worst case scenario) (ICOL, 2013)	Scoped in or out of the Revised Development EIA	Justification
Construction (& Decommissioning) Phase				
Direct temporary habitat disturbance via Export Cable installation	Scallop, Nephrops, Crab & lobster	Negligible/ Minor	Scoped out	The impacts from the Original Development were assessed as not significant and, as a result of the design changes described above, the Revised Development is anticipated to have less of an impact. Further assessment of this potential impact
	Squid	Negligible/ Minor		

Potential Impact	Receptor	Residual Effect (worst case scenario) (ICOL, 2013)	Scoped in or out of the Revised Development EIA	Justification
	Sea trout	Negligible/ Minor		is therefore scoped out of the Revised Development EIA.
	Salmon	Minor/ Moderate		
Indirect disturbance as a result of sediment deposition and temporary increases in SSC via Export Cable installation	Scallop, Nephrops, Crab & lobster	Negligible/ Minor	Scoped out	The impacts from the Original Development were assessed as not significant and, as a result of the design changes described above, the Revised Development is anticipated to have less of an impact. Further assessment of this potential impact is therefore scoped out of the Revised Development EIA.
	Squid	Negligible/ Minor		
	Sea trout	Negligible/ Minor		
	Salmon	Minor/ Moderate		
Disturbance or physical injury associated with construction noise (Export Cable installation)	Scallop, Nephrops, Crab & lobster	Negligible/ Minor	Scoped out	The impacts from the Original Development were assessed as not significant and, as a result of the design changes described above, the Revised Development is anticipated to have less of an impact. Further assessment of this potential impact is therefore scoped out of the Revised Development EIA.
	Squid	Negligible/ Minor		
	Sea trout	Negligible/ Minor		
	Salmon	Minor/ Moderate		
Temporary loss or restricted access to	Scallop fishery	Minor/ Moderate	Scoped in	Scoped in due to the need to update the baseline in order to properly assess magnitude of the effect on the fisheries.
	Nephrops fishery	Moderate		

Potential Impact	Receptor	Residual Effect (worst case scenario) (ICOL, 2013)	Scoped in or out of the Revised Development EIA	Justification
fishing grounds	Squid fishery	Minor/ Moderate		
	Crab and lobster fishery	Moderate		
Safety issues for fishing vessels	All fisheries	No safety risks	Scoped out	The impacts from the Original Development were assessed as no safety risk. Taking into account the design changes and the embedded mitigation (LMP, NSP, VMP, CMS) the Revised Development is considered to have less of an impact than those assessed within the Original Development. Further assessment of this potential impact is therefore scoped out of the Revised Development EIA.
Obstacles on the seabed	All fisheries	No safety risks	Scoped out	The impacts from the Original Development were assessed as no safety risk. Taking into account the design changes and the embedded mitigation (LMP, NSP, VMP, CMS) the Revised Development is considered to have less of an impact than those assessed within the Original Development. Further assessment of this potential impact is therefore scoped out of the Revised Development EIA.
Increased steaming times to fishing grounds	All fisheries	Minor	Scoped in	Scoped in due to the need to update the baseline in order to properly assess magnitude of the effect on the fisheries.

Potential Impact	Receptor	Residual Effect (worst case scenario) (ICOL, 2013)	Scoped in or out of the Revised Development EIA	Justification
Displacement of fishing activity into other areas	Scallop fishery	Minor/ Moderate	Scoped in	Scoped in due to the need to update the baseline in order to properly assess magnitude of the effect on the fisheries.
	Nephrops fishery	Moderate		
	Squid fishery	Minor/ Moderate		
	Crab and lobster fishery	Moderate		
Interference with Fishing Vessels arising from Navigational Conflict	Scallop fishery	Minor	Scoped out	The impacts from the Original Development were assessed as not significant. Taking into account the design changes and the embedded mitigation (NSP, VMP) the Revised Development is considered to have less of an impact than those assessed within the Original Development. Further assessment of this potential impact is therefore scoped out of the Revised Development EIA.
	Nephrops fishery	Minor		
	Squid fishery	Minor		
	Crab and lobster fishery	Minor/ Moderate		
Operation & Maintenance Phase				
Long term loss of original habitat (Export Cable)	Scallop, Nephrops, Crab & lobster	Negligible/ Minor	Scoped out	The impacts from the Original Development were assessed as not significant and, as a result of the design changes described above, the Revised Development is anticipated to have less of an impact. Further assessment of this potential impact is therefore scoped out of the Revised Development EIA.
	Squid	Negligible/ Minor		
	Sea trout	Negligible/ Minor		

Potential Impact	Receptor	Residual Effect (worst case scenario) (ICOL, 2013)	Scoped in or out of the Revised Development EIA	Justification
	Salmon	Minor/ Moderate		
Behavioural responses to EMF associated with cabling (Export Cable)	Scallop, Nephrops, Crab & lobster	Negligible/ Minor	Scoped out	The impacts from the Original Development were assessed as not significant and, as a result of the design changes described above and the increase in knowledge regarding EMF impacts on the receptor groups as presented within this Scoping Report, the Revised Development is anticipated to have less of an impact. Further assessment of this potential impact is therefore scoped out of the Revised Development EIA.
	Squid	Negligible/ Minor		
	Sea trout	Negligible/ Minor		
	Salmon	Minor/ Moderate		
Creation of new habitat due to presence of Cable Protection	Scallop, Nephrops, Crab & lobster	Negligible/ Minor (positive)	Scoped out	The impacts from the Original Development were assessed as not significant and, as a result of the design changes described above, the Revised Development is anticipated to have less of an impact. Further assessment of this potential impact is therefore scoped out of the Revised Development EIA.
	Squid	Negligible/ Minor (positive)		
	Sea trout	Negligible/ Minor (positive)		
	Salmon	No Impact		
Temporary habitat disturbance from O & M activities	Scallop, Nephrops, Crab & lobster	Negligible/ Minor	Scoped out	The impacts from the Original Development were assessed as not significant and, as a result of the design changes described above, the Revised Development is anticipated to have less of an impact. Further assessment of this potential impact
	Squid	Negligible/ Minor		

Potential Impact	Receptor	Residual Effect (worst case scenario) (ICOL, 2013)	Scoped in or out of the Revised Development EIA	Justification
	Sea trout Salmon	Minor/ Moderate		is therefore scoped out of the Revised Development EIA.
Complete loss or restricted access to fishing grounds	All fisheries	Negligible/ Minor	Scoped in	Scoped in due to the need to update the baseline in order to properly assess magnitude of the effect on the fisheries.
Safety issues for fishing vessels	All fisheries	No safety risks	Scoped out	The impacts from the Original Development were assessed as no safety risk. Taking into account the design changes and the embedded mitigation (LMP, NSP, VMP, CMS) the Revised Development is considered to have less of an impact than those assessed within the Original Development. Further assessment of this potential impact is therefore scoped out of the Revised Development EIA.
Obstacles on the seabed	All fisheries	No safety risks	Scoped out	The impacts from the Original Development were assessed as no safety risk. Taking into account the design changes and the embedded mitigation (LMP, NSP, VMP, CMS) the Revised Development is considered to have less of an impact than those assessed within the Original Development. Further assessment of this potential impact is therefore scoped out of the Revised Development EIA.
Increased steaming times to fishing grounds	All fisheries	Negligible/ Minor	Scoped in	Scoped in due to the need to update the baseline in order to properly assess magnitude of the effect on the fisheries.

Potential Impact	Receptor	Residual Effect (worst case scenario) (ICOL, 2013)	Scoped in or out of the Revised Development EIA	Justification
Displacement of fishing activity into other areas	All fisheries	Negligible/ Minor	Scoped in	Scoped in due to the need to update the baseline in order to properly assess magnitude of the effect on the fisheries.
Interference with Fishing Vessels arising from Navigational Conflict	All fisheries	Negligible/ Minor	Scoped out	The impacts from the Original Development were assessed as not significant. Taking into account the design changes and the embedded mitigation (NSP, VMP) the Revised Development is considered to have less of an impact than those assessed within the Original Development. Further assessment of this potential impact is therefore scoped out of the Revised Development EIA.

Scoping of Cumulative Impact Assessment

576. The Cumulative Impact Assessment (CIA) for commercial fisheries set out in the Original Development EIA considered the potential cumulative effects from the Firth of Forth offshore wind projects only for most fisheries on the basis that, whilst it was recognised that projects further afield could potentially contribute to the cumulative impacts on commercial fish receptors, for the majority of commercial fish receptors and other development projects, the scale, nature and distance from the Development Area suggests that they will not interact with a significant proportion of any receptors that could result in a cumulative impact. As such the Original Development CIA considered the cumulative impacts arising from:

- The Neart Na-Gaoithe Offshore Windfarm; and
- The Seagreen Alpha and Bravo Offshore Windfarms.

577. Therefore these projects will be the basis of the Commercial Fisheries CIA for the Revised Development (i.e. the focus being on the Forth and Tay projects as currently planned).

578. In addition the CIA for the Original Development did identify that in certain instances, the wide operational range of certain fishing vessels (i.e. in the case of the nomadic scallop fleet) may result in them being affected by projects in addition to those in the Forth and Tay area (although this potential interaction was not subject to detailed assessment). Therefore, in relation the nomadic scallop fleet only, consideration of cumulative impacts arising from the following projects will also be considered:

- Aberdeen Offshore Wind Farm;
- Hywind Demo;
- Blyth Offshore;
- Beatrice Offshore Wind Farm;
- Telford, Stevenson and MacColl Offshore Wind Farms; and
- Kincardine Floating Offshore Windfarm.
- Moray Firth Offshore Wind Ltd Western Development Area; and
- Rampion Round 3 Zone.

579. Table 9-31 presents the Original Development residual effect from the for all cumulative impacts considered and details whether the potential cumulative impact has been scoped out of the Revised Development EIA, with a relevant justification

Table 9-31: Summary of Potential Impacts – Revised Development with Other Plans, Projects and Activities

Potential Impact	Receptor	Residual Effect (worst case scenario) (ICOL, 2013)	Scoped in or out of the Revised Development CIA	Justification
Construction (& Decommissioning) Phase				
Direct temporary habitat disturbance	Scallop, Nephrops, Crab & lobster	Negligible/ Minor	Scoped Out	The cumulative impacts from the Original Development were assessed as not significant. As a result of the design changes described above, coupled with no change to the projects required to be considered cumulatively, it is anticipated
	Squid	Negligible/ Minor		

Potential Impact	Receptor	Residual Effect (worst case scenario) (ICOL, 2013)	Scoped in or out of the Revised Development CIA	Justification
	Sea trout	Negligible/ Minor		that that there will be less of a cumulative impact associated with the Revised Development. Further assessment is therefore scoped out of the Revised Development CIA.
	Salmon	Minor/ Moderate		
Indirect disturbance as a result of sediment deposition and temp increase in SSC	Scallop Nephrops Crabs	Negligible/ Minor	Scoped out	The cumulative impacts from the Original Development were assessed as not significant. As a result of the design changes described above, coupled with no change to the projects required to be considered cumulatively, it is anticipated that that there will be less of a cumulative impact associated with the Revised Development. Further assessment is therefore scoped out of the Revised Development CIA
	Squid	Negligible/ Minor		
	Sea trout	Negligible/ Minor		
	Salmon	Minor/ Moderate		
Barrier effects disturbance or physical injury associated with construction noise	Scallops *Nephops* Crabs and lobster	Mortality/ injury and behaviour = Negligible/ Minor	Scoped out	The cumulative impacts from the Original Development were assessed as not significant. As a result of the design changes described above, coupled with no change to the projects required to be considered cumulatively, it is anticipated that that there will be less of a cumulative impact associated with the Revised Development. Further assessment is therefore scoped out of the Revised Development CIA.
	Squid	Mortality/ injury = Negligible/ Minor; behaviour = Minor		

Potential Impact	Receptor	Residual Effect (worst case scenario) (ICOL, 2013)	Scoped in or out of the Revised Development CIA	Justification
	Sea trout	Mortality/ injury = Negligible/ Minor; behaviour = Minor		*Impacts on hearing specialists will be assessed under the Natural Fish and Shellfish Ecology chapter.*
	Salmon	Mortality/ injury – minor /Moderate = Behaviour = Moderate		
Temporary or complete loss or restricted access to fishing grounds	All fisheries	Moderate	Scoped in	Scoped in due to the need to update the baseline in order to properly assess magnitude of the effect on the fisheries.
Safety issues for fishing vessels	All fisheries	No safety risks	Scoped out	The impacts from the Original Development were assessed as no safety risk. Taking into account mitigation (e.g. safety and exclusions zones) which will be in force and will ensure no safety risk. As no impact is predicted at the project level due to implementation of appropriate mitigation, no cumulative effects are possible and as such this impact is scoped out of the CIA.

Potential Impact	Receptor	Residual Effect (worst case scenario) (ICOL, 2013)	Scoped in or out of the Revised Development CIA	Justification
Obstacles on the seabed	All fisheries	No safety risks	Scoped out	Scoped out due to mitigation that will be in place, e.g. good construction practices and reporting. As no impact is predicted at the project level due to implementation of appropriate mitigation, no cumulative effects are possible and as such this impact is scoped out of the CIA.
Increased steaming time to fishing grounds	All fisheries	Minor/ Moderate	Scoped in	Scoped in due to the need to update the baseline in order to properly assess magnitude of the effect on the fisheries.
Displacement of fishing activity	All Fisheries	Moderate	Scoped in	Scoped in due to the need to update the baseline in order to properly assess magnitude of the effect on the fisheries.
Interference to fishing activities (navigational conflict)	Scallop Fishery	Minor	Scoped out	Scoped out as mitigation (use of defined navigational routes to be used by vessels to reduce the risk of disturbance to static gear) ensures no significant effects will occur. With the implementation of appropriate mitigation, no cumulative effects are possible and as such this impact is scoped out of the CIA.
	Squid Fishery	Minor		
	Nephrops fishery	Minor		
	Crab and Lobster fishery	Minor		

Potential Impact	Receptor	Residual Effect (worst case scenario) (ICOL, 2013)	Scoped in or out of the Revised Development CIA	Justification
Operation & Maintenance Phase				
Long term loss of original habitat	Scallop, Nephrops, crab & lobster	Minor	Scoped Out	The cumulative impacts from the Original Development were assessed as not significant. As a result of the design changes described above, coupled with no change to the projects required to be considered cumulatively, it is anticipated that that there will be less of a cumulative impact associated with the Revised Development. Further assessment is therefore scoped out of the Revised Development CIA
	Squid	Negligible/ Minor		
	Sea trout	Negligible/ Minor		
	Salmon	Minor/ Moderate		
Behavioural responses to EMF associated with cabling	Scallop, Nephrops, Crab & lobster	Negligible/ Minor	Scoped Out	The cumulative impacts from the Original Development were assessed as not significant. Since then there is also an increase in knowledge regarding EMF impacts on the receptor groups (presented within this Scoping Report). Therefore as a result of the design changes described above, coupled with no change to the projects required to be considered cumulatively, it is anticipated that that there will be less of a cumulative impact associated with the Revised Development. Further assessment is therefore scoped out of the Revised Development CIA
	Squid	Negligible/ Minor		
	Sea trout	Minor		
	Salmon	Moderate		

Potential Impact	Receptor	Residual Effect (worst case scenario) (ICOL, 2013)	Scoped in or out of the Revised Development CIA	Justification
Disturbance or physical injury associated with operational noise	Scallop, Nephrops, Crab & lobster Squid	Negligible/ Minor	Scoped Out	The cumulative impacts from the Original Development were assessed as not significant. As a result of the design changes described above, coupled with no change to the projects required to be considered cumulatively, it is anticipated that that there will be less of a cumulative impact associated with the Revised Development. Further assessment is therefore scoped out of the Revised Development CIA.
	Squid	Negligible/ Minor		
	sea trout	Negligible/ Minor		
	Salmon	Minor/ Moderate		
Effect on fish and shellfish resources due to reduced fishing effort within development area	Scallop, Nephrops, Crab & lobster	Negligible/ Minor (+ve)	Scoped out	The cumulative impacts from the Original Development were assessed as having positive effects. As a result of the design changes described above, coupled with no change to the projects required to be considered cumulatively, it is anticipated that that there will still be a positive cumulative impact associated with the Revised Development. Further assessment is therefore scoped out of the Revised Development CIA.
	Squid	Negligible/ Minor (+ve)		
	Sea trout	Negligible/ Minor (+ve)		
	Salmon	Negligible/ Minor (+ve)		
Creation of new habitat due to presence of infrastructure	Scallop, Nephrops, crab & lobster	Minor/ Moderate (+ve)	Scoped Out	The cumulative impacts from the Original Development were assessed as not significant or positive effects. As a result of the design changes described above, coupled with no change to the projects required to be considered cumulatively, it is anticipated that that there will still be a not significant/ positive cumulative impact associated
	Squid	Negligible/ Minor (+ve)		
	Sea trout	Negligible/ Minor (+ve)		

Potential Impact	Receptor	Residual Effect (worst case scenario) (ICOL, 2013)	Scoped in or out of the Revised Development CIA	Justification
	Salmon	No Impact		with the Revised Development. Further assessment is therefore scoped out of the Revised Development CIA.
Temporary habitat disturbance via O&M activities	Scallop, Nephrops, Crab & lobster	Negligible/ Minor	Scoped Out	The cumulative impacts from the Original Development were assessed as not significant. As a result of the design changes described above, coupled with no change to the projects required to be considered cumulatively, it is anticipated that that there will be less of a cumulative impact associated with the Revised Development. Further assessment is therefore scoped out of the Revised Development CIA
	Squid	Negligible/ Minor		
	Sea trout	Negligible/ Minor		
	Salmon	Minor/ Moderate		
Complete loss or restricted access to fishing grounds	All fisheries	Moderate	Scoped in	Scoped in due to the need to update the baseline in order to properly assess magnitude of the effect on the fisheries.
Safety issues for fishing vessels	All fisheries	No safety risks	Scoped out	Scoped out due to mitigation (e.g. safety and exclusions zones) which will be in force, and will ensure no safety risks. Therefore there is no cumulative effect possible and as such this impact is scoped out of the CIA.
Obstacles on the seabed	All fisheries	No safety risks	Scoped out	Scoped out due to mitigation that will be in place e.g. good construction practices and reporting. As no impact is predicted at the project level due to implementation of appropriate mitigation, no cumulative effects are possible and as such this impact is scoped out of the CIA.

Potential Impact	Receptor	Residual Effect (worst case scenario) (ICOL, 2013)	Scoped in or out of the Revised Development CIA	Justification
Increased steaming times to fishing grounds	All fishing grounds	Minor	Scoped in	Scoped in due to the need to update the baseline in order to properly assess magnitude of the effect on the fisheries.
Displacement of fishing activity	All Fisheries	Moderate	Scoped in	Scoped in due to the need to update the baseline in order to properly assess magnitude of the effect on the fisheries.
Interference to fishing activities arising from navigational conflict	All fisheries	Minor	Scoped out	Scoped out as mitigation (use of defined navigational routes to be used by vessels to reduce the risk of disturbance to static gear) ensures no significant effects will occur. As no impact is predicted at the project level due to implementation of appropriate mitigation, no cumulative effects are possible and as such this impact is scoped out of the CIA.

9.3.7 Approach to EIA

580. As noted in Section 5, the intention of the EIA is to focus on those impacts that are likely to have significant effects (or those effects that are currently uncertain).

581. Based on the evidence summarised for the Original Development EIA and considering the scope of the Revised Development by comparison to the Original Development, it is concluded that all of the potential impacts on Commercial Fish receptors should be scoped out of the EIA for the Revised Development with the exception of:

- The impacts from the development of the Revised Inch Cape Wind Farm and Revised OfTW for:
    - Temporary/ complete loss or restricted access to fishing grounds (during construction and operation);
    - Increased steaming times to fishing grounds (during construction and operation);
    - Displacement of fishing vessels into other areas (during construction and operation); and
    - Complete loss or restricted access to fishing grounds (during operation).

582. ICOL intend to undertake consultation and workshops with stakeholders and MS-LOT to agree the key parameters and the most appropriate methodologies to employ for the impact assessment.

583. As noted above, in order to ensure the most recent 5 years' worth of data are taking into account for the Revised Development EIA, the data sources assessed in the Original Development EIA will be updated, where possible, to ensure that the latest trends in fishing activity are taken into account and in order to consider any spatial or temporal distribution changes to fishing activity. Any additional sources will also be discussed during the stakeholder consultation process.

9.3.8 Scoping Questions - Commercial Fisheries

- Are you satisfied that the EIA should only concentrate on those receptors which may be subject to significant effects from the proposed development?
- Are you satisfied with the proposal to update the commercial fish baseline?
- Are you satisfied with the receptors and potential impact proposed to be included within the impact assessment? Are you satisfied that this sufficiently covers the potential impacts on features from the proposed development?
- Are you satisfied that the embedded mitigation and the proposed use of Consent conditions are appropriate to the potential level of impact from this Revised Development?
- Do you agreed on the projects proposed to be included in the cumulative impact assessment?
- Do you agree that cumulative impacts on Commercial Fisheries should be scoped out of EIA for the Revised Development (with the exception of loss or restricted access to fishing grounds, increased steaming times to fishing grounds and displacement of fishing vessels into other areas) habitat piling noise effects on hearing specialists) based on the assumptions set out and the conclusions reached in the CIA for the Original Development?

9.4 Shipping and Navigation

9.4.1 Introduction

584. This section of the Scoping Report confirms the shipping and navigation receptors of relevance to the Revised Development. As described in Section 5, the purpose of this section is to provide sufficient detail on the potential effects on Shipping and Navigation interests resulting from the construction, operation and maintenance and decommissioning of the Revised Development.

585. The detail provided will allow MS-LOT and their consultees to be clear about what they consider the significant effects of the proposal are likely to be and, therefore, whether they need to be subject to an EIA and be included within the ES.

586. In order to provide sufficient information to consultees reference is made to the baseline data gathered to inform the Shipping and Navigation baseline used within the Original Development EIA, notably the Navigational Risk Assessment (NRA) (Anatec, 2013), and to the outcomes of the impact assessment presented in the Original Development EIA. Design, construction and operational changes between the Original Development and the Revised Development that are likely to have further impacts to metocean and coastal processes are also considered to inform any subsequent impact assessments.

587. For a full description of the design envelope parameters and changes please refer to Section 4. The Development Area for both the Original and Revised remains unchanged.

588. It is noted that since the Original Development EIA, the MCA guidance has been updated from Marine Guidance Note (MGN) 371 to MGN 543. A full assessment and comparison against MGN 543 has not been undertaken; however, it is noted that a post consent requirement will be for the Revised Development to meet the design requirements set out in MGN 543. Given the change in this regulator guidance and the potential variations in AIS baseline since the shipping traffic surveys in 2012 it is proposed that a revised shipping and navigation assessment be included within the Revised Development ES for the following impacts only:

- Operation and Maintenance of the Revised Inch Cape Wind Farm: Vessel to vessel collision risk for commercial vessels, commercial fishing vessels and recreational vessels
- Operation and Maintenance of the Revised Inch Cape Wind Farm: Allision with Inch Cape structures for commercial vessels, commercial fishing vessels and recreational vessels
- Operation and Maintenance of the Revised OfTW: Effects on anchoring operations for commercial vessels

- Operation and Maintenance of the Revised OfTW: Export Cable Corridor Snagging risk – commercial fishing vessels
- Operation and Maintenance of the Revised OfTW: Export Cable Corridor Effects on anchoring operations – recreational vessels

589. For all other potential impacts these are the likely to be less than those assessed for the Original Development and therefore, in line with the EIA regulations are not required to be included with the Revised Development ES. This is due to the following;

- Changes in the Revised Design Envelope (see Section 4);
- Baseline data remaining valid;
- No material changes to data collection;
- No material changes to assessment best practise; and
- Not significant effects concluded within the Original Development EIA.

9.4.2 Data Sources and Baseline Environment

590. This section identifies baseline data sources that can be used to characterise shipping and navigation within and around the Revised Development, drawing predominantly from the data sources used to inform the Original Development EIA and identifying where additional data will be obtained where necessary in respect of the Revised Development EIA.

Baseline Data

591. The following section gives an overview of the baseline assessment which can be found in the Original Development EIA NRA, Appendix 19A and Appendix 19B .

592. As part of the Original Development EIA, two Automatic Identification System (AIS) and Radar marine traffic surveys (vessel based) were undertaken in waters in and around the Development Area to identify vessel activity. The data collection included both summer and winter to take account of seasonal patterns in marine traffic. Ten days' data were collected from the Gargano survey vessel between 26 February and 6 March 2012 and 18 days' data were collected from the Shamariah survey vessel between 23 July and 11 August 2012, giving a combined data set of 28 days. At the time of the original NRA, AIS was required on board all vessels of more than 300 gross registered tonnage (GRT) engaged on international voyages, cargo vessels of more than 500 GRT not engaged on international voyages and passenger vessels irrespective of size built on or after 1 July 2002. At the time of the Gargano survey in February/March 2012, fishing vessels of 45 metres (m) length and over were also required to carry AIS. This requirement was extended to 24-45 m length fishing vessels on 31 May 2012, therefore fishing vessels of 24 m length and over were also tracked on AIS in the Shamariah survey in July/August 2012. From 31 May 2014, the requirement to carry AIS

was applied to all fishing vessels of 15 m length and over under European Union (EU) Directive 2009/17/EC.

593. A proportion of smaller vessels also carry AIS voluntarily and were also tracked by AIS when possible during the site specific surveys. Non-AIS vessels (mainly recreational vessels and smaller fishing vessels) were also recorded during the Gargano and Shamariah surveys using an Automatic Radar Plotting Aid (ARPA). These radar track data were supplemented by manual observations of vessels within visual range to obtain information on the type and size of the vessels recorded.

594. In addition to the marine traffic data collected during the vessel surveys within the Development Area, other data sources used included fishing vessel sightings, maritime incident data, UK Coastal Atlas of Recreational Boating, UK Admiralty Charts and Admiralty Sailing Directions. The data sources are more fully described in the inch Cape Offshore Wind Farm ES Chapter 19 (ICOL, 2013).

595. As part of the Original Development EIA Appendix 19B (ICOL 2013) 56 days of shore based AIS data (2011 and 2012) were analysed including data collected as part of the Forth and Tay Offshore Wind Developers Group in 2011. The analysis identified that tankers and cargo vessels were the most common vessel types recorded within the Offshore Export Cable Corridor Buffer. In January and February 2011, there were an average of 22 unique vessels per day within the buffer. In May 2012, the average number of unique vessels within the buffer was 23.

596. A number of designated anchorage areas and anchor berths were identified in the Firth of Forth and the Offshore Export Cable Corridor buffer. Analysis of the AIS data identified vessels at anchor in those areas, the majority of which were tankers headed for the Hound Point marine terminal in the Firth of Forth. No vessels anchored within the Offshore Export Cable Corridor.

Data Validity

597. At the time of the Original Development EIA the site specific marine traffic survey data met the MCA requirements in terms of age, geographical coverage and comprehensiveness and following the requirements then set out in MGN371.

598. MGN 543 (as the current NMCA guidance) requires that marine traffic data be gathered within a maximum of two years of the submission of an application for consent. Guidance will be sought on this matter from the MCA and as part of the scoping process with a view to establishing the validity of the existing data sets as a basis for the assessment of the Revised Development. However, for the purposes of this Scoping Report it is assumed that in advance of the Revised Development EIA ICOL will require to collect a further 28 days of AIS only data to update the marine traffic baseline.

599. Unlike marine traffic survey data, there are no specific guidelines from the regulator regarding time limits or expiry dates when analysing other data sets. It is assumed that baseline from the following data remains unchanged from that presented in the Original Development EIA;

- Maritime Incident Data (Marine Accident Investigation Branch (MAIB) 2001-2010 and Royal National Lifeboat Institution (RNLI) 2001-2010);
- UK Coastal Atlas of Recreational Boating, 2009 and 2010 GIS Shape Files (RYA, 2010);
- UK Admiralty Charts 1407-0 and 734-0; and
- Admiralty Sailing Directions – North Sea (West) Pilot, NP 54 (UKHO, 2009).

Additional Data Sources

600. As part of the Revised Development EIA a further 28 days of AIS only data may be collected to update the marine traffic data baseline collected for the Original Development EIA.

Review of Baseline Characteristics

601. Chapter 19 of the Original Development ES (ICOL, 2013) presents the baseline characteristics for Shipping and Navigation receptors across the Study Area. Following consultation this may be updated with a further 28 days of AIS data only.

9.4.3 Design Envelope

602. Tables 9-32 and 9-33 set out the worst case scenarios defined by the Original Development EIA for shipping and navigation (ICOL, 2013) compared to the proposed worst case scenario for the Revised Development at a level of detail sufficient to draw conclusions in relation to the scoping process.

Table 9-32: Worst Case Scenario Definition – Wind Farm

Potential Impact	Original Development Design Envelope (worst case scenario) (ICOL, 2013)	Revised Development Design Envelope (worst case scenario)	Difference between the Original and Revised Design Envelopes
Construction (& Decommissioning) Phase			
Construction activities in the Development Area may affect existing marine transit routes, resulting in deviation and increasing journey times.	There will be increased transit times and distances when vessels are required to deviate from their main routes to avoid construction works. Construction period estimated at four years.	There will be increased transit times and distances when vessels are required to deviate from their main routes to avoid construction works. Construction period estimated at two years.	Overall reduction in construction vessels movements from around 3500 to around 1500. Reduced construction period from four years to two years.
Presence of construction vessels and the displacement of existing vessel transit routes may adversely increase encounters and therefore lead to increased vessel to vessel collision risk.	For vessels on these routes there will be an increased vessel to vessel collision risk during construction works due to the increased number of vessels (jack-ups, barges, motherships and transfer vessels) working within the Development Area and associated with the installation of Inch Cape Structures. Vessels could be required to deviate from their main routes to avoid construction works which could lead to an increased number of vessels on these routes. Construction period estimated at four years	For vessels on these routes there will be an increased vessel to vessel collision risk during construction works due to the increased number of vessels (jack-ups, barges, motherships and transfer vessels) working within the Development Area and associated with the installation of Inch Cape Structures. Vessels could be required to deviate from their main routes to avoid construction works which could lead to an increased number of vessels on these routes. Construction period estimated at two years	Overall reduction in construction vessels movements from around 3500 to around 1500. Reduced construction period from four years to two years.
Presence of partially constructed Inch Cape Structures in previously open sea areas may adversely create vessel to structure allision risk.	Partially constructed WTGs not marked or mitigated against collision for extended periods i.e. not marked with navigational aids.	Partially constructed WTGs not marked or mitigated against collision for extended periods i.e. not marked with navigational aids.	Overall reduction in construction vessels movements from around 3500 to

Potential Impact	Original Development Design Envelope (worst case scenario) (ICOL, 2013)	Revised Development Design Envelope (worst case scenario)	Difference between the Original and Revised Design Envelopes
	Construction period estimated at four years.	Construction period estimated at two years.	around 1500. Reduced construction period from four years to two years.
Commercial fishing vessel gear snagging and/or allision due to the presence of partially constructed structures in the Development Area.	Partially constructed WTGs not marked or mitigated against collision for extended periods i.e. not marked with navigational aids which may cause additional gear interaction with the Inch Cape Structures, including increased snagging risk for commercial fishing. Construction period estimated at four years.	Partially constructed WTGs not marked or mitigated against collision for extended periods i.e. not marked with navigational aids which may cause additional gear interaction with the Inch Cape Structures, including increased snagging risk for commercial fishing. Construction period estimated at two years.	Overall reduction in construction vessels movements from around 3500 to around 1500. Reduced construction period from four years to two years.
Increased vessel to vessel collision risk on recreational vessels.	Increased number of vessels working within the Development Area and associated with the installation of Inch Cape Structures. This includes both collision with the construction vessel and collision with another recreational vessel. The displacement of commercial vessels and commercial fishing vessels into areas transited by recreational vessels could further increase this risk. Construction period estimated at four years.	Partially constructed WTGs not marked or mitigated against collision for extended periods i.e. not marked with navigational aids which may cause additional gear interaction with the Inch Cape Structures, including increased snagging risk for commercial fishing. Construction period estimated at two years.	Overall reduction in construction vessels movements from around 3500 to around 1500. Reduced construction period from four years to two years.
Creation of vessel to Inch Cape Structure allision risk on Recreational Vessels	Partially constructed WTGs not marked or mitigated against collision for extended periods i.e. not	Partially constructed WTGs not marked or mitigated against collision for extended periods i.e. not marked with	Overall reduction in construction vessels

Potential Impact	Original Development Design Envelope (worst case scenario) (ICOL, 2013)	Revised Development Design Envelope (worst case scenario)	Difference between the Original and Revised Design Envelopes
	marked with navigational aids. These effects are increased during periods of bad weather, particularly when visibility is reduced by fog. Construction period estimated at four years.	navigational aids. These effects are increased during periods of bad weather, particularly when visibility is reduced by fog. Construction period estimated at two years.	movements from around 3500 to around 1500. Reduced construction period from four years to two years.
Operation & Maintenance Phase			
Physical presence of Inch Cape Structures may displace commercial shipping, fishing vessels and recreational vessels leading to increased deviations and effects on vessel transit time.	There will be increased transit times and distances when vessels are required to deviate from their main routes due to the physical presence of Inch Cape Structures.	There will be increased transit times and distances when vessels are required to deviate from their main routes due to the physical presence of Inch Cape Structures	No change between Original and Revised Development
Physical presence of Inch Cape Structures may displace commercial shipping, fishing vessels and recreational vessels leading to an increase in encounters and therefore vessel to vessel collision risk. Physical presence of Inch Cape Structures may cause an additional vessel to structure allision risk for commercial shipping, fishing vessels and recreational vessels and wind farm operators. Physical presence of Inch Cape Structures may cause adverse interference with Marine Radar Systems.	The following presents the largest area and maximum geometric factor for collision risk and creating the maximum number of routes to encounter another vessel or structure including vessels not under command: • 213 WTGs with irregular layout plus five Offshore Substation Platforms (OSPs) internal to the array. • Micro sitting +/- 50 m • Closest Average Downwind Spacing of 820 m	The following presents the largest area and maximum geometric factor for collision risk and creating the maximum number of routes to encounter another vessel or structure including vessels not under command: • 72 WTGs with irregular layout plus two Offshore Substation Platforms (OSPs) internal to the array. • Micro sitting +/- 50 m • Closest Average Downwind Spacing of 1278 m • Closest Average Crosswind Spacing of 1278 m	Overall there is a 66% reduction in WTGs numbers, 60% OSPs and the Revised Development requires no further met masts. The minimum spacing between WTGs has increased by 458 m

Potential Impact	Original Development Design Envelope (worst case scenario) (ICOL, 2013)	Revised Development Design Envelope (worst case scenario)	Difference between the Original and Revised Design Envelopes
	• Closest Average Crosswind Spacing of 820 m • Jacket Foundation for WTGs: ○ 30 m x 30 m dimension at sea level for WTGs ○ 100 m x 100 m dimension at sea level for OSPs • Minimum blade clearance of WTGs – 22 m above Highest Astronomical Tide (HAT) • Minimum Under Keel Clearance of Inch Cape Structures - four metres below HAT	• Jacket Foundation for WTGs: ○ 30 m x 30 m dimension at sea level for WTGs ○ 100 m x 100 m dimension at sea level for OSPs • Minimum blade clearance of WTGs – 22 m above Highest Astronomical Tide (HAT) Minimum Under Keel Clearance of Inch Cape Structures - four metres below HAT	
Implications on the response capability of emergency responders.	The presence of the Inch Cape Structures has the potential to increase the need for emergency response activities and restrict access to casualties within the Development Area. However, Inch Cape Structures may also aid emergency response by providing a place of refuge and a point of reference.	The presence of the Inch Cape Structures has the potential to increase the need for emergency response activities and restrict access to casualties within the Development Area. However, Inch Cape Structures may also aid emergency response by providing a place of refuge and a point of reference.	No change until final layout with the reduced number of turbines is known, noting that minimum turbine spacing has increased by 458 m.
Physical presence of inter-array cables may cause additional anchor snagging risk for commercial vessels	The main effect will be for those vessels anchoring in close proximity to the cable, or those required to do so in an emergency situation,	The main effect will be for those vessels anchoring in close proximity to the cable, or those required to do so in an emergency situation, such as	46 % reduction in inter-array cable

Potential Impact	Original Development Design Envelope (worst case scenario) (ICOL, 2013)	Revised Development Design Envelope (worst case scenario)	Difference between the Original and Revised Design Envelopes
and commercial fishing vessels.	such as machinery failure. The following presents the worst case scenarios involving the Development Area: • Burial of 0 m with cable protection • Inter-array cabling length – 353 kilometres (km) • Longest installation period, simultaneous operation and over maximum area.	machinery failure. The following presents the worst case scenarios involving the Development Area: • Burial of 0 m with cable protection • Inter-array cabling length – 190 kilometres (km) Longest installation period, simultaneous operation and over maximum area.	

Table 9-33: Worst Case Scenario Definition – Offshore Export Cable Corridor

Potential Impact	Original Development Design Envelope (ICOL, 2013)	Revised Development Design Envelope	Difference between Envelopes
Construction (& Decommissioning) Phase			
Presence of installation vessels and the displacement of existing vessel transit routes may adversely increase encounters and therefore lead to increased vessel to vessel collision risk.	For vessels on these routes there will be an increased vessel to vessel collision risk due to the increased number of installation vessels. AC as largest number (six) of Export Cables; Export Cable length = 83.3 km (multiplied by six);	Two AC Export Cables; Export Cable length = 83.3 km (multiplied by two);	Cable corridor length remains the same (83.3 km), there is a reduction in number of export cables from six to two resulting in the proportional reduction in vessels.
Commercial fishing vessel gear snagging on structures or Offshore Export Cables.	Fishing vessels could potentially snag their gear on partially installed or not yet buried Offshore Export Cables, leading to damage to the vessel and the cable.	Two AC Export Cables; Export Cable length = 83.3 km (multiplied by two);	Cable corridor length remains the same (83.3 km), there is a reduction in number of export cables from six to two.

Potential Impact	Original Development Design Envelope (ICOL, 2013)	Revised Development Design Envelope	Difference between Envelopes
	AC as largest number (six) of Export Cables; Export Cable length = 83.3 km (multiplied by six);		
Operation & Maintenance Phase			
Physical presence of Offshore Export Cables may cause additional anchor snagging risk for commercial vessels and commercial fishing vessels.	The main effect will be for those vessels anchoring in close proximity to the Offshore Export Cables, or those required to do so in an emergency situation, such as machinery failure. The following presents the worst case scenarios involving the Offshore Export Cables: Burial of 0 m with cable protection Offshore Export Cabling length – Up to 6 x 83.3 km Longest installation period, simultaneous operation and over maximum area.	The following relevant changes are noted: Offshore Export Cabling length – Up to 2 x 83.3 km	Cable corridor length remains the same (83.3 km), there is a reduction in number of export cables from six to two.
Physical presence of Offshore Export Cables may cause electromagnetic interference for vessels using magnetic compasses.	Compass deviations are greatest in water depths less than five metres and where the cable is not buried. DC cables have been assessed. Offshore Export Cabling length – Up to 6 x 83.3 km	The following relevant changes are noted: Offshore Export Cabling length – Up to 2 x 83.3 km AC cables.	Cable corridor length remains the same (83.3 km), there is a reduction in number of export cables from six to two. DC cables are no longer considered.

9.4.4 Revised Development Embedded Mitigation Measures

603. Embedded Mitigation for the Revised Development will comprise of a range of measures to minimise environmental effects which were captured within the Design Envelope for the Original Development, as follows:

- WTGs will be designed in accordance with MGN 371 (MCA, 2008) and procedures put in place for generator shut down and other operational requirements in emergency situations to reduce impacts on Search and Rescue (SAR) provision.
- Note: this would now need to consider MGN 543 (MCA, 2016) which includes more detailed requirements for project layouts.
- It has been assumed that a 500 m 'rolling' safety / exclusion zone around working areas during construction, decommissioning and major maintenance activities to exclude vessels not associated with the works will be enforced. Consultation will be undertaken with relevant stakeholders to ensure effective implementation and management of safety / exclusion zones.
- The Inch Cape Structures will be marked on relevant UKHO admiralty charts. The Offshore Export Cable will also be charted, although whether the inter-array cables are shown will depend on the scale of the chart.
- Inch Cape Structures will be marked and lit in accordance with IALA Recommendation O-139 on the Marking of Man-Made Offshore Structures (IALA, 20013. The final lighting and marking scheme will be agreed with the relevant stakeholders prior to construction.
- WTGs will be designed and constructed to ensure that the minimum rotor blade clearance is at least 22 m above HAT (noting that since this measurement has since reverted to a requirement of 22m MHWS).
- An Emergency Response Co-operation Plan (ERCoP) will be established for the project and put in place for the construction, operation and decommissioning stages. The ERCoP will be based on the MCA template and prepared in consultation with the MCA Search and Rescue and Navigation Safety Branches.
- Cables will be suitably buried or will be protected by other means when burial is not practicable. This will reduce the risk of snagging, and will reduce the potential for impacts relating to Electromagnetic Fields (EMF). Consultation will be undertaken with appropriate stakeholders to ensure minimum draft requirements are considered.
- Appropriate marine co-ordination (through a dedicated marine coordination function) will be implemented.
- A risk assessment will be carried out to determine any requirements for guard vessels during the construction phase.

- Additional temporary buoyage, relating to partially constructed works, will be determined through risk assessment and agreed in consultation with the NLB.
- All vessels will be fit for purpose for construction and operation activities as per MCA, international and project safety management system requirements.
- An advanced level of promulgation of information will be carried out which is specifically targeted to receptors identified through consultation.
- Additional temporary buoyage, relating to partially constructed works, will be determined through risk assessment and agreed in consultation with the NLB.
- A monitoring plan will be determined for the Offshore Export Cable, which considers higher risk areas such as anchorage locations. Appropriate remedial action will be taken where required.
- Consideration will also be given to any additional Aids to Navigation that result as a requirement of the finalised project layout.

9.4.5 Commitment to Consent Conditions

604. As noted in Section 2.2.3, ICOL propose to commit to the relevant consent conditions granted for the Original Development for the application of the Revised Development.

605. These consent conditions have taken into account any relevant consultation responses to the Original Development EIA from key stakeholders in relation to Shipping and Navigation and in determining the acceptability of the Original Development; the most relevant consent conditions are summarised in Table 9-34. Conditions in full are provided in Appendix A.

Table 9-34: Most Relevant Consent Conditions to Shipping and Navigation

Requirement	Description
Construction method Statement	Requires the final construction methods to be set out for approval to ensure that they remain consistent with the methods assessed in the ES and to ensure appropriate construction management taking into account mitigation measures to protect the environment and other users of the marine area.
Development Specification and Layout Plan	Setting out for approval the final design and layout of the Development to ensure it remains consistent with the design assessed in the ES as relevant to shipping and navigation.
Vessel Management Plan	Describing, for approval, the types of vessels to be employed and the management and routeing of those vessels.
Navigational Safety Plan	Setting out, for approval, the navigational safety measures to be applied so as to mitigate the navigational risk to other legitimate users of the sea.

Requirement	Description
Lighting and Marking Plan	Detailing the agreed lighting and marking of the scheme, for approval, so as to safeguard the safety of air and surface navigation.
Scheme details	Provision of the locations and details of all structures for inclusion on air and surface navigational charts.
Operations and Maintenance Plan	Setting out, for approval, the operations and maintenance procedures and the management of impacts during the operational phase so as to safeguard environmental interests and other sea users.
Cable Plan	Setting out, for approval, the installation methods for the cables (including burial) to ensure it remains consistent with the installation process assessed in the ES as relevant to shipping and navigation (including matters related to EMF and cable burial).
Navigational and aviation safety and charting	Issuing of notice to mariners and details promulgated via Kingfisher Bulletins and requirement for lighting and marking.
Dropped objects	Procedures for the recording of materials used in the works and for recording any lost items and subsequently recording and recovering any such items.
Navigational safety	In addition to notifications, requirement for cable laying vessels to be equipped with AIS for depths from cabling works not to be reduced by more than 5% without prior approval; restriction on use of radar or radio beacon use without prior approval by OFCOM.
Marking and Lighting	Requirements for marking and lighting of the site as directed by Northern Lighthouse Board (NLB), Civil Aviation Authority (CAA), Ministry of Defence (MOD) and Maritime and Coastguard Agency (MCA) (including requirement for marking of the area with buoys). Requirement for all vessels to be lit/marked in accordance with the COLREGS.

9.4.6 Scoping of the Revised Development EIA

606. Tables 9-35 and 9-36 summarise the anticipated post-mitigation significance for all effects considered for the development and details whether the potential effects have been scoped out of the Revised Development EIA, with a relevant justification.

607. The Embedded Mitigation (Section 9.4.4) was included within the assessment conclusions and therefore only the residual effects have been presented in these tables.

Table 9-35: Summary of Potential Impacts– Development Area

Potential Impact	Receptor	Residual Effect (worst case scenario) (ICOL, 2013)	Scoped in or out of the Revised Development EIA	Justification
Construction (& Decommissioning) Phase				
Allision with partially constructed Inch Cape Structures	Commercial Shipping	Negligible/ Minor	Scoped Out	The impacts from the Original Development were assessed as not significant and, as a result of the design changes described above, the Revised Development is anticipated to have no worse impact. Furthermore as the impact is not affected by any changes to baseline data, further assessment of this potential impact is therefore scoped out of the Revised Development EIA.
Increased transit times and distances				
Vessel to vessel collision risk				
Vessel to vessel collision risk	Commercial Fishing Vessels	Negligible/ Minor	Scoped Out	The impacts from the Original Development were assessed as not significant and, as a result of the design changes described above, the Revised Development is anticipated to have no worse impact. Furthermore as the impact is not affected by any changes to baseline data, further assessment of this potential impact is therefore scoped out of the Revised Development EIA.
Allision with partially constructed structures				
Gear snagging on partially constructed Inch Cape Structures or installed cables				
Vessel to vessel collision risk	Recreational Vessels	Negligible/ Minor	Scoped Out	The impacts from the Original Development were assessed as not significant and, as a result of the design changes described above, the Revised Development is anticipated to have no worse impact. Furthermore as the impact is not affected by any changes to baseline data, further assessment of this potential impact is therefore scoped out of the Revised Development EIA.
Allision with partially constructed Inch Cape Structures				
Operation & Maintenance Phase				

Potential Impact	Receptor	Residual Effect (worst case scenario) (ICOL, 2013)	Scoped in or out of the Revised Development EIA	Justification
Increased transit times and distances	Commercial Vessels Routing	Minor/ Moderate	Scoped Out	The impacts from the Original Development were assessed as not significant and, as a result of the design changes described above, the Revised Development is anticipated to have no worse impact. Further assessment of this potential impact is therefore scoped out of the Revised Development EIA; noting that approval of the final layout is required through consultation with the MCA.
Vessel to vessel collision risk Allision with Inch Cape Structures	Commercial Vessels	Minor	Scoped In	The impacts from the Original Development were assessed as not significant and, as a result of the design changes described above, the Revised Development is anticipated to have no worse impact. However given the potential for the baseline AIS data to change further assessment should be included in the Revised Development EIA.
Vessel to vessel collision risk Allision with Inch Cape Structures	Commercial Fishing	Minor	Scoped In	The impacts from the Original Development were assessed as not significant and, as a result of the design changes described above, the Revised Development is anticipated to have no worse impact. However given the potential for the baseline AIS data to change further assessment should be included in the Revised Development EIA.
Vessel to vessel collision risk Allision with Inch Cape Structures	Recreational Vessels	Negligible/ Minor	Scoped In	The impacts from the Original Development were assessed as not significant and, as a result of the design changes described above, the Revised Development is anticipated to have no worse impact. However given the potential for the baseline AIS data to change further assessment should be included in the Revised Development EIA.

Potential Impact	Receptor	Residual Effect (worst case scenario) (ICOL, 2013)	Scoped in or out of the Revised Development EIA	Justification
The presence of the Wind Farm and associated infrastructure has the potential to increase the need for emergency response activities and restrict access to casualties within the Development Area.	All Sea Users and Emergency Response Operators	Minor	Scoped Out	The impacts from the Original Development were assessed as not significant, and as a result of the design changes described above, the Revised Development is anticipated to have no worse impact. Further assessment of this potential impact is therefore scoped out of the Revised Development EIA; noting that approval of the final layout is required through consultation with the MCA.
Effect on Marine Radar Systems	All Sea Users	Negligible/ Minor	Scoped Out	The impacts from the Original Development were assessed as not significant, and as a result of the design changes described above, the Revised Development is anticipated to have no worse impact. Further assessment of this potential impact is therefore scoped out of the Revised Development EIA.

Table 9-36: Summary of Potential Impacts – Offshore Export Cable Corridor

Potential Impact	Receptor	Residual Effect (ICOL, 2013)	Scoped in or out of the Revised Development EIA	Justification
Construction (& Decommissioning) Phase				
Vessel to vessel collision risk	Commercial Vessels	Negligible /Minor	Scoped Out	The impacts from the Original Development were assessed as not significant, and as a result of the design changes described above, the Revised Development is anticipated to have no worse
Vessel to vessel collision	Commercial Fishing Vessel	Minor/ Moderate	Scoped Out	
Snagging risk				

Potential Impact	Receptor	Residual Effect (ICOL, 2013)	Scoped in or out of the Revised Development EIA	Justification
Vessel to vessel collision	Recreational Vessels	Negligible/ Minor	Scoped Out	impact. Further assessment of this potential impact is therefore scoped out of the Revised Development EIA.
Operation & Maintenance Phase				
Effects on anchoring operations	Commercial Vessels	Negligible/ Minor	Scoped in	The impacts from the Original Development were assessed as not significant and, as a result of the design changes described above, the Revised Development is anticipated to have no worse impact. However given the potential for the baseline AIS data to change further assessment should be included in the Revised Development EIA.
Snagging risk	Commercial Fishing Vessels	Negligible/ Minor	Scoped In	
Effects on Anchoring Operations	Recreation Vessels	Negligible/ Minor	Scoped In	
Interference caused by EMF	Vessel Navigation Equipment	Negligible/ Minor	Scoped Out	The impacts from the Original Development were assessed as not significant, and as a result of the design changes described above, the Revised Development is anticipated to have no worse impact. Further assessment of this potential impact is therefore scoped out of the Revised Development EIA

Scoping of CIA

608. The following list confirms the other plans, projects and activities considered in the scoping of the CIA. The cumulative assessment considered within the Original Development EIA was undertaken using worst case parameters including maximum build out of wind farm developments in close proximity to Inch Cape – namely the Neart na Gaoithe and Seagreen (phase one Alpha and Bravo) projects.

609. There have been no increases to the size of these development areas and therefore it is assumed that a worst case cumulative impact (maximum displacement) was considered

within the Original Development EIA and would apply equally to the Revised Development. The CIA for the Revised Development will therefore consider the same projects, namely:

- Neart Na-Gaoithe Offshore Windfarm ; and
- Seagreen Alpha and Bravo Offshore Windfarms.

610. Table 9-37 summarises the anticipated post-mitigation significance for all cumulative effects considered during the Original Development CIA and details whether the potential effect has been scoped in or out of the Revised Development CIA, with a relevant justification.

Table 9-37: Summary of Potential Impacts – Revised Development with Other Plans, Projects and Activities

Potential Impact	Receptor	Significance (worst case scenario) (ICOL, 2013)	Scoped in or out of the Revised Development CIA	Justification
Construction (& Decommissioning) Phase				
Vessel to vessel collision risk Allision with partially constructed structures	Commercial Vessels	Negligible/ Minor	Scoped Out	The cumulative impacts from the projects under consideration are identical to those considered in the CIA for the Original Development, but with a substantial reduction in the scale of the Revised Development. Cumulative impacts would therefore be no greater than, and possibly less than, those previously described for the Original Development all of which were considered not to be significant.
Vessel to vessel collision risk Allision with partially constructed structures Gear snagging on partially constructed	Commercial Fishing Vessels	Negligible/ Minor	Scoped Out	The cumulative impacts from the projects under consideration are identical to those considered in the CIA for the Original Development, but with a substantial reduction in the scale of the Revised Development. Cumulative impacts would therefore be no greater than, and possibly less than, those previously described for the

Potential Impact	Receptor	Significance (worst case scenario) (ICOL, 2013)	Scoped in or out of the Revised Development CIA	Justification
structures or installed cables				Original Development all of which were considered not to be significant.
Vessel to vessel collision risk	Recreational Vessels	Negligible/ Minor	Scoped Out	The cumulative impacts from the projects under consideration are identical to those considered in the CIA for the Original Development, but with a substantial reduction in the scale of the Revised Development. Cumulative impacts would therefore be no greater than, and possibly less than, those previously described for the Original Development all of which were considered not to be significant.
Allision with partially constructed structures				
Operation & Maintenance Phase				
Increased transit times and distances	Commercial Vessels	Moderate	Scoped In	The cumulative impacts from the projects under consideration are identical to those considered in the CIA for the Original Development, but with a substantial reduction in the scale of the Revised Development. Cumulative impacts would therefore be no greater than, and possibly less than, those previously described for the Original Development all of which were considered not to be significant.However, given the potential for the baseline AIS data to change further assessment should be included in the Revised Development EIA.
Vessel to vessel collision risk				
Vessel to structure allision risk				
Increase of visual confusion when navigating				
Deviations to avoid the wind farm areas.	Commercial Fishing Vessels	Minor/ Moderate	Scoped In	The cumulative impacts from the projects under consideration are identical to those considered in

Potential Impact	Receptor	Significance (worst case scenario) (ICOL, 2013)	Scoped in or out of the Revised Development CIA	Justification
Vessel to structure allision risk				the CIA for the Original Development, but with a substantial reduction in the scale of the Revised Development. Cumulative impacts would therefore be no greater than, and possibly less than, those previously described for the Original Development all of which were considered not to be significant. However, given the potential for the baseline AIS data to change further assessment should be included in the Revised Development EIA.
Vessel to structure allision risk	Recreational Vessels	Negligible/ Minor	Scoped In	The cumulative impacts from the projects under consideration are identical to those considered in the CIA for the Original Development, but with a substantial reduction in the scale of the Revised Development. Cumulative impacts would therefore be no greater than, and possibly less than, those previously described for the Original Development all of which were considered not to be significant.However, given the potential for the baseline AIS data to change further assessment should be included in the Revised Development EIA.
The presence of the Wind Farm and associated infrastructure has the potential to increase the need for emergency response activities and	All Sea Users	Minor/ Moderate	Scoped Out	The cumulative impacts from the projects under consideration are identical to those considered in the CIA for the Original Development, but with a substantial reduction in the scale of the Revised Development.

Potential Impact	Receptor	Significance (worst case scenario) (ICOL, 2013)	Scoped in or out of the Revised Development CIA	Justification
restrict access to casualties within the Development Area.				Cumulative impacts would therefore be no greater than, and possibly less than, those previously described for the Original Development all of which were considered not to be significant.
Effects on Marine Radar Systems	All Sea Users	Minor/ Moderate	Scoped out	The cumulative impacts from the projects under consideration are identical to those considered in the CIA for the Original Development, but with a substantial reduction in the scale of the Revised Development. Cumulative impacts would therefore be no greater than, and possibly less than, those previously described for the Original Development all of which were considered not to be significant.

9.4.7 Approach to EIA

611. Based on the Original Development EIA and considering the design envelope for the Revised Development by comparison to the Original Development, it is concluded that the impacts should not increase from those assessed in the Original Development EIA.

612. However, given the change in regulator guidance (MGN 371 to MGN 543) and the potential variations in AIS baseline since the shipping traffic surveys in 2012 it is proposed that a revised shipping and navigation assessment should be included within the Revised Development ES for those elements identified as being scoped in, in Tables 9-35 to 9-37.

Methodology for the Shipping and Navigation Assessment

613. The marine traffic surveys, desk-based research and consultation undertaken as part of the Original Development EIA baseline assessment allowed for the identification of higher risk areas. As part of the new NRA process a Formal Safety Assessment (FSA) will be carried out

in line with the International Maritime Organisation (IMO) FSA Process (IMO, 2002) for the Revised Development. The impact assessment will review and represent the following sections of the formal safety assessment process undertaken as part of the NRA for the Original Development:

- Hazard log and risk ranking;
- Quantified navigational risk assessment for selected hazards;
- Base case and future case risk levels assessed for selected hazards;
- Emergency response review; and
- Assessment of mitigation measures (updated to include all current, embedded mitigation).

614. It is assumed that an updated hazard workshop will not be required given that nothing will have changed in respect of the hazards as previously described in the Original Development EIA.

Environmental Impact Assessment

615. The NRA and FSA process were used to inform the Original Development EIA and will be similarly applied to the assessment of the Revised Development. The assessment will consider effects on shipping and navigation, considering the nature, duration, magnitude and significance of the potential effects arising from the Wind Farm and OfTW during both construction and operational phases.

9.4.8 Scoping Questions – Shipping and Navigation

- Does the shipping baseline assessment require updating within marine traffic survey data (in line with MGN 543)?
- If updating is required do you agree that, given the level of data obtained for the Original Development EIA, validation against AIS data only is an acceptable approach?
- Are you satisfied that the NRA/EIA should only concentrate on those receptors which may be subject to significant effects from the proposed development?
- Are you satisfied with the receptors and potential impacts proposed to be included within the impact assessment? Are you satisfied that this sufficiently covers the potentially significant impacts from the proposed development?
- Are you satisfied that the embedded mitigation (including Licence conditions) are appropriate to the potential level of impact from this proposed development?

9.5 Socio-Economics and Tourism

9.5.1 Introduction

616. As described in Section 5, the purpose of this section is to provide sufficient detail on the potential effects on Socio-Economics and Tourism resulting from the construction, operation and maintenance and decommissioning of the Revised Development.

617. The detail provided will allow MS-LOT and their consultees to be clear about what they consider the significant effects of the proposal are likely to be and, therefore, whether they need to be subject to an EIA and be included within the ES.

618. In order to provide sufficient information to consultees, reference is made to the baseline data gathered to inform the Original Development EIA, and to the outcomes of the impact assessment presented in the Original Development ES. Design, construction and operational changes between the Original Development and the Revised Development that are likely to have further impacts on socio-economics and tourism are also considered to inform any subsequent impact assessments.

619. For a full description of the design envelope parameters and changes please refer to Section 4.

620. This section concludes that only impacts on the construction employment and the wider economy will be assessed in the Revised Development EIA, both at a project level and cumulatively with those projects identified below. All other potential impacts will be scoped out of the revised development EIA, due to the following:

- Changes in the Revised Design Envelope, (see Section 4);
- No material difference to the baseline data;
- No material changes to assessment best practice; and
- Non- significant effects concluded within the Original Development EIA.

9.5.2 Data Sources and Baseline Environment

621. This section identifies the baseline data sources that can be used to characterise the socio-economic and tourism impacts that may arise from the Revised Development. The data is predominately drawn from the Original Development ES but is updated where possible with more recent data. Commentary is provided on the sufficiency of this data as a basis for scoping the Revised Development EIA.

Baseline Data

622. A variety of datasets were collated and analysed to inform the Socio-economics and Tourism Baseline EIA for the Original Development. Data was drawn from publicly available data. The

data sources are fully described in the Original Development ES Chapter 22 (ICOL, 2013) and supporting technical studies and are summarised in Table 9-38 below.

Table 9-38: Baseline Datasets from the Original Development EIA

Dataset	Coverage	Data use	Date
Census Data (ONS, 2013a)	Economic Study Area	Used to identify the population age structure within the Economic Study Area.	2013
Annual Population Survey (ONS, 2013b)	Economic Study Area	Survey results used to identify the economic activity rate, employment structure and qualifications of residents.	2013
Job density (ONS, 2013b)	Economic Study Area	Data used to identify the density of employment opportunities in the Economic Study Area.	2013
ONS Business Register and Employment Survey (ONS, 2013b)	Economic Study Area	The survey results were used to characterise the industry structure relevant to the Economic Study Area.	2013
DWP benefit claimants (ONS, 2013b)	Economic Study Area	This data was used to characterise the unemployment rates within the Economic Study Area.	2013
ONS annual survey of hours and earnings – resident analysis	Economic Study Area	The annual survey results were used to characterise the earnings of residents within the Economic Study Area.	2013
Inter Departmental Business Register (ONS, 2013b)	Economic Study Area	The data was used to assess the health of businesses operating within the Economic Study Area.	2013
Regional gross value added (ONS, 2013c)	Economic Study Area	This data was used to identify the gross value added by industry sector within the Economic Study Area	2013
Tourism statistics (Visit Scotland, 2013)	Tourism study area	The data was used to characterise the accommodation occupancy rates, purpose and length of stay within the Tourism Study Area.	2013

623. As noted in Section 5 the Development Area between the Original and Revised Developments remains the same.

Data validity

624. The following sections consider the sufficiency and validity of the available data in relation to spatial coverage and age. Where additional data of relevance is available, this has been reviewed and presented in the Additional Data Sources Section.

625. The baseline information presented in the Original Development EIA has been reviewed in light of more recent data (sources provided below) in order to assess the validity of the EIA baseline for any future assessment for the Revised Development. This review of new data is presented in the Additional Data section below, with a summary of the validity of the data provided at the end of this section.

626. The data previously collected as part of the Original Development EIA is considered sufficient to meet the requirements needed to effectively describe the socio-economic and tourism conditions that currently prevail in areas potentially influenced by the Revised Development EIA.

Data coverage

627. The Economic Study Area previously identified in the Original Development EIA was based on four port locations that are still considered suitable to support aspects of construction, O&M and decommissioning associated with the Revised Development. No other port locations or facilities are being considered for the Revised Development EIA. Therefore, the coverage of the baseline data for the Economic Study Area remains sufficient to inform this Scoping Report.

628. As can be seen from the the comparative ZTV (Figure 9-1) produced for the Seascape, Landscape and Visual section there is additional visibility associated with the proposed taller turbines. Analysis of this ZTV shows that there is only one large area of additional theoretical visibility from the Revised Development, which lies in Fife, inland between Elie and Crail, approximately 30 – 40 km from the Revised Development. The only other areas of additional theoretical visibility from the WTGs proposed for the Revised Development are limited in extent and occur along the edge of areas predicted to have visibility of the Original Development. Further information on the additional visibility is included within section 9.1. This additional theoretical visibility at such distances is considered unlikely to cause any significant negative effects on tourism.

629. Therefore the Tourism Study Area previously identified in the Original Development EIA is considered sufficient for the Revised Development therefore the data coverage remains sufficient to characterise tourist behaviour to inform this scoping exercise.

Age of the Data

630. As described above, regional data collated by the Office for National Statistics (ONS) and Visit Scotland was collated for the Original Development EIA taking account of the most recent available Census data collected in 2011 and annual survey data where available.

631. The 2011 census data remains the most up to date data available (next census is planned for 2021) and comprises of a comprehensive dataset detailing the population structure within the relevant areas.

632. Since the submission of the Original Development EIA, ONS and Visit Scotland (collected between 2012 and 2016) data has been updated. This data has been used to verify the validity of the baseline data collected for the Original Development EIA and check that no significant socio-economic and tourism changes have taken place since the 2011 data was collected (see Additional Data section below).

Additional Data Sources

633. The latest ONS and Visit Scotland data covering the period 2012 to 2016 (ONS 2017a, ONS 2017b, Visit Scotland 2016) have been reviewed to confirm there has been no significant changes to the baseline data presented as part of the Original Development EIA. A summary of this most recent data is provided below.

Population and Age Structure

634. The City of Edinburgh and Aberdeen City local authorities have a higher than average (compared to Scotland and UK overall) proportion of working age people from the most recent data, which mirrors the Original Development ES. The Original Development ES identified that both Angus and East Lothian had noticeably higher dependency ratios, however, 2015 data show that only Angus has noticeably higher dependency ratios (compared to the Scottish and UK averages), with East Lothian having improved relative to the averages (although the dependency ratio has increased). These changes are not considered sufficient to alter the conclusions reached in the Original Development EIA.

Economic Activity

635. A review of the most recent data (2015) demonstrates that the patterns outlined in the Original Development ES are still applicable to the Revised Development, with Aberdeen City and Aberdeenshire having an economic activity rate higher than the Scottish and UK averages and Dundee City having economic activity lower than average.

Employment Structure

636. In line with the Original Development ES, the City of Edinburgh, Aberdeen City and Aberdeenshire all have a higher than average proportion of highly skilled workers, with skilled workers for the majority of the Economic Study Area comparable with the Scottish average. As shown in the Original Development ES, Dundee City still has the highest proportion of unskilled workers. Based on the 2015 data the City of Edinburgh and East Lothian have the lowest proportions of unskilled workers in the Economic Study Area, whereas in the Original Development ES, the City of Edinburgh and Angus had the lowest proportions of unskilled workers. These changes are not considered sufficient to alter the conclusions reached in the Original Development EIA.

Job Density

637. Job density measures the number of jobs for every resident (aged between 16-64 years). In addition to Aberdeen City, City of Edinburgh and Dundee City identified in the Original Development ES, the 2015 data reveals that Highland and Glasgow City have job densities higher than the Scottish average. Perth and Kinross has a job density in line with the Scottish average, while all the other local authorities have job densities lower than the Scottish average.

Industry Structure

638. Fife, Moray, Clackmannanshire, Scottish Borders, South Lanarkshire, North Lanarkshire, Falkirk and West Lothian, along with Angus, Aberdeenshire and Fife (as identified in the Original Development ES) have an above Scottish average proportion of manufacturing jobs, while the other local authorities in the Economic Study Area are close to or below the Scottish average. All of the local authorities in the Economic Study Area have above Scottish average proportions of construction jobs except for Dundee City, City of Edinburgh, Aberdeen City, Stirling and Glasgow City which are all below the Scottish average.

639. City of Edinburgh, Highland, Moray, Perth and Kinross, Stirling, Angus and East Lothian all have above average proportions of tourism service sector jobs, with the other areas close to or below the Scottish average.

Unemployment (Job Seekers Allowance)

640. As in the Original Development ES, Job Seeker Allowance claimant count rates in the Economic Study Area were highest in Dundee City and Fife, with the 2016 data showing Glasgow to have a similar proportion as Fife. The lowest proportion of claimants from the 2016 data was in East Lothian, with Highland, City of Edinburgh, Moray, Aberdeenshire, Perth and Kinross, Stirling, Scottish Borders, South Lanarkshire, East Dunbartonshire, Falkirk and West Lothian also being below the Scottish average.

Qualifications

641. As per the Original Development ES, City of Edinburgh, Aberdeen City, Aberdeenshire have higher than the Scottish average for educational and attainment level for Degree, HND and Highers, whereas, in the Original Development ES Angus was above the Scottish average, the latest data shows it is now below the average.

Earnings

642. Residents of City of Edinburgh, Aberdeen City, Aberdeenshire and East Lothian all received salaries above the Scottish average both in recent data and in the Original Development ES. Dundee City, Angus and Fife all received below the Scottish average.

Tourism

643. The overall trends for tourism detailed in the Original Development ES are also reflected in the most recent available data (2015). The Tourism Study Area is relatively healthy, with all accommodation types having high occupancy throughout the year.

Review of Baseline Characteristics

644. Chapter 22 of the Original Development ES presented the baseline characteristics for Socio-economic and tourism activities across the Economic Study Area and Tourism Study Area. This data has been reviewed against the more recent survey data available to confirm that the baseline used to inform the Original Development EIA remains appropriate and relevant for the Revised Development EIA.

9.5.3 Design Envelope

645. Table 9-39 sets out the worst case scenario defined by the Original Development EIA for socio-economics and tourism (ICOL, 2013) compared to the worst case scenario for the Revised Development at a level of detail sufficient to draw conclusions in relation to the scoping process. This table also identifies the differences between the two design envelopes.

Table 9-39: Design Envelope Scenario Definition – Wind Farm

Potential Impact	Original Development Design Envelope (ICOL, 2013)	Revised Development Design Envelope	Difference between the Original and Revised Design Envelopes
Construction (& Decommissioning) Phase			
Construction Employment	Up to 213 WTGs with GBS or jacket foundation substructures; Up to 353 km of inter-array cable; Up to 5 OSPs; Four to six 83.3 km offshore export cables; Four year construction programme	Up to 72 WTGs with GBS or jacket foundation substructures; Up to 190 km of inter-array cable; Up to two OSPs Two 83.3 km offshore export cables; Two year construction programme	Reduction in installed infrastructure and construction period.
Wider economic impacts	Up to 213 WTGs with GBS or jacket foundation substructures; Up to 353 km of inter-array cable; Up to 5 OSPs; Four to six 83.3 km offshore export cables; Four year construction programme	Up to 72 WTGs with GBS or jacket foundation substructures; Up to 190 km of inter-array cable; Up to two OSPs Two 83.3 km offshore export cables; Two year construction programme	Reduction in installed infrastructure and construction period.
Tourism and recreation visual impacts	Up to 213 WTGs with GBS or jacket foundation substructures; Up to 353 km of inter-array cable; Up to 5 OSPs; Four to six 83.3 km offshore export cables; Four year construction programme	Up to 72 WTGs with GBS or jacket foundation substructures; Up to 190 km of inter-array cable; Up to two OSPs Two 83.3 km offshore export cables; Two year construction programme	Reduction in installed infrastructure and construction period.
Tourism accommodation impacts	Up to 213 WTGs with GBS or jacket foundation substructures; Up to 353 km of inter-array cable; Up to 5 OSPs; Four to six 83.3 km offshore export cables;	Up to 72 WTGs with GBS or jacket foundation substructures; Up to 190 km of inter-array cable; Up to two OSPs Two 83.3 km offshore export cables;	Reduction in installed infrastructure and construction period.

Potential Impact	Original Development Design Envelope (ICOL, 2013)	Revised Development Design Envelope	Difference between the Original and Revised Design Envelopes
	Four year construction programme	Two year construction programme	
Operation & Maintenance Phase			
O&M Employment	Onshore control room and base for operational life span; Base and vessels for planned and unplanned maintenance.	Onshore control room and base for operational life span; Base and vessels for planned and unplanned maintenance.	Reduction in installed infrastructure resulting in the proportional reduction of O&M operations.
Wider Economic Impacts	Onshore control room and base for operational life span; Base and vessels for planned and unplanned maintenance.	Onshore control room and base for operational life span; Base and vessels for planned and unplanned maintenance.	Reduction in installed infrastructure.
Tourism and recreation visual impacts	Onshore control room and base for operational life span; Base and vessels for planned and unplanned maintenance.	Onshore control room and base for operational life span; Base and vessels for planned and unplanned maintenance.	Reduction in installed infrastructure with potential change in visibility of infrastructure.
Tourism accommodation impacts	Onshore control room and base for operational life span; Base and vessels for planned and unplanned maintenance.	Onshore control room and base for operational life span; Base and vessels for planned and unplanned maintenance.	Reduction in installed infrastructure.

9.5.4 Revised Development Embedded Mitigation Measures

646. Embedded Mitigation for the Revised Development will comprise of those measures adopted for the Original Development (see also Section 4.4.1), which will seek to benefit local and national opportunities associated with the project, and are as follows:

- ICOL will support a protocol to give local contractors the opportunity to tender for work arising from the Project capital and operational expenditures. The protocol will ensure that local contractors with the relevant skills and experience will be able to access the procurement process through "meet the buyer" events and other initiatives.
- ICOL has worked closely with Scottish economic development agencies to promote opportunities since the inception of the Project and this approach will continue throughout the Project life.

9.5.5 Scoping of the Revised Development EIA

647. Table 9-40 summarise the post mitigation residual significance for all effects considered for the Original Development and details whether the potential effect has been scoped out of the Revised Development EIA, with a relevant justification.

Table 9-40: Summary of Potential Impacts – Revised Inch Cape Wind Farm and Revised Offshore Export Cable Corridor

Potential Impact	Residual Effect (ICOL, 2013)	Scoped in or out of the EIA for Revised Development	Justification
Construction (& Decommissioning) Phase			
Construction Employment	Minor/moderate positive	Scoped in	Taking into account the design changes described above, and the residual positive impacts concluded from the Original Development ES, it is considered that the impacts on construction employment should be scoped in to the Revised Development EIA.
Wider economic impacts	Minor positive	Scoped in	Taking into account the design changes described above, and the residual positive impacts concluded from the Original Development ES, it is considered that the impacts on the wider economy should be scoped in to the Revised Development EIA.
Tourism and recreation visual impacts	Minor/moderate	Scoped out	The impacts from the Original Development were assessed as not significant and, as a result of the design changes described above, the Revised Development is anticipated to have no additional impact. Further assessment of this potential impact is therefore scoped out of the Revised Development EIA.

Potential Impact	Residual Effect (ICOL, 2013)	Scoped in or out of the EIA for Revised Development	Justification
Tourism accommodation impacts	Minor	Scoped out	The impacts from the Original Development were assessed as not significant and, as a result of the design changes described above, the Revised Development is anticipated to have less of an impact. Further assessment of this potential impact is therefore scoped out of the Revised Development EIA.
Operation & Maintenance Phase			
Operation and Maintenance (O&M) Employment	Minor positive	Scoped in	Taking into account the design changes described above, and the residual positive impacts concluded from the Original Development ES, it is considered that the impacts on construction employment during the O&M of the wind farm should be scoped in to the Revised Development EIA.
Wider economic impacts	Minor positive	Scoped in	Taking into account the design changes described above, and the residual positive impacts concluded from the Original Development ES, it is considered that the impacts on the wider economy during the O&M of the wind farm should be scoped in to the Revised Development EIA
Tourism and recreation visual impacts	Minor	Scoped out	The impacts from the Original Development were assessed as not significant and, as a result of the design changes described above, the Revised Development is anticipated to have no additional impact. Further assessment of this potential impact is therefore scoped out of the Revised Development EIA.
Tourism accommodation impacts	Minor	Scoped out	The impacts from the Original Development were assessed as not significant and, as a result of the design changes described above, the Revised Development is anticipated to have less of an impact. Further assessment of this potential impact is therefore scoped out of the Revised Development EIA.

Scoping of Cumulative Impact Assessment

648. The CIA for socio-economics and tourism set out in the Original Development EIA considered the cumulative impacts based on an assessment of the Gross Value Added (GVA) and job numbers in each of the Economic Study Areas for other proposed large offshore wind projects off the east coast of Scotland. For all cumulative effects these were concluded as being negligible to major positive.

649. The same basis is proposed for the purposes of the scoping for socio-economics and tourism CIA with the following list confirming the other plans, projects and activities (selected from the list in Section 5) considered in the scoping of the Revised Development CIA:

- Neart Na-Gaoithe Offshore Windfarm;
- Seagreen Alpha and Bravo Offshore Windfarms.
- Beatrice Offshore Wind Farm;
- Telford, Stevenson and MacColl Offshore Wind Farms;
- Moray Firth Offshore Wind Ltd (MORL) Western Development Area (WDA);
- Aberdeen Offshore Wind Farm;
- Hywind Demo; and
- Kincardine Floating Offshore Windfarm.

650. All of the projects in this list above were included in the Original Development CIA with the exception of the last four (all of which are either small projects likely to give rise to additional minimal cumulative impacts and which in several cases are likely to be constructed in advance of the Revised Development). The exception to this is the Moray Firth Offshore Wind Ltd Western Development Area (MORL WDA) which is currently at the scoping stage (up to 90 turbines with a potential generating capacity of up to 750 MW).

651. Table 9-41 presents the Original Development residual effect from the for all cumulative impacts considered and details whether the potential cumulative impact has been scoped out of the Revised Development EIA, with a relevant justification

Table 9-41: Summary of Potential Impacts – Revised Development with Other Plans, Projects or Activities

Potential Impact	Residual Effect (ICOL, 2013)	Scoped in or out of the EIA for current Application	Justification
Construction (& Decommissioning) Phase			
Construction Employment and Economic Impacts	Minor/Moderate/Major Positive	Scoped In	Taking into account the scale of the projects to be considered in the CIA and the residual conclusion from the Original Development ES of positive, it is considered again that there will be potentially significant positive cumulative impacts associated with the Revised Development. Therefore further assessment will be scoped in for the Revised Development CIA.
Operation & Maintenance Phase			
O&M Employment and Economic Impacts	Negligible to Moderate Positive	Scoped In	Taking into account the scale of the projects to be considered in the CIA and the residual conclusion from the Original Development ES of positive, it is considered again that there will be potentially significant positive cumulative impacts associated with the Revised Development. Therefore further assessment will be scoped in for the Revised Development CIA.

9.5.6 Approach to EIA

652. Based on the evidence summarised from the Original Development EIA, considering the additional data available from 2012 – 2016, and the changes in Design Envelope by comparison to the Original Development, it is concluded that all of the potential effects on socio-economic and tourism should be scoped out of the Revised Development EIA, due to the fact that it is unlikely to cause significant effects. The positive effects on

9.5.7 Scoping Questions – Socio-Economics

- Are you satisfied that the review of new data detailed above is sufficient to conclude that there has been no material change in the socio-economic activity in the area since the submission of the Original Development ES?
- Are you satisfied with the receptors and potential impacts proposed to be included within the impact assessment? Are you satisfied that this sufficiently covers the potentially significant impacts from the proposed development?

9.6 Other Human Considerations

9.6.1 Introduction

653. As described in Section 5, the purpose of this section is to provide sufficient detail on the potential effects on 'Other Human Considerations' resulting from the construction, operation and maintenance and decommissioning of the Revised Development.

654. The detail provided will allow MS-LOT and their consultees to be clear about what they consider the significant effects of the proposal are likely to be and, therefore, whether they need to be subject to an EIA and be included within the ES.

655. In order to provide sufficient information to consultees reference is made to the baseline data gathered to inform the Original Development EIA for this chapter, and to the outcomes of the impact assessment presented. Design, construction and operational changes between the Original Development and the Revised Development that are likely to have further impacts on the these considerations are also considered to inform any subsequent impact assessments.

656. This chapter specifically considers the following, all of which were assessed in Original Development EIA:

- Unexploded Ordnance (UXO) (wind farm development area and export cable corridor);
- Marine Recreational Activities (wind farm development area and export cable corridor);
- Military PEXAs (export cable corridor); and
- Subsea cables and pipelines (export cable corridor)

657. Military aviation is discussed separately in the Aviation section (Section 9.5) and navigational risk considered within the Shipping and Navigation section (Section 9.4).

658. For a full description of the design envelope parameters and changes please refer to Section 4. The Development Area for both the Original and Revised remains unchanged and can be seen in Figure 4-1.

659. This section concludes that the likely impacts on 'Other Human Considerations' from the Revised Development will be less than those assessed for the Original Development and therefore, in line with the EIA regulations are not required to be included with the Revised Development ES. This is due to the following;

- Changes in the Revised Design Envelope (see Section 4);
- Baseline data remaining valid;

- No material changes to assessment best practise; and
- Not significant effects concluded within the Original Development EIA.

Full details and justification are provided within this section.

9.6.2 Data Sources & Baseline Environment

660. This section identifies the baseline data sources that characterise the different other human considerations related to the Revised Development, which draws predominantly from the data sources used to inform the Original Development EIA (but updated where necessary with more recent data). Commentary is provided on the sufficiency of this data as a basis for scoping the Revised Development EIA.

Baseline Data

661. A variety of datasets relevant to those activities covered within this section were collated and analysed to inform the Original Development EIA. Those datasets considered to be relevant to the Revised Development are listed in Table 9-42 below:

Table 9-42: Baseline Datasets from the Original Development EIA

Dataset	Coverage	Data use	Date
General (including Oil & Gas / Subsea Cables and Pipelines, Marine Waste Disposal and Dumping and Aggregate Extraction)			
Seazone data (Seazone, 2013)	National coverage including wind farm site and export cable corridor	Detailed information providing digital shapefiles for all marine users and activities recorded within the area, including admiralty charts, cables, pipelines, aggregates, dumping grounds and O&G infrastructure. Particular information was also obtained on: WWII convoy routes; allied sea mines; munitions related shipwrecks; WWII and current armament and training areas; munitions disposal areas and UXO threats.	2013
Initial data on the presence of marine other users identified by Pager Power	Wind farm site and export cable corridor	High level screening assessment of the East coast, originally prepared for SeaEnergy Renewables.	2009

Dataset	Coverage	Data use	Date
(Knights and Watson, 2008).			
Marine Recreational Activities			
Inch Cape AIS Vessel Survey Data (ICOL, 2013)	Wind farm site and Cable corridor	AIS data of recreational vessels passing through the Development Area.	2013
UK Coastal Atlas of Recreational Boating. Updated 2008. (Royal Yachting Association (RYA), 2005).	Wind farm site and export cable corridor	GIS shape files dated 2010, showing key recreational boating routes around the UK.	2010
Surfers Against Sewage (SAS) (2009)	Export cable corridor	Guidance on Environmental Impact Assessment of Offshore Renewable Energy Development on Surfing Resources and Recreation	2012
East Lothian Council and Visit Scotland watersports data (East Lothian Council and Visit Scotland, 2010)	Wind farm site and export cable corridor	South East Scotland Watersports Guide. 2nd Edition – Pocket Guide.	2010
Review of coastal and marine recreation (Land Use Consultants, 2007)	National coastal resource use	Data used to characterise coastal recreational use and tourism in East Lothian.	2007
Military Practice and Exercises Areas			
Military PEXAs (Marine Scotland, 2011)	National data coverage including Development Area	Data used to identify overlap of military PEXAs with the Development Area.	2011
Unexploded Ordnance			
Various information sources from consultation (not independently referenced) identified in Volume 2H, Appendix 21A – 'Unexploded Ordnance Assessment' of the	Wind farm site and export cable corridor	Data provided for inclusion within the EIA and including: Royal Navy (Diving Unit); Naval Historical Centre, Portsmouth; UK Hydrographic Office; The National Archives, Kew.	2013

Dataset	Coverage	Data use	Date
Offshore Environmental Statement for Inch Cape (Alpha Associates, 2013)			

662. The data sources are more fully described in the Inch Cape Offshore Wind Farm ES Chapter 22 (ICOL, 2013) and supporting technical studies.

Data Validity

663. The following sections consider the sufficiency and validity of the available data in relation to spatial coverage and age.

664. The baseline information presented in the Original Development EIA has been reviewed in light of more recent data (sources provided below) in order to assess the validity of the EIA baseline for any future assessment for the Revised Development. This review of new data is presented in the Additional Data section below, with a summary of the validity of the data provided at the end of this section.

665. Further to this, those elements 'scoped out' of the Original Development EIA have been reassessed to determine whether this would remain valid for the Revised Development EIA.

666. The data previously collected as part of the Original Development EIA is considered sufficient to meet the requirements needed to effectively describe the Other Human Considerations that currently prevail in areas potentially influenced by the Revised Development EIA.

Data Coverage

667. As indicated above, the Development Area will remain the same (apart from the removal of the potential landfall at Seton Sand associated with the export cable), therefore it is considered that the spatial coverage of the original data remains valid for the Revised Development.

Age of Data

668. The datasets used to inform the Original Development ES, that are publicly available, have been revisited to verify the validity of the above data and to check that no material changes has taken place since the Original Development EIA baseline was established (see Additional Data section below).

Additional Data Sources

669. The Original Development EIA did not consider the following elements within the ES, due to the absence from the Development Area or no likely interaction (eg. These elements were scoped out of the Original Development EIA):

Wind Farm Development Area

- Military Practice and Exercise Areas (PEXA);
- Oil and gas infrastructure;
- Marine disposal sites;
- Telecommunications; and
- Aggregate extraction.

Offshore Export Cable Corridor

- Marine disposal sites;
- Telecommunications; and
- Aggregate extraction.

670. The following provides an updated review on each, in order to determine whether there have been any material changes.

Oil and Gas

671. The Revised Development Area is located in UK Continental Shelf oil and gas licence blocks 25/14, 25/15, 25/19 and 25/20. A check in 2017 found that there are no current oil or gas licenses issued covering the Revised Development Area.

672. Since the application for the Original Development, a number of UK Seaward Leasing Rounds have been completed. During the 28th Seaward Leasing Round, the TGS-NOPEC Geophysical Company were successful in securing a production Promote Licence for a number of blocks in Quadrant 26 (Oil and Gas Authority, 2016). The closest part of the TGS-NOPEC Geophysical licensed area is block 26/13 which lies 23 km to the east of the Revised Development Area. The Promote Licence places an obligation on the developer to reprocess 2D seismic data in the first instance with a requirement to progress the project within two years. No apparent progress has been made on this licence and it is unknown whether the development has progressed.

673. There is no oil and gas infrastructure within the revised Development Area. The nearest installed Oil and Gas infrastructure is well 26/12-1 drilling in 1985 by Cluff Oil Plc located approximately 25 km east of the proposed development. This well was subsequently plugged and abandoned.

674. On the 27th July 2016 the Oil and Gas Authority invited applications for the 29th Seaward Leasing Round with a deadline of the 26th October 2016 for applications. No decisions have been made on licence offers associated with the 29th Seaward Leasing Round at the time of this scoping report.

Marine Waste Disposal and Dumping

675. Maintenance and capital dredging activity is concentrated in estuarine and coastal waters, at the harbours and ports in the Firth of Forth and on the Fife coastline some distance inshore of the Revised Development Area. A historic munitions disposal site lies inshore of the Development Area, a short distance seaward of the Isle of May (ICOL, 2010).

676. The offshore waters along the central east coast of Scotland contain two historic sewage sludge disposal grounds; Bell Rock disposal site and St Abbs Head disposal site. These sites were closed in 1998 after a total of 5.85 million tonnes of wet sludge was deposited over a period of 20 years (ICOL, 2010). The revised Development Area is partially located over bell rock disposal site as was previously the case for the Original Development.

Telecommunications

677. With respect to telecommunications, no new telecommunications have been identified. The Joint Radio Company Ltd. (JRC) noted in the Original Development ES that as the use of the radio spectrum is dynamic, validation of Pager Powers (2009) conclusion in respect of radio interference will need to be sought prior to submission of a planning application.

Aggregate Extraction

678. The Scoping report for the Original Development reported that historical marine aggregate extraction licenses were granted at two sites in Scotland: the Firth of Forth and the Firth of Tay. However, these licence areas have now been relinquished. There are no current licences for aggregate extraction in Scottish Waters although there is potential for further activity in the future (Scottish Government, 2015). The closest active marine aggregate extraction licence area lies approximately 350 km to the south of the Revised Development Area off the Yorkshire coastline (Crown Estate, 2015).

Marine Recreational Activities

679. Within the Original Development EIA, the most common specialist activities on the Scottish Coastline were identified as walking, sea fishing, shoreline fishing, sailing, kayaking and canoeing, and wildlife watching. Coastal golf courses are also popular for recreational users. The Firth of Forth and Firth of Tay offered an important and varied resource for recreational users. In the coastal waters of the Firth of Forth and Firth of Tay wildlife watching tours were also common taking visitors to sites such as the Isle of May, Inchcolm Island and Bass Rock. This is still the case in 2017.

Sailing

680. The RYA released a revision of the UK Coastal Atlas of Recreational Boating in 2016 incorporating Automatic Identification System (AIS) data to produce a series of heat maps illustrating recreational boat distribution (RYA, 2016). This data has been used to illustrate the spatial distribution of cruising routes and levels of use in the vicinity of the Revised Development Area. None of the registered cruising routes or usage data interacts directly with the Revised Development area. The data indicates light use on several routes laterally crossing the Offshore Export Cable Corridor, although the direct area affected is limited in extent. It is acknowledged that these routes may be subject to change in the future and individual mariners and non-club affiliated sailors may deviate from the routes potentially straying into parts of the Development Area.

Scuba Diving

681. Scenic diving is largely restricted to areas of rocky habitat and coastline, for example around Bass Rock, St Abbs and the Isle of May in the Firth of Forth. Scenic diving in the inner Firth of Forth and Firth of Tay is limited as a result of water turbidity (WWF, 2006) and is limited further offshore by a lack of features of interest (Marine Scotland, 2016).

682. There are a number of suitable wrecks used by recreational divers in the outer Forth and Tay. Four charted wrecks are noted within the development areas but these lie in deeper waters beyond the reach of many recreational divers. There are a number of wrecks situated in the vicinity of the Export Cable Corridor (Marine Scotland, 2016). The potential effects on wrecks are considered separately within the Archaeology and Cultural Heritage chapter (Section 9.2).

Other Water Sports

683. As identified in the Original Development ES, surfing, kitesurfing, wind surfing and sea and surf kayaking and canoeing are popular in the area (SAS, 2009). There are a number of popular surf locations in East Lothian between North Berwick and Pease Bay (Marine Scotland, 2016). Longniddry is a popular kitesurfing location located in close proximity to the landfall option at Cockenzie (Marine Scotland, 2016).

684. Sea kayaking is common in the area and typically takes place close to the coastline. There is potential for sea kayakers to be affected at the export cable landfall location.

Military Practice and Exercise Areas

685. The data source used to identify the location of military PEXAs for the Original Development was reviewed against the 'Military exercise and danger areas' layer available on Marine Scotland's National Marine Plan's interactive portal (Marine Scotland, 2016). The data layer on the portal incorporates a 2015 update supplied by the MoD. The three PEXA's detailed in

the Original Development EIA are no longer presented on Marine Scotland's interactive portal, it is unclear whether these areas are still used by the MoD. Nonetheless these three areas, scoped into the Original Development EIA, have been considered again within this Scoping exercise against the Revised Development envelope.

Subsea Cables and Pipelines

686. In 2008, The Crown Estate published a report on the potential feasibility of a subsea Eastern High Voltage Direct Current (HVDC) Subsea Link between Peterhead and Tyneside. A scoping opinion was issued (25 April 2012) and this proposed that link options development would be completed by the end of 2014, with the project being completed in 2018. The preferred 500 m wide cable route corridor detailed in the scoping document does not intersect with the Revised Development Area.

UXO

687. A further set of geophysical datasets for SSS, Multibeam bathymetry and magnetometer were collected in 2014 by Horizon Geosciences Limited (Horizon Geosciences Limited 2014) which has been used to validate those taken prior to submission of the Original Development EIA. Further details of the surveys are included in the Archaeology and Cultural Heritage Section and are summarised in Table 9-15. The sufficiency of the geophysical survey in respect to determining potential UXO is also described with the Archaeology section and is deemed sufficient to allow for the next Phase of inspection.

688. Following analysis of the geophysical data potential UXO have been identified, therefore it is ICOLs intention to carry out an ROV visual inspection and detailed UXO gradiometer survey of mapped magnetic anomalies within the Development Area. Further details of which and mitigation measures to minimise impacts to both environmental and human receptors will be covered off within the EMP.

Review of Baseline Characteristics

689. The telecommunications and military exercise areas (PEXAs) baselines remain unchanged and valid.

690. The oil and gas baseline remains valid. Awarded licenses associated with the 26th, 27th and 28th UK Seaward Leasing Rounds have been reviewed and there are no current oil or gas licenses issued covering the Revised Development Area.

691. Marine disposal sites were scoped out of the Original Development EIA, this was due to there being no sites found within the Development Area or predicted to have any interaction with project. As this has not changed (Marine Scotland, 2016) again there will be no interaction.

692. Aggregate extraction was scoped out of the Original Development EIA, this was due to there being no extraction areas found within the Development Area or predicted to have any interaction with project. As no additional applications have been made for aggregate extraction in Scotland (Scottish Government, 2015), again there will be no interaction.

693. The unexploded ordnance (UXO) potential has been updated following the 2014 geophysical survey work. The embedded mitigation measures and consent conditions proposed will ensure that any potential impacts are satisfactory handled.

694. The review of marine and coastal recreation commissioned by SNH (Land Use Consultants, 2007) and used to inform the Original Development EIA has been superseded by a Marine Scotland commissioned report (Land Use Consultants, 2016). The 2016 study has been used to corroborate the validity of the baseline presented in the Original Development EIA. Furthermore, the 2016 update of the RYA's UK Coastal Atlas of Recreational Boating and the 2016 update to Marine Scotland's National Marine Plan interactive mapping portal have additionally both been used to review the baseline information for the purposes of this scoping report. The more recent available information confirms that there has been no material change in the recreational use of the Development Area or nearby coastlines.

695. Since the submission of the Original Development ES no further progress has been reported on the Eastern HVDC Subsea Link since 2012 and so it is assumed that the project remains at an early stage in the planning phase. No additional subsea infrastructure has been installed since the Original Development ES was completed.

696. To summarise, the baseline information previously compiled and reported in the Original Development ES remains valid with respect to all other user groups.

697. Those elements scoped out of the Original Development EIA have undergone a further review and it can be confirmed that there will be no interaction as previously identified.

9.6.3 Design Envelope

698. Table 9-43 and 9-44 set out the design envelope scenarios defined by the Original Development EIA for Other Human Considerations (ICOL, 2013) compared to the proposed worst case scenario for the Revised Development at a level of detail sufficient to draw conclusions in relation to the scoping process. The tables also identify the differences between the two design envelopes.

Table 9-43: Design Envelope Scenario Definition – Wind Farm

Potential Impact	Original Development Design Envelope (ICOL, 2013)	Revised Development Design Envelope	Difference between the Original and Revised Design Envelopes
Construction (& Decommissioning) Phase			
Temporary disturbance or displacement due to vessel presence and construction activities	3,500 vessel movements anticipated over a four-year construction period.	1,500 vessel movements anticipated over a two-year construction period.	Overall reduction in construction vessels movements from around 3500 to around 1500. Two year reduction in construction period.
Direct temporary disturbance of seabed caused by construction based activities	Total seabed area disturbed comprising: • seabed preparation for 213 WTGs with GBS selected as having the largest disturbance footprint (125 m dredge effected diameter); • seabed preparation for five OSPs with GBS selected as having the largest area disturbance footprint (300 m dredge effected diameter); • seabed preparation for three met masts with GBS selected as having the largest area disturbance footprint (125 m dredge effected diameter); • 353 kilometres (km) Inter-array cable installation with a trench affected width of six metres as the widest possible area of disturbance; • jack up vessel with disturbance footprint per jack up vessel of 600 m2 and three visits per foundation installation/decommissioning required for WTGs, OSPs and met masts; and	Total seabed area disturbed is 4.24 km^2, resulting from, equating to 2.82% of the development area: Seabed preparation for up to 72 WTGs with gravity base substructures (GBS) selected as having the largest disturbance footprint (140 m dredger affected diameter); Seabed preparation for two OSPs with GBS selected as having the largest area of disturbance footprint (300 m dredger affected diameter); No met masts; 190 km inter-array cable installation with a cable corridor disturbed width of 15 metres as the	Overall there is a 66% reduction in WTGs numbers, 60% OSPs and 46 % reduction in inter-array cable and the Revised Development requires no further met masts. Total area disturbed is 1.3km^2 less than assessed in the Original Development ES. This equates to a 23% reduction in

Potential Impact	Original Development Design Envelope (ICOL, 2013)	Revised Development Design Envelope	Difference between the Original and Revised Design Envelopes
	• vessel anchorage disturbance from 5 m2 anchor footprints deployed at 500 m intervals along the 353 km of inter-array cable.	widest possible area of disturbance; Vessel anchorage disturbance from 5 m^2 anchor footprints deployed at 500 m intervals along the 190 km of inter-array cable; All other development aspects remain the same as those assessed in the Original Development ES.	total disturbed area.
Operation & Maintenance Phase			
Physical presence of Inch Cape Structures may displace recreational vessels.	Presence of 213 WTGs with GBS, up to five OSPs and three met masts.	Presence of up to 72 WTGs with GBS, up to two OSPs and no met masts.	66% reduction in WTGs numbers and 60% reduction in OSPs and the Revised Development requires no further met masts. ,
Temporary habitat disturbance from operations and maintenance (O&M) activities	Area of seabed disturbed annually comprises: • jack up vessel with disturbance footprint per vessel of 600 m^2 and one visit per foundation (WTGs, OSPs and met masts) every five years; • vessel anchorage disturbance from 5.0 m^2 anchor footprints deployed at 500 m intervals along the 353 km of inter-array cable; and • inter-array cable reburial assuming maximum of 10% reburial during operation of the total 353 km with a trench affected area of six metres as	Area of seabed disturbed annually is 0.12km^2, equating to 0.08% of the Development Area resulting from: Jack up vessel with disturbance footprint per vessel of 600 m^2 and one visit per foundation (WTGs and OSPs) every five years; Vessel anchorage disturbance from 5.0 m^2 anchor footprints deployed at 500 m intervals along the 190	66% reduction in WTGs numbers, 60% OSPs, 46 % reduction in inter-array cable length and the Revised Development requires no further met masts, resulting in the proportional reduction in temporary

Potential Impact	Original Development Design Envelope (ICOL, 2013)	Revised Development Design Envelope	Difference between the Original and Revised Design Envelopes
	the widest possible area of disturbance.	km of inter-array cable; and • Inter-array cable reburial assuming maximum of 10% reburial during operation of the total 190 km with a trench affected area of six metres as the widest possible area of disturbance.	habitat disturbance.

Table 9-44: Design Envelope Scenario Definition – Offshore Export Cable Corridor

Potential Impact	Original Development Design Envelope (ICOL, 2013)	Revised Development Design Envelope	Difference between the Original and Revised Design Envelopes
Construction (& Decommissioning) Phase			
Presence of installation vessels and the displacement of existing vessel transit routes may adversely increase encounters and therefore lead to increased vessel to vessel collision risk.	AC as largest number (six) of Export Cables; Export Cable length = 83.3 km (multiplied by six);	AC as largest number (two) of Export Cables; Export Cable length = 83.3 km (multiplied by two);	Cable corridor length remains the same (83.3 km), there is a reduction in number of export cables from six to two resulting in the proportional reduction in installation vessels.
Direct temporary disturbance of seabed habitats caused by construction based activities	Sub-tidal area of seabed disturbed comprises: • AC selected as worst case as it utilises the largest possible number of cables i.e. six DC options utilises less cables than AC; • Maximum cable length for each of the six cables is approximately 83.3 km; and • Each of the six cables are installed in a separate trench resulting in six trenches in total. Intertidal area disturbed at the Cockenzie beach landfall option is 2,216 m^2 which equates to 2.0% of total beach area (measured from the Cockenzie Power station to East Cuthill Rocks) resulting from: • The cable corridor width which is disturbed by	Sub-tidal area of seabed disturbed across export cable corridor is 2.51km^2 (2.5 %% of Offshore Export Cable Corridor) resulting from the export cable installation: AC selected as worst case as it utilises the largest possible number of cables DC options no longer considered. Maximum cable length for each of the two cables is approximately 83.3 km; and each of the two cables are installed in a separate trench resulting in two trenches in total. Intertidal area disturbed at the Cockenzie beach landfall option is ~875 m^2 resulting from: the cable corridor width which is disturbed by installation equipment which is six metres for each of the two trenches i.e. 12 m in total.	Cable corridor length remains the same (83.3 km), there is a reduction in number of export cables from six to two, resulting in the proportional reduction in disturbed habitats caused by construction.

Potential Impact	Original Development Design Envelope (ICOL, 2013)	Revised Development Design Envelope	Difference between the Original and Revised Design Envelopes
	installation equipment which is six metres for each of the six trenches i.e. 36 m in total. • Two jointing pits estimated at 100 m2 each within the intertidal area; and • Tidal range at widest point of the beach, and therefore cable length across the intertidal area of 56 m. Intertidal Area disturbed at Seton Sands beach landfall option is 14,636 m2 which equates to 1.1% of total beach area measure from Wrecked Craigs to Fenny Ness resulting from: • The cable corridor width which is disturbed by installation equipment which is six metres for each of the six trenches; • Two jointing pits estimated at 100 m^2 each; and • Tidal range at widest point of the beach, and therefore cable length across the intertidal area of 401 m.	Two jointing pits estimated at 100 m^2 each within the intertidal area; and tidal range at widest point of the beach, and therefore cable length across the intertidal area of 56 m. • Seton Sands option no longer under consideration.	
Operation & Maintenance Phase			
Temporary habitat disturbance from O&M activities	Annual disturbance from Export Cable reburial is 0.007 km^2 equating to 0.005% of the Export Cable Corridor. This results from a maximum predicted reburial of 10% of the 83.3 km Export Cable length for each of the six cables during the operational phase.	Annual disturbance from Export Cable reburial is 0.002 km^2 equating to 0.002% of the Export Cable Corridor. This results from a maximum predicted reburial of 10% of the 83.3 km Export Cable length for each of the two cables during the operational phase.	Cable corridor length remains the same (83.3 km), there is a reduction in number of export cables from six to two, resulting in the

Potential Impact	Original Development Design Envelope (ICOL, 2013)	Revised Development Design Envelope	Difference between the Original and Revised Design Envelopes
			proportional reduction of O & M activities.

9.6.4 Revised Development Embedded Mitigation

699. Embedded Mitigation for the Revised Development will comprise of mitigation measures to minimise environmental effects which were captured within the Design Envelope for the Original Development (see Section 5.6.4) as follows:

Marine Recreational Users

- Provision of safety/exclusion zones around construction activities (500 m);
- Regular amendments to relevant UKHO admiralty charts to mark the location of the WTGs, OSPs and subsea cable routes;
- Regular Notice to Mariners will be incorporated into the design of the construction, major maintenance and decommissioning programmes to avoid disruption to RYA cruising routes and to minimise any navigational disruption along these routes; and
- A consultation strategy will be agreed with all relevant recreation groups, clubs and authorities to inform all key recreational users of the sea and coastline of the implications of construction, operation and maintenance of the development and to facilitate feedback in order to minimise disruption where possible.

Military PEXAs:

- To mitigate any impact on the military exercise area during the construction phase of the project, on-going consultation with the MOD will be maintained to determine the frequency and nature of their activities so that unnecessary disruption is avoided. The presence of the PEXA will also be included in any construction risk assessments, due to the nature of the practice activities in this area.
- Promulgation of information and appropriate liaison with the MOD will be carried out to ensure information on the works are circulated through agreed procedure e.g. Notices to Mariners, Kingfisher and other appropriate media.

Subsea cables and pipelines:

- Prior to construction a crossing agreement with National Grid Gas plc. Will be concluded to ensure that the Offshore Export Cables are designed to safely cross the line of an existing gas pipeline in the Firth of Forth. The agreement would include definition of appropriate construction and maintenance methods to prevent any adverse impacts on the integrity or operation of the gas pipeline.
- Consultation with National Grid Gas plc. Will be maintained throughout the construction process to ensure that the appropriate construction methodologies and operations agreed in the crossing agreement are applied when crossing the gas pipeline with the Offshore Export Cable. The measures agreed in the crossing agreement will also be included within the health and safety risk assessment prior to construction.

Unexploded ordnance:

- A UXO threat assessment will be undertaken prior to construction and risk mitigation measures will be implemented with regard to all hazards on site. All practicable mitigation measures to minimise the risk of health and safety incidents associated with UXO will be fully developed prior to construction, as per standard industry practice and included in the Project health and safety plan. Specific measures include the following:
    - Survey will be undertaken prior to any intrusive works to confirm the presence and form of any known or potential UXO.
    - Survey anomalies which indicate the presence of UXO will be avoided through micro-siting of all infrastructure works which could disturb UXO. Establishment of a formal quality assurance process with sign-off certification of the design process from a UXO specialist to reduce risks to As Low As Reasonably Practicable (ALARP).
    - The scope and extent of further surveys to detect the presence of UXO in advance of major maintenance work will be considered in advance of scheduling and undertaking maintenance which has the potential to affect UXO.
    - A UXO coordinator will be part of the vessel crew on relevant construction and maintenance vessels involved in activities where there is a risk of encountering previously unidentified UXO to ensure that all safety procedures and responses are adhered to during operations and in the event of UXO being encountered.
    - Crew on board all vessels involved in Project construction, maintenance and support during operations will be regularly briefed on munitions safety procedures and awareness.

- A UXO management procedure will be put in place to manage any unanticipated finds of suspected UXO. These measures will be delivered as part of the EMP.

9.6.5 Commitment to Consent Conditions

700. As noted in Section 2, ICOL also propose to commit to the relevant consent conditions (that will further minimise the impacts of the development on other human considerations) that were granted for the Original Development for the application of the Revised Development.

701. These consent conditions have taken into account any relevant consultation responses to the Original Development EIA from key stakeholders in relation to the Other Human Considerations assessment in determining the acceptability of the Original Development; the most relevant consent conditions are summarised in Table 9-45. Conditions in full are provided in Appendix A.

Table 9-45: Consent Conditions most relevant to Other Human Considerations

Requirement	Description
Submit a Construction Method Statement	Condition requires the final construction methods to be set out for approval to ensure that they remain consistent with the methods assessed in the ES and to ensure appropriate construction management taking into account mitigation measures to protect the environment and other users of the marine area.
Submit an Environmental Management Plan	Condition will set out for approval means to mitigate the impacts on the environmental interests during construction.
Submit the Development Specification and Layout Plan	Condition will set out for approval the final design and layout of the Development to ensure it remains consistent with the design assessed in the ES as relevant to other users of the marine area.
Submit an Operations and Maintenance Plan	Condition will set for approval, the operations and maintenance procedures and the management of impacts during the operational phase so as to safeguard environmental interests.
Submit a Navigational Safety Plan	Condition will set for approval, the navigational safety measures to be applied so as to mitigate the navigational risk to other legitimate users of the sea.
Submit a Lighting and Marking Plan	Condition will detail the agreed lighting and marking of the scheme, for approval, so as to safeguard the safety of air and surface navigation.
Commitment to Dropped Objects	Procedures for the recording of materials used in the works and for recording any lost items and subsequently recording and recovering any such items.

9.6.6 Scoping of the Revised Development EIA

702. Based on the baseline data available and reviewed in section 9.7.2 and the findings of the Scoping Opinion (SeaEnergy Renewables Ltd., 2010) and subsequent Scoping Opinion it remains the case that no interaction between the following Other Human Activates and the Revised Development is anticipated:

703. Based on the updated review, those receptors scoped out of the Original Development EIA can also be scoped out of the Revised Development EIA, and are as follows:

Development Area

- Military Practice and Exercise Areas (PEXA);
- Oil and gas infrastructure;
- Marine disposal sites;
- Telecommunications; and
- Aggregate extraction.

Revised Offshore Export Cable Corridor

- Marine disposal sites;
- Telecommunications; and
- Aggregate extraction.

704. Tables 9-46 and 9-47 summarise the post-mitigation (residual) significance for all impacts considered for the Original Development and detail whether the potential impact has been scoped out of the Revised Development EIA.

705. Where this is the case relevant justification is noted and where the mitigation applied in the Original Development EIA (in addition to any relevant conditions as highlighted above) has been carried forward as Embedded Mitigation for the Revised Development.

706. For the offshore cable corridor it is noted that the residual effect (post embedded mitigation) was Moderate/ major and thus significant in terms of EIA for impacts on temporary disturbance to marine recreational users- in particular to sailing. It should be noted however that following the commitment to carry out and agree a formal Consultation Strategy with the RYA, that this would indeed result in non-significant effects. Therefore this has been scoped out within the Revised Development EIA, with justification provided within the table below.

Table 9-46: Summary of Potential Impacts – Development Area

Potential Impact	Residual Effect (ICOL, 2013)		Scoped in or out of the EIA for current Application	Justification
Construction (& Decommissioning) Phase				
Temporary disturbance or displacement due to vessel presence and construction activities	Marine recreational users	Moderate	Scoped out	The impacts from the Original Development were assessed as not significant and, as a result of the design changes described above, the Revised Development is anticipated to have less of an impact. Further assessment of this potential impact is therefore scoped out of the Revised Development EIA.
	Unexploded ordnance	Minor		
Direct temporary disturbance of the seabed caused by construction based activities	Marine recreational users	Minor	Scoped out	The impacts from the Original Development were assessed as not significant and, as a result of the design changes described above, the Revised Development is anticipated to have less of an impact. Further assessment of this potential impact is therefore scoped out of the Revised Development EIA.
	Unexploded ordnance	Minor		
Operation & Maintenance Phase				
Physical presence of Inch Cape Structures may displace recreational vessels.	Marine recreational users	Minor	Scoped out	The impacts from the Original Development were assessed as not significant and, as a result of the design changes described above, the Revised Development is anticipated to have less of an impact. Further assessment of this potential impact is therefore scoped out of the Revised Development EIA.

Potential Impact	Residual Effect (ICOL, 2013)		Scoped in or out of the EIA for current Application	Justification
Temporary seabed disturbance from operations and maintenance (O&M) activities.	Unexploded ordnance	Minor	Scope out	The impacts from the Original Development were assessed as not significant and, as a result of the design changes described above, the Revised Development is anticipated to have less of an impact. Further assessment of this potential impact is therefore scoped out of the Revised Development EIA.

Table 9-47: Summary of Potential Impacts – Offshore Export Cable Corridor

Potential Impact	Residual Impact Significance (ICOL, 2013)		Scoped in or out of the EIA for current Application	Justification
Construction (& Decommissioning) Phase				
Temporary disturbance or displacement due to vessel presence and construction activities	Marine recreational users	Moderate/ Major (Sailing only)	Scoped out	The design changes results in an overall reduction in construction vessels movements from around 3500 to around 1500 and a decrease in the overall construction programme to two years. Additional mitigation (consultation strategy) to reduce the significant impacts originally assessed from temporary disturbance on recreation users was proposed in the EIA. The implementation of this Consultation Strategy should have subsequently reduced the residual significance assessed in the Original Development EIA when this mitigation was applied. For the Revised Development EIA. Given the design changes and embedded mitigation proposed and the spatially and temporally limited nature of the impacts on recreational sailing arising from the export cable installation, it is concluded that
	Military PEXAs	Moderate		

Potential Impact	Residual Impact Significance (ICOL, 2013)		Scoped in or out of the EIA for current Application	Justification
				construction impacts on recreational sailing activities should be scoped out of the ES for the Revised Development EIA. The residual impacts on PEXA and Subsea cables & pipelines and UXO from the Original Development were assessed as not significant and, as a result of the design changes described above, and the embedded mitigation, the Revised Development is anticipated to have less of an impact. Further assessment of this potential impact is therefore scoped out of the Revised Development EIA.
Direct temporary disturbance of seabed caused by construction based activities	Marine recreational users	Minor	Scoped out	An updated 2014 Geophysical survey was carried out which has identified potential UXO. The embedded mitigation noted will ensure impacts are minimised. The impacts from the Original Development were assessed as not significant and, as a result of the design changes described above, the Revised Development is anticipated to have less of an impact. Further assessment of this potential impact is therefore scoped out of the Revised Development EIA.
	Subsea cables and pipelines	Moderate		
	Unexploded ordnance	Minor		
Operation & Maintenance Phase				
Temporary disturbance or displacement due to vessel presence and O&M activities	Marine recreational users	Moderate/ Major (Sailing only)	Scoped out	The design changes described above will result in the reduction of export cables, which should result in a reduction in O&M vessels movements.. Additional mitigation (consultation strategy) to reduce the significant impacts originally assessed from temporary disturbance on recreation users was proposed in the EIA. The implementation of this Consultation Strategy should have subsequently reduced the residual significance
	Military PEXAs	Minor/ moderate		

Potential Impact	Residual Impact Significance (ICOL, 2013)		Scoped in or out of the EIA for current Application	Justification
				assessed in the Original Development EIA when this mitigation was applied. For the Revised Development EIA. Given the design changes and embedded mitigation proposed and the spatially and temporally limited nature of the impacts on recreational sailing arising from and O&M requirements for the export cable installation, it is concluded that the impacts on recreational sailing activities should be scoped out of the ES for the Revised Development EIA. The residual impacts on PEXA and Subsea cables & pipelines and UXO from the Original Development were assessed as not significant and, as a result of the design changes described above, and the embedded mitigation, the Revised Development is anticipated to have less of an impact. Further assessment of this potential impact is therefore scoped out of the Revised Development EIA.
Temporary seabed disturbance from O&M activities	Marine recreational users	Minor	Scoped out	The impacts from the Original Development were assessed as not significant and, as a result of the design changes described above, the Revised Development is anticipated to have less of an impact. Further assessment of this potential impact is therefore scoped out of the Revised Development EIA.
	Subsea cables and pipelines	Minor/ moderate		
	Unexploded ordnance	Minor		

Scoping of CIA

707. The Scottish Offshore Wind Farms – East Coast Discussion Document (2) – Approach to Cumulative Effects Assessment (Royal Haskoning, 2010) addressed the scope of cumulative impacts assessments at a regional level on other marine users. This document concludes

that effects on other marine users, considering the distance between the offshore wind farms in the outer Forth and Tay, should be scoped out of regional cumulative assessment.

708. As the Original Development concluded that provided the development was constructed, maintained, operated and decommissioned in accordance with the mitigation set out in the Original Development ES, no significant impact interactions were predicted for effects on any of the marine and coastal recreational users assessed.

709. Therefore considering the Design Changes associated with the Revised Development (reduction in the number of WTGs, OSPs, and met masts, reduced length of inter-array cabling and the reduced number of offshore export cables and thus an associated reduction on the construction schedule), the embedded mitigation in place and commitment to the consent conditions it is proposed that further assessment of cumulative effects also be scoped out of the Revised Development EIA.

9.6.7 Implications for EIA

710. Based on the evidence summarised from the EIA for the Original Development EIA and considering the scope of the Revised Development EIA by comparison to the Original Development and the application of the embedded mitigation set out above, it is concluded that all of the potential effects on Other Human Considerations, as described within this section, should be scoped out of the EIA for the Revised Development.

711. Therefore, it is proposed that no Other Activities and Marine Users chapter would be included within the ES.

9.6.8 Scoping Questions – Other Activities and Marine Users

- Are you satisfied that the review of baseline data is sufficient to confirm that there has been no significant change in the baselines associated with Other Activities as reported in the EIA for the Original Development?

Are you satisfied that the receptor groups detailed within the Other Activities chapter be scoped out of the EIA for the Revised Development based on the reduced design envelope, the use of all embedded mitigation measures set out in the Original Development ES and in the consents for the Original Development and the continued validity of the original baseline data?

9.7 Aviation

9.7.1 Introduction

712. As described in Section 5, the purpose of this section is to provide sufficient detail on the potential effects on civil and military aviation receptors resulting from the construction, operation and maintenance and decommissioning of the Revised Development. This includes consideration of:

- Proximity to and operations of civil airports;
- Types of radar operating over the Revised Development;
- Civil aviation agencies including National Air Traffic Services (NATS) (who is the main en-route air navigation provider in the UK);
- Helicopter operations; and
- Ministry of Defence (MoD) operations of relevance.

713. The detail provided will allow MS-LOT to be clear about what it consider to be the likely significant effects of the proposal be and, therefore, whether impacts need to be subject to an EIA and be included with the Revised Development ES.

714. Reference is made to the information gathered to inform the Original Development EIA, and to the outcomes of the impact assessment presented in the Original Development ES. Design, construction and operational changes between the Original Development and the Revised Development that are likely to have further impacts on civil and military aviation receptors are also considered.

715. For a full description of the design envelope parameters and changes please refer to Section 4. The Development Area for both the Original and Revised remains unchanged (see Figure 4-1).

9.7.2 Baseline Receptors

716. For the Original Development EIA, identification of receptors was based upon a desktop study of publicly available aeronautical documentation and aviation charts which are fully described within the Inch Cape Offshore Wind Farm ES Chapter 20 (ICOL, 2013) and supporting technical studies. ICOL consulted all appropriate aviation stakeholders to inform the scope and nature of analysis undertaken as part of the Original Development EIA.. Although the CAP 764 Policy and CAA's Guidelines on Wind Turbines guidance documents have been updated (2016) since the analysis was completed for the Original Development, the data sources previously utilised for the Original Development EIA are considered sufficient to identify receptors relevant for the Revised Development. In addition, no material changes to airspace classification and operational use of airspace have occurred

since the analysis was completed for the Original Development, details of which are contained within the Inch Cape Offshore Wind Farm ES Chapter 20 (ICOL 2013).

717. As a result of the consideration above, it is possible to conclude that the baseline environment with regard to civil and military aviation stakeholders has not changed since the Original Development EIA was completed, therefore the receptors identified as part of the Original Development EIA are considered appropriate for the Revised Development.

9.7.3 Design Envelope

718. Table 9-48 sets out the worst case scenario defined by the Original Development EIA for aviation (ICOL, 2013) compared to the proposed worst case scenario for the Revised Development at a level of detail sufficient to draw conclusions in relation to the scoping process. The table also identifies the differences between the two design envelopes.

Table 9-48: Worst Case Scenario Definition – Development Area

Potential Impact	Original Development Design Envelope (ICOL, 2013)	Revised Development Design Envelope	Difference between the Original and Revised Design Envelopes
Construction (& Decommissioning) Phase			
Impacts on Radar	During construction, and prior to commissioning WTG blades will not be rotational. As a result the infrastructure will not be processed and presented onto control displays by the radar. Therefore there will be no impacts on radar.	During construction, and prior to commissioning WTG blades will not be rotational. As a result the infrastructure will not be processed and presented onto control displays by the radar. Therefore there will be no impacts on radar.	No difference between Original and Revised Developments
Physical Obstruction	The worst case scenario for impacts on radar services assumes that the entirety of the Development Area will be populated with up to 213 WTGs at the maximum blade tip height of 215 m (705 ft) above Lowest Astronomical Tide. This is because the largest area of the highest WTGs will create the largest impact from an obstruction perspective, leading to a greater effect on aviation services.	The worst case scenario for impacts on radar services assumes that the entirety of the Development Area will be populated with up to 72 WTGs at the maximum blade tip height of 301 m (988 ft) above Lowest Astronomical Tide. This is because the largest area of the highest WTGs will create the largest impact from an obstruction perspective, leading to a greater effect on aviation services.	66% reduction in WTGs numbers, 60% OSPs and the Revised Development requires no further met masts. Increase in maximum blade tip height to 301 m.

Potential Impact	Original Development Design Envelope (ICOL, 2013)	Revised Development Design Envelope	Difference between the Original and Revised Design Envelopes
	Any aspects of the infrastructure that are lower in height than the WTGs and within the Development Area will not create an incremental effect on aviation interests.	Any aspects of the infrastructure that are lower in height than the WTGs and within the Development Area will not create an incremental effect on aviation interests.	
Operation & Maintenance Phase			
Impacts on Radar	As per Physical Obstruction in construction.	As per Physical Obstruction in construction.	66% reduction in WTGs numbers, 60% OSPs and the Revised Development requires no further met masts. Increase in maximum blade tip height to 301 m.
Physical Obstruction	As per Physical Obstruction in construction.	As per Physical Obstruction in construction.	66% reduction in WTGs numbers, 60% OSPs and the Revised Development requires no further met masts. Increase in maximum blade tip height to 301 m.

Revised Development Embedded Mitigation

719. A range of Embedded Mitigation measures to minimise environmental effects were captured within the Design Envelope for the Original Development and would equally apply to the Revised Development. These will comply with current guidelines and be agreed with the appropriate stakeholders. They are as follows (please note where the relevant guidance has been updated since the Original Development EIA, the updated guidance has been noted):

- CAP 393: The Air Navigation Order 2016 and Regulations Article 223 (CAA, 2016) sets out the mandatory requirements for lighting of offshore wind turbines. Legislation requires the fitting of obstacle lighting on offshore WTGs with a height of 60 m or more above the level of the sea at the highest astronomical tide;
- Where four or more WTGs are located together in the same group, with the permission of the CAA only those on the periphery of the group need to be fitted with at least one medium intensity steady red light positioned as close as reasonably practicable to the top of the fixed structure;
- The obstruction light or lights must be fitted to show when displayed in all directions without interruption. The requirements of the angle of the plane of the beam and peak intensity levels are defined within CAP 393 (CAA 2016).
- CAP 437: Standards for Offshore Helicopter Landing Areas (CAA, 2016a) sets out a procedure to indicate to a helicopter operator that the turbine blades and nacelle are safely secured in position prior to helicopter hoist operations commencing. CAP 437 states that this is best achieved through the provision of a helihoist status light located on the nacelle of the WTG within the pilot's field of view, which is capable of being operated remotely and from the platform itself or from within the nacelle.
- A steady green light is displayed to indicate to the pilot that the WTG blades and nacelle are secure and it is safe to operate. A flashing green light is displayed to indicate that the WTG is in a state of preparation to accept hoist operations or, when displayed during hoist operations, that parameters are moving out of limits. When the light is extinguished this indicates to the operator that it is not safe to conduct helicopter hoist operations.
- Obstruction lighting in the vicinity of the winching area that has a potential to cause glare or dazzle to the pilot or to a helicopter hoist operations crew member should be switched off prior to, and during, helicopter hoist operations.
- Information will be circulated to relevant military and aviation stakeholders including NATS, MOD, and RenewableUK. Information on potential aviation obstructions will be promulgated within the UK Integrated Aeronautical Information Package (UK IAIP)

and notified to the Defence Geographic Centre for marking on aeronautical related charts and documentation.

- The ERCoP will be in place for the construction, operation and decommissioning phases of the Revised Development. The ERCoP will be completed initially in discussion between the developer and the MCA, Search and Rescue and Navigation Safety Branches. Detailed completion of the plan will then be in cooperation with the Coastguard Operations Centre (CGOC) responsible for maritime emergency response in the area of the Revised Development. The ERCoP will then be submitted to and approved by the MCA. The ERCoP will detail specific marking and lighting of the WTGs. The SAR helicopter bases will be supplied with an accurate chart of the Revised Development WTG Global Positioning System (GPS) and will provide agreed SAR access lanes, helicopter access positions and spacing between WTGs. Furthermore, the arrangements of liaison between the wind farm developer and HM Coastguard in the event of an emergency response will be detailed together with an explanation of procedures and processes carried out at the Revised Development control centre to shut down the WTGs and the procedures for the CGOC to request this.

9.7.4 Commitment to Consent Conditions

720. As noted in Section 2.2.3, ICOL also propose to commit to those consent conditions (that will further minimise the impacts of the development on the environment) that were granted for the Original Development for the application of the Revised Development.

721. These consent conditions have taken into account any relevant consultation responses to the Original Development EIA from key stakeholders in relation to Aviation in determining the acceptability of the Original Development; the most relevant consent conditions are summarised in Table 9-49. Conditions in full are provided in Appendix A.

Table 9-49: Summary of Most Relevant Consent Conditions Related to Aviation

Requirement	Description
Submit a Lighting and Marking Plan	This condition will ensure safe marking and lighting of the offshore generating station. The LMP will ensure that the Revised Development be lit and marked in accordance with current CAA and MOD Aviation lighting Policy. The Revised Development will, at all times, be constructed and operated in accordance with the approved LMP
Submit an Air Traffic Control (ATC) Radar Mitigation Scheme	ICOL will, prior to the erection of any WTGs, submit the ATC Radar Mitigation Scheme, in writing, to the Scottish Ministers for their written approval. Such approval may only be granted following consultation by the Scottish Ministers with the MOD. The ATC Radar Mitigation Scheme will set out the appropriate measures to mitigate the impact of the Revised Development on the Leuchars PSR and shall be in place for the operational life of the Revised Development provided the PSR remains in operation. No WTGs will become operational unless, and until, all those measures required by the approved ATC Radar Mitigation Scheme have been implemented and the Scottish Ministers have confirmed this in writing. The Revised Development will thereafter be

Requirement	Description
	operated fully in accordance with the approved ATC Radar Mitigation Scheme. ICOL has CAA regulatory approval and MoD agreement for a Transponder Mandatory Zone (TMZ) which will mitigate the effect the Revised Development will have on the Leuchars PSR.
Submit a Buchan ADR Mitigation Plan	An increase in WTG blade tip height of the Revised Development is likely to bring a greater number of WTGs into line of sight to the Buchan Air Defence Radar (ADR). If this is the case, ICOL will agree with the original consent condition that no WTG with a tip height greater than 186 meters above means sea level (amsl) (Newlyn) shall be erected in any part of the Revised Development which is radar line of sight to the Buchan ADR, unless a mitigation plan has been submitted to and agreed by the Scottish Ministers.
Submit a Development Specification and Layout Plan	ICOL will, prior to the commencement of the Revised Development provide the positions and maximum heights of the WTGs, construction equipment over 150 m in height (measured above LAT) and any offshore sub-station platforms to the UK Hydrographic Office (UKHO) for aviation and nautical charting purposes. ICOL will, within one month of the final commissioning of the Revised Development, provide coordinates accurate to three decimal places of minutes of arc for each WTG position and maximum heights of the WTGs to the UKHO for aviation and nautical charting purposes.
Submit a Lighting and Marking Plan	This condition will ensure safe marking and lighting of the offshore generating station. The LMP will ensure that the Revised Development be lit and marked in accordance with current CAA and MOD Aviation lighting Policy. The Revised Development will, at all times, be constructed and operated in accordance with the approved LMP

9.7.5 Scoping of the Revised Development EIA

722. The potential impacts of wind farms on aviation interest generally fall into two scenarios:

- Physical Obstruction: infrastructure can present a physical obstruction at, or close to, an aerodrome, flight path or other landing/take off point; and
- Radar/air traffic services: clutter resulting from infrastructure, appearing on a radar display, can affect the safe provision of air traffic services as it can mask unidentified aircraft from air traffic controllers and/or prevent accurate identification of aircraft under their control. In some cases, radar reflections from the WTGs can affect the detection performance of the radar system itself.

723. The Revised Development has the potential to affect a number of receptor groups and these are separated into civil and military operations as the airspace above and around the Revised Development are used by civil and military aircraft, which are tracked by radar systems operated by NATS and the MoD. The potential for impact to radar is a function of the radar's operational range, any blocking terrain between the radar and the Revised Development and the operational requirements of the users of the radar system.

724. The increase in WTG blade tip height of the Revised Development may provide greater detectability to radar systems previously unaffected by the Original Development.

Civil Aviation Identified Receptors

NATS En-Route Radar

725. NATS En-Route plc (NERL) is the major provider of civilian en-route air traffic control over the UK and is regulated by the CAA. NERL is responsible for the provision of ATC services to aircraft in their en-route phase of flight between their source and destination airports and as such is responsible for the protection of the electronic equipment, such as radar, that allows NERL to carry out this function. The responsibility for the provision of ATC to aircraft in other phases of flight, such as take-off and landing, falls on the aerodrome operator.

726. NERL was consulted during 2009 (NERL 2009) when NATS prepared a pre-planning Technical and Operational Assessment (TOPA) which assessed potential impacts to NATS communication, navigation and surveillance infrastructure. The TOPA was revised in 2013 (NERL 2013). The TOPA concluded that no impacts on NERL communication, navigation and surveillance equipment were anticipated.

727. The Revised Development, although consisting of fewer WTGs, has the potential to affect NERL radar in operational range of the Revised Development due to an increase in WTG blade tip height. The Perwinnes and Allanshill PSR systems will potentially detect increased blade tip height of the WTGs of the Revised Development. Consultation with NERL will be completed to assess the potential for the Revised Development to affect NERL infrastructure.

Aberdeen ATC Radar

728. Aberdeen ATC utilises radar data from two NERL radars, the Perwinnes and Allanshill PSRs for the provision of ATC radar services. The Perwinnes PSR is located close to Aberdeen Airport, while Allanshill is located south west of Fraserburgh. The Inch Cape Offshore Wind Farm ES Chapter 20 (ICOL 2013) provides information of the operational parameters of the Aberdeen ATC Radar which has not changed. Consultation with NATS (of which NERL is a constituent part) will be completed to establish any impact created by the Revised Development.

Military Aviation Identified Receptors

Brizlee Wood Air Defence Radar

729. The Brizlee Wood ADR is located on Alnwick Moor, Northumberland; approximately 63 nm from the Revised Development. The radar is a long range variant and is able to provide radar coverage over the Revised Development for the purposes of notification to the quick reaction alert service which provides air defence of UK airspace. In the consultation

response from the MoD in relation to the Original Development (MoD 2013), no concerns were raised in relation to impact on Brizlee Wood ADR. The increased blade tip of the Revised Development may provide radar detection of the WTGs by the Brizlee Wood ADR, creating unwanted radar clutter; therefore the Brizlee Wood ADR is scoped in to the EIA. Consultation with the MoD Safeguarding Team will be completed to ascertain if the Revised Development will create an impact to the Brizlee Wood ADR.

730. The baseline has identified those receptors which have the potential to interact with the Revised Development. The following Table 9-50 summarises the baseline and whether the potential effect has been scoped in/out for the Revised Development EIA during construction and decommissioning and operational and maintenance phases.

Table 9-50: Summary of Potential Impacts – Revised Development

Group	Receptor Groups	Receptor	Residual Effect (ICOL, 2013)	Scoped in or out of the EIA for the Revised Development	Justification
Construction and Decommissioning Phase					
Civil	NERL and ATC Radar	Radar within operational range and radar line of sight of the Revised Development	Scoped out	Scoped out	Scoped out of Original Development EIA. There would be no specific impact on radar as a result of construction activities. During construction, the reflected radar signal from stationary elements can be removed using stationary clutter radar filters in the radar processor. Agreed mitigation in terms of the WTG operational phase is required to remain in

Group	Receptor Groups	Receptor	Residual Effect (ICOL, 2013)	Scoped in or out of the EIA for the Revised Development	Justification
					place whilst WTG remain operational, any impacts from the operation of the Revised Development would be incrementally reduced to zero with the decommissioning of the wind farm. Further assessment of this potential impact is therefore scoped out of the Revised Development EIA.
	Obstruction to aviation	Search and Rescue	N/A	Scoped out	During the construction and decommissioning of the wind farm, the presence and movement of certain construction vessels (e.g. tall cranes) may present a potential collision risk to aircraft and helicopter flight operations conducting SAR operations. Embedded mitigation and notification of construction and decommissionin

Group	Receptor Groups	Receptor	Residual Effect (ICOL, 2013)	Scoped in or out of the EIA for the Revised Development	Justification
					g of the wind farm and the lighting and promulgation on aviation charts will reduce any obstruction risk to SAR aviation operations. Further assessment of this potential impact is therefore scoped out of the Revised Development EIA.
Military	ATC and Air Defence radar	Leuchars PSR and Brizlee Wood and Buchan ADR	Not significant	Scoped out	During construction and prior to commissioning, WTG blades will not be rotational. As a result, the WTG infrastructure will not be processed and presented onto Radar Data Display Systems (RDDS) by the radar. Agreed mitigation will remain in place until the wind farm is fully decommissioned. The impacts from the Original Development were assessed as not significant and, as a result of the design

Group	Receptor Groups	Receptor	Residual Effect (ICOL, 2013)	Scoped in or out of the EIA for the Revised Development	Justification
					changes described above, the Revised Development is anticipated to have no worse of an impact. Further assessment of this potential impact is therefore scoped out of the Revised Development EIA.
	Precision Approach Radar	Leuchars ATC	Not significant	Scoped out	The Revised Development is outside of the safeguarded area of the Leuchars ATC Precision Approach Radar. Further assessment of this potential impact is therefore scoped out of the Revised Development EIA.
	Obstruction to aviation	Military low flying	Scoped out	Scoped out	Scoped out of Original Development EIA. During the construction and decommissioning of the wind farm, the presence and movement of certain construction

Group	Receptor Groups	Receptor	Residual Effect (ICOL, 2013)	Scoped in or out of the EIA for the Revised Development	Justification
					vessels (e.g. tall cranes) may present a potential collision risk to military low flying aircraft. Embedded mitigation and notification of construction and decommissioning of the wind farm together with the lighting and promulgation on aviation charts result will reduce any obstruction risk. Further assessment of this potential impact is therefore scoped out of the Revised Development EIA.
Operation and Maintenance Phase					
Civil	NERL Radar	Radar within operational range and radar line of sight of the Revised Development	Scoped Out	Scoped in	An increased WTG blade tip height has the potential to increase radar detectability of the WTGs.

Group	Receptor Groups	Receptor	Residual Effect (ICOL, 2013)	Scoped in or out of the EIA for the Revised Development	Justification
	ATC Radar	Aberdeen ATC	Scoped Out	Scoped in	Increased WTG blade tip height has the potential to increase radar detectability of the WTGs
	Obstruction to aviation	Search and Rescue	N/A	Scoped out	An Emergency Response Co-operation Plan (ERCoP) will be compiled in conjunction with the MCA and would be in place for the construction, operation and decommissioning phases of the Revised Development. The ERCoP would detail specific marking and lighting of the WTGs. The SAR helicopter would be supplied with an accurate project GPS position and Revised Development parameters; therefore affect to SAR activities is scoped out of the assessment.
	ATC Radar	Leuchars ATC	Not Significant	Scoped out	Efforts to develop an ATC Radar Mitigation Scheme have been ongoing for a number of years. To this

Group	Receptor Groups	Receptor	Residual Effect (ICOL, 2013)	Scoped in or out of the EIA for the Revised Development	Justification
Military					end, the CAA provided regulatory approval and MoD agreement for a TMZ which will mitigate the effect the Revised Development will have on the Leuchars PSR. Assessment of affordable technical solutions which may be available prior to TMZ implementation are also being progressed with MOD. Therefore ATC Radar at Leuchars is scoped out of the assessment.
	Precision Approach Radar	Leuchars ATC	Not significant	Scoped out	The impacts from the Original Development were assessed as not significant and, (as the Development Area fell outside of the safeguarded area of the Leuchars PAR) as a result of the same Development Area between the Original and Revised Development, the Revised

Group	Receptor Groups	Receptor	Residual Effect (ICOL, 2013)	Scoped in or out of the EIA for the Revised Development	Justification
					Development is anticipated to have no greater impact. Further assessment of this potential impact is therefore scoped out of the Revised Development EIA..
	Air Defence Radar	Brizlee Wood	Scoped out	Scoped in	Increased WTG blade tip height has the potential to increase radar detectability of the WTGs
		Buchan	Scoped out	Scoped out	The impacts from the Original Development were scoped out and, as a result of the same embedded mitigation, the Revised Development is anticipated to have no greater impact. Further assessment of this potential impact is therefore scoped out of the Revised Development EIA.
	Obstruction to Aviation	Military low flying	Scoped out	Scoped out	The impacts from the Original Development were scoped out and as a result of

Group	Receptor Groups	Receptor	Residual Effect (ICOL, 2013)	Scoped in or out of the EIA for the Revised Development	Justification
					the design changes described above, the Revised Development is anticipated to have no greater impact. Further assessment of this potential impact is therefore scoped out of the Revised Development EIA.
		Leuchars Minimum Sector Altitude (MSA) and Radar Vector Chart (RVC)	Scoped out	Scoped out	The impacts from the Original Development were scoped out and as a result of the design changes described above, the Revised Development is anticipated to have no greater impact. Further assessment of this potential impact is therefore scoped out of the Revised Development EIA.

9.7.6 Scoping of Cumulative Impact Assessment

731. The following list confirms the other plans, projects and activities (selected from the list in Section 5.7) that have been considered in the scoping of the CIA for the Revised Development;

Firth of Forth and Tay Offshore Wind Farms

- Neart na Gaoithe
- Seagreen Alpha and Bravo

Other Offshore Wind Farms

- MORL Western Development Area
- The Kincardine Floating Offshore Wind Farm

Other Developments

- The static nature of the infrastructure in the other coastal and onshore projects means that impacts on radar are not anticipated. In addition to this their location means there will be no impacts relating to physical obstruction. As such the other coastal and onshore projects will not be considered within the cumulative assessment.

732. It is assumed that those offshore and onshore wind farms which have been consented or are in operation have, if required, technical mitigation in place which will remove effects to radar systems within radar line of sight.

733. Currently, for radar that are not mitigated, it is assumed that any effects are deemed acceptable; however, the addition of unmitigated clutter created by the Revised Development WTGs could create a cumulative effect that might become apparent where existing detectable WTGs are currently considered manageable.

734. For radar systems that have previously been mitigated against the Original Development would be scoped out in all phases of the Revised Development for the consideration of cumulative impact. However, during the operational phase of the Revised Development, an increased WTG blade tip height has the potential to increase radar detectability of the WTGs. The increase in blade tip height of the Revised Development may bring radar systems into radar detectability which were previously scoped out. If this is the case, ICOL will consult with the radar aviation stakeholder to identify potential impacts and to discuss a route to mitigation which will remove impact.

735. Table 9-51 provides a summary the post mitigation significance for all cumulative impacts considered and details whether the potential effect has been scoped out of the EIA for the Revised Application, with a relevant justification.

Table 9-51: Summary of the Potential Cumulative Impacts– Revised Development with Other Plans, Projects and Activities

Civil/ Military	Other Plans and Projects considered for cumulative impact	Potential Impact	Receptor Group	Scoped in or out of the CIA for Revised Development	Justification
Construction and Decommissioning Phase					
Civil	Firth of Forth and Tay and other offshore wind farms	Radar within operational range and radar line of sight of the Revised Development	NERL and ATC Radar	Scoped out	There would be no specific impact on radar as a result of construction activities. WTG blades will not be rotational. As a result, the WTG infrastructure will not be processed and presented onto the RDDS by radar. Agreed mitigation in terms of the WTG operational phase is required to remain in place, any impacts from the operation of the Revised Development would be incrementally reduced to zero with the decommissioning of the wind farm. Further assessment of this potential impact is therefore scoped out of the Revised Development CIA.
		Obstruction to aviation	Search and Rescue	Scoped out	During the construction and decommissioning of the wind farm,

Civil/ Military	Other Plans and Projects considered for cumulative impact	Potential Impact	Receptor Group	Scoped in or out of the CIA for Revised Development	Justification
					the presence and movement of certain construction vessels (e.g. tall cranes) may present a potential collision risk to aircraft and helicopter flight operations conducting SAR operations. Embedded mitigation and notification of construction and decommissioning of the wind farm and the lighting and promulgation on aviation charts will reduce any obstruction risk to SAR aviation operations. Reduction in Further assessment of this potential impact is therefore scoped out of the Revised Development CIA.

Civil/ Military	Other Plans and Projects considered for cumulative impact	Potential Impact	Receptor Group	Scoped in or out of the CIA for Revised Development	Justification
Military	Firth of Forth and Tay and other offshore wind farms	ATC and ADR systems	Leuchars ATC, Brizlee Wood and Buchan ADR	Scoped out	There would be no specific impact on radar as a result of construction activities. WTG blades will not be rotational. As a result, the WTG infrastructure will not be processed and presented onto the RDDS by radar. Agreed mitigation in terms of the WTG operational phase is required to remain in place whilst any WTG remain operational, any impacts from the operation of the Revised Development would be incrementally reduced to zero with the decommissioning of the wind farm. Further assessment of this potential impact is therefore scoped out of the Revised Development CIA.

Civil/ Military	Other Plans and Projects considered for cumulative impact	Potential Impact	Receptor Group	Scoped in or out of the CIA for Revised Development	Justification
		PAR	Leuchars ATC	Scoped out	The Revised Development and the location of the projects considered for cumulative effect are outside of the operational range of the Leuchars PAR. Further assessment of this potential impact is therefore scoped out of the Revised Development EIA.
Operation and Maintenance Phase					
Civil	Firth of Forth and Tay and other offshore wind farms	Radar within operational range and radar line of sight of the Revised Development	NERL Radar	Scoped in	An increased WTG blade tip height has the potential to increase radar detectability of the WTGs. Unmitigated developments within operational range and within radar line of sight may lead to a cumulative effect.
			Aberdeen Radar	Scoped in	An increased WTG blade tip height has the potential to increase radar detectability of the WTGs. Unmitigated developments within operational range and within radar line of sight

Civil/ Military	Other Plans and Projects considered for cumulative impact	Potential Impact	Receptor Group	Scoped in or out of the CIA for Revised Development	Justification
					may lead to a cumulative effect.
		Obstruction to aviation	Search and Rescue	Scoped out	An Emergency Response Co-operation Plan (ERCoP) will be compiled in conjunction with the MCA and would be in place for the construction, operation and decommissioning phases of the Revised Development. The ERCoP would detail specific marking and lighting of the WTGs. The SAR helicopter would be supplied with an accurate project GPS position and Revised Development parameters; therefore affect to SAR activities is scoped out of the assessment.
Military	Firth of Forth and Tay and other offshore wind farms	ATC Radar	Leuchars ATC	Scoped out	Efforts to develop an ATC Radar Mitigation Scheme have been ongoing for a number of years. To this end, the CAA provided regulatory approval and MoD agreement for a

Civil/ Military	Other Plans and Projects considered for cumulative impact	Potential Impact	Receptor Group	Scoped in or out of the CIA for Revised Development	Justification
					TMZ which will mitigate the effect the Revised Development will have on the Leuchars PSR. Assessment of affordable technical solutions which may be available prior to TMZ implementation are also being progressed with MOD. Therefore ATC Radar at Leuchars is scoped out of the assessment.
		Leuchars ATC	PAR	Scoped out	The Revised Development and the location of the projects considered for cumulative effect are outside of the operational range of the Leuchars PAR. Further assessment of this potential impact is therefore scoped out of the Revised Development CIA.
		Air Defence Radar	Brizlee Wood	Scoped in	Increased WTG blade tip height has the potential to increase radar detectability of the WTGs which may

Civil/ Military	Other Plans and Projects considered for cumulative impact	Potential Impact	Receptor Group	Scoped in or out of the CIA for Revised Development	Justification
					lead to a cumulative effect.
			Buchan	Scoped out	The impacts from the Original Development were scoped out and, as a result of the same embedded mitigation, the Revised Development is anticipated to have no greater impact. Further assessment of this potential impact is therefore scoped out of the Revised Development CIA.
		Obstruction to aviation	Military low flying	Scoped out	The impacts from the Original Development were scoped out and as a result of the design changes described above, the Revised Development is anticipated to have no greater impact. Further assessment of this potential impact is therefore scoped out of the Revised Development CIA.
		Leuchars MSA and RVC	Leuchars ATC	Scoped out	The impacts from the Original Development were scoped out and as a result of the design changes described

Civil/ Military	Other Plans and Projects considered for cumulative impact	Potential Impact	Receptor Group	Scoped in or out of the CIA for Revised Development	Justification
					above, the Revised Development is anticipated to have no greater impact. Further assessment of this potential impact is therefore scoped out of the Revised Development CIA.

736. The cumulative impact assessment will consider the mitigation that has been agreed to mitigate the impact created by the Original Development to be incorporated as Embedded Mitigation in relation to the Revised Development and the commitment by ICOL to the existing consent conditions; therefore, no cumulative impact will be created in respect of those scoped out mitigated radar systems set out in the preceding section.

737. Potential cumulative effects on the following receptors will be considered in the cumulative assessment:

- NERL Radar;
- Aberdeen ATC Radar; and
- MoD Brizlee Wood ADR.

9.7.7 Approach to EIA

738. Based on the evidence provided in the Original Development EIA and considering the Design Envelope of the Revised Development by comparison to the Original Development, it is concluded that the increase in WTG blade tip height may bring the Revised Development into radar detectability by radar systems that had previously been scoped out in relation to the Original Development.

739. Where this is the case, the EIA process will be supported by further desk-based studies including radar line of sight analysis between potentially affected radar systems and the blade tip height of the WTGs of the Revised Development that will identify and examine in greater detail, the operational effect radar detectability may create.

740. The aviation industry and the provision of air navigation services (including radar services) are regulated through extensive legislation; however, the main mechanism for regulating the relationship between aviation and offshore wind is through the Section 36 consenting system and the guidance outlined below. The following documents, as a minimum, will be considered during the EIA process for the Revised Development:

- CAA, CAP 670, Air Traffic Services Safety Requirements 2014;
- CAA, CAP 393, The Air Navigation Order 2016 and Regulations (ANO)), 2016;
- The MoD Obstruction Lighting Guidance 2014; and
- MCA Offshore Renewable Energy Installations, ERCoP, Template for Construction and Operations and Decommissioning Phases 2016.

741. To inform the EIA consultation will be undertaken with the following agencies:

- The CAA;
- The MoD;
- UK MCA (SAR and lighting requirements); and
- NATS/NERL.

10 Summary of EIA Scoping

742. Tables 10-1 and 10-2 set out, based on the scoping outcomes for each topic provided within Sections 7 to 9, those impacts that are proposed to be scoped in to the EIA and CIA and thus assessed in the Revised Development EIA.

Table 10-1: Summary of the impacts to be included in Revised Development EIA

Technical Assessment	Development Stage	Potential Impact
Biological		
Natural Fish and Shellfish	Construction & Decommissioning – Wind Farm	Barrier effects disturbance or physical injury associated with construction noise (piling) – hearing specialists only.
Marine Mammals	Construction & Decommissioning – Wind Farm and Export Cable Corridor	Disturbance from increased noise from geophysical survey systems – all marine mammals
	Construction & Decommissioning – Wind Farm	Displacement/PTS from piling – all marine mammals
Ornithology	Construction and Decommissioning – Wind Farm and Export Cable Corridor (to near shore)	Direct disturbance – Manx shearwater (breeding season only)
		Indirect impacts on birds via prey species – all species
	Operation and Maintenance – Wind Farm and Export Cable Corridor (to Near Shore)	Habitat loss – Manx shearwater (breeding season only)
		Indirect impacts on birds via prey species – Manx shearwater (breeding season only)
		Direct disturbance – Manx shearwater (breeding season only)
		Displacement – Manx shearwater, gannet, kittiwake, guillemot, razorbill and puffin (all for breeding season only)
		Barrier effects – Manx shearwater, gannet, kittiwake, guillemot, razorbill and puffin (all for breeding season only

Technical Assessment	Development Stage	Potential Impact
		Collision risk impacts – Manx shearwater, gannet and, kittiwake (all for breeding season only)
	Construction and Decommissioning –Export Cable Corridor Near Shore to intertidal	Direct habitat loss – Black-headed gull (non-breeding season only)
		Indirect impacts on birds via prey species – Black-headed gull (non-breeding season only)
		Direct disturbance – Black-headed gull (non-breeding season only)
	Operation and Maintenance – Export Cable Corridor Near Shore to intertidal	Direct disturbance – Black-headed gull (non-breeding season only)
Seascape, Landscape and Visual	Construction and Decommissioning – Wind Farm	Construction activities in the development area may affect key characteristics of seascape and/ or landscape character, landscape designations and visual amenity
	Operation and Maintenance – Wind Farm	Physical presence of WTGs, Met Masts and OSPs may affect seascape and/or landscape character, landscape designations and visual amenity.
	Construction and Decommissioning – Revised Offshore Export Cable	Presence of installation vessels and related works, and trenching of cable at landfall location may affect seascape character area, designated landscape and visual amenity.
Cultural Heritage and Archaeology	Construction and Decommissioning – Wind Farm	Damage to or removal of heritage features resulting from direct physical impacts – Known maritime features (A1), unconfirmed locations of shipwrecks (A3) and known intertidal heritage assets (only additional assets not assessed in the Original Development EIA, or those assessed as significant in the Original Development EIA)
	Operation and Maintenance – Wind Farm	Setting changes – Bell Rock Lighthouse Signal Tower, Bell Rock Lighthouse, Tentsmuir Coastal Defences, St Andrews Cathedral and adjacent ecclesiastical remains,

Technical Assessment	Development Stage	Potential Impact
		St Andrews Castle and Crail Airfield pillbox. Review of the revised ZTV has also indicated that there is potential new visibility from SAMs and Listed Buildings not previously assessed. Impacts on setting from these assets will be reviewed and discussed with the relevant Stakeholders and if a significant effect is considered likely they will be included in the Revised Development EIA.
	Construction and Decommissioning – Export Cable Corridor	Damage to or removal of heritage features resulting from direct physical impacts – Known maritime features (A1), unconfirmed locations of shipwrecks (A3) and known intertidal heritage assets (only additional assets not assessed in the Original Development EIA, or those assessed as significant in the Original Development EIA).
		Damage to or removal of heritage features resulting from direct physical impacts – Potential (currently unknown) submerged prehistory.
Human		
Commercial Fisheries	Construction and Decommissioning – Wind Farm	Temporary loss or restricted access to fishing grounds – scallop, squid and creel fishery
		Increased steaming times to fishing grounds – scallop, squid and creel fishery
		Displacement of fishing vessels into other areas – scallop, squid and creel fishery
	Operation and Maintenance – Wind Farm	Complete loss or restricted access to fishing grounds – scallop, squid and creel fishery

Technical Assessment	Development Stage	Potential Impact
		Increased steaming times to fisheries grounds – all fisheries
		Displacement of fishing vessels into other areas – scallop, squid and creel fishery
	Construction and Decommissioning – Export Cable Corridor	Temporary loss or restricted access to fishing grounds – scallop, nephrops, squid, crab and lobster fishery
		Increased steaming times to fishing grounds – all fisheries
		Displacement of fishing activity into other areas – scallop, nephrops, squid, crab and lobster fishery
	Operation and Maintenance – Export Cable Corridor	Complete loss or restricted access to fishing grounds – all fisheries
		Increased steaming times to fishing grounds – all fisheries
		Displacement of fishing activity into other areas – all fisheries
Shipping and Navigation	Operation and Maintenance – Wind Farm	Vessel to vessel collision risk – commercial vessels, commercial fishing vessels and recreational vessels
		Allision with Inch Cape structures – commercial vessels, commercial fishing vessels and recreational vessels
	Operation and Maintenance – Export Cable Corridor	Effects on anchoring operations – commercial vessels
		Snagging risk – commercial fishing vessels
		Effects on anchoring operations – recreational vessels
Socio-Economic	Construction & Decommissioning and Operation & Maintenance-	Construction Employment and Wider economic impacts

Technical Assessment	Development Stage	Potential Impact
	Wind Farm and Export Cable Corridor	
Aviation	Operation and Maintenance – Wind Farm	NERL Radar
		Aberdeen ATC
		Brizlee Wood ADR

Table 10-2: Summary of the impacts to be included in Revised Development CIA

Technical Assessment	Development Stage	Potential Effect
Biological		
Natural Fish and Shellfish	Construction & Decommissioning – Wind Farm	Barrier effects disturbance or physical injury associated with construction noise – hearing specialists
Marine Mammals	Construction & Decommissioning – Wind Farm	Disturbance from increased noise from geophysical survey systems – all marine mammals
		Displacement/PTS from piling – all marine mammals
Ornithology	Cumulative – Construction and Decommissioning (Development Area and Offshore Export Cable Corridor to Near shore)	Direct disturbance - Manx shearwater (breeding season only)
		Indirect impacts on birds via prey species – all species
	Cumulative – Operation and Maintenance (Development Area and Offshore Export Cable Corridor to Near shore)	Habitat loss - Manx shearwater (breeding season only)
		Indirect impacts on birds via prey species - Manx shearwater (breeding season only)
		Displacement - Manx shearwater, gannet, kittiwake, guillemot, razorbill and puffin (all for breeding season only)
		Barrier effects - Manx shearwater, gannet, kittiwake, guillemot, razorbill and puffin (all for breeding season only)

Technical Assessment	Development Stage	Potential Effect
		Collision risk impacts - Manx shearwater, gannet and kittiwake (all for breeding season only)
Seascape, Landscape and Visual	Cumulative – Operation and Maintenance	Direct effects on seascape character of Development Area
		Indirect effects on seascape and landscape character, landscape designations and effects on visual receptors
Cultural Heritage and Archaeology	Cumulative – Construction and Decommissioning	Direct physical impacts - Known maritime features (A1), unconfirmed locations of shipwrecks (A3) and known intertidal heritage assets
	Cumulative -Operation and Maintenance	Operational setting impacts - Bell Rock Lighthouse Signal Tower, Bell Rock Lighthouse, Tentsmuir Coastal Defences, St Andrews Cathedral and adjacent ecclesiastical remains, St Andrews Castle and Crail Airfield pillbox Review of the revised ZTV has also indicated that there is potential new visibility from SAMs and Listed Buildings, impacts on setting from these assets will be reviewed and discussed with the relevant Stakeholders.
Human		
Commercial Fisheries	Cumulative – Construction and Decommissioning	Temporary or complete loss or restricted access to fishing grounds – all fisheries
		Increased steaming time to fishing grounds – all fisheries
		Displacement of fishing activity – all fisheries
	Cumulative – Operation and Maintenance	Complete loss or restricted access to fishing grounds – all fisheries
		Increased steaming times to fishing grounds – all fishing grounds
		Displacement of fishing activity – all fisheries
Shipping and Navigation	Cumulative -Operation and Maintenance	Increased transit times and distances – commercial vessels

Technical Assessment	Development Stage	Potential Effect
		Vessel to vessel collision risk – commercial vessels
		Vessel to structure allision risk – commercial vessels
		Increase of visual confusion when navigating – commercial vessels
		Deviations to avoid the wind farm areas – commercial fishing vessels
		Vessel to structure allision risk – commercial fishing vessels
		Vessel to structure allision risk – recreational vessels
Socio-Economic	Construction & Decommissioning and Operation & Maintenance-Wind Farm and Export Cable Corridor	Construction Employment and Wider economic impacts
Aviation	Operation and Maintenance – Cumulative	NERL Radar
		Aberdeen ATC
		Brizlee Wood ADR

11 Proposed Environmental Statement Contents

11.1 Outline of Environmental Statement

743. The ES will cover the Revised Development as outlined in Section 1 (Revised Inch Cape Wind Farm and Revised OfTW) and will underpin the Section 36 and Marine Licence applications, with a separate ES being prepared for the onshore works and planning application under the Planning etc. (Scotland) Act 2006. In accordance with the requirements of the Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2000 and the Marine Works (Environmental Impact Assessment) Regulations 2007 (as amended), the proposed contents and structure of the Revised Development ES, in light of the findings of the scoping process, will be as follows:

- A Non-technical Summary (NTS);
- Volume 1 - Written statement on the findings of the EIA and CIA; and
- Volume 2 – Any supporting Technical Appendices and graphics.

744. Volume 1 of the Revised Development ES will be divided into the following main chapters:

- Chapter 1 - Introduction;
- Chapter 2 – Policy and Legal Background;
- Chapter 3 – Regulatory Requirements;
- Chapter 4 – Process and Methodology;
- Chapter 5 – Stakeholder Engagement;
- Chapter 6 – Site Selection and Alternatives;
- Chapter 7 – Description of Development;
- Chapter 8 – Benefits of the Project;
- Chapter 9 – Natural Fish and Shellfish;
- Chapter 10 – Marine Mammals;
- Chapter 11 - Ornithology
- Chapter 12 - Seascape and Landscape Visual Receptors;
- Chapter 13 - Archaeology and Cultural Heritage;
- Chapter 14 - Commercial Fisheries;
- Chapter 15 - Shipping and Navigation;
- Chapter 16 – Socio-economic;
- Chapter 17 - Aviation;

745. In support of the application a separate Planning and Policy statement will also be prepared and submitted alongside the ES. This statement will include a description of the legislation, policy and guidance which are relevant in the determination of the application.

746. The technical assessment sections (Chapters 9 to 16), unless defined differently within the relevant section of this Scoping Report, will each comprise of the following sub-headings:

- Introduction;
- Baseline Characterisation, results of consultations, any other desk study and additional fieldwork / surveys and assessment of site or feature value / sensitivity;
- Assessment Methodology;
- Embedded Mitigation;
- Impact Assessment (including cumulative impact assessment); and
- Mitigation Measures, Residual Impact and any recommendations for monitoring.

747. A separate chapter will not be included for 'Underwater Noise and Vibration' as the results of underwater noise modelling will be presented as a Technical Appendix and will then be cross-referenced and applied appropriately within other relevant technical assessment chapters (e.g. Natural Fish and Shellfish, Marine Mammals).

748. The CIA will be completed for each technical discipline and will be presented within that specific technical assessment chapter, rather than presented within a stand-alone chapter.

749. The technical topics to be included within the Revised Development EIA are outlined above within the proposed chapters 9 to 17. For the avoidance of doubt, it is proposed that the following topics are scoped out of the Revised Development ES and EIA:

- Metocean and Coastal Processes;
- Benthic Ecology; and
- Other Activities and Marine Users

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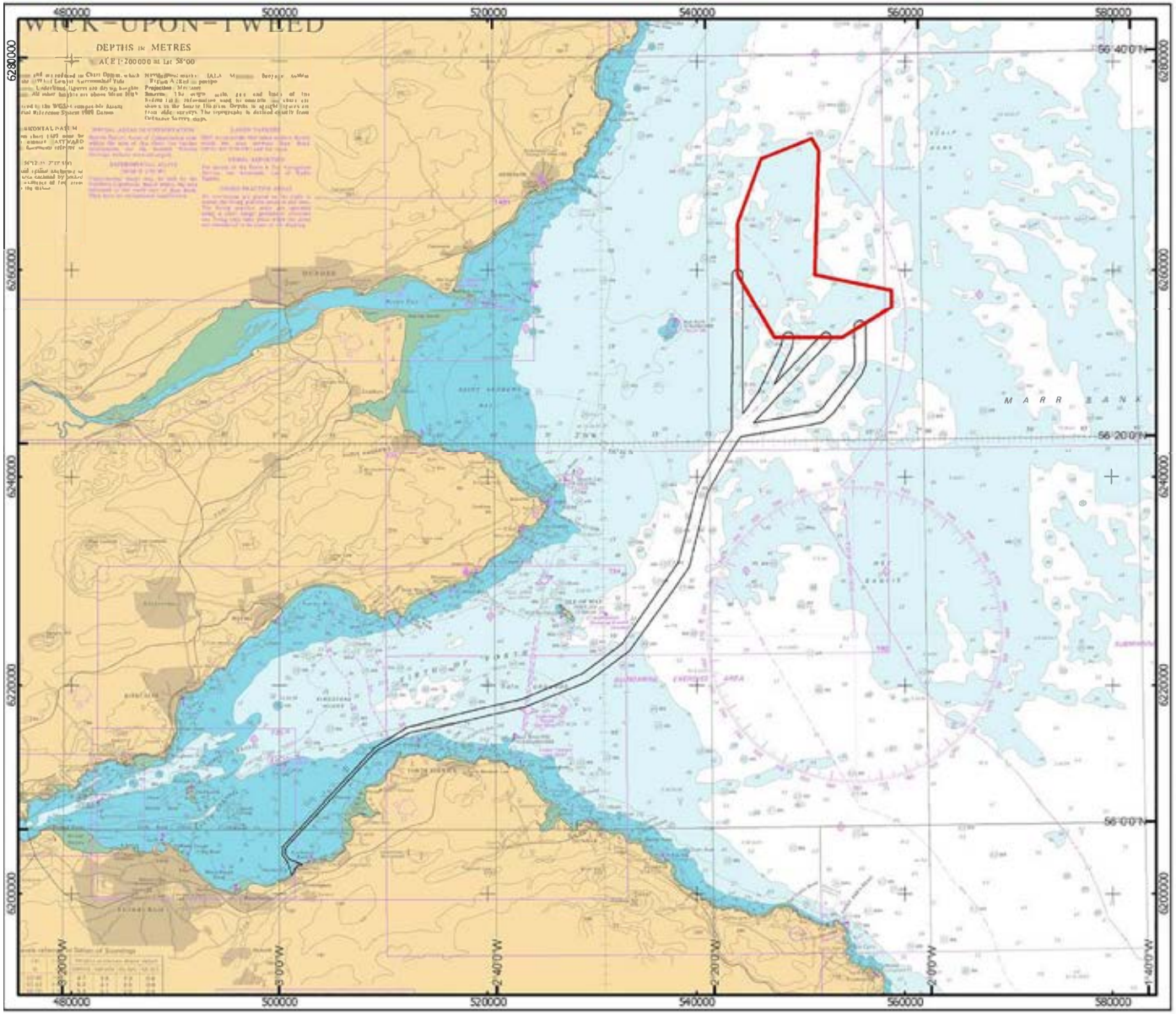
Figures



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KEY

Development Area

Revised Offshore Export Cable Corridor

Horizontal Scale 1:500,000 A4 Chart
0 10 20Km
N

Geodetic Parameters: WGS84 UTM Zone 30N

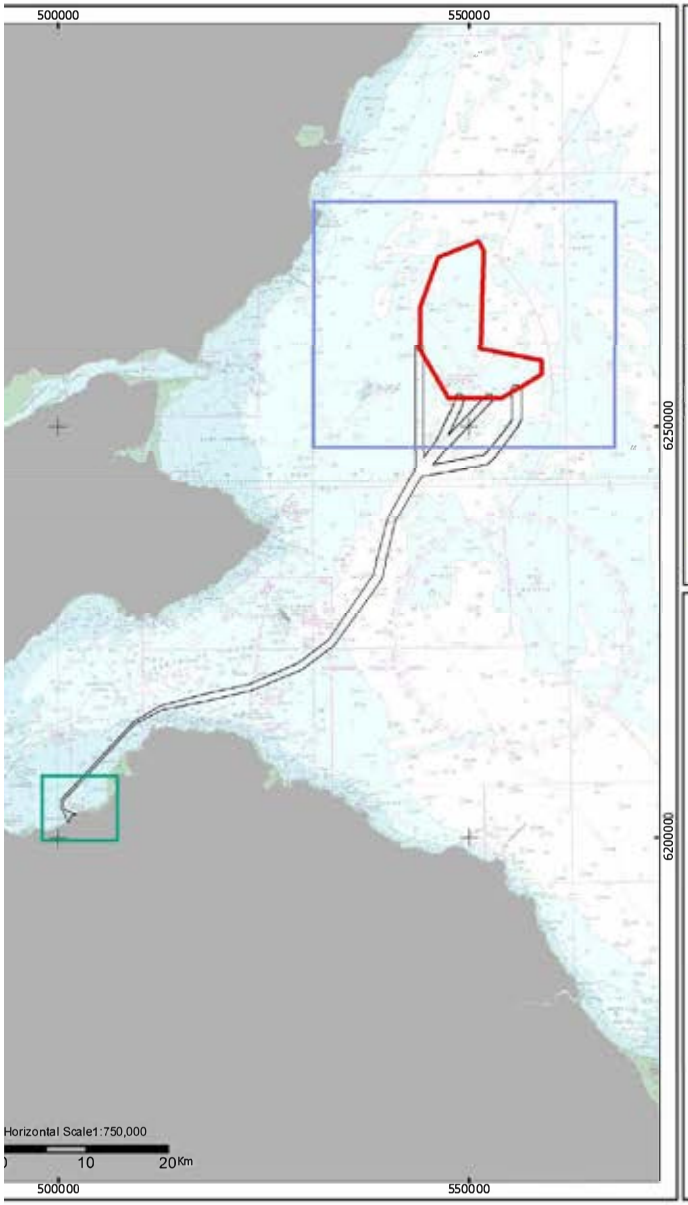
Produced: DB
Reviewed: TY
Approved: NK

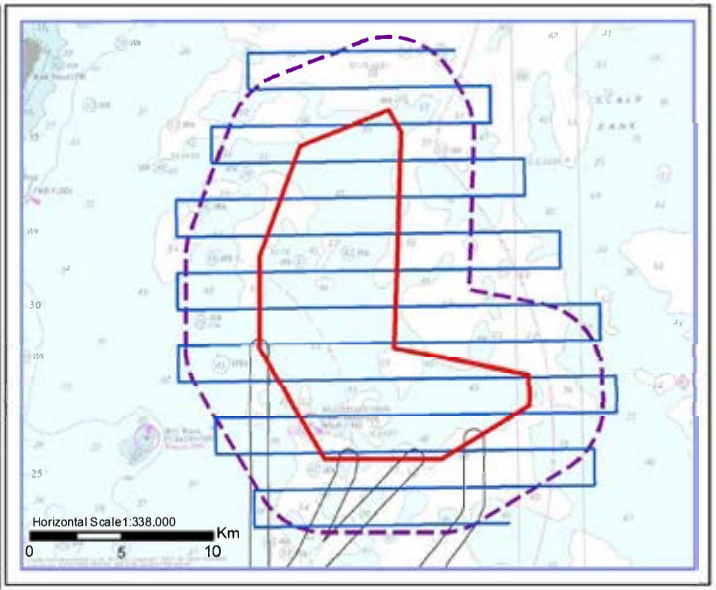
Date: 28/04/2017 | Revision: 3

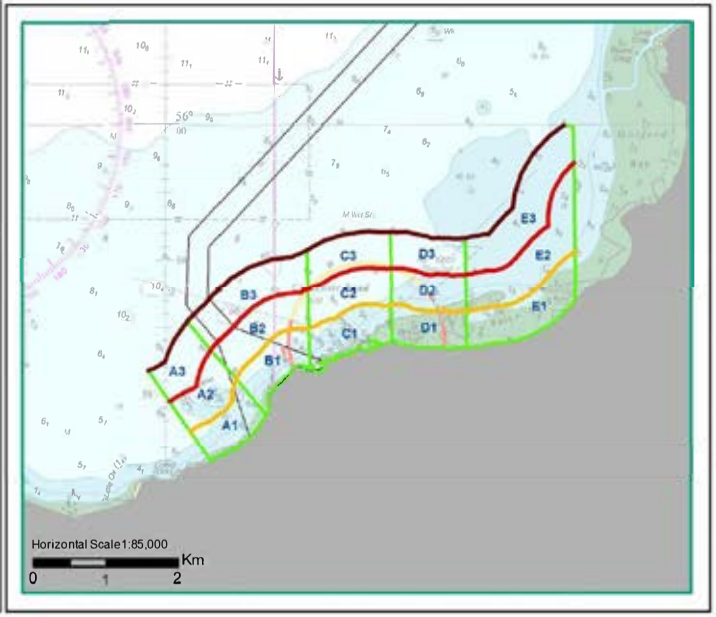
REF: int0022_1_R3

Location of Development Area and Revised Offshore Export Cable Corridor

Figure 4-1
Revised Development







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Royal HaskoningDHV
Enhancing Society Together

Key

- Development Area
- Revised Export Cable Corridor
- Nearshore and intertidal survey sectors A to E
- Boat-based survey area (including 4km buffer)
- Bird Survey Boat Transect Route
- 1.5km from shore
- 1km from shore
- 0.5km from shore

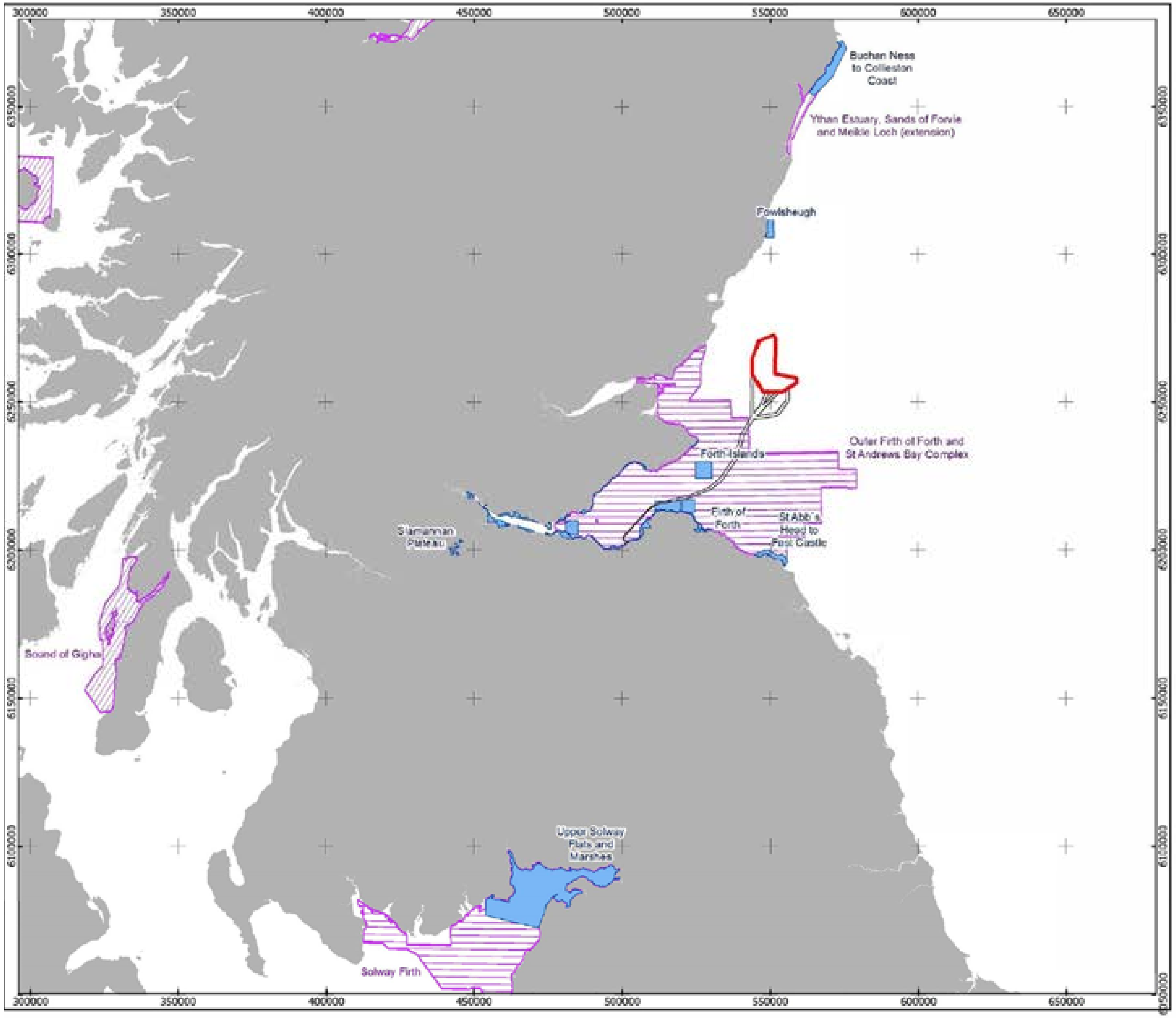
N

A4 Chart

Geodetic Parameters:	WGS84 UTM Zone 30N
Produced: GC Reviewed: MG Approved: MG	
Date: 30/03/2017	Revision: 01
REF:	

Figure 8-1 Ornithology Survey Areas

Revised Development



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Royal HaskoningDHV

KEY

- Development Area
- Revised Export Cable Corridor
- Special Protection Area (SPA)
- Proposed SPA

Horizontal Scale 1:1,758,000 — A4 Chart

0 30 60Km

N

Geodetic Parameters: WGS84 UTM Zone 30N

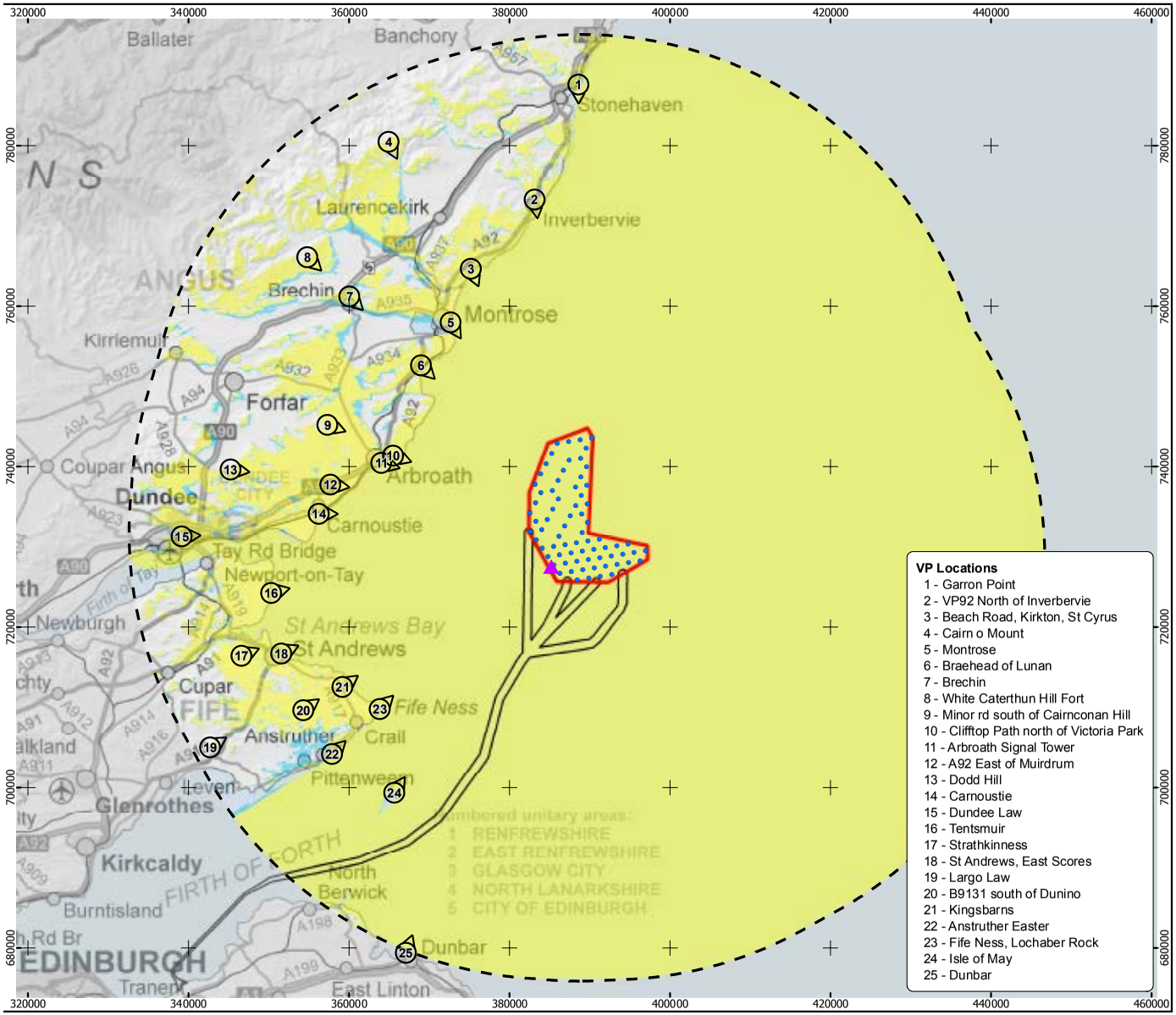
Produced: GC
Reviewed: MG
Approved: MG

Date: 30/03/2017 | Revision: 01

REF:

The Locations of Special Protection Areas and Ramsar Sites Screened in for the Original Application. The Proposed Marine Special Protection Areas in this Region are also Shown

Figure 8-2 Revised Development



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KEY

- DEVELOPMENT AREA
- INDICATIVE INCH CAPE TURBINE LAYOUT (301M TIP HEIGHT)
- VIEWPOINT LOCATION
- MET MAST INSTALLED POSITION
- REVISED OFFSHORE EXPORT CABLE CORRIDOR
- 50km TURBINE BUFFER
- ZONE OF THEORETICAL VISIBILITY AT BLADE TIP HEIGHT (301m)
- ZONE OF THEORETICAL VISIBILITY AT BLADE TIP HEIGHT (215)m

1. PREDICTED VISIBILITY IS FOR OBSERVER EYE LEVEL 2m ABOVE GROUND LEVEL
2. THE ANALYSIS DOES NOT TAKE INTO ACCOUNT THE SCREENING EFFECTS OF VEGETATION, BUILDINGS OR OTHER SURFACE FEATURES
3. CREATED USING ORDNANCE SURVEY DIGITAL TERRAIN DATA ON A 50m GRID

Horizontal Scale1:650,000 A4 Chart

0 10 20Km

Geodetic Parameters: WKID: 27700 Authority: EPSG

Produced: BPHB
Reviewed: LG
Approved:

Date: 27/04/2017 | Revision: b

REF: 4914.0004.29.9.1.1.0 Comparison ZTV

Figure 9.1 Comparison ZTV (with viewpoints)

Revised Inch Cape Wind Farm

Revised Development 72 Turbine Layout for April 2017 Scoping

Original Development 213 Turbine Layout

SDIC
Red Rock Power Limited

OS reference:	388592 E 787597 N	Horizontal field of view:	90° (cylindrical projection)	Camera:	NA
Eye level:	57 m AOD	Principal distance:	522 mm	Lens:	NA
Direction of view:	180°	Paper size:	841 x 297 mm (half A1)	Camera height:	1.5m AGL
Nearest scoping turbine:	44.059 km	Correct printed image size:	820 x 260 mm	Date and time:	NA

Horizontal Scale of Map 1:250,000
0 5 10 Km N
Geodetic Parameters: OSGB 1936 BNG

Produced: SP
Reviewed: JP
Approved: LG
SLR
Date: 25/04/2017 Revision: 0
REF: 04914.00001.29.001.0 VP1 Garron Point

Figure 9.2
Viewpoint 1: Garron Point
Comparative Wireline

Inch Cape
Wind Farm

Revised Development 72 Turbine Layout for April 2017 Scoping

Original Development 213 Turbine Layout

SDIC
Red Rock Power Limited

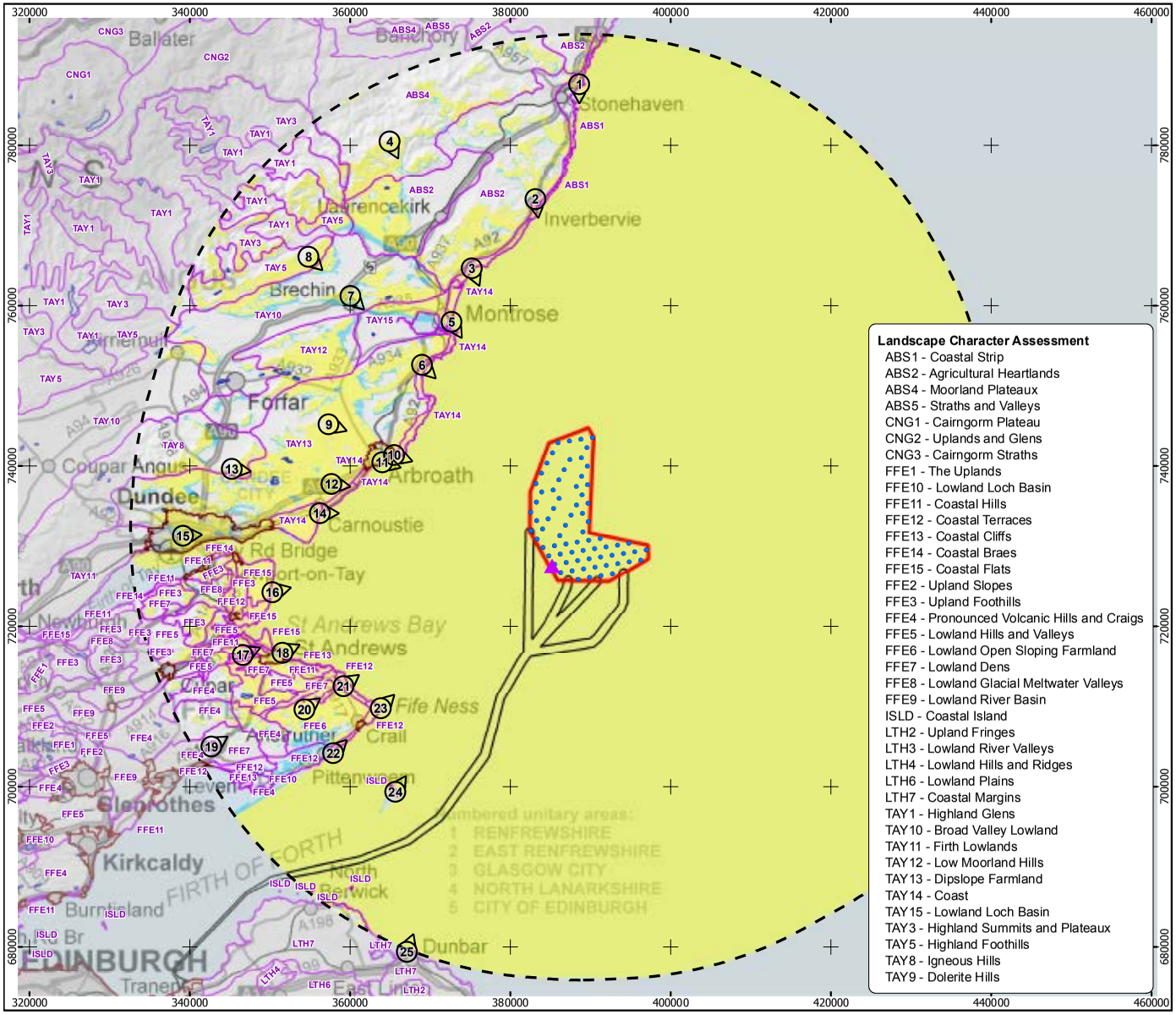
OS reference:	367102 E 679370 N
Eye level:	10 m AOD
Direction of view:	21°
Nearest scoping turbine:	51.079 km
Horizontal field of view:	90° (cylindrical projection)
Principal distance:	522 mm
Paper size:	841 x 297 mm (half A1)
Correct printed image size:	820 x 260 mm
Camera:	NA
Lens:	NA
Camera height:	1.5m AGL
Date and time:	NA

Horizontal Scale of Map 1:250,000
0 5 10 Km
N
Geodetic Parameters: OSGB 1936 BNG

Produced: SP
Reviewed: JP
Approved: LG
SLR
Date: 25/04/2017
Revision: 0
REF: 04914.00005.29.004.0 VP25 Dunbar

Figure 9.3
Viewpoint 25: Dunbar
Comparative Wireline

Inch Cape
Wind Farm



SDIC
Red Rock Power Limited

KEY

- DEVELOPMENT AREA
- INDICATIVE INCH CAPE TURBINE LAYOUT (301M TIP HEIGHT)
- VIEWPOINT LOCATION
- MET MAST INSTALLED POSITION
- REVISED OFFSHORE EXPORT CABLE CORRIDOR
- 50km TURBINE BUFFER
- ZONE OF THEORETICAL VISIBILITY AT BLADE TIP HEIGHT (301m)
- ZONE OF THEORETICAL VISIBILITY AT BLADE TIP HEIGHT (215)m

SNH LANDSCAPE CHARACTER ASSESSMENT

- LCA AREAS
- LCA LOCH
- LCA URBAN

1. PREDICTED VISIBILITY IS FOR OBSERVER EYE LEVEL 2m ABOVE GROUND LEVEL
2. THE ANALYSIS DOES NOT TAKE INTO ACCOUNT THE SCREENING EFFECTS OF VEGETATION, BUILDINGS OR OTHER SURFACE FEATURES
3. CREATED USING ORDNANCE SURVEY DIGITAL TERRAIN DATA ON A 50m GRID

Horizontal Scale1:650,000 A4 Chart

0 10 20Km

Geodetic Parameters: WKID: 27700 Authority: EPSG

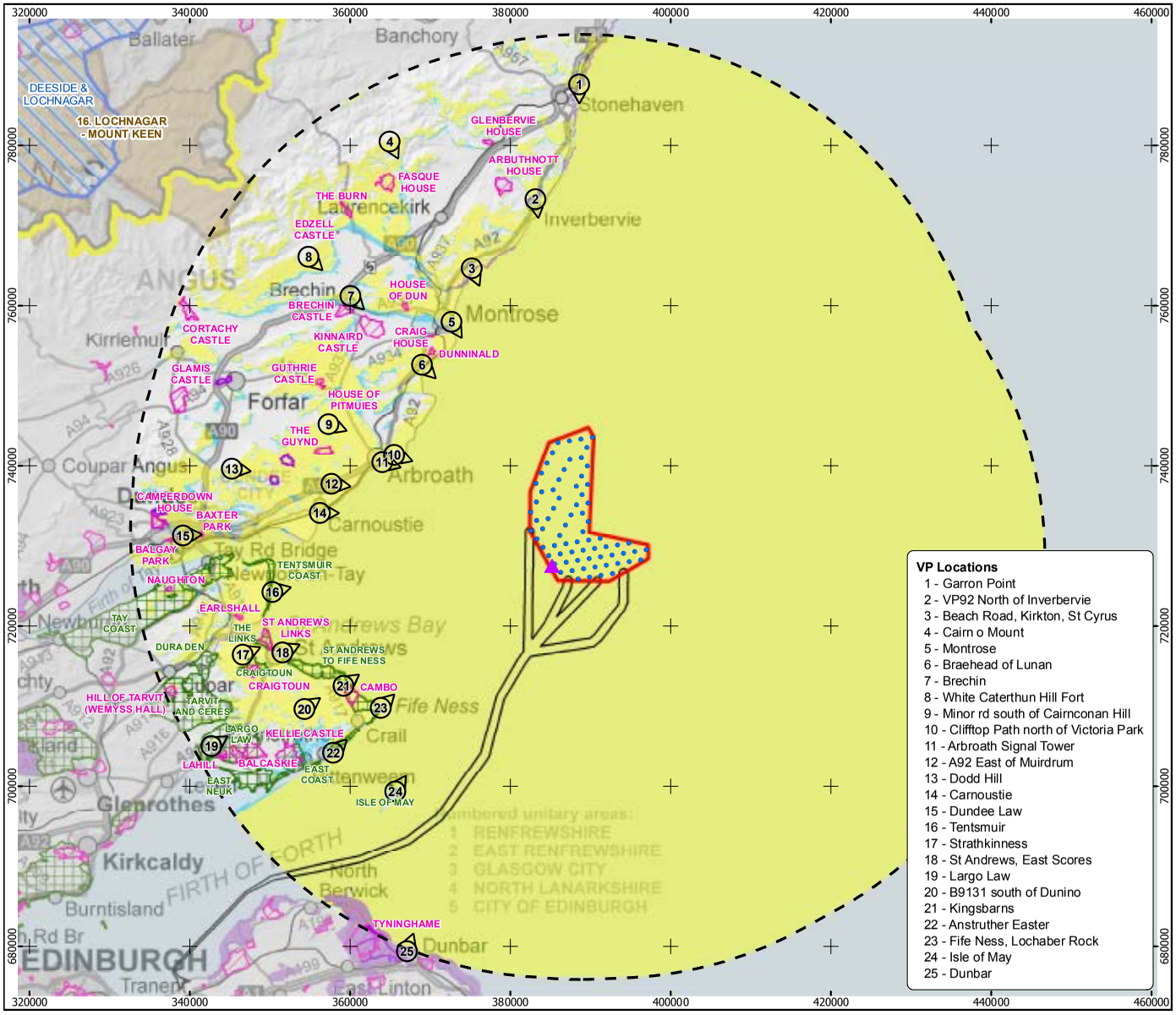
Produced: BPHB
Reviewed: LG
Approved:

Date: 27/04/2017 | Revision: a

REF: 4914.0004.29.9.4.1.0 Comparison ZTV and LCA

Figure 9.4 Comparison ZTV and Landscape Character Areas

Revised Inch Cape Wind Farm



VP Locations

1 - Garron Point
2 - VP92 North of Inverbervie
3 - Beach Road, Kirkton, St Cyrus
4 - Cairn o Mount
5 - Montrose
6 - Braehead of Lunan
7 - Brechin
8 - White Caterthun Hill Fort
9 - Minor rd south of Cairnconan Hill
10 - Clifftop Path north of Victoria Park
11 - Arbroath Signal Tower
12 - A92 East of Muirdrum
13 - Dodd Hill
14 - Carnoustie
15 - Dundee Law
16 - Tentsmuir
17 - Strathkinness
18 - St Andrews, East Scores
19 - Largo Law
20 - B9131 south of Dunino
21 - Kingsbarns
22 - Anstruther Easter
23 - Fife Ness, Lochaber Rock
24 - Isle of May
25 - Dunbar

SDIC
Red Rock Power Limited

KEY

- DEVELOPMENT AREA
- INDICATIVE INCH CAPE TURBINE LAYOUT (301M TIP HEIGHT)
- VIEWPOINT LOCATION
- MET MAST INSTALLED POSITION
- REVISED OFFSHORE EXPORT CABLE CORRIDOR
- 50km TURBINE BUFFER
- ZONE OF THEORETICAL VISIBILITY AT BLADE TIP HEIGHT (301m)
- ZONE OF THEORETICAL VISIBILITY AT BLADE TIP HEIGHT (215)m
- NATIONAL PARK
- NATIONAL SCENIC AREA
- AREA OF GREAT LANDSCAPE VALUE
- FIFE LOCAL LANDSCAPE AREA
- GARDENS AND DESIGNED LANDSCAPES
- AREA OF WILD LAND
- COUNTRY PARK

1. PREDICTED VISIBILITY IS FOR OBSERVER EYE LEVEL 2m ABOVE GROUND LEVEL
2. THE ANALYSIS DOES NOT TAKE INTO ACCOUNT THE SCREENING EFFECTS OF VEGETATION, BUILDINGS OR OTHER SURFACE FEATURES
3. CREATED USING ORDNANCE SURVEY DIGITAL TERRAIN DATA ON A 50m GRID

Horizontal Scale 1:650,000 A4 Chart

0 10 20Km

N

Geodetic Parameters: WKID: 27700 Authority: EPSG

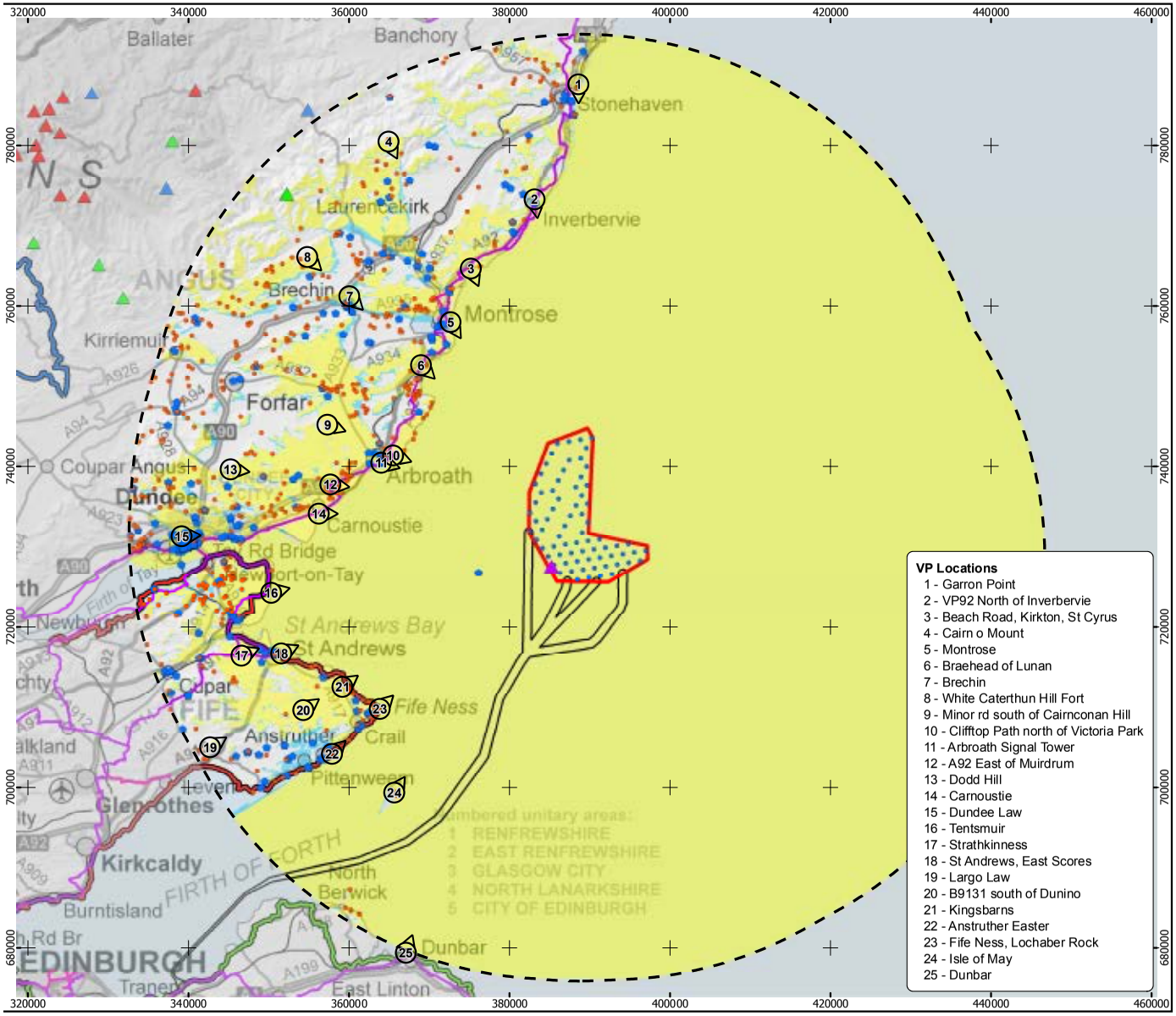
Produced: BPHB
Reviewed: LG
Approved:

Date: 27/04/2017 | Revision: b

REF: 4914.0004.29.9.5.1.0 Comparison ZTV and Des

Figure 9.5 Comparison ZTV and Landscape Designations

Revised Inch Cape Wind Farm



SDIC
Red Rock Power Limited

KEY

- DEVELOPMENT AREA
- INDICATIVE INCH CAPE TURBINE LAYOUT (301M TIP HEIGHT)
- VIEWPOINT LOCATION
- MET MAST INSTALLED POSITION
- REVISED OFFSHORE EXPORT CABLE CORRIDOR
- 50km TURBINE BUFFER
- ZONE OF THEORETICAL VISIBILITY AT BLADE TIP HEIGHT (301m)
- ZONE OF THEORETICAL VISIBILITY AT BLADE TIP HEIGHT (215)m
- MUNRO
- CORBETT
- GRAHAM
- SCHEDULED ANCIENT MONUMENT
- LISTED BUILDING GRADE A
- CATERAN WAY
- FIFE COASTAL PATH
- JOHN MUIR WAY
- NATIONAL CYCLE ROUTE
- NATIONAL CYCLE LINK

1. PREDICTED VISIBILITY IS FOR OBSERVER EYE LEVEL 2m ABOVE GROUND LEVEL
2. THE ANALYSIS DOES NOT TAKE INTO ACCOUNT THE SCREENING EFFECTS OF VEGETATION, BUILDINGS OR OTHER SURFACE FEATURES
3. CREATED USING ORDNANCE SURVEY DIGITAL TERRAIN DATA ON A 50m GRID

Horizontal Scale 1:650,000 A4 Chart

0 10 20Km

Geodetic Parameters: WKID: 27700 Authority: EPSG

Produced: BPHB
Reviewed: LG
Approved:

Date: 27/04/2017 | Revision: b

REF: 4914.0004.29.9.6.1.0 Comparison ZTV and Vis

Figure 9.6 Comparison ZTV and Visual Receptors

Revised Inch Cape Wind Farm

Revised Development 72 Turbine Layout for April 2017 Scoping

Original Development 213 Turbine Layout

SDIC
Red Rock Power Limited

OS reference:	343025 E 769795 N	Horizontal field of view:	90° (cylindrical projection)	Camera:	NA
Eye level:	725 m AOD	Principal distance:	522 mm	Lens:	NA
Direction of view:	129°	Paper size:	841 x 297 mm (half A1)	Camera height:	1.5m AGL
Nearest scoping turbine:	50.657 km	Correct printed image size:	820 x 260 mm	Date and time:	NA

Horizontal Scale of Map 1:250,000
0 5 10 Km
Geodetic Parameters: OSGB 1936 BNG

Produced: SP
Reviewed: JP
Approved: LG
Date: 25/04/2017 Revision: 0
REF: 04914.00005.29.005.0 VPB Hill of Glansie

Figure 9.7
Lochnagar-Mount Keen
Wild Land Area, Hill of Glansie
Comparative Wireline

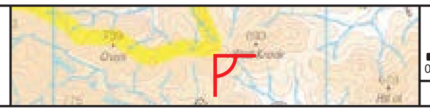
Inch Cape
Wind Farm

Revised Development 72 Turbine Layout for April 2017 Scoping

Original Development 213 Turbine Layout

SDIC Red Rock Power Limited

OS reference:	345932 E 775275 N	Horizontal field of view:	90° (cylindrical projection)	Camera:	NA
Eye level:	692 m AOD	Principal distance:	522 mm	Lens:	NA
Direction of view:	135°	Paper size:	841 x 297 mm (half A1)	Camera height:	1.5m AGL
Nearest scoping turbine:	51.476 km	Correct printed image size:	820 x 260 mm	Date and time:	NA



Horizontal Scale of Map 1:250,000
0 5 10 Km N
Geodetic Parameters: OSGB 1936 BNG

Produced: SP
Reviewed: JP
Approved: LG
SLR
Date: 25/04/2017 Revision: 0
REF: 04914.00005.29.006.0 VPC Black Hill (CNP)

Figure 9.8
Cairngorms National Park, Black Hill
Comparative Wireline

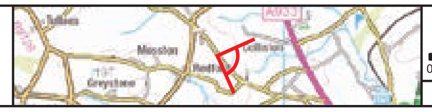
Inch Cape Wind Farm

Revised Development 72 Turbine Layout for April 2017 Scoping

Original Development 213 Turbine Layout

SDIC Red Rock Power Limited

OS reference:	357540 E 744863 N	Horizontal field of view:	90° (cylindrical projection)	Camera:	NA
Eye level:	146 m AOD	Principal distance:	522 mm	Lens:	NA
Direction of view:	111°	Paper size:	841 x 297 mm (half A1)	Camera height:	1.5m AGL
Nearest scoping turbine:	26.602 km	Correct printed image size:	820 x 260 mm	Date and time:	NA



Horizontal Scale of Map 1:250,000
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Geodetic Parameters: OSGB 1936 BNG

Produced: SP
Reviewed: JP
Approved: LG
SLR
Date: 25/04/2017
Revision: 0
REF: 04914.00005.29.002.0 VP9 Cairnconon Hill

Figure 9.9
Viewpoint 9: Cairnconon Hill
Comparative Wireline

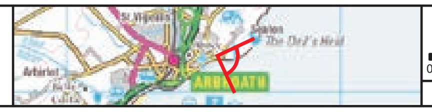
Inch Cape
Wind Farm

Revised Development 72 Turbine Layout for April 2017 Scoping

Original Development 213 Turbine Layout

SDIC
Red Rock Power Limited

OS reference:	365503 E 741346 N	Horizontal field of view:	90° (cylindrical projection)	Camera:	NA
Eye level:	21 m AOD	Principal distance:	522 mm	Lens:	NA
Direction of view:	110°	Paper size:	841 x 297 mm (half A1)	Camera height:	1.5m AGL
Nearest scoping turbine:	18.038 km	Correct printed image size:	820 x 260 mm	Date and time:	NA



Horizontal Scale of Map 1:250,000
0 5 10 Km
N
Geodetic Parameters: OSGB 1936 BNG

Produced: SP
Reviewed: JP
Approved: LG
SLR
Date: 25/04/2017 Revision: 0
REF: 04914.00005.29.003.0 VP10 Arbroath

Figure 9.10
Viewpoint 10: Victoria Park, Arbroath
Comparative Wireline

Inch Cape
Wind Farm

Appendix A – Original Development Conditions

This Appendix reproduces in full, the conditions associated with the Original Development Section 36 consent and Marine Licences. The conditions are taken directly from the decision letters, with the original numbering retained to allow cross referencing.

Section 36 Consent Conditions

The consent granted in accordance with section 36 of the Electricity Act 1989 is subject to the following conditions:

1. The consent is for a period from the date this consent is granted until the date occurring 25 years after the Final Commissioning of the Development. Written confirmation of the date of the Final Commissioning of the Development must be provided by the Company to the Scottish Ministers, the Planning Authority, the Joint Nature Conservation Agency ("JNCC") and Scottish Natural Heritage ("SNH") no later than one calendar month after the Final Commissioning of the Development. Where the Scottish Ministers deem the Development to be complete on a date prior to the date when all wind turbine generators forming the Development have supplied electricity on a commercial basis to the National Grid then, the Scottish Ministers will provide written confirmation of the date of the Final Commissioning of the Development to the Company, the Planning Authority, JNCC and SNH no later than one calendar month after the date on which the Scottish Ministers deem the Development to be complete.

Reason: *To define the duration of the consent.*

2. The Commencement of the Development must be a date no later than 5 years from the date the consent is granted, or such other date from the date of the granting of this consent as the Scottish Ministers may hereafter direct in writing.

Reason: *To ensure the Commencement of the Development is undertaken within a reasonable timescale after consent is granted.*

3. Where the Secretary of State has, following consultation with the Scottish Ministers, given notice requiring the Company to submit to the Secretary of State a Decommissioning Programme, pursuant to section 105(2) and (5) of the Energy Act 2004, then construction may not begin on the site of the Development until after the Company has submitted to the Secretary of State a Decommissioning Programme in compliance with that notice.

Reason: *To ensure that a decommissioning programme is submitted to the Secretary of State where the Secretary of State has, following consultation with the Scottish Ministers, so required before any construction commences.*

4. The Company is not permitted to assign this consent without the prior written authorisation of the Scottish Ministers. The Scottish Ministers may grant (with or without conditions) or refuse such authorisation as they may, in their own discretion, see fit. The consent is not capable of being assigned, alienated or transferred otherwise than in accordance with the foregoing procedure.

Reason: *To safeguard the obligations of the consent if assigned to another company.*

5. In the event that for a continuous period of 12 months or more any Wind Turbine Generator ("WTG") installed and commissioned and forming part of the Development fails to produce electricity on a commercial basis to the National Grid then, unless otherwise agreed in writing by the Scottish Ministers and after consultation with the Company and any advisors as required at the discretion of the Scottish Ministers, any such WTG may be deemed by the Scottish Ministers to cease to be required. If so deemed, the WTG must be decommissioned and the area of the Site containing that WTG must be reinstated by the Company in accordance with the procedures laid out within the Company's Decommissioning Programme, within the period of 24 months from the date of the deeming decision by the Scottish Ministers.

Reason*: To ensure that any redundant WTGs and associated ancillary equipment is removed from the Site in the interests of safety, amenity and environmental protection.*

6. If any serious health and safety incident occurs on the Site requiring the Company to report it to the Health and Safety Executive, then the Company must also notify the Scottish Ministers of the incident within 24 hours of the Company becoming aware of the incident occurring.

Reason: *To inform the Scottish Ministers of any serious health and safety incident occurring on the Site.*

7. The Development must be constructed and operated in accordance with the terms of the Application and related documents, including the accompanying Environmental Statement ("ES"), and Annex 1 of this letter, except in so far as amended by the terms of this section 36 consent.

Reason*: To ensure that the Development is carried out in accordance with the Application documentation.*

8. As far as reasonably practicable, the Company must, on being given reasonable notice by the Scottish Ministers (of at least 72 hours), provide transportation to and from the Site for any persons authorised by the Scottish Ministers to inspect the Site.

Reason: *To ensure access to the Site for the purpose of inspection.*

9. The Company must, no later than 6 months prior to the Commencement of the Development, submit a Construction Programme ("CoP"), in writing, to the Scottish Ministers for their written approval. Such approval may only be granted following consultation by the Scottish Ministers with SNH, the JNCC, SEPA, MCA, NLB, RSPB Scotland, the Planning Authority and any such other advisors or organisations as may be required at the discretion of the Scottish Ministers. The Development must, at all times, be constructed in accordance with the approved CoP (as updated and amended from time to time by the Company). Any updates or amendments made to the CoP by the Company

must be submitted, in writing, by the Company to the Scottish Ministers for their written approval.

The CoP must set out:

a. The proposed date for Commencement of Development;
b. The proposed timings for mobilisation of plant and delivery of materials, including details of onshore lay-down areas;
c. The proposed timings and sequencing of construction work for all elements of the Development infrastructure;
d. Contingency planning for poor weather or other unforeseen delays; and
e. The scheduled date for Final Commissioning of the Development.

Reason: *To confirm the timing and programming of construction.*

10. The Company must, no later than 6 months prior to the Commencement of the Development submit a Construction Method Statement ("CMS"), in writing, to the Scottish Ministers for their written approval. Such approval may only be granted following consultation by the Scottish Ministers with, SNH, the JNCC, SEPA, MCA, NLB, RSPB Scotland, the Planning Authority and any such other advisors or organisations as may be required at the discretion of the Scottish Ministers. The CMS must set out the construction procedures and good working practices for installing the Development. The CMS must also include details of the roles and responsibilities, chain of command and contact details of company personnel, any contractors or sub-contractors involved during the construction of the Development. The CMS must be in accordance with the construction methods assessed in the ES and must include details of how the construction related mitigation steps proposed in the ES are to be delivered. The Development must, at all times, be constructed in accordance with the approved CMS (as updated and amended from time to time by the Company). Any updates or amendments made to the CMS by the Company must be submitted, in writing, by the Company to the Scottish Ministers for their written approval.

The CMS must, so far as is reasonably practicable, be consistent with the Design Statement ("DS"), the Environmental Management Plan ("EMP"), the Vessel Management Plan ("VMP"), the Navigational Safety Plan ("NSP"), the Piling Strategy ("PS"), the Cable Plan ("CaP") and the Lighting and Marking Plan ("LMP").

Reason: *To ensure the appropriate construction management of the Development, taking into account mitigation measures to protect the environment and other users of the marine area.*

11. In the event that pile foundations are to be used, the Company must, no later than 6 months prior to the Commencement of the Development, submit a Piling Strategy ("PS"), in writing, to the Scottish Ministers for their written approval. Such approval may only be granted following consultation by the Scottish Ministers with the JNCC, SNH and any such other advisors as may be required at the discretion of the Scottish Ministers. The Development must, at all times,

be constructed in accordance with the approved PS (as updated and amended from time to time by the Company). Any updates or amendments made to the PS by the Company must be submitted, in writing, by the Company to the Scottish Ministers for their written approval.

The PS must include:

a. Full details of the proposed method and anticipated duration of pile-driving at all locations;
b. Details of soft-start piling procedures and anticipated maximum piling energy required at each pile location; and
c. Details of any mitigation and monitoring to be employed during pile-driving, as agreed by the Scottish Ministers.

The PS must be in accordance with the Application and must reflect any surveys carried out after submission of the Application. The PS must demonstrate how the exposure to and / or the effects of underwater noise have been mitigated in respect of the following species: bottlenose dolphin; harbour seal; grey seal; Atlantic salmon; cod; and herring.

The PS must, so far as is reasonably practicable, be consistent with the EMP, the Project Environmental Monitoring Programme ("PEMP") and the CMS.

Reason: *To mitigate the underwater noise impacts arising from piling activity*

12. The Company must, no later than 6 months prior to the Commencement of the Development, submit a Development Specification and Layout Plan ("DSLP"), in writing, to the Scottish Ministers for their written approval. Such approval may only be granted following consultation by the Scottish Ministers with the MCA, NLB, CoS, SNH, the JNCC, SFF, CAA and any such other advisors or organisations as may be required at the discretion of the Scottish Ministers. The Development must, at all times, be constructed in accordance with the approved DSLP (as updated and amended from time to time by the Company). Any updates or amendments made to the DSLP by the Company must be submitted, in writing, by the Company to the Scottish Ministers for their written approval.

The DSLP must include, but not be limited to the following:

a. A plan showing the proposed location of each individual WTG (subject to any required micro-siting), including information on WTG spacing, WTG identification / numbering, location of the substation platforms, seabed conditions, bathymetry, confirmed foundation type for each WTG and any key constraints recorded on the Site;
b. A list of latitude and longitude co-ordinates accurate to three decimal places of minutes of arc for each WTG, this should also be provided as a GIS shape file using WGS84 format;
c. A table or diagram of each WTG dimensions including - height to blade tip (measured above Lowest Astronomical Tide ("LAT")) to the highest

point, height to hub (measured above HAT to the centreline of the generator shaft), rotor diameter and maximum rotation speed;

d. The generating capacity of each WTG used on the Site and a confirmed generating capacity for the Site overall;
e. The finishes for each WTG (see condition 19 on WTG lighting and marking); and
f. The length and proposed arrangements on the seabed of all inter-array cables.

Reason: *To confirm the final Development specification and layout.*

13. The Company must, prior to the Commencement of the Development, submit a Design Statement ("DS"), in writing, to the Scottish Ministers that includes representative wind farm visualisations from key viewpoints as agreed with the Scottish Ministers, based upon the agreed final DSLP as approved by the Scottish Ministers (as updated and amended from time to time by the Company). The DS must be provided, for information only, to the Planning Authority, SNH, the JNCC and any such other advisors or organisations as may be required at the discretion of the Scottish Ministers. The DS must be prepared and signed off by at least one qualified landscape architect, instructed by the Company prior to submission to the Scottish Ministers.

Reason: *To inform interested parties of the final wind farm scheme proposed to be built.*

14. The Company must, no later than 6 months prior to the Commencement of the Development, submit an Environmental Management Plan ("EMP"), in writing, to the Scottish Ministers for their written approval. Such approval may only be granted following consultation by the Scottish Ministers with the JNCC, SNH, SEPA, RSPB Scotland, WDC, ASFB and any such other advisors as may be required at the discretion of the Scottish Ministers. The Development must, at all times, be constructed and operated in accordance with the approved EMP (as updated and amended from time to time by the Company). Any updates or amendments made to the EMP by the Company must be submitted, in writing, by the Company to the Scottish Ministers for their written approval.
The EMP must provide the over-arching framework for on-site environmental management during the phases of development as follows:

a. all construction as required to be undertaken before the Final Commissioning of the Development; and
b. the operational lifespan of the Development from the Final Commissioning of the Development until the cessation of electricity generation. (Environmental management during decommissioning is addressed by the Decommissioning Programme provided for by condition 3).

The EMP must be in accordance with the ES as it relates to environmental management measures. The EMP must set out the roles, responsibilities and chain of command for the Company personnel, any contractors or sub-contractors in respect of environmental management for the protection of

environmental interests during the construction and operation of the Development. It must address, but not be limited to, the following over-arching requirements for environmental management during construction:

a. Mitigation measures to prevent significant adverse impacts to environmental interests, as identified in the ES and pre-consent and pre-construction surveys, and include the relevant parts of the CMS (refer to condition 10);
b. Pollution prevention measures and contingency plans;
c. Management measures to prevent the introduction of invasive non-native marine species;
d. Measures to minimise, recycle, reuse and dispose of waste streams; and
e. The reporting mechanisms that will be used to provide the Scottish Ministers and relevant stakeholders (including, but not limited to, the JNCC, SNH, SEPA, RSPB Scotland, MCA and NLB) with regular updates on construction activity, including any environmental issues that have been encountered and how these have been addressed.

The Company must, no later than 3 months prior to the Final Commissioning of the Development, submit an updated EMP, in writing, to cover the operation and maintenance activities for the Development to the Scottish Ministers for their written approval. Such approval may be given only following consultation with SNH, the JNCC, SEPA, RSPB Scotland and any such other advisors or organisations as may be required at the discretion of the Scottish Ministers. The EMP must be regularly reviewed by the Company and the FTRAG (referred to in condition 25) over the lifespan of the Development, and be kept up to date (in relation to the likes of construction methods and operations of the Development in terms of up to date working practices and best practice) by the Company in consultation with the FTRAG.

The EMP must be informed, so far as is reasonably practicable, by the baseline surveys undertaken as part of the Application and the PEMP.

Reason: *To mitigate the impacts on the environmental interests during construction and operation.*

15. The Company must, no later than 6 months prior to the Commencement of the Development, submit a Vessel Management Plan ("VMP"), in writing, to the Scottish Ministers for their written approval. Such approval may only be granted following consultation by the Scottish Ministers with SNH, the JNCC, WDC and any such other advisors or organisations as may be required at the discretion of the Scottish Ministers. The Development must, at all times, be constructed and operated in accordance with the approved VMP, (as updated and amended from time to time by the Company). Any updates or amendments made to the VMP by the Company must be submitted, in writing, by the Company to the Scottish Ministers for their written approval:

The VMP must include, but not be limited to, the following details:

a. The number, types and specification of vessels required;

b. Working practices to minimise use of ducted propellers;
c. How vessel management will be coordinated, particularly during construction but also during operation; and
d. Location of working port(s), how often vessels will be required to transit between port(s) and the site and indicative vessel transit corridors proposed to be used during construction and operation of the Development.

The confirmed individual vessel details must be notified to the Scottish Ministers in writing no later than 14 days prior to the Commencement of the Development, and thereafter, any changes to the details supplied must be notified to the Scottish Ministers, as soon as practicable, prior to any such change being implemented in the construction or operation of the Development.

The VMP must, so far as is reasonably practicable, be consistent with the CMS, the EMP, the PEMP, the NSP, and the LMP.

Reason: *To mitigate the disturbance to marine mammals and birds.*

16. The Company must, no later than 3 months prior to the Commissioning of the first WTG, submit an Operations and Maintenance Programme ("OMP"), in writing, to the Scottish Ministers for their written approval. Such approval may only be granted following consultation by the Scottish Ministers with the JNCC, SNH, SEPA, MCA, NLB, RSPB Scotland, the Planning Authority and any such other advisors as or organisations may be required at the discretion of the Scottish Ministers. The OMP must set out the procedures, and good working practices for operations and the maintenance of the WTG's, substructures, and inter-array cable network of the Development. Environmental sensitivities which may affect the timing of the operation and maintenance activities must be considered in the OMP.

Operation and maintenance of the Development must, at all times, proceed in accordance with the approved OMP (as updated and amended from time to time by the Company). Any updates or amendments made to the OMP by the Company must be submitted, in writing, by the Company to the Scottish Ministers for their written approval.

The OMP must, so far as is reasonably practicable, be consistent with the EMP, the PEMP, the VMP, the NSP, the CaP and the LMP.

Reason: *To safeguard environmental interests during operation of the offshore generating station.*

17. The Company must, no later than 6 months prior to the Commencement of the Development, submit a Navigational Safety Plan ("NSP"), in writing, to the Scottish Ministers for their written approval. Such approval may only be granted following consultation by the Scottish Ministers with MCA, NLB and any other navigational advisors or organisations as may be required at the discretion of

the Scottish Ministers. The NSP must include, but is not limited to, the following issues:

a. Navigational safety measures;
b. Construction exclusion zones;
c. Notice(s) to Mariners and Radio Navigation Warnings;
d. Anchoring areas;
e. Temporary construction lighting and marking;
f. Emergency response and coordination arrangements for the construction, operation and decommissioning phases of the Development; and
g. Buoyage.

The Company must confirm within the NSP that they have taken into account and adequately addressed all of the recommendations of the MCA in the current Marine Guidance Note 371, and its annexes that may be appropriate to the Development, or any other relevant document which may supersede said Guidance prior to the approval of the NSP. The Development must, at all times, be constructed and operated in accordance with the approved NSP (as updated and amended from time to time by the Company). Any updates or amendments made to the NSP by the Company must be submitted, in writing, by the Company to the Scottish Ministers for their written approval.

Reason: *To mitigate the navigational risk to other legitimate users of the sea.*

18. The Company must, no later than 6 months prior to the Commencement of the Development, submit a Cable Plan ("CaP"), in writing, to the Scottish Ministers for their written approval. Such approval may only be granted following consultation by the Scottish Ministers with the JNCC, SNH, MCA, SFF and any such other advisors or organisations as may be required at the discretion of the Scottish Ministers. The CaP must be in accordance with the ES. The Development must, at all times, be constructed and operated in accordance with the approved CaP (as updated and amended from time to time by the Company). Any updates or amendments made to the CaP by the Company must be submitted, in writing, by the Company to the Scottish Ministers for their written approval.

The CaP must include the following:

a. Details of the location and cable laying techniques for the inter array cables;
b. The results of survey work (including geophysical, geotechnical and benthic surveys) which will help inform cable routing;
c. Technical specification of inter array cables, including a desk based assessment of attenuation of electro-magnetic field strengths and shielding;
d. A burial risk assessment to ascertain burial depths and where necessary alternative protection measures;

e. Methodologies for (e.g. over trawl) surveys of the inter array cables through the operational life of the Development where mechanical protection of cables laid on the sea bed is deployed; and
f. Methodologies for inter array cable inspection with measures to address and report to the Scottish Ministers any exposure of inter array cables.

Reason: *To ensure all environmental and navigational issues are considered for the location and construction of the inter array cables.*

19. The Company must, no later than 6 months prior to the Commencement of the Development, submit a Lighting and Marking Plan ("LMP"), in writing, to the Scottish Ministers for their written approval. Such approval may only be granted following consultation by the Scottish Ministers with MCA, NLB, CAA, MOD and any such other advisors or organisations as may be required at the discretion of the Scottish Ministers. The LMP must provide that the Development be lit and marked in accordance with current CAA and MOD Aviation lighting Policy and also Guidance that is in place as at the date of the Scottish Ministers approval of the LMP, or any such other documents that may supersede said guidance prior to the approval of the LMP. The LMP must also detail the navigational lighting requirements detailed in IALA Recommendation O-139 or any other documents that may supersede said guidance prior to approval of the LMP.

The Company must provide the LMP, for information only, to the Planning Authorities, SNH, the JNCC and any other bodies as may be required at the discretion of the Scottish Ministers. The Development must, at all times, be constructed and operated in accordance with the approved LMP (as updated and amended from time to time by the Company). Any updates or amendments made to the LMP by the Company must be submitted, in writing, by the Company to the Scottish Ministers for their written approval.

Reason: *To ensure safe marking and lighting of the offshore generating station.*

20. The Company must, prior to the erection of any WTGs on the Site, submit an Air Traffic Control Radar Mitigation Scheme ("ATC Scheme"), in writing, to the Scottish Ministers for their written approval. Such approval may only be granted following consultation by the Scottish Ministers with the MOD.

The ATC Scheme is a scheme designed to mitigate the impact of the Development upon the operation of the Primary Surveillance Radar at RAF Leuchars ("the Radar") and the air traffic control operations of the Ministry of Defence which is reliant upon the Radar. The ATC Scheme must set out the appropriate measures to be implemented to mitigate the impact of the Development on the Radar and shall be in place for the operational life of the Development provided the Radar remains in operation.

No turbines shall become operational unless, and until, all those measures required by the approved ATC Scheme to be implemented prior to the operation of the turbines have been implemented and the Scottish Ministers have confirmed this in writing. The Development shall thereafter be operated fully in accordance with the approved ATC Scheme.

Reason: *To mitigate the adverse impacts of the Development on the air traffic control radar at RAF Leuchars and the operations of the* MOD .

21. The Company must ensure that no turbine with a blade tip height greater than 186 metres above Mean Sea Level (Newlyn) shall be erected in any part of the Site which is within radar line of sight coverage to the Air Defence radar at Remote Radar Head (RRH) Buchan unless, and until, a technical mitigation proposal to address the Ministry of Defence's concerns has been submitted to and accepted in writing by the Scottish Ministers, in consultation with the MOD.

Reason: *To mitigate the adverse impact of the Development on RRH Buchan.*

22. The Company must, prior to the Commencement of the Development, and following confirmation of the approved DSLP by the Scottish Ministers (refer to condition 12), provide the positions and maximum heights of the WTGs, construction equipment over 150m in height (measured above LAT) and any Offshore Sub-Station Platforms to the United Kingdom Hydrographic Office ("UKHO") for aviation and nautical charting purposes. The Company must, within 1 month of the Final Commissioning of the Development, provide co-ordinates accurate to three decimal places of minutes of arc for each WTG position and maximum heights of the WTGs to the UKHO for aviation and nautical charting purposes.

Reason: *For aviation and navigational safety.*

23. The Company must, at least 6 months prior to the Commencement of the Development submit a Traffic and Transportation Plan ("TTP") in writing, to the Scottish Ministers for their written approval. Such approval may only be granted following consultation by the Scottish Ministers with Transport Scotland and any such other advisors as may be required at the discretion of the Scottish Ministers. The TTP must set out a mitigation strategy for the impact of road based traffic and transportation associated with the construction of the Development. The Development must be constructed and operated in accordance with the approved TTP (as updated and amended from time to time, following written approval from the Scottish Ministers)

Reason: *To maintain the free flow and safety of the Trunk Road network.*

24. The Company must, no later than 6 months prior to the Commencement of the Development, submit a Project Environmental Monitoring Programme ("PEMP"), in writing, to the Scottish Ministers for their written approval. Such approval may only be granted following consultation by the Scottish Ministers with SNH, the JNCC, RSPB Scotland, WDC, ASFB and any other ecological advisors or organisations as required at the discretion of the Scottish Ministers. The PEMP must be in accordance with the ES as it relates to environmental monitoring.

The PEMP must set out measures by which the Company must monitor the environmental impacts of the Development. Monitoring is required throughout

the lifespan of the Development where this is deemed necessary by the Scottish Ministers. Lifespan in this context includes pre-construction, construction, operational and decommissioning phases.

Monitoring must be done in such a way as to ensure that the data which is collected allows useful and valid comparisons as between different phases of the Development. Monitoring may also serve the purpose of verifying key predictions in the Application. In the event that further potential adverse environmental effects are identified, for which no predictions were made in the Application, the Scottish Ministers may require the Company to undertake additional monitoring.

The Scottish Ministers may agree that monitoring may be reduced or ceased before the end of the lifespan of the Development.

The PEMP must cover, but not be limited to the following matters:

a. Pre-construction, construction (if appropriate by the Scottish Ministers) and post-construction monitoring surveys for:

    1. Birds;
    2. Sandeels;
    3. Marine fish;
    4. Diadromous fish;
    5. Benthic communities; and
    6. Seabed scour and local sediment deposition.

b. The participation by the Company in surveys to be carried out in relation to marine mammals as set out in a Marine Mammal Monitoring Programme ("MMMP"); and

c. The participation by the Company in a National Strategic Bird Monitoring Framework ("NSBMF") and surveys to be carried out in relation to regional and / or strategic bird monitoring including but not necessarily limited to:

    1. the avoidance behaviour of breeding seabirds around turbines;
    2. flight height distributions of seabirds at wind farm sites;
    3. displacement of kittiwake, puffin and other auks from wind farm sites; and
    4. effects on survival and productivity at relevant breeding colonies.

All initial methodologies for the above monitoring must be approved, in writing, by the Scottish Ministers and, where appropriate, in consultation with the Forth and Tay Regional Advisory Group ("FTRAG") referred to in condition 25 of this consent. Any pre-consent surveys carried out by the Company to address any of the above species may be used in part to discharge this condition subject to the written approval by the Scottish Ministers.

The PEMP is a live document and must be regularly reviewed by the Scottish Ministers, at timescales to be determined by the Scottish Ministers, in

consultation with the FTRAG to identify the appropriateness of on-going monitoring. Following such reviews, the Scottish Ministers may, in consultation with the FTRAG, require the Company to amend the PEMP and submit such an amended PEMP, in writing, to the Scottish Ministers, for their written approval. Such approval may only be granted following consultation with FTRAG and any other ecological, or such other advisors as may be required at the discretion of the Scottish Ministers. The PEMP, as amended from time to time, must be fully implemented by the Company at all times.

The Company must submit written reports and associated raw data of such monitoring surveys to the Scottish Ministers at timescales to be determined by the Scottish Ministers in consultation with the FTRAG. Subject to any legal restrictions regarding the treatment of the information, the results are to be made publicly available by the Scottish Ministers, or by such other party appointed at their discretion.

Reason: *To ensure that appropriate and effective monitoring of the impacts of the Development is undertaken.*

25. The Company must participate in any Forth and Tay Regional Advisory Group ("FTRAG") established by the Scottish Ministers for the purpose of advising the Scottish Ministers on research, monitoring and mitigation programmes for, but not limited to, ornithology, diadromous fish, marine mammals and commercial fish. Should a SSMEG be established (refer to condition 26), the responsibilities and obligations being delivered by the FTRAG will be subsumed by the SSMEG at a timescale to be determined by the Scottish Ministers.

Reason: *To ensure effective environmental monitoring and mitigation is undertaken at a regional scale.*

26. The Company must participate in any Scottish Strategic Marine Environment Group ("SSMEG") established by the Scottish Ministers for the purposes of advising the Scottish Ministers on research, monitoring and mitigation programmes for, but not limited to, ornithology, diadromous fish, marine mammals and commercial fish.

Reason: *To ensure effective environmental monitoring and mitigation is undertaken at a National scale.*

27. Prior to the Commencement of the Development, the Company must at its own expense, and with the approval of the Scottish Ministers in consultation with the JNCC and SNH, appoint an Ecological Clerk of Works ("ECoW"). The ECoW must be appointed in time to review and approve the final draft version of the first plan or programme submitted under this consent to the Scottish Ministers for approval, until the Final Commissioning of the Development.

The responsibilities of the ECoW must include, but not be limited to:

a. Quality assurance of final draft version of all plans and programmes required under this consent;
b. Provide advice to the Company on compliance with consent conditions, including the conditions relating to the CMS, the EMP, the PEMP, the PS (if required), the CaP and the VMP;
c. Monitor compliance with the CMS, the EMP, the PEMP, the PS (if required), the CaP and the VMP;
d. Provide reports on point c) above to the Scottish Ministers at timescales to be determined by the Scottish Ministers; and
e. Inducting site personnel on site / works environmental policy and procedures.

Reason: *To ensure that appropriate and effective monitoring of the impacts of the Development is undertaken.*

28. The Company must, to the satisfaction of the Scottish Ministers, participate in the monitoring requirements as laid out in the 'National Research and Monitoring Strategy for Diadromous Fish' so far as they apply at a local level. The extent and nature of the Company's participation is to be agreed by the Scottish Ministers in consultation with the FTRAG.

Reason: *To ensure effective monitoring of the effects on Migratory fish at a local level.*

29. The Company must, no later than 6 months prior to the Commencement of the Development, submit a Commercial Fisheries Mitigation Strategy ("CFMS"), in writing, to the Scottish Ministers for their written approval.

The Company must remain a member of the Forth and Tay Offshore Wind Developers Group-Commercial Fisheries Working Group or any successor group formed to facilitate commercial fisheries dialogue in the Forth and Tay region.

The Company must include in the CFMS a mitigation strategy for each commercial fishery that Ministers are reasonably satisfied would be adversely affected by the Development. The CFMS must, in particular, include mitigation measures for lobster stock enhancement if the Scottish Ministers are satisfied that such mitigation measures are reasonably necessary. Within such a time period as required by the Scottish Ministers, the Company must undertake a feasibility study specifically to assess the use of alternate scallop gear within the Development area. The scope of the feasibility study must be agreed in writing, by the Scottish Ministers, and must include how scallop gear may be redesigned to coexist with the Development infrastructure.

The Company must implement all mitigation measures committed to be carried out by the Company in terms of the CFMS. The Company must require all of its contractors, and sub-contractors, to co-operate with the fishing industry to ensure the effective implementation of the CFMS.

Reason: *To minimise the impact on commercial fishermen.*

29. Prior to the Commencement of the Development, a Fisheries Liaison Officer ("FLO"), approved in writing by Scottish Ministers, in consultation with the FTOWDG-CFWG, must be appointed by the Company for the period from Commencement of the Development until the Final Commissioning of the Development. The Company must notify the Scottish Ministers of the identity and credentials of the FLO before any construction work commences by including such details in the EMP (referred to in condition 14). The FLO must establish and maintain effective communications between the Company, contractors, fishermen and other users of the sea during the construction of the Development, and ensure compliance with best practice guidelines whilst doing so.

The responsibilities of the FLO must include, but not be limited to:

a. Establishing and maintaining effective communications between the Company, contractors or sub-contractors, fishermen, and other users of the sea concerning the overall project and any amendments to the CMS and site environmental procedures;
b. Provision of information relating to the safety of persons engaged in fishing operations on the site of the Development; and
c. Ensuring that information is made available and circulated in a timely manner to minimise interference with fishing operations and other users of the sea.

Reason: *To mitigate the impact on commercial fishermen.*

30. The Company must, no later than 6 months prior to the Commencement of the Development, submit a Marine Archaeology Reporting Protocol which sets out what the Company must do on discovering any marine archaeology during the construction, operation, maintenance and monitoring of the Development, in writing, to the Scottish Ministers for their written approval. Such approval may be given only following consultation by the Scottish Ministers with any such advisors as may be required at the discretion of the Scottish Ministers. The Reporting Protocol must be implemented in full, at all times, by the Company.

Reason: *To ensure any accidental discovery of archaeological interest is properly and correctly reported.*

3. PART 3 – CONDITIONS

3.1 General conditions

3.1.1 Licence conditions binding other parties

All conditions attached to this licence bind any person who for the time being owns, occupies or enjoys any use of the Works for which this licence has been granted in relation to those licensed activities authorised under item 5 in section 21(1) of the 2010 Act whether or not this licence has been transferred to that person.

3.1.2 Vessels, vehicles, agents, contractors and sub-contractors

The Licensee must provide, as soon as reasonably practicable in advance of their engagement in any Licensable Marine Activity, the name and function of any vessel, vehicle, agent, contractor or sub-contractor appointed to engage in the Works. Where applicable the notification must include the master's name, vessel type, vessel IMO number and vessel owner or operating company.

Any changes to the supplied details must be notified to the Licensing Authority, in writing, prior to any vessel, vehicle, agent, contractor or sub-contractor engaging in the Licensable Marine Activity.

Only those vessels, vehicles, agents, contractors or sub-contractors notified to the Licensing Authority are permitted to carry out any part of the Works.

The Licensee must satisfy themselves that any masters of vessels or vehicle operators, agents, contractors or sub-contractors are aware of the extent of the Works for which this licence has been granted, the activity which is licensed and the terms of the conditions attached to this licence. All masters of vessels or vehicle operators, agents, contractors and sub-contractors permitted to engage in the Works must abide by the conditions set out in this licence.

The Licensee must give a copy of this licence, and any subsequent variations made to this licence in accordance with section 30 of the 2010 Act, ensuring it is read and understood, to the masters of any vessels, vehicle operators, agents, contractors or sub-contractors permitted to engage in the Works.

3.1.3 Force Majeure

Should the Licensee or any of their agents, contractors or sub-contractors, by any reason of *force majeure* deposit anywhere in the marine environment any substance or object, then the Licensee must notify the Licensing Authority of the full details of the circumstances of the deposit within 48 hours of the incident occurring (failing which as soon as reasonably practicable after that period of 48 hours has elapsed). *Force majeure* may be deemed to apply when, due to stress of weather or any other cause, the master of a vessel or vehicle operator determines that it is necessary to deposit the substance or object other than at the Site because the safety of human life or, as the case may be, the vessel, vehicle or marine structure is threatened. Under Annex II, Article 7 of the Convention for the Protection of the Marine Environment of the North-east Atlantic, the Licensing Authority is obliged to immediately report *force majeure* incidents to the Convention Commission.

3.1.4 Material alterations to the licence application

The Licensee must, where any information upon which the granting of this licence was based has after the granting of the licence altered in any material respect, notify the Licensing Authority of this fact, in writing, as soon as is practicable.

3.1.5 Submission of plans and specification of studies and surveys to the Licensing Authority

The Licensee must submit plans and the details and specifications of all studies and surveys that are required to be undertaken under this licence in relation to the Works, in writing, to the Licensing Authority, for their written approval. Commencement of the studies or surveys and implementation of plans must not occur until the Licensing Authority has given its written approval to the Licensee.

Plans or the specification of studies and surveys prepared pursuant to another consent or licence relating to the Works by the Licensee or by a third party may also be used to satisfy the requirements of this licence.

3.1.6 Submission of reports to the Licensing Authority

The Licensee must submit all reports to the Licensing Authority, in writing, as are required under this licence within the time periods specified in this licence. Where it would appear to the Licensee that there may be a delay in the submission of the reports to the Licensing Authority, then the Licensee must advise the Licensing Authority of this fact as soon as is practicable and no later than the time by which those reports ought to have been submitted to the Licensing Authority under the terms of this licence.

The reports must include executive summaries, assessments and conclusions and any data will, subject to any rules permitting non-disclosure, be made publically available by the Licensing Authority or by any such party appointed at their discretion.

Reports prepared pursuant to another consent or licence relating to the Works by the Licensee or by a third party may also be used to satisfy the requirements of this licence.

3.1.7 Chemical usage

The Licensee must ensure that all chemicals which are to be utilised in the Works have been approved in writing by the Licensing Authority prior to use. All chemicals utilised in the Works must be selected from the List of Notified Chemicals assessed for use by the offshore oil and gas industry under the Offshore Chemicals Regulations 2002, unless approved in writing by the Licensing Authority.

3.1.8 Environmental protection

The Licensee must ensure that all reasonable, appropriate and practicable steps are taken at all times to minimise damage to the Scottish marine area caused by the carrying out of any Licensable Marine Activity.

The Licensee must ensure that any debris or waste material placed below MHWS during the construction and operation of the Works is removed from the Site, as soon as is reasonably practicable, for disposal at a location above the MHWS approved by the Scottish Environment Protection Agency ("SEPA").

The Licensee must ensure that all substances and objects deposited during the execution of the Works are inert (or appropriately coated or protected so as to be rendered inert) and do not contain toxic elements which may be harmful to the marine environment, the living resources which it supports or human health.

The Licensee must ensure that the risk of transferring marine non-native species to and from the Site is kept to a minimum by ensuring appropriate bio-fouling management practices are implemented during the Works.

The Licensee must ensure that if oil based drilling muds are utilised they must be contained within a zero discharge system. Any drill cuttings associated with the use of water-based drilling muds situated within the Site of the Works need not be removed from the seabed.

3.1.9 Availability of the licence for inspection

The Licensee must ensure that copies of this licence and any subsequent amendments or variations are available for inspection at any reasonable time by any authorised marine enforcement officer at:

a) the premises of the Licensee;
b) the premises of any agent, contractor or sub-contractor acting on behalf of the Licensee;
c) any onshore premises directly associated with the Works; and
d) aboard any vessel engaged in the Works.

3.1.10 Inspection of the Works

Any persons authorised by the Licensing Authority, must be permitted to inspect the Works at any reasonable time. The Licensee must, as far as reasonably practicable, on being given reasonable notice by the Licensing Authority (of at least 72 hours), provide transportation to and from the Site for any persons authorised by the Licensing Authority to inspect the Site.

3.1.11 Emergencies

If the assistance of a Government Department (to include departments of Devolved Administrations) is required to deal with any emergency arising from:

a) the failure to mark and light the Works as required by this licence;
b) the maintenance of the Works; or
c) the drifting or wreck of the Works,

to include the broadcast of navigational warnings, then the Licensee is liable for any expenses incurred in securing such assistance.

3.2 Conditions specific to the Works

3.2.1 Prior to the Commencement of the Works

3.2.1.1 Commencement date of Works

The Licensee must, prior to and no less than 1 month before the Commencement of the Works, notify the Licensing Authority, in writing, of the date of Commencement of the Works authorised under this licence.

3.2.1.2 Third Party Certification or Verification ("TPC" or "TPV")

The Licensee must, no later than 3 months prior to the Commencement of the Works, provide the Licensing Authority (unless otherwise agreed, in writing, with the Licensing Authority) with TPC or TPV (or suitable alternative as agreed, in writing, with the Licensing Authority) for all WTG foundations, jacket and meteorological mast structures.

3.2.1.3 Navigational and Aviation Safety and Charting

The Licensee must, as soon as reasonably practicable prior to Commencement of the Works, notify the UK Hydrographic Office ("UKHO") of the proposed Works to facilitate the promulgation of maritime safety information and updating of nautical charts and publications through the national Notice to Mariners system.

The Licensee must, as soon as reasonably practicable prior to the Commencement of the Works, ensure that local mariners, fishermen's organisations and HM Coastguard, Maritime Rescue Coordination Centre Aberdeen, are made fully aware of any Licensable Marine Activity through local Notice to Mariners or any other appropriate means.

The Licensee must ensure that details of the Works are promulgated in the Kingfisher Fortnightly Bulletin, as soon as reasonably practicable prior to Commencement of the Works to inform the Sea Fish Industry of the vessel routes, the timings and the location of the Works and of the relevant operations.

The Licensee must prior to Commencement of the Works, complete an "Application for Statutory Sanction to Alter/Exhibit" form and submit this to the Northern Lighthouse Board ("NLB") for the necessary sanction to be granted.

The Licensee must, prior to the Commencement of the Works, and following confirmation of the approved Design Specification and Layout Plan ("DSLP") by the Licensing Authority, provide the precise location and maximum heights of all WTGs and construction equipment over 150 m above lowest astronomical tide ("LAT"), and details of any lighting fitted to all WTGs, to the UKHO for aviation and nautical charting purposes.

3.2.1.4 Meteorological Mast Lighting and Marking Plan

The Licensee must, no later than 6 months prior to the Commencement of the Works, submit a Meteorological Mast(s)Lighting and Marking Plan ("MMLMP"), in writing, to the Licensing Authority for their written approval. Such approval may only be granted following consultation by the Licensing Authority with the Maritime Coastguard Agency ("MCA"), NLB, the Civil Aviation Authority ("CAA"), the Ministry of Defence ("MOD") and any such other advisors as may be required at the discretion of the Licensing Authority. The MMLMP must provide that the Works be lit and marked in accordance with the current MCA, CAA and MOD navigational and aviation lighting policy and guidance that is in place as at the date of the Licensing Authority approval of the MMLMP, or any such other documents that may supersede said guidance prior to the approval of the MMLMP. The MMLMP must also detail the navigational lighting requirements detailed in International Association of Marine Aids to Navigation and Lighthouse Authorities ("IALA") Recommendations O-139 or any other documents that may supersede said guidance prior to approval of the MMLMP.

The Licensee must provide the MMLMP to the Angus Council, the Fife Council, the Joint Nature Conservation Committee ("JNCC"), Scottish Natural Heritage ("SNH") and any other bodies as may be required at the discretion of the Licensing Authority.

The Licensee must, prior to the Commencement of the Works, and following confirmation of the approved Development Specification and Layout Plan ("DSLP") by the Licensing Authority, provide the precise location and maximum heights of all WTGs and construction equipment over 150 m above lowest astronomical tide ("LAT"), and details of any lighting fitted to all WTGs, to the UKHO for aviation and nautical charting purposes.

3.2.1.5 Monitoring of marine mammals

Prior to the Commencement of the Works the Licensee must agree with the Licensing Authority, in writing, the details of the appointment of a Marine Mammal Observer ("MMO"). When appointed, the MMO must as a minimum, maintain a record of any sightings of marine mammals and maintain a record of the action taken to avoid any disturbance being caused to marine mammals during piling activities, as agreed in writing with the Licencing Authority. The Licensee must provide the Licensing Authority with the MMO's records no later than 6 months following Commencement of the Works, and at 6 monthly intervals thereafter.

3.2.1.6 Noise Registry

The Licensee must, in the event that pile foundations are to be used, submit the appropriate completed noise registry form to the Licensing Authority and the JNCC stating, the proposed date(s), location(s) and nature of the piling activities under authority of this licence.

3.2.1.7 Meteorological mast(s) piling strategy

The Licensee must, in the event that pile foundations are to be used to construct the meteorological mast, no later than 6 months prior to the Commencement of the Works, submit a Meteorological Mast Piling Strategy ("MMPS"), in writing, to the Licensing Authority for their written approval. The Works must, at all times, be constructed in accordance with the approved MMPS (as updated and amended from time to time by the Licensee). Any updates or amendments made to the MMPS by the Licensee must be submitted, in writing, by the Licensee to the Licensing Authority for their written approval.

The MMPS must include:

- Full details of the proposed method and anticipated duration of pile-driving at the meteorological mast locations;
- Details of soft-start piling procedures and anticipated maximum piling energy required at each pile location; and
- Details of mitigation and monitoring to be employed during pile-driving, as agreed by the Licensing Authority.

The MMPS must be in accordance with the Application and reflect any surveys carried out after submission of the Application. The MMPS must demonstrate how the exposure to and/or the effects of underwater noise have been mitigated in respect of the following species: bottlenose dolphin; harbour seal; grey seal; Atlantic salmon; cod; and herring.

3.2.2 During the Works

3.2.2.1 Transportation audit sheet

The Licensee must create, complete and submit to the Licensing Authority on the first working day of the month, a detailed transportation audit sheet for each month during the period when construction of the Works is undertaken, for all aspects of the construction of

the Works. The transportation audit sheet must include information on the loading facility, vessels, equipment, shipment routes, schedules and all materials to be deposited (as described in Part 2 of this licence) in that month. Where, following the submission of a transportation audit sheet to the Licensing Authority, any alteration is made to the component parts of the transportation audit sheet, the Licensee must notify the Licensing Authority of the alteration in the following month's transportation audit sheet.

If the Licensee becomes aware of any substances or objects on the transportation audit sheet that are missing, or an accidental deposit occurs, the Licensee must contact the Licensing Authority as soon as practicable after becoming aware, for advice on the appropriate remedial action. Should the Licencing Authority deem it necessary, the Licensee must undertake a side scan sonar survey in grid lines (within operational and safety constraints) across the area of the Works, to include cable routes and vessel access routes from local service port(s) to the Site to locate the substances or objects. If the Licensing Authority is of the view that any accidental deposits associated with the construction of the Works are present, then the deposits must be removed by the Licensee as soon as is practicable and at the Licensee's expense

3.2.2.2 Nature and quantity of deposited substances and objects

The Licensee must, in addition to the transportation audit sheets required to be submitted to the Licensing Authority under condition 3.2.2.1, following the Commencement of the Works, submit audit reports, in writing, to the Licensing Authority stating the nature and quantity of all substances and objects deposited below MHWS under the authority of this licence. Such audit reports must be submitted in writing, to the Licensing Authority by the Licensee at 6 monthly intervals, with the first such report being required to be submitted on a date no later than 6 months following the Commencement of the Works. Where appropriate, nil returns must be provided.

3.2.2.3 Navigational safety

The Licensee must notify the UKHO of the progress of the Works to facilitate the promulgation of maritime safety information and updating of nautical charts and publications through the national Notice to Mariners system.

The Licensee must notify, Aberdeen to Eyemouth, local mariners, fishermen's organisations and HM Coastguard, in this case Maritime Rescue Coordination Centre Aberdeen, of the progress of the Works through local Notice to Mariners or any other appropriate means.

The Licensee must ensure that the progress of the construction of the Works is promulgated in the Kingfisher Fortnightly Bulletin to inform the Sea Fish Industry of the vessel routes, the timings and the location of the Works and of the relevant operations.

The Licensee must, notify the Licensing Authority, in writing, as soon as reasonably practicable, of any case of damage to or destruction or decay of the Works. The Licensing Authority will advise, in writing, of any remedial action to be taken and any requirement to display aids to navigation, following consultation with the MCA the NLB or any such advisers as required.

The Licensee must ensure that any Emergency Response and Rescue Vehicle ("ERRV") and/or cable-laying vessel permitted to engage in the Works must be equipped with an automatic identification system ("AIS") and automatic radar plotting aids ("ARPA").

The Licensee must ensure that navigational safety is not compromised by the Works. The navigable depth must not be reduced by more than 5% of stated chart datum unless otherwise agreed, in writing, with the Licensing Authority in consultation with the MCA and NLB.

The Licensee must ensure that no radio beacon or radar beacon operating in the marine frequency bands is installed or used on the Works without the prior written approval of the Office of Communications ("OfCom").

3.2.2.4 Markings, lighting and signals of the Works

The Licensee must ensure that the Works are marked and lit in accordance with the requirements of the NLB and the CAA and the MOD at all times and such marking and/or lighting must be continued unless and until such time as the Licensing Authority, by notice, relevantly varies this licence under section 30 of the 2010 Act.

The Licensee must not display any marks and lights additional to those required by virtue of this licence and agreed in the MMLMP without the written approval of the Licencing Authority following consultation with the NLB, the CAA, the MOD and the MCA.

The Licensee must ensure that the meteorological masts are marked and lit in accordance with IALA Recommendation O-139.

The Licensee must ensure the Site boundaries are marked by Cardinal Mark buoys (number to be determined when final layout is known). The Cardinal Mark buoys shall be a minimum of 3 metres in diameter at the waterline, have a focal plane of at least 3 metres above the waterline and be of suitable construction for the sea conditions commonly experienced in the North Sea. The light range on these buoys shall be 5 nautical miles. All required buoyage shall remain in place until completion of this phase, or otherwise notified by the Licensing Authority.

The Licensee must ensure that any meteorological masts within the Site area will have marking and lighting amended to suit the layout of the wind farm as it progresses should the meteorological masts be built prior to the WTGs.

3.2.2.5 Markings, lighting and signals of jack up vessels

The Licensee must ensure that any vessels permitted to engage in the Works are marked in accordance with the International Rules for the Prevention of Collisions at Sea whilst under way, and in accordance with the UK Standard Marking Schedule for Offshore Installations if secured to the seabed.

3.2.2.6 Noise registry

The Licensee must, in the event that pile foundations are to be used, and piling is to be carried out for more than 10 consecutive days, submit at quarterly intervals, the appropriate completed noise registry form to the Licensing Authority and the JNCC, stating the date(s), location(s) and nature of such activities under authority of this licence.

3.2.2.7 Bunding and storage facilities

The Licensee must ensure suitable bunding and storage facilities are employed to prevent the release of fuel oils, lubricating fluids associated with the plant and equipment into the marine environment.

3.2.2.8 Restoration of the Site to its original condition

The Licensee must take all reasonable, appropriate and practicable steps to restore the Site to its original condition before any Licensable Marine Activity was undertaken, or to as close to its original condition as is reasonably practicable, in accordance with the PEMP and the Decommissioning Programme ("DP"). Should the Works be discontinued prior to Completion of the Works, the Licensee must inform the Licencing Authority in writing of the discontinuation of the Works. This licence will be varied under section 30(3) of the 2010 Act following procedures laid out under section 31 of the 2010 Act to allow the removal of Works already installed.

3.2.2.9 Compliance with and amendments to approved plans

The Licensee must, at all times, construct the Works in accordance with the approved MMPS, DSLP and the MMLMP (as updated and amended from time to time by the Licensee).

Any updates or amendments made to the MMPS, DSLP, and the MMLMP by the Licensee, must be submitted, in writing, by the Licensee to the Licensing Authority for their written approval.

3.2.3 Conditions upon Completion of the Works

3.2.3.1 Date of Completion of the Works

The Licensee must, no more than 1 month following the Completion of the Works, notify the Licensing Authority, in writing, of the date of Completion of the Works.

3.2.3.2 Navigational safety

The Licensee must notify the UKHO of the Completion of the Works to facilitate the promulgation of maritime safety information and updating of nautical charts and publications through the national Notice to Mariners system.

The Licensee must, within 1 month of the Completion of the Works, provide the "as-built" positions and maximum heights of all WTGs, Metrological Masts, along with any sub-sea infrastructure, to the UKHO for aviation and nautical charting purposes.

The Licensee must ensure that local mariners, fishermen's organisations and HM Coastguard, in this case Maritime Rescue Coordination Centre Aberdeen, are made fully aware of the Completion of the Works.

The Licensee must ensure that the Completion of the Works is promulgated in the Kingfisher Fortnightly Bulletin to inform the Sea Fish Industry.

The Licensee must, notify the Licensing Authority, in writing, as soon as reasonably practicable, of any case of damage to or destruction or decay of the Works. The Licensing Authority will advise, in writing, of any remedial action to be taken and any requirement to display aids to navigation, following consultation with the MCA, the NLB or any such advisers as required.

The Licensee must ensure that no radio beacon or radar beacon operating in the marine frequency bands are installed or used on the Works without the prior written approval of OfCom.

3.2.3.3 Nature and quantity of deposited substances and objects

The Licensee must no later than 1 month following the Completion of the Works, submit a final audit report, in writing, to the Licensing Authority stating the nature and quantity of all substances and objects deposited below MHWS within the Scottish marine area under the authority of this licence.

3.2.3.4 Markings, lighting and signals of the Works

The Licensee must ensure that the Works are marked and lit in accordance with the requirements of the NLB, the CAA and the MOD at all times and such marking and/or lighting must be continued unless and until such time as the Licensing Authority, by notice, relevantly varies this licence under section 30 of the 2010 Act.

The Licensee must ensure that the required IALA availability target for Category 1 Aids to Navigation ("AtoN") is achieved through redundancy, monitoring and repair, must be in place and arrangements made to warn the mariner promptly of any AtoN fault and its subsequent return to fully operational service.

The Licensee must ensure that any meteorological mast(s) within the Site are marked and lit in accordance with IALA Recommendation O-139.

The Licensee must ensure that any meteorological mast(s) within the Site will have marking and lighting amended to suit the final layout of the wind farm.

3.2.3.5 Noise registry

The Licensee must, in the event that pile foundations were used, submit the appropriate completed noise registry form to the Licensing Authority and the JNCC, within 12 weeks of Completion of the Works, stating the actual date(s), location(s) and nature of piling activities carried out under authority of this licence.

3.2.3.6 Operation and Maintenance of the Works

The Licensee must operate and maintain the Works in accordance with the approved OMP. Notification must be provided at least 3 months in advance of any maintenance to the Works where any additional deposits are required. In the event that these works are not assessed in the Application and are considered by the Licencing Authority as being material they will require further Marine Licences.

3.2.3.7 Compliance with and amendments to approved plans

The Licensee must, at all times, operate the Works in accordance with the approved MMPS, DSLP and the MMLMP (as updated and amended from time to time by the Licensee).

The license must, at all times, maintain the Works in accordance with the approved OMP (as updated and amended from time to time by the Licensee).

Any updates or amendments made to the MMPS, DSLP and the MMLMP by the Licensee, must be submitted, in writing, by the Licensee to the Licensing Authority for their written approval.

3.2.3.8 Decommissioning

SCHEDULE TO LICENCE NUMBER: 04916/14/0 DATED: 10 OCTOBER 2014

This licence does not permit the Decommissioning of the Works, for which a separate marine licence is required.

SCHEDULE TO LICENCE NUMBER: 04918/14/0 DATED: 10 OCTOBER 2014

3. PART 3 – CONDITIONS

3.1 General conditions

3.1.1 Licence conditions binding other parties

All conditions attached to this licence bind any person who for the time being owns, occupies or enjoys any use of the Works for which this licence has been granted in relation to those licensed activities authorised under item 5 in section 21(1) of the 2010 Act whether or not this licence has been transferred to that person.

3.1.2 Vessels, vehicles, agents, contractors and sub-contractors

The Licensee must provide, as soon as reasonably practicable in advance of their engagement in any Licensable Marine Activity, the name and function of any vessel, vehicle, agent, contractor or sub-contractor appointed to engage in the Works. Where applicable the notification must include the master's name, vessel type, vessel IMO number and vessel owner or operating company.

Any changes to the supplied details must be notified to the Licensing Authority, in writing, prior to any vessel, vehicle, agent, contractor or sub-contractor engaging in the Licensable Marine Activity.

Only those vessels, vehicles, agents, contractors or sub-contractors notified to the Licensing Authority are permitted to carry out any part of the Works.

The Licensee must satisfy themselves that any masters of vessels or vehicle operators, agents, contractors or sub-contractors are aware of the extent of the Works for which this licence has been granted, the activity which is licensed and the terms of the conditions attached to this licence. All masters of vessels or vehicle operators, agents, contractors and sub-contractors permitted to engage in the Works must abide by the conditions set out in this licence.

The Licensee must give a copy of this licence, and any subsequent variations made to this licence in accordance with section 30 of the 2010 Act, ensuring it is read and understood, to the masters of any vessels, vehicle operators, agents, contractors or sub-contractors permitted to engage in the Works.

3.1.3 Force Majeure

Should the Licensee or any of their agents, contractors or sub-contractors, by any reason of *force majeure* deposit anywhere in the marine environment any substance or object, then the Licensee must notify the Licensing Authority of the full details of the circumstances of the deposit within 48 hours of the incident occurring (failing which as soon as reasonably practicable after that period of 48 hours has elapsed). *Force majeure* may be deemed to apply when, due to stress of weather or any other cause, the master of a vessel or vehicle operator determines that it is necessary to deposit the substance or object other than at the Site because the safety of human life or, as the case may be, the vessel, vehicle or marine structure is threatened. Under Annex II, Article 7 of the Convention for the Protection of the Marine Environment of the North-east Atlantic, the Licensing Authority is obliged to immediately report *force majeure* incidents to the Convention Commission.

3.1.4 Material alterations to the licence application

The Licensee must, where any information upon which the granting of this licence was based has after the granting of the licence altered in any material respect, notify the Licensing Authority of this fact, in writing, as soon as is practicable.

3.1.5 Submission of plans and specification of studies and surveys to the Licensing Authority

The Licensee must submit plans and the details and specifications of all studies and surveys that are required to be undertaken under this licence in relation to the Works, in writing, to the Licensing Authority, for their written approval. Commencement of the studies or surveys and implementation of plans must not occur until the Licensing Authority has given its written approval to the Licensee.

Plans or the specification of studies and surveys prepared pursuant to another consent or licence relating to the Works by the Licensee or by a third party may also be used to satisfy the requirements of this licence.

3.1.6 Submission of reports to the Licensing Authority

The Licensee must submit all reports to the Licensing Authority, in writing, as are required under this licence within the time periods specified in this licence. Where it would appear to the Licensee that there may be a delay in the submission of the reports to the Licensing Authority, then the Licensee must advise the Licensing Authority of this fact as soon as is practicable and no later than the time by which those reports ought to have been submitted to the Licensing Authority under the terms of this licence.

The reports must include executive summaries, assessments and conclusions and any data will, subject to any rules permitting non-disclosure, be made publically available by the Licensing Authority or by any such party appointed at their discretion.

Reports prepared pursuant to another consent or licence relating to the Works by the Licensee or by a third party may also be used to satisfy the requirements of this licence.

3.1.7 Chemical usage

The Licensee must ensure that all chemicals which are to be utilised in the Works have been approved in writing by the Licensing Authority prior to use. All chemicals utilised in the Works must be selected from the List of Notified Chemicals assessed for use by the offshore oil and gas industry under the Offshore Chemicals Regulations 2002, unless approved in writing by the Licensing Authority.

3.1.8 Environmental protection

The Licensee must ensure that all reasonable, appropriate and practicable steps are taken at all times to minimise damage to the Scottish marine area and the UK marine licensing area caused by the carrying out of any Licensable Marine Activity.

The Licensee shall ensure appropriate steps are taken to minimise damage to the beach and foreshore by any Licensable Marine Activity.

The Licensee must ensure that any debris or waste material placed below MHWS during the construction and operation of the Works is removed from the Site, as soon as is reasonably

practicable, for disposal at a location above the MHWS approved by the Scottish Environment Protection Agency ("SEPA").

The Licensee must ensure that all substances and objects deposited during the execution of the Works are inert (or appropriately coated or protected so as to be rendered inert) and do not contain toxic elements which may be harmful to the marine environment, the living resources which it supports or human health.

The Licensee must ensure that the risk of transferring marine non-native species to and from the Site is kept to a minimum by ensuring appropriate bio-fouling management practices are implemented during the Works.

The Licensee must ensure that if oil based drilling muds are utilised they must be contained within a zero discharge system. Any drill cuttings associated with the use of water-based drilling muds situated within the Site of the Works need not be removed from the seabed.

3.1.9 Availability of the licence for inspection

The Licensee must ensure that copies of this licence and any subsequent amendments or variations are available for inspection at any reasonable time by any authorised marine enforcement officer at:

a) the premises of the Licensee;
b) the premises of any agent, contractor or sub-contractor acting on behalf of the Licensee;
c) any onshore premises directly associated with the Works; and
d) aboard any vessel engaged in the Works.

3.1.10 Inspection of the Works

Any persons authorised by the Licensing Authority, must be permitted to inspect the Works at any reasonable time. The Licensee must, as far as reasonably practicable, on being given reasonable notice by the Licensing Authority (of at least 72 hours), provide transportation to and from the Site for any persons authorised by the Licensing Authority to inspect the Site.

3.1.11 Emergencies

If the assistance of a Government Department (to include departments of Devolved Administrations) is required to deal with any emergency arising from:

a) the failure to mark and light the Works as required by this licence;
b) the maintenance of the Works; or
c) the drifting or wreck of the Works,

to include the broadcast of navigational warnings, then the Licensee is liable for any expenses incurred in securing such assistance.

3.2 Conditions specific to the Works

3.2.1 Conditions applicable to all phases of the Works

3.2.1.1 Project Environmental Monitoring Programme ("PEMP")

SCHEDULE TO LICENCE NUMBER: 04918/14/0 DATED: 10 OCTOBER 2014

The Licensee must, no later than 6 months prior to the Commencement of the Works, submit a PEMP, in writing, to the Licensing Authority for their written approval. Such approval may only be granted following consultation by the Licensing Authority with Scottish Natural Heritage ("SNH"), the Joint Nature Conservation Committee ("JNCC"), Whale and Dolphin Conservation ("WDC"), the Association of Salmon Fishery Boards ("ASFB") and any other ecological advisors as required at the discretion of the Licensing Authority. The PEMP must be in accordance with the Application as it relates to environmental monitoring.

The PEMP must set out measures by which the Licensee must monitor the environmental impacts of the Works. Monitoring is required throughout the lifespan of the Works where this is deemed necessary by the Licensing Authority and specifically, monitoring for cable exposure as specified in condition 3.2.2.10 parts f and g. Lifespan in this context includes pre-construction, construction, operational and decommissioning phases.

Monitoring should be done in such a way as to ensure that the data which is collected allows useful and valid comparisons as between different phases of the Works. Monitoring may also serve the purpose of verifying key predictions in the Application. Additional monitoring may be required in the event that further potential adverse environmental effects are identified for which no predictions were made in the Application.

The Licensing Authority may agree that monitoring may cease before the end of the lifespan of the Works.

The PEMP must cover, but not be limited to the following matters:

a) Pre-construction, construction (if considered appropriate by the Licensing Authority) and post-construction monitoring surveys as relevant in terms of the Application and any subsequent surveys for:

    1. Diadromous fish;
    2. Benthic communities;
    3. Seabed scour and local sediment deposition; and
    4. Sandeels (if using Gravity Bases).

b) The participation by the Licensee in surveys to be carried out in relation to marine mammals as set out in the Marine Mammal Monitoring Programme.

All the initial methodologies for the above monitoring must be approved, in writing, by the Licensing Authority and, where appropriate, in consultation with the Forth and Tay Regional Advisory Group ("FTRAG"), referred to in conditions 3.2.2.18 and 3.2.3.10 of this licence. Any pre-consent surveys carried out by Licensee to address any of the above species may be used in part to discharge this condition.

The PEMP is a live document and must be regularly reviewed by the Licensing Authority, at timescales to be determined by the Licensing Authority, in consultation with the FTRAG to identify the appropriateness of on-going monitoring. Following such reviews, the Licensing Authority may, in consultation with the FTRAG, require the Licensee to amend the PEMP and submit such an amended PEMP, in writing, to the Licensing Authority for their written approval. Such approval may only be granted following consultation with FTRAG and any other ecological, or such other advisors as may be required at the discretion of the Licensing Authority. The PEMP, as amended from time to time, must be fully implemented by the Licensee at all times.

The Licensee must submit written reports of such monitoring surveys to the Licensing Authority at timescales to be determined by the Licensing Authority in consultation with the

FTRAG. Subject to any legal restrictions regarding the treatment of the information, the results are to be made publicly available by the Licensing Authority, or by such other party appointed at their discretion.

3.2.1.2 Environmental Management Plan ("EMP")

The Licensee must, no later than 6 months prior to the Commencement of the Works, submit an EMP, in writing, to the Licensing Authority for their written approval. Such approval may only be granted following consultation by the Licensing Authority with the JNCC, SNH, SEPA and any such other advisors or organisations as may be required at the discretion of the Licensing Authority. The Works must, at all times, be constructed and operated in accordance with the approved EMP (as updated and amended from time to time by the Licensee). Any updates or amendments made to the EMP by the Licensee must be submitted, in writing, by the Licensee to the Licensing Authority for their written approval.

The EMP must provide the over-arching framework for on-site environmental management during the phases of works as follows:

a) all construction as required to be undertaken before the Final Commissioning of the Works; and
b) the operational lifespan of the Works from the Final Commissioning of the Works until the cessation of electricity transmission (Environmental management during decommissioning is addressed by condition 3.2.2.2).

The EMP must set out the roles, responsibilities and chain of command for the Licensee personnel, any contractors or sub-contractors in respect of environmental management for the protection of environmental interests during the construction and operation of the Works. It must address, but not be limited to, the following over-arching requirements for environmental management during construction:

a) Mitigation measures to prevent significant adverse impacts to environmental interests, as identified in the Application and pre-consent and pre-construction surveys, and include the relevant parts of the Construction Method statement ("CMS");
b) A completed Written Scheme of Investigation ("WSI") approved by Historic Scotland;
c) A Marine Pollution Contingency Plan ("MPCP") to include but not necessarily limited to provision in respect to spills and collision incidents occurring during construction and operation of the works, whilst taking into account existing plans for all operations including offshore installations that may have an influence on the MPCP; Practices used to refuel vessels at sea which must confirm to industry standards and to relevant legislation. The MPCP must also set out how any oil leaks within the structures are to be remedied and that such relevant repairs are required to be undertaken without undue delay;
d) Management measures to prevent the introduction of marine non-native marine species;
e) Measures to minimise, recycle, reuse and dispose of waste streams; and
f) The methods for responding to environmental incidents and the reporting mechanisms that will be used to provide the Licensing Authority and relevant stakeholders (including, but not limited to, SNH, the JNCC, SEPA, Maritime and Coastguard Agency ("MCA") and the Northern Lighthouse Board ("NLB")) with regular updates on construction activity, including any environmental issues that have been encountered and how these have been addressed.
g) In the event that Seaton Sands forms the landfall location, details of how the Licensee will give consideration to the European Commission Designated Bathing Waters at Seton Sands, with respect to minimising water quality and amenity impacts

during construction. Works must take place out with the bathing season of 1st June to the 15th September, unless agreed in writing with the Licencing Authority

The Licensee must, no later than 3 months prior to the Final Commissioning of the Works, submit an updated EMP, in writing, to cover the operation and maintenance activities for the Works to the Licensing Authority for their written approval. Such approval may be given only following consultation with SNH, the JNCC, SEPA and any such other advisors or organisations as may be required at the discretion of the Licensing Authority. The EMP must be regularly reviewed by the Licensee and the FTRAG (refer to conditions 3.2.2.18 and 3.2.3.10) over the lifespan of the Works, and be kept up to date (in relation to the likes of construction methods and operations of the Works in terms of up to date working practices) by the Licensee in consultation with the FTRAG.

The EMP must be informed, so far as is reasonably practicable, by the baseline surveys undertaken as part of the Application and the PEMP.

3.2.1.3 National Research and Monitoring Strategy for Diadromous Fish (NRMSD).

The Licensee must participate in the monitoring requirements as laid out in the 'National Research and Monitoring Strategy for Diadromous Fish' so far as they apply at a local level (the Forth and Tay). The extent and nature of the Licensee's participation is to be agreed by the Licensing Authority in consultation with the FTRAG.

3.2.1.4 Forth and Tay Offshore Wind Developers Group - Commercial Fisheries Working Group ("FTOWDG-CFWG")

The Licensee must continue its membership in the FTOWDG-CFWG, or any successor group formed to facilitate commercial fisheries dialogue to define and finalise a Commercial Fisheries Mitigation Strategy ("CFMS"). As part of the finalised CFMS, the Licensee must produce and implement a mitigation strategy for each commercial fishery that can prove to the Licensing Authority that they will be adversely affected by the Works. Should it be deemed necessary by the FTOWDG-CFWG, the Licensee must undertake a feasibility study specifically to assess the use of alternate scallop gear within the Development area and must include how scallop gear may be redesigned to coexist with the Works infrastructure. If such a feasibility study is deemed necessary, this must form part of the CFMS. The CFMS to be implemented must be approved in writing by the Licensing Authority. The Licensee must implement all mitigation measures committed to be carried out by the Licensee within the CFMS, so far as is applicable to the Works. Any agents or their contractors or sub-contractors working for the Licensee, must co-operate with the fishing industry to ensure the effective implementation of said CFMS.

3.2.1.5 Health and safety incident

If any serious health and safety incident occurs on the Site requiring the Licensee to report it to the Health and Safety Executive, then the Licensee must also notify the Licensing Authority of the incident within 24 hours of the incident occurring.

3.2.1.6 Bunding and storage facilities

The Licensee must ensure suitable bunding and storage facilities are employed to prevent the release of fuel oils, lubricating fluids associated with the plant and equipment into the marine environment.

3.2.1.7 Restoration of the Site to its original condition

The Licensee must take all reasonable, appropriate and practicable steps to restore the Site to its original condition before any Licensable Marine Activity was undertaken, or to as close to its original condition as is reasonably practicable, in accordance with the PEMP and the Decommissioning Programme ("DP") to the satisfaction of the Licensing Authority. Should all Licensed Marine Activity be discontinued prior to Completion of the Works, the Licensee must inform the Licencing Authority in writing of the discontinuation of the Works. This licence will be varied under section 30(3) of the 2010 Act following procedures laid out under section 31 of the 2010 Act to allow the removal of Works already installed.

3.2.2 Prior to the Commencement of the Works

3.2.2.1 Commencement date of the Works

The Licensee must, prior to and no less than 1 month before the Commencement of the Works, notify the Licensing Authority, in writing, of the date of Commencement of the Works.

3.2.2.2 Decommissioning Programme ("DP")

Where the Secretary of State has, following consultation with the Licensing Authority, given notice requiring the Licensee to submit to the Secretary of State a DP, pursuant to section 105(2) and (5) of the Energy Act 2004, then construction may not begin on the Site of the Works until after the Licensee has submitted to the Secretary of State a DP in compliance with that notice.

3.2.2.3 Construction Programme ("CoP")

The Licensee must, no later than 6 months prior to the Commencement of the Works, submit a CoP, in writing, to the Licensing Authority for their written approval. Such approval may only be granted following consultation by the Licensing Authority with SNH, the JNCC, SEPA, MCA, NLB, the East Lothian Council and any such other advisors or organisations as may be required at the discretion of the Licensing Authority. The CoP must be in accordance with the Application.

The CoP must set out:

a) The proposed date for Commencement of the Works;
b) The proposed timings for mobilisation of plant and delivery of materials, including details of onshore lay-down areas;
c) The proposed timings and sequencing of construction work for all elements of the Works infrastructure;
d) Contingency planning for poor weather or other unforeseen delays; and
e) The scheduled date for Final Commissioning of the Works.

3.2.2.4 Construction Method Statement ("CMS")

The Licensee must, no later than 6 months prior to the Commencement of the Works submit a CMS, in writing, to the Licensing Authority for their written approval. Such approval may only be granted following consultation by the Licensing Authority with SNH, the JNCC, SEPA, MCA, NLB, the East Lothian Council and any such other advisors or organisations as may be required at the discretion of the Licensing Authority. The CMS must set out the construction procedures and good working practices for constructing the Works. The CMS must also include details of the roles and responsibilities, chain of command and contact details of company personnel, any contractors or sub-contractors involved during the

construction of the Works. The CMS must be in accordance with the construction methods assessed in the Application and must include details of how the construction related mitigation steps proposed in the Application are to be delivered.

The CMS must, so far as is reasonably practicable, be consistent with the Design Statement ("DS"), the EMP, the Vessel Management Plan ("VMP"), the Navigational Safety Plan ("NSP"), the Piling Strategy ("PS") (if required), the Cable Plan ("CaP") and the Lighting and Marking Plan ("LMP").

3.2.2.5 Piling Strategy ("PS")

In the event that pile foundations are to be used to construct the OSPs, the Licensee must, no later than 6 months prior to the Commencement of the Works, submit a PS, in writing, to the Licensing Authority for their written approval. Such approval may only be granted following consultation by the Licensing Authority with SNH, the JNCC, and any such other advisors as may be required at the discretion of the Licensing Authority.

The PS must include:

a. Full details of the proposed method and anticipated duration of pile-driving at all locations;
b. Details of soft-start piling procedures and anticipated maximum piling energy required at each pile location; and
c. Details of mitigation and monitoring to be employed during pile-driving, as agreed by the Licensing Authority.

The PS must be in accordance with the Application and reflect any surveys carried out after submission of the Application. The PS must demonstrate how the exposure to and / or the effects of underwater noise have been mitigated in respect of the following species: bottlenose dolphin; harbour seal; grey seal; Atlantic salmon; cod; and herring.

The PS must, so far as is reasonably practicable, be consistent with the EMP, the PEMP and the CMS.

3.2.2.6 Development Specification and Layout Plan ("DSLP")

The Licensee must, no later than 6 months prior to the Commencement of the Works, submit a DSLP, in writing, to the Licensing Authority for their written approval. Such approval may only be granted following consultation by the Licensing Authority with the MCA, NLB the Chamber of Shipping ("CoS"), SNH, the JNCC, the Scottish Fisherman's Federation ("SFF"), the Civil Aviation Authority ("CAA") and any such other advisors or organisations as may be required at the discretion of the Licensing Authority.

The DSLP must include, but not be limited to the following:

a) A plan showing the proposed location of each individual OSP, seabed conditions, bathymetry, confirmed foundation type for each OSP and any key constraints recorded on the Site;
b) A list of latitude and longitude coordinates accurate to three decimal places of minutes of arc for each OSP, this should also be provided as a geographic information system ("GIS") shape file using WGS84 format;
c) A table or diagram of each OSP;
d) The finishes for each OSP; and
e) The length and proposed arrangements on the seabed of all cables.

3.2.2.7 Design Statement ("DS")

The Licensee must, prior to the Commencement of the Works, submit a DS, in writing, to the Licensing Authority that includes representative visualisations from key viewpoints agreed with the Licensing Authority, based upon the DSLP, as approved by the Licensing Authority (as updated and amended from time to time by the Licensee). The DS must be provided, for information only, to the East Lothian Council, SNH, the JNCC, and any such other advisors or organisations as may be required at the discretion of the Licensing Authority. The DS must be prepared and signed off by at least one qualified landscape architect, instructed by the Licensee prior to submission to the Licensing Authority.

3.2.2.8 Vessel Management Plan ("VMP")

The Licensee must, no later than 6 months prior to the Commencement of the Works, submit a VMP, in writing, to the Licensing Authority for their written approval. Such approval may only be granted following consultation by the Licensing Authority with SNH, the JNCC, WDC and any such other advisors or organisations as may be required at the discretion of the Licensing Authority.

The VMP must include, but not be limited to, the following details:

a) The number, types and specification of vessels required;
b) Working practices to minimise the use of ducted propellers;
c) How vessel management will be co-ordinated, particularly during construction but also during operation; and
d) Location of working port(s), how often vessels will be required to transit between port(s) and the Site and indicative vessel transit corridors proposed to be used.

The VMP must, so far as is reasonably practicable, be consistent with the CMS, the EMP, the PEMP, the NSP, and the LMP.

3.2.2.9 Navigational Safety Plan ("NSP")

The Licensee must, no later than 6 months prior to the Commencement of the Works, submit a NSP, in writing, to the Licensing Authority for their written approval. Such approval may only be granted following consultation by the Licensing Authority with MCA, NLB and any other navigational advisors or organisations as may be required at the discretion of the Licensing Authority. The NSP must include, but not be limited to, the following issues:

a) Navigational safety measures;
b) Construction exclusion zones;
c) Notice(s) to Mariners and Radio Navigation Warnings;
d) Anchoring areas;
e) Temporary construction lighting and marking;
f) Emergency response and co-ordination arrangements for the construction, operation and decommissioning phases of the Works; and
g) Buoyage.

The Licensee must confirm within the NSP that they have taken into account and adequately addressed all of the recommendations of the MCA in the current Marine Guidance Note 371, and its annexes, that may be appropriate to the Works, or any other relevant document which may supersede said guidance.

3.2.2.10 Cable Plan ("CaP")

The Licensee must, no later than 6 months prior to the Commencement of the Works, submit a CaP in writing, to the Licensing Authority for their written approval. Such approval may only be granted following consultation by the Licensing Authority with SNH, the JNCC, MCA, and the SFF and any such other advisors or organisations as may be required at the discretion of the Licensing Authority. The CaP must be in accordance with the Application.

The CaP must include the following:

a) Details of the location and cable laying techniques for the cables;
b) The results of survey work (including geophysical, geotechnical and benthic surveys) which will help inform cable routing;
c) A pre-construction survey for Annex 1 habitat and priority marine features to inform cable micro-siting and installation methods in consultation with the Licensing Authority and their advisors;
d) Technical specification of all cables, including a desk based assessment of attenuation of electro-magnetic field strengths and shielding;
e) A burial risk assessment to ascertain burial depths and, where necessary, alternative suitable protection measures;
f) Methodologies for over trawl surveys of the cables through the operational life of the Works where mechanical protection of cables laid on the sea bed is deployed; and
g) Methodologies for cable inspection with measures to address and report to the Licensing Authority any exposure of cables

3.2.2.11 Traffic and Transportation Plan ("TTP")

The Licensee must, no later than 6 months prior to the Commencement of the Works submit a TTP, in writing, to the Licensing Authority for their written approval. Such approval may only be granted following consultation by the Licensing Authority with Transport Scotland, and any such other advisors as may be required at the discretion of the Licensing Authority. The TTP must set out a mitigation strategy for the impact of road based traffic and transportation associated with the Works.

3.2.2.12 Ecological Clerk of Works ("ECoW")

Prior to the Commencement of the Works, the Licensee must at its own expense, and with the approval of the Licensing Authority in consultation with SNH and the JNCC appoint an ECoW or ECoW team. The ECoW(s) must be appropriately qualified and a member of a recognised organisation such as Association for Ecological / Environmental Clerk of Work, Chartered Institute of Ecology and Environmental Management or the Institute of Environmental Management and Assessment. The ECoW must be appointed in time to review and approve the final draft version of the first plan or programme submitted under this Licence to the Licensing Authority for approval, until the Final Commissioning of the Works.

The responsibilities of the ECoW must include, but not be limited to:

a) Quality assurance of final draft version of all plans and programmes required under this licence;
b) Provide advice to the Licensee on compliance with licence conditions, including the conditions relating to the CMS, the EMP, the PEMP, the PS (if required), the CaP and the VMP;
c) Monitor compliance with the CMS, the EMP, the PEMP, the PS (if required), the CaP and the VMP;

d) Provide reports on point c) above to the Licensing Authority at timescales to be determined by the Licensing Authority; and
e) Inducting site personnel on the Site/the Works environmental policy and procedures.

The ECoW role may be carried out by a party appointed by the Licensee or by a third party appointed to carry out an equivalent role pursuant to other consents or licences granted in relation to the Works and subject to the written approval of the Licensing Authority.

3.2.2.13 Fisheries Liaison Officer ("FLO")

Prior to the Commencement of the Works, a FLO, approved by Licensing Authority in consultation with the FTOWDG-CFWG, must be appointed by the Licensee for the period from Commencement of the Works until the Final Commissioning of the Works. The Licensee must notify the Licensing Authority of the identity and credentials of the FLO before Commencement of the Works by including such details in the EMP (refer to condition 3.2.1.2). The FLO must establish and maintain effective communications between the Licensee, any contractors or sub-contractors, fishermen and other users of the sea during the construction of the Works, and ensure compliance with best practice guidelines whilst doing so.

The responsibilities of the FLO include, but are not limited to:

a) Establishing and maintaining effective communications between the Licensee, any contractors or sub-contractors, fishermen and other users of the sea with a fisheries interest concerning the Works and any amendments to the CMS and site environmental procedures;
b) Provision of information relating to the safe operation of fishing activity on the Site of the Works; and
c) Ensuring that information is made available and circulated in a timely manner to minimise interference with fishing operations and other users of the sea.

The FLO role may be carried out by a party appointed by the Licensee or by a third party appointed to carry out an equivalent role pursuant to other consents or licences granted in respect of the Works and subject to the written approval of the Licensing Authority.

3.2.2.14 Navigational and Aviation Safety and Charting

The Licensee must, as soon as reasonably practicable prior to Commencement of the Works, notify the UK Hydrographic Office ("UKHO") of the proposed works to facilitate the promulgation of maritime safety information and updating of nautical charts and publications through the national Notice to Mariners system.

The Licensee must, as soon as reasonably practicable prior to the Commencement of the Works, ensure that local mariners, fishermen's organisations and HM Coastguard, in this case Maritime Rescue Coordination Centre Aberdeen, are made fully aware of the Licensable Marine Activity through local Notice to Mariners or any other appropriate means. The Licensee must consult with any local Harbour Master where appropriate, who may wish to issue local warnings to alert those navigating in the vicinity to the presence of the Works during construction.

The Licensee must ensure that details of the Works are promulgated in the Kingfisher Fortnightly Bulletin, as soon as reasonably practicable prior to the Commencement of the Works to inform the Sea Fish Industry of the vessel routes, the timings and the location of the Works and of the relevant operations.

The Licensee must prior to Commencement of the Works, complete an "Application for Statutory Sanction to Alter/Exhibit" form and submit this to the NLB for the necessary sanction to be granted.

The Licensee must, no later than 6 months prior to the Commencement of the Works, submit a LMP, in writing, to the Licensing Authority for their written approval. Such approval may only be granted following consultation by the Licensing Authority with MCA, NLB, the CAA, the Ministry of Defence ("MOD") and any such other advisors as may be required at the discretion of the Licensing Authority. The LMP must provide that the Works be lit and marked in accordance with the current MCA, CAA and MOD navigational and aviation lighting policy and guidance that is in place as at the date of the Licensing Authority approval of the LMP, or any such other documents that may supersede said guidance prior to the approval of the LMP. The LMP must also detail the navigational lighting requirements detailed in International Association of Marine Aids to Navigation and Lighthouse Authorities ("IALA") Recommendations O-139 or any other documents that may supersede said guidance prior to approval of the LMP.

The LMP must make provision for the marking and lighting of the OSPs to be amended as required by NLB or the CAA in the event that the OSPs are constructed prior to the construction of wind turbine generators forming part of the Inch Cape Offshore Wind Farm within the Site so that the marking and lighting of any OSP suits the layout of wind turbine generators located within the Site.

The Licensee must provide the LMP to East Lothian Council, Angus Council, Fife Council, SNH, the JNCC, and any other bodies as may be required at the discretion of the Licensing Authority.

The Licensee must, prior to the Commencement of the Works, and following confirmation of the approved DSLP by the Licensing Authority, provide the precise location and maximum heights of all OSPs, and construction equipment over 150 m above lowest astronomical tide ("LAT"), and details of any lighting fitted to all OSPs, to the UKHO for aviation and nautical charting purposes.

3.2.2.15 Third Party Certification or Verification ("TPC" or "TPV")

The Licensee must, no later than 3 months prior to the Commencement of the Works, provide the Licensing Authority (unless otherwise agreed, in writing, with the Licensing Authority) with TPC or TPV (or suitable alternative as agreed, in writing, with the Licensing Authority) for all OSPs foundations, jacket and OSP platform structures.

3.2.2.16 Noise Registry

The Licensee must, in the event that pile foundations are to be used, submit the appropriate completed noise registry form to the Licensing Authority and the JNCC stating, the proposed date(s), location(s) and nature of the piling activities under authority of this licence.

3.2.2.17 Forth and Tay Regional Advisory Group ("FTRAG")

The Licensee must participate in any FTRAG established by the Licensing Authority for the purpose of advising the Licensing Authority on research, monitoring and mitigation programmes for, but not limited to, diadromous fish, marine mammals and commercial fish. Should a Scottish Strategic Marine Environment Group ("SSMEG") be established (refer to condition 3.2.2.19 and 3.2.3.11), the responsibilities and obligations being delivered by the

FTRAG will be subsumed by the SSMEG at a timescale to be determined by the Licensing Authority.

3.2.2.18 Scottish Strategic Marine Environment Group ("SSMEG")

The Licensee must participate in any SSMEG established by the Licensing Authority for the purpose of advising the Licensing Authority on research, monitoring and mitigation programmes for, but not limited to, diadromous fish, marine mammals and commercial fish.

3.2.3 During the construction of the Works

3.2.3.1 Compliance with and amendments to approved plans

The Licensee must, at all times, construct the Works in accordance with the approved CoP, CMS, PS (if required), DSLP, VMP, NSP, CaP, TTP and LMP (as updated and amended from time to time by the Licensee).

Any updates or amendments made to the CoP, CMS, PS (if required), DSLP, VMP, NSP, CaP, TTP, and LMP by the Licensee, must be submitted, in writing, by the Licensee to the Licensing Authority for their written approval.

3.2.3.2 Operation and Maintenance Programme ("OMP")

The Licensee must, no later than 3 months prior to the commissioning of the first OSP, submit an OMP, in writing, to the Licensing Authority for their written approval. Such approval may only be granted following consultation by the Licensing Authority with SNH, the JNCC, SEPA, MCA, NLB, East Lothian Council and any such other advisors or organisations as may be required at the discretion of the Licensing Authority. The OMP must set out the procedures and good working practices for the operations and maintenance of the OSPs, substructures, and cable network of the Works. Environmental sensitivities which may affect the timing of the operation and maintenance activities must be considered in the OMP.

The OMP must, so far as is reasonably practicable, be consistent with the EMP, the PEMP, the VMP, the NSP, the CaP and the LMP.

3.2.3.3 Transportation audit sheet

The Licensee must create, complete and submit to the Licensing Authority on the first working day of the month, a detailed transportation audit sheet for each month during the period when construction of the Works is undertaken, for all aspects of the construction of the Works. The transportation audit sheet must include information on the loading facility, vessels, equipment, shipment routes, schedules and all materials to be deposited (as described in Part 2 of this licence) in that month. Where, following the submission of a transportation audit sheet to the Licensing Authority, any alteration is made to the component parts of the transportation audit sheet, the Licensee must notify the Licensing Authority of the alteration in the following month's transportation audit sheet.

If the Licensee becomes aware of any substances or objects on the transportation audit sheet that are missing, or an accidental deposit occurs, the Licensee must contact the Licensing Authority as soon as practicable after becoming aware, for advice on the appropriate remedial action. Should the Licencing Authority deem it necessary, the Licensee must undertake a side scan sonar survey in grid lines (within operational and safety constraints) across the area of the Works, to include cable routes and vessel access routes

from local service port(s) to the Site to locate the substances or objects. If the Licensing Authority is of the view that any accidental deposits associated with the construction of the Works are present, then the deposits must be removed by the Licensee as soon as is practicable and at the Licensee's expense.

3.2.3.4 Nature and quantity of deposited substances and objects

The Licensee must, in addition to the transportation audit sheets required to be submitted to the Licensing Authority under condition 3.2.3.3, following the Commencement of the Works, submit audit reports, in writing, to the Licensing Authority, stating the nature and quantity of all substances and objects deposited below MHWS under the authority of this licence. Such audit reports must be submitted in writing, to the Licensing Authority by the Licensee at 6 monthly intervals, with the first such report being required to be submitted on a date no later than 6 months following the Commencement of the Works. Where appropriate, nil returns must be provided.

3.2.3.5 Navigational safety

The Licensee must notify the UKHO of the progress of the Works to facilitate the promulgation of maritime safety information and updating of nautical charts and publications through the national Notice to Mariners system.

The Licensee must notify, from Aberdeen to Eyemouth, local mariners, fishermen's organisations and HM Coastguard, in this case Maritime Rescue Coordination Centre Aberdeen of the progress of the Works through local Notice to Mariners or any other appropriate means.

The Licensee must ensure that the progress of construction of the Works is promulgated in the Kingfisher Fortnightly Bulletin to inform the Sea Fish Industry of the vessel routes, the timings and the location of the Works and of the relevant operations.

The Licensee must, notify the Licensing Authority, in writing, as soon as reasonably practicable, of any case of damage to or destruction or decay of the Works. The Licensing Authority will advise, in writing, of any remedial action to be taken and any requirement to display aids to navigation, following consultation with the Maritime Coastguard Agency ("MCA") the NLB or any such advisers as required.

The Licensee must ensure that any Emergency Response and Rescue Vehicle ("ERRV") and/or cable-laying vessel permitted to engage in the Works must be equipped with an automatic identification system ("AIS") and automatic radar plotting aids ("ARPA").

The Licensee must ensure that navigational safety is not compromised by the Works. The navigable depth must not be reduced by more than 5% of stated chart datum unless otherwise agreed, in writing, with the Licensing Authority in consultation with the MCA and NLB.

The Licensee must ensure that no radio beacon or radar beacon operating in the marine frequency bands is installed or used on the Works without the prior written approval of the Office of Communications ("OfCom").

3.2.3.6 Markings, lighting and signals of the Works

The Licensee must ensure that the Works are marked and lit in accordance with the requirements of the NLB and the CAA and the MOD at all times and such marking and/or lighting must be continued unless and until such time as the Licensing Authority, by notice, relevantly varies this licence under section 30 of the 2010 Act.

The Licensee must ensure that no marks or lights, other than those required by virtue of this licence, are displayed unless they have been approved, in writing, by the Licensing Authority following consultation with the NLB and the CAA.

In the event that the OSPs are constructed prior to the construction of wind turbine generators forming part of the Inch Cape Offshore Wind Farm, the Licensee must ensure that the marking and lighting of any OSP is such that it can be amended to suit the layout of wind turbine generators located within the Site as specified in the LMP

The Licensee must ensure the Site boundaries are marked by Cardinal Mark buoys (number to be determined when final layout is known). The Cardinal Mark buoys shall be a minimum of 3 metres in diameter at the waterline, have a focal plane of at least 3 metres above the waterline and be of suitable construction for the sea conditions commonly experienced in the North Sea. The light range on these buoys shall be 5 nautical miles. All required buoyage shall remain in place until completion of this phase, or otherwise notified by the Licensing Authority.

3.2.3.7 Markings, lighting and signals of jack up vessels

The Licensee must ensure that any vessels permitted to engage in the Works are marked in accordance with the International Rules for the Prevention of Collisions at Sea whilst under way, and in accordance with the UK Standard Marking Schedule for Offshore Installations if secured to the seabed.

3.2.3.8 Horizontal Directional Drilling (“HDD”)

The Licensee must ensure the seaward exit point of the HDD will be located as far offshore as practicable towards the depth of closure; the landward exit point of the HDD will be located onshore of the high-water mark; and the cables will be suitably buried or otherwise protected between the seaward exit of the HDD and the depth of closure (the depth of water beyond which annually significant wave events will cease to contribute to beach sediment supply and morphological processes).

3.2.3.9 Noise registry

The Licensee must, in the event that pile foundations are to be used, and piling is to be carried out for more than 10 consecutive days, submit at quarterly intervals, the appropriate completed noise registry form to the Licensing Authority and the JNCC, stating the date(s), location(s) and nature of such activities under authority of this licence.

3.2.3.10 Forth and Tay Regional Advisory Group (“FTRAG”)

The Licensee must participate in any FTRAG established by the Licensing Authority for the purpose of advising the Licensing Authority on research, monitoring and mitigation programmes for, but not limited to, diadromous fish, marine mammals and commercial fish. Should a SSMEG be established (refer to conditions 3.2.2.19 and 3.2.3.11), the responsibilities and obligations being delivered by the FTRAG will be subsumed by the SSMEG at a timescale to be determined by the Licensing Authority.

3.2.3.11 Scottish Strategic Marine Environment Group ("SSMEG")

The Licensee must participate in any SSMEG established by the Licensing Authority for the purpose of advising the Licensing Authority on research, monitoring and mitigation programmes for, but not limited to, diadromous fish, marine mammals and commercial fish.

3.2.4 Conditions upon Completion of the Works

3.2.4.1 Date of Completion of the Works

The Licensee must, no more than 1 month following the Completion of the Works, notify the Licensing Authority, in writing, of the date of Completion of the Works.

3.2.4.2 Nature and quantity of deposited substances and objects

The Licensee must, no later than 1 month following Completion of the Works, submit a final audit report, in writing, to the Licensing Authority stating the nature and quantity of all substances and objects deposited below MHWS within the Scottish marine area under the authority of this licence. Where appropriate, nil returns must be provided.

3.2.4.3 Final Commissioning of the Works

The Licensee must, no more than 1 month following the Final Commissioning of the Works, notify the Licensing Authority, in writing, of the date of the Final Commissioning of the Works.

3.2.4.4 Compliance with and amendments to approved plans

The Licensee must, at all times, operate the Works in accordance with the approved VMP, OMP, NSP, CaP, TTP and LMP (as updated and amended from time to time by the Licensee).

The license must, at all times, maintain the Works in accordance with the approved OMP (as updated and amended from time to time by the Licensee).

Any updates or amendments made to the VMP, OMP, NSP, CaP, TTP, and LMP by the Licensee, must be submitted, in writing, by the Licensee to the Licensing Authority for their written approval.

3.2.4.5 Navigational safety

The Licensee must notify the UKHO of the Completion of the Works to facilitate the promulgation of maritime safety information and updating of nautical charts and publications through the national Notice to Mariners system.

The Licensee must, within 1 month of Completion of the Works, provide the "as-built" positions and maximum heights of all OSPs, along with any sub-sea infrastructure, cable landing points and changes to navigable depths, to the UKHO for aviation and nautical charting purposes.

The Licensee must ensure that local mariners, fishermen's organisations and HM Coastguard, in this case Maritime Rescue Coordination Centre Aberdeen, are made fully aware of the Completion of the Works.

The Licensee must ensure that the Completion of the Works is promulgated in the Kingfisher Fortnightly Bulletin to inform the Sea Fish Industry.

The Licensee must notify the Licensing Authority in writing, as soon as reasonably practicable, of any case of damage to or destruction or decay of the Works. The Licensing Authority will advise, in writing, of any remedial action to be taken and any requirement to display aids to navigation, following consultation with the MCA, the NLB or any such advisers as required.

The Licensee must ensure that no radio beacon or radar beacon operating in the marine frequency bands are installed or used on the Works without the prior written approval of OfCom.

3.2.4.6 Markings, lighting and signals of the Works

The Licensee must ensure that the Works are marked and lit in accordance with the requirements of the NLB at all times and such marking and/or lighting must be continued unless and until such time as the Licensing Authority, by notice, relevantly varies this licence under section 30 of the 2010 Act.

The Licensee must ensure that the required IALA availability target for Category 1 Aids to Navigation ("AtoN") is achieved through redundancy, monitoring and repair, must be in place and arrangements made to warn the mariner promptly of any AtoN fault and its subsequent return to fully operational service.

The Licensee must ensure that lit Cable Marker Boards ("CMBs") are positioned as near as possible to the shoreline so as to mark the points at which the cables come ashore. The CMBs shall be diamond shaped, with dimensions 2.5 metres long and 1.5 metres wide, background painted yellow with the inscription 'Cables' painted horizontally in black. The structures shall be mounted at least 4 metres above ground level, with a navigation light flashing yellow once every five seconds ("Fl Y 5s") mounted on the upward apex of the board. The nominal range of these lights should be 3 nautical miles, and they should have an availability of not less than 97% (IALA Category 3) over a rolling three year period. It will be acceptable to screen the navigation light to landward.

The Licensee must ensure that the marking and lighting of any OSP is amended in accordance with the LMP to suit the final layout of wind turbine generators forming part of the Inch Cape Offshore Wind Farm located within the Site.

3.2.4.7 Noise registry

The Licensee must, in the event that pile foundations were used, submit the appropriate completed noise registry form to the Licensing Authority and the JNCC, within 12 weeks of Completion of the Works, stating the actual date(s), location(s) and nature of piling activities carried out under authority of this licence.

3.2.4.8 Environmental protection

The Licensee shall ensure the beach and foreshore is returned to the original profile, or as close as reasonably practicable, following Completion of the Works.

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3.2.4.9 Operation and Maintenance of the Works

The Licensee must operate and maintain the Works in accordance with the approved OMP. Notification must be provided at least 3 months in advance of any maintenance to the Works where any additional deposits are required. In the event that these works are not assessed in the Application and are considered by the Licencing Authority as being material they will require further Marine Licences.

3.2.4.10 Decommissioning

This licence does not permit the Decommissioning of the Works, for which a separate marine licence is required.

Appendix B – Habitats Regulations Appraisal (HRA) Screening

1 Introduction

1.1 Purpose of Document

1. This appendix has been prepared to inform the HRA process that will be applicable to the Revised Development and to assist the competent authority (CA) with their appraisal of potential routes to impact upon European designated sites (Natura sites). The aim of the appendix is to provide information upon potential connectivity of the Revised Development and Natura sites, in order to determine for which designated features it is possible to conclude no 'likely significant effect' (LSE) and so screen out of further consideration at the Appropriate Assessment stage of the HRA. Further explanation of the HRA process is provided in Section 1.2.

2. Thus the objective of this screening assessment is:

   - To determine whether the Revised Development will have a route to impact on to a qualifying feature of a Natura site. The assessment will consider, where there is no potential connectivity or route to impact, can no LSE be concluded for any Natura sites; and
   - To identify those projects that may have an in-combination impact for the Natura sites (and qualifying features of interest)

3. The appendix will then conclude by identifying any Natura sites for which it is not possible to conclude no LSE, and that are considered to require further assessment as part of an Appropriate Assessment (AA).

1.2 Background to HRA

4. Within Scotland, The Conservation (Natural Habitats, & c.) Regulations 1994, as amended (referred to as the 'Habitats Regulations') and The Offshore Marine Conservation (Natural Habitats &c) Regulations 2007, as amended [1] (referred to as the 'Offshore Habitats Regulations') implement the European Council Directives 92/43/EEC on the Conservation of Natural Habitats and of Wild Flora and Fauna (European Commission, 1992); 'Habitats Directive') and Directive 2009/147/EC of the European Parliament and of the Council of 30 November 2009 on the conservation of wild birds (codified version) (European Commission, 2009; 'Birds Directive'). The Habitats Regulations specify, amongst other issues, how development control decisions which could directly or indirectly affect Natura sites

[1] The Conservation (Natural Habitats, & c.) Regulations 1994, as amended covers the terrestrial areas of Scotland and territorial waters out to 12nm. The Offshore Marine Conservation (Natural Habitats &c) Regulations 2007 (as amended) are applicable to UK's offshore marine area which covers waters beyond 12 nautical miles, within British Fishery Limits and the seabed within the UK Continental Shelf Designated Area.

(classified as Special Protection Areas (SPAs) under the requirements of the Birds Directive or Special Areas of Conservation (SACs) under the terms of the Habitats Directive) are to be reached. It is UK Government policy (as outlined in Scottish Planning Policy (SPP); Scottish Government, 2014) that the Regulations should also apply to sites identified as Ramsar sites (under the Ramsar Convention on Wetlands of International Importance) and these are also referred to as 'Natura Sites'. The relevant sections of the Habitats Directive are Articles 6(3) and 6(4) (as implemented in the Habitats Regulations by Regulations 48 and 49).

5. Article 6(3) of the Habitats Directive [92/43/EEC] states, "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." It is therefore necessary to, in the first instance, determine whether it is possible to conclude that there is no LSE on the site. Where it is not possible to conclude this, an AA needs to be carried out by the CA. The European Court of Justice ruling in the case of Waddenzee (Case C-127/02), stated that an AA of a project is necessary, "if it cannot be excluded, on the basis of objective information, that it will have a significant effect on the site." It is therefore clear that if it cannot be objectively ruled out, then the more detailed AA is required. The test is therefore negative, and embeds precaution within it.

6. Regulation 48 of the Habitats Regulations states that an AA must be undertaken by the CA before any decision to give consent for any plan or project that is not directly connected with or necessary to the [conservation] management of a European site and which could significantly affect that site (either alone or in combination with other reasonably foreseeable plans or projects). An AA is required for all plans or projects "likely to have a significant effect" on a Natura site and applies only to the qualifying interests of the Natura site.

7. In Scotland, guidance on government policy regarding Natura sites is provided by Scottish Natural Heritage (SNH) in 'Habitats Regulations Appraisal of Plans' (Tyldesley, D and Associates, 2015). This guidance is referred to within 'Planning Circular 6 2013. Development Planning' (Scottish Government, 2013). Other guidance documents that have been used to inform this appraisal include:

- Department of Energy and Climate Change (DECC) (2016). Guidance on when new marine Natura 2000 sites should be taken into account in offshore renewable energy consents and licences. May 2016.
- SNH (2000). Natura Casework Guidance: Consideration of Proposals affecting SPA and SAC. Guidance Note Series; and
- Oxford Brookes (2001). Assessment of Plans and Projects Significantly Affecting Natura 2000 Sites: Methodological Guidance on the provisions of Article 6(3) and 6(4) of the 'Habitats' Directive 92/43/EEC. November 2001.

1.3 The HRA process

8. The HRA process (which covers both HRA screening and AA) comprises five key stages namely:

- Stage 1 – Description of the Plans or Proposals;
- Stage 2 – Are Plans or Proposals related to Site Management?;
- Stage 3 – LSE ('Screening');
- Stage 4 – Identification of modifications to proposals that may eliminate or reduce the LSE; and
- Stage 5 – AA – Test for Effect on Integrity of the Site(s).

9. In Scotland, guidance on government policy regarding Natura sites is provided by Scottish Natural Heritage (SNH) in 'Habitats Regulations Appraisal of Plans' (Tyldesley, D and Associates, 2015). For more information on the process please refer to this document.

10. Stages 1 – 3 comprise of the 'Screening' stages as described within Oxford Brookes (2001) guidance, while Stage 4 relates to identifying any further measures that can be incorporated in order to remove a LSE. Stage 5 comprises of an AA where no LSE could not be excluded. There are then further stages if there is a negative AA (not detailed at this time).

11. The following sections provide the detail on stages 1-3.

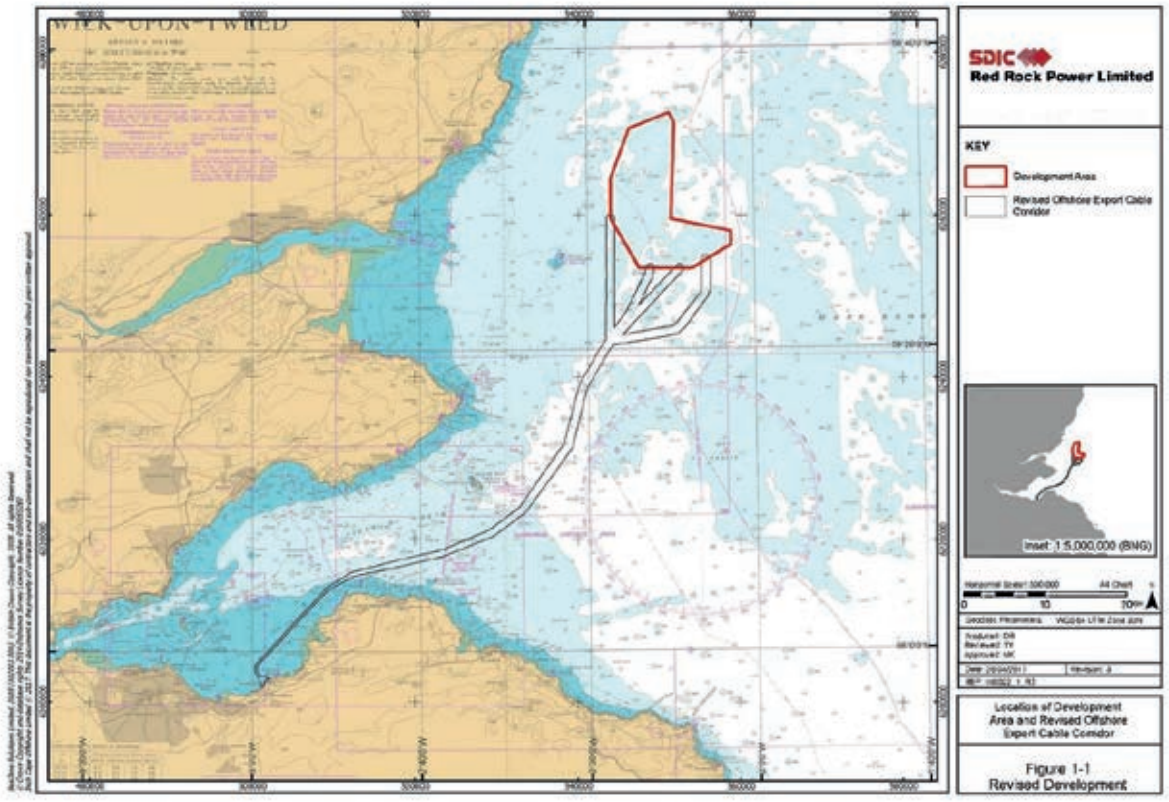
2 Description of the Revised Development (Stage 1 of the HRA Process)

12. This section provides a brief outline of the description of the design envelope of the Revised Development. For full details, please refer to the Revised Development Scoping Report, where detailed information is provided and a comparison between the Original Development and the proposed Revised Development can be seen. The Revised Development description is indicative and the application of a 'design envelope' (which captures the full range of potential design scenarios) is intended to provide sufficient flexibility to accommodate further expected refinement in design as the Revised Development moves through consenting and towards construction. The design parameters identified below are considered to be those which would exert the worst case impact scenario to receptors, and represent the parameters on which the assessment has been carried out.

Development Boundary

13. The Development Area and the Revised Offshore Export Cable Corridor are shown in Figure 1-1.

Figure 1-1: Revised Development



14. These areas encompass the:

- Development Area: This is where the offshore wind farm will be located, which will include the WTGs, OSPs, turbine and OSP foundations, inter-array cables and inter-connector cables; and
- Revised Offshore Export Cable Corridor, within which the Offshore Export Cables will be located.

15. The Development Area for the Revised Development is the same as for the Original Development.

16. The Revised Offshore Export Cable Corridor is the same as the Offshore Export Cable Corridor for the Original Development aside from the removal of the potential landfall at Seton Sands.

Wind Turbines

Design Parameter	Design Envelope (Revised Development Application)
Number of turbines	Up to 72
Minimum Blade clearance above Highest Astronomical Tide	22m
Hub height (above Lowest Astronomical Tide)	Up to 176m
Blade tip height (above Lowest Astronomical Tide)	Up to 301m
Rotor diameter	Up to 250m
Indicative minimum separation between turbines	1,278m

Inter Array Cables

Design Parameter	Design Envelope (Revised Development Application)
Voltage (kV)	<132
Cable length (km)	190
Cable burial (% of cables buried)	90 - 100
Trench Width per cable (m)	1-3
Trench Affected Width per cable (m)	12-15*

Design Parameter	Design Envelope (Revised Development Application)
Trench Depth (m)	0 - 3
Typical Trench Depth (m)	1.2

Offshore Substation Platforms

Design Parameter*	Design Envelope (Revised Development Application)
Top Width (m)	100
Base Diameter (m)	130
Excavated Diameter (m)	260
Scour Protection Diameter (m)	180
Dredger Affected Diameter (m)	300
Excavated Depth (m)	0 – 5**
Shadow (m^2) - Total seabed area under each substructure including those exposed	13,273
Footprint (m^2)- Total seabed area under each substructure which is not exposed	13,273
Footprint including Scour Protection Footprint (m^2)	25,447
Dredger Affected Area Footprint (m^2) (includes scour protection and footprint)	70,686
Maximum Excavated Volume per unit (m^3)	114,012***

* All stated quantities are per each GBS

** In isolated occasions depths of excavation may be greater than five metres if the sediment conditions dictate. For assessment these should be considered in a qualitative sense only due to the low frequency of their occurrence.

*** It is expected that they majority of foundations locations will not require this level of excavation and the extrapolated figure for the entire Development Area will not equate to the maximum volume times the number of OSPs

Export Cables

Design Parameter	Design Envelope (Revised Development Application)
Voltage (kV)	Up to 275 (AC option)
Cable length (km)	83.3
Cable burial (% of cables buried)	80 - 100
Cable Lay rates (m/hr)	300 - 500
Number of Cables/Trenches	2
Trench width per cable (m)	1-3
Trench Affected Width per cable (m)	12-15*
Trench Depth (m)	0 - 3
Typical Trench Depth (m)	1.2

* The area of the seabed that may experience some level of compaction or disturbance due to the footprint of the cable laying equipment. Exceptionally, where trench depth is much deeper (eg three metres) to minimise snagging risk, the affected width may be up to 40 m.

2.1 Stage 2 – Are Plans or Proposals Related to Site Management? (Stage 2 of the HRA Process)

17. It is confirmed that the Revised Development is not related to the management of any Natura sites.

3 Likely Significant Effect (Stage 3 of the HRA Process)

3.1 Introduction

18. In accordance with the SNH HRA guidance (Tyldesley, D and Associates, 2015), Stage 3 comprises of further sub- stages:

- Identifying the European sites that should be considered in the appraisal;
- Screening for no LSE on any European site;
- Concluding screening and consideration of no LSE in combination;
- Applying design modification measures at screening stage to avoid LSE; and
- Rescreening the Revised Development and decision on the need for AA.

19. The purpose of the screening stage is to:

a) Identify all aspects of the plan which would have no effect on a European site, so that that they can be eliminated from further consideration in respect of this and other plans;

b) Identify all aspects of the plan which would not be likely to have a significant effect on a European site (i.e. would have some effect, because of links/connectivity, but which would expert minor impacts and would not be considered to effect the conservation objectives of the site), either alone or in combination with other aspects of the same plan or other plans or projects. For these aspects it is possible to conclude no LSE, which therefore do not require 'appropriate assessment'; and

c) Identify those aspects of the plan where it is not possible to rule out the risk of significant effects on a European site, either alone or in combination with other plans or projects. This provides a clear scope for the parts of the plan that will require appropriate assessment (see impacts to be considered in the AA).

20. The following sections provide the information required for the consideration of both SPAs and SACs against LSE to assist the CA in their appraisal Stage 3 – LSE ('Screening') of the HRA process.

3.2 Special Protection Areas

Approach to the HRA

21. In order to determine whether no LSE can be concluded, it is necessary to consider three aspects:

- Connectivity;
- Route to impact; and
- Non-trivial abundance

22. Connectivity is defined as the presence of the qualifying feature of an SPA in the zone of influence of a project. So, if a qualifying feature has no connectivity to the site, it contributes to the finding of no LSE. However, where connectivity cannot be objectively ruled out for any one qualifying feature, it is necessary to conclude that LSE cannot be excluded on the grounds of connectivity. However, if there is connectivity, but no route to impact on the qualifying feature, then it may still be possible to objectively conclude no LSE. Finally, if the abundance of a qualifying feature within the zone of influence is trivial, it may be argued that no LSE can be concluded, as the conservation objectives of the site will not be compromised. The classification of trivial abundance will vary between features, based on their population size. For a very numerous feature (e.g. gannet in the Forth Islands SPA) a small number of birds (tens) may be considered trivial abundance, whereas for a very rare feature (e.g. roseate tern in the Forth Islands SPA), even one or two birds may be considered non-trivial.

Identifying European Sites and Qualifying Features (Breeding and Non-Breeding) to Be Considered and Screened for LSE

Annex I and migratory species connectivity

23. Species listed in Annex I of the Birds Directive and those listed as migratory species are protected as qualifying features of SPAs (Note species names follow JNCC [http://jncc.defra.gov.uk/page-1419], where scientific binomials can be found for each common name). Where these species may occur within the Development Area and Revised Offshore Export Cable Corridor (and their buffers), and the construction, operations and maintenance, and decommissioning of these has the potential to impact these species, it will be necessary to identify whether there may be connectivity to any SPAs.

24. Species were identified based on the Original Development scoping responses, ES and AA by MS and East Lothian Council. It is considered that these species identified remain relevant for the Revised Development, and are presented below (Table 3-1).

Table 3-1: Annex I and migratory species with potential connectivity to the Revised Inch Cape Wind Farm and Revised OfTW

Annex I and migratory species	Revised Inch Cape Wind Farm	Revised OfTW
Taiga bean goose	X	
Pink-footed goose	X	
Svalbard barnacle goose	X	
Fulmar	X	X
Manx shearwater	X	X
Storm petrel	X	X
Gannet	X	X
Kittiwake	X	X
Little gull	X	X
Lesser black-backed gull	X	X
Herring gull	X	X
Common tern	X	X
Arctic tern	X	X
Guillemot	X	X
Razorbill	X	X
Puffin	X	X
European shag		X
Shelduck	X	X
Tufted duck	X	X
Wigeon		X
Mallard		X
Scaup		X
Eider	X	X
Long-tailed duck	X	X

Annex I and migratory species	Revised Inch Cape Wind Farm	Revised OfTW
Common scoter	X	X
Velvet scoter		X
Goldeneye	X	X
Red-breasted merganser		X
Red-throated diver	X	X
Cormorant		X
Great crested grebe		X
Slavonian grebe		X
Oystercatcher	X	X
Ringed plover	X	X
Golden plover	X	X
Grey plover		X
Lapwing		X
Curlew	X	X
Knot	X	X
Dunlin	X	X
Purple sandpiper	X	
Bar-tailed godwit		X
Redshank		X
Turnstone		X
Arctic skua	X	
Great skua	X	
Great black-backed gull	X	X
Common gull	X	X
Black-headed gull		X

Annex I and migratory species	Revised Inch Cape Wind Farm	Revised OfTW
Sandwich tern	X	X

Route to impact

Revised Inch Cape Wind Farm -Construction

25. The different phases of the Revised Development will have different potential effects on SPA protected birds. The three phases of the Revised Inch Cape Wind Farm (construction, operation and maintenance, and decommissioning) have different potential effects. However, it is assumed that the routes to impact from the construction and decommissioning phases will be the same, with the main impact being one of disturbance. This source of impact is short term, temporary and reversible. The significance of this disturbance in the context of similar available resource is considered to be not significant with regards to the Development Area, and as thus no LSE can be concluded for construction and decommissioning activities.

26. Therefore, the only potential impacts considered during the construction phase on SPA protected birds are those associated with the piling during the construction phase via indirect effects on prey; detailed information is provided below:

- **Indirect effects on prey** – this effect is essentially one of the proximate causes of displacement of birds using the site and buffer. For some hearing specialist fish species, noisy works, such a piling, are hypothesised to cause impacts on populations. This in turn can exert impacts on their predators, including seabirds.

Revised Offshore Transmission Works (Revised OfTW) – Construction

27. The Revised Offshore Transmission Works (Revised OfTW) will only be a potential source of disturbance to birds during the construction phase. This is due to the presence of the vessels associated with the cable laying and the onshore works causing disturbance. The proximity of this activity to breeding sites at the shoreline means that there is the potential for the impact to be non-trivial. The species that are qualifying features of SPAs that may be affected by these activities are also identified in Table 3-1.

Revised Inch Cape Wind Farm –Operation and Maintenance:

28. The main source of potential impact to SPA protected birds from the Revised Inch Cape Wind Farm is the operations and maintenance phase. During this phase, there are three potential sources of impact to SPA protected birds:

- **Collision risk** – birds that fly through the rotor swept volume of the turbines are at risk from being struck by the moving turbine blades. It is assumed that all birds that are struck by a blade are killed. Thus, there is a direct mortality effect on the populations concerned;
- **Displacement** – the presence of the Revised Inch Cape Wind Farm may result in fewer birds using the footprint of the Revised Inch Cape Wind Farm and a buffer around it. This can be for a variety of reasons, including avoidance of unfamiliar infrastructure, and results in habitat loss. Ultimately, this is simply the change in the density of birds using the area before and after construction of the turbines; and
- **Barrier effects** – birds that undertake regular flights may decide to fly around the Revised Inch Cape Wind Farm when, prior to its construction, they would have flown straight through. This results in increased energy expenditure, which can result in reduced fecundity or survival.

29. Therefore the following will be assessed further to determine the presence or absence of likely significant effect:

- Wind Farm (Construction) – Indirect effects on prey
- Wind Farm (Operation) – Collision risk; Displacement; Barrier effects
- OfTW (Construction) – Disturbance

30. All other aspects of the plan will not have an effect on SPAs.

31. The above impacts are also relevant to the pSPA, and in addition the following will be assessed further for the pSPA to determine the presence or absence of LSE:

- Wind Farm (Construction) – Direct disturbance
- Wind Farm (Operation) – Habitat loss, indirect impacts on prey, direct disturbance
- OfTW (Construction) – Direct habitat loss, indirect impacts on prey, direct disturbance
- OfTW (Operation) - Direct disturbance

Connectivity

32. The species from SPAs that may have connectivity with the Revised Inch Cape Wind Farm during the construction, operation and decommissioning phases of the wind farm, and for the OfTW during construction only, are provided in Table 3-2 below. This table also provides the potential impacts on each species.

Table 3-2: SPA protected species with potential connectivity with the Revised Inch Cape Wind Farm and Revised OfTW, and potential sources of impact on them

Species	Collision risk	Displacement	Indirect effects	Barrier effects	Disturbance
Taiga bean goose	X				
Pink-footed goose	X				
Icelandic greylag goose	X				
Svalbard barnacle goose	X				
Svalbard light-bellied brent goose	X				
Shelduck	X				X
Wigeon	X				X
Teal	X				
Mallard					X
Pintail	X				
Pochard	X				
Tufted duck	X				
Scaup	X				X
Eider					X
Long-tailed duck	X				X
Common scoter	X				X
Velvet scoter	X				X
Goldeneye					X
Red-breasted merganser					X
Red-throated diver					X
Fulmar	X	X	X	X	X
Manx shearwater	X	X	X	X	X
Storm petrel	X	X	X	X	X

Species	Collision risk	Displacement	Indirect effects	Barrier effects	Disturbance
Gannet	X	X	X	X	X
Cormorant					X
Shag					X
Great crested grebe					X
Slavonian grebe					X
Hen harrier	X				
Osprey	X				
Corncrake	X				
Oystercatcher	X				X
Dotterel	X				
Ringed plover					X
Golden plover	X				X
Grey plover	X				X
Lapwing					X
Curlew					X
Knot					X
Sanderling	X				X
Dunlin (*Calidris alpina alpina*)	X				X
Dunlin (*Calidris aplina schinzii*)	X				X
Purple sandpiper	X				
Ruff	X				
Snipe	X				
Icelandic black-tailed godwit	X				
Bar-tailed godwit	X				X

Species	Collision risk	Displacement	Indirect effects	Barrier effects	Disturbance
Whimbrel	X				
Curlew	X				X
Greenshank	X				
Redshank	X				X
Wood sandpiper	X				
Turnstone	X				X
Red-necked phalarope	X				
Arctic skua	X				
Great skua	X				
Kittiwake	X	X	X	X	X
Black-headed gull					X
Little gull	X	X		X	X
Common gull	X	X	X	X	X
Lesser black-backed gull	X	X	X	X	X
Herring gull	X	X	X	X	X
Great black-backed gull	X	X	X	X	X
Sandwich tern	X	X	X	X	X
Common tern	X	X	X	X	X
Arctic tern	X	X	X	X	X
Guillemot	X	X	X	X	X
Razorbill	X	X	X	X	X
Puffin	X	X	X	X	X

SPAs with potential connectivity

33. Having identified the Annex I and migratory species that occur within the Development Area and Revised Offshore Export Cable Corridor, and the potential sources of impact to them, it is possible to identify which SPAs have potential connectivity with the Revised Development, and therefore some potential for a LSE.

34. The identification of which SPAs may have connectivity was based upon previous consultations with stakeholders undertaken for the Original Development. There were three types of connectivity considered: those for birds (mostly wetland species) that only occur in the Development Area during migration, those for birds (mostly seabirds) that use the habitats in the Development Area and Revised Offshore Export Cable Corridor, and those with connectivity with the Revised OfTW at the cable landfall.

35. The qualifying features with connectivity through migration only are shown in Table 3-3. The direct connectivity of these features to individual SPAs is unknown, as migratory birds could, hypothetically, be migrating through the Revised Inch Cape Wind Farm to any SPA in the UK and Ireland. Whether no LSE can be concluded is considered further below.

36. For the remaining species, connectivity to sites has been modelled through data obtained from tracking of birds (Daunt et al. 2011a, 2011b) or using foraging range data from Thaxter et al. (2012). Further information is provided in the "Assessment methodologies" section of the Revised Development Scoping Report for ornithology. Based on this information and the species shown in Table 3-1 and Table 3-2, the SPAs shown in Table 3-4 were identified as having likely connectivity with the Revised Development.

Table 3-3: SPA qualifying features with connectivity to the Development Area during migration only

Qualifying feature	Observed
Icelandic greylag goose	
Taiga bean goose	X
Pink-footed goose	X
Svalbard barnacle goose	X
Svalbard light-bellied brent goose	
Wigeon	
Teal	

Qualifying feature	Observed
Pintail	
Pochard	
Tufted duck	X
Scaup	
Long-tailed duck	
Common scoter	
Velvet scoter	
Hen harrier	
Osprey	
Corncrake	
Oystercatcher	
Dotterel	
Golden plover	
Grey plover	
Sanderling	
Dunlin *Calidris aplina alpina*	
Dunlin *Calidris aplina schinzii*	
Purple sandpiper	X
Ruff	
Snipe	
Icelandic black-tailed godwit	
Bar-tailed godwit	
Whimbrel	
Curlew	
Greenshank	

Qualifying feature	Observed
Wood sandpiper	
Redshank *Tringa totanus robusta* and *T. totanus*	
Turnstone	
Red-necked phalarope	
Arctic skua	X
Great skua	X

Table 3-4: SPAs and their qualifying features with connectivity to the Revised Development

Species	Forth Islands	Fowlsheugh	St Abb's Head to Fast Castle	Buchan Ness to Collieston Coast	Outer Firth of Forth and St Andrews Bay Complex	Firth of Forth
Shelduck						X
Wigeon						X
Mallard						X
Scaup						X
Eider					X	X
Long-tailed duck					X	X
Common scoter					X	X
Velvet scoter					X	X
Goldeneye					X	X
Red-breasted merganser					X	X
Red-throated diver					X	X
Fulmar	X	X		X		
Manx shearwater					X	
Gannet	X				X	

Species	Forth Islands	Fowlsheugh	St Abb's Head to Fast Castle	Buchan Ness to Collieston Coast	Outer Firth of Forth and St Andrews Bay Complex	Firth of Forth
Cormorant						X
Shag	X		X	X	X	
Great crested grebe						X
Slavonian grebe					X	X
Oystercatcher						X
Ringed plover						X
Golden plover						X
Grey plover						X
Lapwing						X
Curlew						X
Knot						X
Dunlin (*Calidris aplina alpina*)						X

Species	Forth Islands	Fowlsheugh	St Abb's Head to Fast Castle	Buchan Ness to Collieston Coast	Outer Firth of Forth and St Andrews Bay Complex	Firth of Forth
Dunlin (*Calidris aplina schinzii*)						X
Bar-tailed godwit						X
Redshank						X
Kittiwake	X	X	X	X	X	
Black-headed gull					X	
Little gull					X	
Common gull					X	
Lesser black-backed gull	X					
Herring gull	X	X	X	X	X	
Sandwich tern						X
Common tern	X				X	
Arctic tern	X				X	
Guillemot	X	X	X	X	X	

Species	Forth Islands	Fowlsheugh	St Abb's Head to Fast Castle	Buchan Ness to Collieston Coast	Outer Firth of Forth and St Andrews Bay Complex	Firth of Forth
Razorbill	X	X	X		X	
Puffin	X				X	

SPA information

37. There are several key pieces of information on the SPAs themselves that are needed to undertake a HRA. These include, the qualifying features of the site, the site condition of each qualifying feature, the cited population size and the conservation objectives of the site. The current population size is also important and would form the basis for the impact assessment itself. However, this needs to be considered in the context of the cited population size. The conservation objectives for SPAs are to, broadly, maintain the population size at or above the cited population size, as a minimum. Site condition is an assessment by the relevant countryside agency (in this case SNH) on whether the condition targets set out in the conservation objectives have been met. These are provided by the Joint Nature Conservation Committee (JNCC) and described as:

- **Favourable – maintained**: An interest feature should be recorded as maintained when its conservation objectives were being met at the previous assessment, and are still being met;
- **Favourable – recovered**: An interest feature can be recorded as having recovered if it has regained favourable condition, having been recorded as unfavourable on the previous assessment;
- **Unfavourable – recovering**: An interest feature can be recorded as recovering after damage if it has begun to show, or is continuing to show, a trend towards favourable condition;
- **Unfavourable – no change**: An interest feature may be retained in a more-or-less steady state by repeated or continuing damage; it is unfavourable but neither declining or recovering. In rare cases, an interest feature might not be able to regain its original condition following a damaging activity, but a new stable state might be achieved;
- **Unfavourable – declining**: Decline is another possible consequence of a damaging activity. In this case, recovery is possible and may occur either spontaneously or if suitable management input is made;
- **Partially destroyed**: It is possible to destroy sections or areas of certain features or to destroy parts of sites with no hope of reinstatement because part of the feature itself, or the habitat or processes essential to support it, has been removed or irretrievably altered; and
- **Destroyed**: The recording of a feature as destroyed will indicate the entire interest feature has been affected to such an extent that there is no hope of recovery, perhaps because its supporting habitat or processes have been removed or irretrievably altered.

38. The qualifying feature (or interest feature) is the combination of the Annex I and migratory species, or assemblage, identified as important, and the season in which this importance occurs (for instance, a qualifying feature of the Forth Islands SPA is ganet in the breeding season).

39. The Conservation Objectives for all SPAs in Scotland are the same, and are as follows:

"To avoid deterioration of the habitats of the qualifying species (listed below) or significant disturbance to the qualifying species, thus ensuring that the integrity of the site is maintained; and

To ensure for the qualifying species that the following are maintained in the long term:

- *Population of the species as a viable component of the site*
- *Distribution of the species within site*
- *Distribution and extent of habitats supporting the species*
- *Structure, function and supporting processes of habitats supporting the species*
- *No significant disturbance of the species"*

40. However, the process of identifying the SPAs that will need to be assessed in the HRA also identified the Outer Firth of Forth and St Andrews Bay Complex proposed SPA (pSPA). While this site has not formally been designated, it is provided equal protection to designated SPAs by UK and Scottish Government policy. The Conservation Objectives of this site are different to those listed above. These are:

> ***"To avoid deterioration of the habitats of the qualifying species or significant disturbance to the qualifying species, subject to natural change, thus ensuring that the integrity of the site is maintained in the long-term and it continues to make an appropriate contribution to achieving the aims of the Birds Directive for each of the qualifying species.***
>
> *Marine bird species are exposed to a range of wider drivers of change. Some of these are natural (e.g. population fluctuations/ shifts or habitat changes resulting from natural processes) and are not a direct result of human influences. Such changes in the qualifying species' distribution and use of the site which are brought about by entirely natural drivers, directly or indirectly, are considered compatible with the site's conservation objectives.*
>
> *There may also be wider ranging anthropogenic impacts driving change within the site, such as climate change or in some cases fisheries stock management, which cannot be managed effectively at site level.*
>
> *In reality any assessment of whether a change is natural will need to be assessed in the context of each individual site.*
>
> ***This contribution will be achieved through delivering the following objectives for each of the site's qualifying features:***

a) Avoid significant mortality, injury and disturbance of the qualifying features, so that the distribution of the species and ability to use the site are maintained in the long-term;

The purpose of this objective is to avoid significant mortality, injury or disturbance of qualifying species that negatively affect the site on a long-term basis. Such an impact would have a detrimental effect on the contribution that this site makes to the maintenance of qualifying species at appropriate levels (Article 2 of the Birds Directive) in their natural range in UK waters and therefore should be avoided.

This site supports 1% or more of the GB population of red-throated diver, Slavonian grebe, long-tailed duck, common scoter, velvet scoter, common goldeneye, red-breasted merganser, common guillemot, Atlantic puffin, black-legged kittiwake, Arctic tern, common tern, herring gull, black-headed gull, common gull and Manx shearwater. It also supports 1% or more of the biogeographical population of common eider, Northern gannet and European shag and is an important multispecies area supporting over 20,000 non-breeding waterfowl and over 20,000 breeding and non-breeding seabirds, including razorbill. The non-breeding population of seabirds also supports the largest Scottish population of little gull. For this site "significant" is taken to mean anthropogenic mortality, injury or disturbance that affect the qualifying species distribution and use within the site such that recovery cannot be expected or effects can be considered lasting. An appropriate timeframe for recovery will need to be considered in the context of the life history traits of the species and the impact pathways being assessed.

All birds require energy which they obtain from food, to survive and to breed. Significant disturbance can include displacement and barrier effects on the species. Where such disturbance is brought about by human activities which affect the qualifying species' distribution and use of the site, such that their ability to survive and/or breed is compromised in the long-term, it is considered significant.

For each qualifying species, the ability to use the site should be maintained.

Further advice on ecological use of the site including: occupancy, foraging areas, flightless moulting periods and appropriate recovery timeframes will be provided in policy guidance to support the interpretation of the conservation objectives.

b) To maintain the habitats and food resources of the qualifying features in favourable condition.

The qualifying bird species using the site require sufficient food resource to be available. The qualifying species can eat a variety of pelagic and benthic prey and these should be maintained at a level able to support species populations. Some of these prey species have particular habitat requirements and where this is the case, the site needs to be managed to ensure the extent and quality of the habitats are sufficient to maintain these prey species."

41. For each of the SPAs that will be assessed by the HRA, season, site condition, cited population size and the population units are provided in Tables 3-5 – 3-10 below.

Table 3-5: Forth Islands SPA qualifying feature information

Qualifying feature	Season	Site condition	Cited population size	Population unit
Gannet	breeding	Favourable Maintained	21,600	pairs
Shag	breeding	Unfavourable Recovering	2,400	pairs
Puffin	breeding	Favourable Maintained	14,000	pairs
Sandwich tern	breeding	Unfavourable Declining	440	pairs
Common tern	breeding	Favourable Maintained	334	pairs
Roseate tern	breeding	Unfavourable Declining	8	pairs
Arctic tern	breeding	Favourable Declining	540	pairs
Seabird assemblage	breeding	Unfavourable Declining	90,000	individuals
Fulmar*	breeding	Favourable Maintained	798	pairs
Cormorant*	breeding	Favourable Declining	200	pairs
Razorbill*	breeding	Favourable Maintained	1,400	pairs
Common guillemot*	breeding	Favourable Maintained	16,000	pairs
Kittiwake*	breeding	Unfavourable Declining	8,400	pairs
Lesser black-backed gull*	breeding	Favourable Maintained	1,500	pairs
Herring gull*	breeding	Favourable Maintained	6,600	pairs
* Assemblage named feature only				

Table 3-6: Fowlsheugh SPA qualifying feature information

Qualifying feature	Season	Site condition	Cited population size	Population unit
Seabird assemblage	breeding	Favourable Maintained	145,000	individuals
Fulmar*	breeding	Favourable Maintained	1,170	pairs
Razorbill*	breeding	Favourable Maintained	5,800	individuals
Common guillemot*	breeding	Favourable Maintained	56,450	individuals
Kittiwake*	breeding	Favourable Maintained	36,650	pairs
Herring gull*	breeding	Unfavourable Declining	3,190	pairs
* Assemblage named feature only				

Table 3-7: St Abb's Head to Fast Castle SPA qualifying feature information

Qualifying feature	Season	Site condition	Cited population size	Population unit
Seabird assemblage	breeding	Unfavourable Declining	79,560	individuals
Shag*	breeding	Unfavourable Declining	560	pairs
Razorbill*	breeding	Favourable Maintained	2,180	individuals
Common guillemot*	breeding	Favourable Maintained	31,750	individuals
Kittiwake*	breeding	Unfavourable Declining	21,170	pairs
Herring gull*	breeding	Unfavourable Declining	1,160	pairs
* Assemblage named feature only				

Table 3-8: Buchan Ness to Collieston Coast SPA qualifying feature information

Qualifying feature	Season	Site condition	Cited population size	Population unit
Seabird assemblage	breeding	Unfavourable No change	95,000	individuals
Fulmar*	breeding	Unfavourable Declining	1,765	pairs
Shag*	breeding	Unfavourable No change	1,045	pairs
Common guillemot*	breeding	Favourable Declining	8,640	pairs
Kittiwake*	breeding	Unfavourable No change	30,452	pairs
Herring gull*	breeding	Unfavourable No change	4,292	pairs
* Assemblage named feature only				

Table 3-9: Firth of Forth SPA qualifying feature information

Qualifying feature	Season	Site condition	Cited population size	Population unit
Pink-footed goose	non-breeding	Favourable Maintained	10,852	individuals
Shelduck	non-breeding	Favourable Declining	4,509	individuals
Mallard	non-breeding	Unfavourable Declining	2,564	individuals
Red-throated diver	non-breeding	Favourable Maintained	90	individuals
Sandwich tern	passage	Favourable Declining	1,617	individuals
Bar-tailed godwit	non-breeding	Favourable Declining	1,974	individuals
Golden plover	non-breeding	Favourable Maintained	2,949	individuals
Knot	non-breeding	Unfavourable Declining	9,258	individuals
Slavonian grebe	non-breeding	Favourable Declining	84	individuals
Turnstone	non-breeding	Favourable Maintained	860	individuals
Redshank	non-breeding	Favourable Maintained	4,341	individuals

Qualifying feature	Season	Site condition	Cited population size	Population unit
Waterfowl assemblage	non-breeding	Favourable Declining	95,000	individuals
Wigeon*	non-breeding	Favourable Recovered	2,139	individuals
Scaup*	non-breeding	Unfavourable Declining	437	individuals
Eider*	non-breeding	Favourable Declining	9,400	individuals
Long-tailed duck*	non-breeding	Unfavourable Declining	1,045	individuals
Common scoter*	non-breeding	Unfavourable Declining	2,880	individuals
Velvet scoter*	non-breeding	Favourable Maintained	635	individuals
Goldeneye*	non-breeding	Unfavourable Declining	3,004	individuals
Red-breasted merganser*	non-breeding	Favourable Declining	670	individuals
Cormorant*	non-breeding	Favourable Maintained	682	individuals
Great crested grebe*	non-breeding	Unfavourable Declining	720	individuals
Oystercatcher*	non-breeding	Favourable Maintained	7,846	individuals
Grey plover*	non-breeding	Favourable Declining	724	individuals
Lapwing*	non-breeding	Favourable Maintained	4,148	individuals
Ringed plover*	non-breeding	Favourable Maintained	328	individuals
Curlew*	non-breeding	Favourable Maintained	1,928	individuals
Dunlin*	non-breeding	Favourable Declining	9,514	individuals
* Assemblage named feature only				

Table 3-10: Outer Firth of Forth and St Andrews Bay Complex pSPA qualifying feature information

Qualifying feature	Season	Site condition	Cited population size	Population unit
Common eider	non-breeding	n/a	21,546	individuals
Red-throated diver	non-breeding	n/a	851	individuals
Northern gannet	not stated	n/a	from adjacent colonies	
European shag	not stated	n/a	from adjacent colonies	
Slavonian grebe	non-breeding	n/a	30	individuals
Common tern	non-breeding	n/a	from adjacent colonies	
Arctic tern	non-breeding	n/a	from adjacent colonies	
Little gull	non-breeding	n/a	126	individuals
Waterfowl assemblage	non-breeding	n/a	not stated	
Long-tailed duck*	non-breeding	n/a	1,948	individuals
Common scoter*	non-breeding	n/a	4,677	individuals
Velvet scoter*	non-breeding	n/a	775	individuals
Common goldeneye*	non-breeding	n/a	589	individuals
Red-breasted merganser*	non-breeding	n/a	369	individuals
Seabird assemblage	breeding	n/a	not stated	
Manx shearwater*	breeding	n/a	2,885	individuals
Puffin*	breeding	n/a	61,086	individuals
Common guillemot*	breeding	n/a	28,123	individuals
Kittiwake*	breeding	n/a	12,020	individuals
Herring gull*	breeding	n/a	3,044	individuals
Seabird assemblage	non-breeding	n/a	not stated	
Shag*	non-breeding	n/a	2,426	individuals
Razorbill*	non-breeding	n/a	5,481	individuals

Qualifying feature	Season	Site condition	Cited population size	Population unit
Common guillemot*	non-breeding	n/a	21,968	individuals
Kittiwake*	non-breeding	n/a	3,191	individuals
Black-headed gull*	non-breeding	n/a	26,835	individuals
Common gull*	non-breeding	n/a	14,647	individuals
Herring gull*	non-breeding	n/a	12,313	individuals
* Assemblage named feature only				

No LSE test

42. For migratory species only, determining no LSE is relatively straight forward. The analysis carried out for MS on the strategic collisions risk to the majority of migratory species (WWT 2014) provides sufficient information to conclude no LSE for all sites with these qualifying features. On this basis, no LSE can be concluded for two SPAs that were considered to have connectivity to the Development Area in the HRA for the Original Development. These are the Slammanan Plateau SPA and the Upper Solway Flats and Marshes SPA. In both cases the connectivity was through migration only (with the relevant qualifying features being Taiga bean goose and Svalbard barnacle goose, respectively).

43. For four SPA qualifying features there is currently insufficient information to conclude no LSE at this stage:

- Breeding osprey;
- Breeding corncrake;
- Winter purple sandpiper; and
- Whimbrel.

44. Both osprey and corncrake need further analysis of the potential collisions from the Revised Inch Cape Wind Farm alone, and in combination with other reasonably foreseeable plans and projects. It is likely that risk to these populations is very low, but at present there is insufficient information to conclude this. The analysis by WWT (2014) did not provide collision estimates for purple sandpiper, and therefore it will be necessary to take an assumptions led approach to determine whether collisions could be of importance. This will be undertaken in the HRA for the Revised Development, however, it is unlikely that this is more important than for other small shorebirds assessed. The WWT (2014) analysis reports a very high collision risk for whimbrel (671 birds per year), which ICOL believe to be an error. Therefore, a migratory bird collision risk assessment will be undertaken for whimbrel in the

HRA for the Revised Development. It is considered, at this stage, that the assessment will also predict similar impacts to that of other shorebirds. Overall, ICOL expect that no LSE could be concluded for all species that occur on migration only but, for those where sufficient uncertainty remains to prevent the conclusion of no LSE at this stage, information to support an AA will be provided and a shadow AA will be completed.

Table 3-11: Estimated collision mortality from all Scottish offshore wind farms in relation to the population sizes in the UK SPA suite and the UK in total

Qualifying feature	Total collisions (all offshore wind farms in Scotland)	Citation total SPA suite	UK population size	Population unit
Icelandic greylag goose	95	57,519	81,900	Individuals
Taiga bean goose	3	448	400	Individuals
Pink-footed goose	804	155,582	241,000	Individuals
Svalbard barnacle goose	177	13,595	22,000	Individuals
Svalbard light-bellied brent goose	<1	1,844	2,900	Individuals
Wigeon	90	224,338	426,000	Individuals
Teal	39	68,433	197,000	Individuals
Pintail	9	19,021	28,180	Individuals
Pochard	7	32,489	85,500	Individuals
Tufted duck	70	24,947	120,000	Individuals
Scaup	3	3,229	9,200	Individuals
Long-tailed duck	7	796	16,250	Individuals
Common scoter	2	3,422	50,000	Individuals
Velvet scoter	1	639	3,000	Individuals
Hen harrier	1	244	750	Individuals
Osprey	6	39	148	Pairs
Corncrake	38	204	589	Pairs
Oystercatcher	65	194,898	338,700	Individuals
Dotterel	6	469	750	Pairs

Qualifying feature	Total collisions (all offshore wind farms in Scotland)	Citation total SPA suite	UK population size	Population unit
Golden plover	33	67,233	310,000	Individuals
Grey plover	8	38,842	53,300	Individuals
Sanderling	22	13,028	20,700	Individuals
Dunlin *Calidris alpina alpina*	474	420,758	657,000	Individuals
Dunlin *Calidris alpina schinzii*	18	6,812	9,150	Individuals
Purple sandpiper	n/a	1,973	17,760	Individuals
Ruff	5	316	700	Individuals
Snipe	1	2,097	100,000	Individuals
Icelandic black-tailed godwit	51	8,973	15,860	Individuals
Bar-tailed godwit	70	39,386	65,430	Individuals
Whimbrel	671	612	3,840	Pairs
Curlew	207	50,206	164,700	Individuals
Greenshank	1	408	701	Individuals
Wood sandpiper	<1	10	8	Pairs
Redshank *Tringa totanus robusta* and *T. tetanus totanus*	327	58,167	125,800	Individuals
Turnstone	30	10,200	52,390	Individuals
Red-necked phalarope	0	30	16	Pairs
Arctic skua	2	780	3,200	Pairs
Great skua	42	6,262	8,500	Pairs

Conclusion of Screening, Consideration of LSE, Applying Modification of Site Design and Rescreening of LSE

45. For the remaining qualifying features it is not possible at this stage to conclude no LSE for the following SPAs where they are qualifying features:

- Forth Islands;
- Fowlsheugh;
- St Abb's Head to Fast Castle;
- Buchan Ness to Collieston Coast; and
- Firth of Forth.

It is also not possible at this stage to conclude no LSE for the following pSPA:

- Outer Firth of Forth and St Andrews Bay Complex

46. In addition, there is currently insufficient information to conclude no LSE at this stage on the following migratory species during the operation of the wind farm (collision risk):

- Breeding osprey;
- Breeding corncrake;
- Winter purple sandpiper; and
- Whimbrel.

47. For these, the HRA report will more carefully consider the level and magnitude of impacts from the Revised Development, including the Revised Inch Cape Wind Farm, Revised OfTW and cable landfall. Information to inform AAs by all CAs will be provided in the HRA report, along with a shadow AA.

3.3 Special Areas of Conservation

Qualifying Features – Marine (Benthic and Intertidal) Habitats

Identifying European Sites and Qualifying Features to Be Considered and Screening for LSE

48. Section 8.1 of the Scoping Report sets out the details of the benthic ecology and habitat biotopes that have been recorded at the Development Area. As described in section 8.1.6 of the Scoping Report, the following SACs that cite Annex 1 habitats as qualifying features were initially considered:

- Isle of May SAC – for its Annex 1 habitat of reefs;

- Firth of Tay and Eden Estuary SAC – for its Annex 1 habitats of estuaries; sandbanks which are slightly covered by seawater all the time; and mudflats and sandflats not covered by seawater at low tide; and
- Moray Firth SAC – for its Annex 1 habitat of sandbanks which are slightly covered by seawater all the time.

49. From a review of the above SACs and the potential for no LSE resulting from construction, operation and maintenance and decommissioning, it is concluded that these SACs have no connectivity to the Development Area. This is due to the distance of the habitats from the Development Area and the limited pathways for, and range of, direct or indirect effects. The closest of these sites to the Revised Development is the Isle of May SAC which runs approximately 5 km from the Revised Inch Cape Offshore Cable Corridor, but it is considered there will be no connectivity to the rocky reefs that are designated as Annex 1 habitat.

Conclusion of Screening

50. It is therefore concluded that no SACs with habitat qualifying features need to be considered any further in the HRA process. This conclusion mirrors that presented within the Original Development ES (ICOL, 2013) and within the Appropriate Assessment decision (MS-LOT, 2014).

51. For SACs identified in this HRA screening report with migratory fish or marine mammal qualifying features that are linked to habitat-based conservation objectives, or have freshwater Annex 1 habitats as qualifying features (e.g. River Tay SAC), these habitat aspects are identified and assessed within the relevant qualifying feature section detailed later in this report.

Qualifying Features – Marine Mammals

Identifying European Sites and Qualifying Features to Be Considered and Screening for LSE

52. Section 8.3 of the Scoping Report sets out the details of the marine mammal species that have been recorded both at the Development Area and in the wider Firths of Forth and Tay. Within the UK, SACs are designated for three species of marine mammal (grey seal, harbour seal and bottlenose dolphin) but are also being considered for harbour porpoise. All of these species are relevant to the Revised Development as they have all been recorded during boat-based surveys and so all will need considered within an HRA.

53. As agreed within Section 5.2.5 (Designated Sites) of the Scoping Report for the Original Development (SeaEnergy Renewables, 2010), the following Natura sites which include marine mammals as qualifying features, and for which there is potential connectivity with an impact from the construction, operation and decommissioning activities associated with the Revised Development, are considered relevant to HRA:

- Berwickshire and North Northumberland Coast SAC;
- Firth of Tay and Eden Estuary SAC;
- Isle of May SAC; and
- Moray Firth SAC.

54. Since the Original Development EIA and HRA were completed in 2012, a suite of candidate SACs for harbour porpoise has entered the consultation process for designation within UK waters. The closest of these sites to the Inch Cape Development Area are the candidate Inner Hebrides and Minches SAC[2] and the candidate Southern North Sea SAC[3]. As harbour porpoise are a migratory species, animals that utilise these two sites can be considered to exhibit connectivity to the Inch Cape Development Area. However, discussions between industry, SNCBs and CAs[4] have suggested that impacts from construction, operation and decommissioning activities of offshore wind farms outside a 26 km radii from the cSACs can be considered trivial, and thus for wind farm sites outside this 26 km radii from the cSAC boundaries, it is possible to conclude no LSE. This suite of cSACs for harbour porpoise are therefore not considered further.

55. Available literature, modelling outputs, the Original Project HRA and the Revised Development Design Envelope have been reviewed, and the evidence base set out in the EIA for the Original Development, has been updated as far as possible.

56. Table 3-12 below presents the conservation objectives and designated features associated with each of the sites.

Table 3-12: Conservation objectives of Natura 2000 sites designated for marine mammals

Natura 2000 Site	Specific Conservation Objectives	Designated Feature(s)
Berwickshire and North Northumberland Coast SAC	To avoid deterioration of the habitats of the qualifying species or significant disturbance to the qualifying species, thus ensuring that the integrity of the site is maintained and the site makes an appropriate contribution to achieving favourable conservation status for each of the qualifying features; and	Grey seal

[2] http://www.snh.gov.uk/protecting-scotlands-nature/protected-areas/2016-harbour-porpoise-consultation/
[3] http://jncc.defra.gov.uk/PDF/SouthernNorthSeaSelectionAssessmentDocument.pdf
[4] Workshop on noise management in harbour porpoise cSACs. Edinburgh, 27th of February 2017.

Natura 2000 Site	Specific Conservation Objectives	Designated Feature(s)
	To ensure for the qualifying species that the following are maintained in the long term: • Population of the species as a viable component of the site; • Distribution of the species within site; • Distribution and extent of habitats supporting the species; • Structure, function and supporting processes of habitats supporting the species; and • No significant disturbance of the species.	
Firth of Tay and Eden Estuary SAC	To avoid deterioration of the habitats of the qualifying species or significant disturbance to the qualifying species, thus ensuring that the integrity of the site is maintained and the site makes an appropriate contribution to achieving favourable conservation status for each of the qualifying features; and To ensure for the qualifying species that the following are maintained in the long term: • Population of the species as a viable component of the site; • Distribution of the species within site; • Distribution and extent of habitats supporting the species; • Structure, function and supporting processes of habitats supporting the species; and • No significant disturbance of the species.	Common (also known as harbour) seal
Isle of May SAC	To avoid deterioration of the habitats of the qualifying species or significant disturbance to the qualifying species, thus ensuring that the integrity of the site is maintained and the site makes an appropriate contribution to achieving favourable conservation status for each of the qualifying features; and To ensure for the qualifying species that the following are maintained in the long term: • Population of the species as a viable component of the site; • Distribution of the species within site; • Distribution and extent of habitats supporting the species; • Structure, function and supporting processes of habitats supporting the species; and • No significant disturbance of the species.	Grey seal
Moray Firth SAC	To avoid deterioration of the habitats of the qualifying species or significant disturbance to the qualifying species, thus ensuring that the integrity of the site is maintained and the site makes an appropriate	Bottlenose dolphin

Natura 2000 Site	Specific Conservation Objectives	Designated Feature(s)
	contribution to achieving favourable conservation status for each of the qualifying features; and To ensure for the qualifying species that the following are established then maintained in the long term: • Population of the species as a viable component of the site; • Distribution of the species within site; • Distribution and extent of habitats supporting the species; • Structure, function and supporting processes of habitats supporting the species; and • No significant disturbance of the species.	

57. The key potential effects of the Revised Development on marine mammals have been considered in the Scoping Report Section 8.3.5 (Table 8-24 and 8-25). These are summarised in Tables 3-13 and 3-14 below and will require further consideration as part of any future HRA / AA. The other activities assessed within the shadow AA for the Original Project[5] (collision risk and barrier effect from increased vessel movement, use of ducted propellers leading to risk of corkscrew injury, accidental pollution events, changes in availability of prey species, disturbance from operational noise, loss/creation of habitat, effects of EMF and toxic contamination; Section 8.3.5, Table 8-27) are not considered to provide a route to impact sufficient to prevent a conclusion of no LSE and thus are screened out of future HRA / AA.

[5] Information provided to MS to enable them to undertake the AA.

Table 3-13: Key Potential Effects on Marine Mammals – Revised Inch Cape Wind Farm

Potential Effect	Description of Effect
Construction (& Decommissioning) Phase	
Disturbance from increased noise (non-piling)	Disturbance from increased noise (non-piling i.e. trenching, rock placing, cable laying, dredging and vessel noise) was previously considered to be minor within the assessment for the Original Development (ICOL, 2013). However, recent work has shown that noise from some geophysical survey systems used during the course of preparatory work for cable laying, trenching and other intrusive works has the potential to induce the onset of permanent threshold shift (PTS) and/or disturb/displace animals (depending on the frequencies and source levels of the equipment used). It is therefore proposed to scope further consideration of this potential effect (disturbance from increased noise (non-piling)) into any future HRA Report for the Revised Development. Information on this route to impact will therefore be provided as part of the HRA Report.
Displacement/PTS from piling	It is proposed to scope further consideration of displacement/PTS from piling into the HRA Report for the Revised Development. This is because: • Displacement/PTS onset as a result of piling are still considered to have the potential to affect marine mammals; • Maximum blow energy capacity has increased; • The number of piles per 24 hour period has increased; • Results of recent studies on noise propagation modelling and the properties of the noise field as it moves through the water column (Farcas et al., 2016) may need to be taken into account; • Results of recent studies on the physiological and behavioural consequences for marine mammals from exposure to noise including sensitivity to PTS onset (NMFS, 2016; Hastie et al., 2015; Russell et al., 2016) may need to be taken into account; • New tools for assessing the population consequences of disturbance and/or injury are available (Harwood et al., 2014) and may need to be used; and • Changes in the baseline population sizes used in the Original Development ES (ICOL, 2013) have occurred for some species. Information on this route to impact will therefore be provided as part of the HRA Report.

Table 3-14: Key Potential Effects on Marine Mammals – Revised Offshore Export Cable Corridor

Potential Effect	Description of Effect
Construction (& Decommissioning) Phase	
Disturbance from increased noise	Disturbance from increased noise (i.e. trenching, rock placing, cable laying, dredging and vessel noise) was previously considered to be minor (ICOL, 2013). However, recent work has shown that noise from some geophysical survey systems used during the course of preparatory work for the installation of the transmission cables have the potential to induce the onset of PTS and/or disturb/displace animals (depending on the frequencies and source levels of equipment used). It is therefore proposed to scope further consideration of this potential effect (disturbance from increased noise) into the HRA Report for the Revised Development. Information on this route to impact will therefore be provided as part of the HRA Report.

Conclusion of Screening

58. It is not possible to conclude no LSE at this stage for the four SACs listed in Table 3-12. The potential disturbance from non-piling noise, disturbance from increased noise and displacement /PTS from piling will be further assessed within the HRA Report, including information required for CAs to undertake their AA.

Qualifying Features – Migratory Fish

Identifying European Sites and Qualifying Features to Be Considered and Screening for LSE

59. Section 8.2 of the Scoping Report sets out the baseline conditions for the fish assemblage that is present within the Revised Development, as well as information on salmon migration routes, SAC qualifying features (Atlantic salmon, river lamprey, sea lamprey, brook lamprey, freshwater pearl mussels, otters and habitats) and SACs with potential connectivity to the Revised Development.

60. The qualifying features of brook lamprey, freshwater pearl mussel and habitats are not considered to have connectivity to the Revised Development (due to their wholly freshwater lifecycles). Otter is also not considered to have connectivity, as these only use coastal habitats and are not found within the Development Area or the Revised Offshore Cable Corridor. These species are scoped out of any future HRA on this basis. Freshwater pearl mussels are reliant on salmonids for successful juvenile recruitment and population sustainability so there is connectivity between these species. This needs to be considered in parallel with the test for no LSE on SAC's for Atlantic salmon.

61. Section 5.2.5 (Designated Sites) of the Scoping Report for the Original Development (SeaEnergy Renewables, 2010) identified four SACs that required consideration in terms of

qualifying features that are fish species. These comprised: River Tay SAC, River Teith SAC, River Dee SAC and River South Esk SAC. Section 8.2 of the Scoping Report also identifies the River Tweed SAC. All of these have potential connectivity with the Revised Development.

62. Table 3-15 below presents the conservation objectives and designated features associated with each of the sites.

Table 3-15: Conservation objectives of Natura sites designated for migratory fish

Natura 2000 Site	Specific Conservation Objectives	Designated Feature(s)
River South Esk SAC	Population of the species, including range of genetic types for salmon, as a viable component of the site. Distribution of the species within site. Distribution and extent of habitats supporting the species. Structure, function and supporting processes of habitats supporting the species. No significant disturbance of the species. Distribution and viability of freshwater pearl mussel host species. Structure, function and supporting processes of habitats supporting freshwater pearl mussel host species.	Atlantic salmon Freshwater pearl mussel
River Dee SAC	Population of the species, including range of genetic types for salmon, as a viable component of the site. Distribution of the species within site. Distribution and extent of habitats supporting the species. Structure, function and supporting processes of habitats supporting the species. No significant disturbance of the species. Distribution and viability of freshwater pearl mussel host species. Structure, function and supporting processes of habitats supporting freshwater pearl mussel host species.	Atlantic salmon Freshwater pearl mussel Otter
River Tay SAC	Population of the species, including range of genetic types for salmon, as a viable component of the site. Distribution of the species within site. Distribution and extent of habitats supporting the species. Structure, function and supporting processes of habitats supporting the species. No significant disturbance of the species.	Atlantic salmon Brook lamprey River lamprey Sea lamprey Otter Oligotrophic to mesotrophic standing waters with

Natura 2000 Site	Specific Conservation Objectives	Designated Feature(s)
		vegetation of the *Littorelletea uniflorae* and/or of the *Isoëto-Nanojuncetea*
River Teith SAC	To avoid deterioration of the habitats of the qualifying species (listed below) or significant disturbance to the qualifying species, thus ensuring that the integrity of the site is maintained and the site makes an appropriate contribution to achieving favourable conservation status for each of the qualifying features. To ensure for the qualifying species that the following are maintained in the long term: Population of the species, including range of genetic types for salmon, as a viable component of the site. Distribution of the species within the site. Distribution and extent of habitats supporting the species. Structure, function and supporting processes of habitats supporting the species. No significant disturbance of the species.	Sea lamprey Brook lamprey River lamprey Atlantic salmon
River Tweed SAC	Population of the species, including range of genetic types for salmon, as a viable component of the site. Distribution of the species within site. Distribution and extent of habitats supporting the species. Structure, function and supporting processes of habitats supporting the species. No significant disturbance of the species.	Atlantic salmon Brook lamprey River lamprey Sea lamprey Water Courses of plain to montane levels with the *Ranunculian fluitantis* and *Callitrich-Batrachion* vegetation.

63. The key potential impacts of the Revised Development on migratory fish have been considered and are summarised in Tables 3-16 and 3-17 below.

Table 3-16: Potential Impact on migratory fish species – Revised Inch Cape Wind Farm

Potential Impact	Description of Effect
Construction (& Decommissioning) Phase	
Barrier effects, disturbance or physical injury associated with construction noise	Noise from construction activities (piling particularly) will result in increased levels of noise which may act as a barrier to migration to and from natal rivers, as a result of avoidance behaviour.
Indirect disturbance as a result of sediment deposition and temporary increases in SSC	Construction activities will mobilise and deposit sediments, therefore increasing suspended sediments in the water column which may act as a barrier to migration as a result of avoidance responses.
Direct temporary habitat disturbance	Temporary habitat loss arising from construction activities may potentially reduce area of available habitat for foraging during migration.
Operation & Maintenance Phase	
Behavioural responses to EMF associated with cabling	Migratory fish are known to use the earth's magnetic field as an aid to navigation; therefore EMF arising from cables could in theory act as a barrier to migration.
Long term loss of original habitat	Long term habitat loss arising from the Revised Inch Cape Wind Farm footprint may potentially reduce the area of available habitat for foraging during migration.
Disturbance or physical injury associated with operational noise	Increases to background noise have the potential to cause changes in behaviour and could have masking effects on navigation.

Table 3-17: Potential Impacts on migratory fish species – Revised Offshore Export Cable Corridor

Potential Impact	Description of Effect
Construction (& Decommissioning) Phase	
Disturbance or physical injury associated with construction noise	Migratory fish are known to use sound as an aid to navigation. During cable laying, noise is produced by the motion of the plough or trencher through the seabed, and increased noise could in theory act as a barrier to migration.
Indirect disturbance as a result of sediment deposition and temporary increases in SSC	Construction activities will mobilise and deposit sediments, therefore increasing suspended sediments in the water column which may act as a barrier to migration as a result of avoidance responses.
Direct temporary habitat disturbance via Offshore Export Cable installation	Temporary habitat loss arising from cable laying activities may potentially reduce area of available habitat for foraging during migration.
Operation & Maintenance Phase	

Potential Impact	Description of Effect
Behavioural responses to EMF associated with cabling (Export Cable)	Migratory fish are known to use the earth's magnetic field as an aid to navigation; therefore, EMF arising from the Offshore Export Cable could in theory act as a barrier to migration.
Long term loss of original habitat (Export Cable)	Cable protection would change original habitat which may potentially reduce area of available habitat for foraging during migration.

64. A review of the Original Development AA Decision and Section 8.2 of the Revised Development Scoping Report suggests that any potential effects upon migratory species listed as qualifying features in relation to EMF and direct temporary disturbance of habitat would not occur due to new studies showing that AC cables do not emit EMF strong enough to influence salmonids and other species sensitive to EMF (Armstrong et al., 2015). Research (Godfrey et al., 2014; Malcom et al., 2010), demonstrates that Atlantic salmon are known to migrate using coastal routes and generally only congregate at the mouths of their natal rivers prior to ascending them.

65. Indirect effects from disturbance through sediment deposition offshore are not likely to be significant for the same reasons. Long term habitat loss is considered not significant as the main habitat utilised by salmonids and lamprey are the habitat within and around the river mouths and the riverine habitats. It is therefore possible to conclude no LSE with respect to these potential impacts and the SACs identified in Table 3-15.

Conclusion of Screening, Consideration of LSE, Applying Modification of Site Design and Rescreening of LSE

66. The HRA Report, including information required for CAs to undertake their AA, will relate to barrier effects, disturbance or physical injury due to construction of the Revised Inch Cape Wind Farm and construction and operation of the Revised OfTW. There is also potential for direct temporary habitat disturbance from the Offshore Export Cable which will need further consideration.

67. Drawing on the impact assessment outcomes of both the Original Development and the Revised Development EIAs, assessment of the effect on site integrity from the Revised Development either alone or in-combination with the plans, projects and activities listed in Section 5 below, will be carried out.

4 In Combination Assessment

4.1 Special Protection Areas

68. For the purposes of the in-combination assessment for the Revised Development, the same sites identified for the CIA will be used as a starting point for determining which SPAs may have connectivity to each site. These are:

- Aberdeen Offshore Windfarm;
- Blyth Offshore Demonstrator;
- Dogger Bank Creyke Beck A and B;
- Fife Energy Park Offshore Demonstration Wind Turbine;
- Forthwind Demonstration Array and extension;
- Hywind Demo;
- Kincardine Floating Offshore Windfarm
- Neart na Gaoithe;
- Seagreen Alpha and Bravo; and
- Teesside Offshore Wind Farm.
- Beatrice Offshore Wind Farm
- Telford, Stevenson and MacColl Offshore Wind Farms
- Moray Offshore Western Development Area
- Beatrice Wind Farm Demonstrator Project
- Fife Energy Park Offshore Demonstration Wind Turbine
- Port of Dundee Expansion - Dundee Waterfront Development
- Edinburgh Harbour - Edinburgh Waterfront Development

4.2 Special Areas of Conservation

69. A list of projects that were considered to potentially have in combination effects alongside the Original Development was presented in Table 11 of Section 4 of Volume 2F, Annex 15B.1 of the Original Development ES (ICOL, 2013). This list included a total of 15 projects. For the Revised Development, Section 5.3 of the Revised Development Scoping Report sets out the updated list of projects that should be considered.

70. It is proposed that, as well as revisiting all of the projects listed within the Original Development HRA Screening (Repsol and EDP Renewables, 2012) and reassessing the potential in-combination effects due to the changes in project design that are proposed as

part of the Revised Development, that the following additional projects are included within any future AA:

- Hywind Demonstration Floating Wind Farm;
- Moray Offshore Wind Farm – Western Development Area;
- Kincardine Floating Offshore Wind Farm;
- Forthwind Wind Farm Demonstration Project – Phases 1 and 2;
- Dogger Bank Creyke Beck A & B;
- Dogger Bank Teeside A & B;
- Rosyth International Container Terminal Project; and
- Aberdeen Harbour Redevelopment.

5 Conclusions

71. Table 5-1 below sets out the Natura sites that could potentially be affected by the Revised Development, where no LSE could not be concluded and where further consideration will be required as part of the HRA / AA.

Table 5-1: Summary of proposed Natura (and Ramsar) sites and qualifying features to be included within any future HRA Report

Natura Site	Qualifying Feature with Connectivity	LSE	Further Consideration Required in HRA / AA
SPAs (and pSPA)			
Forth Islands SPA, ,	Gannet, Shag, Puffin, Sandwich tern, Common tern, Roseate tern, Arctic tern, Seabird assemblage, Fulmar*, Cormorant*, Razorbill*, Common guillemot*, Kittiwake*, Lesser black-backed gull*, Herring gull*	Yes	Revised Inch Cape Wind Farm: Collision risk, displacement, indirect effects, barrier effects and disturbance during construction and operation Revised OfTW: Disturbance during construction only.
Fowlsheugh SPA,	Seabird assemblage, Fulmar*, Razorbill*, Common guillemot*, Kittiwake*, Herring gull*	Yes	Revised Inch Cape Wind Farm: Collision risk, displacement, indirect effects, barrier effects and disturbance during construction and operation Revised OfTW: Disturbance during construction only.
St Abb's Head to Fast Castle SPA	Seabird assemblage, Shag*, Razorbill*, Common guillemot*, Kittiwake*, Herring gull*	Yes	Revised Inch Cape Wind Farm: Collision risk, displacement, indirect effects, barrier effects and disturbance during construction and operation

Natura Site	Qualifying Feature with Connectivity	LSE	Further Consideration Required in HRA / AA
			Revised OfTW: Disturbance during construction only.
Buchan Ness to Collieston Coast SPA	Seabird assemblage, Fulmar*, Shag*, Common guillemot*, Kittiwake*, Herring gull*	Yes	Revised Inch Cape Wind Farm: Collision risk, displacement, indirect effects, barrier effects and disturbance during construction and operation Revised OfTW: Disturbance during construction only.
Firth of Forth SPA	Pink-footed goose, Shelduck, Mallard, Red-throated diver, Sandwich tern, Bar-tailed godwit, Golden plover, Knot, Slavonian grebe, Turnstone, Redshank, Waterfowl assemblage, Wigeon*, Scaup*, Eider*, Long-tailed duck*, Common scoter*, Velvet scoter*, Goldeneye*, Red-breasted merganser*, Cormorant*, Great crested grebe*, Oystercatcher*, Grey plover*, Lapwing*, Ringed plover*, Curlew*, Dunlin*	Yes	Revised Inch Cape Wind Farm: Collision risk and disturbance during construction and operation Revised OfTW: Disturbance during construction only.
Outer Firth of Forth and St. Andrews Bay Complex pSPA.	Common eider, Red-throated diver, Northern gannet, European shag, Slavonian grebe,	Yes	Revised Inch Cape Wind Farm: Collision risk, displacement, indirect effects, barrier effects

Natura Site	Qualifying Feature with Connectivity	LSE	Further Consideration Required in HRA / AA
	Common tern, Arctic tern, Little gull, Waterfowl assemblage, Long-tailed duck*, Common scoter*, Velvet scoter*, Common goldeneye*, Red-breasted merganser*, Seabird assemblage, Manx shearwater*, Puffin*, Common guillemot*, Kittiwake*, Herring gull*, Shag*, Razorbill*,Common guillemot*, Kittiwake*, Black-headed gull*, Common gull*, Herring gull*		and disturbance during construction and operation Revised OfTW: Disturbance during construction only
SAC's			
Berwickshire and North Northumberland Coast	Grey seal	Yes	Revised Inch Cape Wind Farm - Disturbance from increased noise (non-piling and displacement / PTS from piling. Revised Offshore Export Cable Corridor – Disturbance from increased noise.
Firth of Tay and Eden Estuary	Common (harbour) seal		
Isle of May	Grey seal		
Moray Firth	Bottlenose dolphin		
River South Esk	Atlantic salmon	Yes	Construction – Barrier effects, disturbance or physical injury from noise (Revised Inch Cape Wind Farm and Revised OfTW) and direct temporary habitat disturbance from Offshore Export Cable laying inshore. Operation – barrier effects, disturbance or physical injury from noise.
River Dee	Atlantic salmon		
River Tay	Atlantic salmon River lamprey Sea lamprey		
River Teith	Atlantic salmon River lamprey Sea lamprey		

Natura Site	Qualifying Feature with Connectivity	LSE	Further Consideration Required in HRA / AA
River Tweed	Atlantic salmon River lamprey Sea lamprey		

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Appendix C – Ornithology Baseline Data Suitability

The need for further baseline survey data to support a re-determination or new application for the Inch Cape Offshore Wind Farm.

Dr Ross McGregor - HiDef Aerial Surveying

Dr Murray Grant - Royal Haskoning

Introduction

Baseline boat-based bird surveys were undertaken from September 2010 to September 2012 to support the Original Development Environmental Impact Assessment (EIA) and Habitats Regulations Appraisal (HRA) of the Inch Cape Offshore Wind Farm. These were undertaken across the development area and a 4 km buffer.

For the purposes of the Revised Development it is necessary to consider whether these existing data are sufficient to suitably represent current baseline conditions, and therefore sufficient to undertake an impact assessment.

Data age

Scottish Natural Heritage (SNH) provide guidance on the age of bird survey data for "extensions to consented developments and revision of previous proposals" of onshore wind farm developments. This guidance states that, Scottish Natural Heritage (SNH) provide guidance on the age of bird survey data for "extensions to consented developments and revision of previous proposals" of onshore wind farm developments. This guidance states that,

> *"For proposals being revised, information is often available from previous EIAs, which will inform a revised or smaller proposal in the same area if it has covered the same area of ground. This information can be used for the EIA for the new proposal provided that:*
>
> *- the data are reliable and not too dated (collected within the last 5 years or within 3 years if the populations of key species are known to be changing rapidly) and*
>
> *- the data adequately cover the area of the new proposal (see 3.8.2.1 in relation to potential VP survey issues)"*

SNH does not provide similar guidance for offshore or coastal developments and no similar guidance is provided by other Statutory Natural Conservation Bodies (SNCB's) in the UK.

It should be noted that this information is intended as guidance, and should not be considered as a strict set of rules.

The baseline boat-based bird survey data from Inch Cape Offshore Wind Farm is currently (at the time of writing) 5 to 7 years old, so is on the upper limit of the age range recommended by SNH for onshore wind farm developments. Therefore, it is important to carefully consider why SNH provide this guidance, and how the situation may differ in an offshore context in relation to seabirds.

SNH provide this guidance as populations at any one location in the terrestrial environment are known to vary. Since most terrestrial breeding birds, and many terrestrial wintering birds, are territorial the number of individuals within any one patch of habitat should be relatively stable in the short term, for as long as conditions on the site remain stable. Changes in bird populations in a development site across a five year period could be important if there were significant changes in habitat or disturbance. Since most species will have territories smaller than the total size of the development, changes in habitat have direct impacts on the population size within the development area.

In contrast, seabirds using a particular patch of sea do not behave territorially and, at an individual level, make use of much larger areas of sea than a wind farm development. Seabird use the habitat differently too, with the principal use being foraging. Seabirds exploit resources that are typically patchy in their availability at small spatial scales (e.g. the size of a wind farm development), but are reliable at large spatial scales (across their whole foraging range of hundreds of square kilometres). This means that the numbers of birds of any particular species in any one small patch of sea are very variable. Thus from day to day, the number of birds in any one patch of sea can be very variable within and between seasons. However, at a terrestrial development, from day to day the number of birds is pretty much the same.

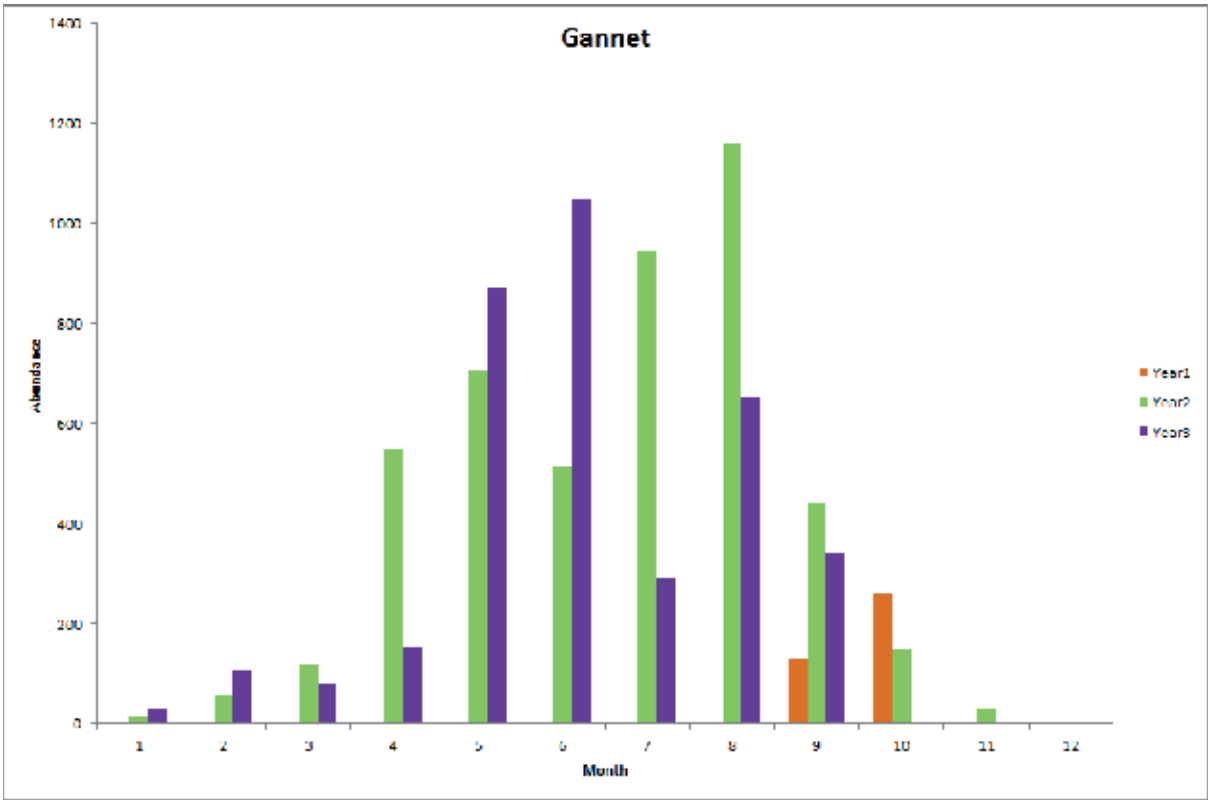
Change in site conditions

In the Inch Cape development site there have been no known large scale changes in habitat, fisheries or disturbance since the current baseline survey data were collected. As such, these determinants are not expected to affect the numbers of birds using the site.

Abundance variability

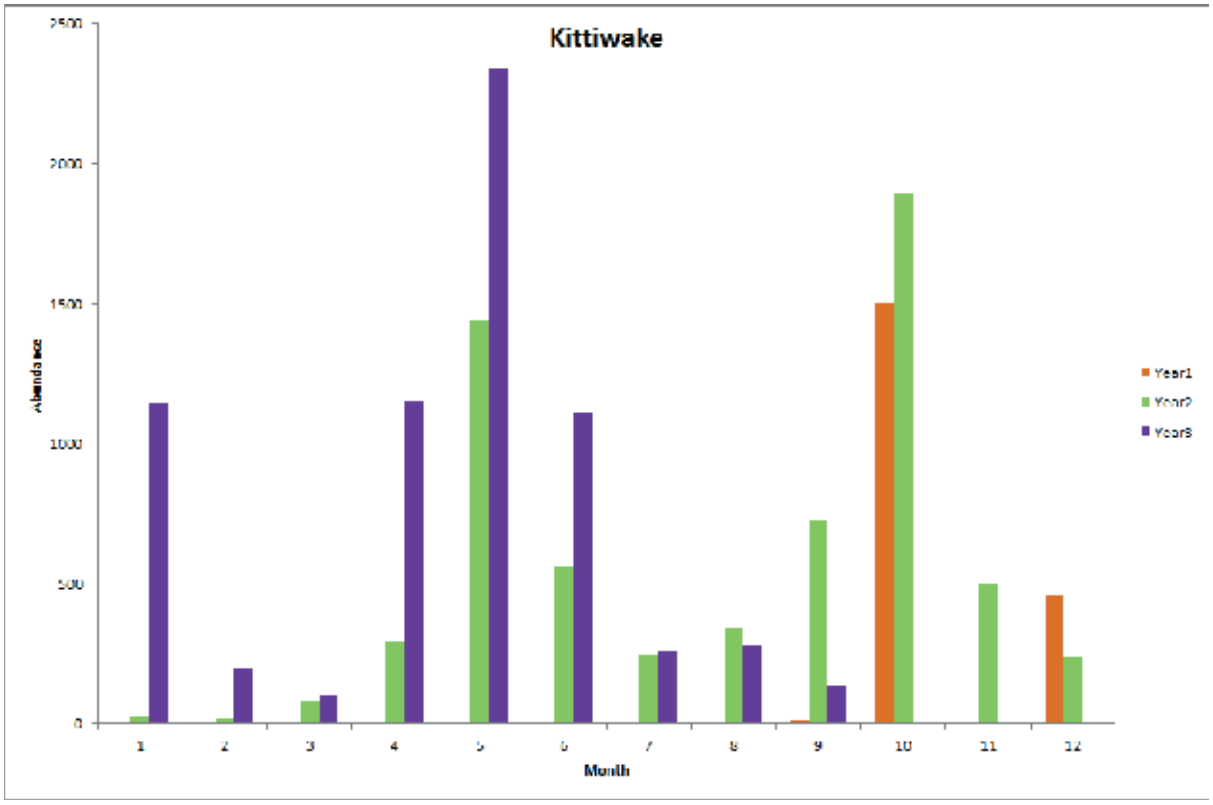
Due to the patchy nature of prey availability in space and time, the abundance of seabirds at sea is typically patchy in space and time. This results in relatively large differences in the estimates of birds within development areas between different surveys, even within the same month. The relative abundance of the three most critical species in relation to the Inch Cape development area (i.e. gannet, kittiwake and puffin), frequently showed a high degree of variability between surveys within the same calendar month when compared to 2011 and 2012 abundance.

Figure 1: Relative abundance of gannets estimated from boat-based surveys inside the Inch Cape development area. Note that year 1 surveys began in month 9 and the year 3 surveys ended in month 9 (i.e. September).



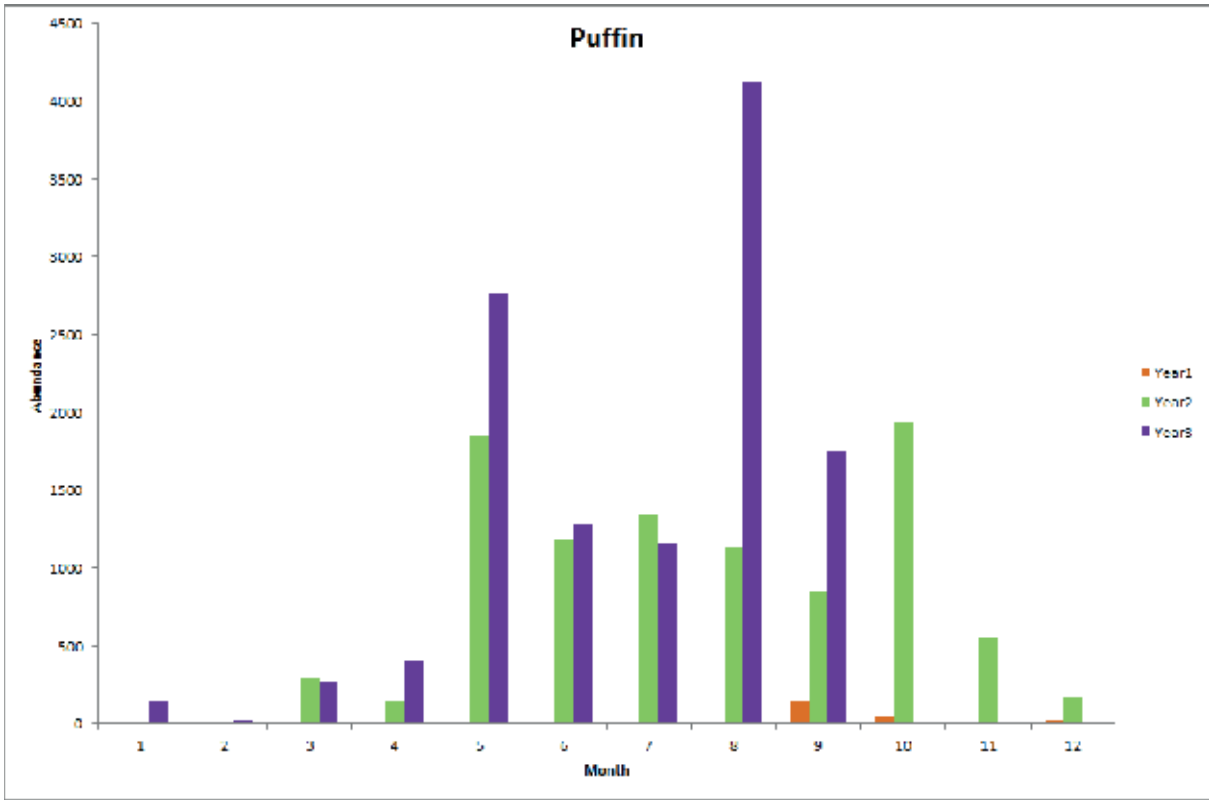
Gannet relative abundance was higher in the 2011 data than the 2012 data in May and June, but lower in the 2011 data than the 2012 data in July and August (Figure 1). Despite these differences, the relative seasonal abundance between the two years was similar, with more birds estimated in the breeding season than the non-breeding season.

Figure 2: Relative abundance of kittiwakes estimated from boat-based surveys inside the Inch Cape development area. Note that year 1 surveys began in month 9 and the year 3 surveys ended in month 9 (i.e. September).



Kittiwake abundances were estimated to be higher in 2012 than 2011 in April, May and June (Figure 2), but higher in 2011 than 2012 and 2010 in September and October respectively. The pattern of relative abundance was similar between different years of data, with peaks in spring and autumn.

Figure 3: Relative abundance of puffins estimated from boat-based surveys inside the Inch Cape development area. Note that year 1 surveys began in month 9 and the year 3 surveys ended in month 9 (i.e. September).



Puffin abundances were higher in 2012 than 2011 in May, August and September (Figure 3), but much higher in 2011 than 2010 in October.

These inconsistent differences are suggestive of a high degree of variability within months but between surveys, rather than between years. This suggests that a further year of data would follow a similar pattern of some months having a higher relative abundance than others, rather than a consistent difference between years. This can be seen in data from other offshore wind farm surveys, as well as from analysis of ESAS data (Kober et al. 2010; Kober et al. 2012). Hotspots of consistent high densities (away from colonies) appear to be relatively rare. The Inch Cape site appears to be outside any known seabird hotspots.

Change in bird populations

The Seabird Monitoring Programme (SMP) database holds seabird colony count data for Britain and Ireland (http://jncc.defra.gov.uk/smp/Default.aspx), and these data provide the basis for assessing the extent of change in breeding seabird abundance within the region from which the birds using the Inch Cape wind farm site are thought to derive. This region is defined by the foraging ranges of each of the different seabird species (Thaxter et al. 2012, ICOL 2013). Checks undertaken on the data for the colonies contributing to the regional populations reveal that for most species there has been some

updating of colony counts since the time of the Original Development EIA, but this usually applies to a proportion of the relevant colonies only (typically 20 – 30%). Based upon the updated counts that are available, evidence of marked changes in the size of these regional populations since the time of the Original Development EIA is limited to a few species only, notably gannet and razorbill (which have increased) and lesser black-backed gull (which have declined).

Of the three species that were arguably most critical to the Marine Scotland (MS) Appropriate Assessment for the Forth and Tay wind farms (i.e. gannet, kittiwake and puffin), as detailed above evidence for marked changes in the regional population sizes is limited to gannet. Although kittiwake are declining at the national level (http://jncc.defra.gov.uk/page-2889), the available SMP data suggest relatively little change in the regional population since the time of Original Development EIA. In terms of the key SPA populations for these three species:

- Gannet numbers have increased strongly in the Forth Islands SPA (i.e. the Bass Rock colony) over recent years (Murray et al. 2015). While gannet numbers have increased, their very large foraging range from the Bass Rock (Wakefield et al. 2013) reduces the extent to which this is likely to result in increases in densities within the wind farm area. Since gannet seem to partition the sea between colonies, and larger colonies seem to use larger areas of sea, increases on the Bass Rock are more likely to result in a larger area of sea being used by birds from the colony, rather than more birds using the same area of sea. It follows from this line of evidence that densities of foraging birds are likely to have remained similar within the wind farm area in recent years, although there could still be increases in density resulting from greater numbers commuting through the site. Importantly, the most recent population estimate for gannets on the Bass Rock (from 2014) is a reasonably close temporal match to the baseline survey data (see below), and it is unclear whether the recent rapid increases at this colony can continue, given that nest-site availability will limit colony growth at some point.
- On the basis of the available SMP count data, puffin numbers on the Forth Islands SPA appear to have been approximately stable since the time of the Original Development EIA.
- Based upon the available SMP data, kittiwake numbers have declined at one of the SPAs with connectivity to the Inch Cape Development Area, since the time of the Original Development EIA (i.e. St Abb's Head to Fast Castle). However, the two SPA populations for which the predicted impacts from Inch Cape are greatest (i.e. Forth Islands and Fowlsheugh), show little evidence of major change in numbers since the time of the Original Development EIA (Figures 4 and 5). At the largest colony in the Forth Islands SPA (the Isle of May) numbers have fluctuated between 2010 and 2015 but with 2015 numbers approximately the same as in 2010 (Figure 4). At the Fowlsheugh SPA, numbers have remained approximately stable between 2009 and 2015 (Figure 5). Colony count data for the fourth kittiwake SPA colony with connectivity to the Inch Cape Development Area (i.e. Buchan Ness to Collieston Coast SPA) have not been updated from those used in the Original Development EIA.

As such, the abundance of these species in the wind farm area is unlikely to have changed as a result of local population changes.

Figure 4: Apparently Occupied Nests of kittiwake at Isle of May (Forth Islands SPA)

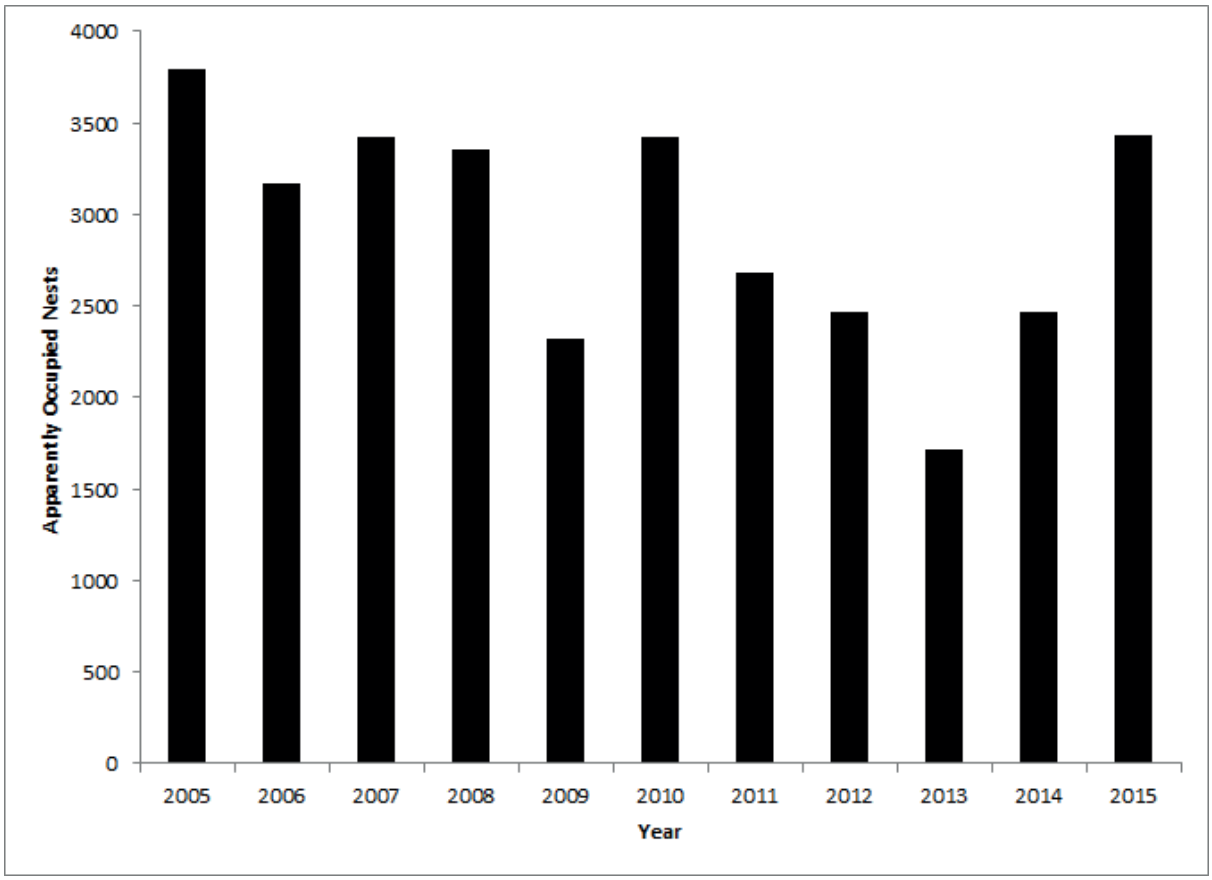
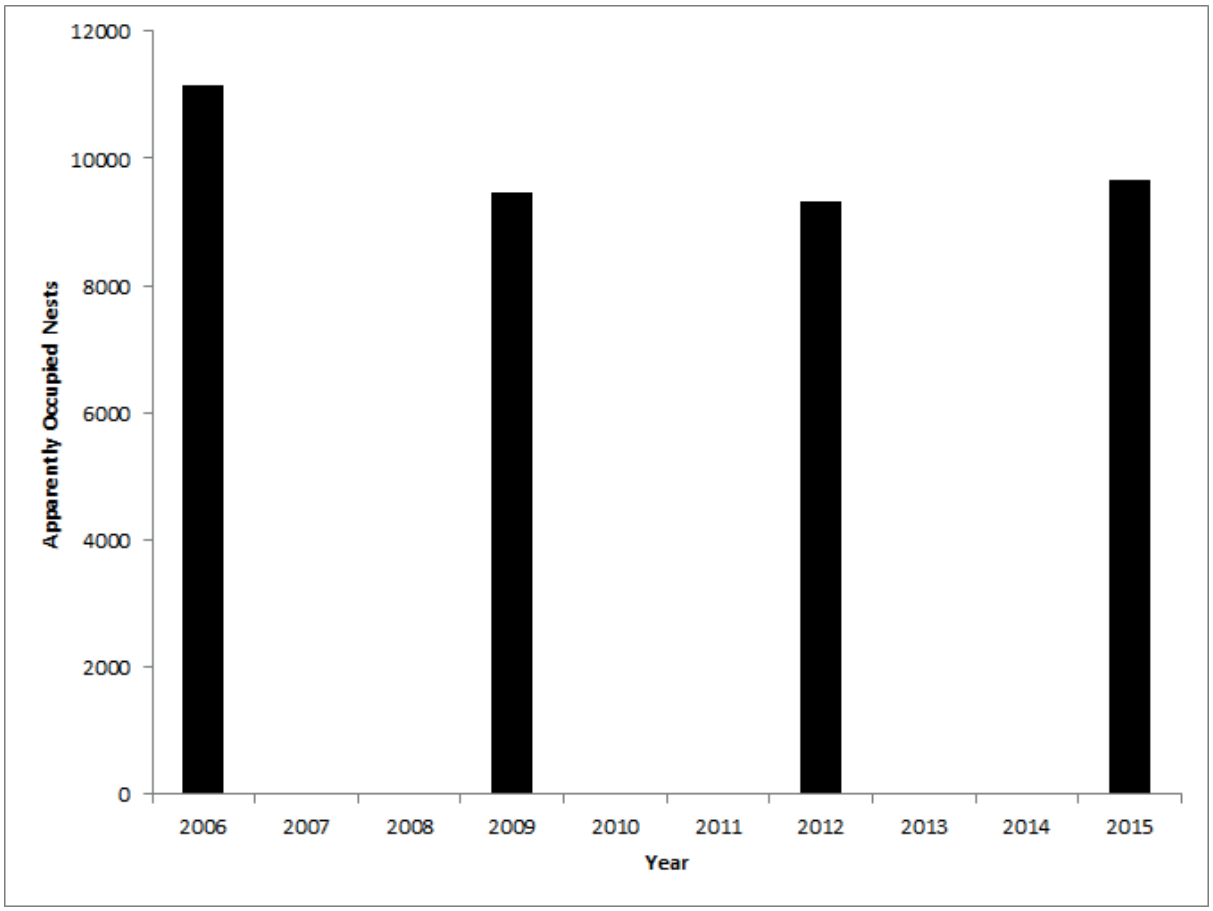


Figure 5: Apparently Occupied Nests of kittiwake at Fowlsheugh SPA



In relation to the possible changes that may have occurred in the reference population sizes for breeding seabirds at Inch Cape, it is also worth noting that many of the colony counts used to inform the Original Development EIA pre-dated the Inch Cape baseline survey data by several years (with many deriving from the Seabird 2000 census undertaken between 1998 to 2002 – Mitchell et al. 2004). Although trend corrections were applied to help resolve this issue (ICOL 2012) in the Original Development EIA, these were applied only to counts from before 2007. Therefore, in many instances, the timing of the updated seabird colony count data is a similar (or even closer) match to that of the existing baseline survey data than was the timing of the colony count data used to inform the Original Development EIA. For example, the Original Development EIA relied upon the 2009 count of puffins on the Isle of May (i.e. the colony forming the bulk of both the regional and Forth Islands SPA populations), whilst the most recent count for this colony is from 2013, so providing a closer match to the timing of the baseline surveys.

The Forth Islands SPA gannet population has probably undergone the most rapid change in numbers of any of the breeding seabird populations directly relevant to the Revised Development (see above), with the most recent colony count data being from 2014. This remains a temporally close match to the baseline survey data and not dissimilar to the extent of difference with the 2009 count, which was used for the estimates of the regional and Forth Islands SPA populations in the Original Development EIA.

Therefore, any changes to the estimated reference population sizes may, in some cases at least, provide a closer reflection of the true relationship to the baseline survey data than did the estimated reference population sizes used in the Original Development EIA.

In relation to wintering and passage seabird populations, the evidence base concerning population sizes in the regions relevant to Inch Cape is unlikely to have changed markedly since the time of the Original Application.

Conclusions

While SNH have recommended that data older than five years should not be used, on their own, to support applications for onshore wind farm consents, the Inch Cape data will only exceed this age marginally by the likely submission time. It is important to note that the SNH guidance is intended to be interpreted carefully, with discretion where it is thought unlikely that bird abundances have changed to an important degree. The information provided above shows that there is a low likelihood that the abundance of key species within the Inch Cape offshore wind farm has changed by an important degree.

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