Offshore Wind Power Limited

West of Orkney Windfarm Offshore EIA Report

Volume 1, Chapter 7 - EIA Methodology

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West of Orkney Windfarm

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CONTENTS

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7 EIA METHODOLOGY

7.1 Introduction

The principal aim of undertaking an Environmental Impact Assessment (EIA) is to ensure that the authority granting consent (the 'regulatory authority') for a particular development makes its decision in full knowledge of any potential significant effects on the environment.

EIA is a means of drawing together, in a systematic way, an assessment of a development's likely environmental impacts and effects, both beneficial and adverse. This helps to ensure that the significance of the predicted effects, and the scope for reducing any adverse effects, is properly understood by the public and the regulatory authority before it makes its decision. Early identification of potentially adverse environmental effects also leads to the identification and incorporation of appropriate mitigation measures into the Project design and management.

This chapter sets out the approach and method that has been used in the EIA for the offshore Project in support of the applications for consent. It provides an overview of the key stages that have been followed, in line with EIA best practice and in accordance with the 'EIA Regulations' as defined in chapter 3: Planning policy and legislative context.

The assessment of impacts on each environmental receptor is provided in separate topic-specific chapters within this Offshore EIA report (chapters 8-20).

7.2 EIA process

The EIA process systematically identifies the potential impacts that the offshore Project could have on the environment. The process involves developing a detailed understanding of both the offshore Project (e.g. proposed construction, operation and maintenance and decommissioning activities), and the environment within and surrounding where the offshore Project will be located. The potential impacts of the offshore Project are then evaluated to determine how the offshore Project would affect the environment, and the significance of those effects are determined.

Figure 7-1 illustrates the EIA process. The key steps are as follows:

1. Baseline characterisation to describe the relevant aspects of the receiving environment in which the proposed offshore Project will be set, including over a defined study area.
2. Description of the Project Design Envelope to set out the range of Project design parameters used to determine the worst case scenario for each impact.
3. Assessment of potential effects to identify and assess potentially significant effects that could arise from the offshore Project, including direct, indirect, cumulative, inter-related, whole Project assessment and transboundary effects. The assessment of potential effects is informed by the worst case scenario, the baseline characterisation, and feedback gained through consultation (including the Scoping Opinion). The assessment of effects takes account of embedded mitigation that can either take the form of management measures required by legislation or industry practices (tertiary mitigation), measures built into the design of the Project (primary mitigation).

4. Identification of secondary mitigation to reduce or remove such impacts (mitigation measures), where potential impacts are likely to be significant, where reasonably practicable.
5. Assessment of residual effects once all proposed mitigation measures into account.
6. Identification of relevant monitoring studies to monitor the predicted impacts of the offshore Project as appropriate for each receptor.
7. Publication of EIA Report and Non-Technical Summary and subsequent consultation with Marine Directorate - Licensing Operations Team (MD-LOT) and other relevant stakeholders.

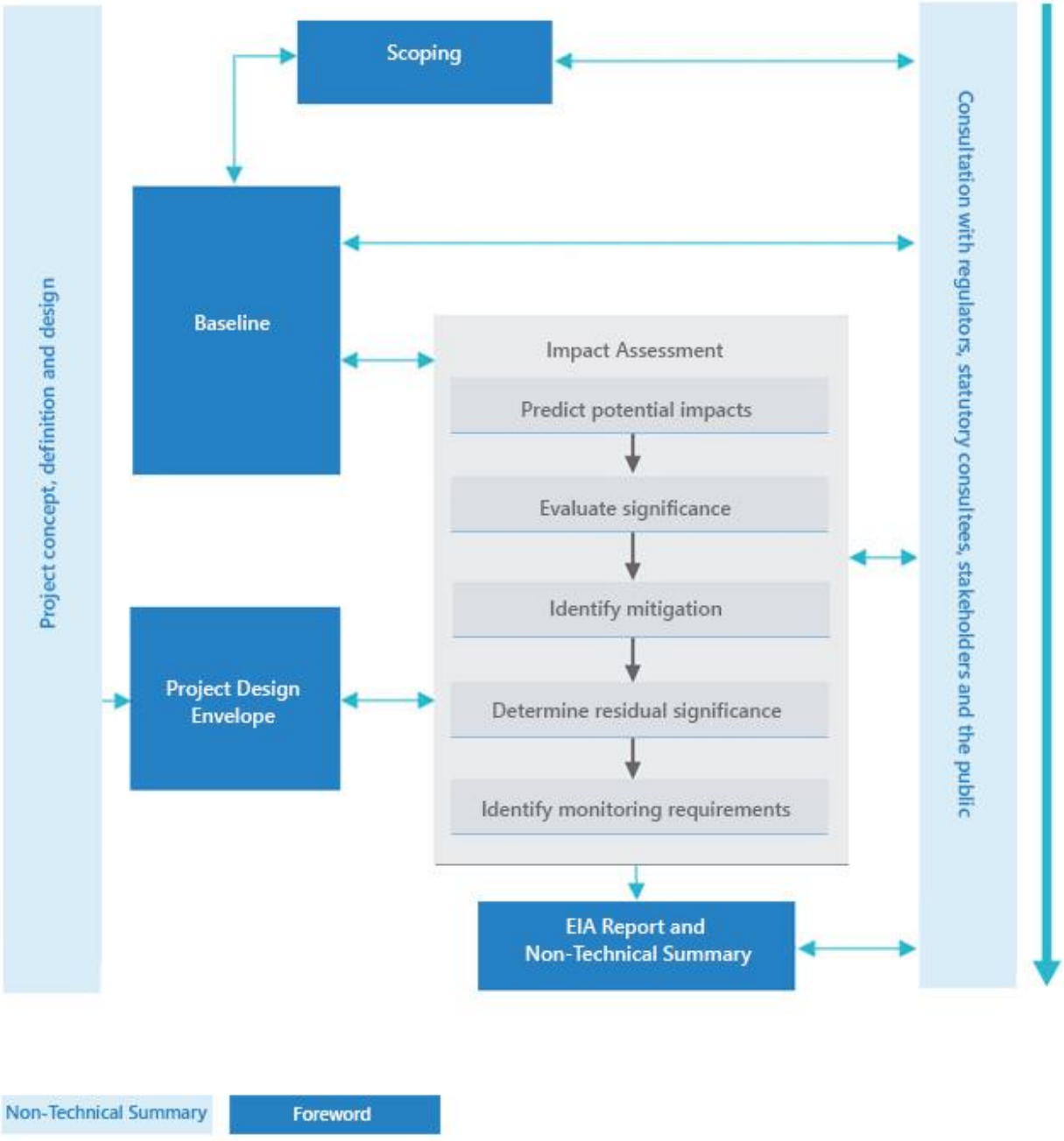

Figure 7-1 EIA Process

Consideration of climate and carbon is also required under the EIA regulations. Supporting study (SS) 1: Climate and carbon assessment provides a detailed description of the future climate baseline over the lifetime of the offshore and onshore Project, focussing on key changes in climate variables that will affect the physical, biological and socio-economic environment. In the context of this future climate baseline and the offshore and onshore Project design, this supporting study provides an overarching assessment of all climate and carbon-related impacts for the Project, including:

- The vulnerability of the Project to climate change, focussing on the ability of the Project to withstand, respond to and recover from changes in climate - climate resilience review;
- The combined effects of the Project, as assessed in the Onshore and Offshore EIA Reports, and climate change on the physical, biological and socio-economic environment - in-combination climate impact assessment;
- The effects of the Project on the climate, including:
  - The disturbance or loss of biological carbon stores (including blue carbon and onshore biological carbon stores) biological carbon assessment; and
  - The carbon life cycle emissions resulting from the Project and the carbon payback period - carbon assessment.

In addition, the EIA regulations also require consideration of the potential effects that may result from a developments vulnerability to major accidents and/or disasters. SS2: Major accidents and disasters assesses the susceptibility of the offshore Project to major accidents and disasters and also the potential for the offshore Project to cause a major accident and/or disaster.

7.3 Habitats Regulation Appraisal

Closely linked but distinct from the EIA process is the requirement to determine impacts on internationally important designated sites and species known as the Habitats Regulations Appraisal (HRA). This process is executed under specific legislation.

The Council Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Fauna and Flora, known as the Habitats Directive, provides for the conservation of natural habitats and of wild flora and fauna including in offshore areas. The Council Directive 2009/147/EC on the Conservation of Wild Birds, known as the Birds Directive, applies to the conservation of all species of naturally occurring wild birds including in offshore areas. In the UK, sites designated as Special Areas of Conservation (SACs) and Special Protection Areas (SPAs), collectively referred to as European Sites, form part of the UK Site Network, delivering the requirements of the Directives. The following legislation ('The Habitats Regulations') transposes the Directives into Scottish Law and outlines the requirement to consider the potential effects of plans and projects (i.e. developments) on European Sites falls under the following legislation:

- The Conservation (Natural Habitats, &c.) Regulations 1994 (as amended) – applicable to developments within the 12 nautical mile (nm) limit;
- The Conservation of Offshore Marine Habitats and Species Regulations 2017 – applicable to developments between the 12 and 200 nm limits; and
- The Conservation of Habitats and Species Regulations 2017 (as amended) – applicable to Section 36 Consent applications.

The Habitats Regulations require for the consideration of potential effects from developments and plans on European Sites, including SACs, candidate SACs (cSACs), SPAs, potential SPAs (pSPAs), Sites of Community Importance (SCI) and Ramsar sites (under the Conservation on Wetlands of International Importance especially as Waterfowl Habitat 'the Ramsar Convention')[1]. An HRA must be carried out to determine the potential for a development to result in a Likely Significant Effect (LSE) on European Sites, either individually or in-combination with other plans or developments. Sites of Special Scientific Interest (SSSIs) are not protected under the Habitats Regulations and do not form part of the HRA process.

The European Commission's (2021) guidance identifies a staged process for the assessment of plans or projects (developments). The three stages are commonly categorised as the following:

- Stage One: HRA Screening - to determine whether a proposal is likely to have a significant effect on a European site, this stage does not take into account any embedded mitigation measures (other than the intrinsic project design);
- Stage Two: Appropriate Assessment (AA) carried out by the Competent Authority and informed by the Report to Inform the Appropriate Assessment (RIAA) - to ascertain whether the proposal will or will not adversely affect the integrity of a European site, this stage considers the embedded mitigation measures implemented for the offshore Project;
- Stage Three:
  - Assessment of Alternative Solutions - if it cannot be ascertained that a European site's integrity will not be adversely affected, alternative solutions will need to be considered; and
  - Assessment of 'Imperative Reasons of Overriding Public Interest' (IROPI) - if there are no alternative solutions which can be implemented to ensure no adverse effects on a European Site's integrity then an assessment of whether there are imperative reasons of over-riding public interest for the proposal will be undertaken.

The Offshore HRA Screening Report (OWPL, 2022a) was submitted to Marine Scotland – Licensing Operations Team (MS-LOT)[2] in September 2022 addressed Stage One of the HRA process. The Offshore RIAA addresses Stage Two of the HRA process and is submitted alongside the Offshore EIA as part of the consent application (OWPL, 2023). The RIAA provides the Competent Authority, in this case Scottish Ministers, with the information required to assist them in undertaking an AA and determine whether there is any 'adverse effect on site integrity' from the offshore Project.

7.4 EIA Scoping

A single Scoping Report (OWPL, 2022b) covering offshore and onshore (Caithness as well as Orkney) aspects of the Project was submitted to MS-LOT, The Highland Council (THC) and Orkney Islands Council (OIC) on 1st March 2022.

The Scoping Report was submitted to Scottish Ministers (via MS-LOT) under Regulation 12 of The Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017, Regulation 14 of The Marine Works (Environmental

[1] *It is Scottish Policy for Ramsar sites to be considered as a European site, see Policy 4 of the National Planning Framework 4: https://www.gov.scot/publications/national-planning-framework-4/documents/*

[2] *MS-LOT have since been renamed Marine Directorate - Licensing Operations Team (MD-LOT).*

Impact Assessment) (Scotland) Regulations 2017 and Regulation 13 of The Marine Works (Environmental Impact Assessment) Regulations 2007 (as amended).

The request for the Scoping Opinion to MS-LOT was submitted alongside requests for Scoping Opinions from:

- THC under Regulation 17 of the Town and Country Planning (Environmental Impact Assessment) (Scotland) Regulations 2017 for the onshore Project; and
- OIC under Regulation 17 of the Town and Country Planning (Environmental Impact Assessment) (Scotland) Regulations 2017 for the onshore transmission infrastructure relevant to the connection to the Flotta Hydrogen Hub[3].

The objective of the Scoping Report was to engage with the regulators, statutory and non-statutory consultees in the EIA process, inviting them to provide relevant information and to comment on the proposed approach to the EIA, to ensure that robust and proportionate EIA Reports are submitted in support of the applications for consents. In order to engage in an informed manner, the Scoping Report provided information on:

- The proposed Project, including the offshore array, the offshore and onshore transmission infrastructure;
- The proposed outline approach to understand further the baseline conditions and address the potential environmental impacts through the EIA process;
- The topics to be scoped into the offshore (and onshore) EIAs, where potentially significant impacts may result from the Project on the physical, biological and human environment; and
- The topics to be scoped out of the offshore (and onshore) EIAs, where significant impacts are not anticipated with consideration of embedded and industry best practice mitigation.

The Scoping Opinion was received from MS-LOT on the 29th June 2022. This Offshore EIA Report incorporates the feedback gained through the Scoping Opinion and subsequent consultation. A summary of the responses to the Scoping Opinion and further consultation is provided in chapter 6: Stakeholder engagement and each topic chapter includes a summary of the relevant responses.

The topics 'scoped out' for assessment within the offshore EIA include offshore air quality, airborne noise and vibration, as detailed in the Scoping Report and in accordance with the Scoping Opinion received from MS-LOT on behalf of Scottish Ministers (MS-LOT, 2022).

Each topic impact assessment chapter details the impacts or receptors that have been scoped out of the assessment for that particular topic.

[3] As described in chapter 1: Introduction, the consent applications for the onshore and offshore transmission infrastructure associated with the connection of the Project to the proposed Flotta Hydrogen Hub will be submitted at a later date and therefore are not considered in this Offshore EIA Report.

7.5 Baseline characterisation

The characterisation of the existing environment is undertaken in order to determine the baseline conditions in the area covered by the offshore Project, including relevant study areas for those issues scoped into the Offshore EIA Report. This involves the following steps:

- Define study areas for each receptor based on the relevant characteristics of the receptor (e.g. mobility / range);
- Review available information (e.g. publicly available data / reports and site-specific surveys);
- Identify likely or potential impacts that might be expected to arise from the offshore Project;
- 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 questions and filling key data gaps;
- Review information gathered to ensure the environmental baseline can be sufficiently characterised in appropriate detail;
- Identify any remaining data gaps or limitations and describe the implications of these on the baseline characterisation; and
- Consideration of the future baseline and potential changes in the baseline over the lifetime of the Project, including climate change, changes in practices and other reasonably foreseeable changes.

The specific methodology to establish a robust baseline (upon which impacts can be assessed) for each receptor is set out under each topic chapter within this Offshore EIA Report. This has been guided by feedback gained through the Scoping Opinion and consultation.

7.6 Assessment of potential effects

7.6.1 Identification of impacts and assessment process

Central to the identification and assessment of potential effects of a development is the conceptual 'source-pathway-receptor' model, as illustrated in Figure 7-2. The 'source-pathway-receptor' model defines those receptors considered to be at risk. In the context of the source-pathway-receptor model, the source represents the origin of an impact (i.e. an activity related to the offshore Project), the pathway represents the route through the environment by which the effects of an activity are transmitted, and the receptor is the environment or resource that receives the impact, which then causes an effect on the receptor. Where there is no known 'pathway' then no effect is considered to occur.

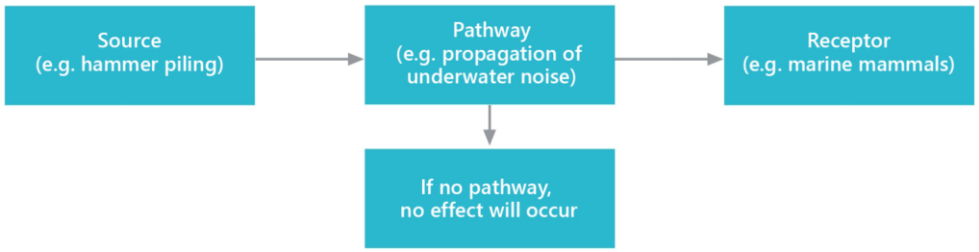

Figure 7-2 Source-pathway-receptor model

In the context of this EIA, an 'impact' is considered to result in an 'effect', if a pathway to a receptor exists. There is the potential for the offshore Project to result in both adverse and positive impacts on the environment. The impact identification considers whether a potential impact is considered to be adverse or positive, direct or indirect, temporary or permanent. The assessment process then considers the significance of the resulting effect on the environment, either positive or negative, using the process outlined below (sections 7.6.2 to 7.6.5).

For those potential impacts scoped into the EIA, the Offshore EIA Report describes the significance of the effect expected to result from the offshore Project using a standard EIA methodology. The assessment process considers the potential magnitude of the change to the baseline conditions arising from the offshore Project and the sensitivity of the particular receptor under consideration, as well as any embedded mitigation measures (see Figure 7-3).

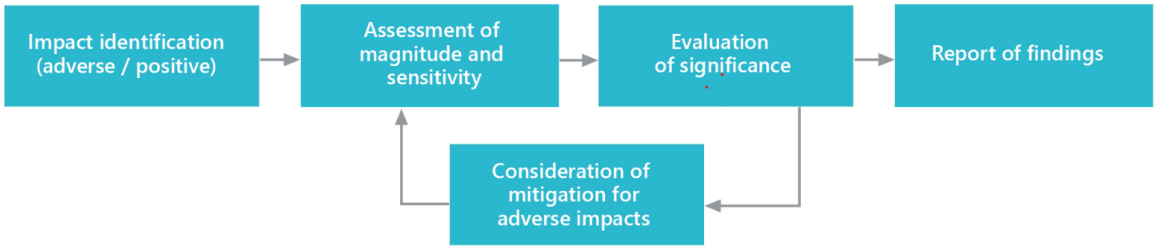

Figure 7-3 Assessment of effects process

7.6.2 Ecosystem approach

There is a requirement to understand potential impacts at a wider ecosystem level. A holistic approach has been undertaken in the characterisation of the baseline and identification of impacts to consider any potential impacts that may occur at an ecosystem scale and particularly across trophic levels (e.g. impacts on prey species affecting their availability for predators). The interactions between different trophic levels and EIA receptors, including indirect impacts between trophic levels, has also been considered within each topic assessment chapter. Impacts on both species and relevant prey and predators, have been considered throughout the assessments and conclusions from each assessment drawn together within an ecosystems effects section to provide a full understanding of consequences on receptors.

7.6.3 Design envelope approach

The design of the Project will continue to evolve through to the post-consent stage, in line with the EIA process and the rapid and frequent advances in the offshore renewable industry and associated technology. In accordance with best practice, including the recent Scottish Government (2022) Guidance for applicants on using the design envelope for applications under Section 36 of the Electricity Act 1989, the Project has utilised a Project Design Envelope approach to inform the EIA. A Project Design Envelope approach allows a range of parameter values to be presented for each Project aspect. This ensures that flexibility is retained in the design so that the final Project can be accommodated within the onshore and offshore Project consents.

The Project Design Envelope has covered all Project components, and permanent and temporary works required to generate and transmit electricity from the Project to the existing National Grid network at Spittal.

Within the EIA, the design parameters which represent the worst case scenario for the impact assessments have been determined on a case-by-case basis, depending on the receptor and impact being considered. Under this approach, the combination of offshore Project options constituting the worst case scenario may differ from one receptor to another and from one impact to another. The end result is an EIA based on clearly defined environmental parameters that define the range of project possibilities and hence the likely environmental impacts that could result from the offshore Project.

7.6.4 Mitigation

In accordance with the Institute of Environmental Management and Assessment (IEMA) (2016) Guide to Delivering Quality Development, mitigation measures can fall into the following classifications:

- Primary mitigation - measures built into the design of the Project which reduce or avoid the likelihood or magnitude of an adverse environmental effect, including location or design;
- Secondary mitigation – are additional measures implemented to further reduce environmental effects to 'not significant' levels (where appropriate) and do not form part of the fundamental design of the offshore Project; and
- Tertiary mitigation – are measures that are required through standard practice or to meet legislative requirements and are independent of the EIA process (i.e. they would be implemented regardless of the findings of the EIA).

7.6.4.1 Consideration of embedded mitigation measures

Embedded mitigation measures are primary or tertiary mitigation measures, identified and adopted as part of the evolution of the design for the offshore Project, that reduce the potential for impacts to the environment. Such measures are considered in the assessment of effect significance (i.e. they are assumed to form part of the design of the offshore Project prior to any assessment).

7.6.4.2 Consideration of secondary mitigation

IEMA (2016) describes secondary (foreseeable) mitigation as: "Actions that will require further activity in order to achieve the anticipated outcome. These may be imposed as part of the planning consent, or through inclusion in the Environmental Statement".

Secondary mitigation measures are implemented, after the assessment process has been completed, to further reduce environmental effects to 'not significant' levels (where appropriate) where the initial assessment concludes there is the potential for a significant effect to occur.

7.6.5 Assessing impact significance

7.6.5.1 Overview

The EIA Regulations, as defined in chapter 3: Planning policy and legislative context, require that the EIA should consider the likely significant environmental impacts of the offshore Project. The decision process related to defining whether or not a development is likely to significantly impact the environment is the core principal of the EIA process.

The regulations themselves do not provide a specific definition of "significance". However, the methods used for identifying and assessing impacts should be transparent and verifiable.

The method detailed here has been developed by reference to the latest EIA principals and guidance provided by Scottish National Heritage (SNH) (now NatureScot) in their handbook on EIA (SNH, 2018), the Chartered Institute of Ecology and Environmental Management (CIEEM) (2018) guidelines for ecological impact assessment in the United Kingdom (UK) and Ireland: terrestrial, freshwater, coastal and marine, and the Marine Scotland (2018) Consenting and Licensing Guidance for Offshore Wind, Wave and Tidal Energy Applications. Topic-specific guidance is listed in the topic-specific chapters where these have informed the assessment methodology. In some instances this may deviate from the generic approach presented here.

For each impact, the assessment identifies a receptor's sensitivity to that effect and implements a systematic approach to understand the consequence and significance of the effect associated with the impact under consideration. The process considers the following:

- Identification of receptor and impact (including duration, timing and nature of impact);
- Definition of sensitivity of receptor;
- Definition of magnitude of impact; and
- Evaluation of consequence of the effect on the receptor, considering the sensitivity of receptor and magnitude of impact.

Where data gaps or limitations in the impact assessment exist, these are noted within the relevant topic-specific chapters. Where these data gaps or limitations present difficulties in assigning the sensitivity of the receptor or the potential magnitude of impact this will also be noted. A precautionary approach will be undertaken with the understanding that an impact cannot be assigned as 'not significant' where insufficient evidence exists to support this conclusion.

Despite the assessment of impact significance being a subjective process, a defined methodology, outlined below, is used to make the assessment as objective as possible and consistent across different topics. As the environmental factors under consideration can vary considerably depending on what is being assessed, there is some variation in this process between topics. Deviations from the outlined process are highlighted within the topic specific chapters.

7.6.5.2 Defining receptor sensitivity

The sensitivity of a receptor to an impact combines the value of the receptor with its ability to tolerate, adapt to and recover from changes in the environment. Expert judgement is particularly important when determining the sensitivity of receptors.

Sensitivity of a receptor is based on the following factors:

- Tolerance to change – ability to withstand / accommodate an impact;
- Recoverability – ability to recover from an impact (i.e. ability to return to baseline state);
- Adaptability – ability to avoid or adapt to an impact; and
- Value – importance (e.g. based on conservation value / protected status or economic value).

The scale of sensitivity will be classed as 'negligible, low, medium or high'. Example definitions are provided in Table 7-1. However, in each topic chapter within the Offshore EIA Report, receptor-specific sensitivity criteria are defined, that are tailored to each topic and informed by guidance, legislation, and/or expert judgment.

Table 7-1 Example receptor sensitivity criteria

SENSITIVITY	DEFINITION
High	• Receptor with no capacity to accommodate a particular effect and no ability to recover or adapt; and/or • Receptor of conservation / economic value to an extent that is internationally or nationally important.
Medium	• Receptor with low capacity to accommodate a particular effect with low ability to recover or adapt; and/or • Receptor of conservation / economic value to an extent that is regionally important.
Low	• Receptor has some tolerance to accommodate a particular effect or will be able to recover or adapt; and/or • Receptor of conservation / economic value to an extent that is locally important.
Negligible	• Receptor is generally tolerant and can accommodate a particular effect without the need to recover or adapt; and/or • Receptor is widespread / common and is of low conservation / economic value.

7.6.5.3 Defining impact magnitude

Defining impact magnitude requires consideration of the following factors:

- Spatial extent – the area over which the impact will occur;
- Duration – the period of time over which the impact will occur;
- Frequency – the number of times the impact will occur over the Project lifespan;
- Intensity - the severity of the impact; and
- Likelihood - the probability that the impact will occur.

The categorisation of magnitude of impact will vary for specific pathways / receptors / topic specific chapters, but will broadly follow the definitions outlined in Table 7-2.

Table 7-2 Example impact magnitude criteria

MAGNITUDE	CRITERIA
High	• Total change or major alteration to key elements / features of the baseline conditions; • Impact occurs over a large scale or spatial geographical extent and/or is long-term or permanent in nature; and/or • High frequency (occurring repeatedly or continuously for a long period of time) and/or at high intensity.
Medium	• Partial change or alteration to one or more key elements / features of the baseline conditions; • Impact occurs over a medium scale / spatial extent and/or has a medium-term duration; and/or • Medium to high frequency (occurring repeatedly or continuously for a moderate length of time) and/or at moderate intensity or occurring occasionally/intermittently for short periods of time, but at a moderate to high intensity.
Low	• Minor shift away from the baseline conditions; • Impact occurs over a local to medium scale / spatial extent and/or has a short to medium-term duration; and/or • Impact is unlikely to occur or at a low frequency (occurring occasionally / intermittently for short periods of time at a low intensity).
Negligible	• Very slight change from baseline conditions; • Impact is highly localised and short term with full rapid recovery expected to result in very slight or imperceptible changes to baseline conditions or receptor population; and/or • The impact is very unlikely to occur and if it does will occur at very low frequency or intensity.

Magnitude of an impact is based on a variety of parameters. Definitions provided above are for guidance only and may not be appropriate for all topics or impacts. Expert judgement is used to determine the most appropriate magnitude ranking and this is explained through the narrative of the assessment.

7.6.5.4 Evaluation of consequence and significance

The consideration of the magnitude of a potential impact and sensitivity of the receptor will determine the overall consequence of the effect, which is used to understand potential significance. This determination may be quantitative or qualitative and often informed by expert judgement. Table 7-3 sets out how the magnitude of impact and the sensitivity of the receptor are combined to provide an assessment of the consequence of effect.

Table 7-3 Consequence of effect

CONSEQUENCE OF EFFECT		MAGNITUDE			
		NEGLIGIBLE	LOW	MEDIUM	HIGH
SENSITIVITY	NEGLIGIBLE	Negligible	Negligible	Negligible	Negligible
	LOW	Negligible	Negligible	Minor	Minor
	MEDIUM	Negligible	Minor	Moderate	Moderate
	HIGH	Negligible	Minor	Moderate	Major

The categories provide a threshold to determine whether or not significant effects may result from the offshore Project, with Moderate and Major effects possibly being 'significant' in EIA terms, as highlighted in amber and red. A typical categorisation is shown below (Table 7-4), noting that effects can be both beneficial or adverse.

Table 7-4 Definitions of consequence of effect and associated significance

CATEGORY	DEFINITION	SIGNIFICANCE
Major	A fundamental change to the environment or receptor, resulting in a significant effect.	Significant
Moderate	A material but non-fundamental change to the environment or receptor, resulting in a possible significant effect.	Potentially Significant
Minor	A detectable but non-material change to the environment or receptor resulting in no significant effect or small-scale temporary changes.	Not Significant
Negligible	No detectable change to the environment or receptor resulting in no significant effect.	Not Significant

Where the impact assessment identifies that an aspect of the offshore Project is likely to give rise to significant environmental effects, secondary mitigation measures, above and beyond any embedded mitigation (as defined in section 7.6.4) will be incorporated into the assessment process to avoid impacts or reduce them to acceptable levels, where possible. At this point the impact is reassessed, considering all mitigations to determine the residual effect.

7.7 Cumulative effects assessment approach

As well as considering impacts from the offshore Project alone, the EIA Regulations require a consideration of potential impacts that could occur cumulatively with other relevant projects (i.e. developments), plans and activities, that could result in a cumulative effect.

The cumulative effects assessment considers developments that are 'reasonably foreseeable' such as:

- Existing developments either built or in construction;
- Approved developments, awaiting implementation;
- Proposals awaiting determination within the planning process with design information in the public domain, including other ScotWind offshore wind farms that requested a Scoping Opinion, as follows:
  - Quantitative assessment of developments that requested a Scoping Opinion up to six months prior to the submission of this Offshore EIA Report;
  - Qualitative assessment of developments that requested a Scoping Opinion up to five months prior to the submission of this Offshore EIA Report; and
  - Acknowledgement of developments that requested a Scoping Opinion between five and two months prior to the submission of this Offshore EIA Report.

Other offshore activities and industries that are considered include (but are not limited to):

- Marine renewables (offshore wind, wave and tidal);
- Coastal developments, including but not limited to port and harbour developments;
- Marine aggregate extraction, dredging and licensed disposal sites;
- Oil and gas activities;
- Carbon capture and storage; and
- Subsea cables and pipelines.

Other ScotWind developments, Offshore Wind Leasing Round 4 developments, and Innovation and Targeted Oil and Gas (INTOG) leasing round developments are considered where there is sufficient publicly available information to conduct a meaningful assessment of in-combination effects. However, if sufficient detail is not available, it is not possible to conduct a meaningful assessment of potential cumulative effects, and therefore, these developments are not considered within the cumulative effects assessment.

As the transmission infrastructure for the connection of the West of Orkney Windfarm to Flotta Hydrogen Hub is being treated as a separate future development, this is considered within the cumulative effects assessment.

A staged approach was undertaken to identify relevant developments, plans and activities for consideration within the EIA. First, a 'long list' of cumulative developments was collated, based on defined Zones of Influence (ZoI) for each EIA receptor. This long list was then reduced to a short-list by taking potential pathways of impact (e.g. temporal and physical overlap of impacts) into account. The most up-to-date publicly available information in relation to the relevant Project parameters was used to inform the cumulative effects assessment.

When completing the cumulative effects assessment, it is important to consider that some proposed developments may not be taken forward and built out as currently described, and therefore, there is a level of uncertainty with respect to the potential impacts which may arise. The 'phase' of a development, in relation to the certainty or uncertainty over whether the development will be brought forward as described, was considered when drawing conclusions on cumulative effects.

7.7.1 Step 1: Compilation of the cumulative project long-list

The first stage of compiling the cumulative project long-list involves defining ZoIs for each EIA receptor, as listed in Table 7-5. The ZoI's provide the maximum search areas for other developments to be screened into the cumulative project long list. A separate process was conducted for ornithology which is presented in chapter 13: Offshore ornithology.

Table 7-5 Zones of influence (ZoI) for offshore EIA receptors

EIA RECEPTOR	ZOI
Marine physical and coastal processes	• 20 kilometres (km) for Option Agreement Area (OAA); and • 30 km for offshore Export Cable Corridor (ECC).
Water and sediment quality	• 20 km for OAA; and • 30 km for offshore ECC.
Benthic and intertidal ecology	• 20 km (except in the intertidal area where this is reduced to 50 m).
Fish and shellfish ecology	• 100 km
Offshore ornithology	• Topic-specific approach taken see chapter 13: Offshore ornithology.
Marine mammals and megafauna	• Dependent on the marine mammal management unit.
Commercial fisheries	• Dependent on the fishing ground - 100 km for all fleets, with the exception of nomadic scallop dredgers which can fish across the UK coastline.
Shipping and navigation	• 50 nm (approximately 92.6 km).
Marine archaeology and cultural heritage	• 60 km
Military and aviation	• 50 km

EIA RECEPTOR	ZOI
Other sea users	• Any development overlapping the offshore Project area.
Socio-economics	• Everything north of Aberdeen within Scottish waters (including Aberdeen); • All ScotWind developments; and • Onshore developments within the ZoI for chapter 18: Seascape, landscape and visual assessment.
Seascape, landscape and visual assessment	• 60 km

Existing operational developments, at the time of writing, were only screened into the long list if there was considered to be the potential for an ongoing impact from that development type. For most receptors, operational developments were considered to be part of the existing baseline and were assessed as part of the offshore Project specific impact assessment and are therefore not considered within the cumulative impact assessment. The receptors which were considered to have ongoing impacts for cumulative operational effects include:

- Ornithology (collision risk); and
- SLVIA (visual impacts from existing structures).

7.7.2 Step 2: Compilation of the cumulative project short-list

Additional information was gathered on each development within the project long list, to understand the activities, timescales and nature of the developments within the long list. This additional information was then reviewed to determine the potential channels for cumulative effect, taking into consideration potential impact pathways and/or the potential for physical or temporal overlap of impacts from other development activities and those of the offshore Project as follows:

- Potential impact-receptor pathways – i.e. the potential for the receptor to be impacted by the other development. For example – the operation of a subsea cable will not impact visual receptors;
- Spatial interaction – i.e. the potential for the impact from the offshore Project to interact spatially with that of another development. For example, an overlap of piling noise contours; and
- Temporal interaction – i.e. the potential for the impact of the offshore Project to occur either at the same time or sequentially as the impact from the other development (e.g. overlapping piling noise). Therefore, the status of the other developments (e.g. pre-consent, consented, under construction, operational and decommissioning) is taken into consideration. For instance, where cumulative impacts are only expected to arise during the construction stage, only those developments with overlapping construction periods with the offshore Project are screened into the short list. In these instances, developments were screened into the short list if construction is likely to occur in 2027 – 2031 (to account for pre-construction activities e.g. underwater from Unexploded Ordnance (UXO)).

7.8 Inter-relationships

Inter-relationships are defined as the interaction between the impacts assessed within different topic assessment chapters (e.g. impacts on fish and shellfish may indirectly impact commercial fisheries) on a receptor. Inter-relationships have been identified through the consideration of the potential interaction of all impacts across topics on a given receptor. The approach includes the consideration of inter-dependencies where one topic draws upon the findings of another.

Where relevant, inter-relationships with other topic assessment chapters are identified upfront within each topic impact assessment chapter.

7.9 Inter-related effects

The EIA will consider inter-related effects, the potential effects of multiple impacts affecting one receptor. Inter-related effects have been identified through consideration of all effects on a receptor, considering both spatial and temporal overlaps, by the offshore Project. Inter-related effects include interactions between the effects of the different stages of the offshore Project (i.e. the interaction of impacts from construction, operation and maintenance and decommissioning) as well as the interaction between impacts on a receptor within a Project stage.

Where relevant inter-related effects have been considered in each of the topic impact assessment chapters of this Offshore EIA Report.

7.10 Whole Project assessment

The Project, as a whole, is comprised of not only the offshore Project, the focus of this document, but additionally the onshore export cables and the onshore substation (the onshore Project).

The offshore and onshore Projects are seeking consent / permission under different legislative regimes and thus separate applications are being made, supported by separate EIA Reports. As such, a 'whole Project assessment' is presented within each topic impact assessment chapter within this Offshore EIA Report. The intention of this assessment is to provide a holistic overview of the effects from both offshore and onshore Project elements, to ensure that the whole Project impacts and effects are understood and that neither the offshore nor onshore Project is considered in isolation.

A summary of the potential effects from the onshore Project is presented in chapter 21: Onshore EIA summary. For the vast majority of receptors assessed in this Offshore EIA Report there will be no pathway for the respective onshore Project activities to impact and result in effects on the receptors assessed in this document. However, certain assessment topics which are not wholly marine or terrestrial e.g. ornithology, will have potential pathways to the onshore Project and as such may be affected by the onshore Project activities. As such, an assessment of these effects from the respective Project activities are presented where appropriate within the topic impact assessment chapters of the Offshore EIA Report.

7.11 Transboundary effects

Transboundary effects arise when impacts from a development within one European Economic Area (EEA) state's territory affect the environment of another EEA state(s). The EIA Regulations require the assessment of transboundary effects. The Convention on EIA in a Transboundary context (Espoo Convention) is a United Nations Economic Commission for Europe The Convention sets out the obligations of involved Parties, including the UK, to assess the environmental impact of certain activities and the obligation of States to notify and consult each other on all major developments under consideration that are likely to have a significant adverse environmental impact across boundaries. Where there is a potential for a transboundary effect, as a result of the offshore development, these are assessed and detailed within the relevant topic specific chapter.

Potential transboundary impacts are identified and assessed within each topic chapter within this Offshore EIA Report. Where no transboundary effects have been identified this is also stated.

7.12 References

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7.13 Abbreviations

ABBREVIATION	DEFINITION
AA	Appropriate Assessment
CIEEM	Chartered Institute of Ecology and Environmental Management
cSAC	Candidate Special Area of Conservation
ECC	Export Cable Corridor
EEA	European Economic Area
EIA	Environmental Impact Assessment
Espoo Convention	The Convention on EIA in a Transboundary context
HRA	Habitats Regulation Appraisal
IEMA	Institute of Environmental Management and Assessment
INTOG	Innovation and Targeted Oil and Gas
IROPI	Imperative Reasons of Overriding Public Interest'
km	kilometre
LSE	Likely Significant Effect
MD-LOT	Marine Directorate - Licensing Operations Team
MS-LOT	Marine Scotland - Licensing Operations Team
nm	nautical mile
OAA	Option Agreement Area
OIC	Orkney Islands Council

ABBREVIATION	DEFINITION
OWPL	Offshore Wind Power Limited
pSPA	Potential Special Protection Area
RIAA	Report to Inform Appropriate Assessment
SAC	Special Area of Conservation
SCI	Site of Community Importance
SLVIA	Seascape, Landscape and Visual Impacts
SNH	Scottish Natural Heritage
SPA	Special Protection Area
SSSI	Sites of Special Scientific Interest
THC	The Highland Council
UK	United Kingdom
UXO	Unexploded Ordnance
ZoI	Zone of Influence