Chapter 19:
Onshore Biodiversity

ORIEL WINDFARM
OFFSHORE RENEWABLE ENERGY

A TETRA TECH COMPANY

PARK WIND
JERA GROUP

Energy for generations

ORIEL WIND FARM PROJECT

Environmental Impact Assessment Report
Chapter 19: Onshore Biodiversity

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19.1 Introduction

This chapter of the Environmental Impact Assessment Report (EIAR) provides an assessment of the potential impacts of the Oriel Wind Farm Project (hereafter referred to as "the Project") on Onshore Biodiversity (terrestrial and freshwater). Specifically, this chapter considers the potential impact of the onshore infrastructure of the Project above the High Water Mark (HWM) on ecological features during the construction, operational and maintenance, and decommissioning phases. In addition, this chapter assesses the potential impacts of the Project on intertidal birds, (i.e. birds occurring between the HWM and the Low Water Mark (LWM)).

The assessment presented is informed by the following technical chapters:

- Chapter 8: Benthic Subtidal and Intertidal Ecology;
- Chapter 9: Fish and Shellfish Ecology;
- Chapter 11: Offshore Ornithology;
- Chapter 20: Land and Agriculture;
- Chapter 21: Soils, Geology and Hydrogeology;
- Chapter 22: Hydrology and Flood Risk;
- Chapter 27: Landscape and Visual Assessment; and
- Chapter 32: Interactions.

This chapter summarises information contained within technical reports, which are included in appendix 19-1: Onshore Biodiversity - Supporting Information; and appendix 19-2: Intertidal Bird Survey and Onshore Bird Survey Reports.

The details and competencies of the specialist who prepared this chapter can be found in volume 2A, chapter 1: Introduction.

19.2 Purpose of this chapter

The primary purpose of the EIAR chapter is to provide an assessment of the likely direct and indirect significant effects of the Project on Onshore Biodiversity. In particular, this EIAR chapter:

- Presents the existing environmental baseline established from desk studies, site-specific surveys and consultation (section 19.7);
- Identifies any assumptions and limitations encountered in compiling the environmental information (section 19.7.4);
- Presents an assessment of the potential likely significant effects on Onshore Biodiversity arising from the Project (section 19.10), based on the information gathered and the analysis and assessments undertaken. An assessment of potential cumulative impacts is provided in section 19.11 and an assessment of transboundary effects is outlined in section 19.12; and
- Highlights any necessary monitoring (section 19.10.5) and/or measures (section 19.8.2 and section 19.10.4) which could prevent, minimise, reduce or offset the likely significant environmental effects identified in the assessment (section 19.10).

19.3 Study area

The Onshore Biodiversity Study Area (see Figure 19-1) encompasses the onshore cable route between the landfall location, south of Dunany point, and the onshore substation site in proximity to the 220 kV overhead lines, east of Ardee in Co. Louth. The Onshore Biodiversity Study Area passes through an area that is largely of agricultural and rural residential landuse, and utilises the existing roads (L2223, Togher Road, Drumcar/Castlethomas Road, L2226 and N33), with proposed trenchless crossings of the River Dee (Drumcar and Richardstown), the Salterstown Stream, the Port Stream at Togher (Ardballan/Port crossing), and the M1 motorway/Dublin-Belfast rail line.

The Onshore Biodiversity Study Area is determined by the Zone of Influence (ZoI) of the Project, which is described below. The Onshore Biodiversity Study Area is also used to inform the Cumulative Impact Assessment (CIA) (see section 19.11).

19.3.1 Zone of Influence

The ZoI for a project (or 'spatial extent of the impact' as described in Annex III(3) of the EIA Directive) is the area over which ecological features may be subject to significant impacts as a result of the Project and associated activities.

The ZoI is likely to extend beyond the boundary of a development, for example where there are hydrological links extending beyond the site boundaries. Activities associated with the construction, operational and maintenance and decommissioning (and where applicable, restoration) phases should be separately identified (where relevant).

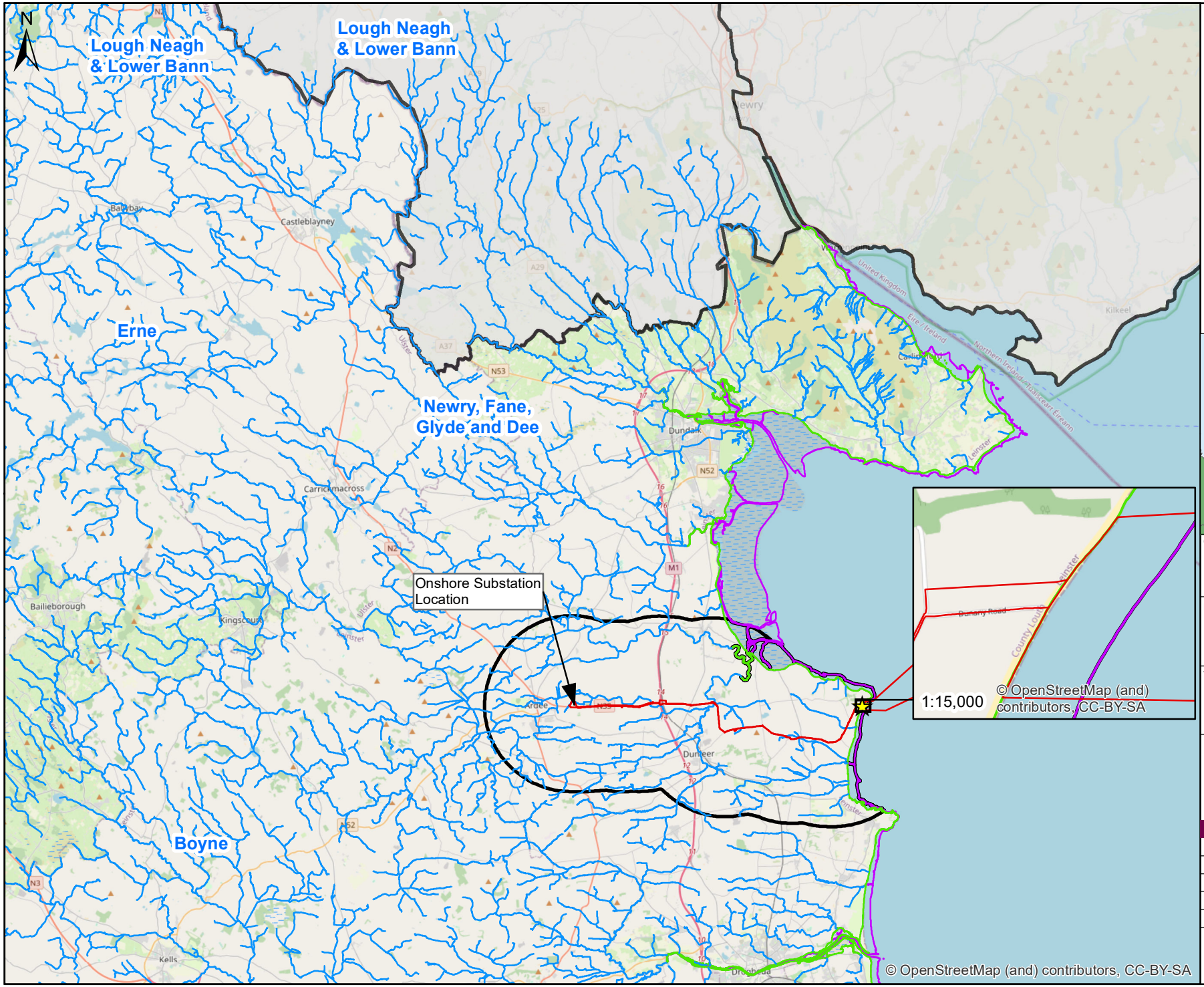
The ZoI will vary for different ecological features depending on their sensitivity to an environmental change. It is therefore appropriate to identify different ZoIs for different features. The features affected could include habitats, species, and the processes on which they depend. ZoIs are specified for different features, and types of potential impact.

It is also important to acknowledge, as per Environmental Protection Agency (EPA) guidance (EPA, 2022) '*that the absence of a designation or documented feature does not mean that no such feature exists within the site*'. As such, a ZoI should be identified for all features potentially occurring within the Project site, in addition to any known to occur. As recommended by the Chartered Institute of Ecology and Environmental Management (CIEEM) (2018), professionally accredited or published studies were used to determine ZoI for this Project.

The Onshore Biodiversity Study Area (see Figure 19-1) is determined by the relevant ZoIs for the ecological features assessed for the Project as outlined in Table 19-1.

Table 19-1: Study area and zone of influence for ecological features.

Ecological Features	Study Area	Zone of Influence
Sites designated for nature conservation (as outlined in section 19.7.1)	Newry, Fane, Glyde and Dee Catchment Management Unit (CMU) (Government of Ireland, 2018)	All sites with connectivity to the Project
Otter	5 km data search	150 m from the planning application boundary (National Roads Authority (NRA), 2006)
Badger	5 km data search	150 m from the planning application boundary (NRA, 2007)
Bats	5 km data search	Planning application boundary and adjoining habitats
Habitats and protected flora (including invasive alien plant species)	5 km data search	Planning application boundary and adjoining habitats
Watercourses	Crossed by the Project	All watercourses crossed by the Project
Birds (breeding)	5 km data search	Onshore cable route
Birds (intertidal)	5 km data search	Landfall location and within 300m
Other rare, threatened, and protected species	5 km data search	Planning application boundary and adjoining habitats

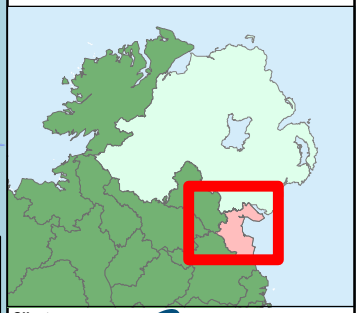


Legend

- Planning Application Boundary
- 5km Buffer
- Landfall Location
- High Water Mark
- Low Water Mark
- Rivers
- Catchment Management Unit

Note: 5km buffer includes all downstream rivers

Data Sources: OWL, EPA, OSi



Client

ORIEL WINDFARM
OFFSHORE RENEWABLE ENERGY

Project

Oriel Wind Farm Project

Title

Figure 19-1: Onshore Biodiversity Study Area

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Issue Details

Drawn By: NR	**Project No.** MDR1520b
Checked By: HF	**File Ref:** MDR1520bArc3014A01
Approved By: CC	
Scale: 1:300,000 @ A4	**Projection:** ITM (IRENET95) Geographic Co-ordinates: ETRS89
Date: 21/11/2023	

19.4 Policy context

Planning policy on renewable energy infrastructure is presented in volume 2A, chapter 2: Policy and Legislation. This section presents planning policy that specifically relates to onshore biodiversity. Policy, guidance and suggested project level mitigation measures in relation to onshore biodiversity (including intertidal), is contained in the Offshore Renewable Energy Development Plan (OREDP) (Department of the Environment, Climate and Communications (DECC), 2022). The OREDP includes guidance on what matters are to be considered in the assessment. The relevant topics, and how these have been considered in this EIAR, are summarised here in Table 19-2.

In February 2023, the 'OREDP II - National Spatial Strategy for the transition to the Enduring Regime' was published in draft and subject to consultation. The key objectives of OREDP II are:

- *"Assess the resource potential for ORE in Ireland's maritime area.*
- *Provide an evidence base to facilitate the future identification of Broad Areas most suitable for the sustainable deployment of ORE in Ireland's maritime area.*
- *Identify critical gaps in marine data or knowledge and recommend prioritised actions to close these gaps".*

The OREDP II will provide an evidence base to facilitate the future identification of Broad Areas of Interest most suitable for the sustainable deployment of ORE in Ireland's maritime area, to be assessed in greater detail at regional scale. This assessment will subsequently inform the identification of more refined areas as part of the designation process for Designated Maritime Area Plans (DMAP).

When published, the OREDP II will update the original OREDP published in 2014.

Biodiversity assessment information is also outlined in the guidance document on wind energy developments and EU nature legislation (European Commission (EC), 2021). The guidance details what matters may require consideration in the assessment. The relevant topics, and how these have been considered in this EIAR, are summarised in Table 19-2.

The move towards 'no net loss' for biodiversity has been identified as an action under objective 1 of the Local Biodiversity Action Plan for County Louth 2021-2026 (LCC, 2021b). The objective recognises the shared responsibility for the conservation of biodiversity and the sustainable use of its components, by all sectors. The relevant actions, and how these have been considered in this EIAR, are summarised in Table 19-2.

Table 19-2: Summary of relevant policy framework and where it is considered in the EIAR.

Summary of relevant policy framework	How and where considered in the EIAR
Climate Action Plan 2024	
The overarching themes of the Climate Action Plan, which are of relevance to the assessment, include: **The Marine Environment**: Key objectives relate to the decarbonisation of the marine energy sector and development of Offshore Renewable Energy (ORE), in tandem with ensuring the conservation, protection and recovery of marine biodiversity. The Plan recognises the ambitious ORE targets required to help meet emissions targets, and also aims to further ensure that development takes place with full consideration for the protection of the marine environment and biodiversity, and that it does so in a sustainable manner. **International Climate Action**: Key objectives relate to the protection and restoration of marine ecosystems, Sustainable Development Goal 14 – 'Life Below Water' (i.e. conserve and sustainably use the oceans, seas, and marine resources for sustainable development), and the overall protection of the marine environment.	The overall aim of these themes are to cut climate emissions, and to protect marine biodiversity. In this regard, the Project aligns directly with the Plan on decarbonising Irish electricity systems. In order to protect biodiversity (where the Onshore Biodiversity Study Area crosses over with the marine environment (i.e. intertidal area) the potential impacts are addressed in section 19.10, and the mitigation provided in section 19.10.4.
Offshore Renewable Energy Development Plan (Department of Communications, Energy and Natural Resources (DCENR), 2014)	
Protected sites and species - suggested project level mitigation measures	

Summary of relevant policy framework	How and where considered in the EIAR
Degradation of protected sites: Careful site selection avoiding sensitive sites for devices and export cables (i.e. existing and proposed protected sites); Modelling of sediment transport; Possible mitigation measures relevant to the specific interest features of the sites and their seasonal and other sensitivities. **Impacts on protected species:** several measures are suggested including careful site selection, avoiding environmental risks through design, characterising sensitive sites and species through surveys and avoiding sensitive seasons.	Chapter 4: Consideration of Alternatives (volume 2A) provides details on site selection and project design. The assessment of marine protected species in relation to sediment transport can be found in volume 2B, chapters 7 to 11. Baseline data collected through site-specific surveys are detailed in appendix 19-1: Onshore Biodiversity – Supporting Information, and section 19.7 of this chapter. Appropriate mitigation measures for relevant ecological features are provided in section 19.8.2.
Marine birds - suggested project level mitigation measures	
Physical disturbance: Surveys to identify key breeding and foraging sites, moulting and migration; Where development occurs near to sensitive sites/areas avoid installation during sensitive seasons (i.e. breeding and moulting); Programme maintenance works to avoid sensitive seasons e.g. breeding; Avoid sensitive sites/areas where possible (i.e. SPAs); Site-specific surveys at project level to identify the presence of key foraging hotspots and/or resting areas and to aid site selection.	Specifically in relation to intertidal birds, baseline data collected through site-specific surveys are detailed in appendix 19-2: Intertidal Bird Survey and Onshore Bird Survey Reports. Appropriate mitigation measures (e.g. avoidance of sensitive seasons) for relevant ecological features are provided in section 19.8.2.
Ireland's 4th National Biodiversity Action Plan (Draft) (Government of Ireland, 2024)	
The overarching objectives and key actions of the Draft 4th National Biodiversity Action Plan, which are of relevance to the assessment, include: **Objective 2:** Meet Urgent Conservation and Restoration Needs. **Outcome 2A**: The protection of existing designated areas and protected species is strengthened and conservation and restoration within the existing protected area network are enhanced; **Outcome 2B**: Biodiversity and ecosystem services in the wider countryside are conserved and restored – agriculture & forestry; **Outcome 2D:** Biodiversity and ecosystem services in the marine and freshwater environment are conserved and restored **Outcome 2H:** Invasive alien species (IAS) are controlled and managed on an all-island basis to reduce the harmful impact they have on biodiversity and measures are undertaken to tackle the introduction and spread of new IAS to the environment.	Objective 2 and the relevant outcomes of the 4th Draft NBAP have been considered through desktop studies (section 19.6.2), site-specific surveys (section 19.6.3), and the assessment of designated areas and species (section 19.10). A terrestrial habitat balance has been completed (see appendix 19-3: Terrestrial Habitat Balance Sheet) to assess No Nett Loss of biodiversity and ensure habitat restoration. Appropriate measures for the control of Invasive Alien Plant Species (IAPS) are provided in section 19.8.2.
Louth County Development Plan 2021-2027 (Louth County Council (LCC), 2021a)	
Planning policy specifically in relation to Biodiversity are of relevance to the assessment. These include policies on the protection of European sites, the promotion and implementation the objectives of the Louth Biodiversity Action Plan and the protection of rare and threatened species. Specific relevant objectives include: **NBG2:** To promote and implement the objectives of the Local Biodiversity Action Plan for County Louth 2021 - 2026 and any subsequent Louth Biodiversity Action Plan published during the life of this Plan. **NBG3:** To protect and conserve Special Areas of Conservation (SACs) and Special Protection Areas (SPAs) designated under the EU Habitats and Birds Directives. **NBG9:** To ensure that proposals for development, where appropriate, protect and conserve biodiversity sites outside designated sites and require an appropriate level of ecological assessment by suitably qualified professionals to accompany development proposals likely to impact on such sites. **NBG10:** To ensure that development proposals, where relevant, improve the ecological coherence of the Natura 2000 Network of	The overall aim of the Local Biodiversity Action Plan for County Louth 2021 – 2026 (objective NBG2) is to protect, enhance and restore biodiversity within the county of Louth. This objective is considered as part of the measures included in the project in section 19.8.2, the potential impacts addressed in section 19.10, and the mitigation provided in section 19.10.4. Objectives NBG3 and NBG10 are addressed within the Natura Impact Statement, provided under separate cover, in addition to the potential impacts section addressed in section 19.10. Objectives NBG9 and NGB11 are addressed within the potential impacts section 19.10, and the measures included in the project in section 19.8.2. Furthermore, in line with NGB9 and with reference to an appropriate level of ecological assessment by suitably qualified professionals, refer to volume 2A,

Summary of relevant policy framework	How and where considered in the EIAR
European Sites and encourage the retention and management of landscape features as per Article 10 of the Habitats Directive. **NBG11:** Where feasible, ensure that no ecological networks, or parts thereof, which provide significant connectivity between areas of local biodiversity, are lost without remediation as a result of implementation of this Plan. **NBG12:** Prevent and control the spread of invasive plant and animal species within the County. **NBG13:** Development sites must be investigated for the presence of invasive species, which if present must be treated and/or eradicated in accordance with best practice. Where appropriate, Invasive Species Management Plans will be prepared for such sites. **NBG14:** To protect from inappropriate development and maintain the character, integrity and conservation value of those features or areas of ecological interest listed as pNHA or that may be designated as NHA, during the lifetime of this Plan. **NBG15:** To ensure that any development within or adjacent to a NHA or pNHA is designed and sited to minimise its impact on the ecological value of the site and to resist development that would result in a significant deterioration of habitats or a disturbance of species.	chapter 1: Introduction which provides the details and competencies of the specialist who prepared this chapter. With reference to objectives NBG12 and NGB13, site specific surveys were undertaken to identify IAPS (section 19.7) and measures are proposed section 19.8.2 in order to prevent their spread. Objectives NBG14 and NBG15 are addressed within the potential impacts section 19.10.2, which addresses proposed Natural Heritage Areas (pNHAs) and specifically Dunany Point pNHA.
Local Biodiversity Action Plan for County Louth 2021-2026 (LCC, 2021b)	
Planning policy specifically in relation to Biodiversity are of relevance to the assessment. These include policies on the protection and enhancement of Louth's biodiversity which are presented in line with the National Biodiversity Action Plan 2017 – 2021. Relevant objectives and actions include: **Objective 1**: Mainstream biodiversity into decision-making across all sectors. Action 2. Louth County Council will require no nett loss of biodiversity in relation to grants of planning permission or in any other activity in which it may have a regulatory role and will, if possible, require nett gain for biodiversity (NBAP action 1.1.3 and influenced by the EU Strategy) **Objective 4**: Conserve and restore biodiversity and ecosystem services in the wider countryside.	A terrestrial habitat balance has been completed (see appendix 19-3: Terrestrial Habitat Balance Sheet) to assess No Nett Loss of biodiversity. Objective 4 has been considered through the collection of baseline information (section 19.7), through the assessment of ecological features (section 19.10) and through the measures included in the project (19.8.2).

19.5 Consultation

Table 19-3 summarises the issues identified during consultation activities undertaken to date, together, with how these issues have been considered in the preparation of this EIAR chapter. Volume 2A, chapter 6: Consultation provides details on the types of consultation activities undertaken for the Project between 2019 and 2024 and the consultees that were contacted.

Table 19-3: Summary of key issues raised during consultation on onshore biodiversity.

Date	Consultee and type of response	Issues raised	Response to issue raised and/or where considered in this chapter
March 2021	Inland Fisheries Ireland (IFI) – online meeting.	Queried if proposed Horizontal Directional Drilling (HDD) crossings of the River Dee can be seasonally restricted to avoid peak movement periods of fish.	Measures have been included section 19.8.2.5 to ensure HDD activities are restricted so as to avoid periods of smolt emigration and adult spawning.
October 2019	DAERA, Northern Ireland, Northern Ireland Environment Agency (NIEA) Natural Environment Division (NED) – response to scoping.	Raised that the Project is subject to the Conservation (Natural Habitats, etc) Regulations (Northern Ireland) 1995 (as amended) (known as the Habitats Regulations).	The Northern Ireland Habitats Regulations are not applicable to this chapter, as the Regulations do not apply outside of the Northern Ireland. However, the equivalent Regulations in the Republic of Ireland (S.I. No. 477/2011 - European Communities (Birds and Natural Habitats) Regulations

Date	Consultee and type of response	Issues raised	Response to issue raised and/or where considered in this chapter
			2011, as amended) are and have been considered in this chapter.
		Natural Environment Division (NED) raised that the closest SPA is Carlingford Lough and that they consider it unlikely that there will be any significant adverse impacts to the habitat features of this designated site due to the substation being located in the Stickillin area, east of Ardee.	Carlingford Lough SPA has been considered and addressed in the context of supporting habitat to Special Conservation Interest (SCI) birds in section 19.10 of this chapter, and within the Natura Impact Statement provided under separate cover.
		NED raised that they would request that Ornithological features of Northern Irelands Special Protection Areas (SPA's) are considered, in relation to feeding areas, in the preparation of the EIAR. In particular NED would highlight potential impacts to: Shearwaters from the Copeland Islands; Terns from Carlingford Lough; and Whooper swan migration corridors.	Ornithological features of SPAs and other important ecological features, occurring in Northern Ireland, and within the ZoI of the Project have been addressed in section 19.10 of this chapter, and within the Natura Impact Statement provided under separate cover.
		NED recommends that all survey works comply with British Standard, Biodiversity—Code of practice for planning and development (42020:2013).	BS42020:2013 is not applicable to this chapter, as the standard does not apply outside of the UK; however, in the absence of an Irish standard the principles outlined in the standard have been informally incorporated into this assessment (sections 19.6, 19.7, 19.8.2 and 19.10).
		NED recommends ecological baseline characterisation and surveys at an appropriate time of the year: • A habitat survey and identification of areas of high nature conservation value or particularly vulnerable to impact; • Flora and fauna; and • Breeding bird and protected species surveys. Surveys should highlight Northern Ireland and EU priority habitats and species, and survey info regarding species vulnerable to persecution should be included as a confidential annex.	Site-specific surveys have been undertaken for habitats, flora and fauna (including those identified as priority habitats and species), and the data collected is presented in appendix 19-1: Onshore Biodiversity- Supporting Information. Site-specific surveys have informed the baseline characterised in section 19.7 of this chapter. Information on species vulnerable to persecution is provided in appendix 19-1: Onshore Biodiversity- Supporting Information, however location specific information will be provided under confidential separate cover.
		Baseline surveys conducted over a short period may not identify long term trends and reference should be made to previous records.	Limitations in relation to data collection are detailed in section 19.7.4. Variation in data (i.e. long term trends) between years and through seasons is bridged through the use of previous records such as desk based information. Desk study information is

Date	Consultee and type of response	Issues raised	Response to issue raised and/or where considered in this chapter
			provided in appendix 19-1: Onshore Biodiversity- Supporting Information.
		Protected species surveys should be carried out to NED specifications. NED website should be checked immediately prior to commencement of surveys.	NED survey specifications are not applicable to this chapter as many do not apply outside the UK. However, many of the guidance documents cited under these specifications have been used for the surveys undertaken.
		Full survey reports should be included and all maps and diagrams should be of an appropriate scale.	Relevant survey information and reports have been provided in appendix 19-1: Onshore Biodiversity- Supporting Information; and appendix 19-2: Intertidal Bird Survey and Onshore Bird Survey Reports.
		NED reserve the right to determine whether the survey info submitted is adequate or when additional info is required.	As this application is outside the jurisdiction of NED, this recommendation does not apply to the Project.
October 2019	Irish Brent Goose Research Group (IBGRG) —response to scoping.	IBGRB raised the following: "*80-90% of the world population of East Canadian High Arctic (ECHA) Brent head south from Strangford Lough to points S and SE from there (mostly S) in late October/November – whether they follow a coastal route or a direct route is currently unknown. A significant proportion of the population also move along this coast northward in March and April during spring migration. I assume you are aware of this and the significant gap in information that exists?*"	Vantage point bird surveys were completed at the landfall (intertidal) and along the cable route (onshore) to establish their presence in relation to the Project (see appendix 19-2: Intertidal Bird Survey and Onshore Bird Survey Reports). A brent geese survey (see volume 2B, appendix 11-3: Migratory Geese Survey Report) also undertaken to support the offshore ornithology chapter (volume 2B, chapter 11: Offshore Ornithology).
October 2019	BirdWatch Ireland – response to scoping.	Advised that there are a couple of small Black Guillemot colonies, one at the north side of Dundalk Bay (Giles Quay) and one to the south, at Clogher Head.	Vantage point bird surveys were completed at the landfall (intertidal) and along the cable route (onshore) to establish their presence in relation to the Project (see appendix 19-2: Intertidal Bird Survey and Onshore Bird Survey Reports).
September 2019	IFI – response to scoping.	Raised the importance of ensuring that mitigation measures are put in place at all locations and stages of the Project to ensure the protection and conservation of the aquatic habitats located therein.	This has been incorporated as part of the measures included in the Project (section 19.8.2).
		Referral made to guidance document entitled 'Guidelines on the Protection of Fisheries during construction works in and adjacent to waters'.	Implementation of these guidelines form part of the measures included in the Project (section 19.8.2).
September 2019	Louth County Council (LCC) – response to scoping.	LCC raised that the coastline is of high intrinsic and special amenity value and is home to a variety of natural habitats, and that Special Areas of	SAC's, SPA's, their habitats (inc. coastal) and other important ecological features occurring in the Republic of Ireland, Northern Ireland, and within the ZoI of the Project have

Date	Consultee and type of response	Issues raised	Response to issue raised and/or where considered in this chapter
		Conservation (SAC) and SPAs designations cover much of the coastline. LCC also raised that the coastline is susceptible to pressure for development which has the potential to encroach on sensitive sites and cause pollution.	been addressed in section 19.10 of this chapter.
September 2023	Department of Agriculture, Environment and Rural Affairs (DAERA), Northern Ireland – response to transboundary consultation	Raised that the Project is located in proximity to Carlingford Lough Special Protection Area (SPA)/Area of Special Scientific Interest (ASSI)/RAMSAR site which is designated for a number of breeding and wintering birds.	Ornithological features of SPAs/RAMSAR sites and other important ecological features, occurring in Northern Ireland, and within the ZoI of the Project have been addressed in section 19.10 of this chapter, and within the Natura Impact Statement provided under separate cover.

19.6 Methodology to inform the baseline

19.6.1 Identification of designated sites

All designated sites for nature conservation (hereafter referred to as 'designated sites') within the Onshore Biodiversity Study Area and ecological features that could be affected by the construction, operational and maintenance, and decommissioning of the Project were identified using the three-step process described below:

- Step 1: All designated sites of international, national and local importance within the Onshore Biodiversity Study Area were identified using a number of sources. These included those outlined in Table 19-4;
- Step 2: Information was compiled on the relevant ecological features for each of these sites; and
- Step 3: Using the above information and expert judgement, sites were included for further consideration if:
  - A designated site directly overlaps or adjoins with the Project;
  - Sites and associated ecological features were located within the potential ZoI for impacts associated with the Project; and
  - Consultation responses specifically mentioned sites to be included in the assessment.

Designated sites and their relevant interest features for the onshore biodiversity chapter are considered further at section 19.7.1 below.

19.6.2 Desktop study

The key sources (i.e. data and reports) used to inform the baseline characterisation of the Onshore Biodiversity Study Area are summarised in Table 19-4 below. These sources provide the most up to date data for this assessment.

Table 19-4: Summary of key desktop sources.

Title	Source	Year	Author
GeoHive Map Viewer	Online interactive mapping tools	2024	Ordnance Survey Ireland, https://webapps.geohive.ie/mapviewer/index.html. Last accessed January 2024.

Title	Source	Year	Author
Map of Irish Wetlands	Online interactive mapping tool	2023	Wetlands of Ireland, http://www.wetlandsurveysireland.com/wetlands/map-of-irish-wetlands--/map-of-irish-wetlands---map/. Last accessed November 2023.
Surface and ground water quality status, and river catchment boundaries	Online interactive mapping tool	2023	Environmental Protection Agency (EPA), https://gis.epa.ie/EPAMaps/default. Last accessed November 2023.
National Parks and Wildlife Service (NPWS) designated area spatial data	Website	2024	NPWS, https://www.npws.ie/maps-and-data/designated-site-data. Last accessed January 2024.
Distribution records for protected species, habitats, and invasive species held online by the National Biodiversity Data Centre (NBDC), NPWS, and Heritage Council.	Online interactive mapping tools	2023	NBDC https://maps.biodiversityireland.ie/Map, Accessed November 2023. NPWS, https://www.npws.ie/maps-and-data/flora-protection-order-map-viewer-bryophytes. Accessed November 2023. Heritage Council, https://heritagemaps.ie/WebApps/HeritageMaps/index.html. Last accessed November 2023.
Local Biodiversity Action Plan for County Louth (2021-2026)	Local Biodiversity Action Plan	2021	Louth County Council
Intertidal bird surveys for proposed landfall, Dunany point, Co. Louth	Report	2020	Aquafact
Checklists of protected and threatened species in Ireland	Report	2019	Nelson *et al.*
Status of EU Protected Habitats and Species in Ireland, Volume 1, 2, and 3	Report	2019a 2019b 2019c	NPWS
Biodiversity Impact Assessment for the Onshore Element of the Oriel Wind Farm	Report	2018	TOBINS
National Biodiversity Action Plan 2023-2030	Report	2023	Government of Ireland
Louth County Development Plan 2021-2027	Report	2021a	Louth County Council (LCC)
County Louth Wetland Survey III	Report	2014	Foss *et al.*
County Louth Hedgerow Survey	Report	2014	Giorria Environmental Services
Bird Atlas 2007–11	Book	2013	Balmer *et al.*
Raptors: A field guide for surveys and monitoring	Book	2013	Hardey *et al.*
County Louth Wetland Survey II and III	Report	2012 2014	Foss *et al.*
Louth Wetland Identification Survey	Report	2011	Foss *et al.*

Title	Source	Year	Author
Bat habitat suitability index	Online interactive mapping tools	2011	Lundy *et al.* (2011) Available via: NBDC https://maps.biodiversityireland.ie/Map, Assessed January 2021.
National and regional surveys of semi-natural habitats	Reports	2008-2015	Grasslands (O'Neill *et al.,* 2013), saltmarsh (McCorry and Ryle, 2009; Devaney and Perrin, 2015), shingle beach (Moore and Wilson, 1999) and woodland (Perrin *et al.,* 2008).
Louth Heritage Plan 2007-2011 and Draft Louth Heritage Plan 2021-2026	Report	2007 and 2021c	LCC
Various Irish red data lists for species	Reports	2006-2020	Nelson *et al.* (2019) for overview; Fitzpatrick *et al.* (2006) for bees; Byrne *et al.* (2009) for non-marine molluscs; Foster *et al.* (2009) for water beetles; Regan et al. (2010) for butterflies; King *et al.* (2011) for fish, amphibians and reptiles; Nelson *et al.* (2011) for Damselflies & Dragonflies; Kelly-Quinn & Regan (2012) for Mayflies; Lockhart *et al.* (2012) for bryophytes; Allen (2016) for macro-moths; Wyse Jackson *et al.* (2016) for vascular plants; Clarke et al. (2016) for cartilaginous fish; Marnell *et al.* (2019) for mammals, and Feeley *et al.* (2020) for stoneflies.

19.6.3 Site-specific surveys

In order to inform the EIAR, site-specific surveys were undertaken. A summary of the surveys undertaken to inform the onshore biodiversity impact assessment is outlined in Table 19-5 with full detailed methodologies outlined in appendix 19-1: Onshore Biodiversity - Supporting Information. The following guidance was considered in the preparation of onshore biodiversity field surveys: the NRA's Ecological Surveying Techniques for Protected Flora and Fauna during the Planning of National Road Schemes (NRA, 2009), which provides useful information on appropriate survey seasons and methods for many of Ireland's protected species.

Table 19-5: Summary of site-specific survey data.

Title	Extent of survey	Overview of survey	Survey contractor	Dates	Reference to further information
Habitats	Onshore substation site, onshore cable route, fibre optic cable connection and landfall.	Habitat classification to Fossitt (2000).	RPS	February, July, and October 2019; September 2020; July and November 2022; and April 2023.	Appendix 19-1: Onshore Biodiversity - Supporting Information.
Protected Flora	Onshore substation site, onshore cable route, fibre optic cable connection and landfall.	Identification of species listed in Flora Protection Order and Red Lists *(*Wyse *et al.,* 2016; Lockhart *et al.,* 2012).	RPS		Appendix 19-1: Onshore Biodiversity - Supporting Information.
Invasive alien plants and animals	Onshore substation site, onshore cable route, fibre optic cable connection and landfall.	Identification of Third Scheduled species of European Communities (Birds and Natural Habitats) Regulations 2011 (as amended).	RPS		Appendix 19-1: Onshore Biodiversity - Supporting Information.
Bat	Onshore substation site, onshore cable route, fibre optic	Preliminary ground level roost assessment, and commuting and	RPS	February, July, October, and December 2019; September 2020;	Appendix 19-1: Onshore Biodiversity -

Title	Extent of survey	Overview of survey	Survey contractor	Dates	Reference to further information
	cable connection and landfall.	foraging habitat suitability.		February 2021; July 2022 and April 2023.	Supporting Information.
		Bat activity.	RPS	August to October 2019; September 2020; July and August 2021; May to September 2023.	
Badger	Onshore substation site, onshore cable route, fibre optic cable route connection and landfall.	Identification of setts and field signs.	RPS	December 2019; February 2021; July 2022 and April 2023.	Appendix 19-1: Onshore Biodiversity - Supporting Information.
Otter	Watercourses crossed by onshore cable route.	Identification of holts and field signs.	RPS	October and December 2019; February 2021; July 2022 and April 2023.	Appendix 19-1: Onshore Biodiversity - Supporting Information.
Other protected mammals	Onshore substation site, onshore cable route, fibre optic cable route connection and landfall.	Identification of field signs.	RPS	During all other site surveys.	Appendix 19-1: Onshore Biodiversity - Supporting Information.
Birds	Onshore cable route.	Counts, location and activity of breeding birds within suitable breeding bird habitat located within the planning application boundary.	RPS	Monthly between April and July 2023.	Appendix 19-1: Onshore Biodiversity - Supporting Information.
	Onshore cable route.	Point count with transect sections.	Aquafact	Monthly between October 2018 and December 2019.	Appendix 19-2: Intertidal Bird Survey and Onshore Bird Survey Reports.
	Landfall location.	Peak counts within 300 m of the landfall location including species, behaviour, and location.	RPS	April to August 2023.	Appendix 19-2: Intertidal Bird Survey and Onshore Bird Survey Reports.
	Landfall location and Dunany north.	Vantage point counts and behaviour within intertidal habitat.	Aquafact	December 2017-December 2019; September 2018-March 2019.	Appendix 19-2: Intertidal Bird Survey and Onshore Bird Survey Reports.
Amphibian and reptiles	Onshore substation site, onshore cable route, landfall, and watercourses crossed by onshore cable route.	Identification of field signs.	RPS	During all other site surveys.	Appendix 19-1: Onshore Biodiversity - Supporting Information.
Invertebrates	Onshore substation site and watercourses	Aquatic survey (rivers and streams).	RPS	October 2019, July 2023.	Appendix 19-1: Onshore Biodiversity -

Title	Extent of survey	Overview of survey	Survey contractor	Dates	Reference to further information
	crossed by onshore cable route.				Supporting Information.
Fish	Watercourses crossed by onshore cable route.	Aquatic assessment survey (rivers and streams).	RPS	October 2019, July 2023.	Appendix 19-1: Onshore Biodiversity - Supporting Information.

19.7 Baseline environment

Key aspects of the baseline environment, identified in the EPA (2022) guidance include context, character, significance, and sensitivity. With reference to onshore biodiversity, the baseline environment describes only 'important ecological features', as detailed by CIEEM (2018).

Complete desk study and field study results are detailed in appendix 19-1: Onshore Biodiversity- Supporting Information and appendix 19-2: Intertidal Bird Survey and Onshore Bird Survey Reports, with summary information outlined in Table 19-6.

Table 19-6: Summary of desk and field study evidence for important ecological features.

Ecological feature	Summary of desk study evidence	Summary of field study evidence
Habitats	Forestry habitats were noted adjoining the onshore cable route (Heritage Maps[1]); hedgerow habitat was noted (Giorria Environmental Services, 2014); shingle beach was noted at the landfall location (*Moore and Wilson, 1999*); and wetlands were noted in the Onshore Biodiversity Study Area (Foss *et al*., 2011 and 2012).	Freshwater, grassland, cultivated and built land, coastland, and woodland and scrub habitats were recorded within the ZoI of the onshore components.
Protected Flora/ Species of Conservation Concern	No protected flora (i.e. Flora Protection Order and Habitats Directive (NPWS 2019a, b, c)) or flora species of conservation concern (i.e. red lists for vascular plants and bryophytes (Lockhart *et al*., 2012; Wyse Jackson *et al*., 2016)), were noted from the desktop study (see Table 19-4).	No protected flora (i.e. Flora Protection Order and Habitats Directive) or flora species of conservation concern (i.e. red lists for vascular plants and bryophytes), were noted from the site-specific surveys.
Invasive alien plants and animals	Four scheduled alien invasive plants and four scheduled alien animals were noted in the data search (NBDC).	Six occurrences of Japanese knotweed *Reynoutria japonica* and one occurrence of water fern *Azolla filiculoides*, both scheduled invasive alien plants, were recorded during the site-specific surveys. No scheduled invasive alien animals were recorded during the site-specific surveys.
Bat	Five bat species of bat were noted in the data search (NBDC), along with a moderate landscape and habitat suitability index score (Bat Conservation Ireland).	Twenty six trees were identified with suitability for roosting bats. The features ranged from low to moderate suitability. The onshore cable route and onshore substation site varied in suitability for commuting and foraging bats, containing sections of negligible, low, and moderate suitability. The only habitat offering moderate suitability is the eastern River Dee crossing. A total of six species of bat (common pipistrelle, soprano pipistrelle, Nathusius' pipistrelle, Leisler's bat, Daubenton's bat, and an unidentified *Myotis*

[1] Available online at: https://heritagemaps.ie/WebApps/HeritageMaps/index.html. Accessed November 2023.

Ecological feature	Summary of desk study evidence	Summary of field study evidence
		species) were recorded from the onshore cable route and onshore substation site during bat activity surveys.
Badger	The presence of badger was noted in the data search (NBDC) within the Onshore Biodiversity Study Area.	Badger evidence (setts entrances and snuffle holes) was recorded within the Onshore Biodiversity Study Area.
Otter	The presence of otter was noted in the data search (NBDC) within the Onshore Biodiversity Study Area.	A single sighting of otter was noted 100 m north of N33 bridge crossing with the River Dee on the 3rd of February 2021. However, no other evidence of otter was found within the Project site or wider area along the River Dee.
Other protected mammals	The presence of Irish hare and hedgehog were noted in the data search (NBDC) within the Onshore Biodiversity Study Area.	Two individuals of Irish Hare were observed during field studies. No other protected mammals were noted from the site-specific surveys.
Birds	96 bird species were noted in the data search (NBDC), of which 25 were Annex I (Birds Directive), 51 were Special Conservation Interest (SCI), 70 were amber listed and 18 were red listed (Gilbert *et al*., 2021).	The onshore breeding bird survey (2023) returned a total of 48 bird species records, of which four are SCI, one is Annex I (Birds Directive), 13 are amber listed and three are red listed (Gilbert *et al.,* 2021). The onshore bird survey (2018/2019) returned a total of 53 bird species records, of which seven are SCI, one was Annex I (Birds Directive), fourteen were amber listed and eight were red listed (Gilbert *et al.,* 2021). The intertidal surveys (2023) recorded a total of 37 bird species, of which 18 are SCI and 5 are Annex I, five are red listed and 22 are amber listed (Gilbert *et al.,* 2021). The intertidal surveys (2019/2020) recorded a total of 34 bird species, of which 29 are SCI, seven are Annex I (Birds Directive), 17 are amber listed and eight are red listed (Gilbert *et al.,* 2021).
Amphibian and reptiles	Common frog was the only amphibian or reptile noted in the data search (NBDC).	No amphibians or reptiles were noted from the field study.
Invertebrates (terrestrial and aquatic)	One butterfly species and one bumblebee species were noted in the data search (NBDC). The Project is outside all known freshwater pearl mussel catchments. White-clawed crayfish have been found on the River Dee historically with the closest record near the confluence with the White River (NPWS 2019a).	No terrestrial invertebrates were noted from the field study. Macroinvertebrate sampling was only applicable to three watercourses, the River Dee at Drumcar Bridge, the Newhall stream and Salterstown stream. Where macroinvertebrate sampling was not possible, a pond sweep was undertaken. A pond sweep was undertaken at three locations - the Rock stream, the Port stream and the Broadlough stream. At one location (River Dee at N33 bridge crossing), no sample could be obtained due to fast flow and water depth. Where kick-samples were completed, no crayfish were recorded. Conditions for crayfish were rated as 'good' at the River Dee N33 bridge crossing and at Salterstown stream; 'very good' at the River Dee at Drumcar. All other locations were rated as poor or no potential for crayfish.
Fish	Rivers (including the River Dee) were identified through consultation (IFI) to contain salmon, brown trout, sea trout, European eel and sea lamprey. Dundalk bay was also noted as containing dogfish, tope, bull huss, mackerel,	Conditions for salmonid and lamprey spawning/habitat were rated as fair at two sites, and very good at one site. All other locations were rated as poor or no potential.

Ecological feature	Summary of desk study evidence	Summary of field study evidence
	codling, spurdog, flounder, whiting, coalfish, ling, gurnard, wrasse and pollack. No waterbodies within the same CMU as the Project are listed in the European Communities (Quality of Salmonid Waters) Regulations, 1998, as amended. One marine fish species was noted in the data search (NBDC).	

19.7.1 Designated sites

Designated sites identified for the onshore biodiversity assessment are described in Table 19-7 and illustrated in Figure 19-2.

The review of designated sites considered nationally and internationally protected sites in the wider area including any potentially linked hydrologically. The lands in which the onshore components are located have no formal designations in relation to onshore biodiversity.

The closest European site (i.e. SAC, candidate SAC (cSAC), SPA, proposed SPA (pSPA), candidate SPA (cSPA)) to the Project is the North-west Irish Sea cSPA (site code: IE004236)[2] (hereafter referred to as "North-west Irish Sea SPA"), which intersects the Onshore Biodiversity Study Area between the HWM and the LWM. The next closest site is Dundalk Bay SPA (site code (IE0004026), which is located approx. 0.6 km to the north of the onshore cable route.

The nearest RAMSAR sites and OSPAR Marine Protected Areas (MPAs) are Dundalk Bay RAMSAR site (site code: 834) and Dundalk Bay MPA (site code: O-IE-0002971), located approx. 3.5 km north of the Project.

The closest Natural Heritage Area (NHA)/ proposed Natural Heritage Area (pNHA) and Wildfowl Sanctuaries to the Project are the Dunany point pNHA (site code: 1858) and Lurgan Green Wildfowl Sanctuary (site code: WFS-36), located within the footprint of the Project and located approx. 8 km north of the Project, respectively.

There are no other designated sites relevant to onshore biodiversity, within the ZoI of the Project.

An Appropriate Assessment (AA) Screening Report and Natura Impact Statement (NIS) have been prepared separate to this EIAR, to assess the potential for likely significant effects and adverse effects on the integrity of any European site(s) and accompanies the application. The NIS concluded that there will be no significant adverse effects on any European Sites.

Table 19-7: Designated sites and relevant qualifying interest for the Onshore Biodiversity assessment.

Designated Site (code)	Closest Distance (km) to proposed onshore substation / cable route / Landfall	Relevant Qualifying Interest /Special Conservation Interest (*Priority SAC Habitat) or Ecological Features of Interest
European Sites (SAC, cSAC, SPA, pSPA/cSPA)		
North-west Irish Sea SPA (IE004236)	Intersects the Project	• Red-throated Diver (*Gavia stellata*) [A001] • Great Northern Diver (*Gavia immer*) [A003] • Fulmar (*Fulmarus glacialis*) [A009] • Manx Shearwater (*Puffinus puffinus*) [A013] • Cormorant (*Phalacrocorax carbo*) [A017] • Shag (*Phalacrocorax aristotelis*) [A018] • Common Scoter (*Melanitta nigra*) [A065]

[2] The North-West Irish Sea cSPA was notified in July 2023, for which conservation objectives were published in October 2023.

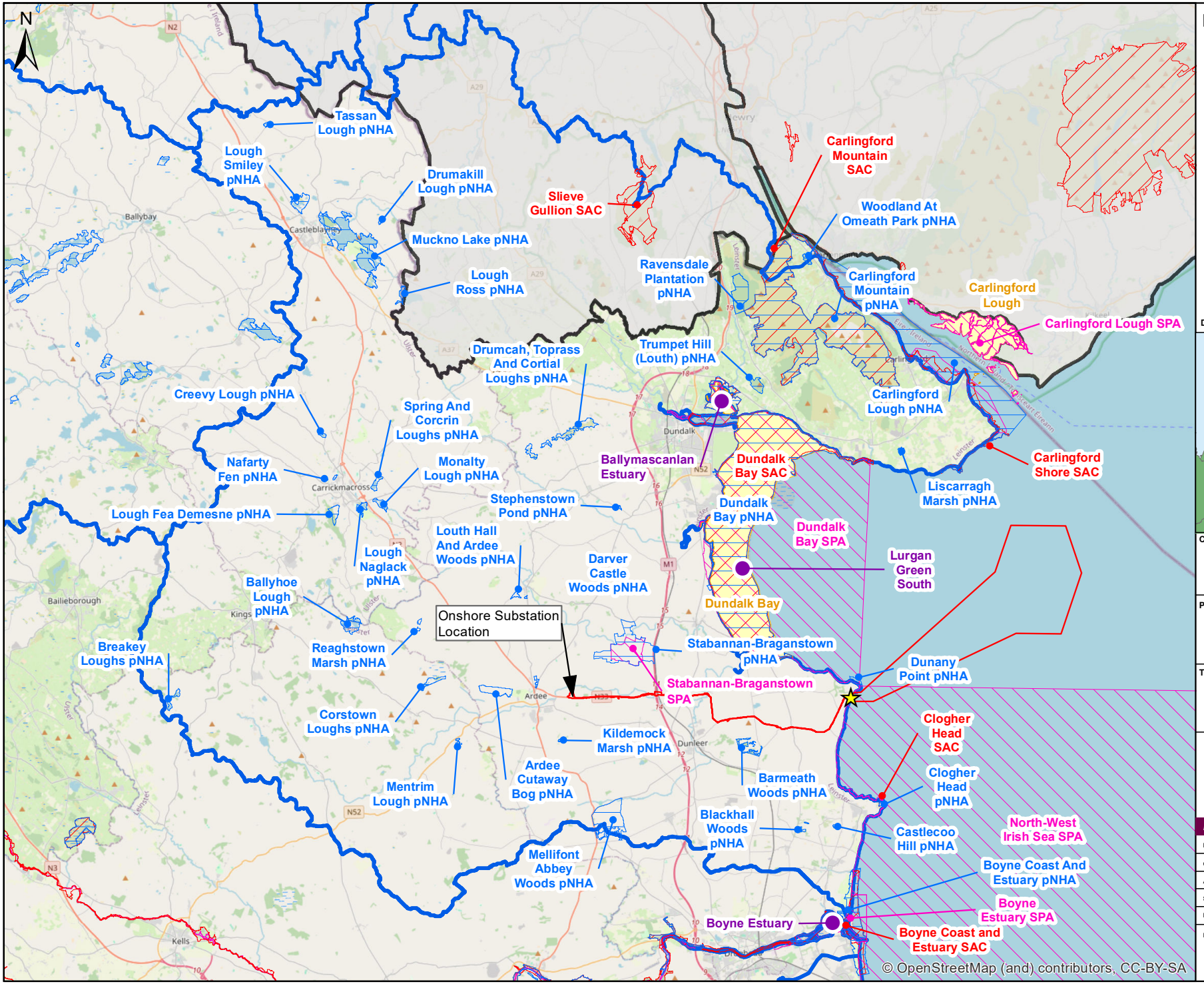
Designated Site (code)	Closest Distance (km) to proposed onshore substation / cable route / Landfall	Relevant Qualifying Interest /Special Conservation Interest (*Priority SAC Habitat) or Ecological Features of Interest
		• Little Gull (*Larus minutus*) [A177] • Black-headed Gull (*Chroicocephalus ridibundus*) [A179] • Common Gull (*Larus canus*) [A182] • Lesser Black-backed Gull (*Larus fuscus*) [A183] • Herring Gull (*Larus argentatus*) [A184] • Great Black-backed Gull (*Larus marinus*) [A187] • Kittiwake (*Rissa tridactyla*) [A188] • Roseate Tern (*Sterna dougallii*) [A192] • Common Tern (*Sterna hirundo*) [A193] • Arctic Tern (*Sterna paradisaea*) [A194] • Little Tern (*Sterna albifrons*) [A195] • Guillemot (*Uria aalge*) [A199] • Razorbill (*Alca torda*) [A200] • Puffin (*Fratercula arctica*) [A204]
Dundalk Bay SPA (IE0004026)	10.1/0.6/0.8	• Great Crested Grebe (*Podiceps cristatus*) [A005] • Greylag Goose (*Anser anser*) [A043] • Light-bellied Brent Goose (*Branta bernicla hrota*) [A046] • Shelduck (*Tadorna tadorna*) [A048] • Teal (*Anas crecca*) [A052] • Mallard (*Anas platyrhynchos*) [A053] • Pintail (*Anas acuta*) [A054] • Common Scoter (*Melanitta nigra*) [A065] • Red-breasted Merganser (*Mergus serrator*) [A069] • Oystercatcher (*Haematopus ostralegus*) [A130] • Ringed Plover (*Charadrius hiaticula*) [A137] • Golden Plover (*Pluvialis apricaria*) [A140] • Grey Plover (*Pluvialis squatarola*) [A141] • Lapwing (*Vanellus vanellus*) [A142] • Knot (*Calidris canutus*) [A143] • Dunlin (*Calidris alpina*) [A149] • Black-tailed Godwit (*Limosa limosa*) [A156] • Bar-tailed Godwit (*Limosa lapponica*) [A157] • Curlew (*Numenius arquata*) [A160] • Redshank (*Tringa totanus*) [A162] • Black-headed Gull (*Chroicocephalus ridibundus*) [A179] • Common Gull (*Larus canus*) [A182] • Herring Gull (*Larus argentatus*) [A184] • Wetland and Waterbirds [A999]
Stabannan-Braganstown SPA (IE0004091)	3.1/1.8/12.9	• Greylag Goose (*Anser anser*) [A043]
Dundalk Bay SAC (IE0000455)	10.1/3.3/4.4	• Estuaries [1130] • Mudflats and sandflats not covered by seawater at low tide [1140] • Perennial vegetation of stony banks [1220] • Salicornia and other annuals colonising mud and sand [1310] • Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) [1330] • Mediterranean salt meadows (*Juncetalia maritimi*) [1410]

Designated Site (code)	Closest Distance (km) to proposed onshore substation / cable route / Landfall	Relevant Qualifying Interest /Special Conservation Interest (*Priority SAC Habitat) or Ecological Features of Interest
Clogher Head SAC (IE00145);	19.4/5.3/6.5	• Vegetated sea cliffs of the Atlantic and Baltic coasts [1230] • European dry heaths [4030]
Boyne Coast and Estuary SAC (IE001957)	10.5/8.6/20.3	• Estuaries [1130] • Mudflats and sandflats not covered by seawater at low tide [1140] • Salicornia and other annuals colonising mud and sand [1310] • Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) [1330] • Mediterranean salt meadows (*Juncetalia maritimi*) [1410] • Embryonic shifting dunes [2110] • Shifting dunes along the shoreline with *Ammophila arenaria* (white dunes) [2120] • Fixed coastal dunes with herbaceous vegetation (grey dunes) [2130]*
Boyne Estuary SPA (IE004080)	21.8/10.1/12.1	• Shelduck (*Tadorna tadorna*) [A048] • Oystercatcher (*Haematopus ostralegus*) [A130] • Golden Plover (*Pluvialis apricaria*) [A140] • Grey Plover (*Pluvialis squatarola*) [A141] • Lapwing (*Vanellus vanellus*) [A142] • Knot (*Calidris canutus*) [A143] • Sanderling (*Calidris alba*) [A144] • Black-tailed Godwit (*Limosa limosa*) [A156] • Redshank (*Tringa totanus*) [A162] • Turnstone (*Arenaria interpres*) [A169] • Little Tern (*Sterna albifrons*) [A195] • Wetlands [A999]
Carlingford Shore SAC (IE002306)	26.3/14.6/14.8	• Annual vegetation of drift lines [1210] • Perennial vegetation of stony banks [1220]
Carlingford Mountain SAC (IE000543)	22.9/17.3/14.7	• Northern Atlantic wet heaths with *Erica tetralix* [4010] • European dry heaths [4030] • Alpine and Boreal heaths [4060] • Species-rich *Nardus* grasslands, on siliceous substrates in mountain areas (and submountain areas, in Continental Europe) [6230] • Transition mires and quaking bogs [7140] • Alkaline fens [7230] • Siliceous scree of the montane to snow levels (*Androsacetalia alpinae* and *Galeopsietalia ladani*) [8110] • Calcareous rocky slopes with chasmophytic vegetation [8210] • Siliceous rocky slopes with chasmophytic vegetation [8220]
River Nanny Estuary and Shore SPA (IE004158)	25.6/16.6/18.6	• Oystercatcher (*Haematopus ostralegus*) [A130] • Ringed Plover (*Charadrius hiaticula*) [A137] • Golden Plover (*Pluvialis apricaria*) [A140] • Knot (*Calidris canutus*) [A143] • Sanderling (*Calidris alba*) [A144] • Herring Gull (*Larus argentatus*) [A184] • Wetland and Waterbirds [A999]

Designated Site (code)	Closest Distance (km) to proposed onshore substation / cable route / Landfall	Relevant Qualifying Interest /Special Conservation Interest (*Priority SAC Habitat) or Ecological Features of Interest
Carlingford Lough SPA (IE004078)	29.3/18.2/18.5	• Light-bellied Brent Goose (*Branta bernicla hrota*) [A046] • Wetland and Waterbirds [A999]
Carlingford Lough SPA (UK9020161)	31.5/20.4/20.7	• Common Tern (*Sterna hirundo*) • Sandwich Tern (*Sterna sandvicensis*), • Light-bellied Brent Goose (*Branta bernicla hrota*)
Slieve Gullion SAC (UK0030277)	27.8/27.4/30.5	• European dry heaths [4030]
Other International Sites (RAMSAR sites and OSPAR Marine Protected Areas)		
Dundalk Bay RAMSAR site (834)	10.1/3.3/0.8	• The site is internationally important for waterbirds regularly holding over 20,000 birds and supporting over 1% of the Northwest European/East Atlantic Flyway populations of numerous species of waterbirds.
Carlingford Lough RAMSAR site (UK12004)	26.3/14.6/14.8	• Includes all lands and intertidal areas seawards to the limits of territorial waters. • Supports important breeding bird populations such as sandwich tern, common tern, roseate tern and Arctic tern. It also supports nationally important numbers of waders such as oystercatcher, ringed plover, grey plover, dunlin and redshank.
Dundalk Bay MPA (O-IE-0002971)	10.1/3.3/0.8	• Estuaries • Mudflats and sandflats
National Sites (NHA, pNHA, National Park, Nature Reserves, Wildfowl Sanctuaries)		
Dunany point pNHA (001856)	16.9/ 0.01 / 0.0	• Coastal headland with the occurrence of shingle beach and the presence of Light-Bellied Brent Geese.
Stabannan-Braganstown pNHA (000456)	2.4/1.7/12.2	• Greylag goose • Wetlands
Louth Hall and Ardee Woods pNHA (001616)	2.0/2.2/19.1	• Mixed, planted and semi-natural deciduous woodland.
Kildemock Marsh pNHA (001806)	2.6/2.6/17.9	• Wetland habitat providing refuge for local wildlife & invertebrate communities.
Dundalk Bay pNHA (000455)	10.1/3.3/4.4	• No information found, but site is contained within Dundalk Bay SAC/SPA (described above).
Ardee Cutaway Bog pNHA (001454)	3.4/3.7/20.8	• Mosaic of bog and heath vegetation with areas of bog mosses (*Sphagnum* spp.) and cottongrasses (*Eriophorum* spp.)
Clogher Head pNHA (001459)	19.4/5.3/6.5	• Vegetated sea cliffs • Dry heaths
Blackhall Woods pNHA (001293)	15.9/5.6/8.2	• Planted woodland with Atlantic communities of bryophytes.
Castlecoo Hill pNHA (001458)	17.7/5.7/7.9	• No information found. Potential for rock outcrops.
Mellifont Abbey Woods pNHA (001464)	6.8/6.2/15.4	• Mixed & wet woodland, conifer plantations, grassland and a lake.
Mentrim Lough pNHA (001587)	7.1/7.3/24.0	• Marsh Fern (*Thelypteris palustris*)
Darver Castle Woods pNHA (001461)	7.5/7.4/16.6	• Mixed wet deciduous woodland with a diverse understorey of orchids.
Corstown Loughs pNHA (000552)	7.6/7.8/24.9	• Variety of habitats supporting several rare plant species of regional interest.

Designated Site (code)	Closest Distance (km) to proposed onshore substation / cable route / Landfall	Relevant Qualifying Interest /Special Conservation Interest (*Priority SAC Habitat) or Ecological Features of Interest
Lurgan Green Wildfowl Sanctuary (WFS-36)	12.9/8.0/10.3	• No information found
Reaghstown Marsh pNHA (001828)	9.9/10.2/26.7	• Freshwater marsh in an area where many similar sites have been destroyed by drainage.
Boyne Coast and Estuary pNHA (001957)	21.8/10.1/12.1	• Saltmarsh habitat
Barmeath Woods pNHA (001801)	10.2/1.26.3	• Demesne woodland dominated by Beech (*Fagus sylvatica*) and Oak (*Quercus* spp.).
Stephenstown Pond pNHA (001803)	11.6/11.4/18.2	• Large, artificially excavated pond that supports a thriving, typical pond wildlife.
Boyne Estuary (part) Wildfowl Sanctuary (WFS-41)	21.1/11.8/14.0	• No information found
Ballyhoe Lough pNHA (001594)	13.5/13.5/30.5	• Acid, peaty lough which contrasts to the calcareous nature of most other loughs in County Meath.
Drumcah, Toprass & Cortal Loughs pNHA (001462)	14.5/14.7/22.8	• The largest areas of open water in Co. Louth displaying marsh transition from open water to grassland.
Carlingford Lough pNHA (000452)	26.3/14.6/14.8	• No information found but site overlaps with Carlingford Shore SAC and Carlingford Lough SPA (described above).
Liscarragh Marsh pNHA (001451)	24.8/15.0/15.2	• Wetland site encompassing open water, swamp, marsh, fen and scrub.
Monalty Lough pNHA (001608)	15.8/16.0/30.7	• Poor quality, nutrient enriched water but host to a rich diversity of birdlife due to abundance of suitable nesting cover.
Lough Naglack pNHA (000561)	16.7/16.9/31.8	• Calcareous lough and marsh, mixed woodland and limestone grassland all supporting a very rich flora.
Spring and Corcrin Loughs pNHA (001671)	17.2/17.4/31.7	• Two calcareous loughs with a stonewort present in each.
Carlingford Mountain pNHA (000453)	22.9/17.3/17.4	• No information found but site is contained within Carlingford Mountain SAC (described above).
Lough Fea Demesne pNHA (000560)	17.8/18.0/33.4	• Limestone grassland extremely rich in diversity and abundance of orchids.
Ballymascanlan Estuary Wildfowl Sanctuary (WFS-35)	20.1/18.0/19.8	• No information found. Due to location, assumed to be sunset of wildfowl species found in Dundalk Bay SPA.
Trumpet Hill (Louth) pNHA (001468)	21.7/18.7/19.4	• A wide range of microflora grow here as the aspect, steep slope and varied plant cover form several suitable habitats.
Nafarty Fen pNHA (002077)	19.5/19.7/34.3	• An unusual wetland habitat for the locality and not impacted by drainage works like other similar habitats.
Creevy Lough pNHA (001599)	21.7/21.9/36.0	• A lough exhibiting different plant communities to other lakes within the region.
Ravensdale Plantation pNHA (001805)	25.3/23.4/24.6	• A largely coniferous plantation that has a particularly rich ground flora not usually found within conifer plantations.
Breakey Loughs pNHA (001558)	23.8/24.0/41.1	• Two small lakes, freshwater marsh, wet woodland, cutover bog and wet grassland.
Lough Ross pNHA (001495)	26.0/26.2/36.6	• A 90 ha. slightly alkaline lake that is one of the largest and least disturbed in the area.
Muckno Lake pNHA (000563)	27.5/27.8/38.4	• The largest lake in Monaghan and is an important habitat for invertebrates and a moderate number of wintering waterfowl.

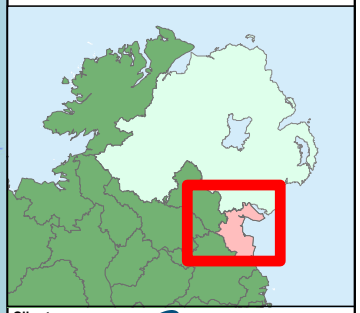
Designated Site (code)	Closest Distance (km) to proposed onshore substation / cable route / Landfall	Relevant Qualifying Interest /Special Conservation Interest (*Priority SAC Habitat) or Ecological Features of Interest
Woodland at Omeath Park pNHA (001465)	30.0/26.7/26.7	• Wet, semi-natural, deciduous woodland and one of the only relatively pure stands of birch in County Louth.
Drumakill Lough pNHA (001600)	31.0/31.3/40.9	• A small lake with wet grassland and freshwater marsh vegetation around its margins.
Lough Smiley pNHA (001607)	33.7/34.0/44.9	• An extensive wetland with a variety of habitats including lakes, freshwater marsh, fen, raised bog, cutover bog mosaic and wet woodland.
Tassan Lough pNHA (001666)	39.4/39.7/50.1	• A small lough situated within an area of Silurian outcrops.



Legend

- Planning Application Boundary
- Landfall Location
- Catchment Management Unit
- Wildfowl Sanctuaries
- Special Protection Area (SPA)
- Proposed Natural Heritage Area (pNHA)
- Special Area of Conservation (SAC)
- Special Protection Area (SPA)
- Ramsar

Data Sources: OWL, EPA, OSi, Ramsar



Client

ORIEL WINDFARM
OFFSHORE RENEWABLE ENERGY

Project

Oriel Wind Farm Project

Title

Figure 19-2: Designated Sites for Nature Conservation

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Issue Details

Drawn By: NR	**Project No.** MDR1520b
Checked By: HF	**File Ref:** MDR1520bArc3015F02
Approved By: CC	
Scale: 1:310,000 @ A4	**Projection:** ITM (IRENET95) Geographic Co-ordinates: ETRS89
Date: 01/02/2024	

19.7.2 Important ecological features

Having defined the relevant baseline conditions within the ZoI of the Project (appendix 19-1: Onshore Biodiversity – Supporting Information), ecological features therein are valued, in advance of commencing the assessment of potential impacts.

The methodology used to value ecological features takes cognisance of the relevant principles underpinning impact assessment under the EPA (2022) guidelines; however, it also has regard for the geographic frames of reference outlined by the NRA (2009). The geographic frames of reference outlined by the NRA (2009) are employed in this chapter.

It is possible that features which are in and of themselves of negligible ecological value (e.g. improved grassland of negligible floristic value) may be of high value in the resource they provide to other features (e.g. a significant resource of invertebrates breeding in the grasslands, which are an important food for local badgers). In some cases, therefore, habitats and species of negligible value may nevertheless be considered of greater importance due to their value to protected species.

'Important Ecological Features', as termed in CIEEM (2018), are defined here as those ecological features which are valued at Local Importance (Higher Value) or above (NRA, 2009; see appendix 19-1: Onshore Biodiversity- Supporting Information). Ecological features below this value are not carried forward to impact assessment.

Table 19-8 summarises all ecological features identified within the ZoI (described above). The identification of Important Ecological Features (IEFs) scoped into the assessment of significance (section 19.10) is based on their ecological evaluation (i.e. whether they are considered important ecological features to be scoped into impact assessment) combined with whether or not they are at risk of significant negative impact from the Project.

Table 19-8: Summary valuation of ecological features and identification of features scoped into the impact assessment.

	Ecological Features	Highest Ecological Valuation within ZoI of the Project	At Risk of Potential Significant Negative Impact	Important Ecological Features (Scoped into Impact Assessment)
Designated Sites	North-west Irish Sea SPA (IE004236)	International	Yes. Potential indirect effects to this site have been identified, as: • A pathway of disturbance for mobile species of the site.	Yes
	Dundalk Bay SPA (IE0004026)	International	Yes. Potential indirect effects to this site have been identified, as: • A pathway of disturbance for mobile species of the site.	Yes
	Stabannan-Braganstown SPA (IE0004091); Clogher Head SAC (IE00145); Boyne Coast and Estuary SAC (IE001957); Boyne Estuary SPA (IE004080); Carlingford Shore SAC (IE002306); Carlingford Mountain SAC (IE000543); River Nanny Estuary and Shore SPA (IE004158); Carlingford Lough SPA (IE004078); Carlingford Lough SPA (UK9020161)	International	No. Direct or indirect effects to these sites are not predicted, as: • No pathway or connectivity within the ZoI of the Project has been identified.	No
	Dundalk Bay RAMSAR site (834)	International	Yes. Potential indirect effects to this site have been identified, as: • A pathway of disturbance for mobile species of the site.	Yes
	Dundalk Bay MPA (O-IE-0002971))	International	Yes. Potential indirect effects to this site have been identified, as: • A pathway of disturbance for mobile species of the site.	Yes
	Dunany point pNHA (1858)	National	Yes. Potential direct and indirect effects to this site have been identified, as: • A pathway of disturbance for mobile species of the site. • A pathway of removal and/or fragmentation for habitats of the site.	Yes
	Stabannan-Braganstown pNHA (000456); Louth Hall and Ardee Woods pNHA (001616); Kildemock Marsh pNHA (001806); Dundalk Bay pNHA (000455); Ardee Cutaway Bog pNHA (001454); Clogher Head pNHA (001459); Blackhall Woods pNHA (001293); Castlecoo Hill pNHA	National	No. Direct or indirect effects to these sites are not predicted, as: • No pathway or connectivity within the ZoI of the Project has been identified.	No

	Ecological Features	Highest Ecological Valuation within ZoI of the Project	At Risk of Potential Significant Negative Impact	Important Ecological Features (Scoped into Impact Assessment)
	(001458); Mellifont Abbey Woods pNHA (001464); Mentrim Lough pNHA (001587); Darver Castle Woods pNHA (001461); Corstown Loughs pNHA (000552); Reaghstown Marsh pNHA (001828); Boyne Coast and Estuary pNHA (001957); Barmeath Woods pNHA (001801); Stephenstown Pond pNHA (001803); Ballyhoe Lough pNHA (001594); Drumcah, Toprass & Cortal Loughs pNHA (001462); Carlingford Lough pNHA (000452); Liscarragh Marsh pNHA (001451); Monalty Lough pNHA (001608); Lough Naglack pNHA (000561); Spring and Corcrin Loughs pNHA (001671); Carlingford Mountain pNHA (000453); Lough Fea Demesne pNHA (000560); Trumpet Hill (Louth) pNHA (001468); Nafarty Fen pNHA (002077); Creevy Lough pNHA (001599); Ravensdale Plantation pNHA (001805); Breakey Loughs pNHA (001558); Lough Ross pNHA (001495); Muckno Lake pNHA (000563); Woodland at Omeath Park pNHA (001465); Drumakill Lough pNHA (001600); Lough Smiley pNHA (001607); Tassan Lough pNHA (001666)			
	Lurgan Green Wildfowl Sanctuary (WFS-36)	County	Yes. Potential indirect effects to this site have been identified, as: • A pathway of disturbance for mobile species of the site.	Yes
	Boyne Estuary (part) Wildfowl Sanctuary (WFS-41); Ballymascanlan Estuary Wildfowl Sanctuary (WFS-35);	Local (Higher)	No. Direct or indirect effects to these sites are not predicted, as: • No pathway or connectivity within the ZoI of the Project has been identified.	No
	FW2 Depositing / lowland rivers	Local (Higher)	Yes. Potential direct effects to these features have been identified, as:	Yes

	Ecological Features	Highest Ecological Valuation within ZoI of the Project	At Risk of Potential Significant Negative Impact	Important Ecological Features (Scoped into Impact Assessment)
Habitats and Flora			• A pathway of removal and/or fragmentation for the feature. • A pathway of surface water run-off carrying suspended silt or contaminants into local watercourses.	
	FW4 Drainage ditches	Local (Lower)	Yes. Potential indirect effects to these features have been identified, as: • A pathway of removal and/or fragmentation for the feature. • A pathway of surface water run-off carrying suspended silt or contaminants into local watercourses. • A pathway of spread of invasive alien species. Although this habitat was recorded within the ZoI of the Project, this ecological feature is valued as Local (lower) value and is not considered an IEF.	No
	GA1 Improved agricultural grassland	Local (Lower)	Yes. Potential direct effects to these features have been identified, as: • A pathway of removal and/or fragmentation for the feature. Although this habitat was recorded within the ZoI of the Project, this ecological feature is valued as Local (lower) value and is not considered an IEF.	No
	GS1 Dry neutral grassland	Local (Lower)	Yes. Potential indirect effects to these features have been identified, as: • A pathway of removal and/or fragmentation for the feature. Although this habitat was recorded within the ZoI of the Project, this ecological feature is valued as Local (lower) value and is not considered an IEF.	No
	GS2 Dry meadow and grassy verges	Local (Lower)	Yes. Potential indirect effects to these features have been identified, as: • A pathway of removal and/or fragmentation for the feature. Although this habitat was recorded within the ZoI of the Project, this ecological feature is valued as Local (lower) value and is not considered an IEF.	No

Ecological Features	Highest Ecological Valuation within ZoI of the Project	At Risk of Potential Significant Negative Impact	Important Ecological Features (Scoped into Impact Assessment)
BC1 Arable crops	Local (Lower)	Yes. Potential indirect effects to these features have been identified, as: • A pathway of removal and/or fragmentation for the feature. Although this habitat was recorded within the ZoI of the Project, this ecological feature is valued as Local (lower) value and is not considered an IEF.	No
CB1 Shingle and gravel banks	Local (Lower)	Yes. Potential indirect effects to these features have been identified, as: • A pathway of removal and/or fragmentation for the feature. Although this habitat was recorded within the ZoI of the Project, this ecological feature is valued as Local (lower) value and is not considered an IEF.	No
CS3 Sedimentary sea cliffs	Local (Lower)	Yes. Potential direct effects to these features have been identified, as: • A pathway of removal and/or fragmentation for the feature. Although this habitat was recorded within the ZoI of the Project, this ecological feature is valued as Local (lower) value and is not considered an IEF.	No
WN2 Oak-ash-hazel woodland	County	No. Direct or indirect effects to these features are not predicted, as: • No pathway or connectivity within the ZoI of the Project has been identified.	No
WD1 (Mixed) broadleaved woodland	Local (Lower)	Yes. Potential indirect effects to these features have been identified, as: • A pathway of removal and/or fragmentation for the feature. Although this habitat was recorded within the ZoI of the Project, this ecological feature is valued as Local (lower) value and is not considered an IEF.	No
WD2 Mixed broadleaved/conifer woodland	Local (Lower)	Yes. Potential indirect effects to these features have been identified, as: • A pathway of removal and/or fragmentation for the feature.	No

	Ecological Features	Highest Ecological Valuation within ZoI of the Project	At Risk of Potential Significant Negative Impact	Important Ecological Features (Scoped into Impact Assessment)
			Although this habitat was recorded within the ZoI of the Project, this ecological feature is valued as Local (lower) value and is not considered an IEF.	
	WS1 Scrub	Local (Lower)	Yes. Potential indirect effects to these features have been identified, as: • A pathway of removal and/or fragmentation for the feature. Although this habitat was recorded within the ZoI of the Project, this ecological feature is valued as Local (lower) value and is not considered an IEF.	No
	WS2 Immature woodland	Local (Lower)	Yes. Potential direct effects to this features have been identified, as: • A pathway of removal and/or fragmentation for the feature. Although this habitat was recorded within the ZoI of the Project, this ecological feature is valued as Local (lower) value and is not considered an IEF.	No
	WL1 Hedgerows	Local (Higher)	Yes. Potential direct effects to these feature have been identified, as: • A pathway of removal and/or fragmentation for the feature. • A pathway of spread of invasive alien species.	No
	WL2 Treelines	Local (Lower)	Yes. Potential direct effects to these features have been identified, as: • A pathway of removal and/or fragmentation for the feature. • A pathway of spread of invasive alien species.	No
	Protected Flora/Species of Conservation Concern	Local (Lower)	No. Direct or indirect effects to these features are not predicted, as: • No pathway or connectivity within the ZoI of the Project has been identified.	No
Fauna	Bats (roosting)	Local (Higher)	No. Direct or indirect effects to this feature are not predicted, as: • No roosting features have been identified within the ZoI of the Project.	No

Ecological Features	Highest Ecological Valuation within ZoI of the Project	At Risk of Potential Significant Negative Impact	Important Ecological Features (Scoped into Impact Assessment)
Onshore Bats (commuting and foraging)	Local (Higher)	Yes. Potential direct effects to this feature have been identified, as: • Disturbance from noise, vibration, lighting and human presence. Although commuting and foraging bats were recorded within the ZoI of the Project, this ecological feature is not deemed to be at risk of significant effect due to the nature of the proposed works (i.e. short-term onshore construction phase). Therefore, this feature is not considered to be an IEF.	No
Badger	Local (Lower)	Yes. Potential direct effects to this feature have been identified, as: • Disturbance from noise, vibration, lighting and human presence. Although breeding and resting sites were recorded within the ZoI of the Project, this ecological feature is valued as Local (lower) value and is not considered an IEF.	No
Otter	Local (Lower)	No. Direct or indirect effects to this feature are not predicted, as: • No pathway or connectivity within the ZoI of the Project has been identified.	No
Other protected mammals (hedgehog, pygmy shrew, pine marten, Irish stoat, red squirrel, Irish hare, and deer species)	Local (Lower)	Yes. Potential direct effects to this feature have been identified, as: • Disturbance from noise, vibration, lighting and human presence. Although breeding and resting sites were recorded within the ZoI of the Project, this ecological feature is valued as Local (lower) value and is not considered an IEF.	No
Birds (onshore)	Local (Higher)	Yes. Potential direct and indirect effects to these features have been identified, as: • A pathway of removal and/or fragmentation for the feature. • Disturbance from noise, vibration, lighting and human presence.	Yes
Birds (intertidal)	Local (Higher)	Yes. Potential direct effects to this feature have been identified, as:	Yes

Ecological Features	Highest Ecological Valuation within ZoI of the Project	At Risk of Potential Significant Negative Impact	Important Ecological Features (Scoped into Impact Assessment)
		• Disturbance from noise, vibration, lighting and human presence.	
Amphibians (common frog and smooth newt) and Reptiles (common lizard)	Local (Lower)	Yes. Potential direct effects to this feature have been identified, as: • A pathway of disturbance from noise, vibration, lighting and human presence. Although records of these species were returned from the data search, this ecological feature is valued as Local (lower) value and is not considered an IEF.	No
Invertebrates (freshwater pearl mussel)	n/a	No. No desk or field study records for this catchment	No
Invertebrates (white-clawed crayfish)	Local (higher)	No. Direct or indirect effects to this feature are not predicted, as: • No pathway or connectivity within the ZoI of the Project has been identified.	No
Invertebrates (aquatic macroinvertebrates)	Local (Lower)	Yes. Potential direct effects to these features have been identified, as: • A pathway of surface water run-off carrying suspended silt or contaminants into local watercourses. Although records of these species were returned from the data search and field stud, this ecological feature is valued as Local (lower) value and is not considered an IEF.	No. However; the ecological importance of this feature is incorporated into the assessment for FW2 Depositing / Lowland Rivers habitats.
Invertebrates (terrestrial)	Local (Lower)	Yes. Potential direct and indirect effects to this feature have been identified, as: • A pathway of disturbance from noise, vibration, lighting and human presence. • A pathway of removal and/or fragmentation for the feature. Although records of these species were returned from the data search, this ecological feature is valued as Local (lower) value and is not considered an IEF.	No
Fish (including lamprey, Atlantic salmon, and trout)	Local (Lower)	Yes. Potential indirect effects to this feature have been identified, as: • A pathway of disturbance from noise, vibration, lighting and human presence.	No

Ecological Features	Highest Ecological Valuation within ZoI of the Project	At Risk of Potential Significant Negative Impact	Important Ecological Features (Scoped into Impact Assessment)
		• A pathway of surface water run-off carrying suspended silt or contaminants into local watercourses. Although records of these species were returned from the data search and field study, this ecological feature is valued as Local (lower) value and is not considered an IEF.	

19.7.3 Future baseline scenario

The European Union (Planning and Development) (Environmental Impact Assessment) Regulations 2018 (hereafter the EIA Regulations 2018) require that "*a description of the relevant aspects of the current state of the environment (baseline scenario) and an outline of the likely evolution thereof without development as far as natural changes from the baseline scenario can be assessed with reasonable effort on the basis of the availability of environmental information and scientific knowledge*" is included within the EIAR.

In the event that the Project is not constructed, an assessment of the future baseline conditions has been carried out and is described within this section.

Table 19-9 outlines the likely evolution of the baseline (i.e. the important ecological features) in the absence of the Project.

Table 19-9: Likely evolution of the baseline in the absence of the Project.

Important Ecological Features		Likely evolution of the baseline in the absence of the Project
Designated Sites	European sites	Designated sites within the ZoI of the Project would likely remain as described in the baseline section of this report into the medium-term future. In the absence of the Project, it is expected that the lands within the planning application boundary would largely remain under the same management regimes. No significant changes to the habitats within the planning application boundary are likely to occur, and the current pressures and threats affecting these sites would remain.
	RAMSAR	
	OSPAR (MPA)	
	National sites (NHA/pNHA, Wildfowl Sanctuary)	
Habitats and Flora	FW2 Depositing / Lowland Rivers	Habitats within the ZoI of the Project would likely remain as described in the baseline section of this report into the medium-term future. In the absence of the Project, it is expected that the lands within the planning application boundary would largely remain under the same management regimes. No significant changes to the habitats within the application boundary are likely to occur, and the current pressures and threats affecting these sites would remain.
Fauna	Birds (onshore)	Fauna within the ZoI of the Project would likely remain as described in the baseline section of this report into the medium-term future. In the absence of the Project, it is expected that the lands within the planning application boundary would largely remain under the same management regimes. No significant changes to the habitats within the planning application boundary are likely to occur, and the current pressures and threats affecting these sites would remain.
	Birds (intertidal)	

19.7.4 Data validity and limitations

Data validity

Data validity depends on the sensitivity of the baseline environment and the nature and type of potential impacts that arise as a result of the Project. Table 19-10 provides details on the validity of the survey data used to inform the onshore biodiversity assessment, and has been reviewed in line with the CIEEM Advice Note on the Lifespan of Ecological Reports and Surveys (CIEEM, 2019). CIEEM (2019) provides guidance on the age of survey data that can be used to inform the assessment. Bat Conservation Trust's (BCT) Bat Surveys for Professional Ecologists: Good Practice Guidelines 4th edition (Collins, 2023) also provides guidance on the age of bat survey data which can be used to inform the assessment. Where CIEEM or BCT do not provide guidance on a particular survey type, professional judgement has been provided.

Table 19-10: Baseline environment - data validity.

Survey Title	Period of survey	Recommended lifespan for the data	Is data valid? Yes /No Notes
Habitats	February, July and October 2019; September 2020; July and November 2022; and April 2023.	18 months - 3 years (CIEEM, 2019)	Yes. There has been limited (if any) change in the land management of the wider area of the Project. Therefore, there has been no significant change in the ecological function or condition of these habitats.
Protected Flora	As for habitats	18 months - 3 years (CIEEM, 2019)	Yes. There has been limited (if any) change in the land management of the wider area of the Project. Therefore, there has been no significant change in the ecological function or condition of habitats in the wider area of the Project, or the likely increase or decrease of the presence of protected flora or IAPS.
Invasive alien plants and animals	As for habitats	18 months - 3 years (CIEEM, 2019)	
Bat – roost potential	February, July, October and December 2019; September 2020; February 2021; July 2022; and April 2023.	12 months (i.e. most recent optimal survey season) (CIEEM, 2019; and BCT, 2023)	Yes. As bats are mobiles species within a dynamic environment (i.e. trees may offer new features over time as a result of breaks etc.) these data are considered valid for one year, and meets the CIEEM recommended advice note of 12 months for mobile-species, and the BCT (2023) guidance where the survey data should be from the most recent optimal survey season.
Bat - activity	August to October 2019; September 2020; July and August 2021; and May to September 2023.	12 months (i.e. most recent optimal survey season) (CIEEM, 2019; and BCT, 2023)	Yes. Commuting and foraging bats are known to occur throughout the wider area of the Project, and are not deemed to be at risk of significant effect due to the nature of the proposed works As described for other mobile species, these data are considered valid for one year, and meets the CIEEM recommended advice note of 12 months, and the BCT (2023) guidance where the survey data should (ideally) be from the most recent optimal survey season.
Badger	December 2019; February 2021; July 2022 and April 2023.	12 months (CIEEM, 2019)	Yes. As badgers are mobiles species within a dynamic environment (i.e. may create new features of relevance such as setts) these data are considered valid for one year, and meets the CIEEM recommended advice note of 12 months for mobile-species.
Otter	October and December 2019; February 2021; July 2022 and April 2023.	12 months (CIEEM, 2019)	Yes. Otters are mobile species, and the Project utilises HDD method in order to avoid suitable freshwater habitat. These data are considered valid for one year (and more based on the Project parameters), and meets the CIEEM recommended advice note of 12 months for mobile-species.
Other protected mammals	During all other site surveys.	12 months (CIEEM, 2019)	Yes. As described for other mobile species, these data are considered valid for one year, and meets the CIEEM recommended advice note of 12 months.

Survey Title	Period of survey	Recommended lifespan for the data	Is data valid? Yes /No Notes
Birds – onshore/ breeding	October 2018 to December 2019; April to July 2023.	12 months (CIEEM, 2019)	Yes. As birds are mobiles species within a dynamic environment (i.e. may utilise new areas for roosting/nesting) these data are considered valid for one year, and meets the CIEEM recommended advice note of 12 months for mobile-species.
Birds - intertidal	December 2017 to March 2019; April to August 2023.	12 months (CIEEM, 2019)	Yes. As birds are mobiles species within a dynamic environment (i.e. changes to land management of intertidal habitat or changes in breeding populations) these data are considered valid for one year, and meets the CIEEM recommended advice note of 12 months for mobile-species.
Amphibian and reptiles	During all other site surveys	12 months (CIEEM, 2019)	Yes. As described above for other mobile species, these data are considered valid for one year, and meets the CIEEM recommended advice note of 12 months.
Invertebrates	October 2019; and July 2023.	18 months (CIEEM, 2019)	Yes. Where there has been no significant landuse change (e.g. fish kills, land management changes, tree felling) , data are considered valid for 1.5 years, and meets the CIEEM recommended advice note of 18 months.
Fish	October 2019; and July 2023.	18 months (CIEEM, 2019)	

Data limitations

Desk study

Sources of desk study information are neither exhaustive nor necessarily easily available, and an extensive effort was made to obtain ecological data in the public domain to inform the description of the baseline environment and its assessment. Additional information, not in the public domain, is likely to exist, but could not be obtained or assessed here. This limitation is acknowledged and incorporated into the assessment is deemed to not affect the certainty or predictability of the EIA.

Field study

The receiving environment (i.e. baseline condition) may naturally vary through seasons and between years (NRA, 2008). All reasonable effort has been made to address this (e.g. combined use of desk and field survey data), and the limitation is acknowledged. Once incorporated into the assessment the limitation is deemed to not affect the certainty or predictability of the assessment.

The timings of the surveys were considered to have been completed during the optimal survey periods (NRA, 2008), however assessment of variation between years has not been incorporated.

The lifespan of ecological data has been assessed against the outline timeframes suggested by CIEEM (2019), and using professional judgment on these timeframes and the likely impacts of the Project, the field studies have been deemed suitable for the purpose of this assessment. These limitations are acknowledged and are not deemed to affect the certainty or predictability of the EIA.

Bat activity

One bat activity survey was completed late in the bat activity survey season (08/11/2019); however, weather conditions were suitable to conduct the survey and bat activity was recorded. Due to an unforeseen delay in getting to site on 19/09/2019, the overall bat activity transect was reduced in extent. The car-based and walked transects were completed as far as possible until dawn, after which no bats are likely to be recorded. The reduced transects started at the onshore substation site and finished approx. 1.3 km northwest and short of the landfall. Listening points 1-4 and the walked transect at Dunany point were, therefore, not

included in this survey. Due to the nature of the limitation, these data limitations are deemed to not affect the certainty or predictability of the EIA.

Badger activity

Access to all areas up to 50 m from the cable junction bays was not possible during surveys due to access requirements onto private lands. To address this limitation, all reasonable efforts were made to survey these areas, including observation from public land and vantage points using binoculars. Furthermore, pre-construction surveys for badger are being proposed (see section 19.8.2.4). This limitation is acknowledged and incorporated into the assessment. Due to the habitat type present and utilising the professional judgement of the surveyors, these data limitations are deemed to not affect the certainty or predictability of the EIAR.

Aquatic features (fish, invertebrates, and habitat)

Due to flood conditions during the field study, the aquatic bio-index assessment was not applied in some water bodies as high flows limited safe access to rivers. However, to address this limitation the EPA latest River Q-Values have been used to supplement the assessment of the aquatic features. These data limitations are deemed to not affect the certainty or predictability of the EIAR.

19.8 Key parameters for assessment

19.8.1 Project design parameters

The project description is provided in volume 2A, chapter 5: Project Description. Table 19-11 outlines the project design parameters that have been used to inform the assessment of potential impacts of the construction, operational and maintenance and decommissioning phases of the Project on an identified receptor or receptor group.

The final location and layout of the Transition Joint Bay (TJB) will be confirmed post consent on examination of the electrical and thermal properties of the selected offshore export cable and the ground conditions at the landfall (design flexibility - see volume 2A, chapter 5: Project Description). For the purposes of the assessment presented in section 19.10, both options have been assessed.

Table 19-11: Project design parameters considered for the assessment of potential impacts on onshore biodiversity.

Potential impact	Phase[1] C O D	Project design parameters	Justification
Disturbance from noise, vibration, lighting and human presence on ecological features	✓ x ✓	**Construction phase:** All construction activities (including mobilisation, site investigations, excavation, through to reinstatement) and machinery used to construct the onshore infrastructure including the TJB (TJB) (Option 1 / Option 2), 29 joint bays, 20.1 km of onshore cable, substation, grid connection and fibre optic cable connection, within the planning application boundary over a 27 month construction programme. This includes all excavations and potential for night time working for the installation of the onshore cable from the landfall to the onshore substation site; HDD activities at five locations, open trench crossings at three locations; seven temporary construction compounds, and all excavations and works to construct the onshore substation. Disturbance from construction activities also includes works between the LWM and HWM i.e. installation and trenching of the offshore cable for connection to the onshore cable at the transition joint bay.	Activities within the planning application boundary that have the potential to result in disturbance.

Potential impact	Phase[1] C O D	Project design parameters	Justification
		Decommissioning phase: Removal of onshore substation infrastructure and removal of onshore cable i.e. cable, joint bays and link boxes.	
Removal and/or fragmentation of important ecological features	✓ x x	Permanent removal of vegetation and habitats at onshore substation, TJB. Temporary removal of vegetation and habitats at passing bays (where located away from the public road), and installation of onshore cable.	The maximum spatial extent of habitats which will be removed (temporarily/permanently) in the planning application boundary.
Surface water run-off carrying suspended silt or contaminants into local watercourses	✓ x ✓	All excavations and works in the planning application boundary.	The area where surface water run-off carrying suspended silt or contaminants could arise and discharge into local watercourses.

1 C= Construction, O = Operation, D = Decommissioning

19.8.2 Measures included in the Project

As part of the project design process, a number of measures have been proposed to reduce the potential for impacts on onshore biodiversity. These measures include designed-in and management measures (controls). As there is a commitment to implementing these measures, they are considered inherently part of the design of the Project and have therefore been considered in the assessment presented in section 19.10 (i.e. the determination of magnitude and therefore significance assumes implementation of these measures).

These measures are considered standard industry practice for this type of Project. This approach has taken regard of the mitigation hierarchy as described by CIEEM (2018), where a sequential process is adopted to avoid, mitigate and compensate negative ecological impacts and effects.

19.8.2.1 Suitably qualified and experienced Ecologist

A suitably qualified and experienced ecologist (hereafter referred to as 'the ecologist') will be utilised in the implementation of the measures and survey requirements outlined in this chapter. The ecologist will be a full member of a relevant institution, such as the Chartered Institute of Ecology and Environmental Management (CIEEM), have relevant experience in the management of mitigation measures and ecological constraints on construction sites/restoration projects, and hold or have previously held a protected species derogation licence in the Republic of Ireland.

19.8.2.2 Construction Environmental Management Plan (CEMP)

For overall onshore biodiversity management during construction, a CEMP has been prepared and will be implemented (see volume 2A, appendix 5-1: Construction Environmental Management Plan). The CEMP will cover the construction phases of the Project and will include planning for accidental spills, address all potential contaminant releases and include key emergency contact details. The CEMP will be updated by the Contractor following receipt of planning consent to ensure that all relevant planning conditions are incorporated as environmental management measures to be applied during the construction phase.

19.8.2.3 Reduction of impact on sites designated for nature conservation

The offshore cable corridor of the Project will traverse Dunany point pNHA.

Two locations for the construction of the TJB are proposed as part of the Project. Only one of these options will be constructed. For TJB option 1, no habitat removal within the pNHA is required.

For TJB option 2 an approximate 234 m^2 area of scrub and vegetated sedimentary sea cliffs within the pNHA will need to be temporarily disturbed for open trenching and sheet piling works for the offshore cable corridor. For revegetation within the pNHA, the profile of the sea cliffs will be reinstated and vegetation will be allowed to naturally regenerate after construction. The ecologist will supervise the works within the pNHA.

Apart from the work proposed within the pNHA, a 10 m buffer zone from Dunany Point pNHA will be implemented on the landward side within the planning application boundary. The buffer zone will be physically demarked using post and rail/post and rope/bunting, or equivalent, and be signposted to identify an ecological sensitivity. The ecologist will assess and verify the demarcation and signage before works commence.

In addition to the measures above, timing of the works at the landfall location (i.e. TJB, the onshore cable, and the offshore cable construction where it occurs between the LWM and HWM) will avoid the peak season for intertidal birds (October to April, inclusive). Timing of vegetation removal works will avoid the bird nesting season (March to August, inclusive).

19.8.2.4 Pre-construction surveys

At least one month in advance, but no greater than six months in advance, of commencing any enabling or advance works, a pre-construction survey for protected and invasive species will be undertaken. The surveys will be undertaken by an ecologist. The ecologist will also advise on any additional relevant protective measures and/or licensing requirements resulting from the pre-construction survey findings.

The ecologist will complete pre-construction protected species surveys (within a suitable season), which will assess the known locations of relevant protected species and will also assess the onshore components of the Project. The ecologist will feed any additional mitigation measures resultant from these surveys into the CEMP *(*see volume 2A, appendix 5-1: Construction Environmental Management Plan*).*

The ecologist will complete pre-construction invasive alien plant species surveys (within a suitable season), which will assess the know locations of invasive alien plants (see appendix 19-1: Onshore Biodiversity – Supporting Information) and will also assess the onshore components of the Project. The ecologist will feed any additional mitigation measures resultant from these surveys into the CEMP (see volume 2A, appendix 5-1: Construction Environmental Management Plan)*.*

The results of the pre-construction surveys will be used by the ecologist to advise the Applicant on potential implications of any potential breeding or resting sites identified, in the light of the development programme and licensing requirements.

19.8.2.5 Disturbance measures

The following measures, outlined in Table 19-12, are proposed to reduce the potential impacts from disturbance on the important ecological features.

Table 19-12: Disturbance measures.

Disturbance measures	Phase[1]		
	C	*O*	*D*
Timing of landfall works (i.e. installation of the cable in the intertidal and shingle banks) will avoid the peak season for intertidal birds (October to April, inclusive).	✓	x	✓
Timing of HDD works will avoid the peak movements of fish (i.e. fish migration into rivers for spawning, and smolt emigration from the river to the sea) between March-May (smolt emigration) and June-August (return for spawning).	✓	x	✓
Timing of works in the intertidal area (i.e. cable repair and reburial) will avoid the peak season for intertidal birds (October to April, inclusive).	x	✓	x
The removal of existing hedgerow will avoid the bird nesting season (March to August, inclusive).	✓	✓	✓
Any external lighting utilised to facilitate night-time working or security (i.e. at the onshore substation site, onshore cable route and landfall location) will be directional and cowled to avoid the light spill (above 1 LUX) to all relevant important ecological features (IEFs).	✓	✓	✓
In the unlikely event that roosting or stranded bats are encountered on the Project, works will immediately cease in that area and the local NPWS Conservation Ranger will be contacted. If present, bats will only be removed under licence from the NPWS.	✓	✓	✓

Disturbance measures	Phase[1]		
	C	O	D
All works within the disturbance range of identified badger setts will implement the following: • Prior to works commencing within the vicinity of any sett, all site personnel will be given a Toolbox talk where operatives will be briefed on the presence of the sett and the legal protection and exclusion buffer zones that badgers and setts are afforded; • Any piling, drilling, and tunnelling will take place at a distance greater than 150 m from identified badger setts; • An exclusion buffer zone of 30 m will be maintained around the setts in the summer season (July to October, inclusive), extended to 50 m during the badger breeding season (November to June, inclusive); • All overburden mounds will be sited at a minimum distance of 50 m from any identified sett; • The buffer zones will be physically demarked using post and rail/post and rope/bunting, or equivalent, and be signposted to identify an ecological sensitivity. The sensitive protected species (e.g. badger) will not be identified in any signage. The ecologist will assess and verify the demarcation and signage before works commence; and • In the event that previously unidentified badger setts are detected, the recommendations set out in the Guidelines for the Treatment of Badgers during the Construction of National Road Schemes (NRA, 2007) will be applied, and the ecologist will formally agree any proposed additional mitigation measures with the local NPWS Conservation Ranger. Further consultation and wildlife derogation licences may be required.	✓	×	✓

1 C= Construction, O = Operation, D = Decommissioning

19.8.2.6 Surface water pollution measures

The following measures, outlined in Table 19-13, are proposed to reduce the potential impacts from surface water pollution on the IEFs.

Table 19-13: Surface water pollution measures.

Surface water measures	Phase[1]		
	C	O	D
• Prior to construction, all Methods Statements for watercourse crossings will be issued to IFI for agreement; • All instream works will avoid the IFI recommended 'closed season' (October to May, inclusive); • All works will be undertaken in accordance with IFI Guidance on the protection of fisheries during construction works in and adjacent to waters (IFI, 2016); and • All construction works will be undertaken in accordance with Construction Industry Research and Information Association (CIRIA) Guidance (CIRIA, 2001; CIRIA 2006a; CIRIA 2006b) titled "Control of water pollution from construction sites (C532)" and "Control of water pollution from linear construction projects (C648 and C649)".	✓	✓	✓
For the general protection of watercourses, the following measures will be employed: • Stockpiling of construction materials will be strictly prohibited within 5 m of any ditch or water-laden channel; • Hazardous materials including diesel, fuel oils, solvents, paints and/or lubricants stored on site will be stored within suitably designed bunded areas with a bund volume of 110% of the capacity of the largest tank/container; • Re-fuelling of plant will not occur within 20 m of any watercourse or surface water/groundwater feature. Drip trays will be used, and spill kits will be kept available and used if necessary; • Fuel will be transported in a mobile, double skinned tank;	✓	×	✓

Surface water measures	Phase[1]		
	C	*O*	*D*
• Waste oils and hydraulic fluids will be collected in leak-proof containers and removed from the site for disposal or recycling; • Only emergency breakdown maintenance will be carried out on site. Emergency procedures and spillage kits will be readily available at strategic site locations and relevant all will be familiar with emergency procedures; and • Any spillage of fuels, lubricants of hydraulic oils will be immediately contained, with an appropriate emergent response put in place. Any contaminated soil will be removed from the site and properly disposed of.			
For the protection of watercourses associated with the onshore substation site, the following measures will be employed: • All ready-mixed concrete will be brought to site by truck. A suitable risk assessment for wet concreting will be completed prior to works being carried out which will include measures to prevent discharge of alkaline waste waters to the underlying subsoil. Wash down and washout of concrete transporting vehicles will take place at an appropriate facility offsite; • Ensure run-off generated from dewatering activities for discharge to surface waters is treated utilizing temporary settlement pond/tanks(s) in accordance with CIRIA Report No.113 titled “Control of groundwater for temporary works” (CIRIA, 1986); • Concrete will be contained and managed appropriately to prevent pollution of watercourses. Concrete pouring will be prevented during periods of heavy rainfall, and quick setting mixes will be used; and • Waste materials will be stored in designated areas that are isolated from surface water drains. Skips will be closed or covered to prevent materials being blown or washed away.	✓	x	✓
For the protection of watercourses associated with the trenchless works (i.e. horizontal directional drilling) at the M1 motorway/railway, River Dee (Richardstown and Drumcar), Ardballan/Port streams (Togher) and Salterstown stream, the following measures will be employed: • A buffer zone of at least 10 m will be established from the River Dee, Ardballan/Port streams and Salterstown stream crossings. The buffer zones will be physically demarked using post and rail/post and rope/bunting, or equivalent, and be signposted to identify an ecological sensitivity. The ecologist will assess and verify the demarcation and signage before works commence; • Silt fencing will consist of a maintainable geotextile membrane (equivalent to Terrastop™ Premium; 250 micron; 45 l/m2/sec). Installation, maintenance, and removal will follow the manufacturers’ specifications. The geotextile membrane will be inspected at least once a week and following any period of heavy rainfall; and • HDD crossing design will ensure no hydraulic connection or interference with the watercourses. Additionally, for the protection of watercourses associated with the use of bentonite during HDD operations: • At pre-construction, detailed site investigations will be undertaken to inform the final design of the HDD route. The results of the site investigations will be used to inform the design and to prevent the risk of a bentonite break out; • An aquatic ecologist will be required onsite to observe the HDD drill operations to ensure that no bentonite leaks or escapes into nearby surface waters; • Bentonite batching locations will be located at least 10 m from watercourses in order to minimise bentonite leaks and spills; • Earth banks and sand bag barriers will be used alongside silt fencing around bentonite batching areas in order to minimise bentonite leaks and spills; • The pressure of bentonite pumping will be strictly monitored, and lowered if necessary to mitigate against a bentonite breakout;	✓	x	✓

Surface water measures	Phase[1]		
	C	*O*	*D*
• Monitoring of watercourses will be undertaken while works are in progress using hand-held water probes to measure pH, alongside visual observations for water quality characteristics including colour and turbidity; • Bentonite will be recycled through the HDD process but must be disposed of as controlled waste at the end of construction; • Should any inadvertent bentonite release occur, containment and clean-up operations will be in place, and works will cease immediately; • For releases on land, the Contractor will make immediately available (and the resources to deploy them) - silt fences, sand bags and earth berms to prevent fluid from migrating or flowing from the immediate area of the discharge. Clean up operation will include removal equipment such as vacuum trucks and small pumps.			
For the protection of watercourses associated with the onshore cable route, the following measures will be employed: • Waste materials will be stored in designated areas that are isolated from surface water drains. Skips will be closed or covered to prevent materials being blown or washed away.	✓	x	x
For all works associated with joint bays 10-29, and the transition joint bay, inclusive, the following measures will be employed: • All ready-mixed concrete will be brought to site by truck. A suitable risk assessment for wet concreting will be completed prior to works being carried out which will include measures to prevent discharge of alkaline waste waters to the underlying subsoil. Wash down and washout of concrete transporting vehicles will take place at an appropriate facility offsite; • Ensure run-off generated from dewatering activities for discharge to surface waters is treated utilizing temporary settlement pond/tanks(s) in accordance with CIRIA Report No.113 titled “Control of groundwater for temporary works” (CIRIA, 1986); • Concrete will be contained and managed appropriately to prevent pollution of watercourses. Concrete pouring will not occur during periods of heavy rainfall, and quick setting mixes will be used; and • Waste materials will be stored in designated areas that are isolated from surface water drains. Skips will be closed or covered to prevent materials being blown or washed away. • Open trench crossings at the Newhall stream and the Port stream at Clonmore will be achieved by fluming the existing stream flow through one or more pipes depending on the size of the flows in the stream. The flume pipe(s) will be approx. 10 m long and the diameter suitable to accommodate the existing flows. Where applicable, under the supervision of the ecologist, spawning gravels will be removed at the stream crossing areas where construction will take place. The extent of spawning gravel removal will be agreed for each site with IFI prior to construction commencing. Following the installation of the cable ducts, the stream bed (and associated riparian habitat) will be reinstated with original or similar material and the spawning gravels replaced under the supervision of the aquatic ecologist.	✓	x	✓

1 C= Construction, O = Operation, D = Decommissioning

19.8.2.7 Removal and/or fragmentation measures

The following measures, outlined in Table 19-14, are proposed to reduce the potential impacts from destruction and/or fragmentation on the important ecological features.

Table 19-14: Removal and/or fragmentation measures.

Removal and/or fragmentation measures	Phase[1]		
	C	*O*	*D*
The removal of existing hedgerow will avoid the bird nesting season (March to August, inclusive).	✓	✗	✓
Replacement at all hedgerow and treeline removal locations will be undertaken and the following measures will be employed: • All replacement planting will be of native tree/shrub species of Irish providence (i.e. from within the island of Ireland). See also chapter 26: Cultural Heritage in relation to replanting of the woodland shelterbelt associated with the former Drumcar Demesne; • Replacement planting at each location will be dominated by native species identified for those locations within the baseline. Where ash was the dominant hedgerow species removed, hawthorn or blackthorn will be planted as dominant instead; • The dominant tree species in the planting will be feathered whips, while sub-dominant species will be greater than 40 cm in height. • All replacement hedgerow planting will contain, at a minimum, four native tree/shrub species; • Planting will follow a double-row format of zig-zag pattern, with row spacing at 50 cm and tree spacing at 40-45 cm; • All replacement hedgerows will be maintained for eight years, with seasonal checks by a suitably qualified arboriculturalist/ecologist for the first two years and yearly checks for the subsequent six years. A rate of 90% living individuals after four years and 80% living individuals at eight years will be retained, with replacement planting as required. Any gaps greater than 1 m will be replanted with native tree/shrub species of similar size to those adjacent; • Depending on the progression of hedgerow/tree replanting and restoration, maintenance of vegetation may extend beyond an eight year period. This will be determined by a suitably qualified ecologist.	✓	✗	✗
Replacement of hedgerow associated with joint bay 20 will also include 20-40% replanting with spindle. Maintenance, as outlined above, will also be completed.	✓	✗	✗
Several mature trees, identified as having low and moderate suitability for roosting bats (BT2, BT3, BT6, BT7, BT24, BT25) will be retained.	✓	✗	✗
Several mature trees, identified as having low suitability for roosting bats (BT4, BT5, BT14-18) are assessed to be removed. These trees will be 'soft' felled. Soft felling will include the following measures: • Felling to be undertaken under the supervision of the ecologist; • Felling of entire tree from base, allowing the tree to fall (i.e. no introduced force); • The ecologist will inspect the felled tree for further evidence of bat roosting. If evidence is found, all works on that tree will be halted and the local NPWS Conservation Ranger will be contacted. No further works on that tree will be permitted without agreement from the NPWS; • Tree to be left in place (uncut) for 24hrs, after which, sectioning, chipping, and removal can take place.	✓	✗	✗

1 C= Construction, O = Operation, D = Decommissioning

19.8.2.8 Invasive Alien Plant Species

The following measures, outlined in Table 19-15, are proposed to reduce the potential impacts from invasive alien species on the important ecological features.

Table 19-15: Invasive alien species measures.

Invasive alien species measures	Phase[1]		
	C	*O*	*D*
Before construction begins, avoidance and management measures for invasive alien plant species (IAPS) listed in the third schedule for the EC birds and Natural Habitats Regulations, 2011 (as amended) will be implemented by the ecologist or a suitably qualified and experienced invasive species specialist. These measures will include the following information and management protocols for dealing with occurrences of scheduled invasive species: • Pre-construction field survey for IAPS within the planning application boundary of the Project will be completed by the Ecologist; • A buffer zone of 10 m will be put in place around all known location of IAPS. The buffer zone will be physically demarked using post and rail/post and rope/bunting, or equivalent, and be signposted to identify an ecological sensitivity. The ecologist will assess and verify the demarcation and signage before works commence; • Prior to works commencing within the vicinity of any IAPS, all site personnel will be given a Toolbox talk where operatives will be briefed on the presence of the IAPS and the legal protection that badgers and setts are afforded; • All excavated material within 7 m of the IAPS locations will be considered to be contaminated with material (roots, stem fragments, or seeds) suitable to cause the spread of IAPS (see Transport Infrastructure Ireland (TII), 2020) and be disposed of at an appropriately licensed waste facility; and • No disturbance of IAPS will take place during the works, apart from essential works within the 7m buffer zone for construction of the Project.	✓	x	✓
The materials which are introduced to the site during the construction will be free from scheduled invasive species, with certification of such.	✓	x	x
Where a scheduled invasive species is accidentally introduced or becomes established within the Project site during pre-construction surveys and/or the construction phase, works will be immediately halted and an effective exclusion zone will be erected (minimum 10 m) until such time that the ecologist/invasive species specialist can assess the site(s), and implement the required management protocol (as set out in the measures above).	✓	x	✓

1 C= Construction, O = Operation, D = Decommissioning

19.8.3 Impacts scoped out of the assessment

On the basis of the baseline environment and the project description outlined in volume 2A, chapter 5: Project Description, a number of impacts are proposed to be scoped out of the assessment for onshore biodiversity. These impacts are outlined, together with a justification for the scoping out decision, in.

Table 19-16: Impacts scoped out of the assessment for onshore biodiversity.

Potential impact	Justification
Changes of groundwater quality, yield and/or flow paths associated with earthworks and impacts on ecological features, during all phases.	There are no specific groundwater features (e.g. Groundwater Dependant Terrestrial Ecosystems (GWDTE) or species) which could be affected as a result of excavation activities or any interaction with the groundwater table. Interaction with the groundwater table when it occurs is considered infrequent and small in scale and will not significantly alter groundwater yield and flow paths.
Construction dust and dust associated with the operational and maintenance phase.	During the construction phase and as described in chapter 23: Air Quality, dust emissions are considered to be negligible. During the operational and maintenance phase, due to the limited nature of activities required for the operational and

Potential impact	Justification
	maintenance of the onshore infrastructure, there is minimal risk that fugitive dust will arise.
Disturbance from noise, vibration, lighting and human presence on ecological features during the operational and maintenance phase.	Operational phase impacts on IEFs (i.e. designated sites for nature conservation, onshore birds, and intertidal birds) as a result of operational activities including; maintenance personnel associated with the onshore infrastructure (i.e. cable route and onshore substation), and maintenance personnel/ crew transfer vessel associated with an operations and maintenance base for the purpose of maintaining offshore infrastructure. These operational phase activities are small-scale and of minimal disturbance during the lifetime of the Project. Furthermore, the operational and maintenance base will be an existing operational port, and will not introduce any new significant levels of disturbance.
Disturbance from noise, vibration, lighting and human presence on breeding birds of the North-west Irish Sea SPA during the construction, and operational and maintenance phase.	No birds of the North-west Irish Sea SPA were found to be breeding within the Dunany bay beach shoreline and within the ZoI of the Project. Disturbance of birds listed as features of the site as a result of the TJB, the onshore cable route construction and the offshore cable corridor construction will not occur. Additionally, ddisturbance of birds listed as features of the site as a result of operational phase activities (i.e. vessels for maintenance of the offshore cable, and routine checks of the onshore cable) will not occur.
Removal and/or fragmentation of important ecological features during the operational and maintenance phase.	Operational impacts on IEFs (i.e. Dunany Point pNHA, depositing/lowland rivers, and onshore birds) due to the removal and/or fragmentation of important ecological features will not occur. Therefore, no pathway of effect has been identified.
Surface water run-off carrying suspended silt or contaminants into local watercourses during the operational and maintenance phase.	Operational impacts on this IEF (i.e. depositing/lowland rivers) are not deemed likely to occur due to the infrequent and small-scale onshore activity expected during the lifetime of the Project.

19.9 Impact assessment methodology

19.9.1 Overview

Specific to the onshore biodiversity impact assessment, the following guidance documents have also been considered:

- Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine, Version 1.2- Updated April 2022 (CIEEM, 2018); and
- Guidelines for Assessment of Ecological Impacts of National Roads Schemes, Revision 2 (NRA, 2009).

For the purposes of this impact assessment process on onshore biodiversity, the CIEEM (2018) guidelines have been used for the basis of the assessment. The process takes cognisance of the EPA (2022) guidelines and incorporates NRA (2009) guidelines for the ecological valuation and geographic context.

19.9.2 Ecological impact assessment process

The impact assessment process, as described by CIEEM (2018), involved:

- Identifying and characterising impacts and their effects;
- Incorporating measures to avoid and mitigate negative impacts and effects;
- Assessing the significance of any residual effects after mitigation;
- Identifying appropriate compensation measures to offset significant residual effects; and
- Identifying opportunities for ecological enhancement.

The assessment comprises the review of the baseline data gathered and the identification of IEFs with features valued on the basis of available information/guidance and using professional ecological judgement.

19.9.3 Impact assessment criteria

Impact on IEFs are characterised with the following qualitative terms, as relevant (CIEEM, 2018):

- **Positive or Negative (adverse)**. Positive and negative (adverse) impacts and effects were determined according to whether the change is in accordance with nature conservation objectives and policy;

– **Positive –** a change that improves the quality of the environment (e.g. by increasing species diversity, extending habitat or improving water quality). This may also include halting or slowing an existing decline in the quality of the environment.

– **Negative (adverse) –** a change which reduces the quality of the environment (e.g. destruction of habitat, removal of foraging habitat, habitat fragmentation, pollution).

- **Extent**. The extent is the spatial or geographical area over which the impact/effect may occur under a suitably representative range of conditions (e.g. noise transmission under water);

- **Magnitude**. Magnitude refers to size, amount, intensity and volume. It was quantified if possible and expressed in absolute or relative terms (e.g. the amount of habitat lost, percentage change to habitat area, percentage decline in a species population);

- **Duration**. Duration was defined in relation to ecological characteristics (such as the lifecycle of a species) as well as human timeframes. For example, five years, which might seem short-term in the human context or that of other long-lived species, would span at least five generations of some invertebrate species;

- **Frequency and Timing**. The number of times an activity occurs will influence the resulting effect. For example, a single person walking a dog will have very limited impact on nearby waders using wetland habitat, but numerous walkers will subject the waders to frequent disturbance and could affect feeding success, leading to displacement of the birds and knock-on effects on their ability to survive. The timing of an activity or change may result in an impact if it coincides with critical life-stages or seasons (e.g. bird nesting season);

- **Reversibility**. An irreversible effect is one from which recovery is not possible within a reasonable timescale or there is no reasonable chance of action being taken to reverse it. A reversible effect is one from which spontaneous recovery is possible or which may be counteracted by mitigation.

There may be any number of possible impacts on IEFs arising from a project. However, it is only necessary to describe in detail the impacts that are likely to be significant. Impacts that are either unlikely to occur, or if they did occur are unlikely to be significant, are scoped out. If in doubt, the precautionary principle is applied, and the potential impact will be assessed.

When assessing the significance of an effect and for the purposes of this assessment, the significance of an effect is simply any effect that is sufficiently important to require assessment and reporting so that the decision maker is adequately informed of the environmental consequences of permitting a project. For the purposes of ecological impact assessment, a “significant effect” is defined as an effect that either supports or undermines the biodiversity conservation for the IEF. These significant effects are qualified with reference to an appropriate geographical scale.

The approach to determining significance does not utilise a matrix of degrees of impact significance (such as EPA (2022)), but instead follows the industry standard for ecological impact significance (CIEEM, 2018) where impacts/effects are determined to be ‘significant’ or ‘not significant.’

19.9.4 Designated sites

Where European sites (i.e. Special Areas of Conservation and Special Protection Area, as part of the Natura 2000 network) are considered, this chapter details the assessments made on the interest features (i.e. Qualifying Interests and Special Conservation Interests) as described in this section. The assessment of European sites has been carried out within the NIS, as part of the Appropriate Assessment for the Project (RPS, 2020). The NIS has been prepared with cognisance of the guidance on the preparation of Environmental Impact Statements (EIS) and NIS for offshore renewable energy projects (Department of Communications, Climate Action and Environment (DCCAE), 2017).

With respect to internationally designated sites (SAC, cSAC, SPA, pSPA, cSPA, RAMSAR sites, and OSPAR Marine Protected Areas) and nationally designated sites (e.g. NHA, pNHA, National Park, Nature Reserves, Wildfowl Sanctuaries), where nationally designated sites fall within the boundaries of an internationally designated sites and where ecological interest features of the international site are also interest features of the nationally designated sites, only the international site has been taken forward for assessment. This is because potential effects on the integrity and conservation status of the nationally designated site are assumed to be inherent within the assessment of the internationally designated site. However, where a nationally designated site falls outside the boundaries of an international site, but within the Onshore Biodiversity Study Area, an assessment of the impacts on the overall site is made in this chapter using the EIA methodology.

19.10 Assessment of significance

The potential impacts arising from the construction, operational and maintenance and decommissioning phases of the Project are listed in Table 19-11, along with the project design parameters against which each impact has been assessed.

A description of the potential effect on onshore biodiversity receptors caused by each identified impact is given below.

19.10.1 Disturbance from noise, vibration, lighting and human presence

Construction and decommissioning phase

Scoping of impacts

During construction, a potential effect resulting from the impact caused by disturbance from noise, vibration, lighting and human presence has been assessed. The construction impact from disturbance has the potential to affect the IEFs - designated sites for nature conservation, onshore birds, and intertidal birds. The assessment of impact on these IEFs during the decommissioning phase is deemed to be similar but less than those anticipated to that of the construction phase and is not described separately.

Assessment of effects

The construction impact of disturbance from noise, vibration, lighting and human presence has the potential to affect the IEF designated sites for nature conservation: North-west Irish Sea SPA, Dundalk Bay SPA, Dundalk Bay RAMSAR, Dundalk Bay MPA, and Lurgan Green Wildfowl Sanctuary. In relation to Dundalk bay, as geographic extents of these sites are overlapping and the interest features of these sites are predominately migratory wintering birds, the disturbance effects on all sites are assessed together. The construction impact of disturbance to SCI birds of the North-west Irish Sea SPA, and migratory birds of Dunany Point pNHA are assessed separately below.

Disturbance to these overlapping sites (Dundalk Bay SPA, Dundalk Bay RAMSAR, Dundalk Bay MPA, and Lurgan Green Wildfowl Sanctuary) during construction may result from noise, vibration, lighting and human presence indirectly affecting wintering and migratory birds at Dunany Bay beach and Dunany Point within the foraging range of these sites, which are connected indirectly via spatial pathway to the IEFs. Disturbance of birds listed as features of the sites may result during the onshore cable route and TJB construction, and the offshore cable construction where it occurs between the LWM and HWM within the intertidal area. The assessment has considered that the potential extent of the effect could extend up to approximately 300 m from the landfall location. This extent has been based on a 'rule of thumb' as set out in Cutts *et al.* (2013) in the waterbird disturbance mitigation toolkit. This extent also has consideration for the duration of effect. The magnitude of the effect is likely to be localised disturbance of foraging and resting intertidal and migratory birds, including those described as features for the sites. The duration of the effect will not extend further than the construction timeframe associated with works and is considered to be short-term. The timing of the construction works may influence the magnitude (i.e. works during the wintering migratory bird season). This effect is considered to be reversible after construction works are completed. Due to the magnitude and short-term nature of the works, and the incorporation of measures included in the Project (see section 19.8.2) , the effect of disturbance of during the construction phase of the Project is predicted to be **not significant**.

The construction impact of disturbance from noise, vibration, lighting and human presence has the potential to affect the North-west Irish Sea SPA and Dunany Point pNHA. Disturbance to this site during construction may result from noise, vibration, lighting and human presence directly affecting the wintering and migratory

birds of the North-west Irish Sea SPA and Dunany Point pNHA within the intertidal area, which are connected directly via spatial pathway to the IEF. Disturbance of birds listed as features of the site may result during the onshore cable route and TJB construction and the offshore cable construction where it occurs between the LWM and HWM within the intertidal area. The assessment has considered that the potential extent of the effect is the North-west Irish Sea SPA within 300 m of the landfall location (as described above). The magnitude of the effect is likely to be localised disturbance of foraging and resting intertidal and migratory birds, including those described in the baseline and those identified as features for the site. The duration of the effect will not extend further than the construction timeframe associated with works and is considered to be short-term. The timing of the construction works may influence the magnitude (i.e. works during the breeding bird season). This effect is considered to be reversible after construction works are completed. Due to the magnitude and short-term nature of the works, and the incorporation of measures included in the Project (see section 19.8.2), the effect of disturbance of during the construction phase of the Project is predicted to be **not significant**.

The construction impact of disturbance from noise, vibration, lighting and human presence has the potential to affect commuting, foraging and breeding onshore birds. Disturbance of birds may result from noise, vibration, lighting and human presence during the onshore cable route, substation, and TJB construction. The extent of the effect is the entire extent of the onshore infrastructure. The magnitude of the effect is likely to be localised disturbance of suitable habitat for commuting, foraging, and breeding birds, including those described in the baseline. The duration of the effect will not extend further than the construction timeframe associated with works and is considered to be short-term. The timing of the construction works may influence the magnitude (i.e. works during the bird breeding season). This effect is considered to be reversible after construction works are completed. Due to the magnitude and short-term nature of the works, and the incorporation of measures included in the Project (see section 19.8.2), the effect of disturbance of habitats during the construction phase of the Project is predicted to be **not significant**.

The construction impact of disturbance from noise, vibration, lighting and human presence has the potential to affect foraging and resting intertidal and migratory birds. Disturbance of birds may result from noise, vibration, lighting and human presence during the TJB construction. The assessment has considered that the potential extent of the effect is the Dunany Point shoreline within 300 m of the landfall location. The magnitude of the effect is likely to be localised disturbance of foraging and resting intertidal and migratory birds, including those described in the baseline. The duration of the effect will not extend further than the construction timeframe associated with works and is considered to be short-term. The timing of the construction works may influence the magnitude (i.e. works during the wintering migratory bird season). This effect is considered to be reversible after construction works are completed. Due to the magnitude and short-term nature of the works, and the incorporation of measures included in the Project, the effect of disturbance of habitats during the construction phase of the Project is predicted to be **not significant**.

Operational and maintenance phase

Scoping of impacts

During operation, a potential effect resulting from the impact caused by disturbance from noise, vibration, lighting and human presence has been assessed. The construction impact from disturbance has the potential to affect the IEFs - intertidal birds. The assessment of impact on these IEFs during the construction and decommissioning phase is deemed to be similar but less than those anticipated to that of the construction phase.

Assessment of effects

The operational impact of disturbance from noise, vibration, lighting and human presence has the potential to affect foraging and resting intertidal and migratory birds. Disturbance of birds may result from noise, vibration, lighting and human presence during the cable repair and replacement activities. The assessment has considered that the potential extent of the effect is the Dunany Bay beach shoreline within 300 m of cable repair and replacement activities. The magnitude of the effect is likely to be localised disturbance of foraging and resting intertidal and migratory birds, including those described in the baseline. The duration of the effect will not extend further than the operational timeframe associated with works and is considered to be short-term. The timing of the operational works may influence the magnitude (i.e. works during the wintering migratory bird season). This effect is considered to be reversible after operational works are completed. Due to the magnitude and short-term nature of the works, and the incorporation of measures

included in the Project, the effect of disturbance of intertidal birds during the operational phase of the Project is predicted to be **not significant**.

19.10.2 Removal and/or fragmentation of important ecological features

Construction and decommissioning phase

Scoping of impacts

During construction, a potential effect resulting from the impact caused by removal and/or fragmentation has been assessed. The construction impact from removal and/or fragmentation has potential to effect Dunany Point pNHA, depositing/lowland rivers, and onshore birds. The assessment of impact on these IEFs during the decommissioning phase is deemed to be similar but less than those anticipated to that of the construction phase and is not described separately.

Assessment of effects

The construction impact of removal and/or fragmentation of habitats and ecological features has the potential to affect the Dunany Point pNHA. Habitat fragmentation/removal during construction may result from trenching associated with the TJB option 2, due to the onshore routing of the offshore cable through the pNHA, which is connected via direct physical pathways to the Project. The extent of the effect is approx. 234 m^2 of scrub and vegetated sedimentary sea cliff for trenching, within Dunany Point pNHA. For TJB option 1, no habitat removal within the pNHA is required. The magnitude of the effect is likely to be the temporary loss of vegetation and habitat fragmentation within this extent. The duration of the effect will extend past the construction timeframe associated with TJB as the vegetation will take c. 2 years to reinstate. Therefore, the duration of the impact is considered to be medium-term. The timing of the construction works may influence the magnitude (i.e. seasonal vegetation growth after works occur). The effect is considered to be reversible after construction works are completed. Due to the magnitude and short-term nature of the works, and the incorporation of measures included in the Project (see section 19.8.2), the effect of removal and /or fragmentation during the construction phase of the Project is predicted to be **not significant.**

The construction impact of removal and/or fragmentation of habitats and ecological features has the potential to affect the depositing/lowland rivers crossed by or adjoining the Project. Removal and/or fragmentation of habitats may result from temporary fragmentation of relevant watercourses (River Dee (crossed twice), Newhall Stream, Salterstown Stream, Port Stream (crossed twice) and Ardballan Stream), which are connected via direct physical pathways to the Project. The extent of the effect is the crossings points of these rivers and the upstream and downstream catchments of the waterbodies. The magnitude of the effect is likely to be temporary and localised habitat fragmentation but is unmeasurable; therefore, the precautionary principle has been applied. The duration of the effect will be linked with the construction timeframe associated with watercourse crossing works and predicted to take approximately three months for HDD crossings of the River Dee (in Richardstown and Drumcar) and approximately four weeks for HDD crossings of the Port Stream, Togher and Salterstown. Open trench crossing are predicted to take less than four weeks to complete. Therefore, the duration of the impact is considered to be short-term. The timing of the construction works may influence the magnitude (i.e. works during high rainfall events). This effect is considered to be reversible after construction works are completed. Due to the likely localised magnitude and short-term nature of the works, and the incorporation of measures included in the Project (see section 19.8.2), the effect of removal and/or fragmentation during the construction phase of the Project is predicted to be **not significant.**

The construction impact of removal and/or fragmentation of habitats and ecological features has the potential to affect commuting, foraging and breeding onshore birds. Removal and/or fragmentation of habitats may result from fragmentation of relevant commuting, foraging, and breeding habitat. The extent of the effect is c.2.2 km of hedgerow associated with the joint bays and passing bays and 234 m^2 of scrub and vegetation sedimentary sea cliff associated with the TJB option 2. The magnitude of the effect is likely to be localised habitat loss and fragmentation of suitable habitat for commuting, foraging and breeding birds, including those described in the baseline. The duration of the effect will extend past the construction timeframe associated with TJB as the vegetation will take c. 5-10 years to reinstate to an equivalent usable structure. Therefore, the duration of the impact is considered to be medium-term. The timing of the construction works may influence the magnitude (i.e. works during the bird breeding season). This effect is considered to be reversible after construction works are completed. Due to the magnitude and medium-term nature of the

works, and the incorporation of measures included in the Project (see section 19.8.2) the effect of removal and/or fragmentation of habitats during the construction phase of the Project is predicted to be **not significant**.

19.10.3 Surface water run-off carrying suspended silt or contaminants into local watercourses

Construction and decommissioning phase

Scoping of impacts

During construction, a potential effect resulting from the impact caused by surface water run-off carrying suspended silt or contaminants into local watercourses. The construction impact from surface water run-off has potential to effect depositing/lowland rivers. The assessment of impact on these IEFs during the decommissioning phase is deemed to be similar but less than those anticipated to that of the construction phase and is not described separately.

Assessment of effects

The construction impact of surface water run-off carrying suspended silt or contaminants into local watercourses has the potential to affect the depositing/lowland rivers crossed by or adjoining the Project. Water pollution during construction may result from surface water run-off carrying suspended silt or contaminants into local watercourses (Rock Stream, River Dee (crossed twice), Newhall Stream, Salterstown Stream, Port Stream (crossed twice), Ardballan Stream, and Broadlough Stream), which are connected via direct physical pathways to the Project. The extent of the effect is the crossings points of these rivers and the downstream catchments of the waterbodies. The magnitude of the effect is likely to be localised water pollution but is unmeasurable; therefore, the precautionary principle has been applied. The duration of the effect will be linked with the construction timeframe associated with watercourse crossing works and predicted to be three months for HDD crossings at the River Dee (in Richardstown and Drumcar) and four weeks for HDD crossings of the Port Stream, Togher and Salterstown. Open trench crossing are predicted to take less than four weeks to complete. Therefore, the duration of the impact is considered to be short-term. The timing of the construction works may influence the magnitude (i.e. works during high rainfall events). This effect is considered to be reversible after construction works are completed. Due to the likely localised magnitude and short-term nature of the works, and the incorporation of the surface water pollution measures included in the Project (see section 19.8.2), the effect of water pollution during the construction phase of the Project is predicted to be **not significant.**

19.10.4 Mitigation and residual effects

The assessment of impacts has concluded that there are no significant effects with the implementation of the measure included in the project. Therefore, no measures over those outlined in section 19.8.2 are required.

Residual effects

With the implementation of the measures included in the project (section 19.8.2), the residual effects are as outlined in the assessment provided in section 19.10.

19.10.5 Future monitoring

Table 19-17 below outlines the proposed monitoring commitments for Onshore Biodiversity. This monitoring commitment is required to ensure the re-establishment of removed hedgerow during the construction phase of the Project and post-construction.

Table 19-17: Monitoring commitments.

Environmental effect	Monitoring commitment
Removal and/or fragmentation in relation to hedgerow removal during the construction phase of the Project.	All replacement treelines/ hedgerows will be maintained for eight years, with seasonal checks by a suitably qualified arboriculturalist/ecologist for the first two years and yearly checks for the subsequent six years. Depending on the progression of re-establishment, yearly checks may extend beyond this six year period. This will be determined by the ecologist. A rate of 90% living individuals after four years and 80% living individuals at eight years will be retained, with replacement planting as required. Any gaps greater than 1 m will be replanted with native tree/shrub species of similar size to those adjacent.

19.10.6 Enhancement measures

Guidelines for ecological impact assessment in the UK and Ireland (CIEEM, 2018) identifies biodiversity enhancement as a key principle underpinning the process. Enhancement measures "*seek to provide net benefits for biodiversity over and above requirements for avoidance, mitigation or compensation*." (CIEEM, 2008). The following opportunities for the implementation of biodiversity enhancement have been identified:

- Native wildflower planting at the onshore substation site. Unmade ground within the onshore substation site (i.e. areas without hardstanding, which will not be returned to agricultural use) should be planted with suitable native wildflower seed mix, sourced from the island of Ireland. This wildflower area should receive reduced mowing management (e.g. early spring and late summer cuts only), with all arisings removed from the site; and
- Bat box and bird box installation. Based on the known receiving environment, suitable specie-specific bat and bird boxes should be installed. These should be installed at suitable locations, including the onshore substation site.

19.11 Cumulative Impact Assessment (CIA)

19.11.1 Methodology

The Cumulative Impact Assessment (CIA) takes into account the impact associated with the Project together with other projects. The projects selected as relevant to the CIA presented within this chapter are based upon the results of a screening exercise (see volume 2A, appendix 3-1: CIA Screening Annex). Each project has been considered on a case-by-case basis for screening in or out of this chapter's assessment based upon data confidence, effect-receptor pathways and the spatial/temporal scales involved.

The approach to CIA examines the effects of the Project alongside the following projects if they fall within the Zone of Influence (ZoI) for onshore biodiversity (see section 19.3):

- Other projects with consent but not yet constructed/construction not completed;
- Other projects in a consent application process but not yet determined (including planning applications, foreshore lease/licence applications, Dumping at Sea Permit applications);
- Other projects currently operational that were not operational when baseline data were collected, and/or those that are operational but have an ongoing impact; and
- Projects, which satisfy the definition of 'relevant maritime usage' under the Maritime Area Planning Act (2021) (i.e. wind farm projects designated as 'Relevant Projects' or 'Phase 1 Projects') including Arklow Bank II, Bray Bank and Kish Bank; North Irish Sea Array, Codling Wind Park (I and II).

No projects were screened in for the CIA for onshore biodiversity.

19.12 Transboundary effects

The potential effects of the Project on onshore biodiversity are considered to be of a local extent and no effect from the Project on onshore biodiversity has been identified on a regional basis. Therefore, there is no potential for significant transboundary effects with regard to onshore biodiversity from the Project upon the interests of the UK or other EEA States.

19.13 Interactions

A description of the likely inter-related effects arising from the Project on onshore biodiversity is provided in volume 2C, chapter 32: Interactions.

19.14 Summary of impacts, mitigation measures and residual effects

Table 19-18 presents a summary of the potential impacts, mitigation measures and residual effects in respect to onshore biodiversity. The impacts assessed include:

- Disturbance from noise, vibration, lighting and human presence;
- Removal and/or fragmentation of important ecological features; and
- Surface water run-off carrying suspended silt or contaminants into local watercourses.

The assessment of effects incorporates the measures included in the Project (see section 19.8.2). Potential effects as a result of disturbance were assessed for designated sites for nature conservation; commuting, foraging and breeding onshore birds; and foraging and resting intertidal and migratory birds. The effect was assessed to be localised, short-term, reversible, and not significant. Potential effects as a result of the removal and/or fragmentation of important ecological features was assessed for Dunany Point pNHA; depositing/lowland rivers; and onshore birds. The effect was assessed to be temporary, localised, medium-term, reversible, and not significant. Potential effect as a result of surface water run-off carrying suspended silt or contaminants into local watercourses was assessed for depositing/lowland rivers crossed by or adjoining the Project. The effect was assessed to be temporary, localised, short-term, reversible, and not significant.

No significant or residual effects have been identified, and no mitigation is proposed over those measures included in the Project. Overall, no projects that spatially or temporally overlap with the Project were considered to have a likely significant in-combination effect on onshore biodiversity.

No potential transboundary impacts have been identified in regard to effects of the Project.

Table 19-18: Summary of potential environment effects, mitigation and monitoring.

Description of impact	Phase[1]			Measures included in the Project	Extent	Magnitude	Duration	Timing/Frequency	Reversibility	Signficance of effect	Additional measures	Residual effect	Proposed monitoring
	C	O	D										
Disturbance from noise, vibration, lighting and human presence on ecological features	✓	✓	✓	Timing of the works at the landfall to avoid the peak season for intertidal birds (October to April, inclusive). Timing of vegetation removal works to avoid the bird nesting season (March to August, inclusive). Avoidance of light spill during night-time hours, and badger buffer zones between 30 m and 150 m depending on works type and season.	Within 300 m of the landfall location; entire extent of the onshore infrastructure.	Likely to be localised disturbance of foraging and resting intertidal and migratory birds; localised disturbance of suitable habitat for commuting, foraging, and breeding birds.	Not extend further than the construction timeframe.	Timing of the construction/ operational works may influence the magnitude.	Reversible after construction/operational works are completed.	Not significant	None	None	None
Removal and/or fragmentation of important ecological features	✓	×	×	Timing of the works to avoid the bird nesting season (March to August, inclusive), replacement of all removed hedgerows, retention of trees with moderate suitability to roosting bats, and soft felling of trees with low suitability for roosting bats.	Approx. 234 m^2 of scrub and vegetated sedimentary sea cliff for trenching associated with TJB option 2, within Dunany Point pNHA; crossings points of these rivers and the upstream and downstream catchments of the waterbodies; c. 2.2 km of hedgerow associated with the joint bays and passing bays and 234 m^2 of scrub and vegetation sedimentary sea cliff associated with the TJB option 2.	Temporary loss of vegetation and habitat fragmentation within those extents; likely to be temporary and localised habitat fragmentation but is unmeasurable; localised habitat loss and fragmentation of suitable habitat for commuting, foraging and breeding birds.	Will extend past the construction timeframe associated with TJB as the vegetation will take c. 2 years to reinstate; Not extend further than the construction timeframe; extend past the construction timeframe associated with TJB as the vegetation will take c. 5-10 years to reinstate to an equivalent usable structure.	Timing of the construction works may influence the magnitude.	Reversible after construction works are completed.	Not significant	None	None	All replacement hedgerows will be maintained for eight years, with seasonal checks by a suitably qualified arboriculturalist/ecologist for the first two years and yearly checks for the subsequent six years. A rate of 90% living individuals after 4 years and 80% living individuals after 8 years will be retained, with replacement planting as required. Any gaps greater than 1 m will be replanted with native tree/shrub species of similar size to those adjacent. Depending on the progression of re-establishment, yearly checks may extend beyond this six year period. This will be determined by the ecologist.
Surface water run-off carrying suspended silt or contaminants into local watercourses	✓	×	✓	Timing of the instream works to avoid the IFI recommended 'closed season' (October to May, inclusive), and protection of watercourses from siltation, hydrocarbons and other pollutants using suitably material storage, procedures, buffer zones, and sediments control measures.	Crossings points of these rivers and the downstream catchments of the waterbodies.	Likely to be localised water pollution but is unmeasurable.	Linked with the construction timeframe associated with watercourse crossing works	Timing of the construction works may influence the magnitude.	Reversible after construction works are completed.	Not significant	None	None	None

1 C= Construction, O = Operation, D = Decommissioning

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